Special mention:

“The Business Science Institute and the iaelyon School of Management do not approve or disapprove of the opinions expressed in this thesis. These opinions are to be considered as those of the author".

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Abstract in English

Services play an essential role in today's economy. Many organizations are transforming their operations to be more service-oriented. While the products that competitors offer are similar, organizations are using a variety of services to differentiate themselves from competitors. Technology, communication, mobility and connectivity play an important role in the way that organizations run their business, reach customers and build their services. At the same time, technology is evolving at an ever-increasing rate. Hence, organizations struggle to keep up with this technological evolution as well as their transformation towards a service-oriented organization. Despite that there are several IT Service Management references on the market, organizations find difficulties to implement and measure them. The aim of this research is to analyze these difficulties and propose specific tools, such as a new Service Orientation maturity model, that would assist organizations in their transformation process. The focalization of this research is the Service Orientation maturity of IT service providers of financial institutions in Luxembourg. The reason for this specific choice is that the financial sector of Luxembourg plays an important role in the country's economy. Additionally, there is an important dependency on IT services to support the financial institutions' operations and services.

The global research approach is based on a preliminary analysis of the context, academic literature and exploration of the initial field observations. The aim of this analysis is to understand the issues that the studied organizations are facing as they implement and measure Service Orientation practices. A gap in the academic literature was found related to the specific context of the research, therefore an exploratory research was carried out to better understand the specific studied population. For this exploratory research phase, I studied 15 organizations in order to have a better understanding of their view on Service Orientation and the importance of Service Orientation within each company. Moreover, I explored the different references that they use as guidance for their IT Service Management practices, the difficulties that they face and the way that they measure the maturity of their IT Service Management practices.

The results of this exploratory research confirmed the field observations: IT service providers of financial institutions in Luxembourg are committed to a strong Service Orientation but they find it difficult to implement, use and measure their Service Orientation. Most of the studied organizations use ITIL as their main reference. In addition to that, it was confirmed that the existing IT service maturity models are too complex and expensive to use, therefore most organizations are unable to measure their maturity. The exploratory research results justify the research in the measurement of service orientation maturity.

The research details one of the gaps discovered during the exploratory research related to the measurement of the studied organizations' Service Orientation maturity. This analysis shows the need of a new Service Orientation maturity model. This justifies the focalization of the research towards the creation of a new Service Orientation maturity model. The new model (Organizational Service Orientation Maturity Model) intends to help organizations measure their Service Orientation maturity. I applied the new model at 13 organizations to assess their maturity by interviewing 17 IT service managers, 24 IT staff members, 17 customers and 22 users for a total of 80 interviews. After this analysis, a maturity profile of each organization was established and afterwards consolidated into a global profile of the studied sample, representing 10% of the studied population.

The usage of the new model proved to be useful to the studied organizations. It provides a clear structure that is easy to use, cost and time efficient, and reliable. Compared to other models, the new model proposed in this study allows organizations to considerably reduce the time and cost required for a maturity assessment. This allows them to use it at regular intervals to understand their current status, to guide them in their improvement projects, to understand their evolution and to benchmark the organization. In the maturity analysis the new proposed model also includes an internal and an external view of the service provider by integrating users and customers. This research contributes to the Service Science domain in the field of Service Orientation by providing insight into established IT Service Management practices in the studied organizations, the importance of Service Orientation and confronted difficulties. This research also contributes to the Service Orientation area by proposing a valuable maturity model that can help organizations in their Service Orientation implementation process. Also, it provides a clear view of the maturity status of the

actual situation of an organization. Additionally, the research documents the Service Orientation maturity profiles of the studied organizations in the sample as well as a global representative maturity profile for IT service providers of financial institutions in Luxembourg. Lastly, it provides some insight into IT service providers of other areas, facing the same difficulties as the studied body of organizations.

Abstract in French

Les services sont une composante essentielle dans l'économie actuelle. Beaucoup d'organisations transforment leurs opérations pour devenir plus orientées services. Tant que les produits sont similaires entre les différentes organisations, elles utilisent les services comme facteur différenciateur face à la concurrence. La communication, la technologie, la mobilité et la connectivité sont des facteurs qui jouent un rôle important dans la façon que les organisations font des affaires, atteignent leurs clients et préparent leurs services. Mais en même temps, la technologie change à une allure de plus en plus rapide et les organisations ont des problèmes pour se maintenir actualisées avec ces évolutions et leurs transformations vers une organisation orientée services. Malgré le fait qu'il existe plusieurs référentiels de gestion des services des systèmes d'information, les organisations ont des difficultés dans l'implémentation, l'usage et la mesure des pratiques proposées dans ces référentiels. L'objectif de cette recherche est d'analyser ces difficultés et proposer des solutions adaptées pour aider les organisations dans cette transformation, en proposant un nouveau modèle de mesure de la maturité de l'orientation service de l'organisation. La focalisation de la recherche est l'orientation service des fournisseurs de service des systèmes d'information du secteur financier au Luxembourg. La raison de cette focalisation est l'importance que le secteur financier a dans l'économie du pays, ainsi que la haute dépendance des organismes financiers des systèmes d'information de la communication.

L'approche globale de la recherche est basée sur une analyse préliminaire du contexte, de la littérature académique et d'une analyse exploratoire afin d'examiner les observations de terrain. L'analyse permet de clarifier le contexte de la recherche et de comprendre les problématiques confrontées par les organisations étudiées dans l'implémentation, l'usage et la mesure des pratiques de gestion des services des systèmes d'information. Des lacunes dans la littérature académique ont été identifiées et une recherche exploratoire a été entamée pour comprendre plus en détail les problématiques confrontées dans l'échantillon étudié. Pour cette phase exploratoire de la recherche, 15 organisations ont été étudiées pour comprendre leur perception de

la signification de l'orientation services, l'importance accordée à l'orientation services, les référentiels utilisés comme guide pour la mise en œuvre de l'orientation services, les difficultés confrontées lors de la mise en œuvre et la façon dont ils mesurent leur orientation services.

Les résultats de cette phase exploratoire ont confirmé que les fournisseurs de service des systèmes d'information au Luxembourg sont focalisés sur une orientation services qu'ils considèrent essentielle, néanmoins ils sont confrontés à bien des difficultés lors de la mise en œuvre, l'utilisation et la mesure de leur orientation service. La plupart des organisations utilisent ITIL comme principal référentiel de gestion des services. Il a été également confirmé que la plupart des modèles de maturité de la gestion des services sont trop complexes pour pouvoir être mis en œuvre dans l'organisation. C'est pour cette raison que les organisations ne mesurent pas leur maturité d'orientation services.

L'étude préliminaire a permis de constater des lacunes en ce qui concerne la mesure de la maturité de l'orientation services. Cette analyse montre le besoin d'un nouveau modèle de maturité de l'orientation services. Cela justifie la focalisation de la recherche sur la mesure de la maturité. Ainsi, un nouveau modèle de mesure de la maturité est proposé. Ce nouveau modèle, OSOMM (Organiztional Service Orientation Maturity Model - Modèle Organisationnel de Maturité de l'Orientation Services-) propose des solutions pragmatiques pour aider les organisations à mesurer leur maturité de l'orientation services. Le nouveau modèle a été utilisé sur le terrain avec 13 organisations au Luxembourg avec 80 interviews (17 gestionnaires des systèmes d'information, 24 membres des équipes des systèmes d'information, 17 clients et 22 utilisateurs). Un profil de maturité de l'orientation services a été établi pour chaque organisation et une consolidation de l'ensemble de l'échantillon étudié a été réalisée pour établir un profil global de la maturité de l'orientation services de l'échantillon représentant 10% de la population étudiée.

L'utilisation du modèle dans l'échantillon montre son utilité pour les organisations étudiées. Il offre une structure consistante qui est facile à utiliser, est fiable et consomme peu de ressources en temps et en argent. Comparé à d'autres modèles existants, il permet aux organisations une utilisation régulière en réduisant d'une façon importante les dépenses liées à ce type d'analyses. Le modèle permet de com-

prendre le statut du moment de l'organisation en ce qui concerne leur orientation services et leur guide dans leurs projets d'amélioration, leur évolution et leur offre une vue claire comparée à un référentiel établi. Cette recherche contribue substantiellement au domaine de la science des services. Plus spécifiquement dans l'orientation services, en documentant quelques aspects de l'orientation services, et des difficultés. La recherche contribue principalement par la proposition valable d'un modèle de mesure de la maturité de l'orientation services des organisations actualisé avec les dernières pratiques de gestion des services des systèmes d'information. Il permet aux organisations d'avoir une vue claire de leur maturité de l'orientation services en présentant un profil de maturité des organisations étudiées. Egalement elle présente un profil consolidé, comme base de référence, de tous les fournisseurs des services des systèmes d'informations des organismes financiers au Luxembourg étudiés.

Une contribution complémentaire est présentée, comme base comparative, en étudiant quelques fournisseurs de services IT dans d'autres domaines d'activité confrontés à des difficultés similaires aux fournisseurs de service IT des institutions financières au Luxembourg.

Preface

An executive DBA needs to be useful to business administrators and to provide practical guidance to practitioners on the field, to solve confronted issues. My main motivation to work on the specific subject in this thesis is to provide solutions to practitioners, who are confronted to various difficulties, related to the implementation, usage and measurement of their Service Orientation practices. Having worked in different countries around the world, I made the same observations in every organization, independently of the economic region or country. It became evident that organizations needed answers to the reoccurring difficulties in the implementation and usage of Service Orientation practices, despite the myriad references and guides available on the market. I also observed their inability to measure their Service Orientation maturity. As the Service Orientation domain is vast, it is important to focus on a specific population to study. Having worked a significant amount of time in the Luxembourgish region and having collaborated with many organizations in the field of Service Orientation, I decided to investigate this specific population.

The finance industry in Luxembourg is a crucial building block of its economy and it is strongly dependent on IT technology. Hence, my interest in the investigation of the Service Orientation of the IT service providers of financial institutions in Luxembourg. An extensive literature review on service science, service management, ITIL and the existing maturity models and their limitations was done. This literature did not allow to have a clear view of the studied population in relation to their Service Orientation practices and measurement. Therefore, I found it necessary to take on an initial exploratory phase to investigate my observations in more detail and critically relate it to the academic literature I worked with.

The exploratory research focuses on the importance of services in the studied sample, the difficulties that organizations encounter while implementing and using Service Orientation practices and how those organizations measure their Service Orientation maturity. The results of the exploratory research show that organizations tend not to measure their Service Orientation maturity, due to lack of time and because the existing maturity models cover only a partial part of the global Service Orientation domain, which fails to provide a global view. Additionally, the existing models are too

complex to use or not exhaustive enough, thus not providing valid information that would justify its usage. Therefore, from the field observations, the literature analysis and the exploratory research, it became evident that there is a real need for a new updated maturity model, in accordance with the actual Service Orientation practices. The model should be simple to use while also providing enough valuable information to guide organizations in their implementation and improvement initiatives.

The new model considered several service orientation practices, focusing mainly on ITIL, since it is the most used reference worldwide as well as in the specific studied sample. ITIL originated in the late 1980's, and it is now at version 4. This latest version was introduced in the market in 2019 and 2020 and is more complete than the previous ones. The presented maturity model "OSOMM" (Organizational Service Orientation Maturity Model) was developed considering the different ITIL versions (including the most recent version 4) as well as other references like ISO20000, COBIT, CMMI and Serv*Or. Some specific criteria were embedded in the OSOMM development to warrant the usability on the market, the simplicity of usage and the rapidity of execution. After its development, the model was used within a specific sample.

From my personal perspective the realization of this research confronted me with an intense challenge of time constraints, academic rigour and additional research skills that are required in order to accomplish such a project. Nevertheless, despite the difficulties, the interest in this subject with its contribution in the market, greatly appreciated by practitioners in the field, justifies the effort. I hope that, with this research, I could contribute with my droplet of water to the vast academic ocean, help organizations with the measurement of their Service Orientation maturity and guide them in their Service Orientation improvement initiatives.

Global Research Structure

The thesis is composed of an introduction, the body of the research and a discussion section. The introduction section briefly explains the importance of services in today's economy, the field observations, the research approach and a presentation of the chapters of this thesis. The body of the research presents the global context of the research, the academic literature review and the used methodology. Subsequently, it documents an exploratory research and analyses the results of the exploratory research. These results justify the need to develop a new Service Orientation maturity model, therefore a presentation of the methodology used for the development of the OSOMM (Organizational Service Orientation Maturity Model) with its quality criteria is presented. It also details how the model is used in a sample population of IT service providers of financial institutions in Luxembourg using ITIL. Additionally, a brief analysis of the results and the usability of the model is presented.

The final discussion presents the research conclusions, the managerial implications of the research, some of the observed limitations of the research and recommendations for further research.

The schema below is an overview of the sections and chapters of the thesis following the above presented flow and logic.

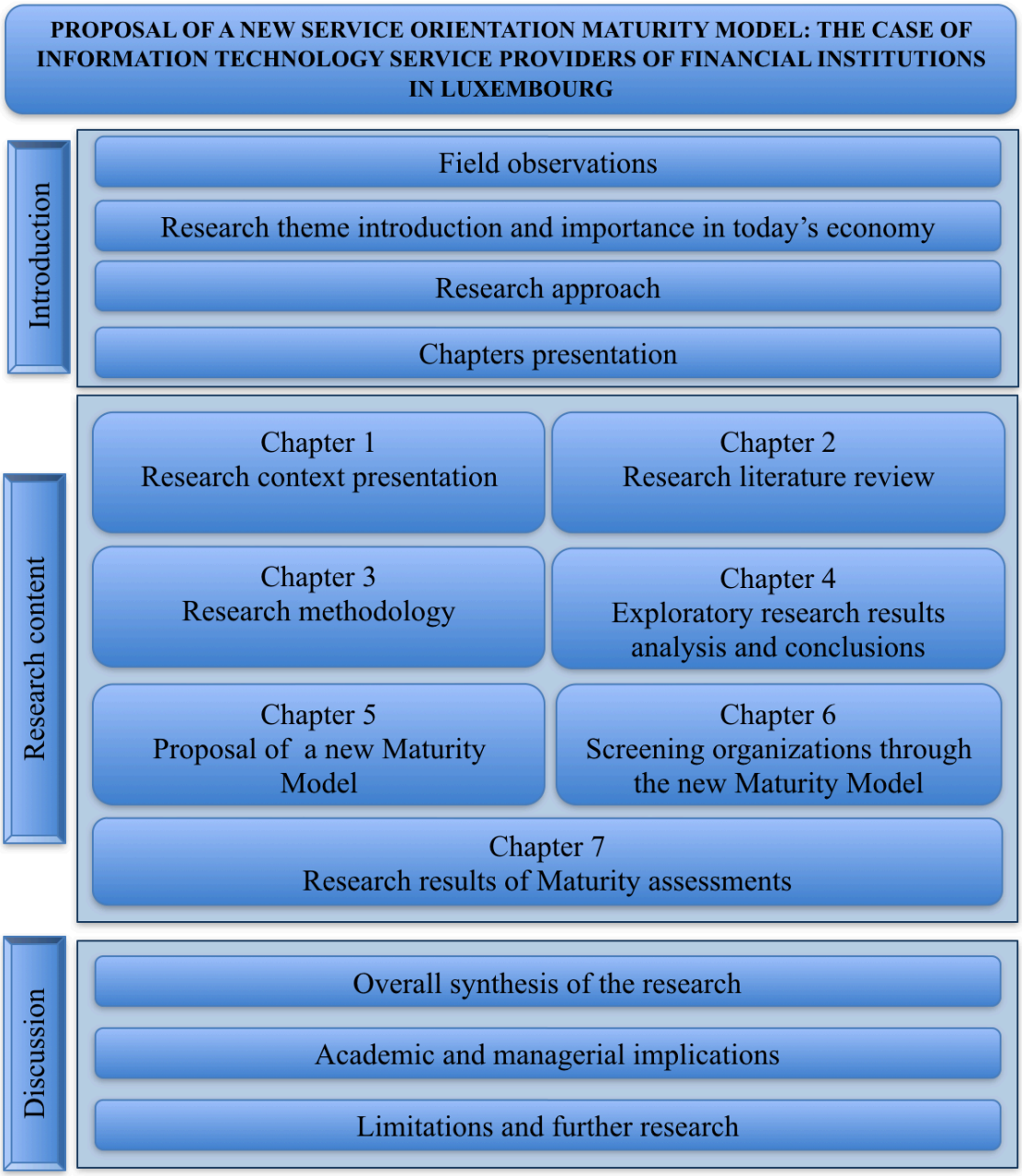

FIGURE 1 : GLOBAL RESEARCH STRUCTURE
Source : Martin Cross

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Introduction

Working in the service management field, I observed several difficulties that organizations face for the implementation and measurement of service management practices. I introduce the research theme by focusing on the importance of services in today's economy. I will then present the research approach and the global structure of the thesis with a brief presentation of each chapter.

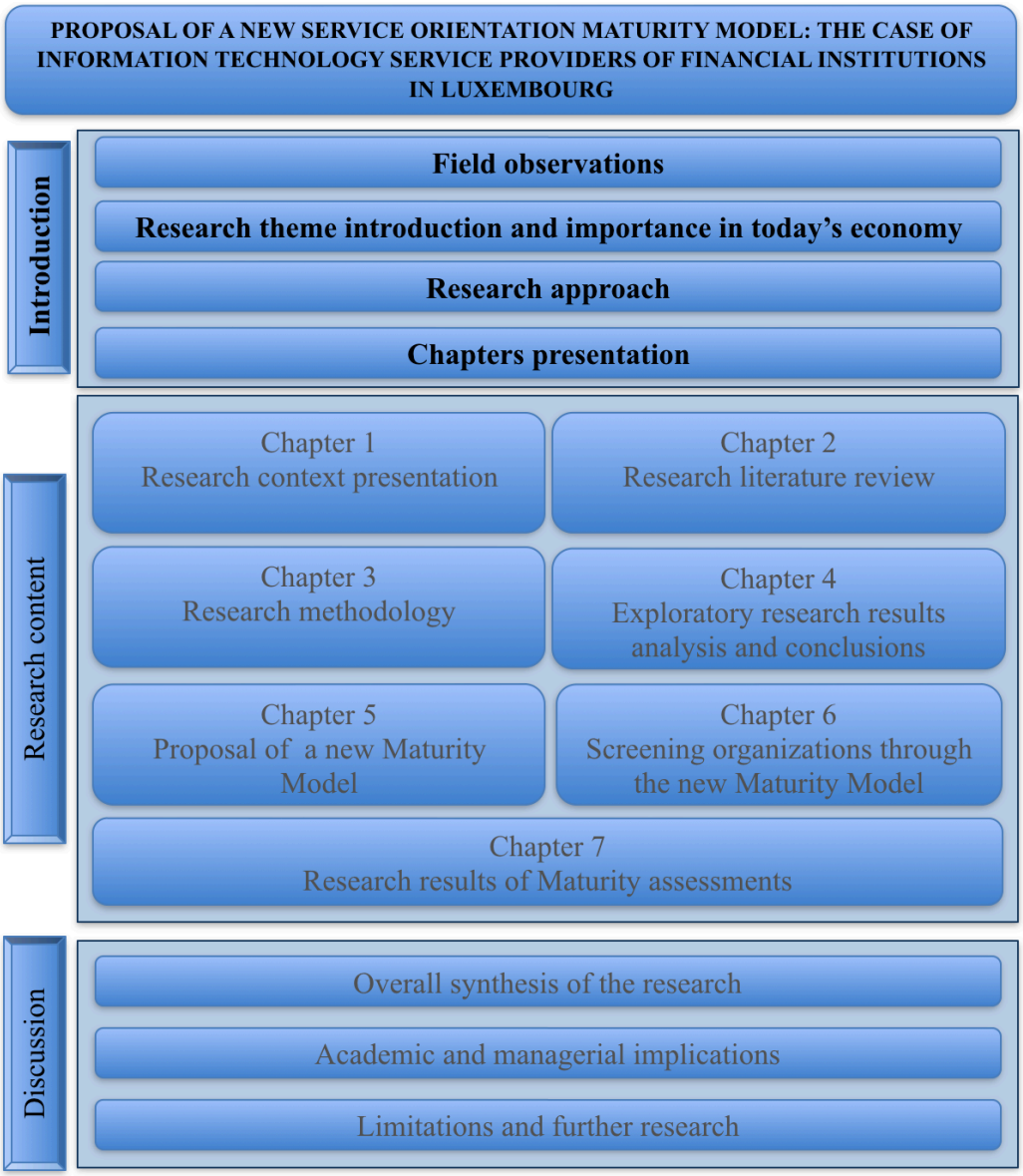


Figure 2 : Introduction content
Source : Martin Cross

IT Service Providers all around the world are facing difficulties in the implementation, usage and measurement of Service Management practices, despite the numerous Service Orientation references that are available on the market. As a consultant, I have observed these difficulties in most organizations I worked with around the world. Luxembourg and the IT service providers of financial institutions, which are an essential component of the country's economy, are no exception. In such economic environment, it is essential to become a mature service-oriented organization, and measuring this capability is extremely important. Therefore a strong Service Orientation maturity model is required.

The main objective of this research is to propose a new maturity model that is reliable, yet also easy to use, inexpensive and less time consuming than the existing service maturity models. The model will be used at IT service providers of financial institutions in Luxembourg.

I 1: Field observations

Services are an important aspect of today's economy and technology facilitates the production and control of services. IT service provision strongly depends on the service provider's capability to create and deliver high quality services that will help customers to achieve their own objectives. Therefore, it is extremely important that organizations become service-oriented and simultaneously learn how to manage their services.

While working in the Service Management domain for a number of years (initially managing Information Systems departments and subsequently managing a business specialized in helping organizations with their implementation of Service Management practices), I observed global issues that organizations face while trying to implement and use Service Orientation practices. At the beginning of the 1980's there was few documentation that could help in the implementation and the management of IT Services. This instigated me to create a working group to brainstorm ideas on global management for Information Systems departments and more specifically on the management of services. For more than 20 years I have been involved in the development of Service Management practices and thereby contributed to the creation

of different standards, methodologies and frameworks like ITIL, ISO20000, ISO15504,VeriSM, SIAM, SSMF, SPMF within others.

Fortunately, nowadays there are many references related to Services and Service Management practices. For more than 10 years now, I worked and observed service-oriented companies in the 5 continents. Nevertheless, despite the existing documented practices, during the interventions I have observed a number of dysfunctions related to the management of services in many companies around the world. From these field observations I formulate an initial statement:

- IT Service Providers around the world are facing difficulties in their implementation and usage of Service Management practices despite the numerous frameworks, standards and methods available on the market.

This statement leads directly to the following question:

- Why do IT Service Providers, despite the numerous existing Service Management guides, face implementation and usage difficulties?

To answer this question, it is required to clarify what is a service and a Service Provider. Also it is required to clarify which are the existing Service Management guides, and lastly, which are the difficulties that they are facing. As a researcher, the departure point is an extensive academic literature review to acquire academic knowledge on the subject and subsequently identify a gap to treat. A service provider is an organization that creates manage and provide services. Nowadays, there are many Service Orientation references to guide service providers in their implementation journey, like ITIL, VeriSM, Cobit, CMMI, SIAM, ISO20000 and many others. Often companies get lost with this profusion of references and struggle to find the correct one that would be suitable for their organization, while simultaneously questioning the validity of these references and evaluating which one best fits their organization. Empirical evidence suggests that the majority of IT organizations are using ITIL as their main guide in the implementation of Service Management practices.

Finally, organizations around the world are subject to local influences such as social behaviors, culture, availability of technology, different political concerns and different economic environments. These specificities lead to different confronted issues, but some factors are constant and the empiric evidence from the field suggests that al-

most all companies, regardless of their differences, are facing similar difficulties. The main observed difficulties are the following:

- Lack resources (financial, human and time).
- Lack of sponsorship.
- Constant pressure to reduce costs.
- Constant technological evolution.
- Difficulties communicating with customers.
- Lack of collaboration between teams leading to isolated silo work.

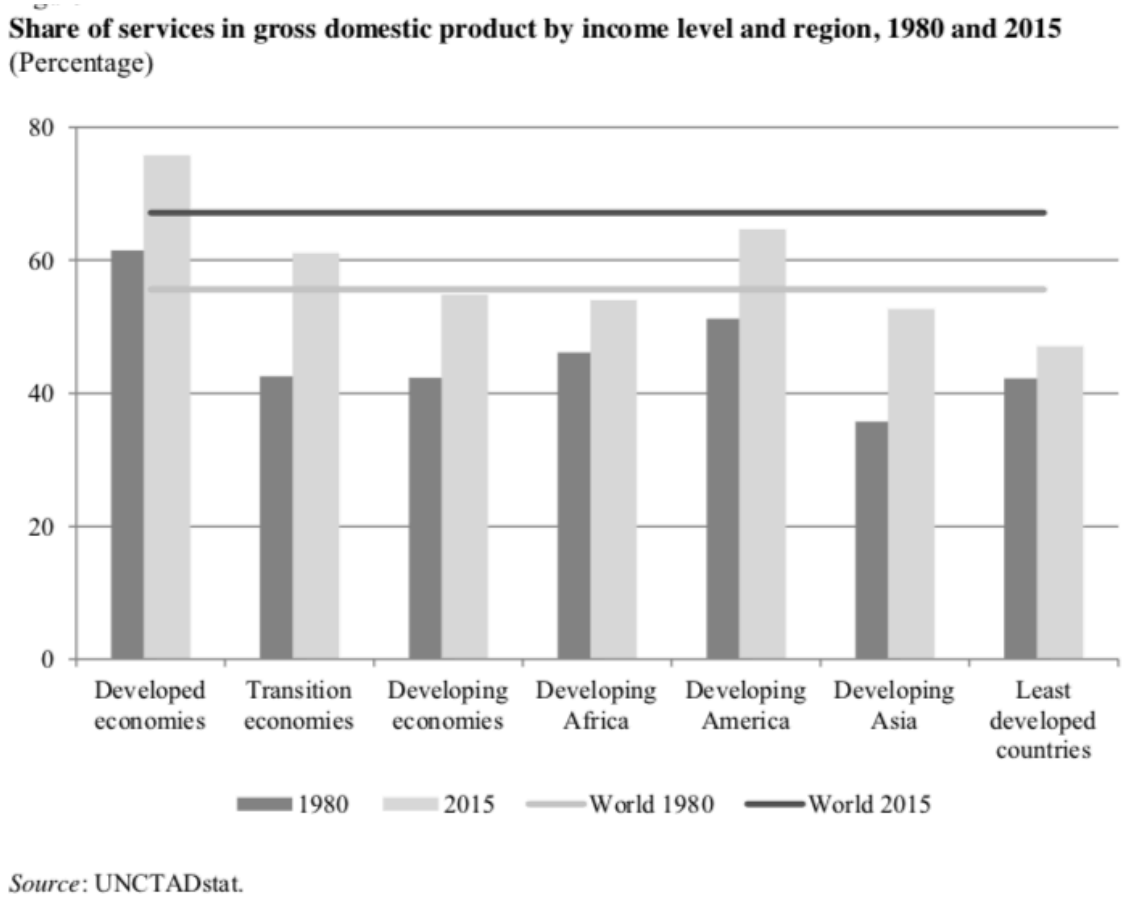
The list is not exhaustive and these observations are personal. It is therefore convenient to investigate academically their accuracy. To do so, it is important to target a more specific population and it is useful to briefly discuss the importance of services in today's economy, to clarify the potential impact of a research in this domain.

I 2: The importance of services in today's economy

Services are extremely important in today's economy and are changing the way we work[1]. More and more organizations are shifting from a product-based economy to a service-oriented economy[2]. Manufacturers have acknowledged the necessity of such a transformation and they are seeking ways to differentiate their products through services. The progress of this transformation has increased in the recent years, as more organizations are becoming more service-oriented. In their service economy report[3] the OECD states that services are greatly transforming OECD economies: *"Manufacturing dropped to less than 20% of GDP and the role of services is rising to more than 70% of the GDP in some OECD countries"* (OECD 2000). Additionally, the

[1] World development report 2019, "*The changing nature of work*", World Bank Group, International bank for reconstruction and development, 2019, Washington DC, USA.
[2] Kim Hyun-Jeong, 2006, *The shift to the service economy; causes and effects*, Institute for monetary and economic research, The bank of Korea.
Ledesma Miguel de Leon and Moro Alessio, 2016, *The rise of the service economy and the real return on capital*, University of Kent.
World Bank. 2019. *World Development Report 2019: The Changing Nature of Work.* Washington, DC: World Bank. doi:10.1596/978-1-4648-1328-3.
[3] OECD, "*The service economy*", STI Science and Technology Industry, Business and Industry policy forum series, 2000.

2017 United Nations conference on trade and development[4] confirms this trend: *"The services sector has emerged as the largest segment and driving force of the economy, contributing with a growing share to gross domestic product (GDP), trade and employment."* This further confirms that this trend is valid for developed economies as well as developing economies including the least developed countries. This is especially true in Europe[5]. Cioban (2014) demonstrates the influence of services in the augmentation of the countries national wealth. The following graphic shows this trend:



Source: UNCTADstat.

FIGURE 3 : WORLD SHARE OF SERVICES IN GDP BY INCOME BETWEEN 1980 AND 2015

[4] United Nations, "*United nations conference on trade and development*", Trade and Development Board, Trade and Development Commission, Multi-year Expert Meeting on Trade, Services and Development Fifth session, Geneva, 18–20 July 2017.
Buera J. Fransisco and Kaboski P. Joseph, 2006, *The rise of the service economy*, Federal reserve bank of Mineapolis.

[5] Caudet Lucia and Talko Mirna, 2017, *A service economy that works for europeans*, European Commission press release.

The establishment of services influences the decline of industrial output in developed economies and the decline of agricultural output. There is a confirmed trend that the service development is a driving force for the world economy. Many organizations worldwide consider services as crucial or absolutely crucial to their operations[6]. Organizations face many difficulties when dealing with services transformation. This is due to the difference in nature between manufactured products and services. Companies have years of experience in manufacturing management but a significant lack of experience in Service Management. Despite the fact that services are as old as humanity, the scientific management of services is quite a recent activity. Products differ from services in many ways and need to be managed in a different way. Therefore, organizations that are involved in service delivery need to learn how to operate and control their services.

According to Uppenberg and Strauss (2010), the manufacturing industry dominated the European economy up until the last century. In the 21st century manufacturers have increasingly converted their goods into services. The official statistics on services in Europe (NACE rev. 2)[7], document organizations by economical sectors and describe the service sectors in sections G to U. Within these sections, it describes section J for *"information and communications (Gathering and dissemination of written, audio or visual information, including films and records)"* and section K for *"financial and insurance activities (Facilitation of financial transactions, including those related to risk management)"*.

There are traces of banking activity since the Babylonians 2000 BC. One can also find records of banking transactions in Egypt and Phoenicia, but the recognized bank origin is attributed to Venice 700 years ago when the republic entered war and to raise funds, made a forced loan with an annual interest of 4%. For that purpose a

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[6] *"*Accenture, 2015*, Beware of the Smoke, Your Platform is Burning: Thriving in the As-a-Service Economy"*, HfS Research, Accenture operations.
Beeson B. Patricia and Bryan F. Mikael, 1986, *The emerging service economy*, Federal reserve bank of Cliveland, USA.
Boyde Stowe, 2017, *State of the services economy*, Mavenlink and Giacom.

[7] International Labour Organization, 2008, *Structure de la classification international type des professions (ISCO-8)*, ITEMS for Information: International economic and social classifications, Bureau international du travail, Statistical commission, 39th edition, Geneve, Switzerland.
ONU, 2009*, Classification internationale type par industrie de toutes les activités économiques (CITI)*, département des affaires économiques et sociales, décision statistique, Nations Unies.

"chamber of loans" was created[8]. Banks were created to deliver financial services and evolved to provide very specialized services in today's global economy[9],[10].

Technology is helping organizations to develop their services. IT is an important driver in today's service economy. Technologies like predictive analytics, big data management, remote communications, cloud computing and virtualization, within others, help organizations to develop their products and services. The digitalization process of organizations has created a dependency on IT systems. This is no exception in the banking industry in which multiple channels of communication allow consumers to use services remotely almost everywhere at any time. There has been a rather positive perception on the impact of technology in the European Union.[11]

IT organizations were traditionally technically oriented but in the last two decades they have become more service-oriented. Computer manufacturers have servitized their products and added services to their catalogues. With the ever-increasing complexity of IT systems, new organizations were created specifically to provide IT services based on knowledge and skills. Initially, IT servitization was used in order to create a competitive advantage on the market. Nevertheless, with the increasing transformation of manufacturers into servitized products and with the emergence of service-oriented organizations, it is essential that IT service providers learn to optimize their services and deliver them affordably with the best quality to cover their customer needs.

Computer systems are evolving fast and becoming more and more complex. In addition to that, there is a constant pressure to deliver services faster and cheaper. Moreover, customer needs evolve as fast as technology, which requires new services or a constant adaptation of the existing services. This is especially true in Luxembourg where services are an important aspect of the country's economy. *"With barely*

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[8] Hildreth Richard, "*The history of banks*", Batoche books, Kitchner 2001, Ontario, Canada.

[9] Conant Charles A., 2015, *A history of modern banks of issue*, 5th edition, Putnams sons, Cambridge University press, England.

[10] Hildreth Richard, 2001, *The history of banks*, Batoche books, Kitchner, Ontario, Canada.

[11] World Bank. 2019. "*World Development Report 2019: The Changing Nature of Work*". Washington, DC, USA.
Konsbruck Robert Lee, 2013, *Impacts of Information Technology on Society in the new century*, Laussane-Vidy, Switzerland.

over 2500 square kilometers of surface, a highly diversified multicultural workforce, the service sector represents 82% of the GDP and 75% of the employment. The financial sector counts for 32% of the GDP"[12]. Luxembourg has built a reputation in the financial sector making of the country one of the biggest financial operators in the world.

The focalization of the research is the maturity of IT service providers of financial institutions in Luxembourg. In this context a service is defined as activities realized by a provider on behalf of a consumer to co-create value to help their customers achieve their objectives. An IT service provider is a role performed by an organization in a service relationship to provide services to consumers. Maturity is the evolution of someone or something from an initial state to a developed desired state. Finally, service orientation is the structure and culture of an organization to deliver value in the form of services. For a complete definition of these concepts please refer to the glossary section.

There are many maturity models available on the market like ISO15504, CMM, CMMI, Axelos maturity model and many proprietary models like Gartner, IBM and HP. Despite the availability of these models, organizations find it difficult to use them because of their complexity, cost and time consumption. Therefore, considering the importance of the service sector, the relative complexity of Service Science and IT systems as well as the global difficulties that organizations are facing, conducting a research in this context is of high interest for the service sector and specifically for the financial sector in Luxembourg. Providing a clear, inexpensive and easy to use maturity model would allow organizations to understand their difficulties in the service management area and can prove of high interest to service providers around the world. The following section provides a description of the global approach of the research.

[12] Thelen Carlo, "*The Luxembourg economy and its competitive advantages*", Chambre de commerce de Luxembourg, 2007.
Thelen Carlo, 2018, *Luxembourg economy; Open Dynamic reliable*, Chambre de Commerce, Luxembourg.

I 3: Research approach

Considering the observed difficulties that specialized IT service providers are encountering on their journey of implementation and usage of Service Orientation practices, my research intends to contribute, with specific knowledge, to the IT service provision of the financial sector in Luxembourg. Organizations need to develop strong service-oriented capabilities in order to warrant high quality services and consolidate a position in a highly competitive environment. The research aims to provide a clear added value on the market by analyzing the confronted Service Orientation issues and propose a clear and useful solution for the measurement of the Service Orientation maturity. The field observations, the academic literature and the results analysis of an exploratory research, comforted in the choice of the research in the measurement of IT Service Orientation maturity.

Before providing solutions to a specific problem, it is important to understand what is really happening in the field in relation to service maturity. From direct field observations and an extensive investigation of the existing academic literature, I complemented the investigation with an exploratory research, to obtain the final theme to study. This logic defines the structure of the thesis presented in the following figure:

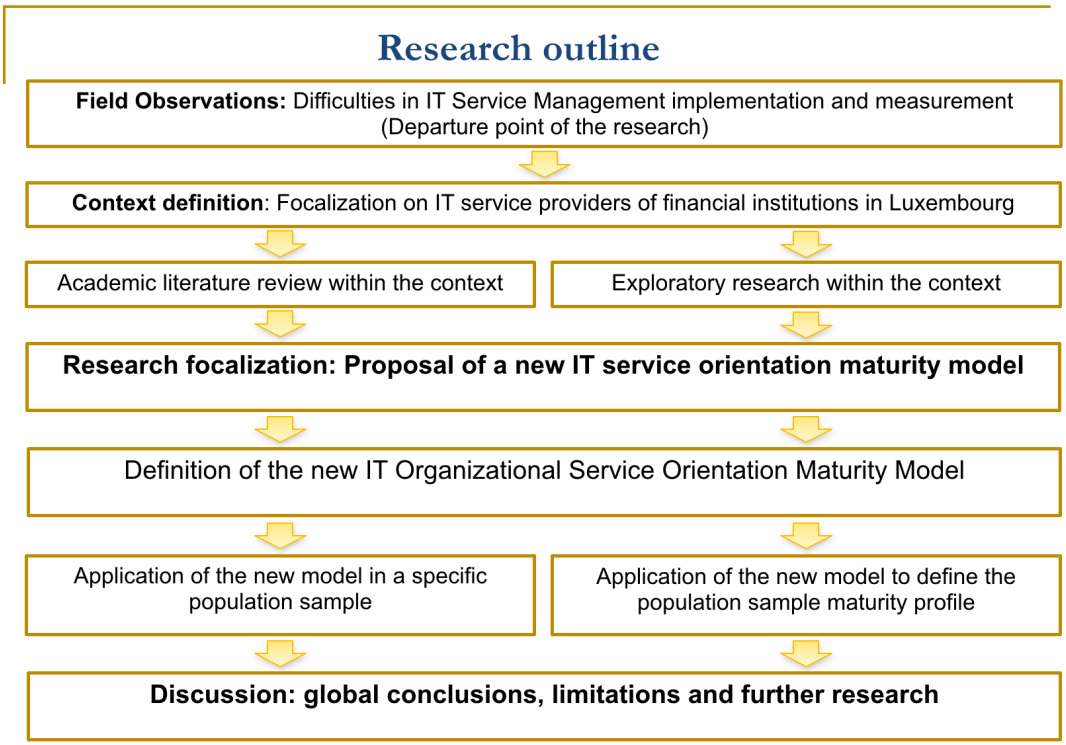

FIGURE 4 : GLOBAL RESEARCH OUTLINE
Source : Martin Cross

An EDBA is meant to create practical knowledge through academic rigor and to propose valuable information for managers that they can apply to a specific field. Nevertheless, managerial knowledge depends on a specific context and is subject to evolve over time with the creation of new knowledge. A qualitative approach seems adapted to analyze concepts without trying to understand the cause-to-effect in terms of A implies B. When observing phenomena in the field there is a series of interactions that cannot be dissociated from a specific reality.

This research does not propose a new theory that can be applied universally. The scope of this research seeks to analyze and understand some aspects of the relationships of the IT Service Providers of financial institutions in Luxembourg, the IT Service Management practices used and the maturity of such practices. While it is possible that the results of the research can be of great utility in other areas (not only financial institutions), other regions (not only Luxembourg) and other domains (not only IT providers), the actual research will focus on the specific studied sample in the chosen population (IT service providers of financial institutions in Luxembourg).

The present research initiates describing initial field observations that originated the research question. Subsequently, describes the global context in which the research is situated and analyzes the existing academic literature in the context of the research. In addition, it proposes an exploratory research to better understand the situation of the observed phenomena in the field. The results of the exploratory research confirmed the field observations: IT providers in Luxembourg face difficulties in the implementation of ITSM practices as well as in the measuring of their service orientation maturity. This allowed the identification of a gap in the literature to pursue the research. An analysis of the main existing maturity models was done and the conclusion is that the numerous available models are too complex, time consuming and costly. That is the reason why organizations do not use them. This leaded to the main purpose of this research, a new and more adapted IT Service Orientation Maturity Model that is more time efficient and less expensive to use is proposed. This new model (OSOMM) was compared to the main existing models in terms of time expenditure and use cost. The application of the OSOMM model allowed to show that it is less expensive and less time consuming than the existing models. Finally, I present a discussion section focusing on the results of my research and providing insight into the managerial implications of the research and its usability in the field. In this

part I cover the identified problems and solutions, evoke the research limitations and recommend further investigations to support the generated conclusions.

In that sense the research uses various elements of the grounded theory, considering the gathering of data from an exploratory research to understand the field implications. The quantitative analysis of the gathered data allowed to identify different gaps to focus the research and choose a research theme. The main methodology used is the analysis of qualitative data to explore the field and confront it to the field observations and the academic literature.

After proposing a new Service Orientation maturity model, the model was applied at the field on a specific representative sample of the studied population. The model was applied through a series of interviews that covered internal aspects of the service providers as well as external aspects. It included IT staff and IT management as well as customers and users. There were a total of 80 interviews from 17 managers, 24 IT staff members, 17 customers and 22 users from 13 organizations. The aim of applying the new maturity model is to verify whether it covers the defined quality criteria used at the creation of the model related to the time and costs involved in the realization of a maturity assessment. The data from the interviews was documented in a series of data sheets used to calculate the maturity of the studied sample. A maturity profile for each studied organization was established and consolidated to obtain the maturity profile for the whole sample representing the population of IT service providers of financial institutions in Luxembourg using ITIL.

The global structure of the research is depicted in the following graphic:

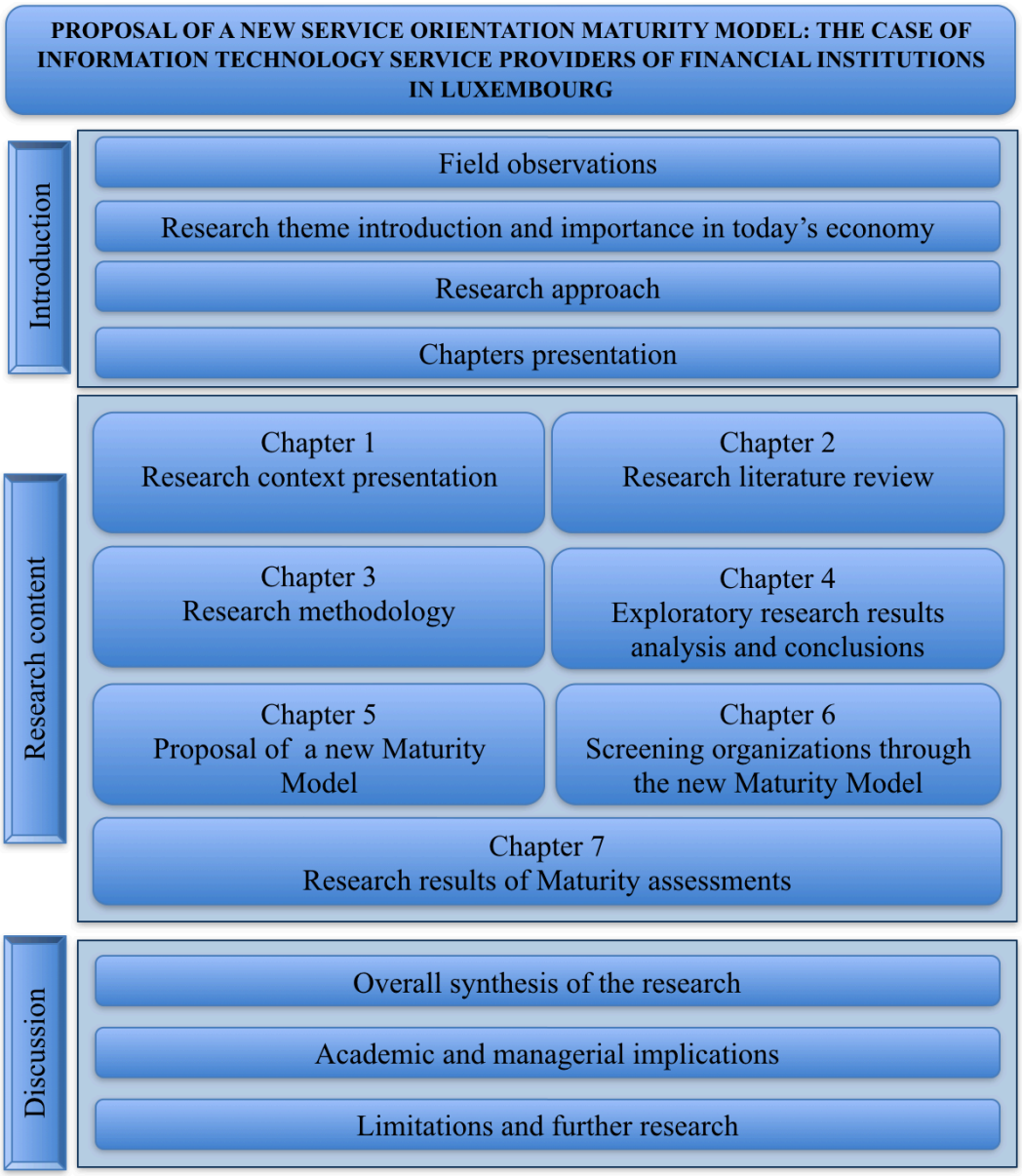

FIGURE 5 : GLOBAL RESEARCH STRUCTURE
Source: Martin Cross

I 4: Chapters presentation

The main objective of the research is the development of a new Service Orientation maturity model that enables the measurement of the organization's maturity in an easy and flexible way. The objective of each chapter contributes to the global research objectives. Therefore, I will describe the objective of each chapter and its contribution to the research:

Chapter 1 Research context presentation

The objective of chapter 1 is to clarify the specific context of the study by narrowing it down to a specific research unit. This allows the understanding of the economic importance in the managerial field.

This chapter presents the global context of the population to be studied. The research stands in the IT Service Management area. I provide a clarification of the notion of "service" and "service provision" and clarify the meaning of a "Service-oriented organization". I present also a brief description of IT history and its evolution, as well as a brief description of the history of Luxembourg and its banking industry. I also document the importance of the bank industry for the country's economy, the importance of ITIL in the ITSM (IT Service Management) area and the maturity context.

Chapter 2 Research literature review

The objective of chapter 2 is to contribute with an extensive review of the existing academic literature in order to support the studied domain and identify gaps that require more exploration.

This chapter mainly focuses on the existing academic literature in the area of Service Science, service, Service Orientation, ITSM (IT Service Management), ITIL and Maturity. There is a vast amount of literature in each of the mentioned domains, but there are gaps when crossing these domains. While there are some useful studies in the Oceania region as well as in the Scandinavian region on IT Service Orientation and IT Service Orientation maturity, other regions are clearly underserved. Lytle et. al. (1998) propose a Service Orientation measurement model that included financial institutions. It is one of the most cited references for service orientation measurement but is not updated with the latest developments in the ITSM area.

Chapter 3 Research methodology

The objective of chapter 3 is to document the used research methodology, the way data was collected and treated and how this data contributes to the understanding of the research objective.

This chapter documents the exploratory research phase and how it was carried out. I explain the criteria used for the selection of the method for data gathering (semi-directive interviews with an interview guide) and elaborate on the choice of the population and the selected sample. The used criteria consider the type of IT service providers (internal or external), their origin and their size. I then describe how the interviews were conducted, how the transcription was done and how the interviews were coded using a codebook. Additionally, it documents the methodology used for the creation of the model supported by the design science theory. I also describe the sampling for the application of the maturity model and the methodology used for the analysis of data related to the maturity of the studied population.

Chapter 4 Exploratory research results analysis and conclusions

The objective of chapter 4 is to analyze the data gathered during the exploratory research and identify a specific gap to direct the research.

This chapter presents the results of the exploratory research related to the field observations. I provide an insight of the perceived meaning of Service Orientation, importance and benefits. I inform on the used ITSM (IT Service Management) references and their time of implementation. The reference that almost all entities of the studied sample use is ITIL. I further showcase the usage of maturity models to control the implemented processes maturity. Most organizations do not measure their maturity. Finally I present a synthesis of the results and document the research focalization. The chosen theme is ITIL maturity. I justify the choice of the theme to explore further and present the benefits and the managerial implications of the choice.

Chapter 5 Proposal of a new maturity model

The objective of chapter 5 is to elaborate on the creation of a new Service Orientation maturity model, updated with the latest advancements in the IT Service Management area. The aim is to help IT service providers to better understand and measure their Service Orientation maturity.

This chapter presents an alignment comparison between ITIL versions and Serv*Or, then presents the required components for the creation of an academically documented model. It also documents the newly proposed Organizational Service Orientation Maturity Model (OSOMM) with a detailed description of the quality criteria that was used during the creation of the model. Finally, a complete description of the model and its components is presented documenting its advantages (and limitations) over the existing Service Orientation maturity models.

Chapter 6 Screening organizations through the new maturity model

The objective of chapter 6 is to describe the application of the newly proposed maturity model on a specific population to understand their current maturity.

This chapter presents the application of OSOMM on a specific sample. It documents the characteristics of the sample in relation of the assessed organizations and interviewed individuals. In the chapter I describe the methodology used for the assessments, which consists in face-to-face interviews for an assisted assessment. Finally, the chapter concludes with documentation on the way that data was collected and treated. Additionally I present the analysis that led to obtain a maturity profile for each assessed organization.

Chapter 7 Research results of the maturity assessments

The objective of chapter 7 is to analyze the results of the maturity assessments carried out in the specific population. The aim is to ascertain that the newly proposed maturity model is useful in the field and adds value to organizations.

This chapter presents the consolidated maturity profile of the studied IT service providers of financial institutions in Luxembourg with the methodology used to obtain this profile with OSOMM. The presented profile can be used to benchmark studied organizations against the global profile.

Discussion

The discussion presents a global view of the research followed by the managerial implications. It also shows the applicability and benefits of the model to help organizations in their ITSM improvement paths and evolution. Additionally, I present the benefits of benchmarking an organization towards a maturity reference of a popula-

tion, country or region. The discussion also presents the limitations of the research and concludes with suggestions for further research.

After the global presentation of the research design and the presentation of the contribution of each chapter to the study objectives, it is important to ascertain if the whole structure is capable to support the research objective.

The aim of the research is to propose a new Service-oriented maturity model for the use of Information Technology service providers of financial institutions in Luxembourg. The objective was determined after an exhaustive literature research and the analysis of the results of the exploratory research. The proposed model was built considering the specific context and the researched difficulties that IT service providers of financial institutions in Luxembourg are confronting. The studied providers do not measure their Service Orientation maturity mainly because of their lack of resources (financial and human), ITSM knowledge as well as their lack of collaboration and communication. The proposed maturity model is simple yet exhaustive and inexpensive compared to the existing maturity models. If a maturity model is used to determine a status at a specific time and is used to compare to a reference it will derive specific improvement actions that would help organizations to gain maturity. In this respect the proposed model has been evaluated rather positively by the interviewed people and clearly support the purpose of the research.

Chapter 1: Research context presentation

This chapter presents the global context of the population to be studied. The research stands in the IT Service Management area. I provide a clarification of the notion of “service" and “service provision” and clarify the meaning of a “Service-oriented organization”. I present also a brief description of IT history and its evolution, as well as a brief description of the history of Luxembourg and its banking industry. I also document the importance of the bank industry for the country’s economy, the importance of ITIL in the ITSM (IT Service Management) area and the maturity context.

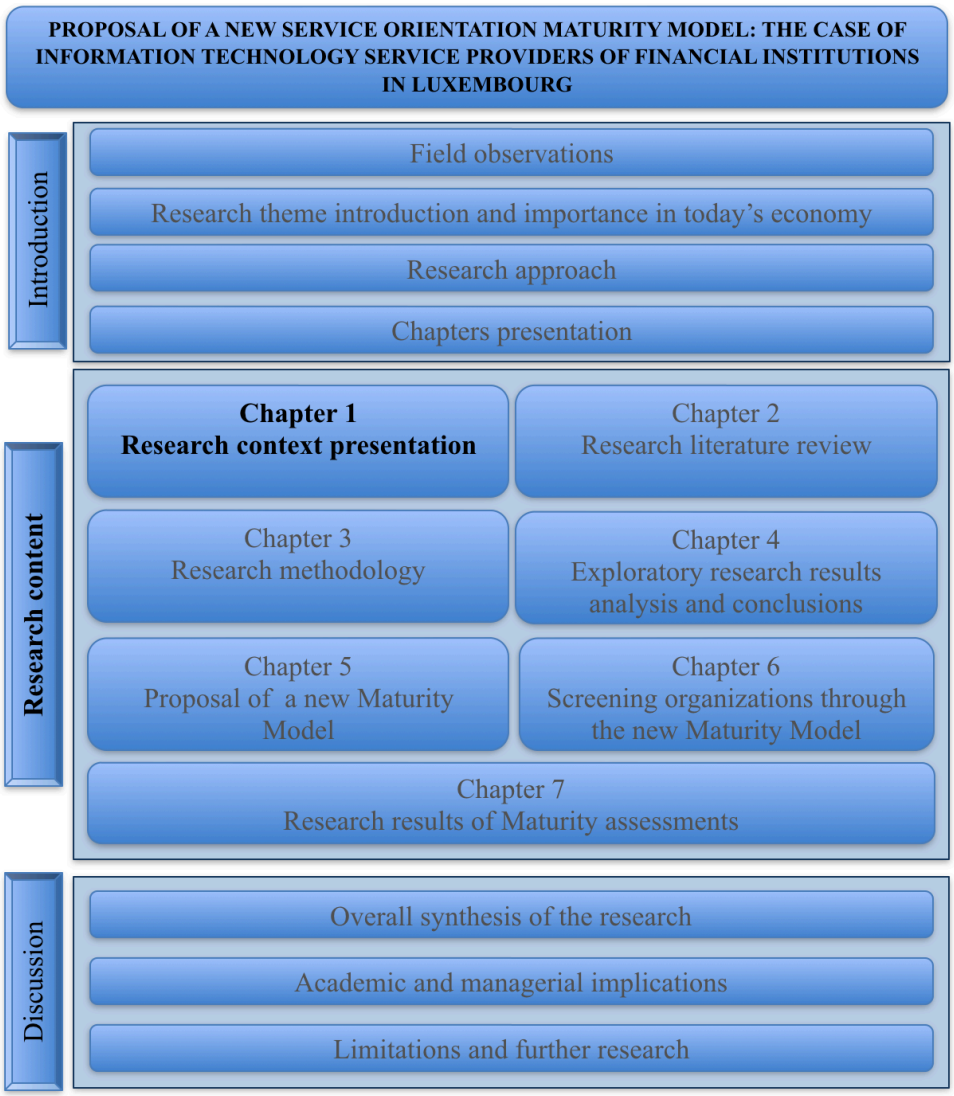

Figure 6 : Chapter 1 Research context

Source : Martin Cross

1.1 Service context

To understand what Service Orientation means we need first to clarify the meaning of "Service". There is vast literature related to services and unfortunately as many definitions of a service. In his literature review of the field of service economy, Petrovski and Neto (2017) mention different reasons why this term is difficult to define, specially considering the evolution from product centric economy into a service centric economy.

Just to mention a few definitions we can state the definition according to Lovelock, Vandermerwe, Lewis and Fernie (2011, p7) "*Services are economic activities that create value and provide benefits for customers at specific times and places, as a result of bringing about a desired change in – or on behalf of – the recipient of the service."* The OECD in his publication, "The service economy, STI Science and Technology Industry, Business and Industry policy forum series", define a service as: "*Simply defined, services are a diverse group of economic activities not directly associated with the manufacture of goods, mining or agriculture. They typically involve the provision of human value added in the form of labour, advice, managerial skill, entertainment, training, intermediation and the like.".* According to the Oxford dictionary a service is : *"The action of helping or doing work for someone" and "Assistance or advice given to customers during and after the sale of goods".* Vargo describes a service as *"the application of resources for the benefit of another"* (Vargo 2008). And according to ITIL a service is: *"A means of enabling value co-creation by facilitating outcomes that customers want to achieve, without the customer having to manage specific costs and risks".*

As it is observable, there are many definitions of the meaning of "Service" and academicians have not reached a consensus. For the purpose of the present research I constructed from the different definitions in the literature a definition. This is the definition that will be used:

A service is specific activities realized by a provider on behalf of a consumer to co-create value at specific moments by using goods and skills to help their customers achieve their objectives without them needing to manage how to obtain that value.

Grönoos (1994) defines three characteristics of a service that are essential to differentiate them from products:

1) Services are processes consisting of activities or a series of activities rather than things,
2) Services are at least to some extent produced and consumed simultaneously
3) The customer participates in the service production process at least to some extent

Kuznar (2016) makes reference to the global service literature and state that there are four characteristics that differentiate products from services:

1) Intangibility
2) Inseparability of production and consumption,
3) Variability (or heterogeneity)
4) Perishability

The proposed definition copes with all these characteristics in the sense that a service are activities realized by using goods to produce value (intangibility), there is a co-creation of the value (inseparability of production and consumption), there is the specifics of the customer objectives at a precise moment (variability) and the specific moment of the need of the value creation (perishability).

Products defer from services as they are tangible and there is an asynchronous production and consumption. The qualities of the product are based on its defined characteristics without variation independently of the consumer and are not perishable after usage. These differences obliges a service provider to manage services in a different way and organize specifically with a Service Orientation management system in which the main facalization is a centric service dominant logic instead of a product centric dominant logic in which tangible assets and isolated exchanges between producer and consumer are dominant. Instead value creation is related to intangible processes and a long-term relationship with the customer (Vargo & Lusch, 2004, 2008). With services, customer satisfaction is highly dependent on the degree of customiza-

tion to meet heterogeneous customer's needs while products might be highly standardized (Anderson, Fornell and Rust,1997).

The concept of service is strongly related to the management of service systems in which value streams, value networks and value creating systems with socio-economic actors are engaged within complex service systems (Badinelli, et. al., 2014). This complexity creates difficulties of implementation and usage. Therefore, organizations need to learn new methods and tools for the management of services. This complexity is reflected in the study of Benedittini in which is demonstrated that Service Orientation leads to greater risk exposure and grater number of bankruptcies (Benedettini, Neely Swink, 2015). Therefore, it is important that organizations learn how to measure and control their Service Orientation in order to avoid difficulties.

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1.2 Service Orientation context

Daniel Bell wrote in the 1970s "The coming of the Post-Industrial Society" in which he predicted a radical change of the economic focus from goods to services (Petrowski, 2017). In today's economy the service sector dominates the economies across Europe and in the developed countries around the world (Lovelock & Wirtz, 2011). Industrial companies are servitizing their products to differentiate form their competitors. This is particularly the case of IT firms that propose services around their products (computer, routers, firewalls, etc.) whilst other sectors are service based at the core like is the case of the management of information technology, maintenance and IT outsourcing. For a list of some Service-oriented sectors please refer to annex 1 where the financial sector as well as the IT management are mentioned as specific service domains.

Developed countries have 70 to 80% of their GDP and employment in the service sector (government, healthcare, education, retail, financial, business and professional, communications, transportation, utilities), with 15-25% in the manufacturing sector, and about 5% in the agricultural sector. In European countries, the service sector accounts for more than 2 thirds of the region's economy, and more than three quarters of the cross-country exchanges (Uppenberg & Strauss, 2010). This shows the

importance of services in today's economy and it is essential that companies understand and improve their skills in managing services to confront the new service-oriented economy because services improve the capacity of a country to improve their national wealth.

Lytle defines Service Orientation as *"a set of relatively enduring organizational policies, practices, and procedures intended to support and reward service-giving behaviours that create and deliver services excellence"* (Lytle et al., 1998, p. 459). Hombourg defines Service Orientation as "*the extent to which services are an essential element of the firm's marketing strategy"* (Homburg, Hoyer, & Fassnacht 2002). Service Orientation is a hard-to-imitate culture that is a result of the service co-creation by customers and employees (Vargo & Lusch, 2008). Services are more prevalent than goods in service-oriented firms, and goods should be considered as a medium for the firm's service.

Service Orientation can be applied to any organization seeking to focus on services instead of products and goods. There might be different behaviors and influences in different markets because transportation, tourism, health and IT services (just to mention a few) will not be structured in the same way nor will use the same means to create and deliver their services, therefore we need to narrow the population to be studied to a specific area. In the context of the present research it will be studied the IT service Providers so we will proceed to clarify the IT context.

1.3 IT context

Information Technology has evolved rapidly and there is no indication that this pace will slow down. On the contrary according to the Moore's law (Moore, 1965) this pace will still accelerate[13]. Information Technology has as well influenced greatly our social behavior and our daily life. Some examples are; the immediate access to information, mobile communications and web commerce. In the same manner this evolution has impacted the way companies operate and use technology to provide new services, reach new markets and manage the important data flows. It is important to describe

[13] Guarnieri Massimo, 2016, *The unreasonable accuracy of Moore's law,* IEEE Industrial Electronics Magazine, No. 10, vol. 1, pp. 40-43.
Rajna Georges, 2018, *Beyond Moore's law*, Vixra.org

briefly the antecedents of IT to understand the actual IT influence in our society[14]. A description of the IT evolution can be found in annex 2.

Organizations are profoundly transforming to embed into their normal operations the available technology, which is as well part of our daily life[15]. Internet, telecommunications and mobility transformed our society and impose us a faster pace of adaptation to the ever-changing technology. Organizations need to adapt their business to make the best usage of all these technology or incur the consequences. Additionally, virtualization and technologies like cloud computing allow for higher flexibility and adaptability. All this technology allowed new business lines based on services like Uber, Amazon and social media like Facebook, self driving cars and geo-localization, drones and chirurgical distant interventions and big data transfers. Adding to all this 3D printing and 3D visual devices allowing for virtual reality immersion.

All this technology is still developing and will require new adaptations to our social behaviors and the way we will do business. From the Service Management perspectives, Information and Communication technologies are key enablers of product servitization and process oriented services (Kowalski 2013) to improve Service Orientation. The present research partly focuses on the usage and management of Information and Communication Technology in the management of services. ITSM (Information Technology Service Management) is a sub topic of the IT service-oriented organizations, which in turn is part of global Service Orientation embedded into Service Science. Figure 7 show this relationship.

[14] Cailleau Robert, 2013, *A very short history of IT,* The story of Information, Gil press, Forbes.
Cailleau Robert, 2018, The 3 eras of IT : Computing, Communication, Communities, The story of information, Gil Press, Forbes.
Kamkarian Pejman, 2016, *A brief history of IT*, IT computer technical support newsletter, 2016, vol 2, no. 26, collage of education and human services, Southern Illinois University, Illinois, USA.
Mahony Michael, 1988, *The history of computing in the history of technology*, Annals of the history of computing, vol.10, pp.113-125, seminar on information technologies, National Museum of American history.
[15] Dudézert Aurélie, 2018, La transformation digitale des entreprises, Collection repères, Ed. la découverte, Paris, France.

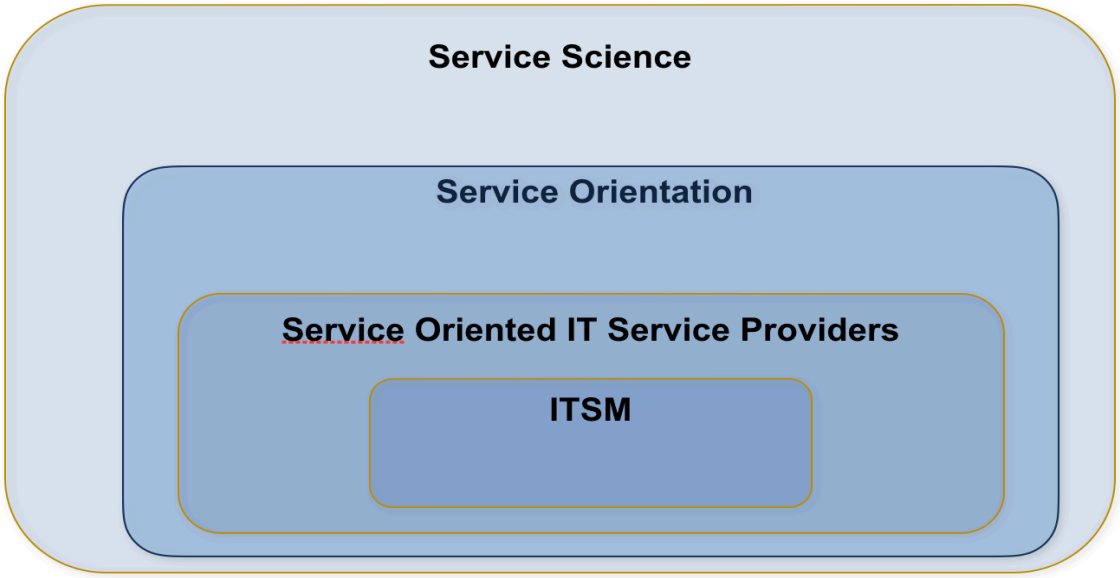

Figure 7 : ITSM research context
Source : Martin Cross

ITSM is a vast topic and it is important to clarify some aspects of this relationship between Services and IT in which IT will provide IT services to support the business activities and the management of these IT Services.

1.4 IT Service Management context

After describing the global importance of services in today economy and the importance of IT, it is now essential to increase our understanding of the mechanisms that are in place in this relationship. From the previously exposed definition of a service we can conclude that an IT service is: "*activities realized by an IT service provider on behalf of a consumer to co-create value at specific moments by using IT assets and skills to help their customers achieve their objectives without the need of managing how to obtain them"*. In this context we can differentiate an IT provider from an IT service provider in the sense that an IT provider is focused on delivering IT assets while an IT service provider use IT assets to co-create value in the form of services. An increased emphasis on services implies an increased Service Orientation (Kowalkowski and Kindström & Gebauer, 2013).

IT providers must transform from a technology oriented provider into an IT service provider and must deploy organizational resources to support their Service Orienta-

tion (Hombourg, 2002) and a methodological structuring of internal IT processes can only be guaranteed by a service-oriented IT management (Hogstein, Zarnekow & Brenner 2005). In their analysis of the ITSM literature Iden and Eikebroekk state that the IT function should be a service organization that provides IT services (Iden & Eikebreoekk, 2013). Also that the IT service provider must focus its attention not only on managing technology to create services but as well managing the IT services to create value. Information Technology Service Management (ITSM) is a subset of Service Science that focuses on IT operations such as service delivery and service support. (Conger, Winiford & Erikson-Harris, 2008). According to Iden and Eikebrokk (2013) there is no single authorized text that defines ITSM, but the concept is portrayed in various books, articles and white papers "*Providers of IT services can no longer afford to focus on technology and their internal organization, they now have to consider the quality of the services they provide and focus on the relationship with customers.*"

For the present research, ITSM will be defined as: *"an approach to IT operations that is characterized by its emphasis on IT services, customers, service level agreements, and an IT function's handling of its daily activities through processes"* (Conger, Winniford, & Erickson- Harris, 2008). Therefore an IT service Provider must consider the four elements; IT services, Customer relationship, Service agreements management of its activities. ITSM is at the cross road of Service Orientation and IT.

There are many references to help organizations work their way through ITSM. The most common approach to it is ITIL, which is considered a de facto standard for IT Service Providers (Hochstein et al. 2005). A variety of ITSM frameworks have been developed using ITIL as a reference, such as Hewlett-Packard (HP ITSM Reference model), IBM (IT Process Model) and Microsoft's MOF. Other commonly used references include CMMI for services[16], COBIT and ISO20000. ITIL being the most established in the field, it is important to describe it more in detail.

[16] Chevalier Françoise, Cloutier Martin, Mitev Nathalie, et. al., 2019, La creation de connaissance par les managers, Collection Business Science Institute, Ed. EMS, Management et Societé, Paris, France.

1.5 ITIL context

ITIL stands for Information Technology Infrastructure Library. It is a public framework based on best practices obtained from the field through a body of knowledge and documented in a series of books known as the ITIL library. The books are edited by TSO (British government editorial) and a formal global training schema is established worldwide. It was created at the end of the 1980's and evolved to a V2 in 2000. It was complemented in 2007 with version 3 and recently in 2019 and 2020 with version 4 with an integrated service value system and 34 service management practices. For a more detailed description of ITIL please refer to annex 3.

Before year 2000 there was not so much activity around ITIL but after the year 2000 there was an important turn around and many companies worldwide began implementing and using ITIL. According to Barafort (2002) and Johansson (2016) ITIL is the most used reference for ITSM. Despite the volume of information available related to all these practices and processes most of the companies that implement ITIL, have not managed it conveniently, having implemented to a fair level of maturity only a handful of practices. (Mainly Incident Management, Problem Management, Event Management, Change Management and Service Level Management). While trying to implement other practices they are confronted to different difficulties causing stagnation and the impossibility to advance further in the implementation of ITSM practices. In the specific context of IT service providers of financial institutions in Luxembourg, it is observed that almost all of them are using ITIL as their main reference. Most of the organizations have implemented ITSM practices for several years but still have a low amount of implemented processes and a low level of maturity. Therefore the importance of proposing adapted tools to help organizations in their ITSM implementation journey.

ITSM is a vast domain and considering that IT Service providers are quite varied according to size, region and culture and might be very different from one country to another, it is important to narrow the field of the research. For this reason in the present research, a specific domain and country with its own characteristics will be studied. The research will focus on the Luxembourgish market space. The following figure represents this relationship:

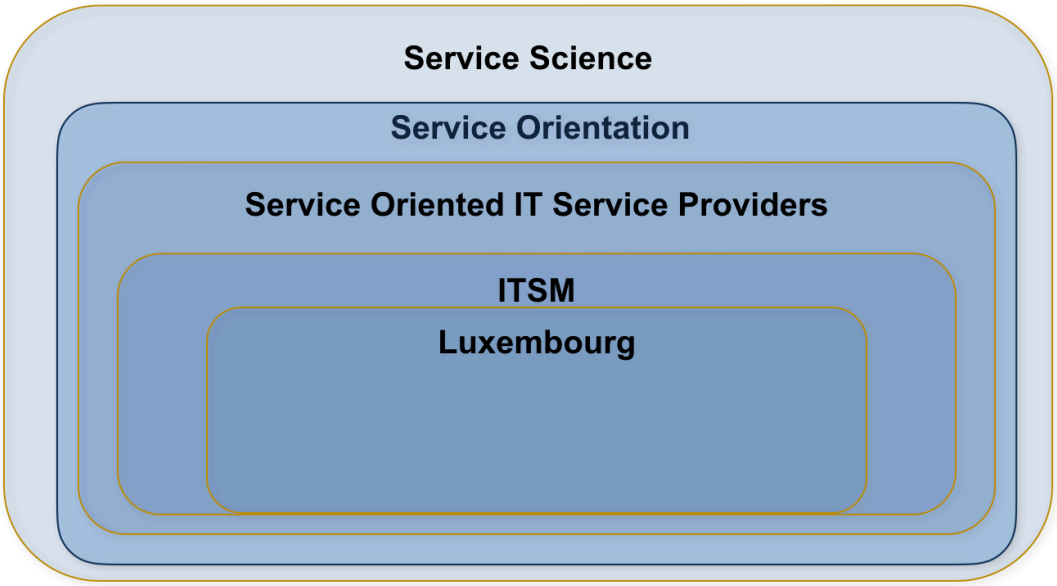

FIGURE 8 : FIELD OF RESEARCH IN THE LUXEMBOURGISH CONTEXT
Source : Martin Cross

1.6 Luxembourgish context

The Great Duchy of Luxembourg[17], a constitutional monarchy with a parliament, is a small central European country covering an area of roughly 2586 KM^2 and a population of 613,012 (Statec 1st of January 2019). The official language is Luxembourgish and the administrative languages are French and German, bordering Germany, France and Belgium. Its location at the heart of Europe providing access to more than 500 million consumers (direct access to more than 11.5 million consumers in the direct boarding region of Wallonia, Lorraine, Rhineland-Palatinate and Saarland) makes of the Grand Duchy of Luxembourg an important European business center and is the most active economy of its region. Luxembourg is part of the Schengen visa free travel zone and has almost 200,000 daily cross border commuters (which represents almost one third of its population). Is a multicultural business environment with 47% of foreign population from 170 nationalities with the highest multilingual population in Europe, speaking an average of 3.6 languages per person (Eurobarometer). The main economical activities are: industry, iron and steel, metal processing, chemical, electric and automotive components, food and financial activities. The service sector accounts for 82% of GDP and 75% of the national employment (Chambre de Commerce, Luxembourg).

[17] Lahtinen Henri, Halme Kimmo and Muller Emmanuel, 2013, *Summary assessment of Luxembourg*, European service innovation centre, Directorate general of the European Commission.

Luxembourg is a founding member of the European Union (EU), is one of the three EU capitals and holds several EU institutions. The capital of the Grand Duchy of Luxembourg is Luxembourg City with 20% of the country's population. To better understand this particular region a brief history of Luxembourg and the main facts of its evolution is presented in annex 4.

Luxembourg is considered the 3th most open economy in the world (International chamber of commerce, Open markets index 2015) and is a service-based economy. 80% of the county exports are services. Holds the World largest satellites operator and one of the largest broad casters holding the 1st place in TV and radio broadcasts in Europe (Chamber of Commerce, Luxembourg). Luxembourg city is ranked 21 out of 231 world main cities for its quality of living and is considered the safest city in the world (Mercer Quality of living survey, 2017). The cumulated service market is 87,7% of the economical activity of the country.

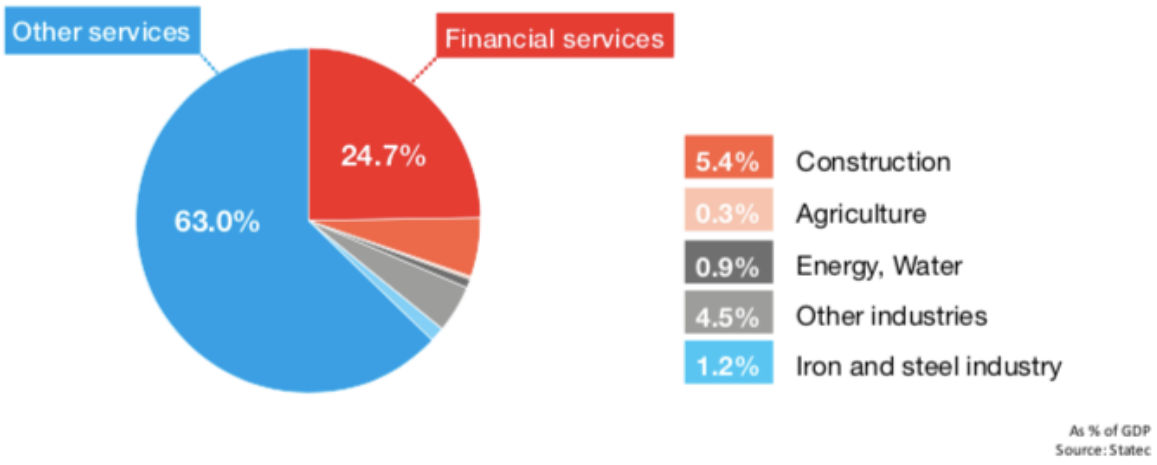

FIGURE 9 : LUXEMBOURGISH ECONOMICAL SECTORS

To better understand this particular region a brief description of the main economical facts of Luxembourg and its financial evolution is presented in annex 5.

The financial sector of Luxembourg plays a capital role in the country's economy as well as in the Eurozone[18]. Due to the importance of the financial sector, it was a natural and deliberate choice for the population to be studied. The dependency from the sector on specialized IT services, influenced as well the choice. IT providers must support the business with quality services to help the financial sector operate conveniently. Other sectors might share similarities but the present research will focus on the financial sector of Luxembourg. Further studies might be necessary to approach other sectors.

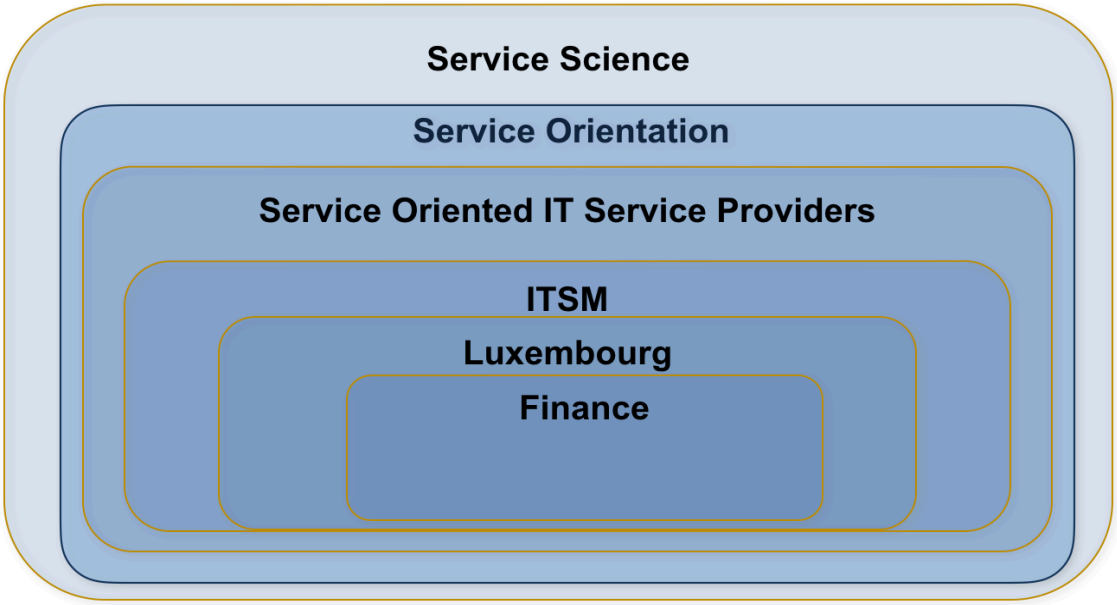

FIGURE 10 : FINANCIAL SECTOR CONTEXT
Source : Martin Cross

1.7 Luxembourg's financial sector context

A big part of its history, Luxembourg was a country dedicated to agriculture with a high level of emigration. At the middle of the XIXth century the economy of the country began to expand mainly due to the iron ore and steel industry. In 1856, 2 banks were created to finance the steel industry and the railways; the private bank BIL (Banque Internationale de Luxembourg) and the government BCEE (Banque et Caisse d'Epargne de l'Etat) establishing the basis for the banking industry in Luxem-

[18] Erpelding Jeanot, 2016, *At the heart of Europe; The Luxembourg economy in a nutshell*, Chamber of commerce, International affairs, Luxembourg.
European Commission, 2018, *Country report Luxembourg 2018*, European Commission.

bourg. In 1893 SOGENAL (today Société Générale), opens a branch in Luxembourg, being the first foreign bank establishing in the country. In 1928 the Luxembourg Stock Exchange (LuxSE) was founded, but is only until 1952 when Luxembourg is chosen as the location for the headquarters of the European Coal and Steel Community (ECSC), the forerunner of the European Union, the need emerges for a broader banking sector to service cross-border flows of capital and multi-currency cash management. [19]

In 1963 Luxembourg starts to play an important role in the development of a pan-European financial services market with the creation of the Eurobond market and the Luxembourg Stock Exchange (LuxSE). The stability of the country attracts commercial opportunities and with them financial investors. Between 1970 and 1980 there is a clear development of the banking industry and Banks from Germany, the US, Switzerland, Japan, Scandinavia and other countries choose Luxembourg as an international base. At the beginning of the 1970's there were 37 banks established in Luxembourg. In 1980 there were 108 banks (Corporate finance (2018), Luxembourg for finance).

The success of the Grand Duchy of Luxembourg as an international financial center is founded in a series of principles and values clearly stated in the country's strategy and policies (Luxembourg sustainable finance, 2018 Luxembourg For Finance) based on the country's stability, specific international finance policies, a vast IT infrastructure specifically aimed for the financial sector and a specific culture of investor protection and anti-money-laundering policies.

Luxembourg has had a consistent growth for decades averaging 2,5% annually, with a low public debt (2018 figures). Today the country has established a formal policy for economic development based on new ICT (Information and communication Technology), developments to remain a EU hub (28 fiber routes to other Eurohubs) for international finance ranking first private banking in Europe, second largest fund administrator in the world and an important eGateway for Europe, having several top 100 companies in the world established in the country. The ICT (Information and

[19] Haag, Émile, 2015, *The Rise of Luxembourg from Independence to Success*, Luxembourg, Éditions Saint-Paul. Haas Roxane, 2017, *Banking in Luxembourg*; Trends and figures, Price Waterhouse Coopers, www.pwc.lu/banking.

Communication Technologies) sector has grown faster than the Luxembourg economy as a whole. Average annual growth was 7.4% between 2009-2013. ICT specialists represent 4.6% of Luxembourg's domestic employment, compared with 3.5% on average in Europe (2015 figures from Luxembourg economy 2017, chamber of commerce). and holds 25% of all European data centers (Statec). The "IT for Innovative Services" (ITIS) department at the Luxembourg Institute of Science and Technology (LIST) bolsters this area of expertise through multi-disciplinary scientific and technological research leading to the development of innovative IT services (Digital economy 2020, 2015, Luxembourg for Finance). The net assets of collective investment grew from 2 billion euros in 1970 to more than 1000 billion euros in 2004 (Source: CSSF), taking Luxembourg to the first place in Europe for unit trust asset management. A more detailed presentation of Luxembourg's financial sector is described in annex 6.

From the above presentation it is observable that the financial sector in Luxembourg and supporting IT providers are essential for the country's economy as well as for the European economy. That is why Luxembourg focuses its attention on this sector. In this context, managerial research that contributes to the understanding of the mechanics of the sector is rather important. When implementing ITSM practices it is essential to understand the status to create a reference point to control the evolution. If organizations do not measure their maturity, they will not have control over their implementations. The present research helps organizations in their development towards a strong service orientation.

Luxembourg built its world financial reputation by providing high-end personal and private banking services. There are two types of banking licenses in Luxembourg: Mortgage Bonds Bank License with 4 established institutions and universal bank license with 126 established institutions[20]. There are three origins (Luxembourg, European and non European) with the main activity related to high wealth individuals, private banking and funds administration. Considering the importance of the financial sector in Luxembourg and the high dependency on IT systems, IT service provides will profit of adequate tools that allow them to measure, in an easy and inexpensive

- [20] *Source; Banque Centrale de Luxembourg: number and geographic origin of credit institutions established in Luxembourg, 2020.*

way, the maturity of their service orientation. Therefore it is important to gain some insight into the maturity domain.

1.8 Maturity context

The field observations indicate that IT Providers do not to measure their maturity. The focalization on maturity of the present research is a deliberate choice to clarify why, despite the existence of vast maturity frameworks, organizations do not measure it. First of all we need to understand what is maturity, what is ITSM maturity and what does that implies in ITIL as a framework.

1.8.1 Maturity definition

The concept of maturity is difficult to define and there is no academic consensus among scholars about a clear definition of service-oriented maturity, therefore the necessity to stipulate a definition. More information on different maturity definitions found in the literature is documented in annex 7.

In the present research, the used definition of maturity applied to a service-oriented IT service provider is:

Maturity of a Service-oriented organization is the evolution of an organization or system from an initial state to a developed desired state of readiness by progressively improving their abilities and capabilities to be able to co-deliver value to stakeholders when required in the form of services. (source: Martin Cross)

This definition was build from different academic sources, dictionaries and my personal experience. This proposed definition intends to point out some important aspects of Service Orientation maturity. The first important aspect is the need for evolution of the organization. This means that any organization seeking to be mature will require a constant evolution to higher levels of desired readiness. As there is a constant evolution this desired state of readiness is only one stage of the evolution and new desired stages of readiness must be defined and seek each time the established one is attained. Secondly the progressive improvement of the organizations abilities and capabilities denoting a specific Service Orientation structure in place with specific skills and knowledge to develop these abilities and capabilities and realize the related

activities in an effective and efficient manner. This developed state will require new evolutions according to the business needs. So the third important aspect is the co-creation of value recognizing the involvement of the stakeholders, not only from the receiving customer perspective but as well as in their participation in the creation of value. This is extremely important in the specific domain of Service Science for services and Service Orientation. Forth, when required means that it is essential to understand the needs of the stakeholders in order to deliver the value when and where is required. Provision of services delivered before or after when there is no need, will not deliver any value. The usage of the term stakeholder instead of the usual customer, is important to denote that value is not only required by customers but it might as well be needed by other actors like users, controllers, managers, auditors, team leaders etc. who in turn might be as well contributors.

1.8.2 Why measure maturity

Today, organizations are confronted to a constant demand of value added IT services and IT providers must evolve with the constant evolution of technology and customers demand. There is a constant need to become better, faster and cheaper, therefore a constant improvement approach is needed. Before beginning implementing ITSM practices it is required to understand the current state to be able to define the desired future state (Johansson, B, Eckerstein, J, & Malmros, J, 2016). It wouldn't be very useful to define a desired state if the current state is not known. Based on the Continual Improvement Model[21] (refer to annex 8) organizations must aim to achieve desired objectives stated in the strategy of the organization and IT service providers must strive to contribute to these efforts. Strategic objectives are global long-term objectives and it is necessary to break them down to specific tactical objectives (representing the middle term desired state) to finish with practical, pragmatic operational objectives (representing the current state and the immediate improvement actions leading towards the tactical objectives and at the end strategic objectives). This approach provides a staged structural organization based on improvements to steadily pursue the organizations achievement of their objectives.

[21] Jouravlev Romain and et. al., 2019, *ITIL Foundation ITIL 4 edition*, TSO Information Publishing and solutions, Norwich UK

According to Lloyd et al (2011) the gap between current and future state aim at being the starting point of an ITIL implementation plan. ITIL documents required practices to increase effectiveness, efficiency and performance for service operations. Nevertheless, the level of abstraction of the documented processes and practices makes it difficult for organizations to structure their improvement activities. One common question observed in the field is related to where to begin from all the available ITSM practices. Unfortunately there is no established answer and it will depend on many factors related to the specificities of the organization's ecosystem as well as their cultural, political, social and technological environments. It will also depend on internal structures, strategies, available resources and so on. Therefore it is essential to establish a reference point from a documented reality (the current state denoted by a maturity assessment) to be able to use it as a departure point for improvement projects.

Today, there is a myriad of maturity models oriented towards specific aspects of the management of services. There are very few models that provide a global service oriented view. From the field observations is understood that organizations struggle to measure their maturity. The observed reasons are the complexity cost and time consumption of the existing maturity models. Also, practically all these models are based on CMMI like types and are well adapted to measure processes maturity but less adapted to measure the service-oriantation. Therefore, the field needs a new maturity model that would help organizations to measure their maturity in an easy, fast and inexpensive manner. Additionally the model should be adapted to the most recent ITSM practices available in the market.

1.8.3 How to measure maturity

There are many different methods and ways to measure the maturity of an IT service provider. Within others the most common methods are Audits, Conformity checks and Maturity assessments. Johansson (2016) claims that one of the most common used methods to measure the IT service provider maturity are maturity assessments and sustain that in order to implement ITIL successfully the organization must use a maturity model. While audits are more suited for Standards like ISO20000, and conformity checks are more suited for methodologies, maturity assessments are more suited to frameworks. The advantage being a structured approach applicable to different situations with specific levels that demonstrates a specific ability. ITIL being a framework, it defines best practices guidelines without any obligation and each or-

ganization shall define their own policies and procedures. This mean there is no possible compliance, but merely an alignment to the practices recommendations. A maturity assessment will provide, according to the different levels of a maturity model, specific recommendations of actions to implement in order to achieve higher levels. This is particularly interesting considering the exposed required evolution of improvements documented in the maturity definition. There are many available maturity models in the market.

1.8.4 Maturity assessments limitations

Maturity assessments have a clear advantage over binary methods (a certificate achieved or not achieved), because in the later organizations are awarded a certificate for the achievement of a specific result according to the specifications in a standard. From the products perspective the alignment to a specific standard is essential to control the quality of the products. Nevertheless, from an organizational management perspective there are strong limitations because an organization that achieved a certificate at the limit of the requirements or an organization that did not achieve it because there was a little element missing, operate quite similarly but one organization obtained the certificate while the other didn't. In such cases an organization that slightly failed to achieve the certificate fall in the same category than an organization that is completely disorganized, while an organization that slightly achieve the certificate fall in the same category than an organization that has attained a high level of performance. A maturity assessment provide profiles with staged levels that have to be achieved before getting to a higher level, providing inputs for improvement programs promoting the evolution of the organization. Nevertheless there are also specific limitations in their usage. According to Mettler (2011) when referring to maturity, it usually reflects a one-dimension focus, describing mainly one of the following three areas: 1) process maturity, 2) object maturity and 3) people capability maturity. These elements are all constituent parts of ITSM operations and when the maturity model does not consider all of them, there will be a gap in the understanding of the organization's maturity. As stated previously, most of the available maturity models do focus on only one of these areas, mainly processes.

Another important limitation is the complexity of many of the existing models. A maturity assessment must reflect the current state as accurate as possible. Therefore, maturity models tend to analyze specific actions with a high level of detail and require

multiple observers and eventually external interventions to avoid interpretations and misunderstandings. This situation creates an issue in which organizations will not define sufficient resources to carry out maturity assessments or will tend to address to simpler methods. Simpler methods tend to focus on one specific area not covering all required domains or will not deliver an added value in the comprehension of the current state and a proposed evolution for optimization.

Lastly, a maturity assessment is an « as is state » that will not present the constant evolutions of the organization. This will require a regular usage of a standardized model to be able to compare the evolution, but if organizations are struggling to obtain the required resources for the realization of a first maturity assessment, seldom will they find the resources for regular assessments.

These limitations will require a special attention when choosing a model to use. The model should be easy to use, inexpensive and useful and also reveal a reliable representation of the status of the organization at a specific moment. These characteristics are essential if the model is to be used regularly, provide a clear view of the organization's reality and provide an added value that would justify the investment, with the scope of providing guidance to improvement projects. As the actual models do not cover all domains, are complex, costly and time consuming, a new model is required that provides a complete global view but simple enough to be used on regular assessments.

1.8.5 Maturity Models

There is a vast diversity of maturity models, which normally should adapt to different situations and organizations. Nevertheless, despite this profusion of maturity models IT Service Providers struggle to measure their maturity (Albliwi, Anthony & Arshed, 2014), (Tarhan, Turetken & Reijers, 2016) and (Poppelbuss, Niehaves, Simons & Becker, 2011). Many other scholars have presented literature reviews of multiple Maturity assessment models available in the market. Most of them focus on a specific aspect of the organization like excellence, customer satisfaction, technological evolution, processes, etc. In the IT Service Management area there are as well several public and proprietary specific maturity assessment models. The most commonly used are based on CMMI, and ISO15504 maturity levels. Others like Axelos ltd. pro-

pose their own commercial ITIL maturity assessment model. In the following chapter a more detailed review of these models will be presented with the relevant academic literature.

A major issue is the difficulty of organizations to implement documented practices. ITIL being a public framework, it recommends specific guidelines but there is no obligation of implementation of these guidelines. Any organization implementing ITIL practices can say that they are doing ITIL, but it is rather difficult to answer to the question on how good or mature does the organization has implemented the recommended practices.

Around 2005 LIST (Luxembourg Institute of Science and Technology) former Centre de Recherche Henri Tudor, developed a measurement framework to control the maturity of ITIL processes based on the standard ISO15504. Despite its exhaustiveness and precision, this framework has not established in the field as the standard way to control ITIL processes maturity. This is probably due to the complexity and costs involved in its usage. This situation resulted in the fact that organizations still are not able to measure their progression and cannot situate themselves towards their evolution. After 2013 when ITIL control was transferred to Axelos ltd. they developed an ITIL maturity model covering all the processes described in ITIL 2011 using the staged CMMI approach with the maturity levels described in ISO15504 for process maturity. Nevertheless this model has not been successful in the field and is not widely used.

1.9 Research context review

The presented context covers the domain an importance of services in today's economy, the importance of ICT for the delivery of quality services, the specific context of Luxembourg, the importance of the financial sector and the importance of the service sector in Luxembourg's economy. Subsequently, the ITIL context and the maturity context were presented. With this in mind, the specific context for the sample of the research is the measurement of the service orientation maturity of IT service providers using ITIL of financial institutions in Luxembourg. The studied population is situated within the research domain of Service Orientation, which is embedded into the Service Science field. The global context is represented in the following figure:

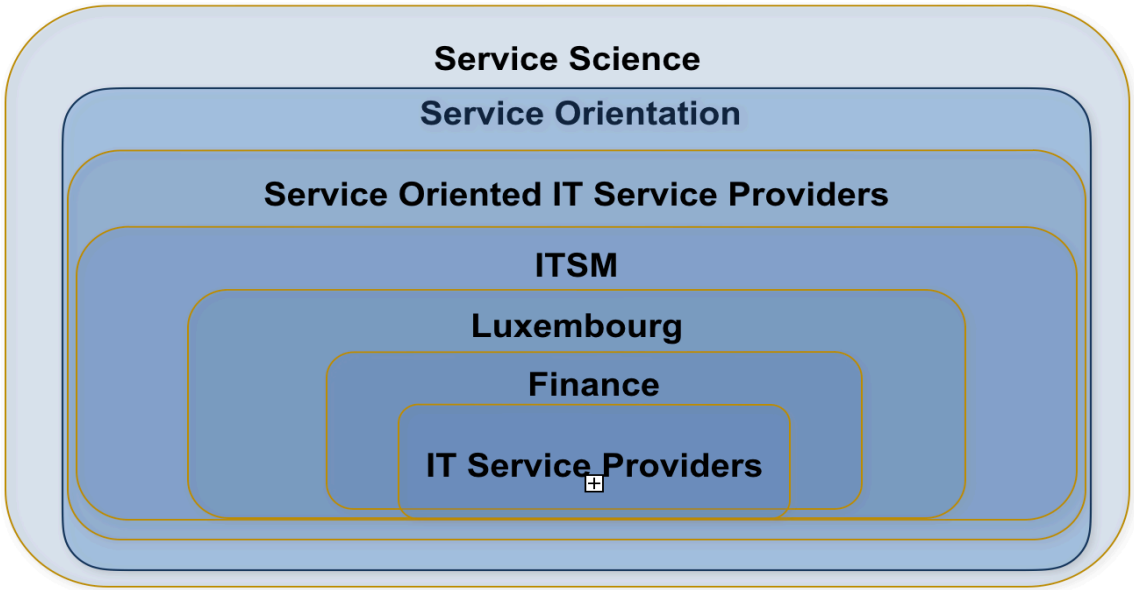

FIGURE 11 : GLOBAL RESEARCH CONTEXT
Source : Martin Cross

Within this context, IT service providers can be internal providers or external providers. Even though there are differences, considering that the boundaries are becoming more and more flow because organizations tend to use a mix of internal and external service providers to build their own services, the two types will be considered together. The interactions that will be considered are that both internal as well as external providers co-create value to their customers and both need to be service-oriented to be able to deliver quality services. Both types need to control their ITSM practices and need to measure their maturity in the same way. There are different interactions between the different elements considered in the context. These relationships are presented in the following figure:

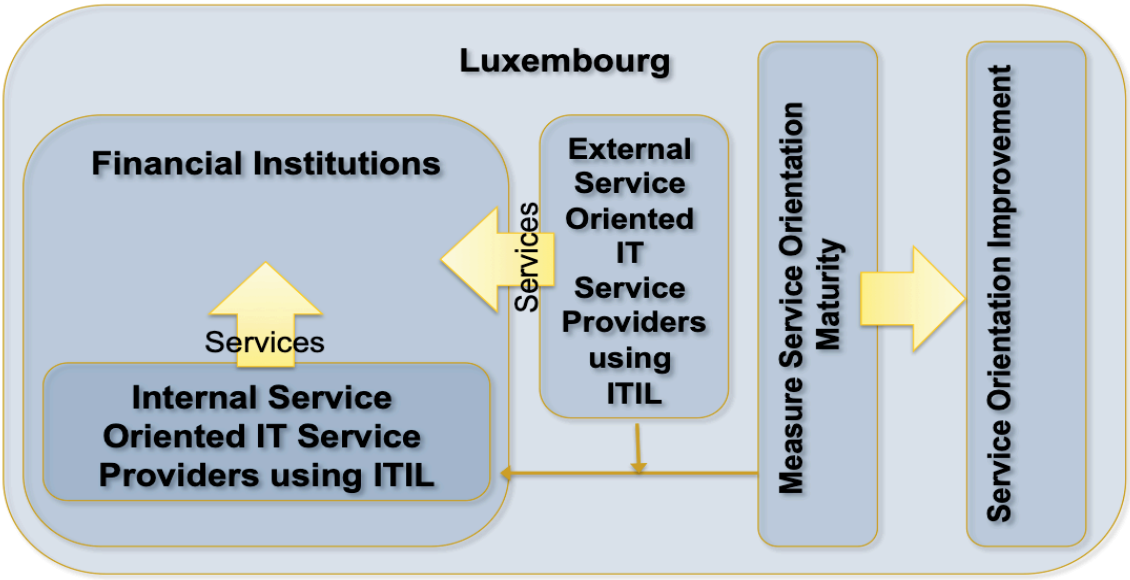

FIGURE 12 : IT SERVICE PROVIDER RELATIONSHIPS
Source : Martin Cross

These relationships considered in the context for the present research can be summarized as follows:

- The service-oriented IT service providers that use ITIL as their main ITSM reference.
- These IT service providers can be internal (IT departments) or external (full legal entities different than the customer's one).
- The relationship between the provider and the customer is related to services and not via technology.
- The IT service provider's customers are financial institutions in Luxembourg (holding a global banking license or being a PSF (Professionnel du Secteur Financier)).

1.10 Conclusion of the context analysis

Services drive today's economy and represent an important aspect for IT providers. The financial sector of Luxembourg is one of the most important industries of the country. IT services are essential to the financial industry of Luxembourg. Most of the IT service providers of the country use ITIL as their main reference to guide them in their ITSM implementations. Maturity measurement is an essential component of the management of services. IT service providers struggle with their ITSM implementations and measurement of their maturity.

Chapter 2: Research literature review

This chapter mainly focuses on the existing academic literature in the area of Service Science, service, Service Orientation, ITSM (IT Service Management), ITIL and Maturity. There is a vast amount of literature in each of the mentioned domains, but there are gaps when crossing these domains. While there are some useful studies in the Oceania region as well as in the Scandinavian region on IT Service Orientation and IT Service Orientation, other regions are clearly underserved. Lytle et. al. (1998) propose a Service Orientation measurement model that included financial institutions.

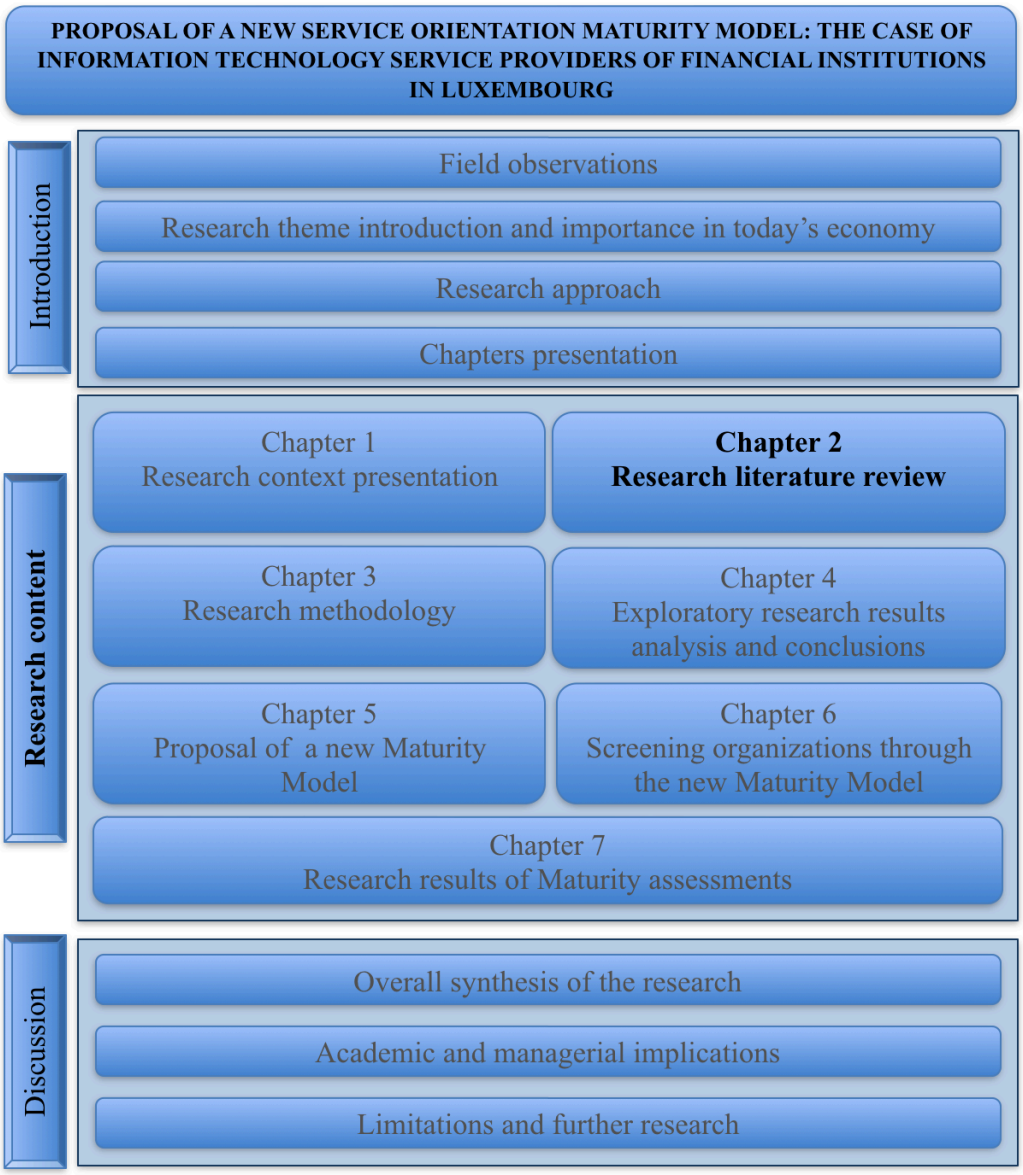

FIGURE 13 : CHAPTER 2 RESEARCH LITERATURE REVIEW
Source : Martin Cross

From the context description, the present research situates in the field of Service Science for which the specific domain of Service Orientation will be treated in the context of the maturity of IT service providers of financial institutions in Luxembourg using ITIL as an ITSM reference. Therefore, a brief description of the academic research in these areas is necessary. Services are embedded into the new concept of Service Science (Galup, Dattero, Quan & Conger, 2009) and ITSM (IT Service Management) is a subset of Service Science (Shahsaravani and Ji, 2011). Therefore, the initial literature research began in the field of Service Science.

2.1 Service Science literature

According to Ng and Smith (2011), *"Service Science is a free of paradigmatic research influences of existing disciplines, proposing Service Science as an integrative discipline of engineering, technological and, social sciences for the purpose of value co-creation with customers"*. Spohrer et al (2007) defines Service Science as *"the study of value co-creation interactions among entities known as service systems"* and also state that *"Service Science can be thought of as a mashup or integration of many areas of study known as Service Orientation, service marketing, service operations, service engineering, service computing, service human resources management, service economics, management of service innovation, service supply chain and contracting, eSourcing, and others"*.

Spohrer and Maglio state that *"the growth of the service sector is changing the nature of the organization, and it is becoming apparent that there is a lack of research and knowledge in services with most academics working within manufacturing rather than a service paradigm, but the rapid growth of the service sector has attracted the attention of researchers in a wide range of disciplines (i.e., technology, business, management, and marketing) in order to gain insight into several aspects of Service Science, innovation and management"* (Spohrer and Maglio 2008). *"Working in the area of Service Science helps organizations to become more adaptive, flexible, cost effective and service-oriented"* (Conger et al, 2008, Winniford et al, 2009). A number of these studies address issues such as the importance of a systems approach to services (Spohrer & Maglio, 2008), theoretical justification of service systems (Alter, 2008a, 2008b), domination of service economy in modern economy (Spohrer & Mag-

lio, 2008; Galup et al.), and the emergence of service-dominant logic (Vargo & Lusch, 2008; Gumesson, Lusch and Vargo 2010). Most of the Service Science developments and innovations depend on an adaptation and effective implementation of Information and Communication Technology (Galup et al., 2009). Nevertheless, organizations must consider the complexity of Service Science and approach it from the parts as well as from a holistic approach (Golineli, Barile, Spohrer and Bassano, 2010). In their study they focus on a service dominant logic illustrating how value is created.

As exposed above, Service Science is a quite new discipline, which is still evolving and needs attention from researchers. It is complex to describe and there are many definitions of it. This alone justifies the research in this area. To get a little more insight on the subject we can state Vargo and Lush (2016) explanations describing that there are two distinct logics that could be used in the development of Service Science. One, goods-dominant logic, *"is based on the idea that services are special forms of intangible goods and therefore points toward a model concerned with the production of intangible units of output"*. The other is based on a concept of *"service as a process of the co-creation of reciprocal value, where the output of an entity is viewed as an input into a continuing process of resource integration"*. They argue that a Service Science built on the latter, service-dominant logic is more likely to result in a science that makes significant strides in the knowledge base than is a service science based on a goods logic. Vargo and Lush documented several articles on service dominant logic and helped in the development of the area in the domain of service dominant logic, advancing Service Science and value co-creation. (2008a, 2008b, 2010, 2012, 2016).

According to the exposed literature, there is no consensus on the definition of service science and it is observable that there are still different interpretations. It is a domain strongly developing but there is still lack of research. More specifically concerning the practical use and influence of the exposed service dominant logic within practitioners. The literature does not show the impact of the domain in the daily management of services. Considering the importance of services in today's economy, as exposed in the context chapter, it is important to promote more research in the domain.

The main used Service Science literature is presented in the table below:

Author	Year	Publication name	Relevance
Golineli Gaetano Maria, Barile Sergio, Spohrer Jim and Bassano Clara	2010	The evolving dynamics of value co-creation in a viable systems perspective	Promotes Service Science service dominant logic in a holistic approach within a pathway of systems dynamics in a viable systems approach.
Gumesson Evert, Lusch Robert and Vargo Stephen	2010	Transitioning from Service Management to Service Dominant Logic: Observations and recommendations	The purpose of this paper is to reflect on actions and obstacles between 1970 and 2000, in the conceptual transition from mainstream Service Orientation to a new approach synthesized in service-dominant (S-D) logic.
Ketonen-Oksi Sanna	2017	Value co-creation practices in service ecosystems. A literature review	Defines service logic and value co-creation as a fast growing phenomena creating discrepancies among scholars. Proposes a thorough literature review and analyzes 319 articles in 7 journals.
Ng Irene, Maull Roger and Smith Laura	2010	Embedding the new discipline of Service Science	Defines Service Science as a discipline of its own and promotes research for Service Science.
Parry Glen, Newnes Linda and Huang Xiaoxi	2011	Goods, products and services	Describe the differences between products, goods and services.
Spohrer Jim and Maglio Paul	2008	The emergence of Service Science: Towards systematic service innovations to accelerate co-creation of value	Describes the accelerated pace of growth in the service sector and the interdisciplinary nature of services.
Spohrer Jim, Anderson Laura, Pass Norm and Ager Tryg	2008	Service Science and service dominant logic	Describe the basics of service dominant logic versus product dominant logic.
Töhönen Harri, Heiskala Mikko and Mänistö Tomi	2011	Towards the operationalization of service logic	Analyzes different streams of service logic literature and provide elements for the operationalization of service logic within existing management constructs.
Tronvoll Bard, Brown Stephen, Gremler Dwayne and Edvardsson Bo	2011	Paradigms in service research	State the evolution of service dominant logic within the Service Science field and analyze paradigms to propose a line of conduct for Service Science and service dominant logic research.
Vargo Stephen and Akaka Archpru Melissa	2012	Value co-creation and service systems (re)formation: A service ecosystems view	The article explores the service dominant logic in a service ecosystems view to study value co-creation emphasizing the social factors, network of actors and institutions that influence services.
Vargo Stephen and Lusch Robert	2008	Service logic for Service Science	Describe the difference between goods dominant logic and service logic based on value co-creation in a continuous process.

Vargo Stephen, Maglio Paul and Akaka Melissa	2008	On value and value co-creation: A service systems and service logic perspective	Describe service dominant logic in which service is the basis of exchange to create value, which in turn is created by service systems.
Vargo Stephen, Maglio Paul and Akaka Achpru Melissa	2010	Advancing Service Science with service dominant logic	Describe paradigms of goods dominant logic compared with service dominant logic and documents key concepts associated with service dominant logic and Service Science

TABLE 1 : MAIN SERVICE SCIENCE REFERENCES
Source : Martin Cross

2.2 Service literature

Spohrer et al (2007) mentions that within the Service Science community a service is often defined as *"the application of competencies (resources) for the benefit of another".* Vargo and Lusch provide the following definition: *"service is the application of competences (knowledge, resources) for the benefit of another"* (Vargo and Lusch, 2008). Ng, Vargo and Smith (2012) analyzed the service concept in its evolution mentioning the difficulty to define services. Many scholars tempted definitions like, Kolter, Barry, Lovelock, Vargo and Lusch within others. According to Ng, Vargo and Smith there is still not a consensus of the meaning of services but it is widely recognized the interdependence between services and goods. Nevertheless there are specific characteristics that define services: intangibility, heterogeneity, inseparability and perishability. Despite this global acceptance of characteristics, there is some literature that heavily criticizes the definition of services solely by these characteristics because they argue that some goods do share them. This is the case of industry services with tangible outputs (like software developers) or that are not fully perishable (like the case of recorded lectures) (Lovelock and Gumesson, 2004).

As per Parry et. al. (2011) even though there has been long agreement on the definition of products and goods there has not been a consensus on the definition of services. They mention 4 characteristics that distinguish services from products and goods: intangible, heterogeneous, inseparable and perishable. Each of these characteristics cannot describe services alone; they must be treated in conjunction.

Intangible things are not physical objects and only exist in connection with other objects. Heterogeneous things vary according to the context, nature and requirements of each customer and can be varied across regions or cultural background. Services

are inextricably linked with customers in terms of production and consumption. Finally services are perishable in the sense that they cannot be preserved as stock of fixed assets nor accounted in inventories of fixed assets.

Some academics argue that there are other characteristics that can be found in services like the experiences felt at the consumption of the services (Pine and Gilmore, 1998). According to them, the value of experience is a significant characteristic of services. Another distinction between services and products is the way quality is perceived. While in products the quality can be visualized before purchase in services it can only be perceived while using the services. Commonly measured with the SERVQUAL model proposed by Parasuraman (1988), it defines five factors that measure the perception of service quality:

- Tangibles – physical facilities, equipment, staff appearance, etc.
- Reliability – ability to perform service dependably and accurately.
- Responsiveness – willingness to help and respond to customer need.
- Assurance – ability of staff to inspire confidence and trust.
- Empathy – the extent to which caring individualized service is given.

Oertzen, Odekerken-Schroeder, Barx and Mager (2018) document the creation of services and more specifically the co-creation of value and consolidate the used terminology for the co-creation of services. They argue that to create services it is important the involvement, engagement and participation of actors in the co-creation process. Customers participate in the creation of value together with the service provider. Rouquet, Goudarzi and Henriquez (2017) studied the participation of customers in the provider's activities for the creation of value. They confirm the importance of managing the customer participation. Additionally Rouquet, Reniou and Goudarzi (2013) sustain that this relationship has recently strongly intensified and today the customer is considered as an active player in a service organization. Goudarzi (2017) point out the interest to develop and maintain a long-term customer relationship. This relationship is inherent to the value co-creation where the customer plays an active role and cannot be dissociated.

ITIL in its last version 4 defines services as *"means to enable value co-create by facilitating outcomes customer want to achieve, without the customer having to manage specific costs and risks".* This definition fails to consider some of the above-mentioned characteristics as well as some important aspects of the service like quality, controls and measurements. There are many more definitions of what is a service and academics have not yet reached a consensus. It is rather difficult to understand a concept if it is not clearly defined and the definition is not commonly accepted, which is the case today within scholars. As a reminder, within the present research the following definition will be used:

"A service is specific activities realized by a provider on behalf of a consumer to co-create value at specific moments by using goods and skills to help their customers achieve their objectives without them needing to manage how to obtain that value". (source: Martin Cross)

I built this definition from several academic literature proposals. Service Science is still evolving and needs more research and understanding, especially due to the impact that services have in today's economy. This definition considers the main arguments exposed in the academic literature to clarify the concept of service.

The table below resumes the main literature used for the service section:

Author	Year	Publication name	Relevance
Ng Irene, Vargo Stephen and Smith Laura	2012	Reconceptualising service through a service dominant logic	Trace the evolution of a service dominant logic and its influence in the definition of services.
Oertzen Anne Sophie, Schréoder Odekerken Gaby Brax saara and Mager Birgit	2018	Co-creating services: Conceptual clarification, forms and outcomes	Assess and clarify the co-creation of services terminology and propose a definition of co-creation of services.
Parry Glen, Newnes Linda and Huang Xiaoxi	2011	Goods, produce and services	Describes the differences between products, goods and services.
Spohrer Jim, Anderson Laura, Pass Norm, Ager Tryg and Gruhl Daniel	2007	Service Science	Defines services and describe different key aspects of services.
Vargo Stephen and Lusch Robert	2008	Service logic for Service Science	Describes services in a service dominant logic, based on value co-creation in a continuous process.

TABLE 2 : MAIN SERVICE REFERENCES
Source : Martin Cross

Considering the importance of services in today's economy, it is understandable why so many organizations are servitizing. This means, transforming from a products oriented organization into a service-oriented organization. Vandermerwe and Rada described servitization as *"the increased offering of fuller market packages or 'bundles' of customer focused combinations of goods, services, support, self-service and knowledge in order to add value to core product offerings"* (Vandermerwe and Rada, 1988). They regarded servitization as a key strategy for organizations to undergo a transition and adapt to a new kind of economy where services play a key role in value propositions. According to Ahmed, Onhoara and Kamoshida, among the transition processes that are occurring, the service sector is no longer being led by the manu-

facturing sector and is becoming the leading area. Servitization, in today's economy, is one of the most critical business strategies of an organization (Ahmed, Inohara, Kamoshida, 2013), and organizations need to offer an integration of services with their products.

West and Gaiardelli (2016) describe some of the challenges organizations are facing in their servitization process, requiring new business models (Gebauer, et. Al., 2005) and create different strategic, organizational and networking challenges (Beines, et. al., 2009, Oliva, et. al., 2012). To make it more complex this servitization journey is not unique and cannot be copied from one organization to another, it depends on the specific context of each organization and will differ depending on their heterogeneity, history and culture (Gebauer 2007, Neely 2008 and Neely et. al. 2011).

There is no doubt that servitization is an important aspect to consider by organizations in today's economy. Nevertheless the subject is vast and complex and despite the enormous academic literature available, there is still the consensus within academics that there is a need for more detailed research covering specific aspects of the Service Science domain in specific contexts. Some academics initiated research in specific domains like Tether (2012) and Huxtable and Schaffer (2016) analyzing servitization in UK manufacturing firms, Buratti and Russo (2015) analyzing servitizations in small firms, Turunen (2011) analyzing organization for servitization, Ahamed, Kamoshide and Inhoara (2013a, 2013b and 2013c) strategy for servitization, organizational factors for effective servitization implementation and the servitization of a manufacturing firm and Vendrell (2017) servitization and digitalization. Nevertheless there is a need for more research, specifically in the IT servitization area. A more detailed description of the servitization literature is found in annex 9.

2.3 Service Orientation literature

According to Camarero and Garrido, if an organization's main focus is based on services, it is recognized that the organization is Service-oriented. The more focus on services the strongest its Service Orientation is (Camarero & Garrido, 2012). Adding services to products is a major way retailers have of gaining differentiation in today's competitive market because products become very similar between retailers, with similar characteristics and prices. This differentiation through services obliges

organizations towards a strong Service Orientation. There are many definitions of Service Orientation (Gheysari, Rasli, Jamshidi, Roghanian and HaghKahah, 2012), They specifically study the factors which influence Service Orientation on bank's prosperity. They also describe the shift from industrial production to Service Orientation. Additionally, they use the Serv*Or structure from Lytle, Hom and Mokwa to measure Service Orientation and define that it is essential to understand the customer and create a strong customer service culture for employees.

According to Homburg, Hoyer and Fassnacht (2002), Service Orientation is *"the extent to which services are an essential element of the firm's marketing strategy"*. In other words there is a change perspective from a goods centric logic towards a service centric logic as the main activity of the firm and goods are considered solely as means to the organizations services. Compared to goods centric logic, Service Orientation is difficult to imitate because services are a mix of resources, behaviors, policies, practices, procedures and culture that are unique to an organization (Vargo and Lusch, 2008).

Homburg, Hoyer and Fassnacht (2002), analyze the influence of a service-oriented strategy in the results of the business. They also analyze the needs of servitization and the reasons why companies are interested in it. Finally they provide a framework for the implementation of a service-oriented strategy, based on 1410 questionnaires applied at retail stores. They proved 4 postulates:

1) The higher the competition and innovation needed, the higher the Service Orientation need,
2) The higher the customer orientation the higher the servitization of the business,
3) The more complex the service is the more focus of the business on services instead of components,
4) The higher the Service Orientation of the strategy the higher the performance of the company.

Antioco et. al. (2008), analyze the Service Orientation of 137 manufacturing firms in Belgium, Netherlands and Denmark defining 2 types of services: Services in support of the client actions (SSC) and Services in support of the products (SSP). Analyzes three dimensions of Service Orientation:

1) The number of services offered.

2) The number of customers that are offered services.

3) The company proactive emphasis on services.

And finally identifies 6 parameters that will help in the servitization process: 1) top Management commitment and leadership, 2) service rewards, 3) service technology, 4) cross functional communications, 5) service trainings and 6) customer treatment.

These elements were inspired from Lytle, Hom and Mokwa (1998), from their article "Serv*or: A managerial measure of organizational Service Orientation" in which they propose a Service Orientation scale (SERV*OR) which capture the extent to which an organization is perceived by its employees as having adopted practices, procedures and policies that represent an organizational Service Orientation. According to the academic research, important organizational outcomes such as profit, growth, customer satisfaction, and loyalty result directly from an organizational Service Orientation Lytle et. al. (1989).Therefore it is essential to understand the extent to which an organization is service-oriented and it is necessary to be able to measure their Service Orientation maturity. Today, organizations find it difficult to measure their service orientation maturity.

In their study Lytle, Hom and Mokwa (1998), they investigated several industries (including finance) by in depth interviews with management practitioners. They describe 10 factors in 4 domains that represent the level to which the organization is service-oriented:

1) Service leadership practices: a) servant leadership and b) service vision.

2) Service encounter practices: c) customer treatment and d) employee empowerment.

3) Human resource management: e) service training and f) service rewards.

4) Service systems practices: g) service failure prevention, h) service failure recovery, i) service technology and j) service standards communication.

This study set the basis of Service Orientation measurement (Lytle et. al., 1998) and defines Service Orientation as the *"organization-wide embracement of a basic set of relatively enduring organizational policies, practices and procedures intended to support and reward service-giving behaviors that create and deliver service excellence."* Even though this is the main reference used for measuring Service Orientation and is

quoted in many academic articles, it dates from 1998 and it would be convenient to adapt it to embrace the latest developments in Service Orientation practices.

There is a vast literature on Service Orientation, which describe specific aspects on the subject, like Akeson, Skalen and Edvardsson (2008) who make a review of selected literature on e-government Service Orientation and highlight differences between academic theory and empirical findings. Bakar et al (2013) review a Service-oriented Enterprise Architecture (SoEA) maturity measurement model documenting extensive literature related to SoEA. Bosch (2007), analyze thee adoptions of Service Orientation in e-government, communications and logistics. Donavan (2002) customer evaluation of employees Irfan (2015) customer orientation of service employees, Finoti (2018), defending the proposal of Service Orientation as a service dominant logic in contrast with goods dominant logic pointing out the importance of customer participation in the co-creation of value. Gebauer (2012) insisting in customer and service focused orientation. Juliette (2014) who analyzes customer orientation.

The table below resumes the main literature for Service Orientation:

Author	Year	Publication name	Relevance
Antioco Michael, Moenaert Ruddy, Lindgreen Adam and Wetzels Martin	2008	Organizational antecedents to and consequences of service business orientation in manufacturing companies	Define two types of services and three dimensions of Service Orientation as well as six parameters that help in the servitization process.
Homburg Christian, Hoyer Wayne and Fassnacht Martin	2002	Service Orientation of a retailer's business strategy: Dimensions, antecedents and performance outcomes	Define Service Orientation. Propose 4 proven postulates describing the relationships between customers Service Orientation, servitization, complexity and specifically the Service Orientation strategy and the performance of the company.
Lytle Richard, Hom Peter and Mokwa Michael	1998	Serv*Or[22]: A managerial measure of Service Orientation	Describe the perception of internal employees of the Service Orientation of an organization. Their model describe 4 service-oriented practices with 10 measured areas.

TABLE 3 : MAIN SERVICE ORIENTATION REFERENCES
Source : Martin Cross

[22] Robinson and Williamson propose a short version of Serv*Or and argue thatthis form provides the same view of service orientation than the complet form.
Robinson Leroy jr. and Williamson Kathleen, 2014, *Organizational service orientation: A short form version of th Serv*or scale*, Routledge, Taylor and Francis group, Service Marketing Quarterly, vo. 35, pp.155-172, School of business, Huston-Clear University, Huson, Tx, USA.

All these studies provide important insight into the academic advancement on Service Orientation, nevertheless they are quite specific covering some aspects of Service Orientation but somewhat far from this research focalization related to the holistic measurement of the maturity of IT providers of financial institutions in Luxembourg, therefore some insight into IT Service Management is required.

2.4 Information Technology Service Management literature

According to Gacenga and Cater-Steel, the growth of the service economy has resulted in service-oriented thinking as organizations attempt to increase value to their customers. Developments in a variety of disciplines such as Information Systems, Computer Science, Marketing, Economics, Accounting, Finance, IT and Operations and Supply Chain Management have resulted in a convergence of what is now labeled Service Science. In the IT area it is referred to ITSM (Information Technology Service Management), (Gacenga and Cater-Steel, 2011). Galup et. al. (2009) define ITSM as *"a subset of Service Science that focus on IT operations such as service support and service delivery".*

Castro Marquez and Velazquez Perez argue that organizations in today's economic environment, have the necessity to apply standards and best practices as tools to direct, control and supervision of ITSM related activities with the aim to optimize resources and if necessary comply with normative requirements. According to them, organizations need models, adapted to their business, to guide them and help them in the fulfillment of their business objectives (Castro Marquez and Velazquez Perez, 2018). Compared with the traditional technology-oriented approaches to IT operations, ITSM is a field that concentrates on process-oriented IT services. ITSM seeks to integrate IT operations with business that follow a number of principles that IT service providers must consider such as quality of services, customer relationships, and value delivery through IT operations. According to Sallé (2004) IT providers need to transform from a normal technology provider to a strategic partner to help organizations attain their objectives (Sallé, 2004). According to Andersen (2013) to be able to deliver excellent services, organizations must develop in the areas of people, processes leadership and culture. Therefore, organizations must organize in the form of

a service system with four key elements: Service culture, employee engagement, service quality and customer experience (Andersen 2013).

In the actual economic environment where organizations highly depend on the performance of information systems, the correct management of technology to support services is essential. ITSM is a subset of Service Science (Stuart, et. al., 2016) that focuses on IT operations for service delivery and service support. Shahsavarani and Ji (2011) define ITSM as a *"subset of Service Science that focuses on defining, managing, delivering, and supporting IT services to achieve organizational goals".* According to them ITSM is growing and a bigger number of research is ongoing related to concepts, constructs and models, nevertheless, they state that generally there is a lack of theoretically driven research. ITSM performance issues, implementations and ITIL are the most common subjects of research.

Iden and Eikebrokk (2013) provide a systematic review on ITSM implementations and document 37 relevant articles in 21 journals and 16 conferences. Most of the articles are related to critical success factors that determine the success of ITSM implementations, strategies and methods, implementation status and outcomes and benefits. They define ITSM as *"an approach to IT operations that is characterized by its emphasis on IT services, customers, service level agreements, and an IT function handling its daily activities through processes"* based on the definition of Marrone and Kolbe, (Marrone & Kolbe, 2011). IT providers cannot focus on technology, they must focus on services and the relationship with customers for value co-creation (Iden and Eikebrokk, 2013). They provide an overview of the different ITSM frameworks focusing their attention on ITIL.

Swinarski, Kishore and Rao (2006), studied the IT providers capabilities that contribute to the success of ITSM outsourcing relationship. They postulate that these capabilities are categories that lead to key process areas and propose a CMMI appraisal for measuring the performance of ITSM processes. They state that there is a vast literature on ITSM practices. Marrone and Kolbe (2011) studied the impact of ITSM frameworks in the IT organization. Their findings indicate that as the maturity of implementation increases, the perception of challenges decreases. Their findings also show that as the maturity of implementation increases, the number of realized benefits increases. They provide a consistent literature review for ITSM and ITIL. Trudel

(2017), describes documented CSFs for a successful implementation of ITSM practices but as well mentions factors that negatively influence the implementation of ITSM practices, like: wrong defined SLAs, lack of direction and bad understanding of customer needs.

The table below resumes the main literature for ITSM:

Author	Year	Publication name	Relevance
Badinelli Ralph, Barile Sergio, Ng Irene, Polese Francesco, Saviano Maria-Luisa and Di Nauta Premiano	2014	Viable service systems and decision making in Service Orientation	Describe the complexity of service systems and the different perceptions of different individuals related to the service systems including the perception evolution over time.
Castro Marquez Dasy Esther, Velazquez Perez Torcoroma and Castro da Silva Hugo	2018	Integration of security and management of services in the government of Information Technologies	The article evaluate different ITSM guidance and propose an integrated model mentioning that each organization must use the relevant guidance that would help them in the fulfillment of their business objectives.
Gacenga Francis and Cater-Steel Aileen	2011	Performance measurement of IT Service Management: A case study of an Australian University	Define ITSM and present ITSM frameworks and performance metrics.
Gacenga Francis, Cater-Steel Aileen, Toleman Mark and Tan Gui-Gee	2011	Measuring the performance of service-oriented IT management	Present a systematic literature review on ITSM measurement and propose performance metrics for 3 ITIL processes.
Galup Stuart, Dattero Ronald, Quan Jim and Conger Sue	2009	An overview of IT Service Management	Define ITSM and associate ITSM with different common areas like Six sigma, CMMI and ITIL.
Iden Jon and Eikebrokk Tom Roar	2013	Implementing IT Service Management: A systematic literature review	Provide an exhaustive literature review on ITSM and analyze different ITSM frameworks focusing on ITIL being the most documented and used framework.
Kamp Andersen Morten and Ankerstjerne Peter	2013	Service Management 2.0; The next generation of service	Define service quality criteria for excellent service delivery focusing attention on several aspects of the service delivery such as culture, attitude and implication.
Marrone Mauricio and Kolbe Lutz M	2010	Uncovering ITIL claims: IT executives perception on benefits and business IT alignment	Study the impact of ITSM frameworks (mainly ITIL) and demonstrate that the usage of such framework provide benefits to organizations. Prove that the greater the maturity of ITIL implementations the greater the benefits.

Shahsavarani Narges and Ji Shaobo	2011	Research in ITSM: Theoretical foundation and research topic perspectives	Define ITSM and inform that it is a growing area still developing. Analyze the main ITSM researched topics. Reviewed ITSM papers edited between 2000 and 2010.
Swinarski Matheuw, Kishore Rajiv and Rao H Raghav	2006	Impact of IT service process capabilities on service provider performance: An empirical study	Postulate the relationship of the providers capabilities and the derived ITSM processes proposing a CMMI appraisal to measure these capabilities.

TABLE 4 : ITSM MAIN REFERENCES
Source : Martin Cross

There is a vast literature on ITSM implementations, nevertheless, there is no specific literature related to the studied population as described in the context. From the exposed literature, we can observe the importance of a well-established mature ITSM to support the business, but there are many ways to structure an ITSM organization. The most used reference for ITSM is ITIL (Barafort (2002), Hochstein et al. (2005) and Johansson (2016)). Therefore, some insight is necessary into this reference and how it can support, control and coordinate IT activities to support the business objectives. More detail on different used references is found in annex 10.

2.5 ITIL literature

When addressing ITSM topics, there is a vast literature and among them ITIL is highly represented. According to Shahsavarani and Ji, despite this vast literature in the area, there is generally a lack of theoretically driven research in a still developing domain. (Shahsavarani and Ji, 2011). ITIL is a highly recognized source of best practice that has acquired worldwide acceptance. Many companies around the globe are implementing and using ITIL to guide them in their effort of improving their Service Management practices and Service Orientation (Conger 2008). ITIL is defined as a set of prescribed practices that an IT function may employ in order to achieve IT Service Management (McNaughton, Ray, & Lewis, 2010), (Iden and Eikebrokk, 2013).

ITIL is only one of the many sources of service practices but is largely the most commonly employed. This fact was documented via the results from exploratory research phase as well as several academic studies like Barafort (2002), Hochstein et al. (2005), and Johansson (2016). According to Axelos ltd. official site

(www.Axelos.com) « *ITIL supports organizations and individuals to gain optimal value from IT and digital services. It helps define the direction of the service provider with a clear capability model and aligns them to the business strategy and customer needs, providing comprehensive, practical and proven guidance for establishing a Service Orientation system »*, *« ITIL is a widely accepted approach to IT Service Orientation (ITSM), which has been adopted by individuals and organizations across the world. It provides a cohesive set of best practice, drawn from the public and private sectors internationally. ITIL advocates that IT services are aligned to the needs of the business and support its core processes.»* and finally Axelos presents the latest version 4 available in the market since January 2019 as a version that « *takes you through a service value system which provides a holistic picture of what it really means to contribute to business value. The focus is now on the co-creation of value through service relationship. The updated framework will focus on facilitating value co-creation via a service value system (SVS). The SVS represents how different components and activities can work together, in any type of organization, to facilitate value creation through IT enabled services ».*

According to Iden & Eikebroekk (2013), ITIL has been translated into more than 20 languages, with representation in more than 150 countries with many professionals around the world following trainings and certifications to develop their skills in the area. This phenomenon alone is sufficient to be interested from the research perspective. In their Literature review on ITSM, Iden and Eikebroekk (2013) identified 37 relevant studies and 27 journal articles related to ITIL usage. Nevertheless considering the importance of the subject, we can state that the ITSM area is underserved of academic research, (Iden and Eikebroekk, 2013). Research was focused on three main topics: 1) antecedents to implementation with 14 articles, 2) implementation with16 articles and finally 3) consequences with 12 articles. Australia is the biggest contributor to the literature and Cater-Steel is the most prolific author with 6 contributions.

Hirth (2010), studied the implementation process of ITIL within Nordic countries, analyzing the transformation requirements through project practices. He insists on the uniqueness of such projects requiring different approaches for each project, but there are many things that can be applied from lessons learnt in the implementation projects from other organizations. Hirth statements show the complexity of ITIL implementations. Therefore, there must be a full justification of such projects. It's conven-

ient to clarify CSF (Critical Success Factors) as well as documenting expected benefits. Hogstein, Tamm and Brenner (2004) studied the extent of ITSM implementation in European countries based on 6 cases, documenting benefits, costs and success factors while integrating service-oriented principles. The main benefits refer to the increase of client orientation, efficiency and transparency of processes. The draw back of this study is that is based on ITIL V2 implementations.

Marrone and Kolbe (2010) studied the benefits of ITIL implementations in 503 organizations in North America, Europe and India and identified only 9 studies that addressed the issue. The main expected benefits in the adoption of ITIL according to these studies are:

- Service quality improvements
- Services standardization
- Increase in customer satisfaction
- Return on investment
- Down time reduction

In a further study in 2011, they identified that if the maturity of the ITIL implementation increases, the perception of the challenges decreases, and that if the maturity of the ITIL implementation increases, the benefits increase as well (Marrone and Kolbe, 2011). But it is not sufficient to decide to implement ITIL, according to Iden and Langeland, organizations that are implementing ITIL find it challenging and usually are confused on how to implement ITIL successfully (Iden & Langelen, 2010). In their study they demonstrated that the main factors that contribute to the successful implementation of ITIL relate to the proper training and skills, leadership and management involvement, communication and collaboration and the establishment of a service culture. Iden and Eikebrokk demonstrate that a strong involvement of management is essential in the success of ITIL implementations as well as organizational commitment (Iden & Eikebrokk, 2014a).

Complementing these studies, Pollard and Cater-Steel observe that many organizations implementing ITIL were not successful. They studied four IT providers (2 in USA and 2 in Australia) that succeeded in implementing ITIL and identified a series of CSF that are important in the ITIL implementation process: importance of a strong management implication, inter-department communication and collaboration, training, process focalization and customer oriented metrics (Pollard & Cater-Steel, 2007).

More recently, Pereira and Silva (2011) studied the implementation of ITIL and mention that *"it is the most popular best practices framework for managing IT. However implementing ITIL is not only very difficult but also there are no recommendations and guidelines for it. As a result, ITIL implementations are usually long, expensive and risky"*. Contrasting with this study, Potgieter, Botha and Lew (2004) studied the usage and benefits of ITIL in South Africa. Using a CMMI maturity model approach they determined that operations performance as well as customer satisfaction increased after the implementation of ITIL. This study was based on ITIL V2 processes. Mohamadi observed as well that many organizations implementing ITIL are not successful and investigated the Critical Success Factors (CSF) that impact on successful implementation of ITIL (Mohammadi, 2015). 22 CSF were identified and classified into five groups: 1) organizational, 2) human resources, 3) project Management, 4) managerial 5) processes. Tayfour studied more recently the same issue and concluded similar CSFs (Tyfour, 2018).

In conclusion, there are several studies evidencing the use of ITIL in the implementation of ITSM practices but organizations struggle in the implementation of such practices. While there is a consistent set of identified CSFs for a successful implementation of ITIL, usually these are the aspects that are causing trouble in the ITIL implementations. More over, there is a gap in the literature in the sense that all these studies relate to ITIL version 2, ITIL version 3 and very few to ITIL 2011. There are no studies for ITIL version 4. This last version has been in the market only since 2019, nevertheless it is important to make more research adapted to the new updated references in the market. Iden and Eikebrokk studied the adoption of ITIL in Nordic counties and found gaps in the literature suggesting that more studies should be done for the adoption of ITIL in other regions and countries (Iden & Eikebrokk, 2016). Today there is only partial information on the subject and many regions and countries are lacking of studies in the area. The present study contributes to this analysis via an exploratory research todefine the maturity status in the region of Luxembourg.

There are other important references for ITSM like CobIT, ISO 20000, ISO 27000, TOGAF, Six Sigma, eTOM, CMMI, VeriSM, IT4IT and many more. Some literature is available for these references and specifically some authors have studied the similarities between ITIL and these references like Ali, Somooro & Brohi (2013) and Somooro & Hesson (2012). As the present study is not focused on the comparison be-

tween other references it will be presented only the mapping between the processes of previous version of ITIL and the practices described in ITIL version 4. Please refer to annex 13 for a table resuming these relationships. From this table we can observe that there is a trend to include more processes and practices over time making ITIL V4 the most comprehensive reference. The following table presents the main literature reviews in the ITIL domain:

Author	Year	Publication name	Relevance
Ali Syed Mubashir, Soomro Tariq and Brohi Muhammad	2013	Mapping ITIL with other IT standards and best practices	Mapped different references like ITIL, ISO20000, ISO 27000, Cobit, TOEGAF, eTOM, CMMI, to mark the similarities and differences.
Axelos	2007	ITIL V3 SS, SD, ST, SO and CSI	Reference manuals of ITIL V3
Axelos	2011	ITIL 2011(SS, SD, ST, SO and CSI)	Reference manuals of ITIL 2011
Axelos	2019	ITIL V4 Foundation,	Reference manuals of ITIL V4
Axelos	2020	ITIL V4 CDS, CSV, HVIT and PDI	Reference manuals of ITIL V4
Cater-Steel Aileen, Toleman Mark and Tan Wui-Gee	2006	Transforming IT Service Management – the ITIL Impact	Analyze the implementation of ITIL in a series of organizations, the required transformation and the impact achieved by the transformation. Document a series of CSFs for ITIL.
Conger Sue, Winniford Marie Ann and Erickson-Harris Lisa	2008	Service Management in operations	Describe the popularity of frameworks such as ITIL, Cobit and CMMI but conclude that there is a lot of confusion in the implementation and usage of the different frameworks.
Iden Jon and Langeland Lars	2010	Setting the stage for a successful ITIL adoption: A Delphi study of IT experts in the Norwegian armed forces.	Study ITIL adoption and state that most organizations find it challenging and confusing. Investigate factors that led to a successful implementation.
Iden Jon and Eikebrokk Tom Roar	2013	Implementing ITSM; A systematic literature review	The article provides a systematic review of ITSM and ITIL implementation literature. Concludes that there are some researched domains but that it is needed more research in the field.

Iden Jon and Eikebrokk Tom Roar	2014a	The impact of senior management involvement, organisational commitment and efficacy in ITIL implementation benefits	Demonstrates that a strong management implication is important for ITIL implementation success but that group efficacy is the strongest factor.
Iden Jon and Eikebrokk Tom Roar	2014b	Using the ITIL process reference model for realizing IT Governance: An empirical investigation	The study demonstrates the benefits and contribution of ITIL processes in IT Governance.
Iden Jon and Eikebrokk Tom Roar	2016	IT Service Management: Exploring ITIL adoption over time in the Nordic Countries	Demonstrate the need of more research in the field of ITIL implementations in different areas and regions to be able to benchmark markets countries and regions.
Marrone Mauricio and Kolbe Lutz	2010	Uncovering ITIL claims; IT executive's perception on benefits and business IT alignment	Studied the benefits of ITIL in 503 organizations in USA, Europe and India, identifying only 9 studies that addressed the issue and document 5 main benefits.
Marrone Mauricio and Kolbe Lutz	2011	Impact of ITSM frameworks on the IT organization: An empirical study on benefits, challenges and processes	Analyze the impact of ITSM maturity (mainly ITIL) in the benefits for the organization. The more mature the more benefits.
Mohammadi Mohammad, Ravasan Ahad and Hamidi Homa	2015	Investigating CSFs in implementing the ITIL framework: The cse of a developing country	Investigate the CFS for a successful ITIL implementation. They referenced 22 CSFs in 5 categories: Organizational, Human resources, Project management, Managerial and processes.
Pollard Carol and Cater-Steel Aileen	2007	Justifications, strategies and CSFs in successful ITIL implementations in USA and Australian companies: An exploration study	Observe that many companies implementing ITIL are not successful and identify a series of Critical Success Factors that help in the implementation of ITIL.
Shahsavarani Narges and Ji Shaobo	2011	Research in ITSM: Theoretical foundation and research topic perspectives	Focus on Service Science and ITSM research publications. Conclude that there is a lack of theoretically driven research in the area but it is developing fast. ITSM performance and ITIL are the most common research topics.

Somooro Tariq Rahim and Hesson Mihyar	2012	Supporting best practices and standards for Information Technology Infrastructure Library	Studiy different ITSM related references like CMMI, Cobit, eTOM, ISO9000, ISO17799, Malcom bridge and six sigma, and demonstrate that rather than being concurrent there is a big advantage of complementing them to improve ITSM practices in ITIL.
Tayfour Mohammed	2018	CSFs for ITIL implementation in public organizations: An exploratory study	Studied CSF for a successful ITIL implementation and concluded similar CSFs as Mohamadi 2015.

TABLE 5 : RELEVANT LITERATURE FOR ITIL
Source : Martin Cross

Other studies and publications address different aspects of the challenging subject of the measurement of ITSM performance: the aspect of ITIL performance metrics (Barafort, Di Renzo, Lejeune, Prime, & Simon, 2005; De Haes, & Amelinckx, 2003), IT service performance and quality measures (Hochstein, 2004), business value of ITIL (itSMF Germany, 2008), ITIL process capability and maturity assessment (itSMF International, 2008), software for measuring ITIL process performance (Jäntti, Lahtela and Kaukola, 2010) and evaluation frameworks for ITIL (A Hochstein, et al., 2005; McNaughton, Ray, & Lewis, 2010). This shows that there are numerous studies addressing some specific aspects of ITSM.

Gacenga, Cater-Steel, Tolemans and Tan (2011), worked on another article specific for the performance measurement of ITSM service-oriented organizations where they state the difficulty of measuring ITSM.: Change Management, Incident Management and Problem Management. These article focuses on the potential benefits of Service Orientation based on ITSM processes and provide an interesting review of different measurement models related to ITSM. While the study of Gacenga, Cater-Steel, Tolemans and Tan (2011) is quite interesting in the search of performance metrics, they address only three of the 26 processes (or 34 practices in ITIL V4). This confirms again the difficulty to measure a global view of ITSM considering all the proposed processes and practices in ITIL. This consolidates the need for a new model to be able to measure the Service Orientation maturity from a holistic perspective. This would allow them to understand their present state and be able to compare it to a desired state to define an improvement program (Lloyd et al, 2011). Thus the need to understand better these aspects and detail the existing academic literature on Maturity and Maturity models for ITIL.

2.6 Maturity literature

Maturity is an essential part of the management of an organization because it defines the present status of the organization's operations and a specific target to evolve to. Nevertheless, maturity is difficult to define correctly. According to Albliwi (2014) determining the level of process maturity is critical for business stability, improvement and sustainability of any organization. The value of a maturity model is that organizations can capture their current maturity. A maturity model is a tool to help organizations assess strengths and weaknesses of their business processes. It provides a roadmap for improvement, and evaluates the organization by comparing the quality standards and best practices of maturity of the organization to other organizations. This helps to reduce their risk of failure. Managing the process definitely leads to production of high quality products within the constraints of time and budget. Van Looy, Backer and Poels (2011) state that deploying a process does not imply that your process is good. Therefore, maturity is necessary as a measure to indicate how good processes can perform. Maturity requires continuous process improvements, which are not easy to realize. A maturity model is a tool to systematically assess and improve capabilities.

In line with the same idea, Salah (2014) sustains that maturity models are a normative reference that assumes a predictable evolution and change patterns. The main purpose of maturity models is to assess the current situation in order to evaluate the strengths and weaknesses and then prioritize and plan for improvement. According to Steenbergen et. al. (2010) it is not possible to implement a fully mature function from scratch, functional domains are developed incrementally, improving them step by step. Maturity models are a well-known instrument to support the improvement of functional domains in IS. Becker Knackstedt and Pöppelbuss (2009) continue with the same idea stating that in IT management, maturity models have proved to be an important instrument because they allow for a better positioning of the organization and help find better solutions for change. Therefore, IT management needs supportive tools to assess the as-is situation of a company, derive and prioritize improvement measures and subsequently control the progress of their implementation. The maturity model serves as the scale for the appraisal of the position on the evolution path. Gomes et al (2010) complement this idea stating that a maturity model is a process improvement approach that provides organizations with the essential elements

of effective change. It can be used to guide process improvement across a project, a division, or an entire organization. Basically, the purpose of maturity models is to provide a framework for improving an organization's business result by assessing the organization's strengths and weaknesses and enabling comparisons with similar organizations. This is useful to justify investments, improvements, recognition of service quality or a better understanding of an organization's strengths and weaknesses. Maturity models are an important element of strategic planning.

With all the above statements, the utility of the usage of maturity models to assess an organization's maturity is evident. Nevertheless, there is no clear evidence of the utility in the sense of performance related to the use of maturity models. This is due to the fact that these models do not describe how to effectively perform recommended actions of improvement. They merely state the as-is status of the organization. Mettler (2011) states that these improvement actions can be very difficult to implement, even when the decision makers know what to do. Therefore, being compliant with the maturity assessment model would not necessarily guarantee that an organization would achieve success. Gomes et. al. (2010) sustain the same idea that maturity models do not in themselves result in performance improvements. According to them, no studies have been able to show that using maturity models result in a sustained competitive advantage for an organization. Another assumption is that an improvement in processes maturity will yield an improvement in the overall organizational maturity. Neither of these assumptions have been empirically tested. They state the study of Ibbs and Kwak (2000) that demonstrated no statistically significant correlation between project management maturity and project success based on cost and schedule performance.

According to Albiwi (2014) there is a lack of consensus on the definition of a maturity model. There are different definitions of the concept in the literature. Albiwi (2014) cites the definition provided by William Pullen who defines a maturity model as *"a structured collection of elements that describe the characteristics of effective processes at different stages of development and suggests points of demarcation between stages and methods for transitioning from one stage to another".* Becker states that a maturity level represents *"an evolution of desired stages"*. For him objects are typically organized in processes and advancing from one stage to another requires continuous improvement. Becker (2009). As a reminder, the used definition for this

research is: the maturity of a service-oriented organization is the evolution of the organization from an initial state to a developed desired state of readiness by progressively improving their abilities and capabilities to be able to co-deliver value to stakeholders when required in the form of services. (Source: Martin Cross)

It is important to differentiate the concept of maturity from a maturity level and a maturity model. A maturity level refers to the specific results achieved by an organization in comparison of a used maturity model that shows a consistent set of behaviors, practices and processes to produce desired outcomes. A maturity model is a normative reference model that embraces the assumption of predictable evolution and change patterns.

Becker states that recently there have been hundreds of maturity models that have been developed. Despite this profusion of maturity models, organizations still struggle measuring their Service Orientation maturity. Zubar (2017) states that IT service maturity is a key success factor for service provider organizations documenting a direct relationship between IT maturity, cost, scalability and efficiency. The study uses ITIL as ITSM reference and also compare CMMI, COBIT and ISO15504 models. The study assess 5 ITIL processes, considering that assessing all ITIL processes is unrealistic and unfeasible. This demonstrates the complexity of maturity assessments based on recommended ITSM processes as well as the need for a more holistic maturity model.

If there are so many maturity models in the market, it is essential to choose the right model that will provide benefits to the organization that uses the model. The usage and implementation of a maturity model require a huge involvement of different teams of the organization and is certainly an important investment, consuming time and money. So let's take a look of what the existing literature express for ITSM Maturity models.

2.6.1 Service Orientation maturity models

As described in the service orientation literature section, the most cited Service Orientation maturity model is Lytle, Hom and Morkowa (1998) Serv*Or expressing the evolution of manufacturing firms into an organizational Service Orientation. The model proposes 35 questions using a Lickaert scale to measure the organization's Service Orientation in the 4 domains and 10 fundamental elements. For reference the

questions are documented in annex 14. Despite that Serv*Or is the main maturity model used for Service Orientation measurement, it was developed at the end of the century where technology was quite different of what we have today. At the time Internet was developing and telecommunications and mobility did not offer what we are accustomed today. Even if the basis for Service Orientation was well established and is still used today, the evolution of ITSM practices require a review of the model because it dates from 1998, and it is not aligned with the latest evolution of ITSM practices (specifically, ITIL V4). Also, it only considers the perception of internal staff about Service Orientation and fails to address the perception of customers and users.

Complementing Serv*Or, Shawn, Mendoza, Buckley, Schoenfeldt and Harraher (1998) propose a SOI (Service Orientation Index) based on their definition of Service Orientation considering four aspects: the disposition to be helpful, thoughtful, considerate and cooperative. This study prove the usage of biodata with the Service Orientation Index, nevertheless does not provide an exhaustive perception of the capabilities of an IT service provider, focusing mainly on behaviors. There is an interesting proposal by Donavan and Hocutt (2002) where they observe that most maturity models focus their evaluations of ITSM performance on a self-assessment perspective from the service provider's employees. From the literature they document that *"customers may not perceive employees to be as customer oriented as employees perceive themselves to be".* They studied the customer perceptions in contact with employees of 219 restaurants. Consequently, they relate the customer satisfaction to two positive outcomes: Customer satisfaction with the service encounter and customer commitment to the firm. Nevertheless, they fail to provide insight into the employees' behaviors and providers operations and performance.

Wangenheim carried out a systematic literature review of software process capability maturity models, and recognized that there is a wide variety of models more or less adapted to specific situations and domains (Wangenheim, et al., 2010). They observed that most of the models were concentrated around the CMM/CMMI framework and the ISO/IEC 15504 (SPICE) standard. Pöpelbuss and Becker offered as well a comprehensive literature review for maturity analysis of information systems (Pöpelbuss and Becker, et al., 2011). They observed as well that CMM is the most extensive used model as a foundation for IS maturity models.

Another interesting initiative is proposed by Christianto and Andy (2018) in their evaluation of maturity using ITIL. Nevertheless, they propose a rather limited view of ITSM maturity as their evaluation is based only in the maturity of a Service Desk, failing to provide a holistic view of ITSM practices. The most recent contribution related to maturity models is Kuikka (2018) who presented a study to measure maturity of business services with the scope of reducing the variation of customer facing services. More references related to ITSM maturity models can be found in annex 12.

From the exposed above we can conclude that there are numerous business management maturity models and numerous maturity models adapted to specific components of ITSM, but most of them based on CMMI and oriented towards the measurement of processes and not Service Orientation. Other models measure different aspects of the business, the service or technology, but there are no global models to measure IT Service Orientation adapted to the actual practices of ITSM and specifically to ITIL V4. Therefore, the need of a new model providing a holistic view and adapted to the latest developments in the ITSM area.

The table below presents the main used references for the analysis of maturity models.

Author	Year	Publication name	Relevance
Albiwi and Arshed	2014	Critical literature review on maturity models for business process excellence	Review the most common maturity models. Observe that the most commonly used maturity model is CMMI and developed a maturity model for Six Sigma. Analyze Crosby's QMMG, Bessant's Continuous Improvement maturity model, CMM, CMMI and BPMM from Object Group Management.
Axelos	2011	Axelos maturity model for ITIL	Proposes a structured approach for a process self assessment.
Becker Jörg	2009	Developing maturity models for IT management; a procedure model and its application	Study different maturity models and describe their utility. Analyzes the existing maturity models and conclude that there is a vast number of them but most of them developed empirically and are not based in a scientific approach. Proposes the development of specific maturity models using a model for the creation of such maturity models.

Domingues Pedro, Sampiao Paulo and Arezes Pedro M.,	2016	Integrated management systems assessment; A maturity model proposal	Analyze the existing literature on maturity topics for Integrated Management Systems. Separate an organization in 2 aspects Back office and Front office and proposes a maturity model to measure integrated management systems considering three axes, process agents, externalities and excellence management. The model is based in CMMI.
Kuikka Riku	2018	Measuring the operational maturity of business services	Based on a thesis he proposes a tool to measure business service maturity. The interest of this study is that is one of the most recent ones proposing a still missing maturity approach to measure more than just processes. Nevertheless it is measuring the service but not organization, culture and people.
Lytle Richard, Hom Peter and Mokwa Michael	1998	Serv*Or: A managerial measure of organizational Service Orientation	Developed a specific model to measure Organizational Service Orientation. The model is quite referenced in many articles and is the most commonly used model to measure Service Orientation .
Pöpelbuss Jens, Niehaves Björn Simons Alexander and Becker Jörg.	2011	Maturity models in information systems research; Literature search and analysis	Conduct an extensive literature review of maturity models and observed that there are many maturity models specific for different domains but most of them based on the initial CMM framework and ISO15504 (SPICE). They documented the different domains of the research.
Trinkenreich Bianca, Santos Gleison and Barcellos Monalessa	2015	Metrics to support IT service maturity models; A systematic mapping study	Analyze metrics to support IT maturity models based on CMMI but include as well ITIL, Cobit, ISO20000 and Servqual.

Wangenheim Christiane Gresse von, Hauck Jean Carlo Rossa, Silvano Cleinio and Wangenhem Aldo von	2010	Systematic literature review of software process Capability Maturity Models	Observe the vast availability of specific maturity models and carry out a systematic literature review of maturity models. Conclude that there are many models specific for different areas but most of the models are based on the CMMI framework and the standard ISO15504 based on processes.
Wulf Johen, Winkler Till and Brenner Walter	2015	Measuring IT Service Capability; Scale development and empirical validation	Developed a specific ITSM maturity model based on four existing ITSM maturity models (CMMI, COBIT 4.1, Spice and Axelos ITIL V3 Maturity model) based on the assumption that the existing models are complex time consuming and unfeasible in cases where the company is seeking to asses their maturity. They define 6 process attribute to measure: Plans and procedures, Awareness and stake holder communication, Tools and automation, Skills and expertise, Responsibility and accountability and Goal setting and measurement.

TABLE 6 : SERVICE MATURITY MAIN LITERATURE
Source : Martin Cross

Recalling the conclusion form the Service Orientation and ITIL literature sub-section we observe that there is a clear gap in the literature. A model that covers different ITSM areas with a view of internal service provider staff as well as customers and users and that is simple to use and cost effective, is highly needed. Even though the focalization of the present research is oriented towards a global organizational Service Orientation view of the maturity it would be convenient to analyze from the academic literature perspective, how does organizations are measuring.

2.6.2 ITIL Specific maturity models

Axelos ltd is a company that was created to develop and commercialize ITIL. They hold the rights over the framework and provide licenses to service providers using ITIL. Comparing ITIL (being a framework) to standards and methodologies, it is not possible to certify ITIL compliance. Axelos ltd has developed a specific training schema, which can be used to prove acquired skills by people. Thus the people ac-

quired knowledge about ITIL can be tested and certified. That is the only recognized and official certification schema. Axelos ltd. developed a specific ITIL 2011 process assessment model based on questionnaires for a self-assessment. There is a questionnaire for each of the 26 processes and the 4 functions of ITIL 2011. Each questionnaire covers the following areas:

- Process/function demographic questions
- Process/function-generic attributes
- Process/function-specific attributes
- Process/function outcomes and outputs
- Interfaces and inputs.

The model was build according to the established CMMI and SPICE maturity levels: 0 Chaos, 1 Initial, 2 Repeatable, 3 Defined, 4 Managed,5 Optimized. The model is realized via a tool that provides the questionnaires with binary answers (Yes/No) with each question corresponding to a specific maturity level. There are more than 4000 questions for a full assessment and the tool provides a maturity level chart for each process and function. While the approach is systematic and exhaustive, field observations show that it is difficult to use, costly and organizations do not always understand the meaning of the questions. This makes it somewhat unreliable and not representing fully the reality of the maturity of the organization. It is fully aligned with ITIL 2011 processes and functions and it is well documented.

ISO15504 is a standard originated from SPICE for software development maturity assessments based on processes. The standard was revised and is now part of the ISO33000 family. The structure of the standard has evolved to include any type of process by documenting a PAM (Process Assessment Model) describing the global concepts that are to be treated in an ISO15504 process assessment. The model describes the rules to apply when describing a process via a PRM (Process Reference Model).

The figure below shows the main components of an ISO15504 assessment:

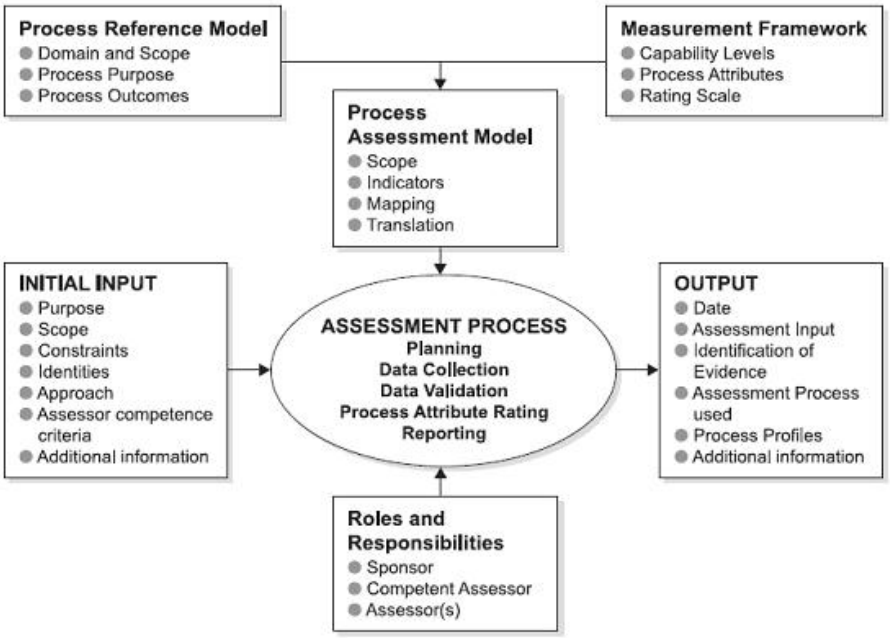

FIGURE 14 : ISO15504 PRM
Source ISO15504

The maturity levels built in ISO15504 are consistent with maturity levels proposed by CMMI from where they derive. The figure below shows the documented maturity levels in ISO15504:

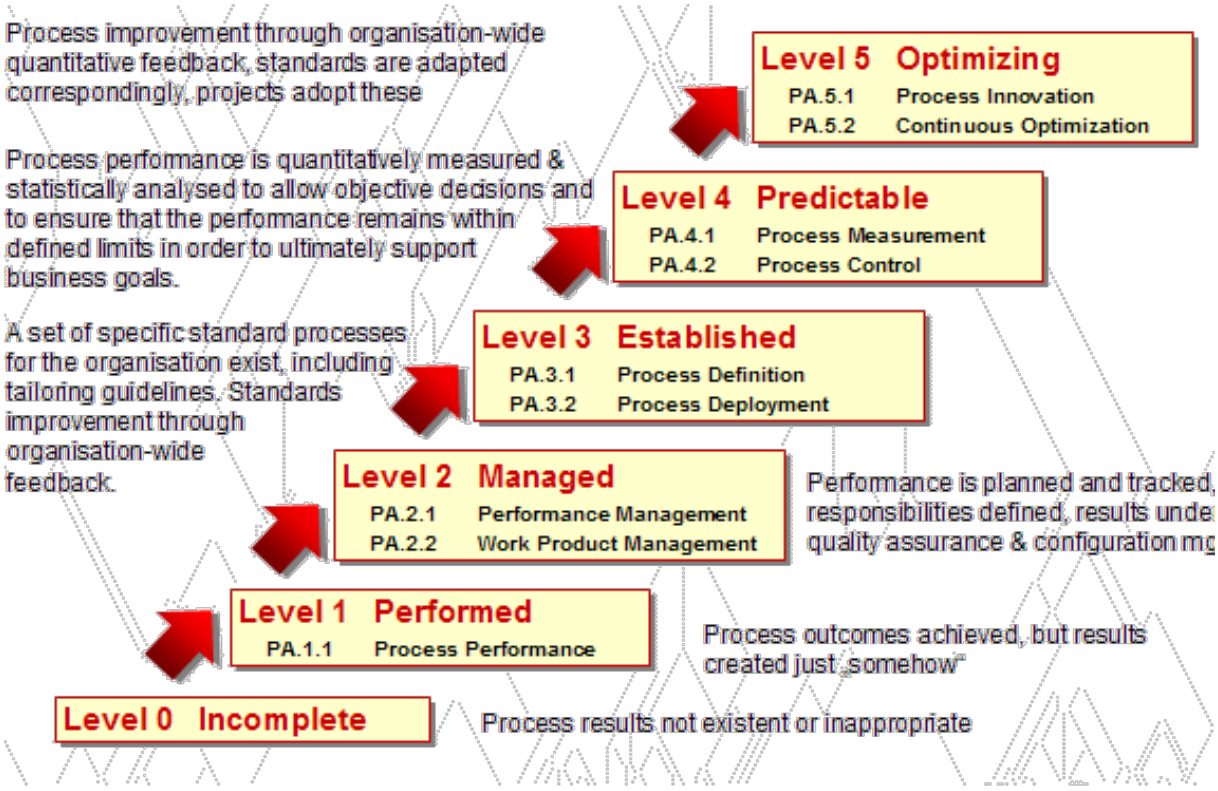

FIGURE 15 : ISO15504 MATURITY LEVELS
Source : ISO15504

Maturity levels are assessed by a series of interviews over a representative sample according to the assessed organization. Processes, process activities and attributes are quoted with a scale of 4 levels (Not realized, Partially realized, Largely realized and Fully realized). There are three types of assessment:

- Internal self assessment, with the scope of understanding the current state
- External assessment, with the scope of measuring the maturity for improvement plans
- External assessment, with the scope of benchmarking and comparison in the market

To achieve a maturity level the specific level must be at least largely achieved and all previous levels must be fully achieved. Despite its precision of process maturity levels, it is complex to use and require specific training and knowledge for its realization. As the model is oriented towards the maturity of processes, to fully asses the ITSM maturity based on ITIL it will be necessary to assess all 26 ITIL 2011 processes, making it quite time consuming and costly. The model is not adapted to measure the maturity of functions and it will require serious adaptations for ITIL V4.

TIPA[23] is a Process maturity assessment model based on the ISO15504 structure that was developed by LIST (Luxembourg Institute of Science and Technology) describing a specific PRM for the processes of ITIL V2, V3 and 2011. It follows the same characteristics as exposed above for ISO15504 and deals with the same limitations as ISO15504.

Janes and Novak (2017) studied the process maturity of a Slovenian electric power supply industry using the McCormack Maturity Model. Their analysis is based on the maturity of processes. They conclude that despite the long timeframe of implementation, the maturity remains low. Jadla and Johansson (2018) propose a tool to measure ITSM maturity in a self-assessment based on ITIL processes. They applied their tool at a Swedish bank of 16000 employees with the idea to integrate it for regular assessments. Unfortunately they do not specify the ITIL version. Their study is based on a derivative of CMMI assessments and is focused on processes maturity.

[23] Cortina Stephan, Picard Michel and Renault Alain, 2015, *TIPA for ITIL 2011,; Process assessment model*, Luxembourg Institute of Science and Technology, Luxembourg.

2.6.3 Maturity models for ITIL V4

Most of the previous studies have been used to identify the maturity levels of processes mainly for ITIL V3 or ITIL 2011, the latter being composed of 26 processes. ITIL V4 focuses much more on value delivered to business and the contribution to the business processes and outcomes. It was launched in February 2019 and the relevant bibliography was available to the market at different stages in 2019, most of it only available in November 2019, part of it only available in May 2020 and the last components coming to the market only on the 25th of September 2020. Being part of the work group developing ITIL practices I had privileged access to ITIL documentation before it was launched in the market, making it possible to analyze the content prior to the launch. At present there are no maturity models specific for ITIL V4 that have been identified in the field or in the literature. Thus the necessity of the creation of a new maturity model covering this version.

2.6.4 Existing maturity models comparison

It is important to understand what each model measures in order to understand the usability of the model. The table in annex 11 shows the main focalization of the most used maturity models. The presented characteristics are not exhaustive. What can be observed in this table is that all maturity models do focus on specific aspects of ITSM, processes being the most represented. The result is that all these models provide only a partial view of the maturity of the organization according to the measured processes. Even though we might associate processes to ITIL V4 described practices, the models are not perfectly adapted to that change and will require the assessment of 34 practices. This makes these types of models unpractical and unrealistic for a regular assessment to control the evolution over time. Only the Serv*Or variant includes people perceptions and tests the customer experience. Nevertheless this model is weak covering processes and technology and its main focus is on the internal service provider staff perception and not the external perception of the customers and users. Therefore, the necessity of a more consistent updated model.

All these models are either too complex and time consuming or quite simplistic and not providing a reliable representation of the organization's reality. In annex 12 are presented comparative tables with the characteristics and quality criteria of the main ITSM maturity models. From these tables we can observe that the main maturity models (TIPA -and CMMI derivatives- and Axelos) are reliable but time consuming

and costly. The average cost for a full TIPA and Axelos assessment is 62.860€ and 12.738€ respectively. On the other hand some models are quite simplistic and do not provide enough insight to guide organizations in their improvement paths. A balanced model providing enough reliability, yet simple to use and inexpensive, could prove useful for practitioners in the field.

2.6.5 Maturity literature conclusions

Considering that there are a wide variety of maturity models more or less adapted to specific situations, it would be expected that organizations would find in this vast number of models what they require to measure their maturity. But from the academic literature analysis, it is clear that most organizations are not capable of measuring their ITSM maturity. This is mainly for two reasons: 1) the required investment to use a reliable model together with the lack of available resources and/or 2) the lack of understanding of the usage of a model together with the usefulness of the results for planning improvements. This was confirmed as well in the exploratory phase of this research.

Adding to this, the fact that despite the wide variety of available maturity models in the market, most of them provide a partial view of the organization's maturity because they focus too much on processes. ITSM is a vast domain that requires attention to multiple aspects. To measure the maturity of ITSM will require the measuring of these multiple aspects. ITIL V4 complemented ITSM practices with a wider range of activities and domains (like Organizational change, talent management, risk management) which are not covered in previous versions, therefore, ITIL maturity models oriented towards these versions will be incomplete and it is needed an adapted model to the latest ITSM developments covering a holistic view of the organization.

From the moment that there is no clear vision of the state of advancement of the Service Orientation focalization of the service provider, it would be rather difficult to estimate the next steps to follow. According to Mettler (2011) maturity is an informed approach for continuous improvement. Gomes et. al., also defend the idea that maturity models are process improvement approaches that help organizations with essential elements for successful change. The benefits of maturity models are related to the integration of functions, guidance on improvements, and benchmark (Gomes, et. al., 2013). According to them it is essential to link the maturity measures with benefits of

investment. But a maturity model provides a view of the as-is status and not an improvement plan. Therefore, a maturity model not linked to improvement opportunities to produce benefits will be useless. Nevertheless, maturity measuring is the basis of changes based on a staged improvement approach. It is therefore essential to develop the capability of measuring maturity with a model that promotes evolution and change rather than an end state. The existing models are too complex, detailed but expensive or too simple, cheap but not reliable. It is important to provide adapted tools to practitioners to measure their service-oriented maturity. The proposed model must be adapted to the actual practices. Additionally, the model should be simple to use, inexpensive and reliable while providing practical guidelines for future steps in the evolution of ITSM implementation. From the existing academic literature it is not possible to obtain enough information related to the usage of holistic maturity models and specifically the intended benefits. Existing articles define the usage of models to measure specific ITSM components but fail to analyze and propose solutions for a global maturity approach to help practitioners on the field to improve their ITSM practices and service orientation.

The model should be flexible to use in a variety of organizations, independently of the size and structure. Eventually could be applicable to other areas than just IT Service providers for financial institution is Luxembourg. IT service provider for other domains as well as other countries with a similar situation than the studied sample should be able to use the model. More over, if the model is not specific to ITIL (even though aligned to it) but specific to the global Service Orientation practices it could as well be used in other domains than just ITIL or IT providers. Thus the managerial impact could be important in many domains and many organizations of different types of providers in different countries could use the model, as long as the organization is seeking a strong Service Orientation. With all this in mind, it is evident that a new service-oriented maturity model adapted to the latest ITSM practices is needed, but a little bit more insight on how the specific studied sample is coping with the ITSM complexity and measurement. For that purpose an exploratory research is convenient to get more insight on the field.

Chapter 3: Research methodology

This chapter documents the exploratory research phase and how it was carried out. I explain the criteria used for the selection of the method for data gathering (semi-directive interviews with an interview guide) and elaborate on the choice of the population and the selected sample. The used criteria consider the type of IT service providers (internal or external), their origin and their size. I then describe how the interviews were conducted, how the transcription was done and how the interviews were coded using a codebook. Additionally, it documents the methodology used for the creation of the model supported by the design science theory. I also describe the sampling for the application of the maturity model and the methodology used for the analysis of data related to the maturity of the studied population.

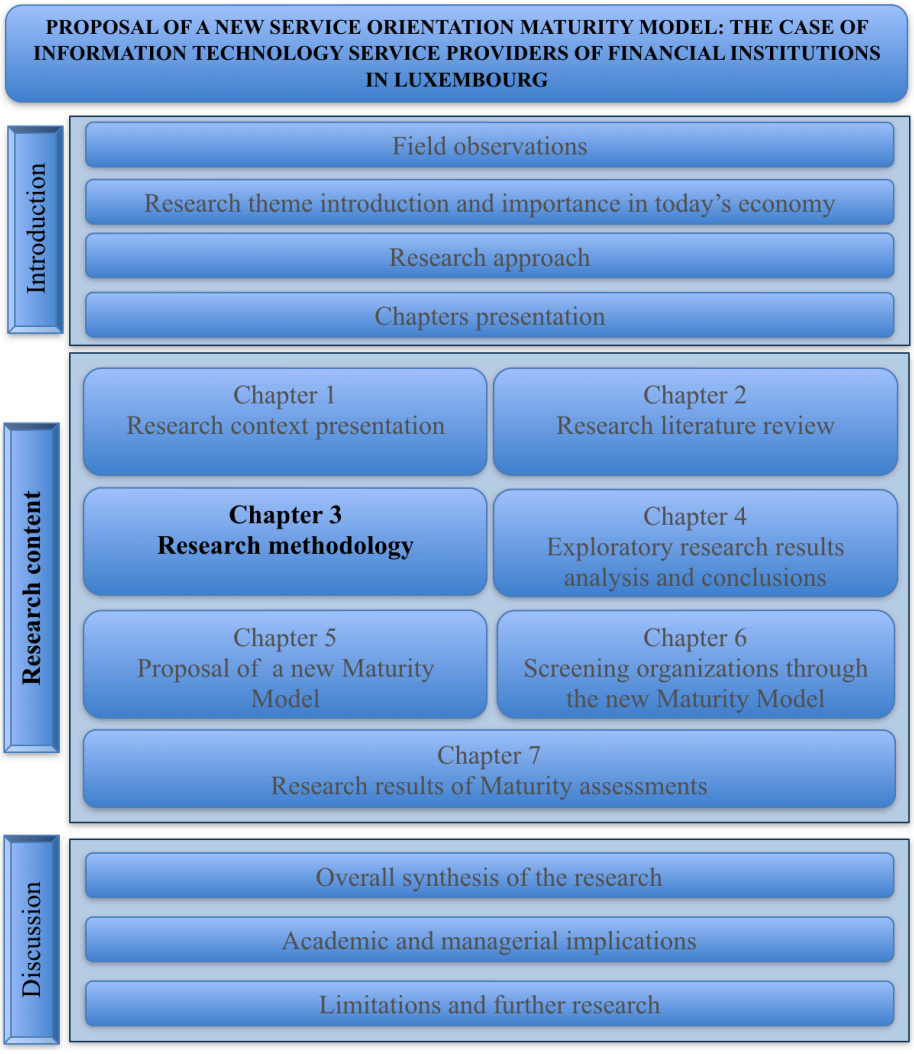

FIGURE 16 : CHAPTER 3 RESEARCH METHODOLOGY
Source : Martin Cross

Data gathering is an important step in a research. There are several ways of gathering data for observation, demonstration and explanation of certain phenomena. In the case of this research two approaches were already considered: 1) field observations based on experience and 2) academic literature in the field of Service provision as well as IT's role in the context of the financial sector in the Luxembourgish economic environment.

As a basis for an academic research, it is important to ground observations from the field based on the global experience of the researcher. Specifically in the case of an EDBA research which is founded on observable phenomena and where researchers are well paced within the ecosystem where this phenomena take place. Years of experience working in this field allows to be more critical about situations that generate a discomfort or problems within the managerial field. Personally, I have more than 30 years of interventions into managerial missions with different types of service providers in different parts of the world. Therefore I have observed many of the difficulties in the field that practitioners confront.

On the other hand, it is of the upmost importance to conduct extensive academic literature review on the different studied areas, to document the exiting knowledge in those areas. The scope of this literature research is to:

- Acquire evidence of the issues at hand from previous works.
- Understand how these issues have been addressed in previous works.
- Gain insight into potential existing gaps.
- Justify the research based on the found gaps.
- Acquire additional knowledge in support of the research objectives.

When there are gaps in the existing academic literature and there is lack of documentation of the observed phenomena, it is then valuable to explore the field from the academic perspective. This would allow evaluating whether the empirical observations are correct.

As shown in the previous chapter, there is an extensive amount of literature on Service Science in different areas like value co-creation, marketing, service strategy and many others but not specific to the context of maturity measurement of IT providers of financial institutions in Luxembourg using ITIL. Therefore, the existing literature

does not provide possible answers to the stated questions: 1) are the IT service providers in Luxembourg committed to Service Orientation? 2) are they facing difficulties in this process? 3) are they facing difficulties with the measurement of their Service Management practices maturity?. To clarify these questions, an exploratory research is convenient. This will allow to:

- Corroborate or reject the field observations.
- Understand the specific ecosystem in which the phenomena takes place.
- Identify new potential gaps.
- Detect potential bias of the researcher related to the implication of the field.
- Detect and identify focal phenomena.
- Understand variances in the studied sample.
- Direct the research on a most significant aspect that would bring the most managerial benefit on the field.

In this context a qualitative exploratory research seems well adapted to the purpose of this research. At first, I will address the methodological aspects of the exploratory phase. I will then present the studied sample, followed by the interviews to finally delve into the analysis of the content.

3.1 Exploratory research Methodology

In order to explore the field it is first essential to collect quality data that represents as close as possible a phenomenon on the field. There are multiple forms and methods to gather data such as direct observations, direct meetings, business meetings, internal business documentation, unofficial discussions, focus groups, brainstorming sessions and interviews, just to mention a few. Not all of the methods are adapted to the collection of data with academic validity. For this exploratory research phase it was chosen to make individual interviews to avoid influences within a group and a semi-directive interview type to direct the interview to the desired topics while still providing freedom of expression of the interviewee. A more detailed description on the analyzed interview methodologies is found in annex 16.

Choosing a sample that is representative of the studied population is also essential to gather quality data. This will allow inferring from the sample to explain the phenome-

na in the reference population. The population refers to all of the members who meet the particular criteria specified for a research investigation (Alvi 2016). Sampling is the process through which a group is extracted from a population (Alvi 2016). A sample can be defined as a group of relative smaller number of people (or entities) selected from a population for investigation purposes (Alvi 2016). From the different sample techniques like random, systematic, stratified, convenience, snowball and quota, a mix was used to constitute the final sample according to the following logic:

- Categorize the population according to representative characteristics.
- Define a quota for each category.
- Pick elements from the population by convenience.
- Use snowball sampling to discover new candidates for the sample.
- Control the quota.
- Randomly pick elements for the categories with missing respondents.

A more detailed description on the used sampling methodologies is found in annex 17.

The present research considers only the universal banking license institutions (136 institutions in 2020) in the studied population. These are more representative of the financial operations in the country, compared to the mortgage bonds banking license institutions (4 institutions in 2020). The universal banking license institutions are categorized in three sectors:

- UBL (Universal banking license)
- Specialized PSF (Professionel du Secteur Financier- Financial Sector Professional-)
- Support PSF

The following table documents the different types of financial institutions in Luxembourg:

Type	Code	Category	Number (31/12/2017)
UBL (135)	B1	Banks under Luxemburg law	94
	B2	Branch of banks from EU member state origin	32
	B2	Branch of banks from Non EU member state origin	13
Specialized PSF (108)	SP1	Professional services for constitution and management of institutions	92
	SP2	Domiciliation institutions	86
	SP3	Registry holders agents	58
	SP4	Family offices	31
	SP5	Professionals holding non financial assets	13
	SP6	Professionals offering credit operations	5
	SP7	Professionals holding financial instruments	3
	SP8	Reassurance of debts	2
	SP9	Savings funds administration	1
	SP10	Regulated market operation	1
	SP11	Postal financial services	1
Support PSF (79)	PS	There are 4 main support PSF and there are several potential combinations of the 4 types (*)	79
MBBL		-	4

Detail of the support PSFs is found in table 10

Source; Banque Central de Luxmbourg: number and geographic origin of credit institutions established in Luxembourg, 2020.

- *www.bcl.lu/statistics/series_statistiques_luxembourg/11_credit_institutions/index.html.*

TABLE 7 : CATEGORIES OF FINANCIAL INSTITUTIONS IN LUXEMBOURG

The final sample was constituted as follows:

Id	Financial institution Type	Size Category	Origin	Turn over	IT Service provider type	IT type
1	Investment Bank	C	UK		Shared IT	Internal
2	European financial institution	E	EU		PSF type 3 and 4	External
3	Global Financial institutions	D	Lux		Telecom	Internal / External
4	Support PSF type 1, 2, 3 & 4	D	Lux		Shared IT	Internal / External
5	Investment Bank	C	Swe		Shared IT	Internal
6	Global Financial market	A	Fr		Training	Internal
7	Non Fin Institution Steel distribution	B	Lux		Shared IT	Internal
8	Global Financial Institutions	C	USA		Support PSF type 3 & 4	External
9	Non Fin Institution Air transportation	C	Lux		Shared IT	Internal
10	Global Financial Institutions	B	Lux		PSF type 3 & 4	External
11	Support PSF type 1 & 2	B	Fr		Consultancy	External
12	Financial and Insurance	A	Japan		Shared IT	Internal
13	Specialized PSF	B	Ger		Shared IT	Internal
14	PSF support type 3 & 4	A	Lux		Consultancy	External
15	Essential Organization Media, Finance and Telecom	D	Lux		Shared IT	Internal /External
16	Global Financial Markets	B	Lux		PSF type 3 & 4	External
17	Global Financial Institutions	B	Fr		PSF type 3 & 4	External
18	Specialized PSF	D	Lux		Shared IT	Internal
19	Essential Organization (air transport)	C	Lux		Shared IT	Internal

Internal IT service providers are ruled by the financial institution
External IT service providers who are support PSFs are ruled by the prudential control of the CSSF.

External IT services providers who are not PSF are not subject to the prudential control of the CSSF.
IT providers type 3 and 4 are considered as well a financial institution.
Size category A up to 50, B51 to 100, C 101 to 500, D 501 to 1000 E more than 1001.

TABLE 8 : STUDIED ORGANIZATION IN THE EXPLORATORY RESEARCH SAMPLE
Source : Martin Cross

From these 19 interviewed entities, 4 companies are not financial institutions as exposed in table 10. These 4 companies are classified as essential operators and have an important impact in the country's economy as well as the financial institutions in Luxembourg. These essential operators provide direct services and serve as important global service providers in the country. These organizations were included in the research due to their importance to the Luxembourgish market, but were analyzed separately. The results were compared to those of the financial institutions to verify the differences or similarities.

The remaining 15 organizations are financial institutions of various types as documented in table 7, and they represent the population as follows:

- **Type**: There are 6 internal service providers, 7 external service providers and 2 service providers that deliver services internally as well as externally.
- **Origin**: There are 6 service providers under Luxembourgish law, 7 from a European union member and 2 from a non-European origin.
- **Size**: There are 8 small financial institutions (3 with less than 50 employees and 5 between 51 and 100 employees), 6 mid size organizations (3 with 101 to 500 employees and 3 with 501 to 1000 employees) and 1 big institution with more than 1001 employees.

This sample is rather representative of the global Luxembourgish financial sector. A more detailed view of the sample stratification is found in annex 18.

In the same way that a careful sampling must be applied to select the entities to analyze, it is necessary to select very carefully the people for the interviews in order to ensure that they have the required responsibility in terms of Service Management operations and decision-making. It is also important that they have a wide view of Service Management practices implemented in the organization. All of the interview-

ees hold specific responsibility in the implementation of ITSM projects. The table below lists the role and skills of the interviewed individuals representing their company:

Int Id	Function	Language	SM skills	Interview Time
1	Responsible for Service Management in IT	Fr	Service Management and team management. ITIL certificate	74
2	Project team leader (responsible for Service Management Implementation projects)	Fr	Service Management, Project Management and Managerial skills. ITIL and maturity assessments certificate	45
3	Service and marketing Manager	Fr	High managerial skills, SM skills and engendering	46
4	Service and quality Manager	Fr	SM experience, quality management and managerial skills. ITIL Expert	48
5	Service Management development Manager	Fr	SM, development and infrastructure management. Intermediate ITIL certifications	36
6	Global responsible for Infrastructure Management	Fr	Practical Service Management experience	35
7	Responsible for world implementation of SM practices	Fr	Development management and international teams management ITIL certified	46
8	Responsible for services and customer care in the EMEA region	En	Managerial and SM skills. ITIL certified	49
9	Service Manager	Fr	Development, Project management. ITIL certified	50
10	Service Manager and head of operations	En	Project management and team management. ITIL certified	52
11	Customer Account manag-	Fr	Solutions leader, customer representa-	39

	er		tive, ITIL certified	
12	Head of IT	En	Infrastructure management, support and IT management. ITIL certified	69
13	Process owner	Fr	Team leader, application owner, Scrum master, PM, DevOps. ITIL certified	78
14	General Manager	En	IT science, MBA, PM. ITIL certified	60
15	Head of Financial information	En	Finance, Information Management and Human resources management. ITIL certified	50
16	Chief internal auditor	En	IT, Security, infrastructure and data management. ITIL certified.	38
17	Core banking	En	Development, support and finance. ITIL certified	39
18	Head of SM	En	Head of development and responsible for SM implementation. ITIL certified	62
19	Head of SM	En	Head of IT. ITIL certified	70

TABLE 9 : EXPLORATORY RESEARCH INTERVIEWED INDIVIDUALS
Source : Martin Cross

3.2 The interview methodology

All interviewed candidates participated with self-will, had specific Service Management skills and hold specific responsibilities in the studied field. All but one interviewee are ITIL certified (ITIL foundation, ITIL intermediate or ITIL Expert certificate). All candidates had multiple skills in other areas like IT technical areas, Project Management area, Global Managerial skills and Human Resources Management skills.

The methodology used for the interviews was based on an interview guide built from the initial field observations.

1. IT Service providers in Luxembourg are committed to Service Orientation.
2. IT Service Providers in Luxembourg face Service Orientation implementation difficulties.
3. IT Service Providers in Luxembourg face Service Orientation measurement difficulties.

In annex 19 is documented the used interview guide and in annex 20 is documented the standard confidentiality agreement that was used during the interviews. In some cases, an internal organization's confidentiality agreement document was used. Annex 21 describes the interview process and the used controls.

3.3 Content analysis methodology

Data collected through a semi-directive interview lacks structure and quite is diversified because it allows individuals to express themselves freely. A rigorous approach is necessary to structure the data and extract valid information from it. There are two different objectives for the analysis of textual data, 1) to prove or explain or 2) to explore and understand (Bardin 2003). In the context of the exploratory research phase, the objective is to explore and understand what is really happening in the field in respect to the field observations.

3.3.1 Analysis description

The content analysis can be done in different ways that provide different observations and points of view from the same data set. Lexical and syntax analyses are typically done to extract a sense from breaking the text in tokens (lexical analysis) and then recombine the tokens (syntax analysis) to provide a structure of the text. Content and thematic analysis involves establishing themes to structure the text (Thematic analysis), establishing categories of the content and counting the number of instances in which they are used in the text to make sense of them (Content Analysis) (Joffe and Yardley 2003). From the moment that an interview guide was used during the interviews, established themes were explored more intuitively. Instances of the different interviews related to a specific category are accounted and provide a message that makes sense. Therefore, a content thematic analysis is the most convenient methodology to use.

From the interview guide, a codebook was developed to structure the content of each interview. After the interviews, all gathered data was consolidated according to the codebook. Finally, the analysis of the consolidated interviews was established. In the following sections there is a description of the methodology used for the transcripts, the creation of the codebook as well as the data analysis.

3.3.2 Interviews transcripts

All the interviews were recorded with the agreement of the interviewees and were held in English or French. The interviews of the two languages were treated differently. In English the interviews provided a direct input for analysis while the interviews in French needed to be translated before the analysis.

For all the interviews, the full text of the interview was transcribed and the main themes were extracted into the codebook. For the French interviews, after the transcription into the codebook in the original language, the themes were translated. As an extra precaution and to avoid wrong interpretations, a different person extracted the themes from the codebook, translated them into English, then consolidated them and documented them into the codebook. This method, despite of being laborious and time consuming, guarantees that misinterpretation and bias of translation are avoided.

3.3.3 Interview code-book

For qualitative data analysis, a systematic coding of the interview texts is essential. Codes are building blocks and the foundation of the analysis[24]. According to Saldana, there are 4 identified tasks for the analysis: 1) discovering themes and sub-themes, 2) windowing themes to a manageable few, 3) building the codebook (hierarchies of themes) and 4) linking themes into theoretical models. (Saldana, 2008). For the creation of the interviews' codebook, the essential themes derived from the initial field observations. Then sub-themes were derived from expected answers coming from the observed experience. The first interviews were used to document more detailed categories from the content of the original text. Subsequent interviews analysis provided extra categories. As the analysis advanced, the content of the interviews increasingly fitted in existing categories. After that, the rest of the interviews were done with the interview guide aligned to the codebook.

After the categorization of the content of the interviews, all categories were reviewed and rebuilt for a final version of the codebook. All interviews were reviewed according to the final codebook structure to obtain the final structured data set for analysis.

[24] Saldana Johnny, 2008, *The coding manual for qualitative researchers*, Based on the text of Anselm L. Strauss, Qualitative Analysis for Social Scientists, 1987, p. 27

The documented categories were inserted into a spreadsheet where the data were analyzed using traditional functions of the application. Each of the three domains related to the initial field observations was analyzed separately according to the structure proposed in the codebook. The analysis focused on the interpretation of data with the aim of exploring and understanding the field and not at all with the aim of demonstrating or trying to prove any specific aspect.[25]

The data gathered during the exploratory research phase were analyzed and the results were confronted with the initial field observations and the literature analysis. These three aspects confirmed that:

1. IT service providers are committed to Service Orientation.
2. Most IT service providers are using ITIL as the main reference for Service Orientation.
3. IT service providers are facing Service Orientation implementation and measurements difficulties.

Additionally, it was confirmed that organizations do not measure their service orientation maturity due to lack of resources (human, time and financial), lack of knowledge and the complexity of the existing models. It became evident the need to propose to the field adapted tools that would allow them to measure their service orientation maturity. As exposed in the literature review and confirmed by the field observations and the exploratory research results, there is a profusion of maturity models, nevertheless these are too complex to implement and use, and require too many resources. In addition the main proposed models are outdated or unsuitable because they focus on processes instead of results and lack the perception of users and customers. Therefore the need of a more adapted model updated with the latest ITSM developments (including the newly ITIL version 4) that is easy to use, cost efficient, reliable and time efficient.

[25] Nagura Lilian, 2006, *L'analyze de contenu dans l'étude des representations sociales*, *SociologieS*, Théories et recherches, mis en ligne le 22 octobre 2006, URL : http://journals.openedition.org/sociologies/993

3.4 Methodology for the creation of the new maturity model

The fundamentals for the creation of models reside in the methodology of design science. It seeks to extend the boundaries of human and organizational capabilities by creating new and innovative artifacts. IT is the foundation of the IS discipline (Hevner et, al., 2004). According to them, it is a fundamentally problem solving paradigm. It seeks to create innovations that define the ideas, practices, technical capabilities and products through which the analysis, design, implementation and use of information systems can be effectively and efficiently accomplished. The design process is a sequence of expert activities that produce an innovative artifact. The two processes involved in design science are: build and evaluate. There are four artifacts: constructs, models, methods and instantiations. Artifacts are built to address unsolved problems. Constructs define the language in which problems and solutions are communicated. Models use constructs to represent real world situations related to a design problem and its solutions (Hevner et. al., 2004). Therefore, the goal of design science is utility. This methodology is well adapted for the present research in the creation of a maturity model as a response to the measurement problems that organizations face for the measurement of their service orientation maturity. Additionally, it is a perfect fit for an EDBA research.

According to Mettler (2011) little is known about the design of maturity assessment models. An extensive search within the relevant literature demonstrated that the greatest part of the developed maturity assessment models do not disclose their research method and their underlying design decisions. He identified 5 main steps in the research design of maturity assessment models: 1) identify need, 2) define scope, 3) design model, 4) evaluate design 5) reflect evolution. He also documents that Bruin and Rosemann (2005), Becher et. al. (2009) propose similar approaches. Hevner et. al. (2004) also propose 7 similar science design guidelines. According to the multiple proposals, we could add after the evaluation of the design the application of the model.

This is the global methodology approach used in my research for the creation of the model:

1. Identify need; justified by the field observations, the gap in the literature and the results of the exploratory research.

2. Define scope; the scope of the model is IT service providers. Nevertheless, for the present research the scope is defined for the IT service providers of financial institutions in Luxembourg using ITIL. Even though the model is not specific for this population, within this research it was necessary to reduce the scope for feasibility purposes.

3. Design the model; described in chapter 5.

4. Evaluate the design; for that purpose, a specific maturity models evaluation form proposed by Salah (2014) is used.

5. Application of the model; the model was applied on a sample of the studied population. This is described in chapter 6 and 7.

6. Evaluation of the model; specific quality criteria were documented at the creation of the model and evaluations were carried out by the assessed entities.

7. Reflect evolution; the model shall be maintained but this attribute is not part of the present research.

Additionally, the agency theory was used for its contribution in the clarification of the client/provider relationship. A service provider acts as an agent while the customers act like principals. Service providers must contribute to the business objectives providing added value to customers in the form of services. The service quality perception of the customer might differ from the perception of the provider, even with documented measurements. Equally important is the relationship between the assessor and the assessed entity, which might have different points of view, especially when the assessor plays an active role in the activities of the provider. There might be the temptation to prove the attainment of a business objective. This perception might differ from the perception of the sponsor of an assessment.

According to Mettler (2010) most maturity models are empirical and do not have an academic foundation. Mettler proposes a model to academically document maturity models. The proposed new maturity model is academically founded and uses Mettler's template for the documentation and Becker (2009) for the evaluation of the model.

The first thing to clarify is the scope of the maturity model and its usability[26]. According to Albiwi (2014), the purpose of the maturity model is to assess the current situa-

[26] Lahav Sarah, 2014, *4 things you need to know about maturity assessments*, August 13, 2014 in General IT (https://www.sysaid.com/blog/category/general-it).

tion of an organization (descriptive), suggest paths for improvement (prescriptive) and benchmark (comparative). I introduced a fourth purpose, “evolution control (evolutive)”, to insist in the expected regularity of assessments. The reason is that, from the managerial perspective, it is essential to control the investments and their benefits. Comparing the evolution over time will provide clarity into the differences between stages at specific moments, providing a clear picture of the organization’s evolution. Therefore, I postulate that maturity models are useful in four cases:

1. Understanding the actual status of the assessed organization.
2. Guidance for an improvement plan according to a best practices reference.
3. Control the evolution over time.
4. Comparison between similar companies and Benchmarking.

The proposed model’s aim is to provide a clear view of the global service orientation of an organization and its named OSOMM (Organizational Service Orientation Maturity Model). It covers all these 4 purposes. At the creation of the model specific quality criteria and controls were embedded to ascertain the trustability of the model. The presentation of the model is covered in detail in chapter 5. Moreover, after the model’s development, it was used to analyze the maturity of several IT service providers of financial institutions in Luxembourg to verify its usability.

The sampling methodology used is the same than the one used for the exploratory research phase. Nevertheless the final sample was different to ascertain specific quotas. Using the classification proposed by Alvi (2016) a mix of stratified-convenience-quota sampling was realized. The first level of categorization was done with the type of service provider (internal or external). Internal meaning; pertaining to the same legal entity of its customers and users. External meaning; pertaining to a different legal entity than the one of its customers and users. A second level of categorization was done considering the size criteria: Big, Medium and Small. Taking into consideration the size of the country and the dominant size of organizations in the country (répertoire alphabétique des entreprises Luxembourgeoises, Statec 2014; NACE rev 2.0 and Liste des principaux employeurs au Luxembourg, d’après l’effective, classement par taille, 2018), the following metric was retained:

- Big: more than 250 employees.
- Medium: between 61 and 249 employees.
- Small: 60 employees or less.

The last category level for which a quota was established is the origin. Three origins were considered. Domestic Luxembourgish banks, European banks and Non European banks, to represent the bank population.

The organizations in the sample were categorized according to the type, size and origin criteria and a quota was assigned for each category (minimum 2 organizations of each category). The final sample was constituted of 13 organizations, which represent 10% of the population. Therefore the sample is representative of the population.

The model was applied on the sample to analyze the service orientation maturity of the studied population, with the aim of evaluating the model. A specific maturity profile was established for each organization of the sample. After its application within the studied sample, participants answered a questionnaire to evaluate their perception towards the defined quality criteria. Lastly, with the aim to ascertain its applicability for benchmarking, the model was consolidated to document a global maturity profile for the sample to serve as a reference for the studied population.

Chapter 4: Exploratory research results analysis and conclusions

This chapter presents the results of the exploratory research. It provides an insight of the importance and benefits of Service Orientation. As well inform on the used ITSM references, time of implementation and percentage of implementation of the used ITSM reference. The chapter also Inform on the usage of maturity models to control the implemented processes maturity. Most organizations do not measure their maturity. Finally, I present a synthesis of the found results of the exploratory research, analyze the potential research direction, make a choice for the research direction and justify it presenting the benefits and the managerial implications.

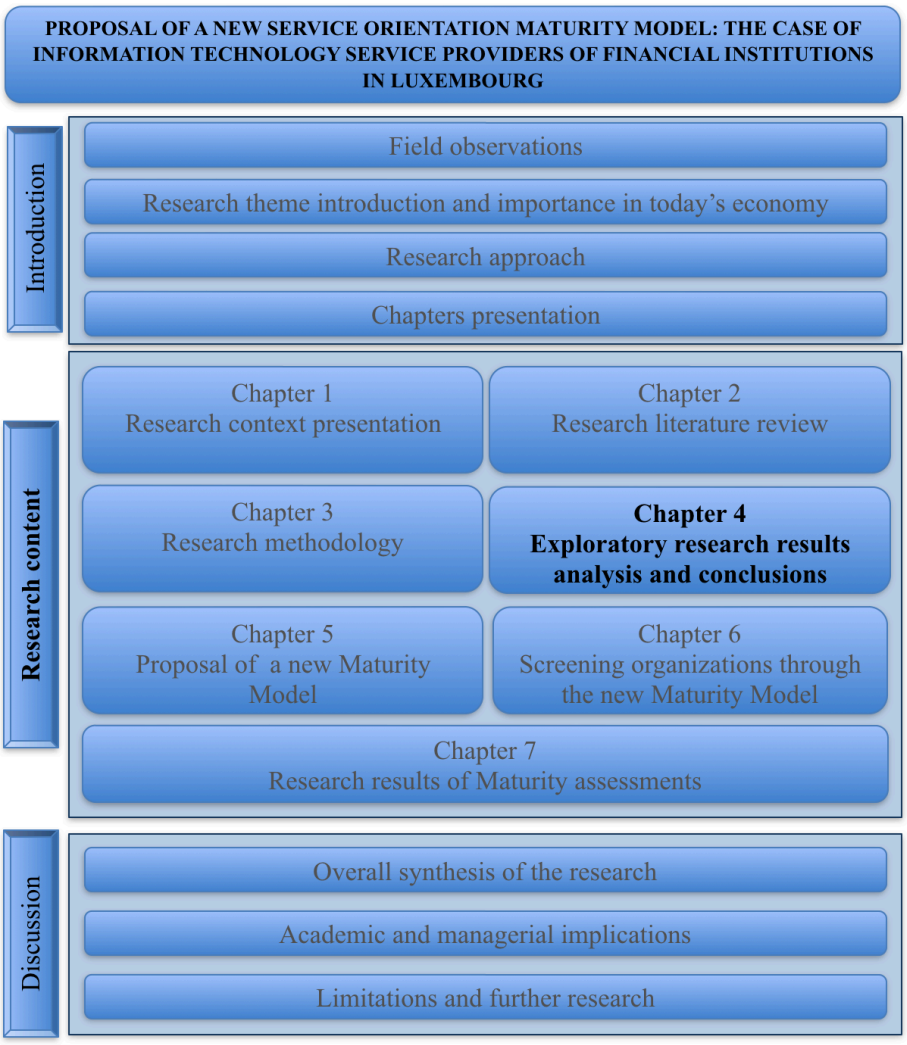

FIGURE 17 : CHAPTER 4 EXPLORATORY RESEARCH RESULTS ANALYSIS AND CONCLUSIONS
Source : Martin Cross

4.1 Exploratory research results

Despite that there is an extensive literature in the respective areas (Service Science, Servitization, IT Service Management, Service Orientation, ITIL and Service Maturity measurement) there is an academic literature gap in the crossing of these fields in the specific area of IT providers of financial institutions in Luxembourg. More specifically in the area of their difficulties to implement, use and measure their IT Service Orientation maturity. The exploratory phase allowed to gather valid data to gain insight of the studied field. The purpose of the exploratory research was to validate or reject the field observations that are not supported by available academic literature. The data gathered during the exploratory research phase was analyzed and the results were confronted with the initial field observations and the academic literature analysis. This confirmed the initial field observations.

A detailed description of the exploratory research analysis and results is found in annex 22. The presentation of the analysis is supported by the qualitative data collected during the interviews and is presented with the observed results. The obtained holistic view with field observations, literature gaps and exploratory research results is used to define the potential areas of focalization for the research. Resuming the findings of the exploratory phase and confronting them with the initial field observations, we observe the following:

1. IT Service providers of Financial Institutions in Luxembourg are committed to Service Orientation
    a. They are committed.
    b. For most of them it is essential or at least very important.
    c. There is a diversity of interpretations and perceptions about the meaning of Service Orientation.
2. Most IT Service providers of Financial Institutions in Luxembourg are using ITIL as the main reference for Service Orientation.
    a. All (besides one) of the IT Service Providers of Financial Institutions in Luxembourg in the studied sample do use ITIL as their main reference for Service Orientation.
    b. The only IT Service provider that does not use ITIL is a very small organization and is not using any other reference.
    c. The main reasons for using ITIL are 1) it is proven reference and 2) it has a wide recognition.

d. Most IT Service Providers of Financial institutions in Luxembourg have implemented ITIL for more than 6 years.

e. Time is not a warranty of high levels of implementation or maturity.

f. Most IT Service Providers of Financial Institutions in Luxembourg have implemented not more than 20% of the ITIL reference.

g. Almost everyone wants to implement most or all of the ITIL reference.

3. IT Service Providers of Financial Institutions in Luxembourg are facing Service Orientation implementation difficulties.

    a. All IT Service Providers of Financial Institutions in Luxembourg do face difficulties in the implementation of ITIL practices.

    b. The main difficulties are 1) communication with the business leading to different points of view between the IT Service Provider and the customer 2) lack of financial and human resources and 3) lack of Service Management skills.

4. IT Service Providers of Financial Institutions in Luxembourg are facing Service Orientation measurement difficulties.

    a. Organizations in the sample are not measuring their ITIL implementation (in terms of implemented practices).

    b. They do not measure their maturity.

    c. There are many maturity models available in the market but they are not used.

    d. The main reasons why they are not using them is that 1) They are expensive and time consuming 2) they do not have time to do it 3) they don't know how to use the existing models 4) the utility of the model is not perceived.

4.2 Fields of action

Considering the above results, there are different potential directions to focus a research on. The first one would be the reasons why there is such a diversity of interpretations of the meaning of Service Orientation. A potential explanation is that despite the vast literature on the subject, scholars do not reach a consensus. Another area of investigation could be to analyze more in detail the reasons that lead IT Service providers to focus their attention on Service Orientation considering that if everyone is doing it, it cannot be considered as a competitive advantage. In this respect a wider view of this focalization with other IT Service Providers from other economical activities would be useful as well as other types of Service Providers.

Could be interesting to investigate more in detail the reasons that lead to the adoption of ITIL as a main reference comparing with other available references. The actual main criteria being proven practice and market recognition might not be enough to explain the choice, as some other references dispose as well of a fair market recognition and describe as well proven best practices. Its also of interest to investigate the reason why, despite of the time implementing ITIL, which most of the providers have done for more than 6 years, they haven't reached a higher level of implementation. Most of them have not implemented more than 20% of the reference even if their scope is to implement all or most of it.

Other areas of interest to investigate include; the relationship between servicing the customers and understanding their needs, because it will be difficult to correctly serve customers if their needs are not correctly understood. Also a point of interest is the importance of Service Orientation to organizations and why. The exploratory research shows a diversity of opinions. Another issue is the expected benefits of a strong Service Orientation. The academic literature mentions a competitive advantage but if all organizations are directing their efforts to Service Orientation, it will not be possible to consider it as a competitive advantage. Nevertheless, if a provider reaches a higher level of performance it would indeed benefit of a competitive advantage. There are some insights of the expected benefits in the literature but more research is needed in this area.

Yet another area of interest to investigate is the difficulties that the IT providers of financial institutions in Luxembourg are facing. Specially considering that there is enough guidance in the literature related to communication, business relationships, and resource management. Equally interesting is the reason why there are difficulties in the acquisition of skills while there is a well-established training schema for ITIL and a Service Management portfolio. Research related to the size of organizations that implement ITIL could be as well a subject of interest. The exploratory research indicates that most organizations but one (the smallest) use ITIL. It would be interesting to analyze more in detail this aspect to verify if there is a clear influence over the size of organizations and the usage of ITIL. It would be interesting as well to investigate the relationship time-implemented percentage of the reference and why organizations have not implemented yet (despite a long time of implementation) a lot of practices while their objective is to implement most of the reference.

Last issues of interest to investigate are the relationship between quality of service delivery and quality controls. Today organizations are willing to deliver quality services but few organizations have developed the capability of conveniently measure their services. One of the main issues of interest for further research is the fact that organizations are not measuring their Service Orientation maturity, despite that there are many maturity models available. The most common informed reasons being that the existing maturity models are either too complex, time consuming and expensive or too simplistic and useless. Adding to that, the fact that most of the IT Service providers have difficulties with the implementation of Service Management practices due to the lack of resources (financial and human), it would be interesting to investigate how can they overcome these limitations to be able to measure their maturity and propose adapted solutions.

4.4 Choice of a research domain

The above results allowed to identify several issues worth investigating. Nevertheless it's not possible to investigate in all of these areas in the context of an EDBA. Therefore it is important to carefully choose a specific domain that could contribute to the existing knowledge that could bring the best added value to practitioners in the field. Even if all the domains are of interest for the research, considering the big gap between the organization's needs and the real measuring of the maturity in the field, Service Orientation maturity measurement seems to be a rather interesting field of action to continue the investigation. Despite that there are several references to measure maturity in the Service Management area, some of them being specific to ITIL, IT Service providers of financial institutions in Luxembourg are not measuring their maturity because either it is too expensive, too complex and time consuming or because it is too simplistic and the results are not useful.

4.5 Justification of the choice

The observations above show that organizations are too busy with their own operations and do not have the required resources (time, financial and human) to carry out maturity assessments that would provide a clear view of their Service Orientation maturity. ITIL is a complex and extensive framework describing a number of processes

and often implementations fail or take a longer term to implement than expected. Often organizations underestimate costs and risks for such implementations (Nicewicz-Modrzewska & Sotolaski, 2008). It is recommended that before starting an improvement plan, organizations need to understand their current status in order to define the targeted point of improvement. The current state is the departure point to fill in the gap towards a desired future state in IT Service Management implementations (Lloyd et al, 2011)

There are a number of maturity models in the market and it is important to choose an adapted model that will benefit the organization with its results (Albliwi & Arshed, 2014), (Mettler, 2011). From the exploratory research results, we learn that organizations do not measure their ITSM maturity because they lack of resources (financial, human and time) denoting poor management of resources. Nevertheless, added to that difficulty, organizations do not measure their maturity mainly because they find the existing models complex, costly and time consuming. Therefore, to help practitioners, it is essential to propose a model that reduces the complexity as well as the time and the costs involved in the realization of maturity assessments. Annex 12 provides some insight into the characteristics of the existing models. The model should cope with the actual difficulties that organizations are facing and it needs to be simple to use, inexpensive and useful.

It is essential to use a maturity model to identify the current status of an organization. Some of the reasons are stated in the list below:

- If the organization cannot measure their maturity they will not understand their actual status in the implementation of Service Management practices.
- If the actual status is not understood it will be rather difficult to define a structured improvement plan for the implementation of ITSM practices.
- Organizations will keep on struggling with lack of resources for the implementation of Service Management practices.
- It is only when an organization can reduce their operations time with improvements, that they will have more time for other improvements.
- Organizations should evaluate at regular intervals their maturity to evaluate their evolution.
- A better understanding of their operations would help them in communicating better with the business.

- Optimized operations will lead to less expenditure and competitive advantages.

Another aspect to consider is that ITIL is a public framework, which means that there is no obligation of achievements compared to a standard like ISO20000. This obliges organizations to use adapted maturity models to control their status instead of auditing for compliance. From the exploratory research we observed that organizations have implemented parts of ITIL recommended practices but it is difficult for them to clearly state their status of advancement in their ITIL implementation journey. While almost all of them are committed to implement 100% of the recommendations, mostly all organizations have implemented a little part of the practices without being able to measure and control the advancement. Therefore it is clear that the available maturity models in the market are not being used. Proposing a tool to help practitioners get insight into their ITSM implementation status is essential to allow them to support their improvement plans with clear field data.

4.6 Managerial impact

It is rather difficult to understand and control what is not measured. If an organization has in its objectives the implementation of a strong Service Orientation, there must be a clear return on investment perception to validate the benefits of the effort. Therefore it is important to measure the maturity of the Service Orientation to gain a clear view of the actual state. This will allow to compare to the used ITSM reference (in our case ITIL). One of the main benefits of a maturity assessment is the recognition of the status of an organization and expected benefits of an improvement plan towards a higher level of maturity (Gomes, et. al., 2013). According to Mettler and Rohrer (2009), a maturity assessment is the base of any improvement status. If we consider the continual improvement theory (documented in annex 8), a maturity assessment represents the “where are we now” stage. Therefore, the implementation of changes and improvements is not the responsibility of the maturity model. It merely describes the as-is status, which is the departure point for the improvements. As documented by Steenbergen, et. al. (2010) maturity models provide support for incremental actions and are the basis of a change management. Becker et. al. sustain that *“the responsibility of an effective and efficient use of IT lies with the company*

IT's management. Continual improvement requires the company positioning with regards to its IT capabilities and the quality of its goods and services. As a rule this position involves a comparison with the company's goals, external requirements or benchmarks. To achieve an objective assessment of a company's position, however, often proves to be a difficult task." "…the questions arise, what needs to be measured and how, and what to compare it with, in order to assess the as-is situation of a company and to assign a specific quality degree of maturity. IT management therefore needs supportive tools to assess the as is situation of a company, derive and prioritize improvement measures and subsequently control the progress of their implementation. Maturity models are helpful tools for addressing this issues." Becker et. al. (2009).

The used maturity model needs to be simple and inexpensive to use, yet powerful enough to be useful in providing guidance to improve Service Orientation maturity via a well structured improvement plan. Organizations will benefit from the results of a maturity assessment with the specific as-is status and global guidance for their implementations of Service Management practices. The impact of a model that would allow an easy way for measuring the maturity of ITIL would benefit a large population of organizations.

Another important benefit will be achieved as well if the easiness of usage and the usefulness of the model are sufficient that would allow organizations to be able to use it at regular intervals to control the evolution of their Service Orientation. This would bring a justification of the realized investments by clearly measuring the covered gap between the previous situation and the new assessed situation. Still another important benefit is that it will allow the creation of differentiation factors in the quality of their services and compare the organization to a specific model or specific target. Eventually compare different companies using the same model. Lastly, a specific achieved level of maturity can be used as a reference in marketing campaigns to gain credibility among customers in a specific market.

All these reasons lead to the specific choice of investigating more in detail the measurement capability of organizations to control their Service Orientation maturity

Chapter 5: Proposal of a New Maturity Model

This chapter presents an alignment comparison between ITIL versions and Serv*Or. It then proceeds with the concepts of creation of an academically documented model. It also documents the newly proposed Organizational Service Orientation Maturity Model (OSOMM) with a description of the quality criteria that was used during the creation of the model. Finally, a complete description of the model and its components is presented, detailing its advantages (and limitations) over the existing Service Orientation maturity models.

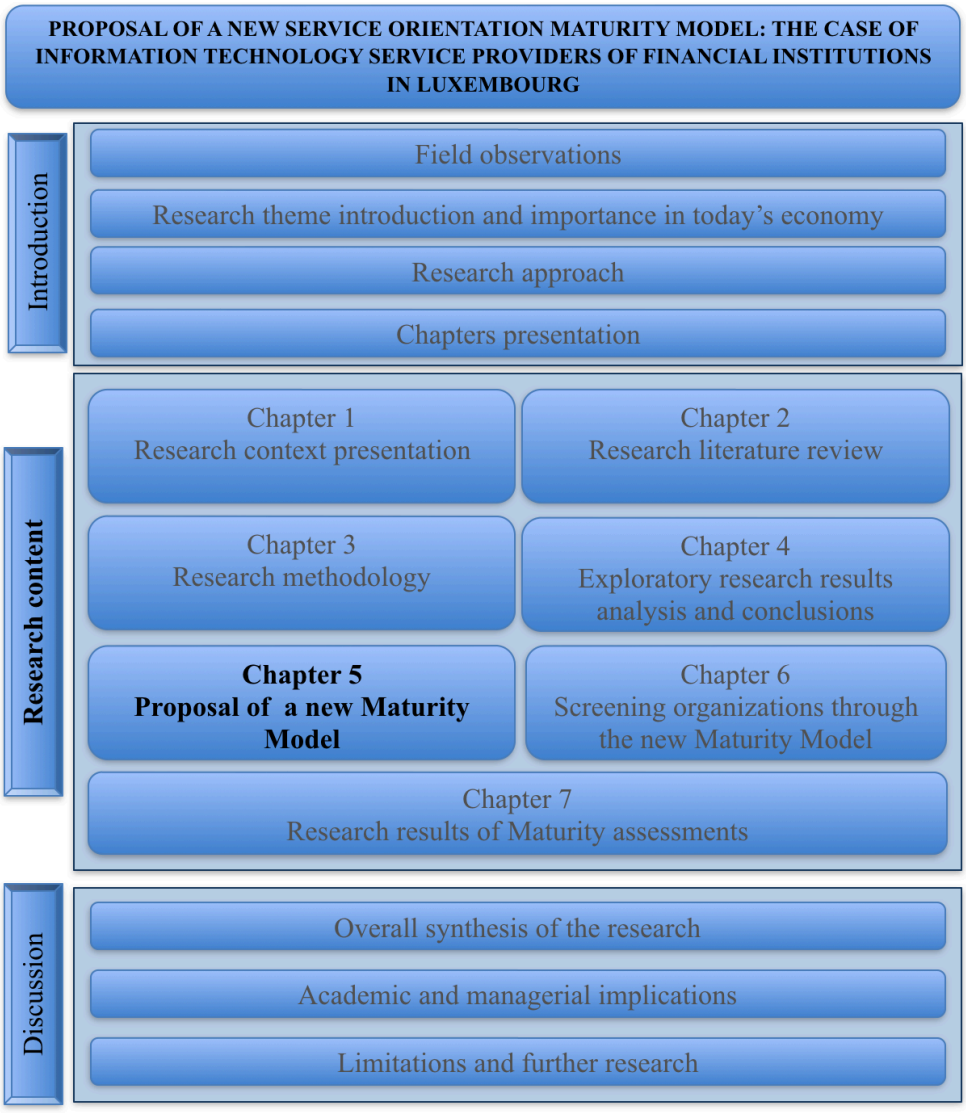

FIGURE 18 : CHAPTER 5 PROPOSAL OF A NEW MATURITY MODEL
Source : Martin Cross

According to Becker (2009), over the last few decades many maturity models have been developed because companies need tools to help in their improvement journey. Maturity models are a useful way for organizations to assess their processes and their overall maturity levels (Albliwi, 2014). However, according to him there is a lack of consensus on the definition of a maturity model. Even though there is a vast amount of literature on Service Orientation for manufacturing firms, more specific research needs to be done on Service Orientation and maturity in IT firms and IT service providers. The previously documented field observations, literature reviews and exploratory research phases, showed the need of a Service Orientation maturity model that would be adapted to the new developments in the ITSM area, including ITIL Version 4.

So far, ITIL has focused on processes. Consequently, most of the related ITIL maturity models focus as well on measuring the maturity of processes. Nowadays, ITIL V4 does not define processes. Instead, organizations need to define their operational processes and document them with their interactions as value streams. The former ITIL processes are now recognized as practices. These provide organizations with more flexibility as they define and implement these recommended practices. The result of this evolution is that process maturity models are not adapted to the newly presented structure of ITIL V4. New maturity models must be more related to outcomes to achieve rather than processes. Therefore, it is necessary to map ITIL V3 and 2011 processes to the related ITIL V4 practices. In annex 13, I present this comparison to show the processes and practices equivalences. It also shows the subjects that are covered in V4 but are not considered in previous versions.

One of the main differences between ITIL version 2011 and V4 is their structure. While ITIL version 2011 is structured in a lifecycle approach, ITIL V4 is structured in an SVS (Service Value System) approach. This results in the removal of the Lifecycle as well as Lifecycle oriented processes (like design coordination and transition planning and support), which are not longer needed. Another important difference is that previous ITIL versions were focused on value delivery, while ITIL V4 is mostly focused on value contribution towards business processes and outcomes. Finally ITIL V4 included several practices that are not included in version 2011. While analyzing the table in annex 13, we can observe the following differences in the content of the two versions:

There are two aforementioned lifecycle oriented processes that are not longer needed in V4 (Design Coordination and Transition Planning and Support). These two processes are covered in the SVS structure within the SVC (Service Value Chain) in the form of Plan and Design activities.

There are a series of new practices (Architecture Management, Measurement and Reporting, Organizational Change Management, Project Management, Risk Management, Workforce and Talent Management and Service Design) that are not included in version 2011.

There are some processes that are similar to the new practices that were broken in two. For instance, Release and Deployment Management became two: Release Management and Deployment Management. Service Asset and Configuration Management became two; IT Asset management and Configuration Management.

Some practices cover a similar scope but they were renamed. This is the case of Demand Management who's content is covered in the Business Analysis practice. Change management named now Change enablement.

There are some practices that are similar to the previous process description, but they have a broader scope. For example, Business Relationship Management is now Relationship Management and covers more stakeholders. Change enablement not only managing changes but also facilitates the correct execution of changes.

The change in the description of ITIL V4 (practices instead of processes) and the stronger focalization of ITIL V4 on outcomes and business relationship, makes a proposal like Serve*Or more adapted for the measurement of practices. Nevertheless, it is important to understand the relationship between Serv*Or and ITIL V4 to document their alignment and differences. It is also important to verify whether Serv*Or can be used to conveniently measure the maturity of ITSM organizations based on ITIL V4. The table in annex 24 shows these relationships. From this table we learn that there are many aspects of ITSM proposed by ITIL V4 that are not covered in Serv*Or (like supplier management or continual improvement). There are other aspects that are highly developed in Serv*Or (like customer treatment and employee empowerment) that are covered within one ITIL V4 practice. These differences require to mix both models in order to obtain a version that would be more complete. Taking as a basis the Serv*Or structure and complementing it with the missing ITIL V4 practices.

5.1 Definition of the model

A maturity model is intended to provide a clear view of the current state of an organization. This state determined by a maturity assessment is crucial for an organization as a guide for an improvement plan. A reference model is used to compare the gaps between the reference model and the existing status of an organization. For that purpose, the model must be capable of representing the current status of an organization as accurately as possible without any bias or interpretations. To avoid interpretations it is common to make maturity assessments via an external company with two assessors and interview a representative sample of the organization's studied population. This makes the realization of maturity assessments a long, complex and expensive process. A good maturity model must allow for clarity of use, be simple and inexpensive, but at the same time complete, reliable and it must cover a global view of the assessed organization, not only a portion of it.

The first thing to clarify is the scope of the maturity model and its usability[27]. According to Albiwi (2014), the purpose of a maturity model is to assess the current situation of an organization (descriptive), suggest paths for improvement (prescriptive) and benchmark (comparative). I introduced a fourth purpose, "evolution control (evolutive)", to insist in the expected regularity of assessments. The reason is that, from the managerial perspective, it is essential to control the investments and their benefits. Comparing the evolution over time will clearly demonstrate the differences between stages at specific moments, providing a clear picture of the organization's evolution. Therefore, I postulate that maturity models are useful in four cases:

1. Understanding the actual status of the assessed organization.
2. Guidance for an improvement plan according to an ITSM reference.
3. Control the evolution over time.
4. Comparison between similar companies and Benchmarking.

The proposed model's aim is to provide a clear view of the global service orientation of an organization and its named OSOMM (Organizational Service Orientation Maturity Model). It covers all these 4 purposes. Nevertheless, it is important to point out

[27] Lahav Sarah, 2014, *4 things you need to know about maturity assessments*, August 13, 2014 in General IT (https://www.sysaid.com/blog/category/general-it).

that in order to ensure the results of the evolutive scope, it is necessary to execute regular assessments at pre-defined intervals. In the case of benchmarking, it is required a strong scheme of trainings and certifications. This would guarantee the assessor's capability to conduct repeatable assessments overtime ensuring a rigorous usage of the model. This would help avoiding interpretations and deviations, independently of the person who carry out the assessment. In addition to that, for benchmarking purposes, it is necessary to previously assess a specific sample of a population to obtain a maturity reference to benchmark.

The model provides valuable results for 1) a clear view of the current status of an organization's Service Orientation, 2) specific guidance according to the used reference that propose specific actions to evolve into a higher maturity level 3) a simple and trustable means of repeatability to conduct a maturity assessment at regular intervals, and thereby to control the organization's evolution, 4) a robust structure that guarantees the validity of the results with the scope of comparison between organizations. These criteria will be used to verify the validity of the model.

Another important point to address is the method of application. According to Mettler (2011) there are three ways of doing an assessment: 1) Self-assessment, 2) Assisted assessment and 3) Outsourced independent assessment. A self-assessment is carried out by internal teams, while an outsourced assessment is carried out by an external team. Assisted assessments can be carried out by internal or external teams. There is no specific recommendation for an assessment and all types have advantages and disadvantages.

In the table below there are some advantages and disadvantages of the different types of assessments, according to multiple experiences in carrying out maturity assessments (the table is not exhaustive, is just indicative):

Advantages and disadvantages of internal and external assessments

	Advantages	Disadvantages
Internal Assessment	• Acquired knowledge of the assessed entity • Fastest and easiest way of doing an assessment • Preserved security for accessing information	• Potential bias • Potential deformation of reality to demonstrate an achievement • Potentially missing important points • Potential lack of assessment experience • Difficulty to obtain specialized resources for an assessment • Extra burden over the day to day activities
External Assessment	• Starting fresh discovery avoiding bias and interpretations • Assessors expertise • No extra burden in operational activities	• Depend on the competency of assessors • Potential security issues • Cost • Time consuming

TABLE 10 : ADVANTAGES AND DISADVANTAGES OF INTERNAL AND EXTERNAL ASSESSMENTS

Source : Martin Cross; based on Mettler (2011)

It might be tempting to use the easiest and less expensive option of an internal self-assessment method. Nevertheless, it is important to ensure that the assessment results reflect the actual status of the assessed organization and internal bias must be avoided. If the executor of the assessment wants to demonstrate a specific achievement to obtain a promotion, audit compliancy or demonstrate the attainment of objectives in the assessed managed area, it is probable that the results will be influenced by their motivation to show specific results. This will lead to a deformation of the organization's current state with the consequence of missing out important aspects that need improvement. Johansson, Eckerstein and Malmros (2016) state that a self-assessment is not as reliable as an external assessment. The results of their study

demonstrate a higher maturity and a higher level of variation than what they are in reality.

When considering assisted assessments, the disadvantages of both, self-assessment and outsourced assessment, are mitigated:

- There is external assessment experience without adding too much extra burden in day-to-day activities.
- Cost is mitigated as part of the assessment is supported internally.
- There is specific guidance on the execution of the assessment.
- Security issues are limited.
- Promotion of exchanges between assessor and internal staff diminishes potential bias.

Thus an assisted self-assessment seems to be the most cost effective/reliable solution. It is important to note that an internal assessment must not always be a self-assessment. It is possible to make the assessment under the control of another entity of the organization, like an audit department, a quality control department or a specialized assessment group. This means that an assisted assessment can be carried out for both types (internal and external). This is the method that will be used in the present research and the method that is used in the model.

Another important aspect to control is the primary source used for the maturity model. As most of the studied organizations are using ITIL and intend to implement it as extensively as possible, it is interesting to use it as the primary source. While previous versions of ITIL have focused on processes without describing practices for people and organizations, the actual ITIL V4 has integrated new practices that cover some aspects that were neglected in previous versions. This is the case of organizational change management, talent management, project management and risk management within others. An important focalization in ITIL V4 is the 4 domains that cover the whole SVS:

- People and Organization.
- Information and technology.
- Suppliers and partners.
- Processes and value streams.

These domains provide a global view of ITIL practices' applicability covering most of the gaps of previous versions. The first 3 domains shall be included in the assessment. The fourth domain is not covered because it is unique to each organization and therefore out of the scope of a model to be used by different organizations in a repeatable way. This is an important aspect to consider, especially considering that all previous maturity models for ITIL focused on measuring ITIL processes. In version 4 processes are operational and specific to each organization. They are not described in ITIL.

It is also important to consider the novelty of ITIL V4 coming to the market only in 2019 and some modules during 2020. The latest delivered to the market only middle of September 2020. ITIL V4 describes practices that are to be applied within the SVS (Service Value System) and the SVC (Service Value Chain) and up until today there is no known adapted maturity model for this version. Therefore, it is important to develop a model for this version to help organizations in their implementation of the described new practices and their evolution for the new ITIL version.

According to Mettler (2011), maturity models can be classified according to the fractions they measure:

- Process maturity.
- Object maturity.
- People capability.

The process maturity measurement refers to the extent to which a process is realized, achieve its objectives, produce desired outcomes and is documented and established. The object maturity measurement refers to the extent to which a particular object (product, software, machine or tangible result of an activity) reaches the intended quality. The people capability measurement refers to the extent to which the workforce is capable to generate knowledge, information or outputs and have the required skills and competencies to execute the assigned work.

It is important to cover the three areas. If a maturity model does not cover all these areas, there might be a gap in the representation of the organization's maturity status and the organization will be invariably missing improvement opportunities. There are also links between the three areas and failure to address one of them will affect the others. Annex 11 presents a review of the focalization area of the main maturity

models. For that reason, the aim of the proposed Service Orientation maturity model is to cover to some extent all three areas.

Areas covered by OSOMM

	Serv*Or	**CMMI and derivatives (including Axelos maturity model and TIPA)**	**OSOMM**
Process maturity		X	X
Object maturity			X
People capability	X		X

TABLE 11 : METTLER'S (2011) DOMAINS COVERED BY THE MAIN MATURITY MODELS
Source : Martin Cross; Based on Mettler (2011)

Metller, Rohner and Winter (2010), propose a description of maturity models for documentation purposes that would also assist organizations in their usage of a maturity model. They argue that most of the maturity models on the market do not have an academic background and are not correctly documented. According to that statement, it is recommended to propose a fully academically documented maturity model. The table below documents the main OSOMM attributes. The complete description is to be found in annex 32:

Dimension	**Attribute**	
General model attributes	Name	Organizational Service Orientation Maturity Model
	Acronym	OSOMM
	Primary source	ITIL V4 and Serv*Or
	Secondary sources	ISO15504 and CMMI
	Addressed topic	Global service provider organization's Service Orientation and IT Service Management
	Origin	Academic

	Audience	Management oriented
	Year	2019
	Access	Public
Maturity model design	Maturity concept	Organizational Service Orientation; maturity level for improvement capability
	Documentation	Documented model
	Mutability	Any Service-oriented organization
Maturity model use	Method of application	Assisted self assessment
	Support	Electronic forms
	Evidence	Documented evidence

TABLE 12 : OSOMM ATTRIBUTES

Source : Martin Cross; Based on Mettler, Rohner and Winter.

The OSOMM model primary source is ITIL V4, complemented with Serv*Or domains and structured in an ISO15504 like approach. A completely new set of maturity levels is introduced. It follows ISO15504 recommendations for assessment execution. Serv*Or domains were consolidated into a new structure and ITILV4 practices were mapped to these new domains. The structure of ISO15504 described in its PAM (Process Assessment Model) documenting the different elements of an assessment is used. These elements are shown in the figure below:

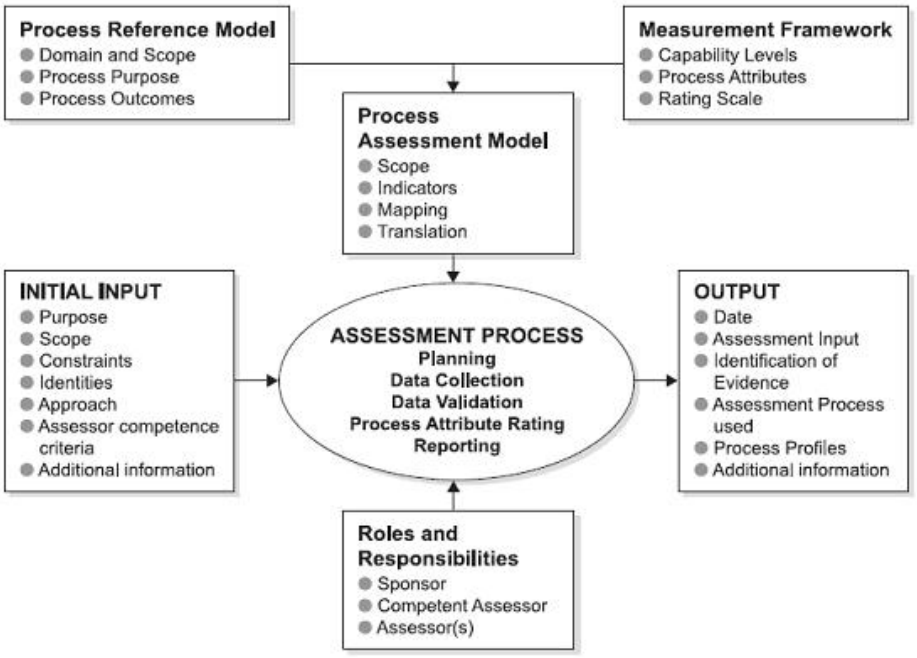

FIGURE 19 : ISO 15504 PROCESS ASSESSMENT MODEL
Source : ISO15504

In the PAM (Process Assessment Model), ISO15504 specifies 6 stages for an assessment. The OSOMM model bases its stages on the proposed stages of ISO15504. These stages are summarized in the following figure:

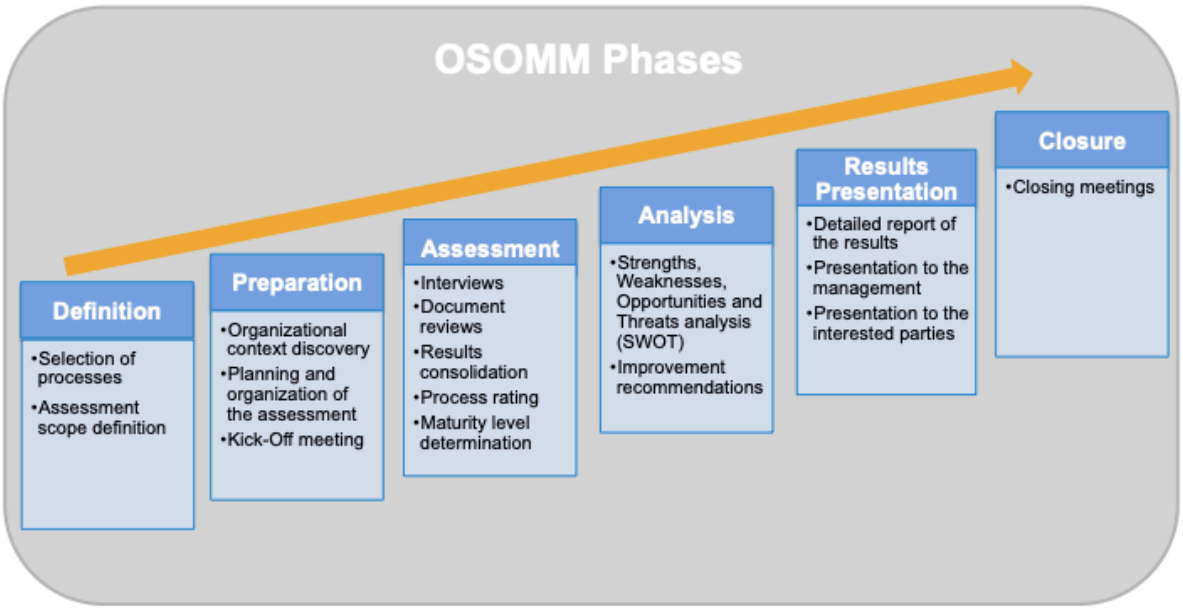

FIGURE 20 : OSOMM ASSESSMENT STAGES
Source : Martin Cross; Based on ISO15504

Maturity levels is a core aspect of a maturity model in the sense that they document the actual situation of an organization in comparison to a predefined desired state related to the reference model. The level must represent a specific status of the organization at the moment of the assessment. It also must document the gaps for the achievement of a higher maturity level. Each level requires a specific demonstration of the achievement of predefined objectives in such a way that the level will define the missing components to determine an action plan for improvements.

Maturity levels were obtained after an analysis of the main existing maturity models levels. A table documenting the main sources of maturity levels is presented in annex 34. From this table we observe that most of the models do have 5 (1 to 5) or 6 (0 to 5) maturity levels. As most of the maturity models are derivatives of the CMMI or ISO15504 models, they are mainly related to the specific maturity of a process. Existing maturity models mainly focus on the achievement of specific processes actions measuring processes attributes. These processes attributes determine the achieved maturity level. This approach, even if convenient for the improvement of processes, fails to measure the global outcomes generated by the interactions of processes. The structure of the maturity levels proposed by the OSOMM model is related to business outcomes and covers a more holistic view.

The retained levels represent specific characteristics that an organization must achieve in order to be granted a specific maturity level. In the logic of maturity, each level represents specific achievements that are beneficial to the organization. OSOMM's main objective is not to implement practices or processes but to create specific outcomes that are useful for specific stakeholders. One of the main criticisms of maturity models is the irrelevance of an achievement maturity level without a specific benefit for the organization. That is why it is essential to assess the achievement of a beneficial outcome and not the realization of activities.

The OSOMM model was built with the specific logic to encompasses the IT providers' evolution. This evolution is an integral component of an evolutive maturity. When the IT provider works on new customer needs, it is important to first build and implement services to cover the new need. Subsequently these new (or modified) services must be operated and maintained (levels 0 to 2). Afterwards, it will be possible to measure and improve these services (level 3). From that point it is then possible to evolve to

control and measure the usefulness for specific stakeholders (level 4). Finally, it will be possible to integrate service management activities in a global service view with a perceived contribution in the achievement of strategic objectives for a business (level 5). This is the built logic for the OSOMM maturity levels. The initial level is inaction or basic activities (required things are not done or barely done). After that inertia is broken, required tasks are completed but not in a very structured way (this is a learning process). After the required activity is understood, it can be executed according to what is expected (level 1). Afterwards, it is possible to measure the execution in a controlled environment (level 2). When maturity is low, people tend to focus their attention on the execution and not on the purpose. This is an important shift to begin focusing on the added value that can be obtained from the execution of tasks. This is the basis for the negotiation of agreements with the business representatives. When this level is achieved is necessary to improve the measurement systems to reinforce agreements (level 3). It would be rather difficult to approach customers if there is no objective perception of what is delivered. When service delivery is stable, controlled and agreed, it is important to evolve towards a customer view to understand how services provide added value to customers (level 4). Finally, it would be possible to focus on the facilitation of the achievement of the strategic objectives of the organization (level 5).

This approach is important for the definition of the OSOMM's maturity levels because the basic objective of a service provider is not to implement and manage technology but rather use it to deliver value to stakeholders and contribute to the achievement of business' objectives. When performing an OSOMM assessment it is important that assessors and interviewed individuals have a clear perception of the requirements to fulfill each level because they represent the set of values to assess the IT service provider.

The following figure summarizes the OSOMM maturity levels and their relationships. A full description of the levels is found in annex 35:

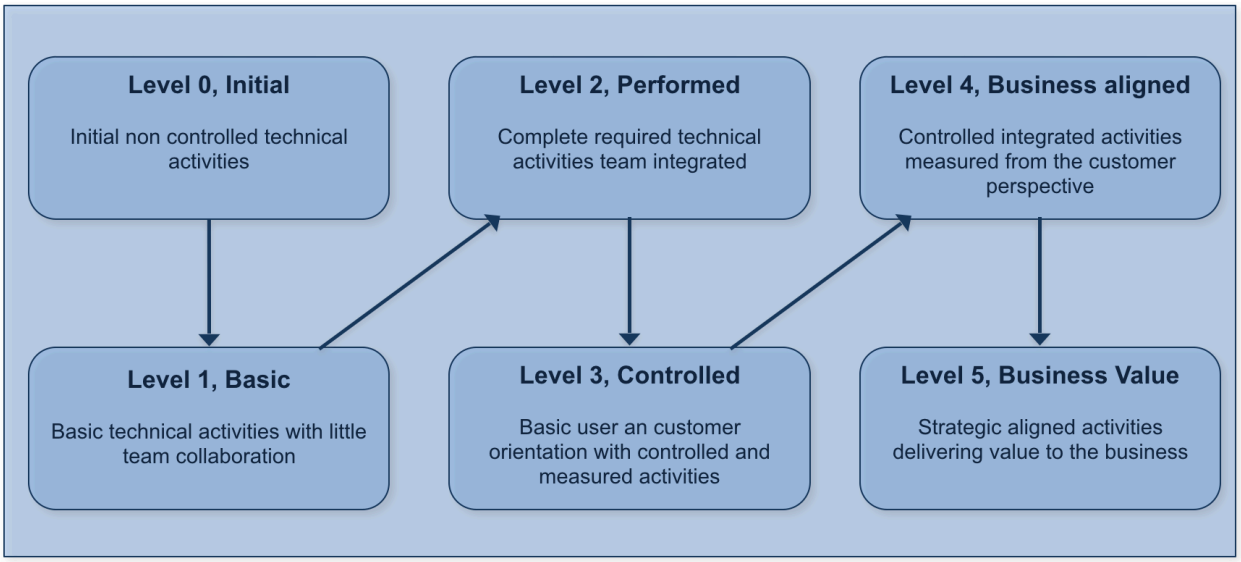

FIGURE 21 : OSOMM MATURITY LEVELS
Source : Martin Cross

The above levels were built with the final requirement in mind, which is fully alignment with the business to support the achievement of their objectives at all levels, strategic, tactical and operational. Compared to the usual maturity levels, where organizations question the added value of achieving higher levels, each OSOMM level provides an added value and there is no doubt about the necessity to cover all the levels. It is evident that, if a specific level will not provide enough value compared to the benefits, it would be wiser not to invest in the fulfillment of the level. The proposed levels were created considering the purpose of a service provider: co-create value to support the business activities. Therefore, all levels should be attained. The main issue is not if a level must be attained but how to attain it. The presented maturity model offers a structured approach that helps organizations to achieve the desired outcome of a service-oriented organization, step by step (level by level).

5.2 OSOMM quality criteria

As previously stated, a maturity model should have a specific purpose, be reliable and useful. Additionally, the model should be simple enough for easiness of use on a regular basis without extensive costs and investments. To fulfill these criteria, several

controls were built within the model to ensure the usability at a fair cost and its simplicity. The list below summarizes the controls that were carried out on OSOMM:

1) Coverage of three of the 4 Domains proposed in ITIL V4: People and organizations, Information and Technology, Partners and suppliers. Processes and Value streams are excluded from the present scope because they are specific to each organization and it is impossible to describe processes and value streams that would be applicable to each organization.

2) Coverage of the 34 practices proposed by ITIL V4. Annex 24 present the relationship between ITIL V4 practices, related Serv*Or areas and OSOMM areas.

3) Coverage of the three domains proposed by Mettler (2011): process maturity (in OSOMM represented by ITIL V4 practices). object maturity and people capability.

4) Applicability of the four maturity assessments purposes:

   a. Understanding the actual status of the assessed organization.

   b. Guidance for an improvement plan according to a best practices reference.

   c. Control the evolution.

   d. Benchmarking.

5) Coverage of the five domains proposed by Mohammadi, Ramadan and Hamidi (2015) and Tayfour (2018): organizational, human resources, project management, managerial and processes (in OSOMM represented by ITIL V4 practices).

6) Inclusion of the Iden and Langelen (2010) and Pollard and Cater-Steel (2007) CSF for successful ITSM implementations: training skills, leadership and management involvement, communication and collaboration and service culture.

7) The model for assessing the consistency of maturity models proposed by Salah, Peige and Cairns (2014) was used to ascertain the robustness of the model. Annex 36 documents the assessing model. A careful attention was taken to warrant that all the requirements of the evaluation were satisfied.

Besides the above quality criteria, the OSOMM model shall guarantee the following usability criteria:

- Consistent strong structure.
- Independent.
- Reliable.

- Repeatable.
- Easiness of use.
- Low cost.
- Technology independent.
- Adaptable.
- Useful.

These elements are important to ensure that organizations will find the required utility in the model. Organizations must be capable to implement it and use it on a regular basis to control their maturity evolution. This would lead them towards a strong mature service-oriented organization.

5.2.1 Consistent strong structure

The model structure must be robust, trustable and adapted to the needs of the assessed organizations. To ensure this characteristic, the new model was created using the proven ISO15504 structure. In this way, the assessment structure and steps to follow are consistent and well documented. Roles and responsibilities for assessments are also well documented and included in the assessment preparation phase. The inputs and the outputs are standardized to facilitate repeatability of assessments and consistency of results presentation. An assessment reference model was developed based on ISO15504 Process Reference Model. The process assessment model was adapted to integrate ITIL 4 practices. And lastly, the measurement framework was adapted to fit a Service Orientation assessment instead of a process activity based assessment. These attributes provide a model that is consistent with proven maturity assessment practices and provides a robust and well-documented structure.

5.2.2 Independence

Assessors must not be influenced by internal procedures. During a self-assessment it is possible that the assessor is interested in obtaining specific results. By consequence, misleading the results and missing important aspects for an improvement plan. The deliberate choice of making an assisted assessment will ensure that the results reflect precisely the organization's operations without influences and interpretation biases. It is not always necessary to execute assessments with external assessors. There could be specific roles within the company to carry out assessments with neutrality of the analysis. It is still possible to make a self-assessment after un-

derstanding the methodology used for the assessment. In such cases, the result of the assessment will be focused on obtaining an internal maturity capability with the goal of an improvement plan. The assessor must be conscious of the limitation of the option. Nevertheless, considering the suggested repeatability of assessments, within time, the internal staff will gain the required skills for the realization of assessments. This will further provide the possibility to make self-assessments with little bias, provided that the results will be used for improvements and not to demonstrate a specific capability.

5.2.3 Reliability

If the model is not trustworthy, it will be useless. The structure shall be defined with clear steps and some rigidity of rules so that if different assessors make an assessment they should end up with the same results. Providing a specific structure as described in section “consistent strong structure” with an assessment manual will give assessors tools to guide them in the realization of assessments and in the interpretation of the results. Additionally, merely gathering data and answering assessment questions is not sufficient to assign a maturity level to demonstrate a capability. Interviewees must clearly understand the meaning of each level in order to judge correctly the level assignment. It is also required to document proof of the tasks execution in order to judge conveniently the achievement of the level. This guarantees that levels assignments are fully documented and representing the organizations capabilities.

5.2.4 Repeatable

One of the most important benefits of a maturity assessment is to provide a clear view of the current state of the organization. Thereafter, having the capability to realize regular assessments to control the evolution. If the model is complex and expensive, organizations will not make regular assessments. Therefore, it is essential that the model is cost efficient and easy to use. Nevertheless this is not sufficient, it is also necessary that the model provides a clear structure with strict rules so that the realization of assessments stays consistent every time the model is used. Providing a clear structure will allow conducting regular assessments with the aim to control the evolution of the organization’s Service Orientation and promote a continual culture of improvement. The OSOMM’s described structure allows this repeatability to make

regular assessments under the same conditions avoiding results variability as much as possible.

5.2.5 Easiness of use

A model that is not easy to use will not be used regularly. There is also the risk of results variation due to the incorrect use of the model. Potentially assessments results will not reflect correctly the organization's operations. The model must have a clear structure and be well documented. All its components must be interconnected and provide tools for the realization of assessments. All steps must be clear and understood by all parties. An assisted assessment warrants the required skills and knowledge to carry out assessments. If assessors are not knowledgeable enough and struggle during assessments, the assessment's credibility is at risk. The model was intentionally developed with this in mind. To build in the simplicity of the model, the amount of detail of the assessed elements is not equivalent to the detail provided by traditional process assessment models. However, the model provides sufficient detail to detect gaps for each maturity level. This allows for each maturity level, to guide organizations towards specific steps to follow to develop an improvement plan. As an example, assessing a specific process using a traditional model would require several days (in general 4 or 5 days) to provide a maturity level for that specific process. In ITIL 2011 there are 26 documented processes. This means that to cover all the processes, the organization would need to spend about half a year of assessments with a full assessment team (usually two assessors). This represents an expenditure of one year man/days. In contrast standard common maturity models based on processes self-assessment questionnaires would allow for a faster result. Yet, would still provide an incomplete result as they focus only on specific processes, missing important aspects like people capabilities, organizational aspects and management practices. Within a couple of days, an OSOMM assessment would provide sufficient holistic results to point out the weaknesses to address with sufficient detail to uncover gaps and launch an improvement plan with the right priorities.

5.2.6 Cost efficiency

As previously shown, the simplicity and easiness of use of the OSOMM model will drastically reduce the time spent on a global maturity assessment. Within a week, an OSOMM assessment provides enough results to point out the organization's weaknesses while covering all aspects of the organization. This allows launching a targeted improvement project. The time

invested will directly influence the cost of the assessments. This will also allows for repeatability due to the reduced amount of resources (financial and human) that are required for the realization of OSOMM assessments, compared to the traditional methods. This is an important requisite considering the results of the initial exploratory research that showed that one of the main reasons why organizations are not measuring their Service Orientation maturity is precisely the lack of resources (time and money).

5.2.7 Technology independence

As documented in the context definition, information and communication technology has evolved incredibly fast in the last few decades and there is no sign of relenting. If we consider the incredibly accurate predictions of Moore's law, we can expect that technology will keep evolving at a faster pace. Therefore it is not reasonable to develop a technology-dependent maturity model that is destined to continually change. It is important that the maturity model can be used independently of the used technology. This is another reason for providing a simple model with global guidelines focused on the structural Service Orientation of an organization rather than the way the organization deals with specific technology and its internal processes.

5.2.8 Adaptability

The Service Orientation area has evolved as fast as the technology that it manages and equally this evolution is not to relent soon. Therefore, it is essential that the proposed maturity model is adaptable to the upcoming ITSM practices. If the model is too detailed and particular to specific processes, it would be difficult and costly to adapt to every new version of ITSM practices. From the moment that OSOMM's focus is not on the technology nor on specific processes but rather on global Service Orientation organizational structure and outcomes, it becomes more stable and independent of the processes and technology evolution. If eventually the need of an adaptation is required, it will be easy to do (include, retire or modify) any component of the model without affecting the other parts because the model was built with independent modules to assess.

5.2.9 Usefulness

A maturity model must provide useful results. It doesn't matter how easy, cheap or adaptable the model is, if it fails to provide useful information to guide organizations in their evolution path. OSOMM was structured using various existing proven models components together with experience from the field. It covers all the domains that an

organization needs to address for successful operations. Every level represents an achievement and denotes the missing components for the achievement of higher levels. Specifically, the levels were created with the business results contribution as a central point and improvement actions are derived from each level.

5.3 Organizational Service Orientation Maturity Model (OSOMM) presentation

The global structure of the model is based on former ISO15504 descriptions. This structure provides a well-documented and robust description of the different components of the model. It also provides a solid ground for repeatability. Each element describes the main components that must be present in an assessment.

OSOMM global model structure:

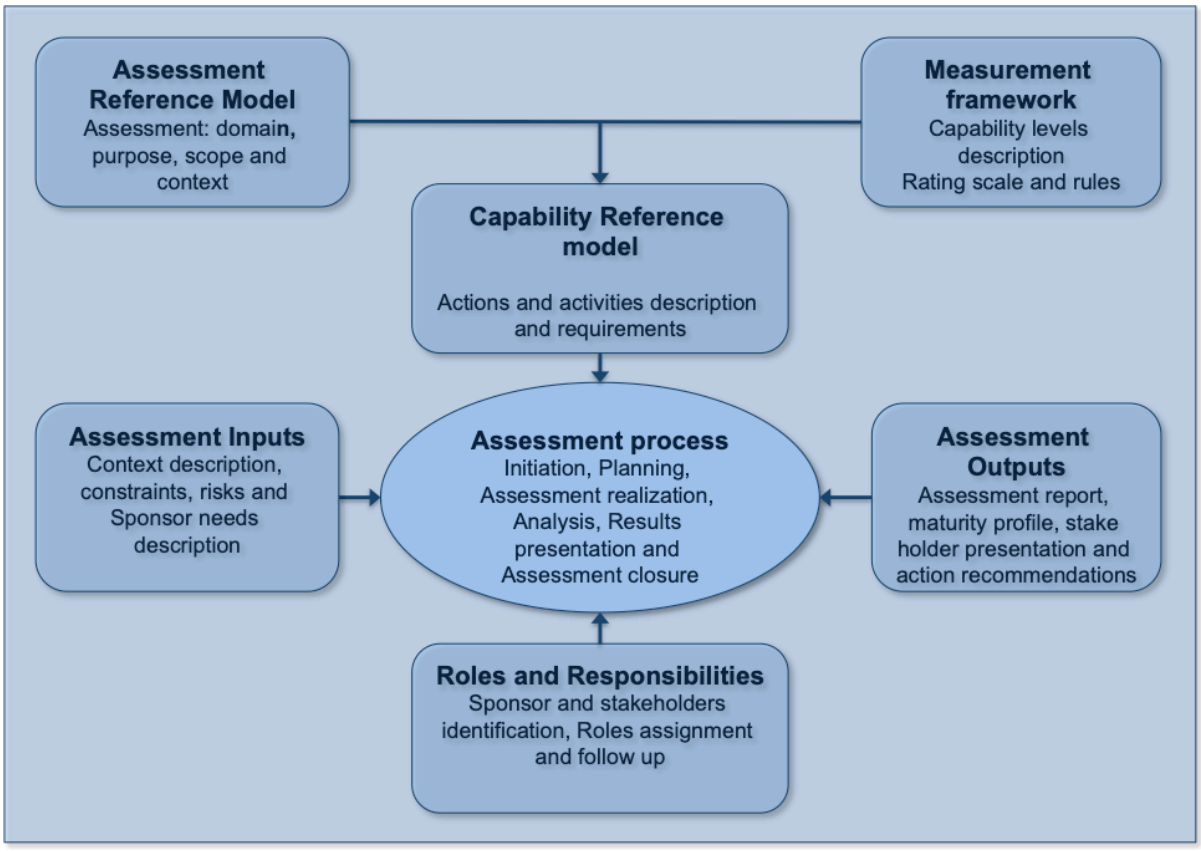

FIGURE 22 : OSOMM GLOBAL MODEL STRUCTURE
Source : Martin Cross; Based on ISO15504 structure.

5.3.1 Assessment Reference Model (ARM)

The Assessment Reference Model describes the domain, purpose, scope and context that clarify the purpose of an assessment. The domain describes the global environment of the organization to be assessed. The purpose describes the type of assessment and the expected usage of the assessment results. These can be: 1) to define the current state according to the Service Orientation reference described in the Activity Reference Model, 2) promote an improvement plan 3) compare with previous situations and 4) benchmarking. The scope defines and documents the areas that will be assessed. Normally, the assessment should cover an organization as a whole but there might be cases when the assessment will be carried out for a specific area or department. This would be the case for internal IT departments providing services to internal customers. The context describes the global characteristics of the entity that will be assessed. It is important to collect historical information concerning the entity that will be assessed. Previous assessment initiatives, existing surveys, global cultural aspects, their current relationship with customers, documented risks and specific strategic objectives or any other information that could influence the assessment.

5.3.2 Measurement Framework

The measurement framework describes the maturity levels, the rating scale and the global measurement framework rules behind the assignment of a maturity level. As previously described, the maturity levels were defined from a comparison between the multiple documented levels from different maturity models as described previously in this chapter. Every level is a step forward in the evolution towards a more mature service-orientation. Each level describes specific requirements to achieve the level. Every level requires predefined inputs and will propose specific outputs that will be used as input for the subsequent level. In this way, every level will be built upon the results of the previous one. This requires a progression from one level to the next one. This means that in order to obtain the denomination of a level it must achieve the criteria specified in that particular level plus have achieved all the criteria specified in all previous levels.

The rating scale has been defined in accordance with the percentage of realization of each assessed activity. The levels rating criteria is as follows:

- Level 0, Initial: 0 to 20% of required tasks realization.
- Level 1, Basic: 21 to 80% of required tasks realization.
- Level 2, Performed: 81 to 100% of required tasks realization.
- Level 3, Controlled: 81 to 100% of required tasks realization with complete measurement control of all composing elements and basic customer orientation.
- Level 4, Customer aligned: 81 to 100% of required tasks realization with end to end service measurement adapted to specific customers' needs.
- Level 5, Business value contribution: 81 to 100% of required tasks realization with end to end measurements adapted to the customers' needs and aligned with the strategy of the business.

These levels are rather different than the usual maturity levels for process assessments in CMMI type models. The CMMI type models levels refer to a specific organizational capability of a process and measure the extent to which this organizational capability is realized. The presented levels in the CRM (Capability Reference Model) in OSOMM represent the extent to which the organizational capability is realized (levels 0 to 2), the extent to which the organizational capability is controlled (level 3) and the extent to which these capabilities are aligned to customers' and business' needs (levels 4 and 5). This levels structure provides an exhaustive view of the organizational capability and help organizations to focus on a more customer/business oriented view.

5.3.3 Capability Reference Model (CRM)

The Capability Reference Model describes the required activities for a mature Service Orientation. It is important to point out that this model will measure these organizational capabilities instead of processes. The capabilities were built aligned with ITIL 2011 and V4 requirements as a main reference model with other requirements from Serv*Or, (Lytle et. al., 1998). The model also considers Mohammadi (2015) and Tyfour et. al. (2018) proposal of maturity components, Mettler (2011) assessment components, Alwibi (2014) main domains for maturity models and Iden and Langelen (2010) and Pollard and Cater-Steel (2011) CSF for successful ITSM implementations. The result is a questionnaire[28] of capabilities in two main areas: external relationships

[28] Arsham Hossein, 2001, Questionnaire design and surveys sampling (http://ubmail.ubalt.edu/harsham-data/oper330 surveys.htm.

with stakeholders and Internal activities for ITSM. These two areas are subdivided in several others. External aspects are categorized into 1) business relationship, 2) customer care and 3) user care. Internal aspects are categorized into: 1) culture and collaboration, 2) strategy and leadership, 3) human resources, 4) failure treatment and preventions and 5) technology management. Each category is analyzed through a series of questions that investigate their Service Orientation status. The questionnaire is documented in annex 25. For the purpose of the present research additional questions were embedded into the questionnaire. Sections 1, 2, 3, 5 and 7 are an integral part of the assessment. Sections 4 and 6 are specific to the present research to analyze the Service Orientation perception as well as the difficulties that organizations face while conducting maturity assessments. The following figure shows the main Service Orientation components of OSOMM.

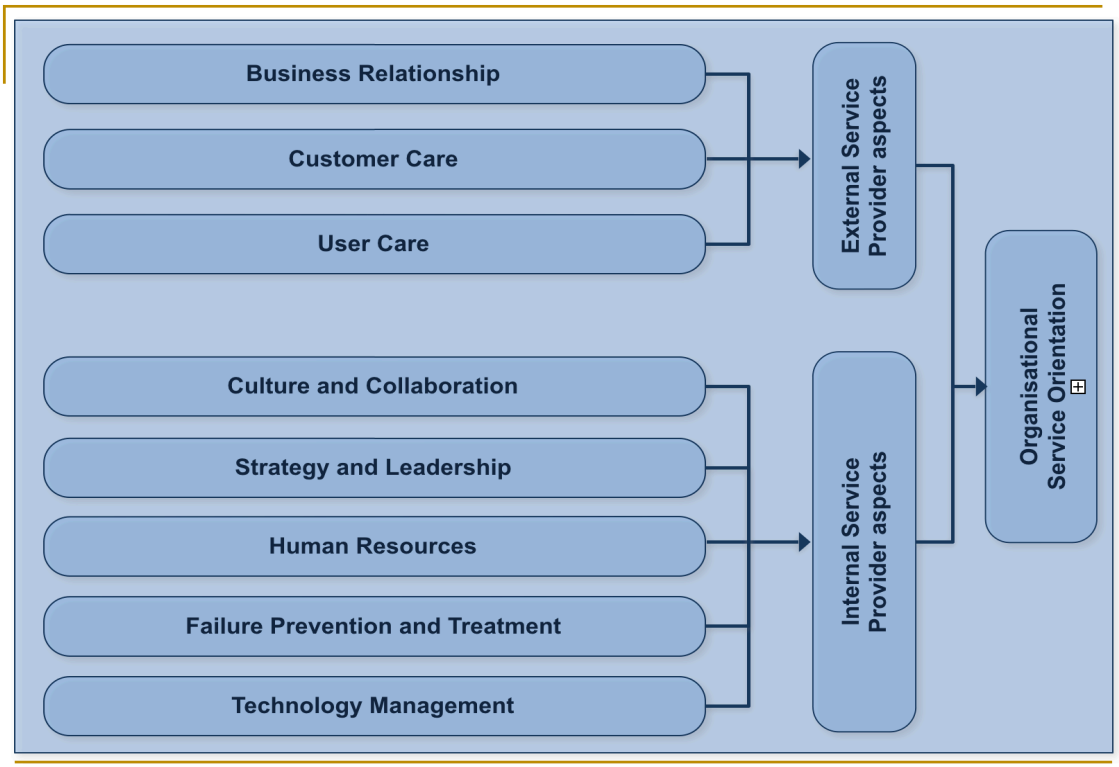

FIGURE 23 : OSOMM SERVICE ORIENTATION COMPONENTS
*Source : Martin Cross; Based on Serv*or, Lytle, Hom and Mokwa (1989).*

Fanning Elizabeth, 2005, Formatting a paper based survey questionnaire : Best practices, Practical assessment research and evaluation, Vol 10, No. 12, University of Virginia.
House Carol, 1985, Questionnaire design with computer assiste telephone interviewing, Journal of official statistics, Vol. 1 No. 2, pp. 209-219. Statistics Sweden.
Siniscalco Maria Theresa and Auriat Nadia, 2005, *Questionnaire design*, Quantitative research methods in educational planning, UNESCO International Institute for Educational Planning, Paris, France.
Taylor-Powell Eilen, 1998, *Questionnaire Design: Asking questions with a purpose*, University of Winsconsin, Program Development and Evaluation.

5.3.4 Roles and Responsibilities

The roles and responsibilities section of the model clarifies the different roles that are needed in an assessment as well as the specific responsibilities related to that role. One of the main activities is the identification of the different stakeholders. There are two types of roles 1) from the assessment team and 2) from the assessed entity. The required roles are:

- Sponsor: the person who has the main interest in the result of the assessment and who decides on the budget to assign to an assessment.
- Customer Coordinator: the manager of the assessed entity who coordinates the assessed entity activities and logistics for the realization of an assessment. Will interact with the assessment team coordinator.
- Customers: persons who negotiate services and control the results of services provided by the assessed entity. They can be internal or external to the assessed organization.
- Users: persons who use and receive the benefits of the services. They can be internal or external to the assessed organization
- Operators: persons pertaining to the assessed entity and who participate in the data gathering.
- Provider managers: persons pertaining to the management of the assessed entity who participate in the data gathering.
- Assessment team coordinator: person who holds responsibility for the correct execution and quality controls of an assessment. The person will coordinate the assessment team's activities and is in regular contact with the Customer coordinator.
- Assessors: persons who will carry out the assessment. These activities can be part of any phase of the assessment but mainly participate in the data-gathering phase. They are represented by the assessment team coordinator.

The roles described above are compulsory. There might be other stakeholders like controllers, auditors, observers, and contributors, participating in an assessment. This will depend on the specificities, context and size of the assessed organization. These roles are optional and need to be clarified and documented prior to an assessment.

5.3.5 Assessment Process

The assessment process is described in 6 phases. Each phase has a specific purpose and produce specific outputs that will be used in the subsequent phases. These phases cover the life cycle of an assessment. The Assessment initiation phase de-

scribes the required aspects for the Assessment Reference Model (ARM) and agrees with the sponsor on the scope and purpose of the assessment. The preparation phase forms the assessment team and communicates with the customer coordinator for the preparation of the assessment and the coordination of all the required logistics. The assessment realization phase is in charge of the execution of the assessment data gathering with the customers and operators. The analysis phase consolidates the data from the different operators, service provider managers, users and customers and analyzes the consolidated results that further help prepare the maturity profile and recommendations of actions. The results presentation phase provides the assessment results to the sponsor via a standard report and makes a presentation of the results to the assessed team, the customer coordinator and the sponsor. The closing phase hands over all the relevant data to the assessment coordinator, formally closes the assessment with the sponsor and ensures the knowledge transfer to the assessed entity for the initiation of an improvement plan.

5.3.6 Assessment Inputs and Outputs

Assessment Inputs: The assessment team coordinator gathers all relevant data related to the assessed entity and its context. Prepare a formal agreement for the assessment and verify all the assessment phases with the customer coordinator and if necessary with the sponsor. The assessment coordinator will make a quality analysis of the existing data to support the assessment and ensures that all required information is available to begin the assessment. During the assessment phase, pertinent information shall be gathered to prove actions and justify the achievements of a maturity level.

Assessment Outputs: The required output is a standard maturity report and a targeted presentation. The maturity report contains specific sections predefined in a template to warrant a consistent presentation of different assessments and facilitates the reading and interpretation. The report presents the global maturity profile of the organization and specific profiles for the different domains. It also presents the assessment conclusion, a SWOT and recommendations of improvement to help the organization achieve the next level of maturity in a specific capability or domain.

5.4 OSOMM benefits over existing maturity models

In chapter 4 I presented the justifications to direct the research into the maturity area. From the results of the exploratory research it is observed that, despite the numerous maturity models available on the market, organizations do not measure their maturity. This is mainly because they find existing models complex, time consuming and expensive, therefore, the need of a model that would be simple to use, time efficient and inexpensive. These are the main criteria that were used in the creation of the model and denote its main benefits over the existing models. Nevertheless there are other advantages and benefits obtained from different components of the model. The list below resumes the main benefits of the model:

1. Academically documented model.
2. Holistic view.
3. Latest ITSM practices alignment.
4. New business aligned maturity levels.
5. Supporting the 4 purposes of maturity models.
6. Strong business alignment.
7. Inclusion of users and customers in assessments.
8. Simplicity of usage.
9. Time efficiency.
10. Cost efficiency.

These criteria are presented in the following sub-sections.

5.4.1 Academically documented model

According to Mettler, Roher and Winter (2010) most maturity models derive from the practice and are not academically described. The academic description of the OSOMM model will facilitate the knowledge distribution of the model. Additionally, the documentation of its characteristics will facilitate the decision-making when comparing the different models and choosing the model to use. The academic description of the model is documented in annex 32.

5.4.2 Holistic view

Most maturity models are focused on a specific part of an organization, losing a holistic view of the maturity of the organization. Some models cover a more or less com-

plete view of the whole organization but the main focus remains on specific components. This is the case for example of CMMI models focusing mainly on processes. The OSOMM model covers a wide range of organizational activities making of it the model that covers the widest view of an organization. It covers the three purposes of maturity models proposed by Mettler (2011): processes, objects and people. It covers also the proposed Mohamidi (2018) components: organizational, human resources, projects, managerial and processes. It also considers the components derived from the CSFs documented by Iden and Langelen (2010) and Pollard and Cater-Steel (2007): training skills, leadership and management involvement, collaboration and communication and service culture.

The OSOMM model also includes the three maturity models purposes described by Mettler (2011), Mohamidi and Iden Langelen and Cater-Steel: status, improvement and benchmark. It considers as well all the elements described by Lytle et. al. (1998) in their Serv*Or model. This makes OSOMM the model that covers the most aspects of an organization.

5.4.3 Latest ITSM practices alignment

ITIL is the widest used ITSM reference in the world. This is specifically the case of the studied population. ITIL version 4 was launched on the market in 2019 and 2020. It describes a complete new structure for an IT service provider based on a SVS (Service Value Systems), a SVC (Service Value Chain), 7 service management guiding principles and 34 practices. To my knowledge, OSOMM is the only existing maturity model available covering these elements. This is quite important as ITIL version 4 describes the latest advancements in the ITSM area.

5.4.4 New business aligned maturity levels

The vast profusion of maturity models leads to a vast profusion of maturity levels descriptions. Many maturity models describe their own maturity levels. Nevertheless most of them derive from CMMI type maturity levels. These levels were built focused on the maturity evaluation of processes. OSOMM does not measure processes but desired outcomes. Therefore, the proposal of a new set of maturity levels adapted to the latest ITSM practices, the holistic view of the model and the strong business orientation required today. The full description of the levels is presented in annex 34 with a comparison between the main used maturity levels of other maturity models. The OSOMM maturity levels represent the maturity of the IT service provider opera-

tions (levels 0 and 1), the way the provide measure and control achievements (levels 2 and 3) as well as the business orientation of the provider (levels 4 and 5).

5.4.5 Supporting the 4 purposes of maturity levels

The academic literature proposes 3 utilizations of maturity models. Within the description of the purposes of maturity models I propose a 4th utilization (evolutive). The addition of this 4th purpose is important because it helps organizations with the evolutionary approach described in the definition of maturity. The 4 purposes of maturity assessments are: 1) status definition, 2) improvement guidance, 3) maturity evolution and 4) benchmark. The OSOMM model is perfectly adapted for all four purposes.

5.4.6 Strong business alignment

IT service providers must develop strong capabilities to support the business of their customers. Today, most IT providers are technically oriented and struggle to integrate their activities into the business strategy. In traditional maturity models, assessments seek to improve processes (mainly internal technical processes). The OSOMM model was created specifically to help providers to develop a strong focalization in creating outcomes to support the business strategy. The OSOMM maturity levels delve to guide organizations to this achievement.

5.4.7 Inclusion of customers and users in assessments

Traditional service maturity models investigate with detail the provider's capability to deliver services. While this is the basis of service provision, a strong focalization to provide added value to customers and users is essential. If the model considers, while conducting assessments, only the perception of the provider's staff, this will create discrepancies in the results. This is supported by the agency theory described in the methodology section. It is quite common that customers and users may have different points of view than the provider's staff. To my knowledge, the OSOMM model is the only one that considers, as an integral component, the integration of customers and users in the maturity evaluations.

5.4.8 Simplicity of usage

The results of the exploratory phase of this research showed that organizations find existing models too complex to be used. This is one of the main reasons why organizations do not measure their maturity. When the model is process oriented, it requires to know in detail the processes to evaluate. In ITIL version 4 there are 34 practices described and it becomes difficult for organizations to evaluate all these practices. The OSOMM model is not process oriented but outcome oriented and value con-

tribution oriented. This means that the evaluation is focused on the contribution and not on the tasks. This makes it possible to greatly simplify the model. For a comparison, an Axelos assessment requires the evaluation of more than 3000 questions to evaluate the 26 processes and the 4 functions described in ITIL 2011. OSOMM proposes 68 outcomes to evaluate. The outcomes are described in popular language that is easily understood by non-specialist individuals. Adding to that, OSOMM proposes a strong structure categorized in 1) external service providers aspects: business relationship, customers treatment and users treatment and 2) internal service providers aspects: culture and collaboration, strategy and leadership, human resources management, failure prevention and treatment and technology management. This structure facilitates assessments as it allows to separate the internal aspects to be treated only by the provider's staff, from the external aspects to be evaluated as well by customers and users.

5.4.9 Time efficiency

Time is an extremely important aspect for organizations. One of the main issues reported in the exploratory research for not measuring maturity is the lack of time. Therefore, it is essential that a maturity assessment is time efficient, especially if the maturity is to be measured at regular intervals to control the evolution. OSOMM is one of the most efficient maturity models available. As documented in annex 12, a full maturity assessment using traditional models (like TIPA) will require more than 200 man/days to be realized. Axelos type assessments take 40 man/days. An OSOMM assessment instead of measuring processes will focus on outcomes, therefore an assessment will take 2,5 man/days. This is 1,5 % of the time compared with a TIPA assessment and 6,25% of the time compared with an Axelos assessment.

5.4.10 Cost efficiency

The direct consequence of the time efficiency of OSOMM is the drastical reduction in cost for the realization of an assessment. Considering the cost of specialized handcraft in Luxembourg, a man/day will cost 312€ to an organization. Considering the need of more than 200 man/days for a full TIPA assessment, this will represent a cost of 62,868€. An Axelos assessment requires 40man/days. This represents a cost of 12,738€. As an OSOMM assessment requires only 2,5 man/days, the total cost for an OSOMM assessment is 780€. This costs represents a net value based on a cost unit of 312€ per man/days. This is not the real selling cost for an assessment but provides an objective cost unit comparison of the involved costs.

After presenting the OSOMM model an its main characteristics and benefits, it is convenient, as exposed in the science design theory, to evaluate the model. For that purpose, the model will be applied to a specific sample of the studied population.

Chapter 6: Screening organizations through the New Maturity Model

This chapter presents the application of OSOMM model within a specific sample and documents the characteristics of the sample in relation to the assessed organizations and interviewed individuals. It describes the methodology used for the assessments consisting on face-to-face interviews for an assisted assessment. Finally, this chapter documents the treatment of the gathered data and the analysis that was done to obtain a maturity profile for each assessed organization. It also presents an assessment report in accordance with the OSOMM ARM (Assessment Reference Model) specifications, including a SWOT and recommendations for an improvement plan.

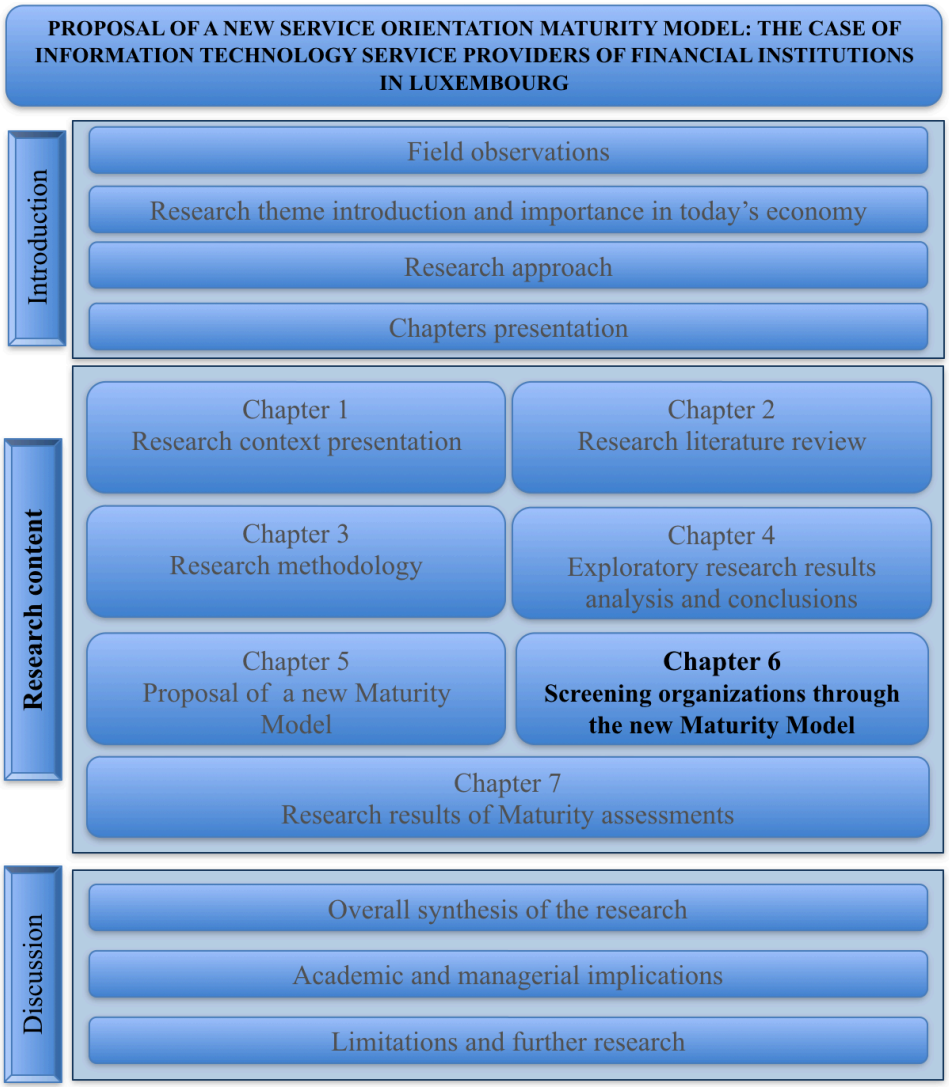

FIGURE 24 : CHAPTER 6 ORGANIZATIONS' MATURITY ASSESSMENTS
Source : Martin Cross

6.1 Population and choice of the sample

The objective of applying OSOMM to a specific sample is to verify its applicability within the field and verify the model's coping with the documented quality criteria. The population where the model was applied is the same one as described in the exploratory research phase (IT service providers of financial institutions in Luxembourg using ITIL), therefore the same methodology was used. Nevertheless, the sample differs slightly.

6.1.1 Sampling methodologies

Using the classification proposed by Alvi (2016) a mix of stratified-convenience-quota sampling was realized. The first level of categorization is per type of service providers (internal or external). Internal meaning, pertaining to the same legal entity as its customers and users. External meaning, pertaining to a different legal entity than the one of its customers and users. A second level of categorization was done while considering the size criteria: big, medium and mall. Taking into consideration the size of the country and the dominant size of organizations in the country (répertoire alphabétique des entreprises Luxembourgeoises, Statec 2014; NACE rev 2.0 and Liste des principaux employeurs au Luxembourg, d'après l'effective, classement par taille, 2018), the following metric was retained:

- Big: more than 250 employees.
- Medium: between 61 and 249 employees.
- Small: 60 employees or less.

The organizations in the sample were categorized according to the type and size criteria and a quota was assigned to each category (minimum 2 organizations from each category). The final sample consisted of 13 organizations that represent 10% of the population. Therefore the sample is representative of the population. The table below shows the distribution of the final sample:

	Big	Medium	Small
Internal	2	2	3
External	2	2	2

TABLE 13 : SAMPLE USED FOR THE APPLICATION OF OSOMM IN THE FIELD.
Source : Martin Cross

Several organizations that participated in the initial exploratory research, participated also in this phase. Nevertheless, with the following differences:

- One organization closed during this period and was not available anymore.
- One organization's main contact person left the company, and no one was assigned to the same position.
- One employee of an organization changed functional responsibility and was no longer in charge of the implementation of services. Another employee was assigned the role and participated in the analysis.
- One organization desisted (constraints provoked by the CoVid19 shutdown).
- An important big organization joined the research.
- A small consultancy firm joined the research.
- Essential operators were not included.

For the purpose of this section, the same definitions used as in the exploratory section. Refer to the glossary for the definition of terms.

Three options were analyzed for the realization of the maturity assessments:

1) A detailed business case based on in-depth analysis of a chosen representative company with the aim of understanding in detail the situation of that specific company. This option was not used because it would provide a rather limited view of the studied population.

2) Investigation of the largest sample as possible and provide a more exhaustive view of the maturity of the different IT service providers of financial institutions in Luxembourg. While this option was interesting, it was rejected because it is not adapted to face-to-face assisted meetings for the interviews. It would depend on delivering a questionnaire to a large amount of organizations. Without proper guidance to answer the questionnaire, the results might not be consistent. As proved by Johansson, Eckerstein and Malmros (2016), self-

assessments tend to be less representative of a reality than a guided assessment.

3) The use of a specific sample of IT providers of financial institutions in Luxembourg to provide a representative view of the population. This was the option used because it provides an accurate view of the population and it is well adapted to guided assessments. In total, there were 13 organizations that participated in the maturity assessment. This represents 10% of the population. This option provides a better view of the population than a business case. Even though it does not address as many entities than the largest sample option, it still provides an accurate view rather representative view of the whole studied population and is more adapted to assisted interviews.

The exploratory research showed that most of the IT providers of financial institutions in Luxembourg (as well as other IT providers in other economic activity domains) consider Service Orientation very important or essential. However, they struggle to implement and use recommended Service Orientation practices and do not measure their maturity. Special attention was given in balancing the sample according to the specified criteria (type, size and origin).

The table below provides information on the characteristics of the studied organizations by documenting the type of financial institution, the origin of the mother institution, the size of the financial institution, the type of service provider and the IT type (internal or external).

Final studied sample:

Int Id	Financial institution Type	Origin	Size	IT Service provider type	IT type
1	Investment Bank	UK	M	Shared IT	Internal
2	European financial institution	EU	B	PSF type 3 and 4	External
3	Global Financial institutions	Lux	B	Telecom	Internal
4	Support PSF type 1, 2, 3 & 4	Lux	B	Shared IT	External
5	Investment Bank	Swe	M	Shared IT	Internal
6	Global Financial market	Fr	S	IT Training	Internal
7	Global Financial Institutions	Lux	M	PSF type 3 & 4	External
8	Support PSF type 1 & 2	Fr	M	Consultancy	External
9	Financial and Insurance	Japan	S	Shared IT	Internal
10	PSF support type 3 & 4	Lux	S	Consultancy	External
11	Essential Organization financial services	Lux	B	Shared IT	Internal
12	Global IT services provider	Lux	S	Shared IT	Internal
13	Global IT service provider	Lux	S	Shared IT	External

Internal IT service providers are ruled by the financial institution
External IT service providers who are support PSFs are ruled by the prudential control of the CSSF
External IT services providers who are not PSF are not subject to the prudential control of the CSSF
IT providers type 3 and 4 are considered as well a financial institution.
Size category Big= more than 250, Medium = between 61 and 249 and Small= 60 or less employees.

TABLE 14 : AMPLE ORGANIZATIONS WHERE OSOMM WAS APPLIED
Source : Martin Cross

The 13 studied organizations of the sample are either, financial institutions under Luxembourgish law, or external IT service providers delivering services to Luxembourgish financial institutions under Luxembourgish law. The sample presented in the above table, represents the population as follows:

- **Type**: There are 6 internal service providers and 7 external service providers.
- **Origin**: There are 7 financial institutions of Luxembourgish origin, 5 from a European country and 1 of a non-European origin.
- **Size**: There are 5 small organizations, 4 midsize organizations and 4 big organizations.

6.1.2 Interviewees selection

In the same way that a careful sampling must be applied to select the entities to analyze, it is necessary to carefully select the people to interview. This is important in order to ensure that they have the required responsibility and knowledge about Service Management operations and decision-making. For the maturity assessment it is not sufficient to interview a person with service management responsibilities. According to the agency theory, there are potential differences of perceptions between principals and agents. Therefore, it is essential to cover a broader perspective than just the one from the service provider's management. Consequently, the information gathered in the assessments also includes the IT service provider's technical staff, users and customers. Depending on the employees availability and the size of the organization, one or more persons from each category were interviewed. The table below informs the number of interviewed individuals from each organization of the sample:

Org Id	IT Management	IT staff	Customers	Users
1	2	3	2	3
2	2	3	1	2
3	1	2	1	1
4	1	1	1	2
5	1	2	1	2
6	1	1	1	1
7	1	1	1	1
8	1	2	1	1
9	1	1	1	1
10	1	1	2	1
11	2	3	2	3
12	1	3	2	3
13	2	1	1	1
	17	24	17	22

TABLE 15 : MATURITY ASSESSMENTS INTERVIEWED INDIVIDUALS
Source : Martin Cross

All the interviewed IT candidates have specific Service Management skills and hold specific responsibilities within the Service Management area. Users receive and use services from the service providers. They can be internal or external and do not have a view into the internal practices of the IT provider. They perceive services from the utility point of view. Their main concern is the reception of a specific utility to facilitate their work. Customers do not necessarily use the services but hold specific responsibilities for the decision, for the purchase and for the budgeting of the services they demand.

In total, there were 17 IT service provider's management interviews, 24 IT service provider's staff members, 17 customers and 22 users for a total of 80 interviews.

6.2 The interview methodology

The objective of the interviews is to gather relevant data about the IT Service Orientation practices in place within the studied organizations. The goal is to analyze their Service Orientation implementation and usage. During the assessment interviews, the newly developed Organization's Service Orientation Maturity Model (OSOMM) structure was used. The model proposes a specific questionnaire covering three domains in the external area and five domains in the internal area. In annex 25 is documented the detail of the domains and the questions.

The OSOMM guidelines described in the ARM (Assessment Reference Model) were used during assisted interviews. My participation as a researcher was limited to the explanation of the model levels and clarification of any arising questions when required. Knowing that online questionnaires and electronic systems cannot replace direct human contact (Kalika, Boukef and Isaac, 2007), Kalika, Boukef and Isaac (2008), the interviews were held on a face-to-face basis as far as possible, assisting interviewees through the interview. Nevertheless, due to the restrictions imposed by the COVID-19 quarantine, 7 interviews were held via videoconferencing systems. Despite that fact, the structure of the interviews remained the same. In all the cases, the interviewed people were already well aware of the research objectives due to previous meetings to explain the concept. Several people could participate in the same interview. Nevertheless, each organization was interviewed separately and users and customers were always met separately from the IT staff.

The interviews were held at the assessed organization premises. The interviews always started with an explanation of the research objectives and the clarification of confidentiality issues. For each interview, an anonymous questionnaire was prepared and handed out to each participant. Everyone answered each question separately, but at the same time without any intervention of the part of any other participant. The interviews were not recorded because they were based on a questionnaire with several individuals at the same session. All candidates had access to an individual questionnaire and the researcher only intervened for clarification purposes.

At the end of the interview, I explained the way the collected data was to be treated. Additionally, I explained the results that could be expected by the participating organizations at the end of the analysis. This included the reached maturity profile and the standard assessment report with conclusions, a SWOT analysis and specific improvement recommendations. Lastly, a short questionnaire was distributed to the interviewees to provide feedback of the assessment session. The purpose of this questionnaire was to help in the evaluation of the OSOMM model according to the established quality criteria.

6.3 Data treatment

After the interviews, the collected data from each organization and each person, was transferred to a spreadsheet. For privacy and anonymity issues, the name of the organizations and interviewed persons were coded. Answers from interviews were transferred individually and calculated by type groups (IT management (M), IT staff (S), customers (C) and users (U)) and then consolidated to obtain the average of the responses for each question.

It is extremely important to interview the four profiles because each type of profile might have a different perception. It is quite common that the provider believes that they are performing correctly, yet the customers and users sense a lack of quality. As expressed in the used agency theory, these aspects are commonly observed in the field and it was confirmed in the exploratory research phase where one of the expressed difficulties was the discrepancy between the provider's and the customer's point of view. It is equally possible that users have a different perception than customers and IT staff might have as well a different point of view than the IT managers. This is why profile types were treated separately and afterwards consolidated to obtain the final organization profile. During the analysis of weaknesses, it is then possible to point out these discrepancies between perspectives and promote a better communication and collaboration between the different profile types.

The set of questions analyzed in the data spread sheets relate directly to the questionnaire used during the interviews. The table below showcases an abstract of the data spreadsheet showing the values for the different types of profiles and the calcu-

lations that were done to obtain the final organization's maturity profile. The complete set of questions in the spreadsheet can be found in annex 26:

	EDBA SOMM Interview Analysis	PIM1	PIM2	PIM MAvg	PIS1	PIS2	PIS3	PIS MAvg	CI1	CI2	CI MAvg	UI1	UI2	UI3	UI MAvg	Interviews Maturity Average
5.2	External Provider Maturity Aspects			1,3				1,5			1,2				1,0	1,2
5.2.1	Business Relationship	1,5	0,8	1,2	2,0	1,7	0,7	1,4	1,3	1,5	1,4	0,8	1,5	0,5	0,9	1,2
5.2.1.1	Is there a well established relationship between the provider and the business at strategic level?	2	1	1,5	2	2	0	1,3	1	2	1,5	1	4	1	2,0	1,6
5.2.1.2	Does the provider understands and is aware of the business strategy?	1	1	1,0	2	2	1	1,7	0	2	1,0	0	1	1	0,7	1,1
5.2.1.3	Does the provider understand the business of its customers?	3	2	2,5	3	2	2	2,3	3	1	2,0	2	1	0	1,0	2,0
5.2.1.4	Does the provider communicate clearly with the business to demonstrate the provider added value?	1	1	1,0	2	2	1	1,7	2	1	1,5	1	2	0	1,0	1,3
5.2.1.5	Is there a clear established sponsorship from the business to the provider for Service Orientation matters?	1	0	0,5	3	1	0	1,3	2	0	1,0	1	1	0	0,7	0,9
5.2.1.6	Has the provider established clear financial tools to valuate services and inform customers about service costs?	1	0	0,5	0	1	0	0,3	0	3	1,5	0	0	1	0,3	0,7

TABLE 16 : DATA SHEET EXAMPLE FOR THE CALCULATION OF THE ORGANIZATION'S MATURITY

Source : Martin Cross

The above example shows the business relationship attributes of the external provider maturity aspects. In this example, there were 2 IT provider managers interviews, 3 IT provider staff interviews, 2 customers interviews and 3 users interviews. The raw data of the answers appear in the white columns. For each question the average of interviews by type was calculated (shown in the light grey columns). As an example, the calculated maturity in question 5.2.1.1 for Provider's IT management is 1,5, for IT staff is 1,3 for Customers is 1,5 and for Users 2,0. These averages were consolidated to get the value in the last column in mid grey, 1,6 for question 5.2.1.1. The same procedure was used to calculate the organization's maturity of each domain as presented in annex 26. Here we can observe the different perceptions of IT managers IT staff and users.

As a control measure, in order to improve the precision of the maturity profile, the average of all questions per interview was calculated and shown in the domain row. It was then calculated per profile type confronting the question averages with the domain average to finally consolidate them into the domain profile. After obtaining all the profiles for the domains, the same procedure was used to calculate the average maturity profile for the rows and for the columns to confront both values for internal and externals aspects. Finally, these values were consolidated to obtain the maturity profile of the organization.

To present the maturity profile of the organizations, the standard OSOMM maturity report was generated. The report includes the global organization's maturity profile. This profile is represented in two graphics for the consolidated external profile and for the consolidated internal profile. After that, the report presents a table with the details of the maturity profile for each domain. These are followed by the conclusions of the analysis, a SWOT and a list of recommended actions to help the organization in their Service Orientation improvement plans. The report is standardized as part of the model description to facilitate the interpretations and comparisons in case regular assessments are realized.

6.4 Maturity profile report abstracts

Below an example of some components of the OSOMM maturity report. The origin of the examples come from different organizations to avoid the potential recognition of a specific organization's profile. An example of a full report can be found in annex 27:

	EDBA OSOMM Global Maturity Analysis	2,3
		Global
5.2	External Provider Maturity Aspects	2,5
5.2.1	Business Relationship	2,4
5.2.2	Customer care	2,5
5.2.3	User care	2,5
5.3	Internal Provider Maturity aspects	2,5
5.3.1	Service Provider Culture and Collaboration	2,2
5.3.2	Service Provider Strategy and Leadership	2,1
5.3.3	Human Resources Management	2,0
5.3.4	Service failure prevention and treatment	2,4
5.3.5	Technology Management	2,4

TABLE 17 : EXAMPLE OF ORGANIZATION'S MATURITY PROFILE
Source : Martin Cross

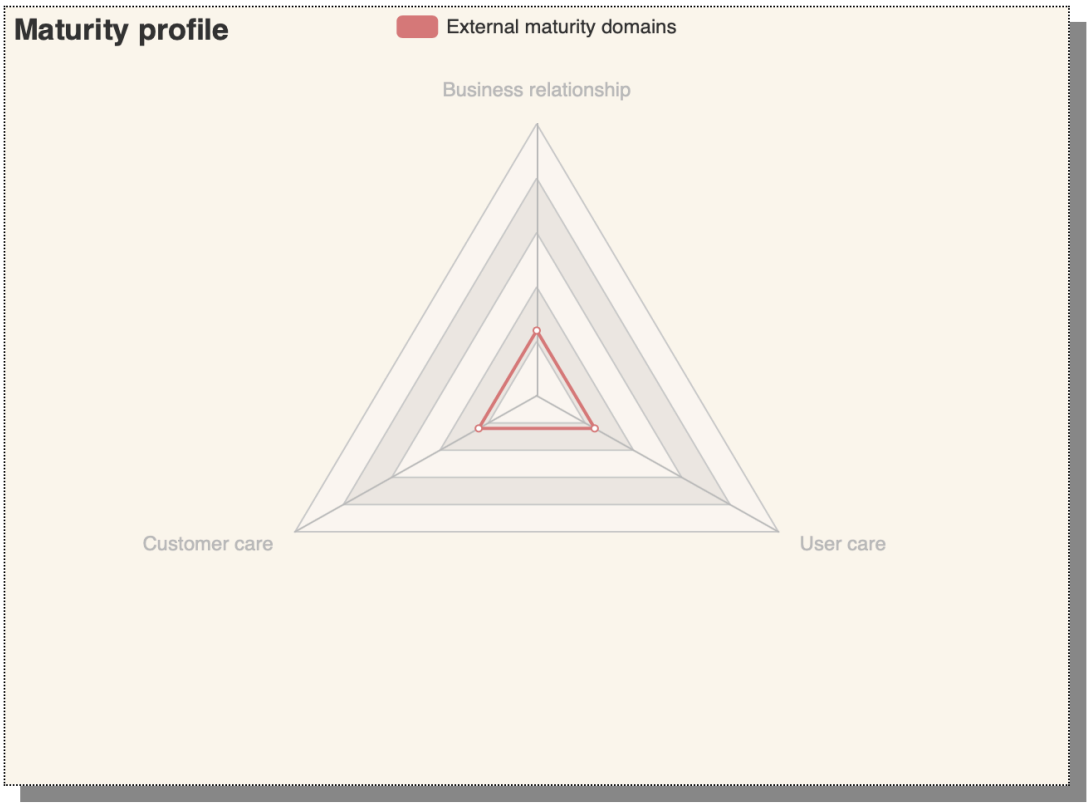

FIGURE 25 : EXTERNAL DOMAINS MATURITY SOURCE : MARTIN CROSS

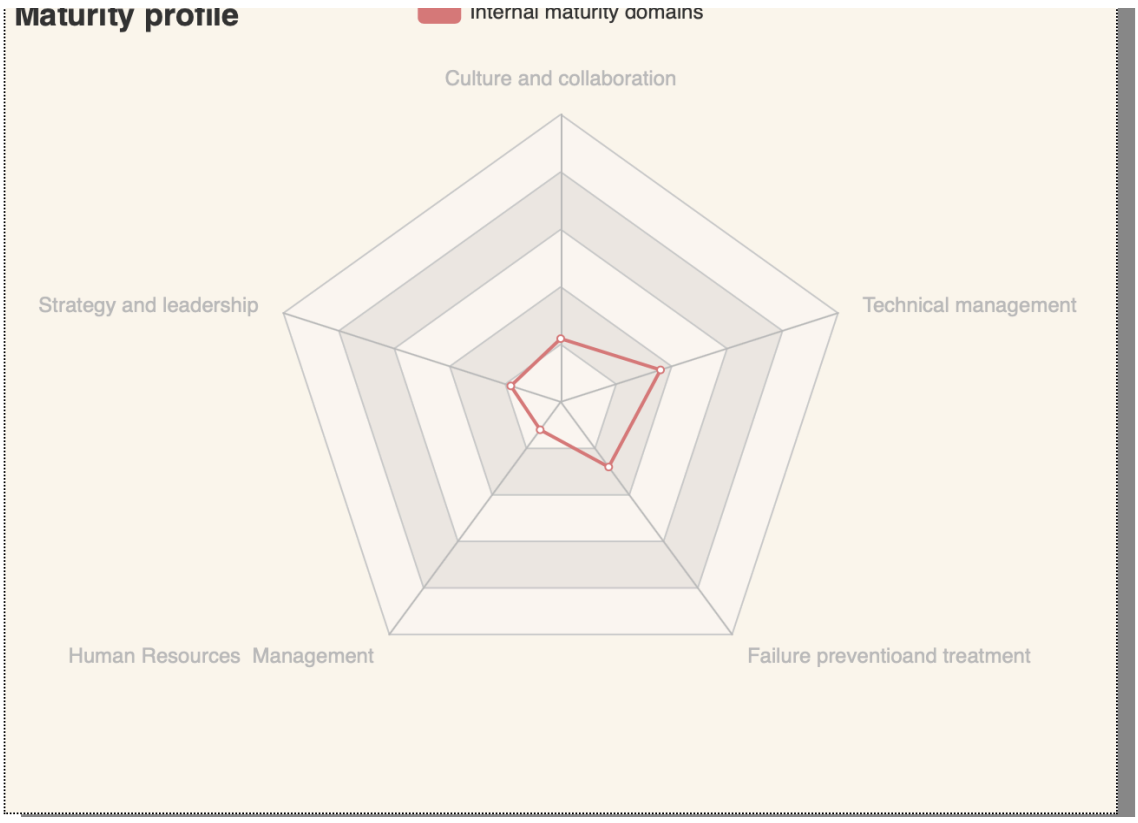

FIGURE 26 : INTERNAL DOMAINS MATURITY SOURCE : MARTIN CROSS

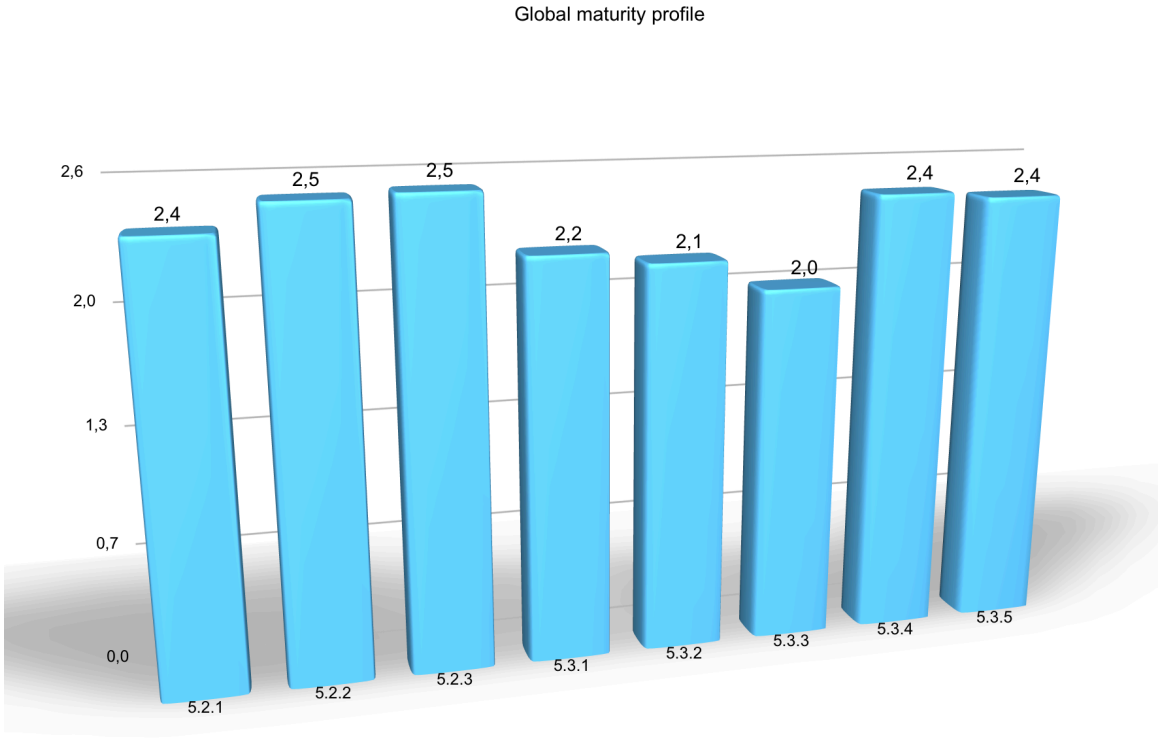

FIGURE 27 : MATURITY LEVELS
Source : Martin Cross

At the end of each assessment, this report was delivered to the sponsor of the assessment and with them it was decided which information is to be disclosed and to whom. A meeting with the sponsor and the main IT management team was promoted to present the results. If accepted by the sponsor, an invitation was sent to all participants to present the results and explain the decided improvement actions. I paid special attention to explain the maturity levels in order to warrant that the participants understood that there is no good or bad result. The obtained profile represents a view of a status at a specific moment and is subject to change. The important aspect of a maturity assessment is to record this maturity status and to be able to take the necessary decisions for an improvement program. As a reminder, the purpose of maturity assessments is to determine of a specific maturity profile, improvements, evolution and benchmark. The first assessment of an organization will serve as the departure point for improvements. It will also serve as a reference to control the evolution over time.

At the end of this presentation a formal closure of the assessment is done. All gathered data is returned to the assessed organization and all activities related to the as-

sessment are finished. An evaluation form is an integral part of the interview process, and as part of the closure procedure these evaluations are revised and lessons learnt discussed. For the present research a specific section was included to verify the IT management perception of the assessment process. For this evaluation, 6 criteria were questioned:

- Simplicity of usage.
- Assessment cost.
- Assessment time.
- Assessment ITSM Service Orientation exhaustiveness.
- Assessment usefulness.
- Assessment results value.

The used scale is a Likert type scale where 1 is the lowest (less positive value) and 5 is the highest (more positive value). The scale was defined as: 1 Strongly disagree, 2 Disagree, 3 Neutral, 4 Agree and 5 Strongly agree.

A low score in simplicity would mean complex, while a low score in cost and time would mean expensive and time consuming. It is important to note that at the moment of the submission of the thesis and due to constraints imposed by the CoVid-19 quarantine, 2 organizations did not closed the assessments. Consequently (even if the assessment was finished) these two organizations did not provided input for the evaluation of the assessment because they did not have the maturity report. Therefore the evaluation consisted in only 11 evaluations.

The consolidated evaluation results for each organization are show in the following table:

Criteria	1	2	3	4	5	6	7	8	9	10	11	T
Simplicity	4	5	4	5	5	5	5	4	4	4	5	4,5
Cost	5	5	5	5	5	5	5	5	5	5	5	5
Time	4	5	5	5	5	5	4	4	4	5	5	4,6
Exhaustiveness	4	5	5	5	5	5	5	5	5	5	5	4,9
Usefulness	4	5	4	5	5	5	4	5	5	5	5	4,7
Value	4	5	4	5	4	5	5	5	5	4	5	4,6
												4,7
Average	4,2	5	4,5	5	4,8	5	4,6	4,6	4,6	4,6	5	**4,7**

TABLE 18 : OSOMM ASSESSED ORGANIZATIONS EVALUATION SCORE
Source : Martin Cross

In the above table we can observe that all organizations rated OSOMM at 4,5 or more. Only the first organization is slightly lower. Nevertheless all of the values are higher than 4.

From this table we deduce the following:

- The global score considering all criteria is 4,7, which is rather high.
- All values are higher than 4,5.
- There are several values that are close to 5, even for the lowest score, which is 4,5 for simplicity.

All in all we can conclude that the global perception of the model within the field is rather positive. The following points can be observed:

Simplicity: Even if ITSM and Service Orientation are rather complex domains, OSOMM gets a high score for simplicity. This is important because if the model is complex it will require specific expertise to use it and potentially will create variations in the results depending on the perception of the individual who would be performing the assessment or the interviews. Additionally, if the model is complex, the cost for learning and execution of assessments will raise and potentially organizations might not adopt it. We can conclude that OSOMM is simple to use.

Cost: Cost efficiency is rated at the maximum. This confirms that the model can be used without too much investment. This is significant considering the observed difficulty in the exploratory research. High cost is one of the main reasons why organizations do not use any maturity model and do not measure their maturity. We can conclude that OSOMM is cost efficient.

Time: Execution time is rated at 4,6, which is quite high. This quality is quite important considering that lack of time is as well one of the main difficulties that obstruct organizations from conducting maturity assessments. If the time invested in a maturity assessment is convenient, organizations will be more open to measure their maturity. This is especially important in the sense that, if the model is to be used regularly to control the evolution of improvements, each execution will require time for the realization of the assessment. This score is rather positive, especially while compar-

ing the OSOMM model with existing models that are rather time consuming. We can conclude that OSOMM is time efficient.

Exhaustiveness: This score is as well close to 5, which is important because if the model does not cover the required areas in order to have a clear view of the global Service Orientation, there will be gaps influencing the overall provider's performance. This is especially true if we compare with existing models that do not provide this global view. We can conclude that OSOMM is exhaustive.

Usefulness: The value is 4,7. If a model does not provide useful outcomes it will be useless. Therefore, this quality is quite important especially if the model is used to guide organizations in their improvement journey. The usefulness comes from specific conclusions, SWOT and recommendations provided in the final maturity report. With this in mind we can conclude that OSOMM is useful.

Value: The concept of value is at the core of Service Science. The model must provide value in order to expect to be used by organizations. With a score of 4,6, organizations perceive OSOMM to be beneficial to the organization providing practical guidance and value for the organization. We can conclude that OSOMM is valuable.

These scores are extremely important in order to assure that the model is convenient and can provide value for practitioners with a heavy workload and with little time to dedicate to maturity assessments. If the model is simple to use, requires little time and cost for its execution, its exhaustive and useful, provides specific value to the assessed organization, the model has all the required characteristics to be used in the field. Despite the profusion of maturity models available in the field, so far these models are not used. With the exposed criteria, it is likely that the OSOMM model will provide factual benefits and it will be used to assist organizations in the measurement of their Service Orientation maturity.

This chapter described the methodology used for the OSOMM application over a specific sample representing a population. After the realization of these assessments it is interesting to consolidate the findings and provide a global profile. The next chapter will present this consolidation.

Chapter 7: Research Results of the Maturity Assessments

This chapter presents the consolidated maturity profile of the studied IT service providers of financial institutions in Luxembourg, obtained with the OSOMM model. The presented profile uses the predefined OSOMM's report. This profile can be used as benchmark to compare the studied organizations against the global profile.

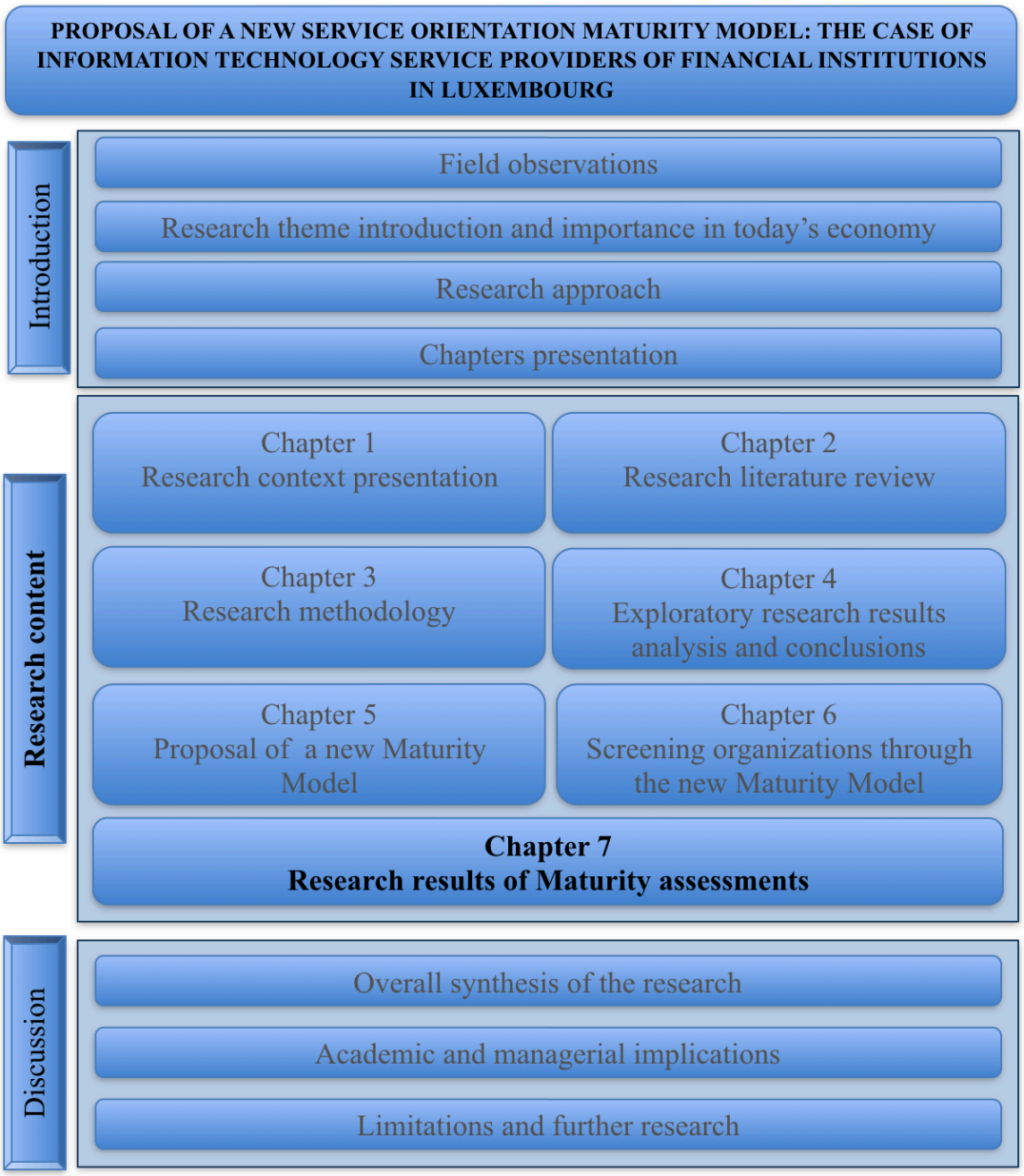

FIGURE 28 : CHAPTER 7 MATURITY ASSESSMENTS RESULTS
Source : Martin Cross

The maturity assessments of the 13 organizations allowed to obtain a maturity profile for each one of them. One of the purposes of maturity assessments is benchmarking. Often, organizations desire to position themselves towards the competition or market targets and it is rather interesting to have a market reference. As expressed by Iden and Eikebrokk (2016), there is a need for more research of ITSM implementations in different regions and countries. Therefore, the study of a sector, region or country can prove interesting not only for comparison purposes but also in order to provide an image of the economic interest of a country or region.

For that purpose, a consolidated maturity profile was obtained. There are four interesting consolidations that can be obtained from the data set:

1. Global Maturity of the IT service providers of financial institutions in Luxembourg.
2. Maturity per type of provider (internal or external).
3. Maturity per size of IT organization (small, medium and big).
4. Maturity per type of role (internal IT staff and external staff –customers and users)

Each one of these analyses present a certain interest. A global profile for the country is rather useful for organizations as a main reference and could be useful when compared with other countries and regions as long as they define their profile using the same model. The analysis by type is rather interesting as it helps to understand the difference of Service Orientation maturity between internal and external providers. This view can support organizations in their decisions for in-sourcing or out-sourcing. The analysis by size is interesting as it verifies if there is a relationship between maturity and size. Finally the analysis by type of role will allow to understand the difference in perception between the IT staff and the customers and users. There are other potential relations and analyses that can be done with the same data but for the present research I will focus the attention on these three aspects because they are of interest within the specific field.

Bellow an example of the data-sheet used to calculate the global profile of IT providers in the sample. The complete table is found in annex 28.

	EDBA OSOMM Global Maturity Analysis	O21 OE1	O2 OE2	O3 OE3	O10 OE4	O11 OE5	O22 OE6	External	O20 OI1	O5 OI2	O6 OI3	O12 OI4	O14 OI5	O1 OI6	O4 OI7	Internal	Organisation's Maturity Average	Domain Average	Maturity
5	Global Maturity Profile		EB	EB	EM	EM	ES	2,6	IB	IM	IS	IS	IS	IM	IM	2,1	2,3	2,3	2,3
5.2	External Provider Maturity Aspects							2,6								2,3	2,5	2,5	2,5
5.2.1	Business Relationship	4,1	2,0	1,6	3,3	1,9	2,5	2,6	1,3	1,3	3,1	1,0	4,2	2,3	1,9	2,2	2,4	2,4	2,4
5.2.1.1	Is there a well established relationship between the provider and the business at strategic level?	3,5	2,1	2,4	3	1,9	2	2,5	1,6	1,6	2,5	0,8	4	3	1,4	2,1	2,3		
5.2.1.2	Does the provider understands and is aware of the business strategy?	3,8	1,8	0,8	2,3	1	1,8	1,9	1,1	1,1	3	1,1	4	3	1,4	2,1	2,0		
5.2.1.3	Does the provider understand the business of its customers?	4,6	2,3	3	3,8	3,1	2,6	3,2	2	1,9	4	2,3	5	3,3	2,6	3,0	3,1		
5.2.1.4	Does the provider communicate clearly with the business to demonstrate the provider added value?	4,3	1,9	1,4	3,5	2,4	3,3	2,8	1,3	1,4	3,3	0,9	3,8	2,8	1,8	2,2	2,5		
5.2.1.5	Is there a clear established sponsorship from the business to the provider for Service Orientation matters?	4	2,5	1,9	3,8	2,4	1,9	2,8	0,9	1,3	3,3	1,1	3,8	1,8	1,3	1,9	2,3		
5.2.1.6	Has the provider established clear financial tools to valuate services and inform customers about service costs?	4,1	1,6	0,3	3,5	0,6	3,4	2,3	0,7	0,5	2,5	0	4,4	0	2,9	1,6	1,9		

TABLE 19 : DATA SHEET EXAMPLE TO CALCULATE THE GLOBAL MATURITY PROFILE
Source : Martin Cross

7.1 Global maturity profile

The data set presented in annex 28 was used to obtain the maturity profile of each of the questions for all domains. As in the generation of the maturity profiles for each organization, the maturity for each question was obtained by calculating an average of the maturity profile of each organization and from there, the maturity profile for the domain was calculated. As a control measure, the average of the maturity profile of each domain from an organization was calculated and then consolidated into the profile of the domain. After that, both averages were consolidated into the maturity profile of the domain.

After the maturity profile of all the domains was calculated, the maturity profile for the internal and external aspects were calculated in the same way as the domains via a two-way calculation for organizations and for questions. Finally, the two aspects (internal and external) were consolidated to obtain a global maturity profile for the whole of the IT service providers of financial institutions in Luxembourg of the studied sample. The maturity profile of the consolidated sample for the 13 entities in the sample is 2,3. The complete report is found in annex 29.

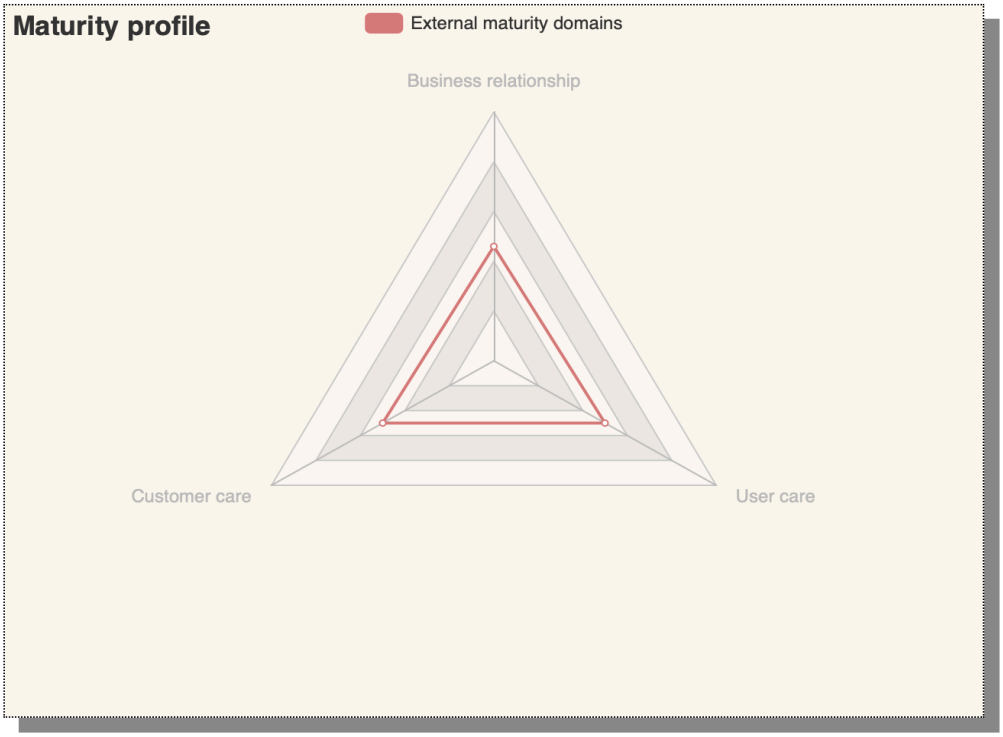

FIGURE 29 : GLOBAL INTERNAL MATURITY PROFILE
Source : Martin Cross

FIGURE 30 : GLOBAL EXTERNAL MATURITY PROFILE
Source : Martin Cross

	EDBA OSOMM Global Maturity Analysis	2,3
5.2	External Provider Maturity Aspects	2,4
5.2.1	Business Relationship	2,3
5.2.2	Customer care	2,5
5.2.3	User care	2,5
5.3	Internal Provider Maturity aspects	2,2
5.3.1	Service Provider Culture and Collaboration	2,1
5.3.2	Service Provider Strategy and Leadership	2,1
5.3.3	Human Resources Management	1,9
5.3.4	Service failure prevention and treatment	2,4
5.3.5	Technology Management	2,4

Table 20 : Global maturity data sheet

Source : Martin Cross

FIGURE 31 : GLOBAL MATURITY LEVELS

Source : Martin Cross

Conclusions of the global maturity profile

The global maturity of the studied organizations is 2,3, which means that all required activities to obtain specific outputs have been documented and are known. The expected activities are fully implemented, and their objective is fulfilled. Operations are reactive and repeatable. The focalization is output-oriented with basic customer relationship activities. Teams begin to work together for the realization of the required activities and basic information exchanges are in place. Required processes are documented but not completely implemented and expected results are known and achieved. Activities are more focused towards user satisfaction than customer satisfaction. This is a technical-collaborative level.

The highest scores are obtained in external aspects for customer care and user care which denotes a strong customer and user focalization. Nevertheless business relationship is as well strong. For internal aspects there is a strong technical control and failure treatment. More emphasis is needed in culture and collaboration and strategy and leadership to prepare the path for level 3. The weakest point is human resource management, which is the only value below 2. This means that human resources management is still at level 1.

All together level 2 is well established but needs improvements to evolve into level 3. For that it will be required to get more involved with the customers and the business to better understand their needs. Also, it is needed more specific documentation in the catalogue and more measurements to control services end-to-end. It is required that the organizations evolve from a controlling technology perspective into a more controlling contribution to fulfill the customer's needs.

Recommendations

The providers studied in the sample need to focus more on the customer view proposing business oriented SLAs and consolidate their catalogues of services. They need as well to implement financial tools and procedures to account for services, valuate them and analyze their costs. The consolidation of level 2, which is still quite technically oriented, will allow them to prepare for level 3 and have a better perception of their contribution to the business, not only by delivering technical components but by documenting their utility for the business.

After the analysis of the global maturity profile, it will be interesting to focus the attention on the differences between the internal and the external service providers.

7.2 Maturity profile per type (internal/external)

From the consolidated maturity assessments profiles it is obtained the global maturity profile for internal IT providers and for external IT providers:

External IT provider's maturity profile: 2,6
Internal IT provider's maturity profile: 2,1

The table below shows the obtained global maturity scores per type of provider (internal and external. The complete table is shown in annex 30:

	EDBA OSOMM Global Maturity Analysis per provider type	Internal	External
	Global Maturity profile	**2,1**	**2,6**
5.2	**External Provider Maturity Aspects**	**2,3**	**2,6**
5.2.1	**Business Relationship**	**2,2**	**2,6**
5.2.2	**Customer care**	**2,3**	**2,7**
5.2.3	**User care**	**2,4**	**2,6**
5.3	**Internal Provider Maturity aspects**	**1,8**	**2,6**
5.3.1	**Service Provider Culture and Collaboration**	**1,9**	**2,5**
5.3.2	**Service Provider Strategy and Leadership**	**1,7**	**2,5**
5.3.3	**Human Resources Management**	**1,5**	**2,4**
5.3.4	**Service failure prevention and treatment**	**2,0**	**2,9**
5.3.5	**Technology Management**	**2,1**	**2,7**

TABLE 21 : GLOBAL MATURITY PROFILE PER TYPE OF PROVIDER (INTERNAL AND EXTERNAL)
Source : Martin Cross

This profile shows that both types of providers are at maturity level 2, nevertheless external IT providers are slightly higher than the internal providers. While 2,6 means that external providers have already implemented several practices related to this level and are advancing towards the next level, internal providers have just reached this level and are at the beginning of their journey to the next level. Therefore they need to implement more practices to consolidate the level. These profiles for the internal and the external providers are shown in the figures below:

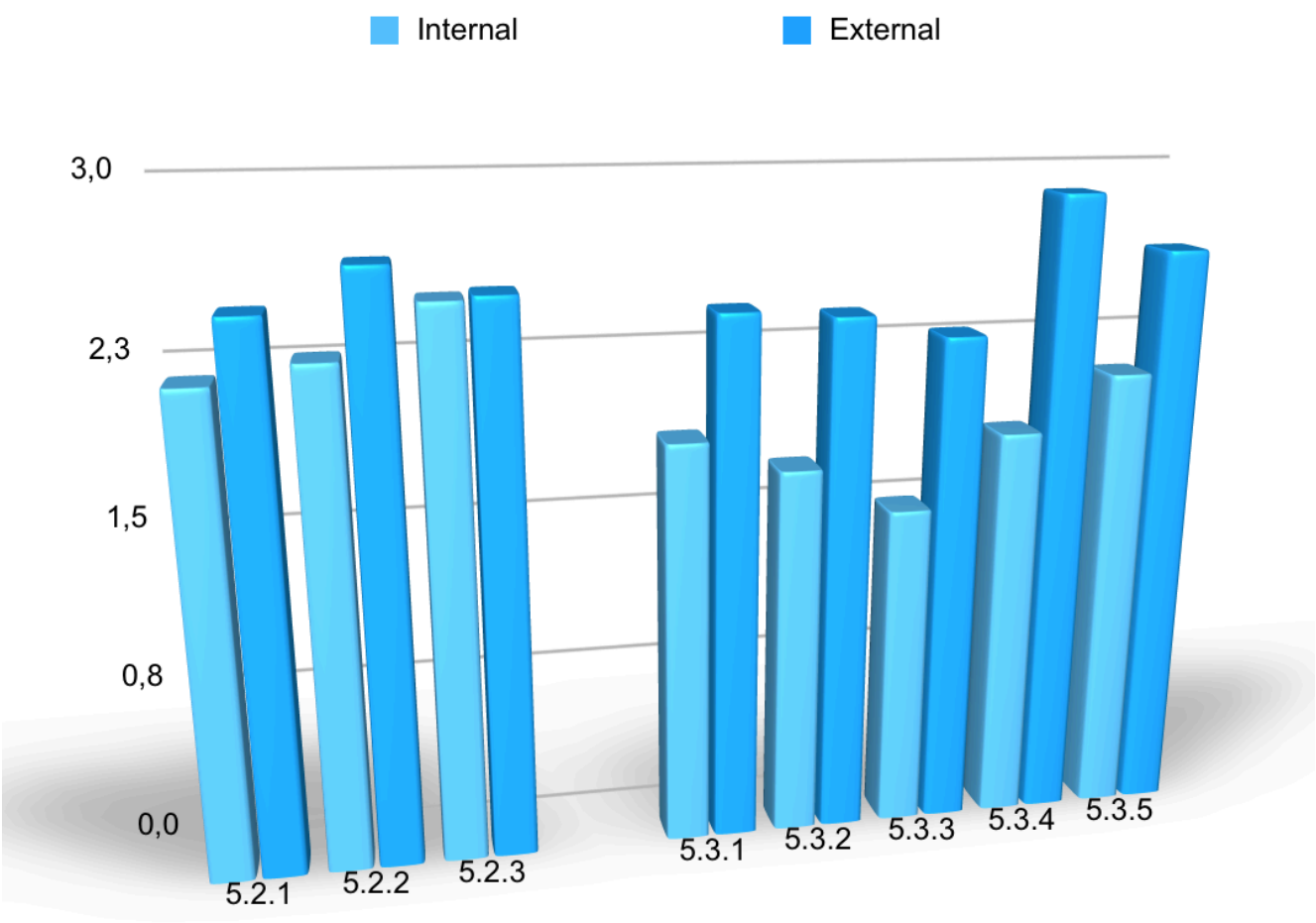

FIGURE 32 : GLOBAL MATURITY PROFILES PER TYPE OF PROVIDER
Source : Martin Cross

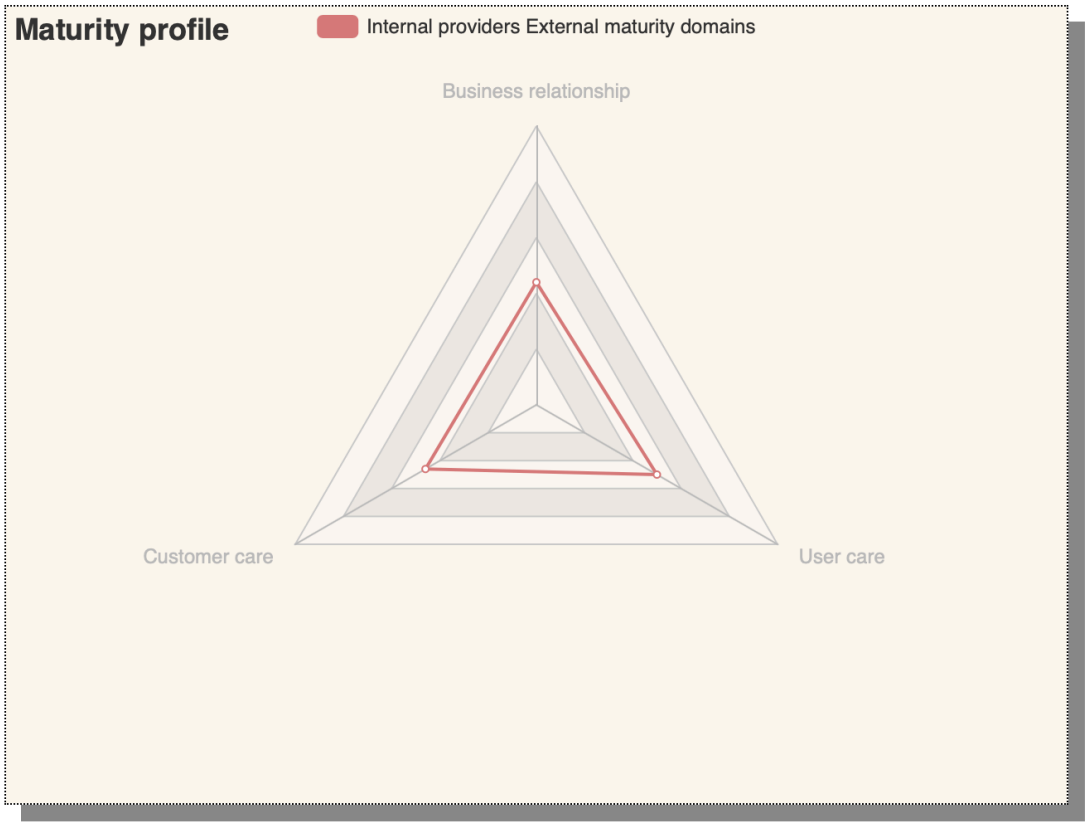

FIGURE 33 : EXTERNAL DOMAINS GLOBAL MATURITY PROFILE OF INTERNAL PROVIDERS.
Source : Martin Cross

FIGURE 34 : EXTERNAL DOMAINS GLOBAL MATURITY PROFILE OF EXTERNAL PROVIDERS.
Source : Martin Cross

FIGURE 35 : INTERNAL DOMAINS GLOBAL MATURITY PROFILE OF INTERNAL PROVIDERS.
Source : Martin Cross

FIGURE 36 : INTERNAL DOMAINS GLOBAL MATURITY PROFILE OF EXTERNAL PROVIDERS.
Source : Martin Cross

While the external domains are similar 2,3 and 2,6 (which represent a gap of 6%), there is a bigger difference for the internal domains, 1,8 and 2,6 (which represent a gap of 16%)

From the above table and figures we can observe that user care is the same but business relationships and customer care is more mature in external providers. This is probably due to the necessity of external providers to negotiate with customers and provide more evidence of added value to conclude contracts, while internal providers evolved from an internal technical perspective where historically internal providers did not find the necessity to prove their added value. As the borders between internal and external providers stomp, internal providers face the competition of external providers for delivered services. Therefore, it is important that internal providers reduce the gap between themselves and external providers. Nevertheless, these gaps are not so important (8%, 8% and 4% respectively) and we can conclude that internal providers and external providers have a similar Maturity profile for external domains.

In the case of internal domains, we observe that all of the scores are higher for external providers and the gaps are also larger (12%, 16%, 18%, 18% and 12%). The biggest differences are obtained in the Human Resources Management and Service Failure Prevention and treatment domains.

Globally, we can conclude that external IT service providers of financial institutions in Luxembourg have an overall better Service Orientation maturity for ITSM practices than the internal IT service providers.

Since in the sample there was a categorization by size this maturity profile might potentially be influenced by the size of the organization. Therefore, it is interesting to analyze a little more in detail the size of the provider.

7.3 Maturity profile per size

The size of the organization is often a determinant in the implementation of ITSM practices. Feedback from the field often states that ITIL is for big organizations with lots of resources. My field observations suggest that smaller organizations are more flexible and tend to react faster. Big organizations are complex and require complex ITSM implementations. From the analysis of maturity profiles of IT service providers

of financial institutions in Luxembourg, we observe how much the size of the organization influences the implemented ITSM practices.

As a reminder, the size of organizations was categorized according to the number of employees of the IT service provider: Big = more than 250, Medium = between 61 and 249 and Small= 60 or less employees. This scale is representative of the size of organizations in Luxembourg.

The obtained maturity profiles corresponding to the size of the organization are:

- Big size organizations: 1,8
- Medium size organizations: 2,2
- Small size organizations: 2,8

The table below shows the maturity profiles per size of organization (regardless whether they are internal or external providers). The complete table can be found in annex 31:

	Maturity profile by size of provider	Big	Medium	Small
5.2.1	Business Relationship	1,71	2,21	3,02
5.2.2	Customer care	1,96	2,37	3,02
5.2.3	User care	1,81	2,68	2,96
5.3.1	Service Provider Culture and Collaboration	1,74	1,96	2,74
5.3.2	Service Provider Strategy and Leadership	1,50	1,98	2,77
5.3.3	Human Resources Management	1,34	1,53	2,81
5.3.4	Service failure prevention and treatment	2,13	2,47	2,70
5.3.5	Technology Management	2,14	2,46	2,56

TABLE 22 : MATURITY PROFILE PER SIZE OF ORGANIZATION.
Source : Martin Cross

What can be observed is that the maturity decreases with the size. All figures show this trend. Every single value indicates that the bigger the organization the lower the maturity. Therefore, we can conclude that the maturity is inversely proportional to the size of the organization. The following figure shows this relationship with more clarity.

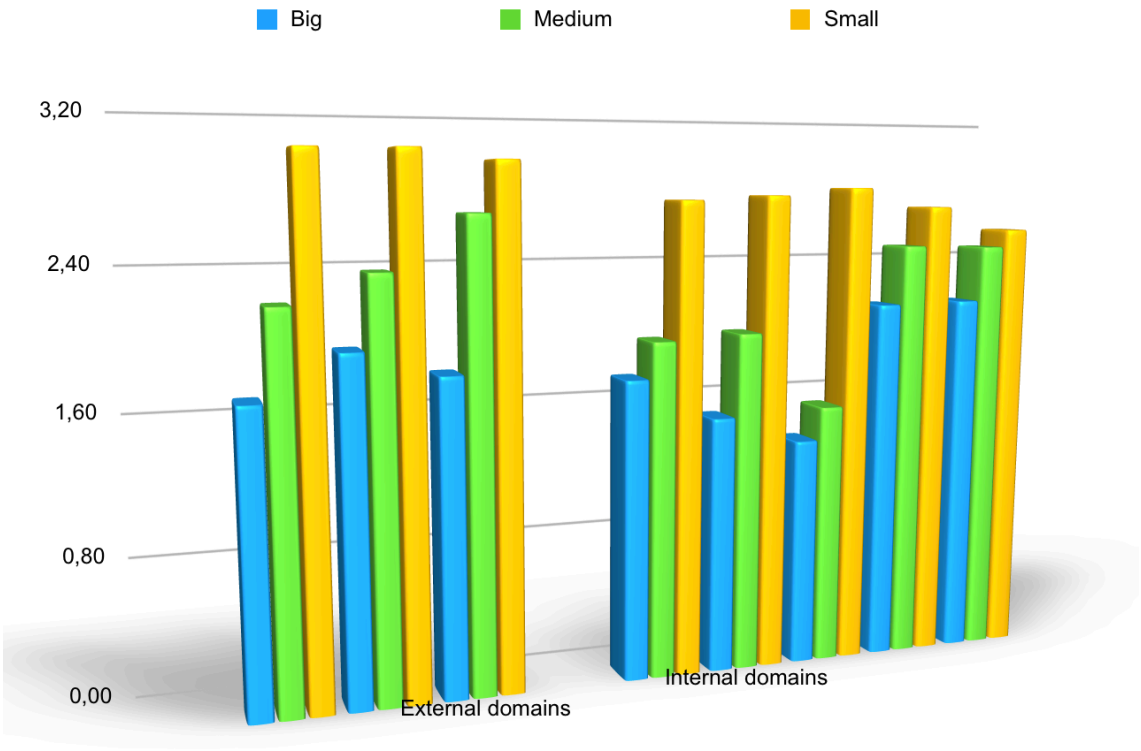

FIGURE 37 : MATURITY PROFILE PER SIZE OF ORGANIZATION
Source : Martin Cross

7.4 Maturity analysis per type of role

Analyzing the data from each organization organized by role (internal IT staff/external IT staff) we obtain the table presented in annex 33. We observe that for 4 cases the perception of the maturity for the external staff is higher than the perception of the internal staff. In one case the perception is identical and in 8 cases the perception of the internal staff is higher than the external staff. Consolidating all the results for the whole sample we observe that the global estimated maturity by the internal staff is 2,5 while the estimated maturity by the external staff is 2,3. According to the agency theory there is generally a difference in perception between the principals and the agents. Nevertheless the collected data in this research is not sufficient to confirm this difference. A larger sample would be necessary to analyze this influence. Despite that fact it is interesting to note the results from the perspective of each organization. Considering the global culture, the relationship of the provider with customers and users, some historical relationships and some other parameters, this relation could

be of interest to explain certain behaviors. Despite that, more research would be needed to analyze these fact.

7.5 Conclusions of IT providers maturity profiles

The maturity profiles presented above, obtained using the new OSOMM model have a certain interest to understand the present status of ITSM practices of a service provider. They guide them in their improvement programs, and benchmark providers. The comparison of the evolution of an organization is not presented in the present research because it would require a longer period of time to analyze the maturity at regular intervals to control this evolution. More research in this area would be required.

The model complied well with the established quality criteria and was described in academic terms. It is documented to support the use of the model and was used in a specific sample in a defined population in a specific context. While there is an evident interest in the usage of the OSOMM model to analyze the maturity of organizations, it is also of interest to note the usability of the model that proved to be cost efficient, time efficient, simple to use, reliable, useful and valuable.

The objective of this research is to propose a new Service Orientation maturity model with the aim of helping organizations in their struggle to implement and use ITSM practices, specifically ITIL practices. From the field observations, data analysis and exploratory research it was observed the need for an updated model. The new maturity model was developed and applied to a representative sample of the population of IT service providers of financial institutions in Luxembourg using ITIL. Their specific Service Orientation maturity profile was established. Also, a consolidated Service Orientation maturity profile was established for the whole sample. In both cases, the results of the maturity assessment (using a standard OSOMM report) provide valuable recommendations to guide organizations in their improvement plans. Additionally, the consolidated maturity profile is useful to obtain a reference maturity profile that can be used to benchmark organizations. With this in mind, we can proceed to the conclusions of the research.

Discussion

In the discussion section I present a global view of the conducted studies complemented with the academic and managerial implications of the research. I show the applicability of the model and its benefits for helping organizations in their IT Service Management improvement projects, as well as the benefits in their improvement projects and evolution. Additionally, I show the benefits for benchmarking organizations towards a reference maturity of a population, country or region. I then present the limitations of the research, mainly related to the limited size of the sample where the model was applied, the portability of the model to other domains and the limited contribution of a maturity model towards the vast IT Service Management, Service Orientation and Service Science domains. Finally, the discussion concludes with recommendations for further research.

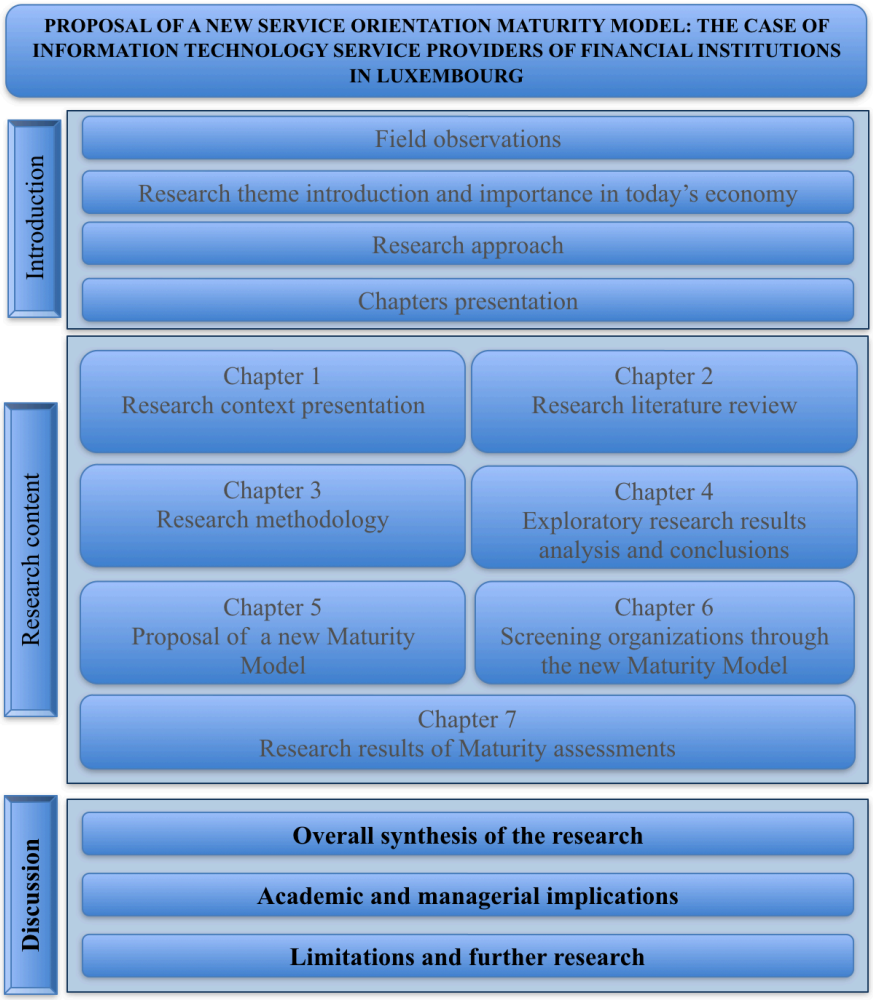

FIGURE 38 : GLOBAL RESEARCH DISCUSSION
Source : Martin Cross

D 1 Overall synthesis of the research

The aim of this research is to delve deeper into some aspects of the Service Science domain in relation to the specific organizations' Service Orientation and measurement of their maturity. I worked in the field of Service Orientation (specifically for IT organizations) for more than 25 years. I have also collaborated in the implementation of IT Service Management practices in several countries of all continents. My field observations have shown that most of the IT providers are committed to a strong Service Orientation, but they struggle to implement practices from existing references. The most used reference is ITIL. As a framework, ITIL provides recommendations of ITSM practices without any obligation of implementation, as there is no associated certification for organizations. Therefore it is rather difficult to measure and fully understand their implementation status. There are several academic studies that document CSFs (Critical Success Factors) for a successful ITIL implementation, but despite this academic material, organizations still struggle in their implementations and these studies fail to provide managerial means for measuring the Service Orientation. As a consequence, organizations do not measure the maturity of their ITSM implementations.

It is difficult to obtain valid conclusions while studying such a large population, Therefore it is important to choose a specific population and a representative sample of the population. In this study I chose the IT providers of financial institutions in Luxembourg using ITIL for their ITSM implementations. Nevertheless, the research is not specific to this population, it is merely a choice to be able to apply the new model on a specific population. The main reasons for this choice is threefold:

1. I have worked with a large number of organizations in Luxembourg and have observed their difficulties.
2. The influence of Information Technology on the financial institutions is crucial.
3. The financial sector in Luxembourg is one of the main economic activities of the country and plays an important role in the country.

Field observations are subject to interpretations and are not always consistent. Therefore, it is essential to investigate the academic literature to gain insight into the existing research on the subject. The main researched literature concerns Service Science, ITSM, Service Orientation, ITIL and maturity. Service Science is a fairly recent domain of research. Despite that, there is a vast amount of literature on the sub-

ject. Even though many scholars state that there is a general lack of research in the area (Golinelli et.al., 2010), (Gunesson et. al., 2010), (Ng et. al., 2019), (Spohrer et. al., 2008), (Trinvoll et. al., 2011), (Vargo and Akaka, 2012). There is also a lack of consensus on the definition of terms like service, service orientation and maturity (Iden and Eikebrokk, 2013,2016), (Shahsaravani, 2011), (Spohrer et. al., 2007), (Vargo and Lusch, 2008). Many organizations, mainly manufacturers, have turned into servitizing their products. There is much less literature on IT Service Orientation and some of it is outdated. There is a clear gap in what concerns the studied population. There is barely any information about Service Orientation of IT providers within the studied population. Most scholars agree on the difficulty of ITSM implementations (Cater-Steel et. al., 2006), (Conger et. al., 2008), (Iden and Langeland, 2010), (Mohamidi et. al., 2015). The existing literature shows that there are numerous proposed maturity models, yet most of them are oriented towards a specific aspect of IT Service Management and do not provide a holistic view. There are a few models that propose a measurement system for ITIL based on process evaluation type models like CMMI (Capability Maturity Model Integration) and its derivatives. Most models are derivatives from CMMI (Albiwi and Arshed, 2014), (Pöppelbuss, 2011), Wangenheim, 2010). However these models are too complex, time consuming and costly (Becker 2009), (Wulf et. al., 2015) and not adapted to the latest ITSM developments. These are some of the reasons why organizations do not use them and do not measure their maturity. Therefore a deeper investigation was needed.

Service Science is a vast academic domain, it is therefore essential to narrow down the focalization of the research. Hence an exploratory research was done to investigate more in detail some areas not covered in the existing literature. This will help to evaluate the field observations. For this exploratory research, 15 IT managers from various organizations were interviewed (plus 4 IT managers from essential operators in Luxembourg). The results of this exploratory phase validate the field observations and show that IT service providers of financial institutions in Luxembourg are committed to Service Orientation and are in the process of implementing recommended ITSM practices. The most frequently used reference is ITIL and the studied organizations struggle to implement it. They do not measure their maturity. These results propose several course of action for research, but with the time limitations of an EDBA it is impossible to focus on them all. Therefore, one aspect was chosen to pursue the

research: The maturity measurement was chosen considering it has a bigger managerial implication.

In the exploratory research results, a few attempts were observed to measure the Service Orientation maturity, but all of them were either incomplete or abandoned. Another observation is that ITIL launched its latest version (ITIL V4) at the beginning of 2019 and there is no maturity model available for this new version. Lastly, the most referenced mean to measure Service Orientation is proposed by Lytle et. al. (1998) and although the model is still valid in general terms, it does not cover the latest developments in the IT Service Management area. Therefore, the need to have an updated Service Orientation maturity model that will cover these issues, became evident. Becker states the need for academically documented models (Becker, 2009). The model needs to be easy to use, inexpensive, reliable, time efficient and valuable.

Specific literature on the creation of maturity models was used and quality criteria for the model were defined and documented. Supported by a deep analysis of the existing maturity models and the existing maturity levels, a new set of maturity levels was created, that represents more accurately the needs of today's organizations for Service Orientation. These levels were integrated into the new model with specific criteria for controlling the quality of the model. Additionally, an academic description of the model was documented to sustain its validity. The main benefits of the new model, compared to existing models, are the following: it is exhaustive, its simplicity of use, the reduced cost, its limited time consumption and its reliability. The new model provides a holistic view of Service Orientation while considering the latest developments of ITSM practices, including the newly released ITIL V4. There is so far no referenced model for ITIL V4 and this new model represents an important addition to the existing models to cover this gap. The model is adaptable and it is technology independent. All these characteristics make the model stand out from the existing ones that are mainly focused on processes, provide a partial view of the global Service Orientation, are complex, and require a big amount of resources for their usage and implementation.

It seemed interesting to verify the usability of the model in the studied population. For that purpose, a field exploration was done to analyze the maturity of 13 organizations using the newly proposed OSOMM (Organizational Service Orientation Maturity

Model). A series of interviews of key stakeholders was conducted including IT managers responsible for IT Service Management implementations (17 interviews), IT staff that carries out service operations and technical tasks (24 interviews), customers of the service providers (17 interviewees) and users that manipulated and co-created value through the usage of services (22 interviews). The results show that the model copes well with the imposed quality criteria and is fit to help organizations in their evaluation of their current status, their improvement projects, their maturity evolution and benchmark organizations towards an established population reference. The model is also useful for the establishment of a maturity reference of a population within a specific market, country or region.

A brief analysis of the collected data on the maturity of IT providers allowed to define the specific profile of each organization and consolidate it into a global population profile. The global profile allowed to benchmark participant organizations towards an established reference. It also allowed the identification of differences between the maturity of internal IT service providers and external IT service providers as well as the identification of a higher maturity of small firms compared to big firms.

D 2 Academic and Managerial implications

Contributing to the existing academic literature is essential to advance the studied domain. Moreover an Executive DBA has the duty to create applicable knowledge to the field in order to solve specific issues and help practitioners in their everyday tasks. There are different contributions at the academic level and managerial level. Before referring to these contributions, I would like to mention that on a personal level, pursuing an EDBA was an important challenge for me. It helped me acquire serious academic knowledge, strengthen my methodology and provided me with a high level of satisfaction for accomplishing this difficult task. The aim was to contribute with my little droplet to the vast ocean of academic knowledge.

D 2.1 Academic contribution

On the academic level, this study contributed in 4 ways: 1) by providing some clarifications of terms where scholars have not arrived to a consensus, 2) by providing insights into IT Service Management, Service Orientation and maturity measurement of IT service providers of financial institutions in Luxembourg, 3) by proposing a new

academically documented service orientation maturity model, 4) by documenting a global maturity profile of the studied sample representing the population of IT service providers of financial institutions in Luxembourg.

D 2.1.1 Definitions

Scholars have not reached a consensus on several definitions in the service domain and the maturity domain. This study contributed to the clarification of maturity, organization's maturity, service, service orientation and service orientation maturity. For these terms I propose a definition.

D 2.1.2 Service orientation status of IT service providers of financial institutions in Luxembourg

The realized field observations stated the difficulties that organizations confront in the implementation and measurement of ITSM practices. Nevertheless there are few academic studies documenting these difficulties. There are a few articles that studied the status of some regions in Scandinavia and Australia. The present study proposed an exploratory research, of existing issues related to the usage of IT Service Management references in the specific population of IT service providers of financial institutions in Luxembourg as well as issues surrounding the measurement of the maturity for their Service Orientation. This is an important contribution as it provides a clear view of the issues for the studied population.

D 2.1.3 Proposal of a new academically documented service orientation maturity model

According to Becker (2009), despite the vast profusion of maturity models, most of them are not academically documented. This study proposes a new academically documented Service Orientation maturity model (OSOMM) considering specific criteria of usability. The model takes into consideration different components from the existing academic literature for the measurement of Service Orientation. These include: Mettler's (2011) scope of maturity models (process, object and people), Mohamidi's domains for maturity models (Organizational, human resources, projects, managerial and processes), Iden and Langelen (2010) components for a successful adoption of ITIL (training skills, leadership and management involvement, collaboration and communication and service culture).

D 2.1.4 Global service orientation maturity profile of IT service providers of financial institutions in Luxembourg

The application of the newly created model allowed to verify its usability and define the profile of the studied sample. This profile is interesting as the basis reference for benchmarking IT service providers in the financial industry and other industries within the country as well as within other countries and regions.

D 2.2 Managerial contribution

An EDBA is meant to be useful for practitioners. This focalization is the main drive of my research. The point of departure in this research were field observations related to the issues confronted by organizations that are implementing IT Service Management practices, despite the numerous existing references. There are two main contributions: 1) an exploratory research providing insight into the service orientation status of IT service providers of financial institutions in Luxembourg using ITIL and 2) the proposal of a new maturity model to help organizations to measure their service orientation maturity in a simpler, cheaper and faster way. Each of these two contributions can be detailed in several managerial implications.

D 2.2.1 Exploratory research contributions

The realized exploratory research allowed to clarify some of the issues confronted by IT service providers of financial institutions in Luxembourg:

- The studied organizations are committed to a strong Service Orientation.
- They consider Service Orientation rather important or essential.
- The main used reference to guide them is ITIL.
- They struggle to implement ITIL.
- They do not measure their ITSM maturity.

Having a clear view of what is happening on the field in other organizations is important to understand their position in a specific market. Alone these results are an important contribution for practitioners. Nevertheless, the interview guide that was used during the exploratory research, could also be used by any country or region willing to understand the confronted issues in the IT Service Management usage and

measurement areas. Additionally, many organizations could benefit from the obtained results in the exploratory research. The research also included other IT providers from organizations considered to be essential operators for Luxembourg's economy. These included broadcasting, air transportation, steel industry and telecommunications. The results show that the IT from these essential providers confront similar issues as the IT providers in the studied sample. Observing similar results for these types of providers suggests the applicability of the obtained results and recommendations in other domains.

Furthermore, the results of the exploratory research allowed as well to identify different issues and potentially new research actions. One of the most important issues is the measurement of the Service Orientation maturity. If an organization cannot measure its maturity, it will not be able to identify its current status according to a specific target reference. Therefore, understanding the reasons why organizations do not measure their Service Orientation maturity is an important contribution. According to this, the choice to direct the research to help organizations to be able to measure their Service Orientation maturity is an important outcome. Some more insight into ITSM aspects was provided. First of all, I provide a comparison of the different ITIL versions (while there are several studies comparing ITIL V2, V3 and 2011, there are no comparisons with ITIL V4). Secondly, I also provide a comparison of the Serv*Or model of Lytle et.al (1998) with the ITIL versions.

D 2.2.2 Proposal of a new service orientation maturity model

After a vast revision of existing maturity models it became clear that they are not adapted to the latest evolutions of IT Service Orientation. Therefore the proposal of a new model is crucial. This is the main contribution of my research and can be detailed at different levels.

Categorization of Serv*Or domains in internal and external aspects

Serv*Or divided Service Orientation into 5 domains without distinction. All the domains are important for the measurement of the Service Orientation but there is an important difference between these aspects. Providers have better control and power of decision over the internal aspects. In contrast, for the external aspects, they depend on the contribution or participation of people outside of their decision making space. Therefore, the way to address each aspect is different. While internal aspects

depend solely on internal decisions, external aspects depend on relationships and require other types of skills. These categorizations are quite important to avoid difficulties when implementing ITSM practices. This also simplifies the assessments and post-assessments analysis to precisely define the required actions of improvement.

A new maturity levels scale

The traditional maturity levels proposed by the quasi totality of maturity models are derivatives of CMMI or ISO15504. They are related to maturity of processes. Analyzing an ITIL process provides a rather partial view of an organization's maturity. To obtain a complete view a maturity assessment of all processes is required. This is one of the main reasons why organizations do not measure their maturity. In ITIL 2011 there are 26 documented processes, taking an average of a week to analyze each process using a model like TIPA or CMMI for services. It takes quite an amount of time as well as vast financial resources to analyze the maturity of ITIL. Processes are interrelated and to a certain extent, depend on each other. Reaching high maturity in a process does not ensure a high Service Orientation maturity level. Therefore, if a proposed level measures a specific process, there will still be important undetected gaps. The newly proposed maturity levels measure the maturity of an organization in order to help them develop certain capabilities related to a Service Orientation instead of processes capabilities. These new maturity levels not only measure operational processes needed to obtain a specific result, but they also measure the organization's orientation towards service outcomes for the fulfillment of customers' needs and the contribution to the business objectives. No other model proposes such a complete view covered with the maturity levels.

Simplicity of usage of the OSOMM model

The main reasons for not measuring an organization's maturity are related to their lack of time, shortage of human resources, lack of financial resources and lack of skills required to use a maturity model. Therefore, it is essential to propose a maturity model that would be easy to use, while also being time efficient and inexpensive and still providing a consistent view of an organization's Service Orientation maturity. Additionally, if the model is to be used regularly to control the evolution of the organization's Service Orientation, it is essential that it does not require too many resources. The application of the OSOMM model within a specific sample allowed me to confirm

these characteristics. It therefore proved to be useful for practitioners who are willing to understand their current status and their evolution without further overloading agendas.

Inclusion of users and customers in the assessment

Most maturity models analyze the internal capabilities of a service provider (CMMI, TIPA, ISO14504, Axelos ITIL maturity model). While this is important, when it comes to service operations, value cannot be manufactured like goods or products. It needs to be co-created instead. There is a direct association between production and consumption in which customers and users must participate with providers in the creation of value at a given time. If the maturity model only measures the viewpoint of the provider, there might be a difference in the perception of customers and users about the quality of services. Therefore, the addition of these different views when making maturity assessments, is an important contribution of the model and provides practitioners with a more accurate view of their service operations.

Time efficiency

The OSOMM model is based on specific outcomes that are required to support business activities. Compared to traditional models that are focused on process measurement, a maturity assessment is greatly simplified. Therefore, it takes only a fraction of the time required for the execution of assessments using traditional models. An OSOMM assessment requires only 1,25% to 6,25% of the time needed for traditional assessments using CMM type models or Axelos type models. This is extremely important considering that organizations do not measure their maturity mainly because maturity assessments require a lot of time and organizations spend their time in operational tasks. They consider that they do not have time to conduct time-consuming assessments.

Cost efficiency

Cost efficiency is one of the main contributions. Practitioners do not measure their maturity because they consider the existing maturity models to be too complex and time consuming, therefore expensive. This is especially true if an organization is to conduct regular assessment to control its evolution. An OSOMM assessment can be conducted in a fraction of the time required by traditional assessments. This influ-

ences directly the cost of execution. For the realization of a complete ITSM assessment, CMMI type models require more or less 200 man/days representing a cost of more than 60.000€. Axelos type assessments require 40 man/days representing more than 12.000€. An OSOMM assessment can be done within a few days representing a cost inferior to 1.000€. This is a huge improvement and an extraordinary contribution to the field.

Application of the model to a specific sample

Applying the model to a specific sample allowed a consolidated view of the studied population, providing a specific regional reference point. It is of extreme importance for practitioners to situate their organization within a specific market reference and compare it with potential competitors. This view allows organizations to take strong strategic decisions and to better understand some aspects of market behavior. The capability of the OSOMM model to be easily applicable to a specific population, allows to define a reference point and therefore, benchmark organizations towards that reference.

Other managerial implications

Maturity models seek different outcomes: 1) establishment of the current status, 2) guidance for an improvement program, 3) control of the evolution and 4) benchmarking. The presented model provides a complete view of ITSM practices for Service Orientation, including IT Management, IT staff, users and customers. This provides a more accurate view of the current status than other maturity models. With its strong structure, the model also provides a clear view of the weak points of the different domains. This allows practitioners to choose and prioritize ITSM practices to implement as they improve their Service Orientation. The model (if used at regular intervals) provides a clear repeatable structure to measure the maturity at different moments and helps to control the evolution of the ITSM practices implementation. If used in a specific population, the model provides a consolidated view of the population's maturity as a reference point, allowing benchmarking.

Therefore, practitioners can use the OSOMM model to cover all four purposes of an assessment. This will allow practitioners to use a single model reducing the time, complexity and costs of using multiple models.

The model is independent of any specific ITSM reference even though it covers all proposed processes or practices proposed in ITIL. The reason is that the OSOMM model measures the Service Orientation of organizations instead of specific processes of a reference. This makes the model more adaptable, evolutionary and useful in different situations. This ensures practitioners that the investment in this model is of worth. This is especially useful in the present IT context and its rapid evolution. The model does not need to be replaced each time there is an updated version of the used reference or a new implemented technology. It will only require the mapping of the new reference to the model's CRM (Capability Reference Model).

Finally, the model was developed focusing on the Service Orientation and the results of providers activities rather than solely on the internal providers processes. Therefore the model could be useful in a number of domains and is not specific to IT providers of financial institutions in Luxembourg. From the moment that an organization becomes service-oriented, the domain of the provider does not matter, the model will still be valid. This is a huge managerial implication due to the portability of the model and its potential wide applicability at other service domains. While the actual structure of this study fits this purpose, more research on the application of the model at other areas would be required.

D 3 Limitations and further research

D 3.1 Limitations

Like in any research, there are limitations of application and reachability. The main limitation of this research is that it covers a very specific aspect of the vast Service Science domain. The domain of Service Science covers different aspects of marketing, strategy, communication and many other aspects. My research deliberately focuses on the measurement of maturity. To warrant a consistent view and control of the results, it was required to choose a very specific sample of a limited population. Luxembourg, being a small country, has a little more than a hundred financial institutions. While the sample represents more or less 10% of the population, an assessment with a bigger sample could be useful. This would provide a more accurate view of the maturity of the population. While the research considered only IT providers of financial institutions in Luxembourg, the inclusion of other economic areas would be

useful. This would expand the applicability of the model. The inclusion in the exploratory research of 4 non-financial organizations (considered essential operators in Luxembourg) allowed to verify whether the confronted issues by IT providers of financial institutions in Luxembourg are specific to this market or more widely spread. While the research shows similarities in the confronted issues, these relate only to those four studied organizations. The study of more domains could be of interest.

The research focused the attention on ITIL, which is the most used reference. Therefore it consolidated the alignment with ITIL and did not consider other ITSM references. The inclusion of other references could be useful however.

A specific limitation of this research concerned the case of the SARS-CoVi-2 virus causing the CoVid-19 pandemic. This pandemic modified the organization's global structures as well as their priorities, provoking changes in the organization's operations, and their availability. Therefore, some organizations retired from the study making the sample smaller. Additionally, these changes in their working structures promoted remote-work, social distancing and specific pandemic procedures. The present study did not take these changes into consideration.

D 3.2 Further research

As shown above, a significant limitation of this research is the OSOMM (Organizational Service Orientation Maturity Model) applicability to a limited number of organizations. It would be interesting to enlarge the sample in this specific population, to increase the accuracy of the consolidated maturity profile. Another complementary interesting research could be done to apply the OSOMM model in other countries or regions. This would allow the observation of similarities or differences among countries and regions.

It would also be of interest to enlarge the studied population to cover other areas than just IT service providers of financial institutions in Luxembourg. As the model is not exclusive to this population, more research on the OSOMM model application on IT service providers of other business sectors and on non-IT service providers would be useful to better understand the applicability of the model. This would provide the possibility to compare the different areas. Additionally, more research would be needed

to compare the OSOMM model with existing models. This would provide more academic insight into the benefits of specific models and the differences of the OSOMM model compared to the existing models.

Further research in the analysis of the difficulties for IT Service Management practices implementations could also be useful. The different definitions of the meaning of Service, Service Orientation and Maturity could as well profit of more research to clarify these terms. Additionally, more studies on the direct benefits of a strong Service Orientation would be useful to practitioners. Moreover, more research into new technology, telecommunication, teleworking and mobile communications and their impact on the Service Orientation of organizations and on their maturity would be interesting.

Globally, more research in the young Service Science domain and Service Orientation area would be useful, specifically considering the fast evolution of computing systems and their influence on the field of Service Orientation.

D 3.3 Global conclusions of the research

The global conclusion of this research is that systems are becoming increasingly more complex and there is a greater dependency on IT systems for service-oriented organizations to operate correctly. It is therefore rather important to have a strong IT Service Orientation to support the business. An essential component of a strong Service Orientation is the ability of measuring its maturity and evolution. This study provides an interesting insight into the difficulties that IT providers encounter when they implement IT Service Management practices. It also identifies difficulties that organizations confront when they attempt to measure their Service Orientation maturity. The main contribution of this study is the proposal of a new strong maturity model: OSOMM (Organizational Service Orientation Maturity Model) that measures the maturity of organizations' Service Orientation in an easy, inexpensive, reliable and faster manner, compared with existing models. Practitioners will benefit of the results of an OSOMM (Organizational Service Orientation Maturity Model) assessment in the following way:

- They will acquire useful information on their current Service Orientation status.
- They will acquire useful guidance on recommended improvements.

- They will find useful information on their Service Orientation evolution (if OSOMM is used at regular intervals).
- They will have a clearer view of their position within a defined global maturity reference in a specific market or region.

These are important academic contributions that could be rather useful for practitioners in the field. The application of the new model on the specific field of IT service providers of financial institutions in Luxembourg, showed a good perception within the studied community. It allowed to define the maturity profile of the studied organizations as well as a consolidated maturity profile of the whole sample. Any academic model needs to be practical and provide value to practitioners. If the model cannot be used in the field, it is useless. The application of the model on a specific population allowed to verify its usability. As the model was developed with the time efficiency and cost efficiency criteria in mind, its simplicity of use, time consumption and involved costs are minimal compared to existing models. This makes the OSOMM model a perfect candidate to be used in the field to support organizations in their service orientation journey.

As companies are increasingly focusing their attention on Service Orientation and as the Service Science domain is growing, further research is needed. Especially focusing on conducting similar maturity assessment in other domains, countries or regions, would provide a clearer picture of the organization's evolution in these different geographical areas. It would be useful for decision makers to have a global profile of a region, country or continent during the decisions about investments, professional collaborations or joint ventures. It is also essential to understand the current status of an organization as it helps define specific actions of improvement and control the evolution of the organization. The OSOMM model contributes to these objectives.

Evidently, from an academic description to the deployment on the field there is a big road. Therefore it is understandable to question how organizations will be able to use the model. First of all, as stipulated in the design science used methodology, the last step is the communication and popularization. Therefore, it is required to inform practitioners of the availability of the model. There is no implementation, deployment or configuration needed for the usage of the model. Therefore, whenever an organization is informed of the existence of the model and would like to conduct an assessment, it would be required to either, get trained on the execution of OSOMM assess-

ments or address a request to a qualified consultant. Both actions would require the development of a training program for organizations and a training program for consultants. As it stands right now, I began an information campaign and I am in touch with several organizations in different countries to formalize the execution of OSOMM assessments. I am also in contact with a research group specialized in technology research and the deployment of the technology to the field, to promote the model. Additionally, I began preparing a handful of consultants to the specifics of the model and the preparation of the trainings. Several of the studied organizations included in the sample are already interested in the reiteration of assessments.

It is worth mentioning that the OSOMM model is not in direct confrontation with the existing models. From the moment that the existing models are focused on processes, they provide a high level of detail on operational activities. Therefore, these models can optimally operate in conjunction. Initially OSOMM assessments can be realized for a base line and regular assessments to control the evolution. This would provide guidance on the current status and the missing components for a strong service orientation. Subsequently, a traditional assessment focused on these missing components can be realized to detail the practice and conclude an improvement plan.

With all this said, the presented model can provide numerous business opportunities in the field. Additionally, the OSOMM model provides valuable information for practitioners to guide them in their service orientation journey. Lastly, for me, there is the personal satisfaction of having contributed with valuable knowledge to the academic field and for practitioners creating new business opportunities.

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CSSF (Commission de Surveillance du Secteru Financier) www.cssf.lu

European banks directory, https://TheBanks.eu/Bansks-by-Country

Luxembourg for Finance,
https://www.luxembourgforfinance.com/en/publications/publications/

Luxembourg's ministry of economy, http://www.eco.public.lu

Luxembourg's ministry of finance, http://www.mf.public.lu

Luxembourg's ministry of finance, http://www.fi.etat.lu

Luxembourg's tourist office, http://www.luxembourg-city.com Discover Luxembourg, Luxembourg tourist office

Price Waterhouse Coopers Luxembourg, http://www.pwc.lu/banking.

Statec (Central Statistics and Economic Studies Services) National Statistical Office, http://www.statec.lu

Key words used for the research

Finance, Banking, Bank services, Financial institutions, Bank servitization, Bank industry, Financial Sector, Servitization of the financial sector.

IT, Information Technology, IS, systems, IT history, MIS, Information Systems Management, ITC, Information Technology and communication.

Service, Service Science, Servitization, Service Value, IT Servitization, Service economy, Value Co-creation, Service Management, Service management evolution,

ITIL, Information Technology Infrastructure Library, Axelos, ITSMF, ITSM, IT Service Management, IT frameworks, Service frameworks, Service Management frameworks, Service standards, Service Management evolution, ITSM measurement, ITSM metrics, ITSM CSF.

Maturity, Maturity models, Service management maturity models, Service Management maturity, Maturity measurement, Maturity levels, Maturity performance, ITSM maturity, Service maturity, Serve providers maturity, Maturity methods, Measuring maturity, Maturity performance, Maturity metrics.

Specific sector sites:

ITsmf.com

Axelos.com

exin.com

Peoplecert.org

statec.lu

TSOonline.co.uk, gov.uk/governmentorganisaions/cabinet-office,

Glossary

Financial institution in Luxembourg: An organization under Luxembourgish law specialized in financial operations. There are two main categories of financial institutions as per the Luxembourg legislation based on the type of license A) Universal Banking license and B) Mortgage bonds banking license (monopole of emission of mortgage bonds and interdiction to collect public funds).

Information and Communications Technology (ICT): refers to technologies that provide access to information through telecommunications. It is similar to Information Technology (IT), but focuses primarily on communication technologies. This includes the Internet wireless networks, cell phones, and other communication mediums. (Christensson, 2010).

IT Service Management (ITIL 2011, SS): is the activities that are performed by an organization to design, plan, deliver, operate and control Information Technology services offered to customers.

IT Service provider (ITIL V4 2019): is a role performed by an organization in a service relationship to provide services to consumers (customers, users and sponsors) using IT means to create manage and deliver IT services.

Information Technology (IT) (Merrian-Webster dictionary 2019): the technology involving the development, maintenance, and use of computer systems, software, and networks for the processing and distribution of data.

Maturity (According to the author of this thesis): is the evolution of something from an initial state to a developed desired state of readiness by progressively improving abilities and capabilities.

Organization (ITIL V4 2019): A person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its objectives.

Organization's Maturity (According to the author of this thesis): is the evolution of the organization from an initial state to a developed desired state of readiness by

progressively improving the organizations abilities and capabilities to create and deliver value to stakeholders.

Service (according to the author of this thesis): A service is specific activities realized by a provider on behalf of a consumer to co-create value at specific moments by using goods and skills to help their customers achieve their objectives without them needing to manage how to obtain that value.

Service (ITIL V4 2019)**:** A means of enabling value co-creation by facilitating outcomes that customers want to achieve, without the customer having to manage specific costs and risks.

Service Orientation (according to the author of this thesis): An organization structure aiming to create a disposition of positive attitudes and behaviors to deliver value in response to customers needs in the form of services and having its main focus and activities on services.

Service-orientation maturity (According to the author of this thesis): is the evolution of an organization from an initial state to a developed desired state of readiness by progressively improving the organizations abilities and capabilities to be able to co-deliver value to stakeholders when required in the form of services.

Service Provider (ITIL V4 2019)**:** is a role performed by an organization in a service relationship to provide services to consumers (customers, users and sponsors).

Technology (Collins dictionary 2019): refers to methods, systems, and devices, which are the result of scientific knowledge being used for practical purposes

Abbreviations

ARM: Assessment Reference Model.

COBIT: Control Objectives for Information and related Technologies.

CMMI[29]: Capability Maturity Model Integration.

CRM: Capability Reference Model.

CSI: Continual Service Improvement.

CSSF: Comité de Surveillance du Secteur Financier.

ITIL: Information Technology Infrastructure Library.

ITSM: Information Technology Service Management.

OSOMM: Organizational Service Orientation Maturity Model.

PAM: Process Assessment Model.

PRM: Process Reference Model.

SIAM: Service Integration and Management.

SD: Service Design.

SO: Service Operation.

SS: Service Strategy.

ST: Service Transition.

SCV: Service Value Chain.

SVS: Service Value System.

TIPA: Tudor Improvement Process Assessment.

[29] Niessink Frank and van Vliet Hans, 1999, *The Vrije Universiteit IT Service Capability Maturity Model*, Faculty of science, division of mathematics and computer science, Vrije Universiteit, Amsterdam.

Annexes

Annex 1: Examples of service economy domains

Spacy John, 2018, *23 examples of service economy*, Simplicable, https:// simplicable.com/new/ service-economy.

Knowledge

Information Technology Management

Design

Performing arts and entertainment

Creative artistic services

Government services

Education

Maintenance and cleaning

Financial services

Agents and Brokers

Health care

Wellness

Sports and fitness

Transport

Insurance

Rentals

Annex 2: IT evolution

I will divide randomly the timeframes of the evolution of IT in four parts: 1) Ancient computing to electronic era, 2) electronic era to personal computing, 3) personal computing to telecommunications mobility and connectivity and 4) the actual era with high mobility, big data, IT of things, virtualization and artificial intelligence. This timeframes represent, in my sole opinion, key turning points for our society. To begin with let's briefly present the first part; from ancient computing to the electronic area.

From ancient computing to electronic era.

Even though some people would argue that IT began as far as humanity can be traced with archaic (nevertheless useful) methods of computation like the abacus, cords, stones and calendars, I will consider the beginning of Information Technology (IT) in the mechanical form in 1649 when Blasé Pascal invented the Pascaline or Arithmetic machine capable of basic calculations with 2 numbers. But it is only after 1840 that the electromechanical era of IT began, with inventions like the Morse code, radio transmitters and telephony. In 1939 IBM signed an agreement with Harvard University for the creation of an automatic sequence controlled calculator and in 1944 IBM created the Harvard Mark 1, the first large scale digital computer based on electro-mechanical relays. This period sets the basis for computing science. Many machines were developed in different countries with different schemas. These machines were used in military programs for the development of the atomic bomb, codes deciphering during the war and in the anti-missiles systems during the cold war. The definition of this timeframe relates to the fact that during all these IT developments there was little influence in our society behaviors.

The era from electronic computing to personal computers

The era from electronic computing to personal computers had a bigger influence in society and began in 1940 with the ENIAC (Electronic Numerical Integrator And Computer) the first electronic general purpose computer that could adapt to different calculations by reprogramming. In 1945 John von Neumann published a draft report of the EDVAC that is recognized as the first description of the logical design of a computer using a stored program concept. In 1953 Richard Grimsdale and Douglas

Webb, working at the Manchester University in England proposed a prototype of computer based on transistors. Afterwards IBM created in 1954 the 650 model as the first mass produced computer and in 1957 DEC (Digital Equipment Corporation) was founded by Harlan Anderson and Ken Stan Olsen to develop electronic modules for testing. They created an early example of personal computer. In 1958 RCA launches the first transistorized computer which allows the treatment of large databases and the same year the first large scale communications network (SAGE) connects 23 computer sites in USA and Canada to detect soviet bombers.

In 1959 the development of Cobol influenced the IT in a vast form so that still today there are applications running in that language. In 1961 IBM develops its Mainframe transistor based 7000 series and system 360. In 1966 HP introduces the HP2116A computer that interface with a number of laboratory instruments. At the same time parallel computer programs began with the ILLIAC IV project. By 1968 computers began to be widely spread in laboratories, Universities, defense departments and space programs like the Apollo program. In 1969 one of the most important developments that influenced modern IT systems is the development of Arpanet, the predecessor of the modern Internet and a year later the creation of Unix. In 1973 Bob Metcalfe set the documents for Ethernet at the Xerox Palo Alto Research Centre and the same year IBM developed the SCAMP (Special Computer APL Machine Portable) as a personal computer prototype. A year later Selbi sells the H8 personal computer based on the Intel 8008 processor and in 1975 the Intel processor 8080 was introduced with a speed five times faster than the 8008. In 1976 Steve Jobs, Steve Wozniak and Ronald Wayne signed a partnership agreement that established the creation of Apple computer Inc. and introduced one year later the Apple II computers. In 1978 DEC builds the VAX computer systems and transforms in the second largest computer company in the world at the time and Tandy Radio Shack sells 10,000 units of its desktop computers, TRS80, with the Basic computer programming language. In 1979 Atari sells not only gaming consoles but as well the Model 400 and Model 800 personal computers and Motorola introduces the 68000 microprocessor.

This computing era began in the 40s with big calculating machines based on binary bulbs and afterwards transistors increasing exponentially their arithmetic calculation capabilities. At this period big computers were used only by big companies needing to calculate and store what was considered a huge amount of data, consisting of a

limited calculating capacity with some mega-bites of data. Systems were highly centralized and managed by specialized technicians. The basis for personal computers was set but still not widely spread. The influence of this period is not reflected in the general public but began the digitalization transformation of companies using computers for managing big amounts of data.

Personal computing to telecommunications mobility and connectivity

A key turn in the evolution of IT is the establishment of personal computers as a normal working tool early in the 80s. This era is dominated by the vulgarization of personal computers, networking, digitalization of telecommunications and mobile communication in contrast with highly centralized main frames. It marked a clear evolution towards the recognition of users and a distributed environment. At the same time emerged the need of a formal support department to assist users (usually called help desk).

In 1980 Comodore introduces the VIC20 computer, which is the first computer to reach more than a million units sold. Sinclair introduces the Zx80 with a series of software and the dissociation of the computer hardware and the software was recognized. In 1982 Comodore launches the C64 systems that sold more than 22 million units in 10 years of existence. The same year SUN micro-systems (Stanford University Network) developed a computer with an Ethernet network interface and Unix as an operating system. In 1983 Apple launches the Lisa computer and a year later the Macintosh with a graphical interface and a mouse. The same year IBM launches the DOS based PC Jr. and the PC AT with 5.1/4 inch floppy drives. In 1986 Compaq launches its Deskpro 386 system with a new Intel 80386 32 bits chip processor increasing the processing power of older machines that were based on a 16-bit chip processor. These machines could use Windows operating system. In 1987 IBM launches its PS/2 computer based on the same Intel 80386-chip processor, 3.5 inches floppies and a color VGA interface.

Briefly after mid 80s network connectivity was widely spread in companies information systems, emerged a new architecture called client-server in which part of an application ran in a dedicated server and users could reach this application via a customer application installed in their Personal Computer. At the late 80’s it was initiated a telecommunication revolution with the break out of telecom monopolies, the digitali-

zation of voice systems, the integration of voice and data and the beginning of mobile communications.

This period beginning in the early 80s and running through the whole decade transformed fundamentally the management of information in companies through implementation and usage of personal computers marking a clear decentralization of Information Systems from highly secured controlled systems into widely spread systems. By the end of the 80s Apple launches the first Macintosh portable and the initial works for the development of basic guidelines for managing information services began after the Falkland Islands war between Great Britain and Argentina. This resulted into more than 30 publications on the management of services through information systems. While companies were using more and more technology to manage information, it became evident that a strong dependency between technology and business was established and companies could no longer foresee to manage their business without strong information systems.

In 1990 Tim Berners-Lee described the World Wide Web and in 1991 became publicly available. The same year Linus Torvald begins his work on Linux and a year later DEC announces the Alpha chip architecture based on a 64-bit processor. In 1993 Apple launches the Newton Personal Digital Assistant setting the landscape for handheld computers and a year later the Intel Pentium processor is in the market. In 1998 Palm Inc. was founded to support Casio's personal assistants, and launches the first generation of Palm hand held assistants. In 1995 Microsoft launches Windows 95 and a year later Steve Jobs re-joined Apple

In the middle of the 90s with the explosion of computer integrated telecommunication systems, reduction in the costs of telecommunication, development of mobile communications and a wider usage of Internet, there was a shift in the way organizations managed their information systems and it became evident the need of strong security systems to protect the distributed information. At this period Cobit and CMMI emerged as documented practices to manage the IT of organizations. Some organizations integrated disaster continuity matters as part of the business activities but is only at the end of the century with the recognition of the impact of the year 2000 bug (at the turn of the century massive amount data stored in computers contained dates encoded in a 2 digit format for the year. With the beginning of a new century -added

to be a leap year- dates would appear to be 1900 instead of 2000) contributed to develop IT organizations much more in this area than the business counterpart.

Actual era

At the turn of the century and with the famous year 2000 bug gone, technology kept on evolving in and ever faster way proposing more and more data storage as well as cheaper and faster telecommunication lines. When previously Internet connectivity was based on Modems inducing costs per connection, Internet evolved into a connected society. With the creation of napster and P2P protocols for file sharing in 1999, data distribution accelerated. The launch of Wikipedia, beginning in 2001 (a collaborative free encyclopedia) marked a key turn in the creation and shearing of information. The constant evolution of super power computers like Japan's earth simulator parallel vector system or IBM Road runner launched in 2009 capable of one petaflop (one thousand trillion floating point transactions per second) made it possible to generate and use an incredible amount of information. At the same time multiple devices connected to Internet and controlled via smartphones like the Nest learning thermostat began to be offered. The retina display launched by Apple in 2010 with 400 pixels per inch approaching the human eye perception capability, made visual effects quite realistic. Even performance can be kept with miniaturization like the Raspberry Pi credit card size computer launched in 2012. Electronic books with devices like Amazon's Kindle and Apple iPads and iPhones allowing to store a whole library in the pocket. The power of smartphones and tablets capable of more transactions per second than sophisticated computers two decades ago allowed for more power and mobility. Cheap telecommunication lines and powerful devices allow for mobility and collaborative work.

Annex 3: ITIL evolution

In the late 80' after the Falkland Islands war between Great Britain and Argentina, a British government commission, under the responsibility of the CCTA (Central Computer and Telecommunication Agency), was formed to analyze the lessons learnt form the war. One of the main dysfunctions during the war was the management of information which was greatly influenced by the recent technological innovations related to the usage of computing systems, networks and the recent distribution of computer systems based on personal computers in a customer server configuration with networking links. The CCTA commission edited a series of documents gathering proven practices for the management of computer based Information Systems and the management of information. During the last decade of the XXth century, several publications were added to the existing ones to adapt to the newest technologies of the time related to networking, Internet connectivity, security and digitalization of voice systems. More than 30 publications were available to what was known as GITIM (Government Information Technology Infrastructure Management) and recognized as ITIL Version 1. Before year 2000 there was not so much activity around ITIL but after the year 2000 there was an important turn around and many companies worldwide focused their attention on the ITIL recommended practices.

In the middle of year 2000, all the ITIL practices were reviewed and a version 2 of ITIL was published consolidating the framework knowledge in 7 books. The CCTA changed into the OGC (Office of Government Commerce) that took the responsibility of ITIL. Between 2000 and 2007 ITIL established worldwide and became the most used Framework for the management of services within IT organizations. Other initiatives were available in the market during this period like the ISO20000 standard, COBIT and CMMI. In ITIL version 2 mainly 2 books were used in the field with a specific certification schema for individuals; the Service Support book and the Service Delivery book that described 5 processes each documenting best practices for ITSM:

Service Support Book

- Incident Management
- Problem Management
- Service Asset and Configuration Management

Change Management

Release Management

Service Delivery

Service Level Management

Availability Management

Capacity Management

IT Service Continuity Management

Financial Management

In 2006 an official glossary of terms was launched and in the mid of 2007 the control of ITIL was transferred to the Cabinet Office. Version 3 was published with a new structure based on a Service Lifecycle that hosted the documented processes. The growth of ITIL kept on consolidating in the market. This version described more than 20 processes in 5 publications related to the lifecycle. The objectives of each of these are:

- Service Strategy (SS): analyzing markets, defining strategies, detecting needs and deciding which services to offer.
- Service Design (SD): Build and test the functionality to be delivered with specific agreements and levels of service.
- Service Transition (ST): Fully testing compatibility and controlling risks before the delivery into production.
- Service Operation (SO): The delivery of the created functionality of the service, maintenance of operations and support activities.
- Continual Service Improvement (CSI): Promoting improvements to the services as well as any component that could influence in one way or another the service.

In 2013 a joint venture between Capita Plc. and the British Government's Cabinet Office was created and named Axelos ltd. with the aim to promote the evolution of ITIL, established the rules of usage of ITIL and control the copyrighted material. Licenses agreements must be established between AXELOS and organizations (ATO, Accred-

ited Training Organizations) that wish to provide services using ITIL material. Since then ITIL is under the control of Axelos ltd.

In 2011, AXELOS released a revision of ITIL that resolved errors and inconsistencies with V3. In this updated version of the 2007 edition, the 5 volumes remained representing the 5 stages of the lifecycle: ITIL Service Strategy (SS), ITIL Service Design (SD), ITIL Service Transition (ST), ITIL Service Operation (SO) and ITIL Continual Service Improvement (CSI). In each of the service lifecycle stages there are a number of hosted processes that are meant to support the creation, management and provision of services. The complete list of processes is the following:

SS
Strategy Management
Business Relationship Management
Service Portfolio Management
Financial Management
Demand Management

SD
Design Coordination
Service Level Management
Service Catalogue Management
Availability Management
Capacity Management
Security Management
IT Services Continuity Management
Supplier Management

ST
Planning and Support to Transition
Change Management
Release and Deployment Management
Service Assets and configurations Management
Knowledge Management
Validation and Testing
Change Evaluation

SO
Incident Management
Problem Management
Request Fulfillment
Event Management
Access Management

CSI
7 Steps Improvement process

This version 2011 is considered to be a revision of version 3 and often referred as version 3.1. In the field, often there is no distinction between version 3 and version 2011 nevertheless it is important to make the distinction because both versions do not have the same amount of described processes. When necessary this distinction will be documented but in cases when it is not necessary to make the distinction only version 2011 (being more recent and complete than version 3) will be referred.

During the whole evolution of ITIL from its beginning until 2017 several certification organizations had the right to deliver certifications based on an established certification program for ITIL trainings (ISEB, EXIN, APMG and PeopleCert being the main ones). Organizations around the world providing ITIL trainings, would accredit as AEC (Accredited Examination Centers) to provide certifications. Beginning of 2018 the control and establishment of the certification path was transferred solely to PeopleCert, being today the only organization in the world permitted to deliver ITIL certifications via Accredited Training Organizations (ATO) and Accredited Examination Organization (AEO).

End of February 2019 a new version (ITIL V4) came to the market with a new certification path and a new structure. ITIL V4 integrates a structure based on a Service Value System (SVS) that describes in an integrated way 7 Generic principles, Governance, improvement, practices and an operational model called Service Value Chain (SVC). In ITIL version 4 former processes are described as practices (now 34) and can be found in annex 4. These practices are categorized in three areas:

- Global Management Practices
- Service Management Practices
- Technical Management Practices

Annex 4: Brief history of Luxembourg

The name Luxembourg first appeared in 963 when the Count Sigefroid became the owner of a region on which he built a fortified castle[30]. Luxembourg remained an independent principality attached to the German Empire until 1354 and changed its status from earldom to duchy by acquiring the earldom of Chiny. In 1437 it became attached to the Habsburgs of Spain and later in 1443 acquired by Philip the Good of Burgundy. Incorporated in the Netherlands, Luxembourg became an intermediary between the kingdom of France and the German Empire. With the death of Charles the Bold in 1715, the principalities of the North passed to the Austrian Habsburgs. Incorporated into the French Republic in 1795 was given the name "Département des Forêts" (Department of the Forests). During that period Vauban fortified the City of Luxembourg.

The Congress of Vienna elevated the Duchy of Luxembourg to the rank of Grand Duchy in 1815, theoretically making it independent, while linking it by personal union to the Netherlands. The two were recognized as separate countries but ruled by the same sovereign: William I of Orange-Nassau, King of the Netherlands and Grand Duke of Luxembourg. The 1839 Treaty of London marked Luxembourg as an independent country cutting it in two, giving the French-speaking part to Belgium and the German-speaking part remained the Grand Duchy. William II integrated it into a customs union with Germany, the Zollverein in 1842.

Luxembourg was an undeveloped agricultural country with high rates of emigration (between 1841 and 1891 one third of the population left the country) but with the discovery of mining fields and the building of railways, the country enjoyed strong economic growth stopping the usual emigration and resulting in a heavy immigration in several waves of Germans and afterwards Italians. In 1890 the union between Luxembourg and the Netherlands ended and the crown passed to the Nassau-Weilburg

[30] Pauly, Michel, 2013, *Histoire du Luxembourg*, Brussels, Éditions de l'Université de Bruxelles. translation from Pauly, Michel, 2011, *Geschichte Luxemburgs*, Munich, Verlag C.H. Beck.
Trausch, Gilbert (under the supervision of), 2002, *Histoire du Luxembourg. Le destin européen d'un « petit pays »*, Toulouse, Éditions Privat.
Trausch, Gilbert, 2007, *Le Luxembourg. Émergence d'un État et d'une nation*, newly revised and expanded edition, Esch/Alzette, Éditions Schortgen.

branch obtaining its own dynasty, with Grand Duke Adolf as the country's first representative. Germany's unsuccessful attempt to annex Luxembourg in 1914 incited Luxembourg to gain its independence and to leave the Zollverein and entered an economic union with Belgium in 1921, known as the Belgo-Luxembourg Economic Union (BLEU). It subsequently adopted the Belgian franc as the Union's currency, while keeping the Luxembourg franc in limited issue.

During the Second World War, Luxembourg suffered forced Germanisation where 2 % of the total population lost their lives. Needing to form part of a larger market, Luxembourg became a founding member of UNO in 1945 and a member of NATO in 1949. The Belgo-Luxembourg Economic Union (BLEU), which had come to an end under the occupation, was reinstated after the liberation. Luxembourg is a founding member of the Organization for European Economic Co-operation (OEEC) becoming later on the OECD, as well as the Brussels pact, the council of Europe and the North Atlantic Treaty Organization (NATO). Luxembourg had a direct involvement in the creation of the European Coal and Steel Community (ECSC) and became a member in 1951 (the steel industry accounting for 75 % of its industrial output of the time) and of the European Economic Community (EEC) in 1957. The ECSC became the foundation for a new period of growth, while membership of the EEC marked the starting point of economic expansion. As the first workplace of the ECSC, the City of Luxembourg became one of the three headquarters of the European Union, alongside Strasbourg and Brussels and the country developed until present days in the services and financial sector. At the second half of the XXth century there was another massive wave of immigration from Portugal. Since the 60s the country implemented a policy of industrial diversification and strong financial activities began. The 1974 economical crisis where steel production dropped by 50% and the work force of the steel industry was reduced by 2 thirds forced Luxembourg out of its monolithic steel industry economy pushing forward the financial sector with a sustained growth. Today Luxembourg is one of the only 12 countries awarded an AAA rating from three major rating agencies.

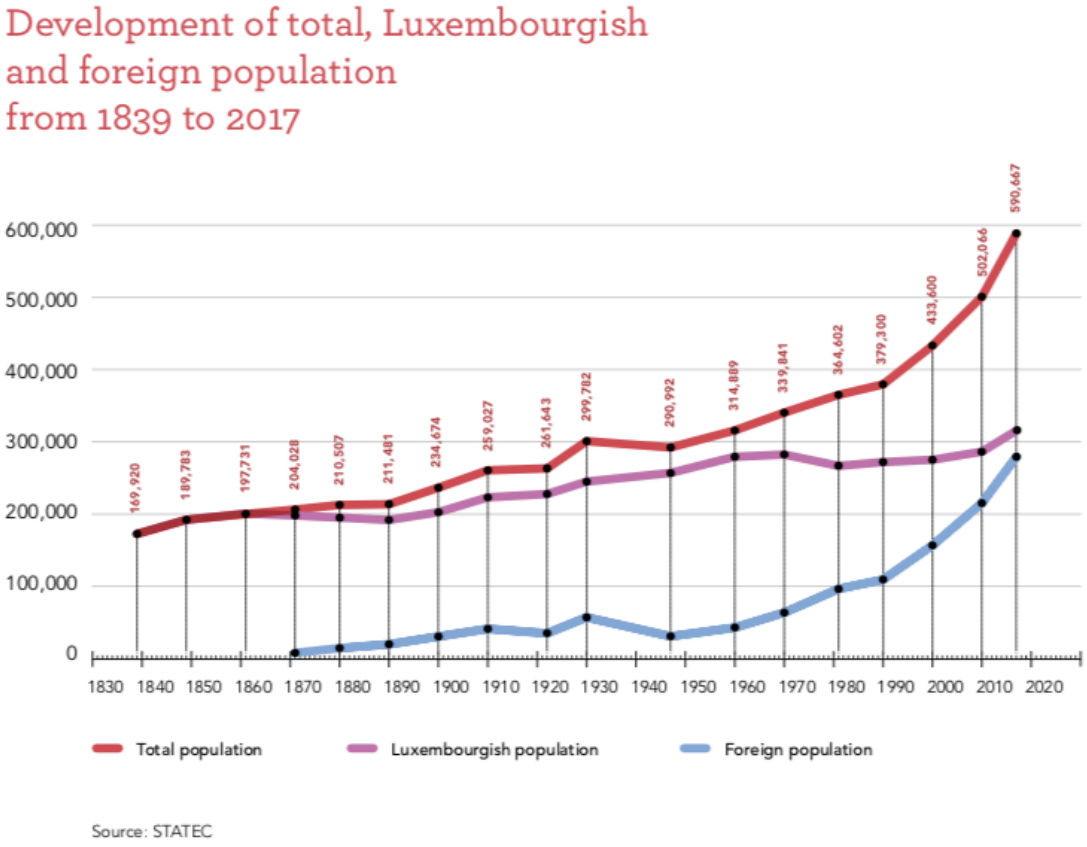


FIGURE 39 : EVOLUTION OF THE LUXEMBOURGISH POPULATION

Annex 5: Luxembourg's economic facts

Luxembourg is considered the 3th most open economy in the world (International chamber of commerce, Open markets index 2015) and is a service-based economy. 80% of the county exports are services. Holds the World largest satellites operator and one of the largest broad casters holding the 1st place in TV and radio broadcasts in Europe (Chamber of Commerce, Luxembourg). Luxembourg city is ranked 21 out of 231 world main cities for its quality of living and is considered the safest city in the world (Mercer Quality of living survey, 2017). The cumulated service market is 87,7% of the economical activity of the country.

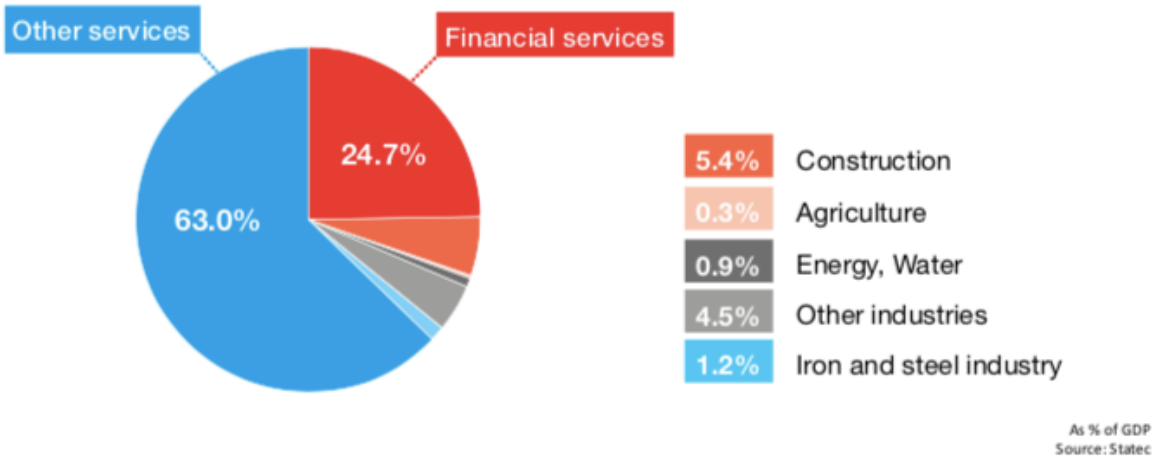
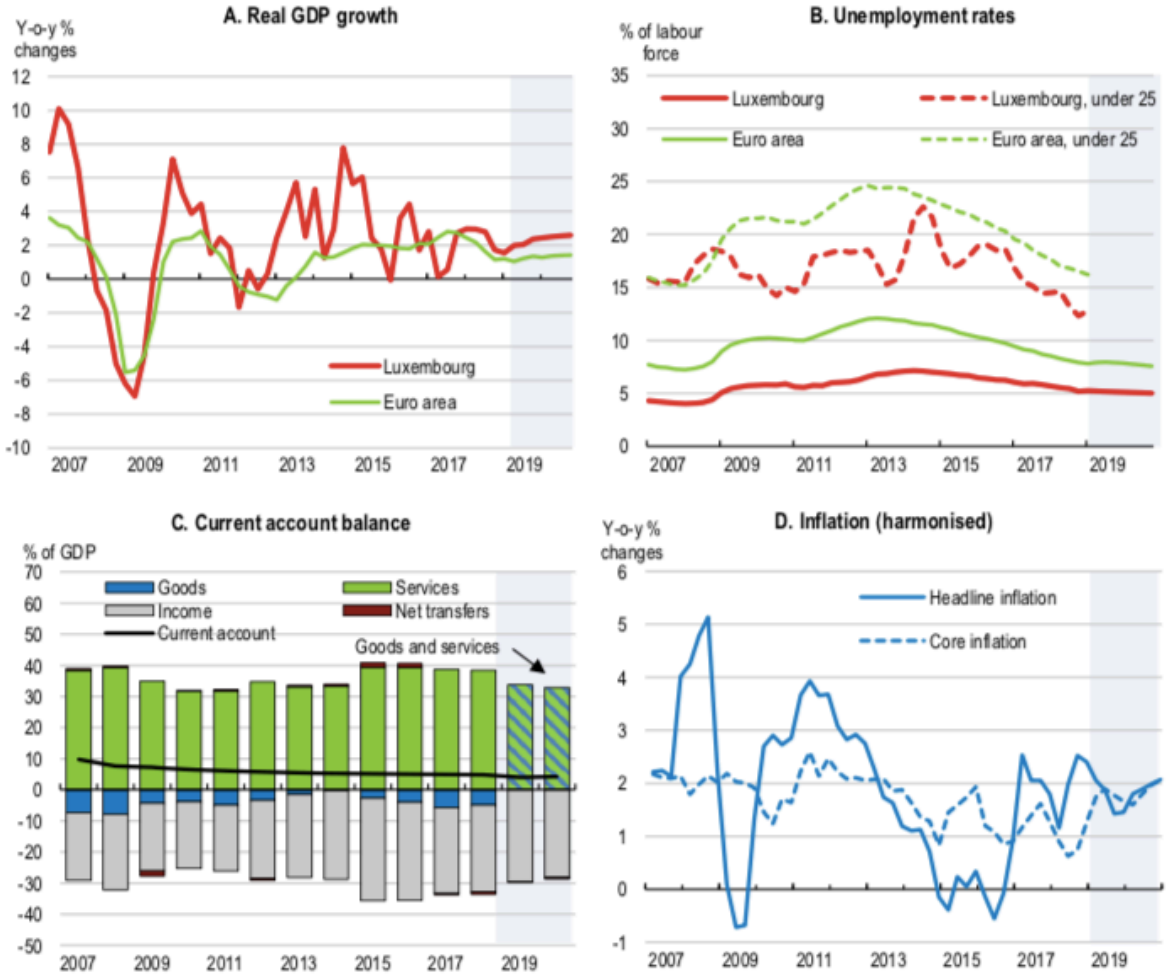


FIGURE 40 : LUXEMBOURGISH ECONOMICAL SECTORS

There is a sustained GDP growth over the European average and has one of the lowest unemployment rates of the Euro zone. The part of Luxembourg's GDP in the Eurozone is 3.4%. There are 310,000 wage earners with 65% of foreign labor force from which 40% are foreign commuters.

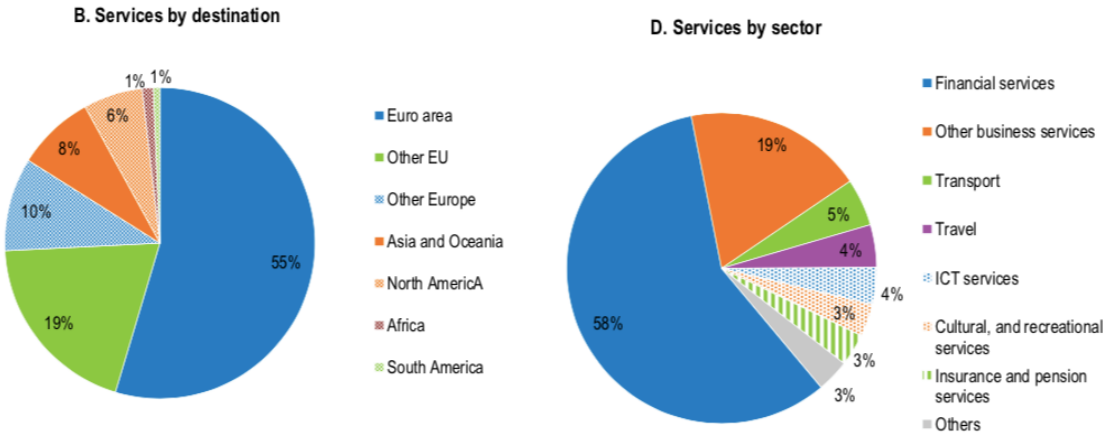


Source: OECD Economic Outlook (database); Eurostat, Employment and Unemployment (Labour Force Survey) Statistics; OECD National Accounts Statistics.

FIGURE 41 : ECONOMICAL FACTS OF LUXEMBOURG'S ECONOMY

Most of he economical activity of the country is focused on the European region accounting for 74% of the total trades. As per the service area 58% of the total trades on services is related to the financial sector. Today the financial sector is the most important pillar of Luxembourg's economy, accounting in 2017 for 28% of GDP and 10% of total employment.

Share of exports by sector and destination, 2017



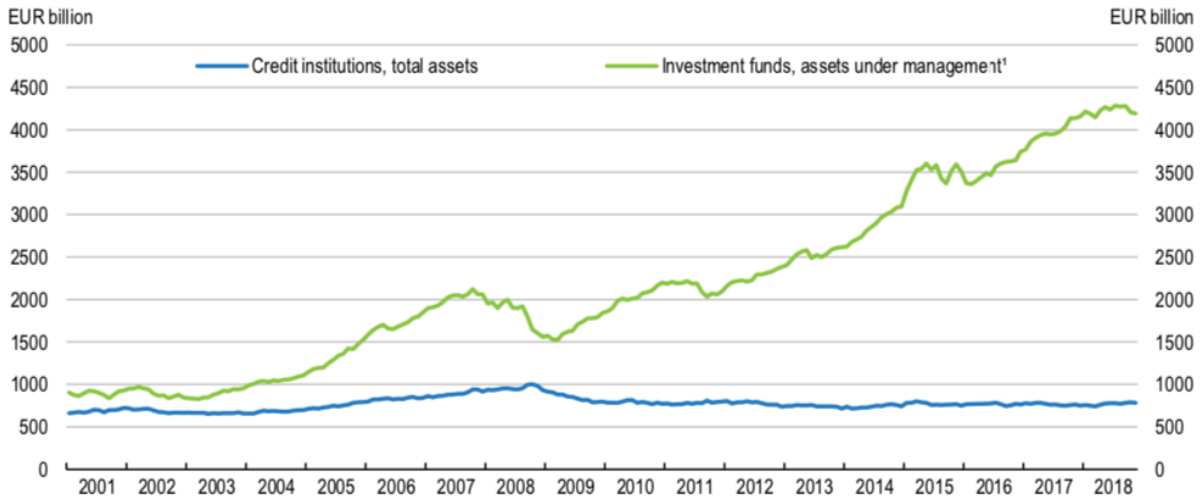
Source: OECD International Trade Statistics.

Note: In Panel D, Others include intellectual property charges, insurance and pension, construction services, maintenance services, and manufacturing services. In 2017, goods made up 13% of exports while services made up 87% of exports.

FIGURE 42 : SERVICES BY SECTOR

Annex 6: Financial sector context in Luxembourg

Assets under management

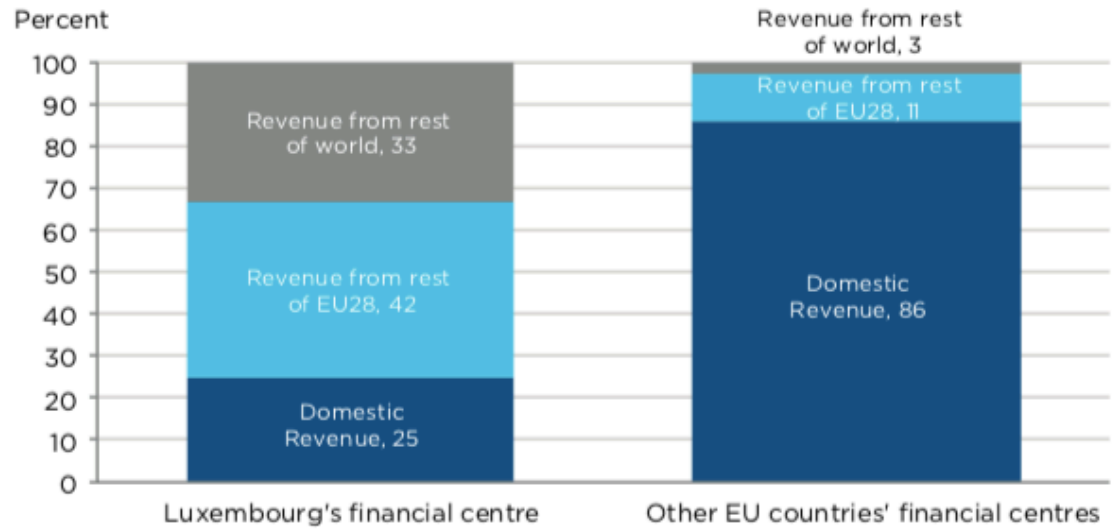


Undertakings for collective investment (UCI), net assets.

Source: Banque Centrale du Luxembourg, Statistical tables.
FIGURE 43 : ASSETS UNDER MANAGEMENT EVOLUTION IN LUXEMBOURG

Luxembourg has succeeded in attracting prominent fintech and big technology companies to establish in the country to perform banking activities, e-payments, trading platforms, online checking accounts and e-money institutions, serving customers all over Europe (Economic survey, 2019, OECD). Luxembourg is today one of the most significant cross-border financial centers in the world. 75% of all the Luxembourg financial center's income is from international customers, comparing to Europe who has only 14%. Luxembourg holds 27% of all investment funds domiciliated in Europe and 23% of all bonds listed in the EU, with net assets of 3,7 trillion euros at end 2016. In 2015, some 944 billion euros of debt was issued as bonds on the Luxembourg Stock Exchange (Oxford Economics, 2015, OECD). The financial sector employs 81% of the foreign workers and employs more than 46000 people. The origin of the income handled by the financial sector in Luxembourg comes mainly from the other European countries compared with the other European financial centers where most of the income comes from the domestic market. Luxembourg invests a big part of this income directly into the European economy. In 2016 Luxembourg invested 1422 BN in the European Union.

Origin of the income of the financial sector in Luxembourg and in other EU countries

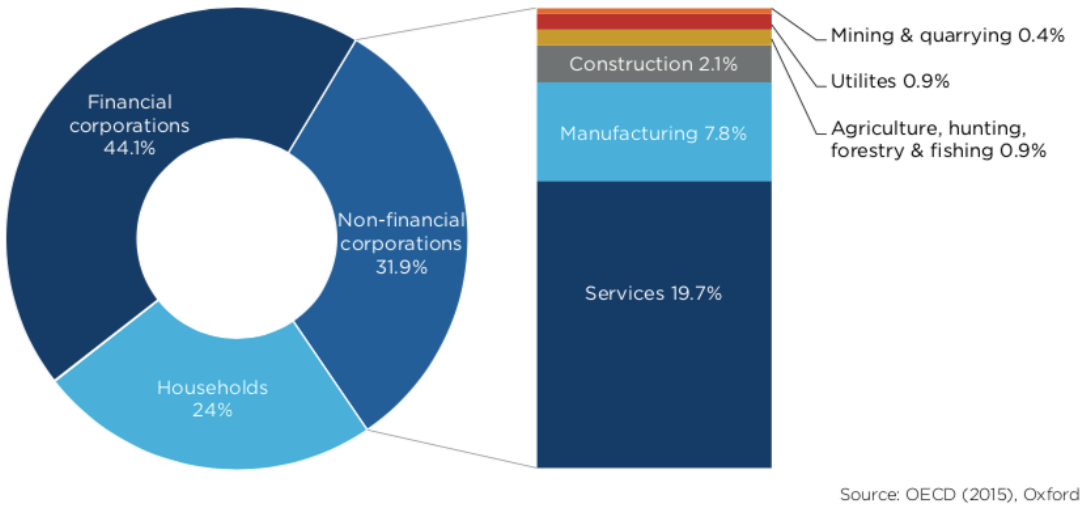


Source: OECD (2015), Oxford Economics

FIGURE 44 : LUXEMBOURG'S INCOME ORIGINS

The financial sector of Luxembourg has a high impact, not only in the local economy but as well in the European economy. The local revenues of Luxembourg generated by the global economy of the country depend mainly of the financial sector where more than 44% of these earnings are generated.

The Luxembourg financial center's earnings by type of organization



Source: OECD (2015), Oxford Economics

FIGURE 45 : LUXEMBOURG'S EARNINGS ORIGINS

Annex 7: Maturity definitions

The Cambridge dictionary defines maturity as the quality of being mature or a very advanced or developed form or state. There are many other different definitions. In terms of business management we can refer to Soanes and Stevenson (2006) who define maturity as; *"The state of being complete, perfect or ready"*. This definition can be broken in three different components that might lead to different paths; complete, perfect or ready. When something is complete there is nothing more to be done because it is the final desired state. In terms of service-oriented organizations there will always be a constant evolution thus requiring modifications and improvements. The state of being perfect is a final state, and again this final state is the accomplishment of the objectives and is the end of the journey. In managerial terms there will never be a perfect state, things will always be perfectible. Last but not least the state of being ready. This implies a state in which the service provider is ready to realize its objectives. Yet again, things evolve and there will always be the need to improve.

This definition is quite general and can be applied to the maturity of an individual, an organization, an action a project and many other areas. The definition of Soanes and Stevenson (2006) denotes a final desired state but fails to inform on the required evolution to reach that final state. In terms of Service Management and Service Orientation it is important to mention this evolution and it is admitted that organizations are in constant evolution according to their ecosystem. Therefore another definition is required to clarify these issues. According to Mettler (2011) "Maturity implies an evolutionary progress in the demonstration of a specific ability or in the accomplishment of a target from an initial to a desired or normally occurring end stage". This definition provides insight in the evolutionary progress, denote the needed abilities of the organization, which are used for the accomplishment of a target or desired state. This is important because this desired state is a defined target and not and end state. Finally it considers the stages of the evolution from an initial state to a desired state. Nevertheless this definition is too general and applicable to all organizations.

Annex 8: Continual Service Improvement Model

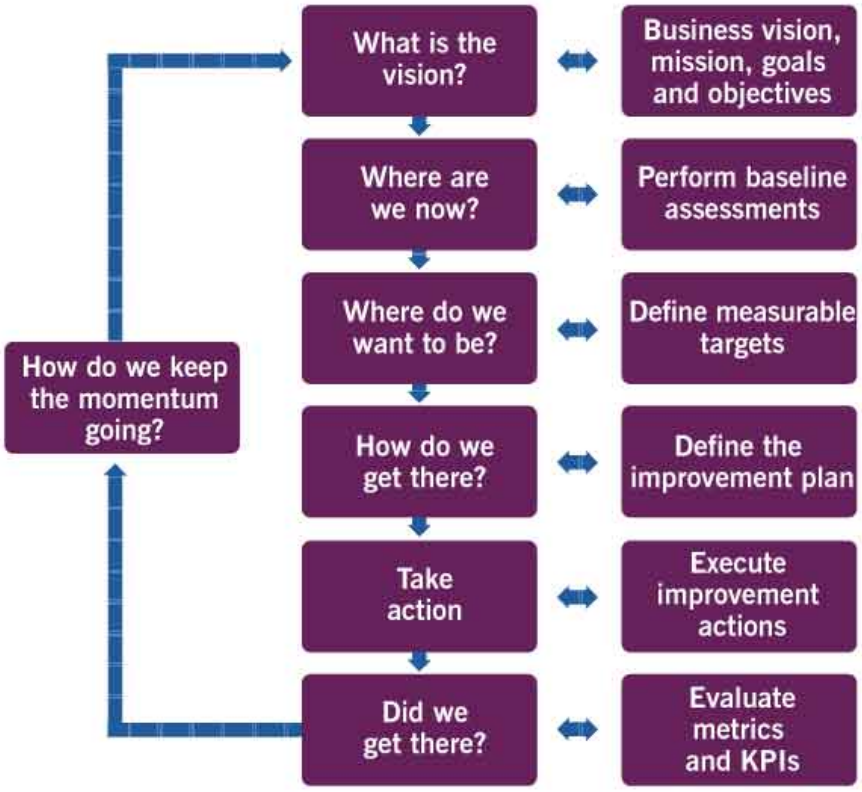


FIGURE 46 : ITIL CONTINUAL SERVICE IMPROVEMENT MODEL
Source: ITIL Jouravlev Romain and et. al., 2019, *ITIL Foundation ITIL 4 edition*, TSO Information Publishing and solutions, Norwich UK.

Annex 9: Servitization literature

According to Callabretta, Lille, Breck and Tanghe (2016), the relevance of servitization for (primarily) manufacturing companies is well documented, but there is limited knowledge on how to implement a servitization transition effectively. More precisely, whilst it is well acknowledged that servitization requires changes in organizational culture, strategy and structure (Vendrell-Herrrero, Busitinza, Parry and Georgantizis, 2017), there is a scarcity of hands-on knowledge providing guidance (e.g., tools and practices) on how product-centric companies can implement those changes and fully capture the performance potential of becoming more service-oriented.

Alter mentions that Service Science is still in a formative stage, with many basic ideas still in flux and significant disagreements about definitions and implications of basic concepts. He suggests that Service Science should not privilege servitizing over productizing; that a series of design dimensions whose endpoints are often associated with products or with services are more useful than yes/no distinctions between products and services; that the concept of "the customer" should be replaced with clearer identification of different groups and types of customers; that value co-production by customers and co-creation by providers are optional characteristics of services; that assumptions about the importance of the intentions and variability of service system participants should be clarified; and that better balance between analytical rigor and the spirit of service is often needed (Alter, 2012).

According to Ahmed, Onhoara and Kamoshida, among the transition processes that are occurring, the service sector is no longer being led by the manufacturing sector and is becoming the leading area. Servitization, in today's economy, is one of the most critical business strategies of an organization (Ahmed, Inohara, Kamoshida, 2013), and organizations need to offer an integration of services with their products. Their study shows that factors like, vision creation, mindset, leadership, communication, and anchoring the new service culture have significantly positive influence on company changes towards servitization of business. Servitization does not mean that products cease to exist, but the main focus of the organization becomes service-

oriented. In that sense products are just one part of services (Almeida, 2008) to provide value to customers (Grönroos 2000).

Callabretta, et. al., (2016) also describes that in order to servitize, organizations need to address two core transitions; a cultural one and a capability one. Bigdeli and Baines (2017) sustain that a service-oriented culture is specific and profoundly different from a traditional product-centric culture, and changing it requires substantial time and resource investments to make such a shift. There are many references for servitizing firms like Oliva and Kallenberg, (2003), Wise and Baumgartner, (1999); Mathieu, (2001); Martin and Horne, (1991). Almeida (2008) presents a literature review on servitization. There is a vast literature on the topic describing multiple aspects of the servitization processes of manufacturing firms. Generally they are divided into two main currents, a goods dominant logic and a service dominant logic. Green, Davis and Ng argue that, even if both streams deal with servitization, they are fundamentally different (Green et. al. 2017). They analyze the two different aspects and analyze the points of convergence and divergence to clarify the approaches.

Important aspects of the servitization of organizations come from the digitalization of processes and the usage of IT to support these processes. According to Paschou, Adrodegari, Perona and Saccani, the convergence of services and digital technologies is generating unprecedented opportunities in manufacturing, by adding value to products, allowing more efficient processes, and supporting improved managerial decisions with richer, faster and sounder information and they argue that there is still a lack of scientific knowledge regarding this phenomenon, (Paschou, et. al., 2017). They present a systematic review of the scientific literature concerning how digital technologies enable servitization in manufacturing firms. Their study presents 43 papers between 2005 and 2017. The main studied areas are PSS (Process Service System), servitization, innovation, business models and value creation.

Dinges as well presents servitization as an option that has allowed manufacturers to maintain their competitive advantage in the face of competitive pressures arising from globalization, and at the same time create greater value for customers. However, maintaining this advantage is a challenge, and requires an innovative and progressive approach to servitization, and sustains that the adoption of technologies that allow the improvement of existing, and the development of new, integrated product–

services offers a route to sustaining competitiveness (Dinges, Urmetzer, Martinez, Zaki and Neely, 2013). They documented 85 technologies that are important for servitization within them the most important (from the practitioner's perspective) are: predictive analytics, remote communications, consumption monitoring, pushing information technologies and mobile platforms. They also describe the main motivations for the usage of this technology but mainly insist on the usage of this technology for a successful servitization.

West and Gaiardelli (2016) describe some of the challenges organizations are facing in their servitization process, requiring new business models (Gebauer, et. Al., 2005) and create different strategic, organizational and networking challenges (Beines, et. al., 2009, Oliva, et. al., 2012). To make it more complex this servitization journey is not unique and cannot be copied from one organization to another, it depends on the specific context of each organization and will differ depending on their heterogeneity, history and culture (Gebauer 2007, Neely 2008 and Neely et. al. 2011). Martin and Bigdeli tempt to document the connection between academic research and business practice to explain when and why to servitize (Martin-Penha and Bigdeli, 2016).

Stephen Vargo, Robert Lusch, Paul Maglio and Jim Spohrer are important contributors to the development of servitization and contributed with numerous academic articles related to a service dominant logic for servitization (Vargo and Lusch (2004), Lusch, Vargo and Wessels (2008), Spohrer, Vargo Caswell and Maglio (2008), Maglio, Vargo, Caswell and Spohrer (2009), Vago, Lusch and Akaka (2010), Wieland, Polese, Vargo and Lusch (2012)). They worked on a service centric dominant logic for Service Science (Vargo and Lusch 2004), describing the conceptualization of a service as a process rather than a unit of output, a focus on dynamic resources like knowledge and skills rather than static resources like natural resources and the understanding of value like a collaborative process between customers and providers (Vargo, Lusch, Vessels 2008). They also described the service system as a basic abstraction of Service Science, described as a configuration of people, technology and other resources that interact with other service systems to create mutual value (Spohrer, Vasrgo, Caswell and Maglio, 2009) and strongly defended and documented a Service dominant logic versus a goods dominant logic (Vargo, Lusch and Akaka, 2010) complementing their contribution with a service dominant logic in a service

eco-systems approach focusing on resource integration as a central means connecting people and technology among service ecosystems (Vargo and Akaka, 2012).

Karpen, Boven and Jossiasen built on the work of Vargo an Lusch conceptualizing a service dominant logic as a strategic orientation for organizations competing through services. Weiland and Vargo continued the service dominant logic view, proposing a service dominant logic eco-system perspective on value co-creation. They describe how the core concepts of service-dominant logic, service-for-service exchange, value co-creation, value propositions, resource integration, and highly collaborative relationships point to a generic actor conceptualization in which all actors engaged in exchange (e.g., firms, customers, etc.) are viewed as service providing, value-creating enterprises (Weiland, Polese, Vargo and Lusch, 2012).

From the exposed above there is no doubt that servitization is an important aspect to consider by organizations in today's economy. Nevertheless the subject is vast and complex and despite the enormous academic literature available, there is still the consensus within academics that there is a need for more detailed research covering specific aspects of the Service Science domain in specific contexts. Some academics initiated research in specific domains like Tether (2012) and Huxtable and Schaffer (2016) analyzing servitization in UK manufacturing firms, Buratti and Russo (2015) analyzing servitizations in small firms, Turunen (2011) analyzing organization for servitization, Ahamed, Kamoshide and Inhoara (2013a, 2013b and 2013c) strategy for servitization, organizational factors for effective servitization implementation and the servitization of a manufacturing firm and Vendrell (2017) servitization and digitalization. Nevertheless there is a need for more research.

The following table resumes the main used literature for servitization:

Author	Year	Publication name	Relevance
Ahamed Zahir, Inohara Takehiro and Kamoshida Akira	2013	A strategic journey of firm transformation towards a new framework for implementing servitization strategy	Describe the transformation of organizations from a manufacturing centric view towards a service centric view. And document the importance of servitization as a strategic element in an organization.
Almeida Leandro F., Cauchick Miguel Paulo and Terra da Silva Marcia	2008	A literature review of servitization: A preliminary analysis	Provide a detailed servitization literature analysis and describe the servitization process to become more service-oriented.
Alter Steven	2012	Challenges for Service Science	Defines characteristics of services and provides guidance for servitization by promoting design dimensions, embedding the customer and the identification of different types of customers.
Calabretta Giulia, De Lille Christine, Beck Caroline and Tanghe Jurgen	2016	Service design for effective servitization and new service implementation	Describe the importance of servitization for organizations and the main concepts and challenges they face for this transformation.
Dinges Veit, Urmetzer Florian, Zaki Mohamed and Neely Andy	2013	The future of servitization: Technologies that will make a difference	Present the advantages for manufactures for servitizing and defend the need of technology for a successful servitization.
Green Maxwell, Daves Philip and Ng Irene	2017	Two strands of servitization: A thematic analysis of traditional and customer co-created servitization and future research directions	Complement the Vargo and Lusch approach of service dominant logic by analyzing both strands on goods dominant logic and service dominant logic.
Paschou T., Adrodegari F., Perona M. and Saccani N	2017	The digital servitization of manufacturing: A literature review and research agenda	Describe the convergence of services and digital technologies and argue that there is still a lack of research in this area. They present a comprehensive literature review in the area.

Vendrell-Herrero Ferran, Bustinza Oscar, Parry Glen and Georgantzis Nikos	2017	Servitization, digitization and supply chain interdependency	Describe the interactions between servitization and digitalization and the changes that need to occur to succeed in servitizing a firm, emphasizing the scarcity of literature with guidance on how to servitize.
West Shaun and Gaiardelli Paolo	2016	Driving the servitization transformation through change management: Lessons learnt from industrial cases	Describe the challenges for servitization and the ubiquity of the approach for each organization.

TABLE 23 : MAIN SERVITIZATION REFERENCES
Source : Martin Cross

Most of this academic literature refers to servitizing manufacturing firms. Even though IT can globally fall into this category if we consider the manufacturing of computing, information systems and communication devices, it is convenient to take a closer look at this domain because of the high influence of IT and digitalization into every organization. As well relating to the research context; Service Orientation of IT service providers of financial institutions in Luxembourg, it is convenient to check what does the academic literature says, specifically for these two domains. First we'll focus on Service Orientation and secondly ITSM (IT Service Management) practices.

Annex 10: ITSM references literature

As a practitioner I have observed the usage of several ITSM references among organizations in several parts of the world with a clear dominance of ITIL. In a study on Service Orientation maturity Burg and Valverde document that 80% of the studied organizations use ITIL but all of them have less than 30% of implemented practices Burg and Valverde (2011). They argue that most organizations still have a long way to change from a silo oriented Service Orientation into a fully service-oriented organization. Some organizations use other references like ISO20000, ISO27000, COBIT, and CMMI within the most observed. Nevertheless, ITIL remains the most used reference. There are other used references but marginal. Several academicians referenced the usage of different references like Castro (2018), Gacenga and Cater-Steel (2011), Mugashir (2013), Salle (2004), and Trudel (2017) within others. Some others like Marrone and Kolbe (2011) have studied the impact and benefits of such frameworks and standards in the business performance.

Salle (2004) describes several ITSM frameworks insisting that IT functions must evolve from a provider to a strategic partner governing IT to help the organizations to fulfill their objectives. Therefore, they need to use ITSM frameworks to support them in this evolution. One of the main frameworks associated with IT governance is COBIT (Controlled Objectives for Information and related Technologies). It was designed to be an IT governance aid to business management in their understanding and management of the risks and benefits associated with information and related technology. COBIT is independent of the technical IT platforms adopted in an organization, it is an open standard for control over information technology, developed and promoted by the IT Governance Institute. COBIT is a three dimensional view of IT processes, IT resources and Information criteria. Salle (2004) also address the evolution of other frameworks like ITIL (in 2004 at version V2 level) composed of 7 guidance books from which only two were generally accepted and used in the field (Service Support and Service Delivery) documenting 5 processes each. ITIL inspired a number of models like HP IT Service Management Reference Model (HP-ITSMRM), Microsoft Operations Framework (MOF) and IBM's Systems Management Solution Lifecycle (ISMSL), which are interpretations of the ITIL proposal. Several other acad-

emicians have referenced such frameworks, but from the moment that they are derived form ITIL we will focus our attention only on ITIL.

According to Swinarski, Kishre and Rao (2006), organizations have specific resources and capabilities that can lead to potential superior firm performance but different scholars argue that it is difficult to associate a specific IT resource to a specific increase of performance because there are several other factors that might as well affect the performance. They postulate that these capabilities can evolve to establish specific processes to support the business. This is the case of SW-CMM (Capability Maturity Model for Software) developed by the Carnegie Melon University and used by the US defense department for the acquisition of avionics. This model evolved to CMMI (Capability Maturity Model Integration).

The CMMI Model integrated an appraisal model defining 6 levels of maturity and dominated the market being the basis for the development of numerous maturity models.

Gacenga and Cater Steel (2011) argue that as more organizations embrace IT Service Orientation with a service-oriented approach to managing the operations of their IT organizations, a number of ITSM frameworks, standards and models have been developed. Some of the mentioned common frameworks and models include MOF, ISMSL and HP-ITSMRM the three of them derived from ITIL. They integrate in their study ITSM International Standard, ISO/IEC 20000. According to them, under the impulsion of the internationally active IT Service Management Forum (itSMF), ITIL has become widely adopted and recognized for providing effective management and control of IT service delivery and support.

Marrone and Kolbe (2011) studied the impact of ITSM frameworks in the IT organization but focus only on ITIL as they consider it to be the most used framework for ITSM around the world. As per Mubashir, Soomro and Brohi (2013), they analyze as well different frameworks and standards and map them to ITIL showing their similarities. Within others they analyzed, COBIT, ISO 27000-2005, TOGAF, eTOM, CMMI and Six Sigma. They argue that, despite the global dominance of ITIL, organizations will profit of the implementation of different frameworks and standards concurrently as they are complementary. They state that with the evolution of IT from a centric mainframe based infrastructure to a more dispersed distributed infrastructure organi-

zations confronted inconsistencies in management methods of technology. This situation obliged organizations to seek guidance to improve the technology management and began implementing different ITSM standards and frameworks documenting that ITIL has established as the most frequently used ITSM framework.

To compare these frameworks and standards it is important to provide a brief description of them. ISO2700 is a standard derived from the BSI (British Standard Institute) 7799 published in 1995. In 2000 was published the ISO standard 17799 and in 2005 a new version was published named ISO27001 and later on 27002. It describes guidance on information security management.

COBIT was already described above but we can add that it has evolved over time proposing new versions controlled by ISACA (Information Systems Audit Control Association) and has established as an important reference for IT governance. COBIT propose 34 processes for controlling IT.

TOGAF is a well-established framework for enterprise architecture developed by the open group. Motorola developed Six Sigma in 1985. It provides guidance on products improvements and seeks to identify defaults using statistics to control and eradicate them. It is widely established around the world.

In their study, Marrone and Kolbe (2011) identified these frameworks and standards similarities and map them to ITIL. Soomoro and Hesson (2012) studied as well different ITSM frameworks: CMMI, COBIT, eTOM, Six Sigma ISO1799 and included as well ISO9000 (focusing on global quality management) and Malcom Baldrige (a high level holistic model for improving the quality of the whole enterprise). They base their study on ITIL being the widest used framework but conclude that organizations can benefit of the collaborative usage of the different frameworks and standards.

More recently, Trudel (2017) studied the CSFs (Critical Success Factors) for implementing ITSM practices. He describes different ITSM frameworks and standards, namely, ISO2000, COBIT, CMMI and ITIL including PRINCE2 as a project oriented framework identifying from the academic literature 40 CSFs and prioritizing them in order of impact and contribution to the ITSM performance.

Finally Castro Marquez, Velazquez Perez and Castro Silca (2018) worked as well in the identification of the used ITSM Frameworks. They studied the necessity of organ-

izations to use ITSM frameworks to coordinate, control and supervise the IT activities. They document as well the main established frameworks and standards for ITSM. Within others, COBIT version 5 launched by ISACA in 2012 positioning it as a corporate governance framework. They include its derived governance standard ISO 38000. ISO27001 and ISO27002 for Information Security management, IS20000 for services management and ITIL as guidance for ITSM processes. They argue that is convenient to consolidate and integrate several frameworks to benefit form the strong points of each of them but consider the difficulty of such a task taking into account the independence of the controlling bodies of these frameworks. They conclude with the necessity to develop an integrated model.

From the above we can observe that there are several well established frameworks and standards for ITSM, each one providing its own structure and with its own advantages and disadvantages. Nevertheless it is observable that ITIL has established as the main ITSM reference and is the most widely used framework for ITSM around the world. This is still corroborated by more academic literature like Barafort, Di Renso and Merlain (2002) and Johansson (2016),who state that ITIL is the most commonly adopted of the ITSM frameworks. According to them, under the impulsion of itSMF (IT Service Management Forum), ITIL has become widely adopted and recognized for providing effective management and control of IT service delivery and support. Marrone and Kolbe (2011) mention that according to the IT Governance Institute, the IT operational framework with the highest adoption rate is ITIL with 24%, followed by COBIT with an adoption rate of 14%. Their study focuses on ITIL as the most popular ITSM framework. These statements validate the initial field observation stating that most of the IT service providers in Luxembourg use ITIL as their main ITSM reference.

The table below resumes the main literature used for the ITSM area:

Author	Year	Publication name	Relevance
Castro Marquez Day Esther, Velazquez Perez Torcoroma and Castro Silva Hugo	2018	Integration of security and management of services in the government of Information Technologies	The article evaluate different ITSM guidance references and propose an integrated model mentioning that each organization must use the relevant guidance that would help them in the fulfillment of their business objectives.
Gacenga Francis and Cater-Steel Aileen	2011	Performance measurement of ITSM: A case study of an Australian University	Define ITSM and present ITSM frameworks and performance metrics.
Gacenga Francis, Cater-Steel Aileen, Toleman Mark and Tan Gui-Gee	2011	Measuring the performance of service-oriented ITSM	They present a systematic literature review on ITSM measurement and propose performance metrics for 3 ITIL processes.
Marrone Mauricio and Kolbe Lutz M	2011	Uncovering ITIL claims: IT executives perception on benefits and business IT alignment	Study the impact of ITSM frameworks (mainly ITIL) and demonstrated that the usage of such framework provide benefits to organizations. Prove that the greater the maturity of ITIL implementations the greater the benefits.
Mubashir Ali Syed, Soomro Tariq Rahim and Brohi Muhammad	2013	Mapping ITIL with other Information Technology standards and best practices	Compare multiple ITSM frameworks and standards and map them to ITIL to complement the usage of ITIL.
Salle Mathias	2004	ITSM and IT Governance: Review comparative analysis and their impact on utility computing	The article references different ITSM frameworks proposing the support of such frameworks to evolve from a service provider to a governed IT to help organizations in the fulfillment of their objectives.
Swinarski Matheuw, Kishore Rajiv and Rao H Raghav	2006	Impact of IT service process capabilities on service provider performance: An empirical study	Postulate the relationship of the providers capabilities and the derived ITSM processes proposing a CMMI appraisal to measure these capabilities.
Trudel Christian	2017	CSFs pour la mise en oeuvre et le soutien de la gestion des services TI dans une organization manufacturière mondiale: Une approche systémique	Compares several ITSM frameworks used in the field. Describe ITIL 2011 and all its processes. Identifies academic studies that focused on ITIL CSFs.

TABLE 24 : ITSM FRAMEWORKS AND STANDARDS MAIN LITERATURE

Source : Martin Cross

Annex 11: ITSM maturity references focalization table.

	Processes	Service Orientation	People and skills	Results	Experience	Governance	Technology
TIPA	X			X*			
ISO20000	X						
ISO15504	X			X*			
Cobit	X		X			X	
CMMI	X			X*			
Serv*Or		X	X		X		
Gartner**	X					X	X
Axelos	X						
Short Serv*or		X	X		X		
Mountain view	X						
OSOMM	X	X	X	X	X	X	X

*CMMI, TIPA and ISO15504 main focalization is process assessment but in the attributes of the process it is analyzed the outcomes of the process. Global Services and Service Orientation outcomes are not covered.

**Gartner propose different models for specific areas. The presented focalization is obtained from different models.[31]

TABLE 25 : ITSM MATURITY MODELS FOCALIZATION

Source : Martin Cross

[31] Kerremans Marc, 2008, *Maturity assessment for business process, improvement leaders: Six phases for successful BPM adoption*, Gartner for IT leaders, id: G00160844.

Annex 12: Comparative quality criteria table of the main ITSM maturity models.

Most of the available maturity models available on the market are derivatives of ISO15504 and CMMI. Both maturity models share the same maturity levels. ISO15504 describes the methodology used for processes assessments in the same way that a maturity appraisal is defined with CMMI. Therefore the evaluation of the models would be the same. TIPA covers the PRM (Process Reference Model) describing the different components to be assessed of ITIL version 2, version 3 and version 2011. The 2011 TIPA version is used for the present evaluation. All derivatives of CMMI and ISO15504 are integrated in this TIPA 2011 PAM evaluation. Another group of assessment types refer to the self-assessments based on predefined questionnaires. Axelos maturity assessment is the most representative and most established in this group. ISO20000 is not considered in this evaluation because it is not considered a maturity assessment. The standard specifies the required ITSM components that are required to obtain a compliance certificate. Nevertheless the evaluation ISO20000 is based on an audit type providing proof of realization of tasks and delivering a binary proof (achieved/not achieved) instead of a definition of a maturity level. Therefore ISO200000 is not included into this evaluation comparison. Serv*Or is an important academic reference but quite outdated and not covering the latest developments of the ITSM area. The OSOMM model is based on the Serv*Or structure but updated with the latest ITSM developments, therefore it is not included in this evaluation. For more information about the relationship between Serv*Or and OSOMM please refer to annex 24.

Therefore, the present evaluation is based on a TIPA assessment and an Axelos assessment compared to an OSOMM assessment. The evaluation criteria is based on 2 parameters: time and cost.

Time: The calculation methodology is based on the time unit “Man/days” This is the work carried out by one person in an 8 hours work-day. The estimations are based on historical data from executed assessments using the referenced maturity models.

A TIPA assessment type 2 (evaluation for establishment of a maturity profile with the goal to promote an improvement plan) is realized with two assessors. For the evalua-

tion of one process it is required to interview a representative sample, usually composed of 5 individuals. Each interview must be conducted individually and last 2 hours. Therefore, 5 interviews of 2 hours is 10 hours of work for two assessors. This represents a total of 20 hours. The preparation of the assessment accounts for 5 hours with one assessor. The analysis after the interviews and the data consolidation accounts for 16 hours of work for two assessors. The closure and results presentations accounts for 5 hours for two assessors. Therefore the sum of 5h+ (10h*2)+ (16h*2)+(5h*2)= a total of 62 hours. In ITIL there are 26 processes, therefore, this result should be multiplied time 26 to get the total amount of hours for a complete ITIL assessment: 62*26=1612. To convert the amount of hours into man/days we need to devide by 8h: 1612/8=201,5 man/days.

An Axelos assessment is carried out as a self-assessment. There are over 3500 questions for a full assessment of the 26 processes and the 4 functions. Whilst some questions are straightforward and can be answered easily, some other questions require data collection and a lot of cogitation. Considering an average of 5 minutes per question (based on historical assessments) the total amount of time spent on such an assessment is 3500*5=17500 minutes, which represents 291,6 hours of work. Considering the initial phase of an assessment (5 hours), the analysis phase (25 hours) and the closing phase (5 hours) we need to add 35 hours. Therefore the total amount of time spent on an Axelos assessment can be estimated at 5+291,6+25+5=326,6 hours of work which represent 40,83 man/days.

An OSOMM assessment is carried out as an assisted assessment. The required time to answer the OSOMM questionnaire is 2 hours. Interviews can be done in groups. The only restriction is not mixing users and customers with IT staff for the interview. Therefore the assessment can be done in tow sessions of 2 hours each. Including the initial phase (5 hours), an analysis phase (8 hours) and a closure phase (5 hours), this type of assessment can be done in 5+2+8+5=20 hours which represents 2,5 man/days.

To calculate the cost it is necessary to assign a standard cost unit. Considering the transaction cost theory, it does not matter who is realizing the tasks, there is always the cost of the transfer to an external party. This is the case of an OSOMM assisted assessment. Even for internal cases there will be transaction costs generated by the

exchanges between departments. This could be the case of an internal department carrying out an assessment for another area of the same company. While realizing assessments in different parts of the world would impact the man/day cost, the studied population is situated only in Luxembourg. Therefore the economic reality of the country will be considered to set the cost unit. The cost of specialized work in Luxembourg is 39 euros per hour (statistiques.public.lu, bulletin N0. 5 03/2019). From this value we can assign a cost per unit for a man/day (39*8=312 euros per man day).

	Time (man/days)	Cost 312€ per man/day	Reliability
TIPA	201,5	62.868,00	Representative sample of IT.
Axelos	40,83	12.738,96	1 person view.
OSOMM	2,5	780	Representative sample of IT, including the view of customers and users.

TABLE 26 : TIME/COST ANALYSIS OF THE MAIN MATURITY MODELS
Source : Martin Cross

From this table we can observe that the time and cost involved in a maturity assessment are much lower for OSOMM than for Axelos and TIPA. The calculation for an Axelos assessment was done considering the usual manner that Axelos assessments are realized. To compare Axelos with TIPA it would be necessary to adjust the value to cover several views and not only one. The TIPA estimations considered 5 persons to interview, therefore we can compare with 5 persons answering the Axelos questionnaire. This would sum up to 5+(291,6*5)+25 +5= 1493 hours which represents 186,6 man/days and a cost of 58,227€.

In both cases (TIPA and Axelos) the assessment covers only the perception of internal IT staff. OSOMM considers also the point of view of users and customers. And even if it is considered that not all the individuals could be interviewed at the same time with only two sessions, the cost will remain extremely low comparing to the other

two alternatives. For example if instead of two interviews there are 5 interviews with 2 individuals per interview, the cost would be 5+10+8+5=28 hours which represents 3,5 man/days for a total cost of 1.092,00€ including the double of interviewed individuals and covering also the views of customers and users.

Maturity model Criteria coping: From + (little) to +++++ (a lot)

	Time	Cost	Complexity	Usefulness	Reliability
TIPA	+++++	+++++	+++	+++++	++++
ISO20000	++	++	+	+	++
ISO15504	+++++	+++++	+++++	+++++	++++
Cobit	+++	+++	++++	+++	+++
CMMI	++++	++++	++++	+++	+++
Serv*Or	++	++	+	+++	+++
Gartner	++	++++	++	+	++
Axelos	+++	+++	++	+++	+
Short Serv*or	+	+	+	++	+
Mount view	+++	+++	+	+++	+
OSOMM	+	+	+	+++++	+++++

TABLE 27 : CRITERIA ANALYSIS OF THE MATURITY MODELS
Source : Martin Cross

Time and cost criteria is based on the same calculation as described above. Complexity was estimated considering the amount of time that is required to gain the necessary skills to make an assessment. In cases like ISO5504, TIPA and CMMI, there are specific trainings to be able to learn the assessment method. The cases of Serv*Or , Mountain View, Axelos and OSOMM are base don pre-prepared questionnaire and the delta to learn how to use the model is very low. Usefulness is based on satisfaction surveys realized on the field. Reliability considers the capability of the model to represent correctly the as is status of an organization. Most of the models

scored low because they represent only the view of the internal provider's staff. OSOM is the only model that considers the point of view of external staff (customers and users).

Annex 13: ITIL V3, ITIL 2011 and ITIL V4 comparative table.

ITIL V4 Practices	ITIL V3 Processes	ITIL 2011 Processes
General management practices		
Architecture management	-	-
Continual improvement	Continual Service Improvement	Continual Service Improvement
Information security management	Information security management	Information security management
Knowledge management	Knowledge Management	Knowledge Management
Measurement and reporting	-	-
Portfolio management	Portfolio management	Service Portfolio management
Organizational change management	-	-
Project management	-	-
Relationship management	Business Relationship Management	Business Relationship Management
Risk management	-	-
Service financial management	IT Service Financial Management	Financial Management for IT Services
Strategy management	-	Strategy Management for IT Services
Supplier management	Supplier management	Supplier management
Workforce and talent management	-	-
Service Orientation practices		
		Design Coordination
		Transition Planning and Support
Availability management	Availability management	Availability management
Business analysts	-	Demand Management

Capacity and performance management	Capacity Management	Capacity Management Change Evaluation
Change control	Change Management	Change Management
Incident management	Incident management	Incident management
IT asset management	Service Assets and Configuration Management	Service Assets and Configuration Management
Monitoring and event management	Event Management	Event Management
Problem management	Problem management	Problem management
Release management	Release Management	Release and Deployment Management
Service level management	Service level management	Service level management
Service catalogue management	Service catalogue management	Service catalogue management
Service continuity management	IT Service continuity management	IT Service continuity management
Service design	-	Design Coordination
Service desk	Service desk	Service desk
Service Configuration Management	Service Assets and Configuration Management	Service Assets and Configuration Management
Service request management	Request Fulfillment	Request Fulfillment
Service validation and testing	Service validation and testing	Service validation and testing
Technical management practices		
Deployment management	-	Release and Deployment Management
Infrastructure and platform management	Technical Management	Technical Management
Software development and management	Application Management	Application Management
	Operations Management	Operations Management

TABLE 28 : ITSM FRAMEWORKS AND STANDARDS MAIN LITERATURE
Source: Martin Cross

Annex 14: Serv*Or questionnaire

Domain: Service Leadership

Element: Servant leadership practices

Management constantly communicates the importance of service. (25)

Management regularly spends time in the field or on the floor with customers and front line customers. (26)

Management is constantly measuring service quality. (27)

Management shows that they care about service by constantly giving off themselves. (28)

Management provides resources, not just lip service, to enhance employee ability to provide excellent service. (29)

Managers give personal input and leadership into creating quality service. (30)

Element: Service Vision

There is a true commitment to service, not just lip service. (22)

Customers are viewed as opportunities to serve rather than a source of revenue. (23)

It is believed that fundamentally, the organization exists to serve the needs of its customers. (24)

Domain: Service encounter practices

Element: Customer treatment

Employees care for customers, as they would like to be cared for. (1)

Employees go the extra mile for customers. (2)

We are noticeably more friendly and courteous as our competitors. (3)

Employees go out of their way to reduce inconveniences for customers. (4)

Element: Employee empowerment

Decisions are made close to the customer. In other words employees often make important decisions without seeking management approval. (5)

Employees have freedom and authority to act independently in order to provide excellent service. (6)

Domain: Human resources management practices

Element: Service training

Every employee receives personal skills training that enhance his/her ability to deliver high quality service. (33)

We spend much time and effort in simulated training activities that help us provide higher levels of service when actually encountering the customer. (34)

During training sessions we work through exercises to identify and improve attitudes towards customers. (35)

Element: Service reward

Management provides excellent incentives and rewards at all levels for service quality, not just productivity. (31)

This organization noticeably celebrates excellent service. (32)

Domain: Service systems practices

Element: Service failure prevention

We go out of our way to prevent customer problems. (10)

We go out of our way to head off or prevent customer problems rather than reacting to problems once they occur. (11)

We actively listen to our customers. (12)

Element: Service failure recovery

We have an excellent customer complaint handling system for follow up. (13)

We have established problem-solving groups to enhance our ability to resolve service beak-downs. (14)

We provide follow up service calls to confirm that our services are being provided properly. (15)

We provide every customer with an explicit service guarantee. (16)

Element. Service Technology

We enhance our service capabilities through state of the art technology. (7)

Technology is used to develop higher levels of service quality. (8)

We use high levels of technology to support the efforts of men and women on the front line. (9)

Element: Standard service communication

We do not wait for customers to complain, we use internal standards to pinpoint failures before we receive customer complaints. (17)

Every effort is made to explain the results of customer research to every employee in understandable terms. (18)

Every employee understands all of the service standards that have been instituted by all departments. (19)

We have a developed chain of objectives linking together every branch of the corporate vision. (20)

Service performance measures are communicated openly with all employees regardless of position or function. (21)

Annex 15: Additional ITSM maturity literature references

Wangenheim carried out a systematic literature review of software process capability maturity models, and recognized that there is a wide variety of models more or less adapted to specific situations and domains (Wangenheim, et al., 2010). They observed that most of the models were concentrated around the CMM/CMMI framework and the ISO/IEC 15504 (SPICE) standard. In this systematic literature review they identified 52 maturity models used in very specific domains like knowledge management, e-learning, automotive systems. From these 52 models, 50 were based on CMMI or ISO15504. Most of these models are applied for software development, which despite being an important component of IT systems, do not cover all the requirements for a mature service-oriented organization. Flores, Rusu and Johanesson (2011) propose a maturity model of IT service delivery structured around five maturity levels based on CMMI-SVC, COBIT and ITIL V3. Their approach is operational and define 7 characteristics in their SDMM model (Service Delivery Maturity model): Service definition, negotiation and agreement, Budgeting, business requirements and service performance, recovery, availability and security. The model does not detail neither behaviors, nor organization management nor customers.

Pöpelbuss and Becker offered as well a comprehensive literature review for maturity analysis of information systems (Pöpelbuss and Becker, et al., 2011). They observed as well that CMM is the most extensive used model as a foundation for IS maturity models. According to this study there is a huge number of maturity models in the past years. Most of these models are based or derived from CMM/CMMI and ISO15504 (SPICE). The study outlines the profusion of model variants to fit a specific domain. According to Pöpelbuss and Becker, maturity models have their roots in multi-staged approaches like Maslow human needs (Maslow, 1954) or Nolan's stage model on the progression of IT organizations (Nolan, 1973). The results of this study covering a fifteen-year period (from 1996 to 2010) in twenty-two leading IS journals and 5 international conferences, obtained seventy-six articles related to IS maturity models.

This research of articles on maturity covered five mayor IS areas: 1) IT and individuals, 2) IT and groups, 3) IT and Organizations, 4) IT and markets and 5) IS development. Most of the research was done in the IT and organizations area but covering

specific activities like IT adoption, Knowledge Management, outsourcing, IS planning, collaboration. Only one study relates to the Management of Information Systems and no research was identified in the area of Service Orientation.

More recently Albliwi and Arshed (2014) carried out a critical literature review on maturity models for business processes. According to their study the origin of maturity models is evolved from the software industry in the late 70s CMM dominating the lot. They identified five main models that are at the origin of other models:

- Crosby's Quality Management Maturity Grid (QMMG)
- Bessant's Continuous Improvement Capability Model (CICIM)
- CMM Capability Maturity Model
- CMMI Capability Maturity Model Integration
- BPMM from OMG (Object Management Group)

The first two models are more organization oriented and include people skills and abilities. The last three are more oriented towards processes. According to Röglinger, Pöppelbuss and Becker (2012) the main maturity models are complex and difficult to use while others are quite simplistic and not reliable. These five models, even though being the most popular have been criticized. QMMG is not process oriented and a limited amount of models have used it as their basis. CICM has been criticized as some main elements are not addressed (like communication) and is used mainly at small and middle size organizations. CMM being the widest used as a basis for other maturity models, is criticized as being too complex and many of its variants are contradictory. More specifically due to its strong focus on processes ignoring important aspects like people, culture and organization. CMMI obviously received the same criticism as CMM with additional criticisms due to its complexity and lack of IT support references. The authors argue that there are two main currents of maturity assessments; the ones created to assess processes maturity and the ones created to assess organizational maturity with almost no maturity models that address both aspects.

Trinkenreich, Santos and Barcellos (2015) analyzed metrics that are useful for Maturity models but address mainly CMMI SVC version of the CMMI model which leads

to the same criticism above, namely this model is based in process assessment missing some important features of Service Orientation and making its utilization quite laborious and complex. Latif, Din and Ismail (2010) analyzed as well the usage of ITIL using a CMMI approach to assess the maturity of processes. They compare several models like COBIT, eTOM, PRINCE2 ISO17799. Additionally they documented complexities before implementation, during implementation and after implementation.

Wulf, Wrinkler and Brenner (2015) developed a specific ITSM maturity model based on four existing ITSM maturity models (CMMI, COBIT 4.1, Spice and Axelos ITIL V3 Maturity model) based on the assumption that the existing models are complex time consuming and unfeasible in cases where the company is seeking a model to be used on a regular basis to follow up the evolution of the company. According to their study, despite the wide literature available there is only little literature that addresses the wide view of Service Orientation in the organization. According to Marrone and Kolbe (2011) maturity models address the variety of processes or a single item of the organization. Wulf, Winkler and Brenner (2015) aim to answer how to measure ITSM capability. Based on the work of Becker, et al. (2009) on developing maturity models for ITSM they constructed a maturity model describing 6 process attributes:

- Plans and procedures
- Awareness and stake holder communication
- Tools and automation
- Skills and expertise
- Responsibility and accountability
- Goal setting and measurement

They propose that jointly these 6 process attributes determine the maturity of process. They defined a scale of 6 levels (0 to 5): None, initial, repeatable, defined managed and optimized. The model then was applied to 205 organizations to test the 26 ITIL V3 processes. Even though the models prove to be efficient to assess the process maturity of ITL V3, there is the limitation of covering only a process view and based specifically on ITIL V3. Thus a model providing a wider view of the organiza-

tional maturity covering culture and people is necessary and adapting it to the most recent practices like ITIL V4.

Tarhan Turetken and Ilisulu (2015) propose an analysis of the confronted challenges while using processes maturity models and identify the characteristic of process assessment models that would facilitate their use. The conclusion of their study is that the process assessment field is quite immature. They identified 9 business process assessment models. Within the identified characteristics, the model must be adaptable, specific for a domain and presented in a structured way. The draw back of this study is that is focused on Business process maturity mod, nevertheless the key documented characteristics are relevant for my research. Tarhan, Turetken and Reijers (2016) also present a systematic literature review of business maturity models. They sustain that the number of proposed models have considerably increased but that there is a lack of studies to validate them and prove their utility. They propose to clarify the difference between the maturity levels and the maturity model. This should simplify the understanding and usage of a model.

Domingues, Sampiao and Arezes (2016) proposed a maturity model called Integrated Management Systems Maturity Model with a literature review on ITSM maturity models. The maturity model is composed of three dimensions: the key process agents, externalities and the excellence management pillars, is based on CMMI model and specific to Integrated Management Systems considering the 2015 ISO9001 (standard specifying the management requirements for the production of quality products and services) and ISO14001 (standard specifying the management requirements for environmental organizations). Even though the study represents some interest from the maturity demonstrations it is more focused on global (integrated) management systems and not ITSM, therefore is not adapted to the needs of this research.

Proença and Borbinha (2016) propose an extensive literature review on ITSM maturity models and analyze 22 of them. From the studied sample only 4 models proposed a maturity definition. These are: ISO15504, CMMI, IT Capability framework and COBIT. Their conclusion is that assessments using these frameworks are complex, and expensive. They conclude that further investigation is needed to propose assessment models that are simpler and less expensive.

An interesting initiative is proposed by Christianto and Andy (2018) in their evaluation of maturity using ITIL. Nevertheless, they propose a rather limited view of ITSM maturity as their evaluation is based only in the maturity of a Service Desk, failing to provide a holistic view of ITSM practices. The most recent contribution related to maturity models is Kuikka (2018) who presented a study to measure maturity of business services with the scope of reducing the variation of customer facing services. The interest of this study is that a specific maturity tool for measuring services is proposed, in contrast to most of the ITSM maturity models that measure processes. The model proposes 8 areas to measure:

1. People training.
2. Documents and knowledge sharing.
3. Development.
4. Roles and responsibilities.
5. Systems and tools.
6. Processes.
7. Business development.
8. Marketing.

This is the most recent model found in the literature and covers a wide range of areas and it is well documented. Nevertheless this proposal measures only the service from the business perspective and lacks the measurement of a service structural organization, people, culture and technology, which are necessary in a global view of Service Orientation.

Annex 16: Exploratory research interview methodologies

In order to explore the field it is first essential to collect qualitative data that represents as close as possible a phenomenon on the field. There are multiple forms and methods to gather data such as direct observations, direct meetings, business meetings, internal business documentation, unofficial discussions, focus groups, brainstorming sessions and interviews, just to mention a few. Not all of the methods are adapted to the collection of data with academic validity, therefore it is essential to choose a specific method that can warrant that:

- Data is valid.
- Data represents a perceived reality.
- Data is consistent.
- There is no bias in the collected of data.

In this research, interviews are the best method for data collection covering the above criteria, as long as the interviews are conducted with precision. Interviews can be done individually or in groups. As usual, both interview types have their specificities with advantages and disadvantages.

Group interviews permit to gather different opinions in a short time frame, as within the same interview there is a variety of individuals but precisely because of this, there might be persons in the group that will not provide opinions. There are persons who are quite communicative and others who are timid and fade in a group. Group interviews might lead to a group consensus in which some participants will not provide opinions or input to avoid confrontation with other participants. This effect is particularly present in organizations with a strong hierarchical structure. For the exploratory phase of this research and considering the topics to be treated it is important that interviewees can express freely their opinions. Therefore group interviews, even if more efficient, are not well adapted for this research.

Individual interviews give more space for individual expression within the confidentiality of the room but tend to require more time to gather the same amount of data than with group interviews. Added to that, there is a higher difficulty in the process of consolidating data in view of the analysis. Nevertheless, as this type of interview pro-

vides a more personal view on the subjects treated during the interview, and despite the difficulty of data integration, data sets tend to show better variances that represent better the studied phenomenon.[32]

For these reasons it has been chosen to conduct individual interviews for the data gathering of the exploratory phase. Nevertheless, there is another important factor to consider. Generally we can classify interviews in three types (Sojceska 2018):

- Structured interviews.
- Unstructured interviews.
- Mixed interviews (also referred as semi-structured or semi-directive interviews).

Each interview type present different advantages and disadvantages and it is important to choose the most appropriate type of interview to collect quality data.

Structured interview

A structured interview (also called standard interview, planned interview or formal interview) is characterized by a pre-prepared questionnaire which allows every interviewee to follow the same set of questions in the same chronological order. This type of interview requires a careful preparation, previous to the interview. The disadvantage of this type of interview is that it takes a significant amount of time to prepare. Additionally, potential leaks might happen provoking bias in the interviews results, if interviewees know the answers in advance. It is less personalized and potentially some questions might also not be adapted for all individuals in the sample. Gathered data strongly depends on the pre-prepared questions, the way they are stated and the chronological order. This would potentially induce specific answers or influence interviewees choices. As this type of interviews depends on a pre-prepared questionnaire, here might also be some important points that are not addressed in the questions. The advantage is that data is pre-formatted and it is easier to consolidate and to analyze.

[32] Gorden, Raymond, 1992. *Basic Inteviewing Skills*. Itasca, IL: F. E. Peacock.
Mathers Nigel, Fox Nick and Hunn Amanda, 2002, *Using interviews in a research project*, Tent focus for research and development in primary health care, Institute of General Practice Northern General Hospital Sheffield.

Unstructured interview

An unstructured interview (also called free form interview, casual interview or informal interview) is characterized by a free exchange of information without pre-prepared questions. The flow of information is spontaneous as well as the questions. This type of interview is well suited for the gathering a diversity of opinions. The main disadvantage is that the outcome of each interview might diverge as interviewees do not necessarily provide the same information nor do they address the same questions. The more diversity there is in the outcome, the more the analysis of data becomes complex and might lead to a lack of information in desired topics. The main advantage is that the interviews are more personalized, tend to collect more subject specific opinions and information. This could potentially launch specific discussions on interesting topics that initially were not expected to be addressed. Unstructured interviews also tend to lead to a wider level of opinions and provide diversity in the gathered data, which is rather convenient in an exploratory research.

Semi directive interview

A semi-directive interview (also called semi-structured interview, mixed interview or hybrid interview) is characterized by a mix of the two previous ones where there is a small set of predefined areas or questions to direct the interview while avoiding to force the interview into a specific direction. This give space for free expression. This situation results in a combined set of advantages and disadvantages. As the two previous types of interviews are quite opposite, these advantages and disadvantages tend to compensate and nullify. The main disadvantage is that the interviews, as well as the interviewer, need to be prepared in advance. The development of an interview guide is necessary and it needs to be tested. The gathering of unstructured data makes its treatment and analysis more complex. The advantage of this type of interview is the pre-prepared structure with the warranty that all areas of interest will be covered while allowing freedom of expression and diversity of personal opinions.

Chosen methodology justification

Each type of interview is more or less suited for different situations. For my research, a semi-directive interviewing approach seemed to be the best method due to the combination of advantages with little disadvantages of the structured and unstruc-

tured types. This approach allows to explore the field, treating specific areas while still offering the freedom of expression.

Because the objective of the exploratory phase is to confirm or reject the data gathered during the field observations, the main directive areas of a semi-structured interview allows to cover issues related to the observed phenomena while still providing enough freedom to express the perceived issues of each interviewee, without limiting their field of expression. In this manner, collected data will cover a wider, more personalized range of subjects, which is appropriate for this exploratory phase. This helps to understand in the best way possible the interviewee's ecosystem, their preoccupations and their personal opinion on the subject.

With these reasons in mind a semi-directive individual interview method seem to be the most convenient and was chosen for the initial data collection of the exploratory phase.

Annex 17: Exploratory research phase sampling methodology

Considering that the objective of this exploratory research phase is to investigate specific phenomena related to the initial field observations with the aim of validating them or rejecting them, it is extremely important to have a representative sample of the population to study. This will allow inferring from the sample to explain the phenomena in the reference population. The population refers to all of the members who meet the particular criteria specified for a research investigation (Alvi 2016). Sampling is the process through which a group is extracted from a population (Alvi 2016). A sample can be defined as a group of relative smaller number of people (or entities) selected from a population for investigation purposes (Alvi 2016). In an investigation process, it would be rather difficult to address the whole population, so a group of entities (smaller in size) is selected for the investigation and inferences are drawn for the population. With these inferences it is admitted that the results will be subject to bias inherent to a specific sampling type and do not cover the whole population, but the results still represent the population.

Sampling methodologies

There are different types of sampling, each one with its own advantages and disadvantages. The sampling method is of high importance because it influences the gathered data. Therefore giving special attention to the analysis of the population to derive a correct sample is essential. [33]

The most common sampling methodologies according to Alvi are depicted in the following table (Alvi 2016):

[33] Atman Jeanne, 1974, *Observational Study of Behavior: Sampling Methods*, Ilee Laboratory of Animal Behavior, University of Chicago, Chicago, Illinois, USA, Vol. 49, No. 3-4.
Bret Hanlon and Bret Larget, 2011, *Samples and Populations*, Department of Statistics University of Wisconsin—Madison.
Moshin Hassan Alvi, 2016, *A manual for selecting sampling techniques in research*, University of Karachi.
Taherdost Hamed, 2016, S*ampling Methods in Research Methodol How to Choose a Sampling Technique,* 2016, International journal of acid Management (IJARM), Vol 5, No. 2, pp. 18-27.

Sampling Type	Description	Advantages	Disadvantages
Random	Each member of the population has an equal chance to be selected	Simplicity	Non representative sample
Systematic	Arranging the sample in a specific order and select elements at regular intervals	Population evenly sampled	Bias induced by the even periodicity of the sample
Stratified	The population is pre-arranged by common characteristics, pertinent to the research, trying to re-create the population characteristics in a smaller scale, then randomly sampled	Better coverage in the sample of different characteristics of the population	Complexity. Requires deep understanding of the population
Convenience	Elements of the sample are picked up based on convenience and availability	Availability of the elements of the sample	Potential poor representation of the population
Snowball	Relay on initial respondents to refer next respondents	Fast to initiate making usage of an existing contacts network	Potential sample restricted to a close homogeneous circle
Quota	Characterize the population by desired features and assigns a quota to each subset of the population	Balanced sample	Requires careful preparation

TABLE 29 : SAMPLING TYPES.

Source : Martin Cross; Based on Alvi (2016), A manual for selecting sample techniques in research

There are other types of sampling methods but for the present study, the presented sampling methods are relevant for the research. The used methodology is a mix of methods presented above according to the following logic:

- Categorize the population according to representative characteristics
- Define a quota for each category
- Pick elements from the population by convenience

- Use snowball sampling to discover new candidates for the sample
- Control the quota
- Randomly pick elements for the categories with missing respondents

There are no sequential restrictions on the above activities and they can be executed as needed to complete the sample.

Annex 18: Exploratory research phase sample stratification

The present exploratory phase of this research intends to validate the initial field observations of the studied population which is: Information Technology Service providers of financial institutions in Luxembourg.

It is important to understand without any ambiguity the studied population. For that purpose we need to define the different elements of this population. For the exploratory research phase the following definitions will be used to establish the sample:

Service Provider: is a role performed by an organization in a service relationship to provide services to consumers (customers, users and sponsors). (ITIL V4 2019)

Organization: A person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its objectives. (ITIL V4 2019)

Information Technology (IT): the technology involving the development, maintenance, and use of computer systems, software, and networks for the processing and distribution of data. (Merrian-Webster dictionary 2019)

Technology: refers to methods, systems, and devices which are the result of scientific knowledge being used for practical purposes (Collins dictionary 2019)

Information and Communications Technology (ICT): refers to technologies that provide access to information through telecommunications. It is similar to IT but focuses on communication technologies. This includes the Internet, wireless networks, cell phones, and other communication mediums. (Christensson 2010). For the purpose of tis research, every time that IT is mentioned it will cover as well ICT.

Financial institution in Luxembourg: An organization under Luxembourgish law specialized in financial operations. There are two main categories of financial institutions the Luxembourg's legislation based on the type of license A) Universal Banking license and B) Mortgage bonds banking license (monopole of emission of mortgage bonds and interdiction to collect public funds).

The present research considers only the universal banking license institutions (135 institutions in 2017) in the studied population. These are more representative of the financial operations in the country, compared to the Mortgage bonds banking license

institutions (4 institutions in 2017). The universal banking license institutions are categorized in three sectors

UBL (Universal banking license)

Specialized PSF (Professionel du Secteur Financier- Financial Sector Professional-)

Support PSF

The following table documents the different types of financial institutions in Luxembourg:

Type	Code	Category	Number (31/12/2017)
UBL (135)	B1	Banks under Luxemburg law	94
	B2	Branch of banks from EU member state origin	32
	B2	Branch of banks from Non EU member state origin	13
Specialized PSF (108)	SP1	Professional services for constitution and management of institutions	92
	SP2	Domiciliation institutions	86
	SP3	Registry holders agents	58
	SP4	Family offices	31
	SP5	Professionals holding non financial assets	13
	SP6	Professionals offering credit operations	5
	SP7	Professionals holding financial instruments	3
	SP8	Reassurance of debts	2
	SP9	Savings funds administration	1
	SP10	Regulated market operation	1
	SP11	Postal financial services	1
Support PSF (79)	PS	There are 4 main support PSF and there are several potential combinations of the 4 types (*)	79
MBBL		-	4

Detail of the support PSFs is found in table 9

Source; Banque Central de Luxmbourg: number and geographic origin ofcredit institutions established in Luxembourg, 2020. www.bcl.lu/statistics/series_statistiques_luxembourg/11_credit_institutions/index.html .

TABLE 30 : CATEGORIES OF FINANCIAL INSTITUTIONS IN LUXEMBOURG

Support PSFs play an important role in the financial sector and have specific characteristics. There are 4 different types of Support PSFs but there can be any combination of them. In the following table, a description of the existing Support PSFs in Luxembourg and the combination of types:

Type	Code	Category	Number (31/12/2017)
Support PSF	PS1	1) Administrative agents	
	PS2	2) Customer communication agent	13
	PS3	3) Primary information systems operator	
	PS4	4) Secondary information systems operator and financial communication sector operator	20
	PS5	1+2	5
	PS6	3+4	21
	PS7	1+3+4	1
	PS8	2+4	2
	PS9	1+2+4	1
	PS10	2+3+4	5
	PS11	1+2+3+4	9

Some support PSFs provide only one type of service (this is the case of PS2 and PS4) but most of the support PSFs provide different type of services, which gives different combinations.

Source; Banque Central du Luxmbourg: number and geographic origin of credit institutions established in Luxembourg, 2020. www.bcl.lu/statistics/series_statistiques_luxembourg/11_credit_institutions/index.html .

TABLE 31 : TYPES OF SUPPORT PSFS IN LUXEMBOURG

From the above tables the population to be studied has the following relationships:

- IT institutions in Luxembourg providing services to other financial institutions are under the prudential control of the CSSF (Commission de surveillance du Secteur Financier -Financial Sector Surveillance Commission-) and licensed as Support PSF of category 3 and 4.
- Financial institutions (UBL and specialized PSFs) under the CSSF prudential control are quite diverse providing direct financial services to their financial customers.
- Globally, financial institutions are the customers of supporting PSFs type 3 and 4.
- Internal IT service providers fall into the financial institution prudential control.
- External IT service providers are usually Support PSFs type 3 and 4, but it can be any global or specific IT service provider such as financial software providers, financial software development, financial infrastructure management, IT consultancy services and IT support.

Selected sample

The final sample was chosen using the sampling methodology described above.

Id	Financial institution Type	Size Category	Origin	Turn over	IT Service provider type	IT type
1	Investment Bank	C	UK		Shared IT	Internal
2	European financial institution	E	EU		PSF type 3 and 4	External
3	Global Financial institutions	D	Lux		Telecom	Internal / External
4	Support PSF type 1, 2, 3 & 4	D	Lux		Shared IT	Internal / External
5	Investment Bank	C	Swe		Shared IT	Internal
6	Global Financial market	A	Fr		Training	Internal
7	Non Fin Institution Steel distribution	B	Lux		Shared IT	Internal
8	Global Financial Institutions	C	USA		Support PSF type 3 & 4	External
9	Non Fin Institution Air transportation	C	Lux		Shared IT	Internal
10	Global Financial Institutions	B	Lux		PSF type 3 & 4	External

11	Support PSF type 1 & 2	B	Fr		Consultancy	External
12	Financial and Insurance	A	Japan		Shared IT	Internal
13	Specialized PSF	B	Ger		Shared IT	Internal
14	PSF support type 3 & 4	A	Lux		Consultancy	External
15	Essential Organization Media, Finance and Telecom	D	Lux		Shared IT	Internal /External
16	Global Financial Markets	B	Lux		PSF type 3 & 4	External
17	Global Financial Institutions	B	Fr		PSF type 3 & 4	External
18	Specialized PSF	D	Lux		Shared IT	Internal
19	Essential Organization (air transport)	C	Lux		Shared IT	Internal

Internal IT service providers are ruled by the financial institution
External IT service providers who are support PSFs are ruled by the prudential control of the CSSF.
External IT services providers who are not PSF are not subject to the prudential control of the CSSF.
IT providers type 3 and 4 are considered as well a financial institution.
Size category A up to 50, B51 to 100, C 101 to 500, D 501 to 1000 E more than 1001.

TABLE 32 : STUDIED ORGANIZATION IN THE EXPLORATORY RESEARCH SAMPLE
Source : Martin Cross

From these 19 interviewed entities, 4 companies are not financial institutions as exposed in table 10. Regardless of that, they were included in the research because they present an interest in the exploration. These 4 companies are classified as essential operators and have an important impact in the country's economy as well as the financial institutions in Luxembourg. These essential operators provide direct services and serve as important global service providers in the country. These organizations were included in the research due to their importance to the Luxembourgish market, but were analyzed separately. The results were compared to those of the financial institutions to verify the differences or similarities. In the case of similarities, there is a potential applicability of the results of this research at the other markets.

These companies operate in the following markets:

- Steel distribution
- International air transportation services and support
- Media and communication
- Management of local premises for air transportation

The remaining 15 organizations are financial institutions of various types as documented in table 10, and they represent the population as follows:

- **Type**: There are 6 internal service providers, 7 external service providers and 2 service providers that deliver services internally as well as externally.
- **Origin**: There are 6 service providers under Luxembourgish law, 7 from a European union member and 2 from a non-European origin.
- **Size**: There are 8 small financial institutions (3 with less than 50 employees and 5 between 51 and 100 employees), 6 mid size organizations (3 with 101 to 500 employees and 3 with 501 to 1000 employees) and 1 big institution with more than 1001 employees.

This sample is rather representative of the global Luxembourgish financial sector.

Annex 19: Exploratory research phase interview guide

Executive Doctorate in Business Administration

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Semi-directive Interview guide

General guidelines

Present yourself

Professional position, position as a researcher for an EDBA, observed neutrality as a main observer of phenomena without any judgment during the discussion of the interview

Present the research and the research objectives

The purpose of the following questionnaire is to understand the implemented and used IT Service Management practices, the way they are measured and the potential issues that might arise from their implementation

Present the benefits of their participation to the research

The research will allow understanding more in detail the difficulties that IT Service Providers in Luxembourg are facing during the Service Orientation journey and the way to measure the service orientation maturity

Will provide a clear representative view of the Service Orientation status of IT Service Providers in Luxembourg The information will be available upon request)

Will analyze and present in an organized way difficulties that IT Service Providers in Luxembourg are facing

Will permit to compare the interviewed entity towards a global average

Explain confidentiality issues

The information that youill w provide will not be disclosed. The global results will be presented consolidated (and can be obtained upon request) without any reference to the specific entities of the sample or references of the interviewees. If necessary agree and sign a Non Disclosure Agreement, as presented in Annex 3.

Ask if there are questions, it is possible to record the interview and agree on the beginning of the interview.

Important note: remember that this is only a guide and questions are there to guide the conversation when there is a paralysis or a lack of information in a desired area. It is not intended to be used a questionnaire in a sequential order. It is recommended to promote a conversation with open expression of the interviewee ideas and opinions in the studied areas.

Interview guide

Domain: Service Orientation

1.- How important is for the IT Service Provider organization to evolve into a Service-oriented organization and why?

2.- What does Service orientation means to the interviewee and to the interviewed organization?

3.- Which reference (methodology, standard or framework) does the IT Service provider use as a reference for Service Management? If several methods, standards or frameworks are used investigate all of them.

4.- If a specific reference (methodology, standard or framework) is used, investigate why is it important to use a reference.?

5.- If more than one reference (methodology, standard or framework) is used, investigate which one is the main reference and why?

6.- Which are the expected benefits of the usage of the reference (methodology, standard or framework)?

7.- Is there a well established Service Orientation culture?

8.- How long is the reference (methodology, standard or framework) been established and used.?

Domain: Service Orientation Maturity measurement

9.- Is Service Orientation measured?

10.- How is it measured?

11.- Is a Service Maturity reference ((methodology, standard or framework) used to guide the IT Service Provider in the measurement of Service Orientation? If it is the case investigate which reference and why it has been chosen.

12.- What is the percentage of Service Management practices that have been implemented according to used reference (standard, methodology or framework)?

13.- How far does the IT Service Provider intend to implement the Service Orientation reference?

Domain: Service Orientation difficulties

14.- Which are the main difficulties or blocking factors that the IT Service Provider has encountered in the implementation of Service Orientation practices? (Allow time to the interviewee to express all issues and concerns)
Consider difficulties that:

a) Were encountered in the practices that are already implemented
b) Difficulties that were encountered for practices in phase of implementation
c) Are expected or identified difficulties for the upcoming practices to implement.
d) Relate to internal factors of the IT Service Provider like knowledge, resources, hierarchical issues, relational issues etc.
e) Relate to external factors of the IT Service provider like, relationship with customers and users, relationship with providers and suppliers, political, social, economical and technological factors.

15.- Investigate what is needed to overcome these difficulties or blocking factors?

16.- Investigate what interfere in the overcoming of these difficulties?

17.- At the end of the interview as the following closed question: From the list below choose three subjects (in order of priority) that you judge are the most important aspects to consider as a service provider?

Delivering value
Understanding your customers
Increase performance
Cost reductions
Controlling risks
Promote improvements
Better understanding of IT operations
Customer satisfaction
Adapt to new technologies
Better control of established processes

Domain: Interview conclusion and closure

18.- To conclude the interview ask if there is any subject that was not discussed that the interviewee would like to address?

19.- Thank the interviewee and reinforce the field benefits of the research

20.- Close the interview by requesting their participation in potential future actions for data gathering and inform that they can request a report of the results.

Annex 20: Confidentiality agreement template

UNIVERSITÉ LYON III INSTITUT D'ADMIN-ISTRATION DES ENTRE-PRISES

BUSINESS SCIENCE INSTITUTE

DOCTORATE in BUSINESS ADMINISTRATION

Martin CROSS

Exploratory research of ITSM practices of IT service providers of financial institutions in Luxembourg

Confidentiality agreement

Purpose

The present confidentiality agreement purpose is to provide warranty by the researcher Martin Cross to the parties involved in the specific research related to the dissertation of a Doctorate diploma at the Business Science Institute in partnership with the "Université Lyon 3 Jean Moulin" that all information exchanged during the research relationship will be handled with care according to the security required by the specific type of information.

Terms

Researcher: The person or persons (including subcontractors) who will handle any type of information provided by the research contributor.

Research contributor: The person or persons who will provide information to the researcher.

Parties: Include the researcher and the research contributor. In singular refer to either of the parties.

Information: Refers to all information disclosed in tangible form, orally or otherwise in intangible form between the researcher and the research contributor.

Agreement

Both parties undertake to comply with the confidentiality requirements as stated in the present agreement:

1. To hold the Information exchanged between parties in strict confidence and to take all necessary precautions to protect it.

2. Not to divulge the Information out of the framework of the present research.

3. Not to make any dishonorable use whatsoever at any time which could harm in any way the business or reputation of the parties.

4. Not to copy or modify the information and only use it for the fulfillment of the present agreement.

The present undertaking shall enter into force on the date of signature and shall remain valid after the expiration of the agreement until the owner party deems the information not confidential, becomes public domain or by mutual understanding the present agreement is deemed obsolete.

The breach of the confidentiality obligation of the present agreement may be regarded as serious offence by the counter-party.

Done in duplicate on the date: _____

Researcher Signature

Martin Cross

Research contributor Signature

Annex 21: The interview process and controls

The interview guide is the main support to guide the interview. Nevertheless it is important to keep in mind that it is just a guide. The interview can be directed at any direction that is judged of interest for the research. During the interview it is important to generate an empathic attitude to promote the exchange and an authentic expression of information from the interviewee. All interviews were conducted in face-to-face meetings to warrant the best contact with the interviewees.

Using the described sampling methodology, stratified, convenience, snowball and quota, pertinent potential research contributors of specific organizations were contacted and an appointment was set to conduct an interview.

At the beginning of the interview, special attention was drawn to explain the research purpose and interest, clarify issues, inform confidentiality issues (if not done previously a confidentiality agreement was signed) and requested permission to record the interview, explaining the importance and usage of the recording. The main advantage recording interviews are:

- Focus attention on the person (if a person perceives to be heard there will be a more communicative attitude).
- There are no wasted time writing exchanges during the interview.
- There will be no interruptions while writing and the communication flows more naturally.
- The interviewer would perceive more things than if making a direct transcription.
- Non-verbal communication signs are easier to perceive.
- The exchanges are preserved and do not depend on the memory or writings of the interviewer.
- There will be less biased in the interpretations of the gathered information.
- Transcripts of verbatim preserve the exactitude of the exchanges

Of course the list is not exhaustive, nevertheless, not everyone might feel at ease with the interview being recorded and it could prove to be a limitation to the expression of the individ-

ual. If the interviewee prefers not to be recorded the interviewer must respect the choice and adapt accordingly.

It is also very important to explain to the interviewee that the interview is meant to explore the field according to their experience and not at all a test with pass or fail questions. Therefore, there are no good or bad answers, just the description of the interviewee perception of what is happening in the field.

Equally important is to ensure that the interviewer will not influence or induce opinions during their exchange. The interviewer must remain neutral and avoid expressing personal opinions during the interview. In some cases there might be an historical factor related to a previous professional relationship between the two parties. In such cases the interviewer must avoid any aspect that could influence the perceptions and opinions of the interviewee.

Interviews quality controls

There are different controls that can be done in relation to the collected data, its quality and its consistency. Because the interviews are merely exploratory and not based on questions, the main focus is to obtain a diversity of opinions and the potential identification of deviations and variances that could prove of interest for the research. Nevertheless, there is a control question at the end of the interview (namely the only question of the interview guide) asking interviewee to think and express an opinion of the importance in the Service Management area. The interviewees were asked to prioritize what they considered the three most important aspects of their Service Orientation. They could only pick three aspects in order of importance from the following list:

Delivering value
Understanding your customers
Increase performance
Cost reductions
Controlling risks
Promote improvements
Better understanding of IT operations
Customer satisfaction
Adapt to new technologies
Better control of established processes

For example, if during an interview, the interviewee is of the opinion that the Service Management's definition and/or benefits are related to delivery of customer value, the natural answer for the question should relate to understand the customer or deliver value to customers and not related to risks or technology or anything else. On the other hand, if the interviewee is of the opinion that Service Management is all about making the best use of technology to deliver value (or something similar) the natural answer of the last question should be oriented to promote improvements, adaptation to new technologies or a better understanding of IT operations.

Another important aspect to consider is the interviews transcript. The interviewer should work on the transcript as soon as possible to avoid as much as possible biases induced by the time. Preferably immediately after the interview ends, because things are fresh in the interviewer's memory. With the time passing, the more details the interviewer might miss and is prone to interpretations.

The first interviews trend to last longer than the last ones because the more interviews are conducted the more familiar the interviewer is with the subject. Therefore, it becomes easier to steer the interview in the right direction without losing time or undergo deviations.

Following the same idea it is important to conduct the interviews in a short time frame. This helps with the familiarization of the subject. Additionally, a short time frames of transcriptions help in better understanding interviews and the analysis. Nevertheless, in the case of this research, the availability of interviewees, as well as professional obligations, influenced the time frame and made the interview period longer than expected.

Lastly, language differences must be considered carefully. As documented in the context chapter, Luxembourg has a rather heterogeneous international environment with multiple cultural aspects and an important pluri-linguism. Therefore, the possibility to interact with people of different origins and speaking different languages during the interviews. Whenever possible, English was the reference language, especially because English is a reference language in the IT area as much as in the IT Service management area. Moreover, because this research paper is written in English, it was much more convenient to conduct the interviews in English too. But the language preferred by the interviewee prime and the interviews language was adapted accordingly. Most of the interviews were carried out in French. Therefore, only

English and French languages were used for the interviews. Careful attention was given to the translation of collected data. The verbatim was transcribed and coded in the original language. Only after the coding phase the translation was executed. The translation was verified by a different person who was not involved in the research. This allow to ensure that the initial message was maintained.

Annex 22: Exploratory research results analysis

The first part explored in the field concerned the perceptions that IT service managers of the service providers of Financial institutions in Luxembourg have, related to the Service Orientation meaning, the importance of it and the expected benefits to be obtained while service orienting.

Service Orientation Meaning

Despite that it seems a simple question: What is Service Orientation? The truth is that it is quite difficult to define. In the academic literature there are several definitions:

- "*Service orientation is the disposition to be helpful, thoughtful, considerate, and cooperative."* (Hogan, Hogan, and Busch, 1984: 167)
- *"Service orientation is defined as an organization-wide embracement of a basic set of relatively enduring organizational policies, practices and procedures intended to support and reward service-giving behaviors that create and deliver service excellence."* (Lytle, Hom, Mokowa, 1998: 455-499)
- *"Service Orientation means to provide customer value by contracting others to do what the company has to do just to get by, and by focusing the company's own resources on what it does best".* (Allen, 2006:)
- *"Service orientation is a key concept that bridges service computing and Service Orientation although the former focuses on computational issues while the latter emphasizes issues related to business and customer relationships".* (Zaho, et. al., 2008)

These are just a few examples of the complexity to define Service Orientation. It is not possible to measure something that is not clearly defined and if companies do not have a clear perception of the meaning of Service Orientation it will be difficult for them to measure it and manage it. For the purpose of the present research the following definition, constructed by the author from various sources is used.

Service Orientation is: **An organization structure aiming to create a disposition of positive attitudes and behaviors to deliver value in response to customers needs in the form of services and having its main focus and activities on services.**

The first topic to investigate is therefore the interviewees understanding of the meaning of Service Orientation. During the interviews the theme was treated openly and interviewees could express themselves freely. This implies that the objective was not to express one defi-

nition but the interviewee perceptions. The same interviewee could express different perceptions in different themes. From the interviews we find a total amount of 23 answers. The table below represents the total amount of answers by theme that was given by interviewees with its percentage and type: external IT service provider factors or internal IT service provider factors

Theme	Total	%	Type
Focus on customer satisfaction	6	26,09%	External
Service provider structure and organization	6	26,09%	Internal
Quality delivery	4	17,39%	Internal
Serve the customer	3	13,04%	External
Communicate with customer from a business perspective	3	13,04%	External
Measure and control delivery	1	4,35%	Internal
Understand the customer	0	0,00%	External
Risk control	0	0,00%	Internal

TABLE 33 : RESPONSES TO THE TOPIC; WHAT DOES SERVICE ORIENTATION MEAN?
Source : Martin Cross

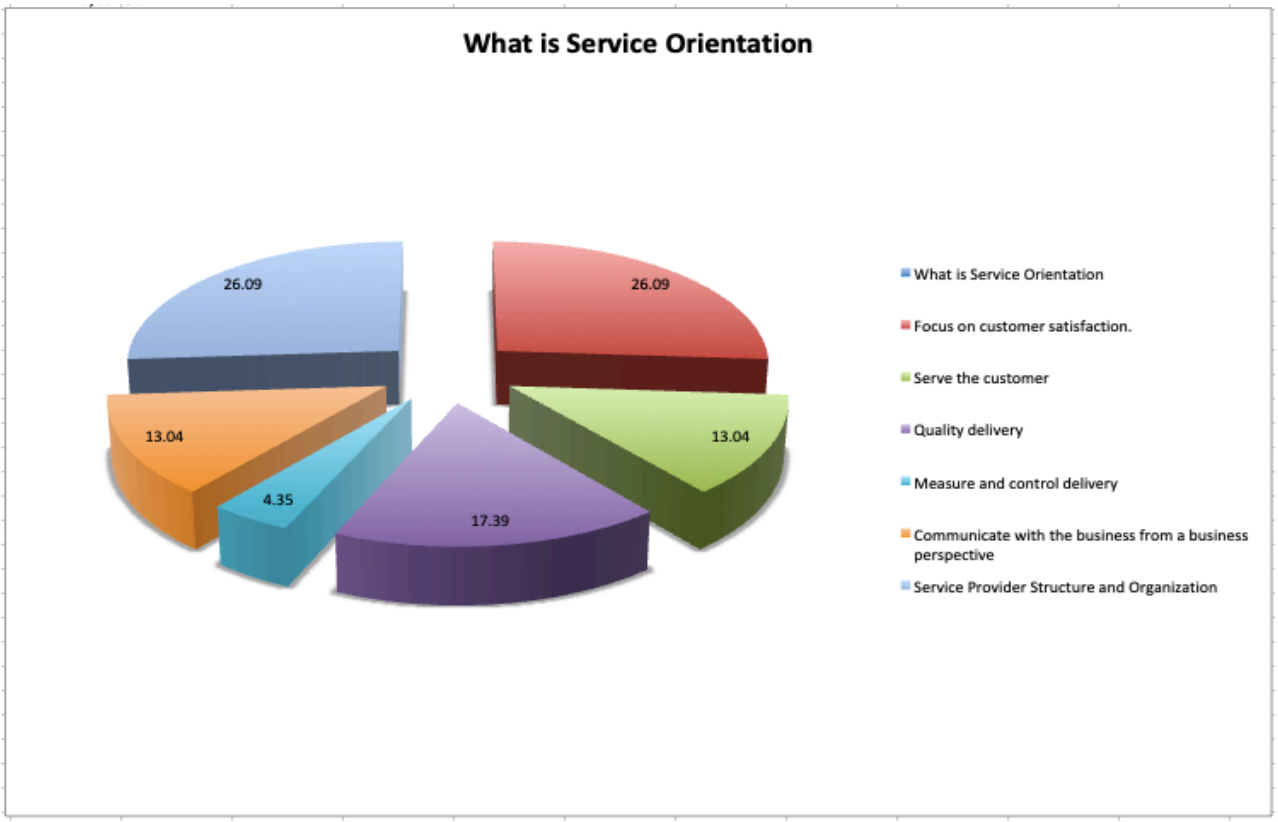


FIGURE 47 : INTERVIEWEES RESPONSES FOR THE MEANING OF SERVICE ORIENTATION
Source : Martin Cross

Following some transcripts from interviews verbatim:

Focus on customer satisfaction:

- Internal: "*To know and understand the customer needs and to answer it in the best way possible".*
- Internal: "*Work to satisfy the customer".*
- Internal: "*Try to better serve the customer".*
- Internal: "*To implement customer orientation and customer satisfaction*."
- External: "*First of all customer satisfaction".*
- External: "*Satisfy our customers*".

Serve the customer:

- External: "*Adaptability to the needs of the customer".*
- External: "*To deliver an extra value to a customer or partner".*
- External: "*What really interest us is to sell our services to our customers to help them deliver their services to their customers".*

Quality delivery:

- Internal: "*To deliver an excellent service".*
- External: "*Deliver the best service with the optimum timing"*.
- External: "*To provide a global structure that allows the creation, management and delivery of an added value to our customers".*
- External: "*Deliver quality services to differentiate ourselves from the competition".*

Measure and control delivery

- Internal: "*Put everything in the right place"*.

Communicate with the business from a business perspective

- Internal: "*Talk to the business in business language and not in technical terms".*
- Internal: "Document how we do things and explain it to the customer".
- External: "To communicate with the customer in service terms and not in technical terms".

Service Provider Structure and Organization

- External: "*Change the culture on how we make business".*
- External: "*To provide a global structure that allows the creation, management and delivery of an added value to our customers".*
- External: "*To create an internal service culture in which everyone of our staff is committed to the delivery of high quality services".*
- External: "*We have a service catalogue to document what we do and which services we provide. Then there is our organization service-oriented (that works)".*

From the above table we can observe that there is a dominant perception of focalization in customer satisfaction and Service provider structure and organization. Considering that the "Focus on customer satisfaction" is an external factor and the "Service provider structure and organization" is an internal factor, we can conclude that there is a balance between internal and external factors in the perception of the meaning of Service Orientation. These two factors together sum more than 50%.

Another interesting observation is that "Understand the customer" and "Risk control" had no answers. Again here we have an internal factor and an external factor. All internal factors depend of the capability of the service provider to perform and improve. The external factors

depend on the attitudes and behaviors. In that way all external factors are related to each other in a way that if one is not treated correctly the other ones will be affected. The theme "Focus on customer satisfaction" is linked to "Understand the customer" because it is not possible to focus on the customers to serve him well if their needs are not understood. In the same way it will be rather difficult to satisfy the customer if the customer needs are not understood. This creates an issue that must be addressed. In the same way it will be rather difficult to communicate correctly with the customers if their needs are not understood. Despite that in the table it can be observed that the factor serve the customer and satisfy the customer seek a similar objective and together sum 39,13%

Similarly the relationship of "Quality delivery" with the other internal factors is an issue. It is not possible to warrant a delivery of quality if there are no internal controls in place and if there is not a strong measurement system in place. This is an issue that must be treated and improved. In the table below the same themes from table 12 were taken but categorizing the answers from the type perspective (internal or external IT service provider):

Theme	Type	Total	%	Int	Ext	Int/ Ext	Es Op
Focus on customer satisfaction	External	6	26,09%	4	2	0	
Understand the customer	External	0	0,00%	0	0	0	1
Serve the customer	External	3	13,04%	0	3	0	
Quality delivery	Internal	4	17,39%	1	3	0	4
Measure and control delivery	Internal	1	4,35%	1	0	0	
Risk control	Internal	0	0,00%	0	0	0	
Communicate with customer from a business perspective	External	3	13,04%	2	1	0	
Service provider structure and organization	Internal	6	26,09%	0	4	2	1

The column type refers to the theme type and the columns Int and Ext refers to the type of IT service provider

TABLE 34 : INTERVIEWEES PERCEPTION ON THE MEANING OF SERVICE ORIENTATION
Source : Martin Cross

From the table above one can observe that internal providers are more focused on external factors with 4 answers for Focus on customer satisfaction and 2 on communicate with the business from the business perspective. External providers have a balance focus between the internal factor (Quality of delivery) and external factor (Serve the customer) but highly focus on internal issues considering “Service provider structure and organization. There are 12 answers related to external factors and 11 related to internal factors. That means that there is a balance between the interviewee’s perception of the meaning of Service Orientation for the external aspects and for the internal aspects. Organizations that are both Internal and external service providers focus more on internal issues. It is interesting to observe that "Essential operators” are mainly focused on delivering quality.

Conclusions:

Despite the fact that there is a dominance of 2 themes, there is a global distribution in the perceptions of what it means to be service-oriented, which means that there is not a common understanding of it. This must be considered as an established difficulty because it will become complex to exchange information between collaborative teams in the co-creation of services and between service providers if there is not a common understanding. Equally important, it would be rather difficult if not impossible to measure and control Service Orientation if the perceptions of the meaning are different, which would lead to be measuring different things. This aspect is reinforced by the literature because there is no academic consensus on the meaning of service and Service Orientation.

Another issue to address is the clarification of the relationship between a customer focalization and the understanding of the customer needs, because there could well be established attitudes and behaviors to serve the customer but if the needs are not clarified most probably the activities realized to serve the customer will not be covering the needs of the customer and by extension the customer will not be satisfied. In the same manner careful attention is needed in relation to the quality of delivery without measurements and controls. The three issues should be addresses as a difficulty in the implementation of Service Orientation practices and more research and academic consensus is needed.

Importance of Service Management

Understand the importance that companies consent to Service Orientation is rather important because it will influence the amount of effort and resources that an organization is willing to invest to improve Service Management practices and consolidate their Service Orientation. During the interviews, interviewees expressed freely their perception of the importance of Service Orientation for their company and at a later stage their observations were integrated in the codebook at specific categories of importance. The categories are as follow:

- It is fundamental.
- It is very important.
- It is somewhat important"
- It is indifferent.
- It is not important.

For the purpose of this question the interview text was analyzed to obtain a position for each interviewee and each organization was categorized with only one entry so that the total amount of answers is 15. The answers per category are presented in the following table:

Category	Total	%	Internal	External	Int/Ext
It is fundamental	11	73,33%	2	7	2
It is very important	2	13,33%	2	0	0
It is somewhat important	2	13,33%	2	0	0
It is indifferent	0	0,00%	0	0	0
It is not important	0	0,00%	0	0	0

TABLE 35 : INTERVIEWEES PERCEPTION ON THE IMPORTANCE OF A SERVICE ORIENTATION
Source : Martin Cross

From the table above it is obvious that Service Orientation is in general very important in the context of IT service providers of financial institutions in Luxembourg. The cumulative percentage of answers fundamental and very important is 86,66% which justifies itself to focus

attention on this domain and get a better insight. As stated in the literature chapter, there is a wide literature in the domains of Service Orientation, IT Service Management, ITSM implementation difficulties, but there are some gaps crossing the four factors together and applying it in the context of IT Providers of Financial institutions in Luxembourg. More research would be welcomed to increase the knowledge in this specific context. The following figure represents the volumes for the importance category.

The figure below represents the textual analysis of the interviews according to the presented categories and documented within the codebook:

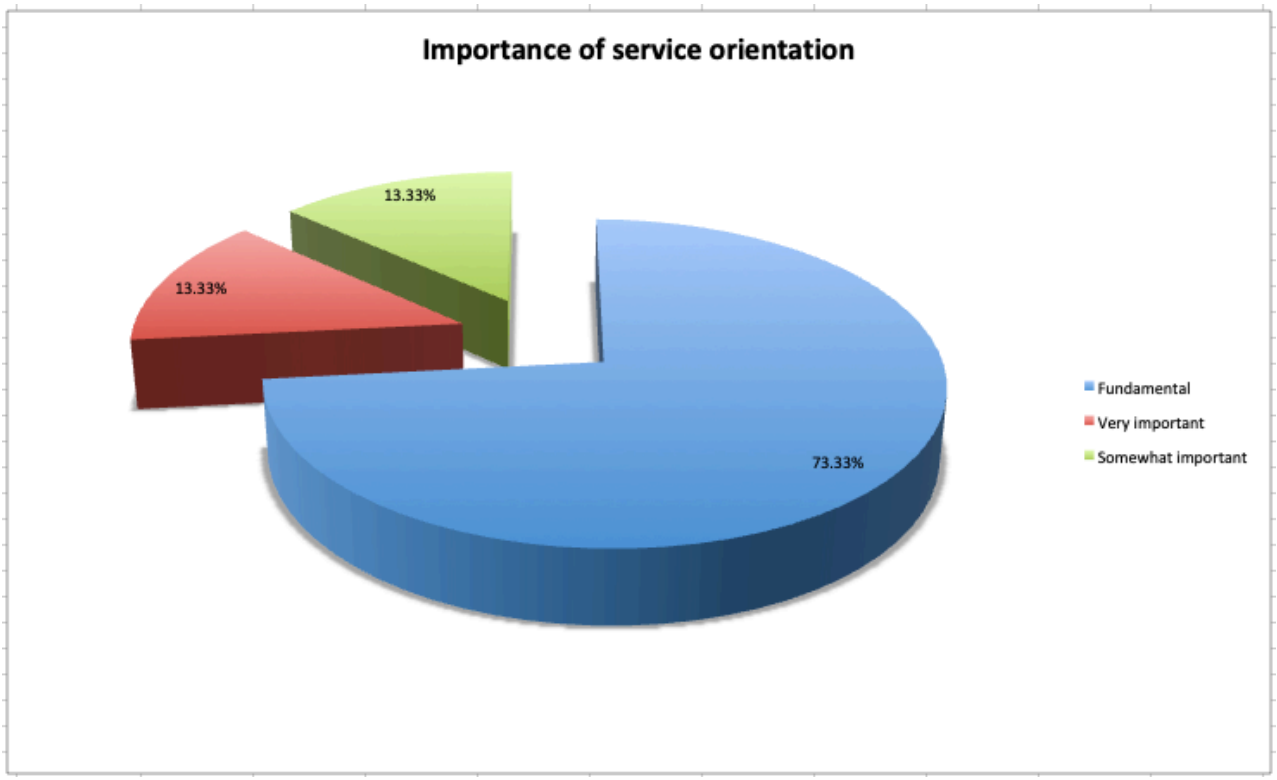


FIGURE 48 : INTERVIEWEES PERCEPTION ON THE IMPORTANCE OF BEING SERVICE-ORIENTED.
Source : Martin Cross

Following some examples of the verbatim of different interviews:

It is fundamental

- ***"****Yes it is the heart of our activity, just services oriented to customers. Is extremely important".*
- *"It is the essence of what we do".*
- *"It is essential. Is the heart of our organization. We produce little products and they are all embedded into a service, so we only provide services".*

- *“Of course is all we do”.*
- *“It is fundamental. We offer support services for our software”.*
- *“Historically we were technically oriented but now we don’t sell technology any more but services. So it is the basis of what we do”.*
- *“Service Orientation is fundamental to us. Is part of our evolution and is now the essence of our business”.*

It is very important

- ***“****It starts to be very important now. The old management is moving away and new management is quite service-oriented”.*
- *“Yes it is very important for the company”.*

It is somewhat important

- ***“****Yes it is very service-oriented, internally and externally”.*
- *“Yes we are service-oriented and is important”.*

It could be observed that candidates expressed freely. In that respect the 2 entries categorized as somewhat important expressed the perception of the importance with words that suggested that it was important but did not clearly expressed how important. For the case of the fundamental category, it was considered in this category even if the word fundamental was not explicitly used but in the explanation it was clearly expressed that it was the basis of their activity or that it is everything they do. This expressions lead to categorize the observation as fundamental..

Conclusion:

Considering that no one expressed that Service Orientation is not important or is indifferent, and that the vast majority expressed that it is fundamental for their operations, there is a confirmation of the initial field observation that organizations are transforming to a service-oriented organizations and this transformations s quite important for organizations. There is a full justification to research in these areas due to the importance for organizations.

Expected benefits

The usage of ITSM guides signifies important investments for the organization. The decision to do it must come with an expected return on investment. Companies must have clarified the expected benefits to be able to compare the previous situation without using Service Orientation practices, to the new situation after implementing them.

The results analysis of the expressed benefits by the interviewees is quite consistent with the documented definition of Service Orientation. Here some of the collected observations during the interviews:

- *"Better develop the service culture, specifically integrating customers and users".*
- *"Structure things in a chain and explain how to respect it".*
- *"Explain better to users and people who do not understand about IT, how it works".*
- *"Definitely increase in performance. Our business is based in excellence".*
- *"Improve team work and avoid silos".*

These observations are aligned with the reasons expressed for what is Service Orientation: better communicate with the business from the business perspective, provide a better structure and organization of operations, better controls, better serve the customer, etc.. Therefore, no further analysis will be done in this matter. Nevertheless it is interesting to observe that no one expressed an expected benefit of cost reduction or a competitive advantage. These two elements are mentioned often in the academic literature. More research in this domain can prove interesting to better understand the reasons why organizations are so focused on a strong Service Orientation and complement the existing academic literature.

In this respect it could be observed that if there would be only a few organizations that are service-oriented this could be an important differentiator factor that would give a certain competitive advantage to the service-oriented organizations, but from the moment that almost all of the organizations are in the same logic of Service Orientation the company can not expect to derive any more a strong competitive advantage and should focus more on its results in terms of quality, performance and excellence.

As per the cost reduction, it is observed in the field that most companies are quite concerned with budgetary issues, financial optimization and cost reductions. There is some significance that no one expressed concerns in this aspect. Specifically knowing that (as will be shown

later on) there is a big concern of the available financial resources, as expressed in the difficulties area. This suggests that the matter should be investigated more in detail.

Conclusion:

There is varied literature on the expected benefits of Service Orientation but today, Service Orientation alone does not represent any more a competitive advantage. The expected benefits and competitive advantage comes from what a mature Service Orientation allows to achieve. Organizations that have better operations, best usage of technology and are optimized, certainly will deliver better services. Therefore, they will have definitely a competitive advantage towards the organizations that don't have a mature service-oriented operation.

Exploration of Service Management practices

From the moment that companies consider Service Orientation as very important or fundamental (at minimum somewhat important) it is clear that organizations will be implementing and using Service Orientation practices. The field offers a wide variety of well-established methods, standards and frameworks specific for the IT area that can be used for this purpose. Then it is interesting to investigate more about what is used in the field, the reasons and timeframes of usage of the reference and how far organizations have implemented the proposed practices. To begin with, the investigation focused on the used references.

Used reference(s): methods, standards and/or frameworks

There is a variety of established references. These fall in three main categories:

- Standards
- Methodologies
- Frameworks

A standard is used as a reference with the scope of proving a certain capability of the service provider. There are many standards recognized by the ISO (international Standard Organization) body that apply to the Service Management area. Many of them are focused on a specific area of Service Management and cannot be considered as a global Service Management standard. They are important contributors but deal with only a specific part of the Service

Management needs. This is the case of ISO 27000 (information security), ISO 15504 (maturity of processes) and ISO30000 (quality of processes) within others. ISO 20000 is the only global Service Management standard.

In terms of methodologies we can observe the same thing as explained above. This is the case of Prince2 and Agile that are specific to Project Management, complement a Service Management reference but they are not themselves a Service Management reference. A methodology is used to provide a specific structure to help the organization achieve an objective. There is a specific rigor in their application and there are no global Service Management methodologies.

A framework is focused on providing guidance that can be applied to numerous organizations and situations without the rigor of a methodology or standard. The following references were observed to be used in the field:

- IT SM references
    - ITIL
    - CMMI (for services)
    - SLM
    - ISO20000[34]
    - ISO27000[35]
    - IT4IT
    - Cobit
    - VeriSM
    - SSMF
    - SLA

- Specific references
    - SIAM (Multi vendor integration)
    - Prince2 (project management)

[34] Rovers Mart, 2012, *ISO/IEC 20000 1/2011*, Van Haren publishing Netherlands.
Van Bon Jean, 2008, *ISO/IEC 20000*, Van Haren Publishing, Netherlands, 2008.
[35] Calder Alain and Watkins Sreve, 2006, *International IT governance, An executive guide to ISO17799/ISO27001*, Kogan Page, Digital publishing solutions, London, UK.

    - Agile (project management)
    - ISO27000 (Information security)
- Other
    - eTOM (telecom)
    - BCM40 (Continuity)
    - ISO22301 (Continuity)
    - ISO9001 (quality)
    - HDS (health data housing)

Some of them are seldom used and others are too specific. In the codebook, only the 9 global Service Management references were considered. The other references, not being global Service Management references are not considered as choice for Service Orientation but are mentioned to account their usage.

The collected data during the exploratory research phase shows that 14 out of 15 organizations use ITIL as their main reference for Service Orientation. It is interesting to note that the exception is the smallest of the interviewed organizations and it is not using any other reference. The 4 essential operators use as well ITIL as their main reference, which suggest that ITIL is very well established in the field. This is very interesting from the applicability of this research as it could indicate that the presented results are valid in other areas. Nevertheless, to ascertain that, more research is needed in other populations and other economical activities domains.

From the 15 interviewed entities, 93,33% use ITIL nevertheless it is important to observe that 2 (13,33%) of the organizations use ITIL but is not clearly defined nor really supported by the hierarchy.

- *“We use ITIL but it is not a specific choice. I think the added value is not perceived".*

Which means that most organizations (12 out of 15) have specifically decided to use ITIL as the main reference.

- *“We use ITIL. It was a clear decision to use ITIL”.*
- *“We use ITIL V3, it has been officially defined but some times all in the company do not recognize it".*

- *“We use ITIL. Is the base of our organization”.*
- *“Definitely ITIL”.*

Conclusions:

While there are several global Service Management references, almost everyone is using ITIL and there is no other reference that is used for the moment in the studied sample. To corroborate this observation a more detailed investigation with a wider sample might be needed, but for the present research this clearly indicates that ITIL is predominant in the field. This is consistent with the academic literature. More research might be needed to understand the specific reasons why despite that other references exist, organizations are only using ITIL. Specifically knowing that there are difficulties for the usage and implementation of ITIL. This issue is covered in the next topic.

Understanding that ITIL is predominant in the field is an important observation for the case of the present research because it leads to focus the attention on ITIL instead of diverging into areas that will not bring a specific benefit in the field. Specifically because for the present research, the exploratory research phase intends to understand and corroborate or reject the initial field observations. This result corroborate that:

- Most of the IT service providers of Financial Institutions in Luxembourg use ITIL as their main reference.

This assertions fully justify the field of the research and further focalization in ITIL.

Choice of the reference

There are several references available in the field for managing services, nevertheless most of the studied IT organizations use ITIL. It is then of interest to consider the reasons that lead organizations to use ITIL instead of other references. The data gathered while discussing this issue shows that there are a variety of reasons. Initially all collected information was categorized in 8 groups. The analysis of these categories showed that they could be grouped in 2 main domains: 1) a defined reason that lead to the choice of the reference compared with

other references and 2) an explanatory reason seeking justification of the choice but not being a comparative reason between different references (this is more related to expected benefits than criteria to justify a choice).

Examples of the later are:

Improve information exchanges.

- *“To have a common language”.*
- *"So that we use the same language”.*
- *"It facilitates the exchanges with our suppliers and customers”.*

Improved relationship with the customer

- *“To obtain a better customer satisfaction”.*
- *“Alignment and conformity with the business risk management requirements”.*
- *“Better serve the customer”.*

Improve Performance

- *“To standardize and save money”.*
- *“Assure quality”.*

IT stability

- *“A better stability of our production environment”.*

The above observations were excluded from the analysis because despite that they justify the usage of ITIL, other reference might obtain the same result and these reasons do not allow for a comparison between different references with the scope of choosing one of them. With this criteria the following categories were retained:

Usefulness

- *“It is adapted to our needs”.*
- *“It is perfectly adapted to our needs“.*

Recognition and market usage

- *“We needed a known framework that has established reputation and is known world-wide”.*
- *“It was quite evident as it was well established in the market”.*
- *“Is what is the most used”.*
- *“Due to market representativity”.*
- *“It was evident. It is well known by our customers (it was done in collaboration with our customers). Commercially it is good, it provides credibility”.*
- *“Our suppliers use ITIL. It facilitates exchanges”.*
- *“Because that is what our customers use”.*
- *“So we can align everyone”.*
- *“It is well established in the market”.*

Proven knowledge.

- *“Because ITIL provide many good practices that can help the business”.*
- *“To avoid reinventing the wheel. Why break our neck if others did it already and published a reference. We can profit of the experience documented by different bodies of knowledge”.*
- *“Not to invent what already exist”.*
- *“They are best practices specific for IT”.*
- *“It is a well described framework without being obligatory”.*
- *“To win time. Avoid to reinvent the wheel”.*

Exhaustiveness

- *“It is the only framework that covers at least 90% of our needs”.*
- *“It is quite complete and adaptable”.*

It is interesting to note that the organization that does not use ITIL did not make a clear choice of not using ITIL nor is using any other reference. The reason being that they don’t use any specific reference because they are small and take decisions on the go. In the sample it was the smallest organization.

- *"We don't use a specific reference. It is personal. I focus on the customer and I adapt to their needs. It does not matter how is done".*

For this specific case represented by only one answer it would be interesting to interview more small organizations to confirm or reject the observation, but for the purpose of this exploratory research we will focus our attention on the 4 categories above.

Interviewees could express different opinions. There were a total of 19 responses that could be used in the categories above.

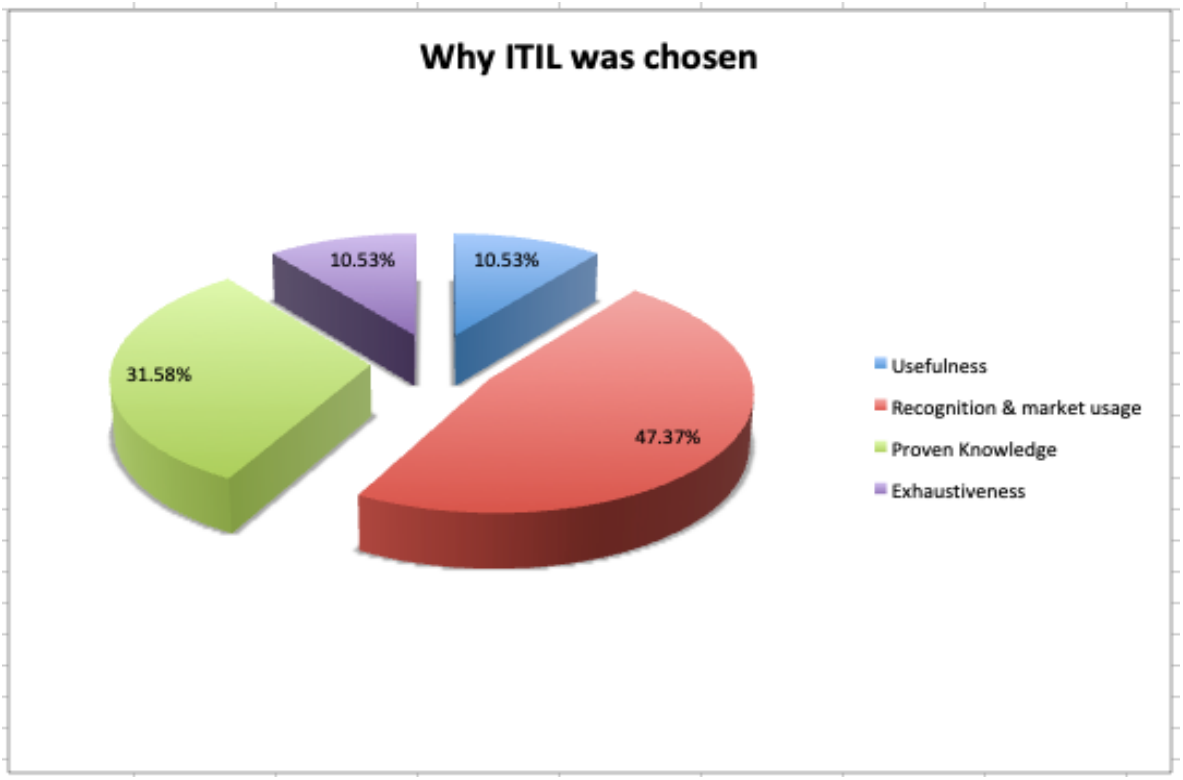


FIGURE 49 : REASONS FOR CHOOSING ITIL AS A REFERENCE FOR ITSM.
Source : Martin Cross

The most mentioned category was: recognition and market usage (47%). This could be considered like an external factor. This is, organizations have chosen ITIL because others are using it. If a lot of organizations use it, it will facilitate information exchanges. This will not be the case if few organizations would be using it. Another reason for that would be reassurance. This is, if so many organizations are using it, it should be the best or at least good and convenient. According to the academic literature exposed above, ITIL has representative

bodies like itSMF in many countries around the world and is widely available through specific publications from the TSO (UK government editor), a structured certification schema managed by Peoplecert and specific policies and governance managed by Axelos ltd. ITIL certifications have been steadily growing in number every year but there was no central repository until recently and the figures are quite divers. Nevertheless different statistics show that there is a global market acceptance and that ITIL certifications represent a clear added value within the market.

The second most mentioned category was: proven best practices knowledge. This is important as it warrants the usage of proven concepts and would avoid a lot of lost time and effort on things that are not worth it. There is a well-established body of knowledge (to which I take part) to seek, validate and publish ITSM practices These knowledge is derived from practitioners and well established proven existing practices in the field. This situation is quite compatible with the logic of an Executive DBA willing to promote knowledge applicable on the field.

Conclusions:

Together the two main reasons (Proven best practice knowledge and market recognition and usage) account to 78,95% of the answers. There is potential for more research in the area evaluating more in detail with historical data the evolution of this influence and eventually consider more research in other areas of IT service provision and in other countries and regions to verify if this fact is more global than just in the IT provision of services for Financial Institutions in Luxembourg.

Time using the reference

The origin of ITIL is the late 80's with ITIL version 1 and more than 30 isolated publications. After year 2000 there was a review of all the publications and they were consolidated in 7 publications from which only 2 were used with an associated certification path (Service Support and Service Delivery). Many organizations adopted ITIL at this time. In year 2007 came to the market version 3 and later version 2011. Around 2010 there was a boom of companies

implementing ITIL V3. It would be expected that the sample show this distribution. The scale used is:

- *"Less than a Year".*
- *"More than a year and less than three years".*
- *"More than three years and less than six years".*
- *"More than six years and less than ten years".*
- *"More than ten years".*

The reason to have chosen this scale is to distinguish the recent implementations with the older ones. It is expected that the longer the timeframe the more mature is the implementation and better IT operations can be expected. Following some extracts from the interviews to support the data analysis:

Less than a Year

- "Recently, about a year".

More than a year and less than three years

- *"2.5 Years".*
- *"We are using it for 2 years. It is quite recent".*

More than three years and less than six years

- *"3 Years".*
- *"We use it since 4 years".*
- *"We have used ITIL for more than 5 years".*

More than six years and less than ten years

- *"We began more than 6 years ago".*

More than ten years

- *"We have used ITIL for more than 20 years but is only since 2 years that is more structured and defined".*

- *"We have implemented most of the practices documented in the references we use. For example, for ITIL we have implemented all documented processes but I must say that they are not quite mature. We obtain the expected results but there is no formalization. There are deviations and the control becomes difficult".*

The table below present the results of all of the interviews related to the amount of time using ITIL:

Time	Amount	Percentage
Less than a Year	1	6,67%
More than a year and less than three years	1	6,67%
More than three years and less than six years	2	13,33%
More than six years and less than ten years	4	26,67%
More than ten years	5	33,33%
Not defined	2	13,33%

TABLE 36 : TIME OF IMPLEMENTATION OF ITIL PRACTICES
Source : Martin Cross

What can be observed in the table above is that ITIL has been used by many organizations already some time ago. 9 out of 15 organizations (60%) use ITIL for more than 6 years. It is interesting to observe that the organization that informed that is not using any reference, answered more than 6 years of usage of Service Management practices.

Also it is interesting to observe that all of the essential operators have been using ITIL for more than 6 years.

Conclusions:

Most of the organizations have used ITIL for some time now. Reminding Marrone and Kolbe (2011), it is expected that as the maturity of implementation increases, the perception of challenges decreases and that as the maturity of implementation increases, the number of realized benefits increases. It is expected that the longer the initial implementation began, the more implemented practices and the more maturity has been achieved by the organization. If time allows implementing more practices, most of the organizations should have implemented most of the recommended practices. To verify this, the following section analyzes the amount of implemented practices.

Percentage ITIL implementation

ITIL is the main used reference for all the studied organizations but one. Most of the organizations have implemented ITIL for more than 6 years. It would be interesting to observe the percentage of implemented Service Management practices and eventually observe if there is a relationship between the time and the amount of implemented practices. According to Carballo-Mendivil, Arellano-Gonzales and Rios-Vasquez (2017) 75% of the 100 studied organizations in the Mexican area, have a low maturity level and only 25% of them are developing to a Service Orientation. The initial scale was composed of the following ratio: from 0 to 25%, from 26 to 50%, from 51 to 80% and from 81 to 100%, but more than half of the population was situated in the first portion with more or less 20% of implemented practices, therefore the need to break down this value to get a better insight of the observed population. So the scale was altered to be more representative and the following scale was used:

- 0 to 5% (initial efforts of implementation)
- 6 to 20% (partial implementation)
- 21 to 50% (middle implementation)
- 51 to 80% (largely implemented)
- 81 to 100% (almost complete to complete implementation)

It is important to note that this scale shows only the estimated implementation but its limitation is that it does not show the perception of the maturity of the implementation. This means

that an organization could have implemented all the reference practices but not necessarily in a complete and mature manner. On the other hand an organization could have implemented just a few practices but to a high level of maturity.

Very few times interviewees provided a clear figure. Most of the time they mentioned the processes that were implemented and some estimations were necessary to calculate the percentage. ITIL V2011 is composed of 26 processes so that the following rule was applied:

- 0 to 5% = 0 to 1 process and some isolated activities from other processes
- 6 to 20% = 2 to 5 processes
- 21 to 50% = 6 to 13 processes
- 51 to 80% = 14 to 20 processes
- 81 to 100% = 21 to all processes

Here some extracts from the interviews in support to the analyzed data:

0 to 5% (initial efforts of implementation)

- *"Almost nothing. We are beginning".*
- *"Don't know it is quite new".*

6 to 20% (partial implementation)

- *"It is very difficult to estimate. I cannot place a figure. There is a specific group working on it. Probably around 20%".*
- *"There are a lot of basic activities without formalization. A lot of service operations, that's all".*
- *"Incident Management, Request Fulfillment, Knowledge Management, Service Assets and Configuration Management".*

21 to 50% (middle implementation)

- *"Incident Management, Problem Management, Validation and testing. Change management and release and deployment management. Access management is not very advanced".*
- *"10 processes but still not very mature".*

51 to 80% (largely implemented)

- *"We have documented, validated and implemented 10 processes but still not very mature. We are working in 10 other processes but they are still not fully implemented".*

81 to 100% (almost complete to complete implementation)

- *"We have implemented most of the practices documented in the references we use. For example ITIL, we have implemented all documented processes but I must say that they are not quite mature. We obtain the expected results but there is no formalization, so there are deviations and the control becomes difficult".*
- *"We have implemented 100% of ITIL".*

The table and the figure below show the results obtained for the issue on how much of the ITIL implementation has been done (eventually calculated from their expressed amount of processes):

Time	Amount	Percentage
0 to 5% (initial efforts of implementation)	5	33,33%
6 to 20% (partial implementation)	4	26,67%
21 to 50% (middle implementation)	3	20,00%
51 to 80% (largely implemented)	1	6,67%
81 to 100% (almost complete to complete)	2	20,20%

TABLE 37 : TIMEFRAME OF THE BEGINNING OF USAGE OF ITIL.
Source : Martin Cross

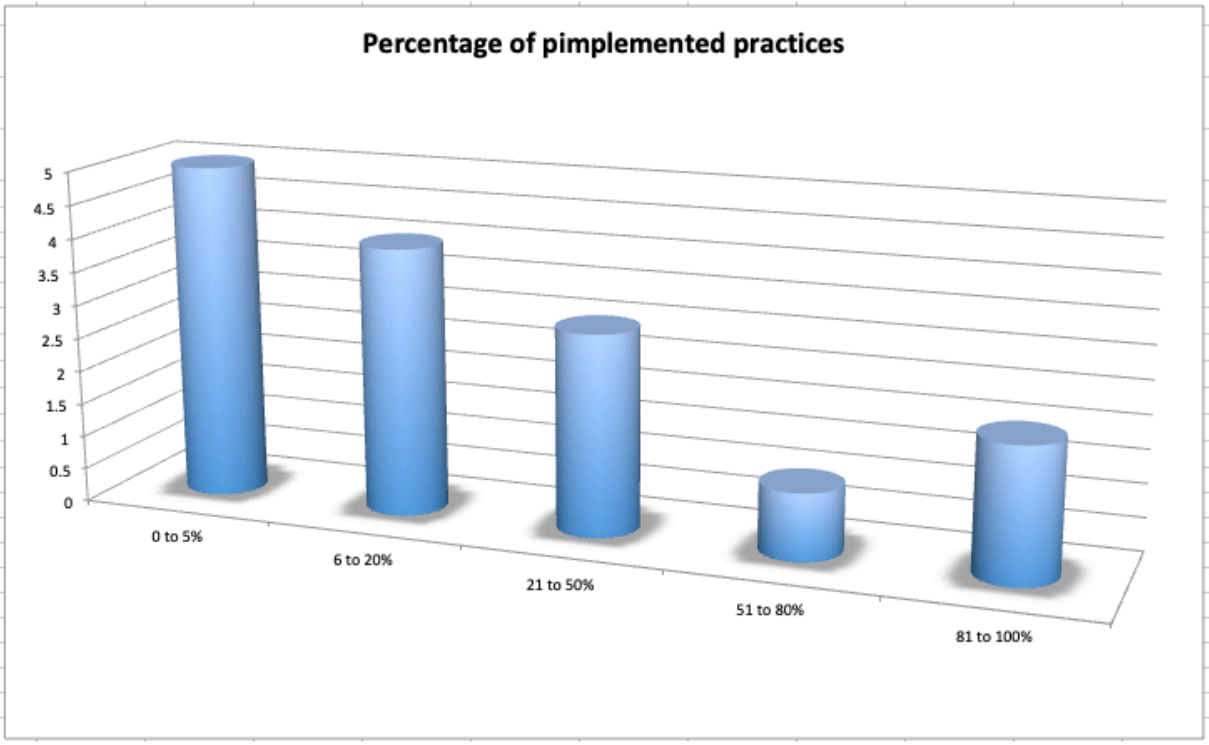


FIGURE 50 : PERCENTAGE OF IMPLEMENTED ITIL PRACTICES
Source : Martin Cross

This distribution shows that 60% of the organizations have not yet implemented but few Service Management practices. It is important to notice that the expressed percentage of implementation is rather subjective and candidates hesitated to provide a figure. This figure, in most of the cases, is a mere estimation by the interviewee based on their perception and is not based on a precise measurement system. None of the organizations were measuring the maturity of implemented practices. The question of measurement will be treated in the next section, but it is important to notice that the present figures might not represent the reality on the field. It would be necessary to research more in detail the measurement methods that the organizations use to estimate this percentage of implementation.

If we consider from the time analysis that most of the organizations have implemented ITIL for more than 6 years, this means that time is not a warranty of successful mature implemented practices. To clarify this it is convenient to take a better look to this relation. In the table below there is a review of all interviews with the time of implementation, the percentage of implemented practices and the relationship between the two. To build the table the following criteria was used:

- L = Low value
- M = Middle value
- H = High Value

In the case of time L means less than a year, M means between a year and 6 years and H more than 6 years

In the case of percentage of implemented Service Management practices L means less than 20%, M means form 21% to 80% and H means more than 81%. This scale was built from maturity models like CMMI and ISO15504 which determine that 0 to 20 is Not executed, 21 to 50% is Partially executed, 51 to 80% is Largely executed and 81 to 100 is Fully executed. In the present case both intermediate values were joined to form only one intermediate value. Organizations O7, O9, O15 and O19 are marked in red because they are the essential operators so they are to be treated separately.

Organization code	Time Implemented	% Implemented	Relation Time/% Implemented
O1	3Y-6Y	51-80%	Middle Middle
O2	> 10Y	21-50%	High Middle
O3	6y-10Y	6-20%	High Low
O4	6y-10Y	21-50%	High Middle
O5	3Y-6Y	6-20%	Middle Low
O6	6y-10Y	0-5%	High Low
O7	> 10Y	6-20%	High Low
O8	6y-10Y	0-5%	High Low
O9	6y-10Y	6-20%	High Low
O10	> 10Y	6-20%	High Low
O11	NA	0-5%	? Low
O12	< 1Y	0-5%	Low Low
O13	NA	0-5%	Low Low
O14	> 10Y	81-100%	High High
O15	NA	51-80%	? Middle
O16	> 10Y	81-100%	High High
O17	> 10Y	6-20%	High Low
O18	1Y -2Y	21-50%	Middle Middle
O19	6y-10Y	6-20%	High Low

TABLE 38 : IMPLEMENTATION TIME AND AMOUNT OF PRACTICES RELATIONSHIP
Source : Martin Cross

From the time frame table above, one of the interviewees did not provide an answer and a second one could not tell the timeframe of implementation because it began before he joined the company, which was more than 10 years, therefore it was considered in this timeframe. With this in mind, there remain only 14 relations to analyze. As usual the essential operations are not considered in the analysis but commented separately.

From the table above we can observe the following relationships where the first letter represents the time and the second letter represents the implementation of ITIL processes:

Organizations	Relationship Time/Level of implementation
2	High High
2	High Medium
5	High Low
0	Medium High
2	Medium Medium
1	Medium Low
0	Low High
0	Low Medium
2	Low Low

TABLE 39 : RELATIONSHIP BETWEEN TIME AND AMOUNT OF IMPLEMENTED PRACTICES.
Source : Martin Cross

It is interesting to note that 3 of the essential operators have a long time of implementation (value H) but a low level of implemented practices. One essential operator did not have information about the timeframe because it was already implemented for some time before the interviewee joined the company.

The table above can be represented in the following matrix:

Time/Impl	High	Medium	Low
High	2	2	5
Medium	0	2	1
Low	0	0	2

TABLE 40 : TIME/IMPLEMENTATION RELATIONSHIP.
Source : Martin Cross

There are 8 organizations with Low levels of implementation but with different timeframes (5 H, 1 M and 2L).

There are 4 organizations with Medium level of implementation and different timeframes (2 H and 2 M).

There are only 2 organizations with a high level of implementation and both have a high timeframe.

From this table we can observe the following patterns:

Most of the organizations have a low level of implementation despite the long time of implementation efforts, but no organization attains a high level of implementation in a short timeframe.

All organizations with a low timeframe have a low level of implementation.

Organizations do not achieve a high level of implementation in a short period of time.

Very few organizations have attained a high level of implementation.

To reach a high level of implemented practices requires a long time frame.

Time is not a warranty of achieving a high level of implementation

Conclusions:

The studied literature presented the complexity of ITSM and servitization and this is potentially a cause of the low levels of implementation despite the long timeframes. As well the litera-

ture documents the fact that implementations cannot be copied from one organization to another, they are unique, which adds to the complexity of implementation. The percentages of implemented practices are based on interviewee's perceptions and estimations, therefore they are approximations and probably are not very accurate because they are not really measured. It is necessary to promote more research in this area to verify this relationship as well as more research related to specific methods for measuring the maturity of implemented practices and the reasons why organizations are not measuring their maturity. Some insight into this area will be studied as part of the present exploratory research in the following subchapters.

Percentage of expected implementation

Another interesting observation is the expected amount of practices to be implemented in the future. The used scale is the same as above with the same calculations for the percentages. Here some of the interviews data to support the analysis:

0 to 5%

- *"We have nothing implemented as we don't use ITIL. We use some practices that are helpful but we have not implemented processes".*
- *"It is still to be decided".*
- *"The future goal is Incident Management, Problem Management and Change request. This is just to begin with because it can take a long time".*

6 to 20%

- *"We go slowly, it is difficult and time consuming. By now we need to consolidate what we have before implementing new processes". (NB: the implemented practices for this organization is 20%)*

21 to 50%

- No answers for this category

51 to 80%

- *"We intend to implement 75% of ITIL. Not everything is useful for us".*

81 to 100%

- *"Strategically the intention is 100% but between you and me, we very well know that this is not possible. There are some processes that will not be necessary".*
- *"Our customer expects 100% but we don't think it is possible nor convenient. We still have a lot of work to do with what is already implemented and we do not have the required amount of resources".*
- *"We intend to implement everything"*
- *"As far as possible. Why because all those things must be done".*
- *"We will implement 100%".*
- *"As far as we find an added value. A lot of companies impose themselves to use a framework and try to apply it without understanding the consequences and implications. As long as there is a defined value we will implement and use Service Management practices, but we do not have much time to spend on managing these practices. They must be simple and pragmatic".*
- *"We have implemented already 100%".*
- *"10 more processes" (NB: This will reach 80% for this organization).*

From the above interview extracts we can observe that most of the organizations are willing to implement as much as they can, preferably 100%. The following table shows the results:

Time	Amount	Percentage
Note decided	3	20,00%
0 to 5% (initial efforts of implementation)	2	13,33%
6 to 20% (partial implementation)	1	6,67%
21 to 50% (middle implementation)	0	00,00%
51 to 80% (largely implemented)	1	6,67%
81 to 100% (from almost complete to complete)	8	53,33%

TABLE 41 : PERCENTAGE OF EXPECTED ITIL IMPLEMENTATION FOR THE FUTURE.
Source : Martin Cross

From the table above we can observe a clear distribution to the extremes with almost nothing in the middle ranges. It is important to note that more than half of the organizations intend to implement between 81% and 100% of ITIL. Half of them would like to implement everything while the other half intends to go as far as possible. In some cases it is perceived that it is not possible to reach 100% but their customers press to do it.

Conclusions:

Companies feel the necessity to implement more Service Management practices willingly or by customer pressure.

The fact that all but one company (that uses ITIL isolated practices) are using ITIL and most of the companies are willing to implement all or almost all of the ITIL reference demonstrates the importance of ITIL in the field and comforts in the justification of the research in this area. Despite that there is extensive research in the field for ITIL, ITIL implementations and ITIL CSFs for successful implementations, more specific research is required to verify the reasons why, despite the willingness to move forward and implement many more practices, compa-

nies are still struggling to do it. As well more research in specific countries and regions would allow to better understand the influences of the country's economic factors and culture in the ITIL implementations. From the existing literature, there are some regions proposing several studies like Australia and Scandinavia but more academic knowledge is needed in other regions. This would allow to compare Service Orientation practices between countries and regions.

Exploration of maturity measurement

Many IT Service Providers have implemented a handful of ITIL processes. ITIL provides a description of processes with specific inputs, outputs, objectives and activities. There is a huge level of abstraction in the description of process, which allows to use the same processes by all companies independently of their domain of activity as long as is related to services. Nevertheless this level of abstraction, even if it guides the IT Service Provider on what to do, requires a specific analysis and description of policies and procedures that are specific to each IT Service Provider. This level of abstraction, even if essential to document the guidelines to be useful to all organizations, makes it complex for organizations to implement the practices and provoke as well difficulties in the measurement of such practices.

In the previous sub-chapter it was analyzed the level of implementation of proposed ITIL practices and it was observed that most organizations have not achieved a high level of implementation. This observation is not sufficient to judge on the level of performance and benefits that organizations might expect form the implementation of the practices, because it is not sufficient to know whether a process is in place or not. It is necessary to understand the extent to which the proposed practice has been implemented in a mature way. From the previous analysis one can notice that several interviewees mentioned that a certain amount of processes are in place but that they are very basic and not mature.

- *"Is very difficult to estimate. I cannot place a figure. There is a specific group working on it. Probably around 20%"*
- *"A lot of basic activities without formalization. A lot of Service Operation, that's all"*

- *"Incident Management, Problem Management, Validation and testing. Change management and release and deployment management. Access management is not very advanced".*
- *"We have implemented most of the practices documented in the references we use. For example ITIL, we have implemented all documented processes but I must say that they are not quite mature. We obtain the expected results but there is no formalization so there are deviations and the control becomes difficult".*

So it is essential to clarify the difference between a well established process that is delivering its defined outputs in a consistent, effective and efficient manner, and a process that is implemented but is not reaching its expected results. In both cases the answer to the questioning if the process is in place could be the same. For this purpose the exploratory research intended to investigate more about the way IT Service Providers are measuring their processes maturity and which reference they use to measure them.

Maturity measures

It may be tempting to directly investigate how do IT Service Providers measure their Service Orientation maturity and what they use for that purpose, but this implies that they are measuring it. So the initial focalization for the investigation is to verify if they are measuring their implemented ITSM practices maturity and which is the level of detail of their measurement system. To do so the following scale was used:

Measurement level	Percentage
Fully measured	81% to 100%
Largely measured	51% to 80%
Partially measured	11% to 50%
Not Measured	0% to 10%

TABLE 42 : ISO15504 AND TIPA MATURITY SCALE
Source : Martin Cross

This scale was taken from ISO15504 that provides a structured approach specific for the measurement of processes. The advantage of the scale is that it is well established in maturi-

ty models using ISO15504 as a reference model. This is the case of TIPA (Tudor Improvement Process Assessment) developed by LIST (Luxembourg Institute of Science and Technology) which is a model specifically created to measure the maturity of ITIL processes. It provides precise guidelines on how to measure each process level of maturity and provide a maturity profile of a process. Considering the application for ITIL, each process should be measured towards this scale.

From the interviews of the exploratory research phase we obtain the following results:

Measurement level	IT Service Providers	Percentage
Fully measured	0	00,00%
Largely measured	2	13,33%
Partially measured	3	20,00%
Not Measured	10	66,67%

TABLE 43 : LEVELS OF PROCESS MATURITY MEASUREMENT OF ORGANIZATIONS
Source : Martin Cross

This result is related to the total of IT Service Management practices that are implemented and measured and not the proportion of IT Service Management practices described in ITIL. This is, if an organization has implemented 5 processes out of the 26 proposed processes in ITIL 2011, 100% measured would refer to the 5 processes and not the other 21. Most of the organizations do not measure the maturity of their processes (66,66%). Some have begun to measure it (20%). Only 13,33% have advanced in the implementation of a measurement system. Considering that only 2 organizations have attained a high level of implementation and most of the organizations have implemented less than 20%, even the 2 largely and 3 partially measured organizations would be measuring only a tiny part of the ITIL proposed processes.

From the table above we can observe that most of the organizations do not measure the maturity of their processes. At the most there are 2 organizations that measure more or less consistently and 3 that have little measures for their processes. The rest of the organizations just do not measure them. The figure below shows this distribution:

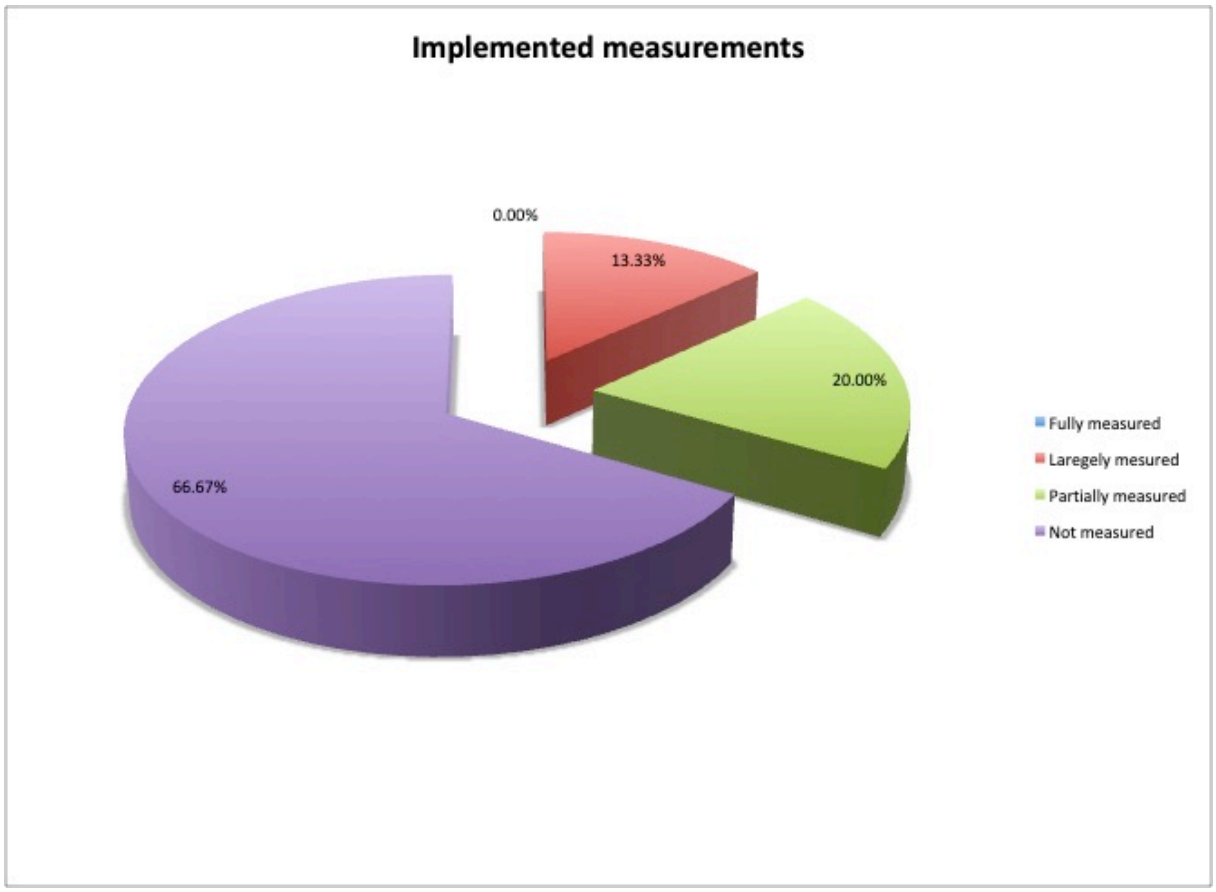


FIGURE 51 : ORGANIZATIONS MEASURING THE MATURITY OF THEIR IMPLEMENTED PROCESSES
Source : Martin Cross

Despite that it is recognized the need of measuring to control, most of the companies are not measuring their maturity. Some of the reasons exposed during the interviews relate to the lack of maturity of the organization to implement a measuring system to be able to measure their maturity. Other reasons include the complexity of measurement methods, lack of time and lack of human resources. Here some extracts from the interviews:

Fully measured

- No entries

Largely measured

- *"There are maturity frameworks in the market but usually they are way too complex and expensive to use. We cannot afford them. On the other hand there are methods that are too simplistic that do not deliver any added value".*

- *“Yes we use TIPA as a main reference but a modified version, because TIPA is too heavy and costly to implement. As an idea, a full evaluation of a process can take up to a week. In ITIL there are 26 processes. This would mean 26 weeks of work to have a complete evaluation. So, we desisted, now we use our own simplified version but has no external recognition”.*

Partially measured

- *“We use TIPA because when we began there was nothing else that was serious. It was the first to deliver something that could specifically evaluate the maturity of ITIL processes”.*
- *“We implemented a mix-team with the idea to measure services end to end from the business perspective. We did a maturity assessment one year ago, proposed by a small Belgian company that uses a proprietary method based on a questionnaire. (NB: The provider did the evaluation but the detail of what was used and how was done is quite obscure to them. They just have the results)”.*
- *“We used a free maturity model from Internet. The model was implemented by maturity level. And questions were organized by levels. We needed to finish a level before passing to the next one. We did not pass to a higher maturity level because we had almost nothing. It was quite complex and I did it only for Incident Management, Request Fulfillment and Change management. It would be useful to do it again now to check”.*

Not measured

- *” I will be very honest with you, we do not measure anything. We are very immature”.*
- *“We implemented some Service Operation processes but to be quite transparent we do not measure them”.*
- *“We have some KPIs but they are not really relevant. I have no solution for this, and this is just for the most known processes. All the others it is zero”.*
- *“There is nothing specific. We implemented a specific transversal team to analyze processes but it is not mature. We used at some point COBIT through 30 interviews. (NB: They use ITIL as the reference and use COBIT to measure it)”.*
- ***“**Initially we used CMMI. We did an analysis and the maturity was 0. Everyone was doing things their own way but when we tried to standardize it was perceived as a disruption to their work so it did not work”.*
- *“We only evaluate the customer satisfaction via satisfaction surveys. I don’t know if there are statistics but when a customer makes remarks we address the issue directly with the customer”.*
- *“We use external providers to make audits. Mainly for some of our standards, ISO 27000 and ISO 23301 but there is nothing specific for ITIL”.*

- *"We work close to the customer. We agree how to measure the service with them. We have just the perception of the customer. Internally we have nothing. Only staff evaluation and the attitude towards customers".*
- *"It's a good question. Whatever you do the end measure is customer satisfaction. If people are happy and say everything is good. This is one of the best metrics that you can have in a company".*
- *"We do not measure. We do not use any maturity reference. We do not have any measurement of the performance".*

It is interesting to observe that essential operators are not measuring their maturity either.

Conclusions:

Very few IT Service providers have implemented a measurement system to control the maturity of their Processes. The few IT Service Providers that implemented some measurements are oriented towards the measurement of processes and not a global Service Orientation. Specifically in the current evolution of ITIL all of the defined processes were renamed as practices and it is note clear if the established measurement methods will be useful in this new context. The most referenced system to measure the maturity of a Service Orientation is Serv*Or that is dating already from 1998 and it has not been adapted to the evolution of new IT Service Management practices.

Organizations do not have neither the time neither the budget to implement complex measurement systems and are seeking easier ways to do it. The literature mainly describes measurement models based on CMMI. Very little literature was found on TIPA. There are many maturity references but there is little academic literature for them. There is a clear gap in the academic literature related to maturity measurement models and from the existing literature many of them date already several years old and are not adapted to the actual evolution of ITSM practices. It would be of high interest to develop more research in this area.

Used measurement reference

Even though most of the IT Service Providers are not measuring their Service Orientation or their processes, there were some initiatives to do it. There are several references in the field to the measurement of processes. Some of them are well known and public domain but mainly there are proprietary methods. Some tools are available for free in the Internet. The codebook documented the most common references available in the field.

TIPA	TIPA is a Maturity model developed by LIST (Luxembourg Institute of Science and Technology) based in the PAM of ISO15504 describing in a PRM the specific processes of ITIL Version 2, Version 3 and Version 2011
ISO15504	Is a standard describing a Process Assessment Model (PAM) created specifically to measure the maturity of any kind of process by describing the processes to measure in a Process Reference Model (PRM). It is derived from software development process (SPICE)
CMMI	CMMI stands for Capability Maturity Model Integrated and is a process maturity model that provides definitions of what an organization should do to promote behaviors that lead to improved performance.
SCAMPI	SCAMPI stands for Standard CMMI Appraisal Method for Process Improvement and is the way CMMI proposes for the realization of CMMI Assessment.
COBIT	COBIT (Control Objectives for Information and related Technologies) was created by ISACA to provide a set of controls for information technology organized as a logical framework of IT-related processes and enablers
ISO20000	Is a standard specifically developed to control the implementation of IT Service Management practices
Serv*Or	Methodology specifically developed to control the Service Orientation Maturity. Based on interviews of the Service Provider staff.
Axelos Maturity Model	Developed by Axelos ltd, is a specifically ITIL oriented maturity model aiming to provide an overview of the global ITIL maturity. It is composed of a certain number of questions related to each ITIL process in the form of a self-assessment.

TABLE 44 : MOST RECOGNIZED ITSM MATURITY MODELS
Source : Martin Cross

Ten interviewed providers do not measure their maturity. Nevertheless two of them implemented initiatives to try a measurement system. One used CMMI and another one used COBIT. Both cases ended in a failure and stopped.

One organization uses TIPA for their implemented processes (which represent 20% of the ITIL proposed processes) with a well-documented achieved maturity. The main issue for this organization is the required investment in time and money and is in search for alternatives. Another organization uses a simplified version of TIPA to reduce costs and time. This reference was developed internally and the organization is looking for similar solutions with market recognition. Another organization used a downloaded free process maturity methodology but considered quite complex and not relevant. One organization uses ISO20000, which is not a maturity model but a standard. It provides an insight in the advancement of IT Service provision processes and activities but is mainly related to ITIL V2 processes.

Conclusions:

Despite that there are many options in the field to measure and control Service Orientation maturity, these models are mainly based in the control of maturity of processes. In all of the cases there were problems related to the usage of these methodologies in respect to their complexity and cost or related to their simplicity and in utility of their results. Here is a clear gap in terms of availability of a maturity model that is neither complex nor expensive to use but at the same time provides valid results that are useful and is updated to the actual Service Management practices.

Exploration of difficulties and challenges

From the previous results we can conclude that despite the long time that organizations have started implementing Service Management practices, they haven't reached a high level of maturity. In many cases the fact that they are still struggling with the implementation does not allow them time to measure the maturity. Even companies that have implemented these practices for more than 6 years haven't reached a high level of maturity. Field observations indicate that organizations are struggling with their ITSM implementations. The academic literature documents the complexity and difficulty to implement such practices and provide several articles studying and proposing CSFs (Critical Success Factors) to help organizations in their implementation journey. The previous review of the exploratory research suggests as well the difficulty of IT service providers in their implementation efforts of ITSM practices. Therefore it

is natural to investigate more in detail the difficulties that these companies are experiencing when implementing Service Management practices.

Service Orientation difficulties

To be able to understand the difficulties that IT Service Providers are facing for Service Orientation it is important to classify them in meaningful groups. This is essential to be able to address them and propose specific recommendations to overcome them. The first category is internal and external reasons. The importance of this first category is that the IT Service Provider will have much more resources and authority to treat the internal issues while it will be more dependent of the business and its customers for the external issues. There is a third category, Organizational Changes that involves both the business and the IT Service Provider. Subcategories were build initially from field observations and confronted to the interviews data to adjust and consolidate them into an intermediate list of difficulties. This first list represented the inputs provided by the interviewees related to the theme: Which are the difficulties that you have encountered or are having in the implementation of Service Orientation and IT Service Orientation? To control the validity of the data, a second theme was to address: What is needed to overcome the difficulties? Initially it was expected to have a one to one relationship of the difficulties and how to overcome them, but in semi directive interviews the free expression of the interviewees was maintained. The answers of both questions were confronted and consolidated to avoid double entries. After this consolidation, the final version of the structure in the codebook for the analysis of the difficulties was obtained. The final categories are:

1 Customer relationships (external to the IT Service Provider)

- 1.1 Communication with the business
- 1.2 Understanding business needs.
- 1.3 Different point of view between supplier and customers.
- 1.4 Lack of Strong sponsorship.
- 1.5 Lack of resources

2 IT provider management (internal to the service provider)

- 2.1 IT collaboration
- 2.2 Lack of Skills and training
- 2.3 Inappropriate tools.
- 2.4 Lack of service culture

3 Organizational changes.

It is important to note that the answers were expressed in many different forms and the content extracted into the category. Different expressions of the same idea during an interview were accounted only once. These answers represent the perception of the interviewees. Whenever there were too many entries in a category, each entry in that category was analyzed to fit into a subcategory. Then the category was separated in two categories. In the same way, when there were categories with few entries, these were analyzed to check if they fitted into a common higher-level category. Then the categories were joined into one category. These final categories were checked to verify the consistency towards a common potential solution.

Considering that all interviewees have specific responsibilities in the implementation of Service Management practices these perceptions represent the real difficulties that they are confronting in the realization of their responsibilities. In total there are 5 difficulties related to the external IT service provider category (customers and business), 4 related to the internal IT Service provider structure and organization and one of global organizational issues that are common to both. The following table documents these categories and the entries per category of the interviews:

Difficulty	Answers	Domain of action
1 Business Customer relationships (external to the IT Service Provider)		
1.1 Communication with the business and customers	11	Business and Customer Relationship Management
1.2 Understanding business needs.	4	Demand Management and Business and Customer Relationship Management
1.3 Different point of view between supplier and customers.	5	Service Level Management and Business and Customer Relationship Management
1.4 Lack of Strong sponsorship.	6	Business Relationship Management and Strategic Management
1.5 Lack of resources	13	Financial Management and Human Resource Management
2 IT provider management (internal to the service provider)		
2.1 IT collaboration	9	Team Building
2.2 Lack of Skills and training	13	Knowledge Management, Human Resource Management and Skills Management
2.3 Inappropriate tools.	6	Technical Management and Service Management
2.4 Lack of Service culture	10	Service Management and Organizational Change Management
3 Organizational changes.	7	Organizational Change Management

TABLE 45 : ITSM IMPLEMENTATION DIFFICULTIES PER CATEGORY.
Source : Martin Cross

Following some extracts from the interviews to support the above results:

1 Business and Customer relationships (external to the IT Service Provider)

1. Communication with the business and customers

- *“Better interface with the business”.*
- *“Better measurement systems. More adapted KPIs”.*
- *“Deliver evidence that processes have an added value and are positive”.*
- *“Better demonstrate the added value”.*
- *“Better communication with the customer “.*
- *“When we exchange with users we always speak very technically and the end user is looking at you like ‘m lost. (Using technical language)”.*
- *“Bad perception of IT by the business. Perception that IT is too costly and is not working fine. If people do not want to see what is in the other side of the river is taking to deaf people then you just do what they tell you. If we implement something and users are not happy with that is that we did not take the opinion of the end user”.*
- *“We have communication problems with our customers”.*
- *“Lack of recognition of achievements. We have never listed our accomplishments. So no one knows what we have done and if it was useful. We need to prove achievements”.*

1.2 Understanding business needs.

- *“Need to better understand the business because it changes regularly”.*
- *“Complexity of the customers”.*
- *“There is always the problem of understanding the customer environment and its needs. All our customers have their specificities and we must understand them to be able to deliver what they need”.*
- *“Another issue is the ever changing of needs. Things go too fast now a days. It is already difficult to understand the needs of the customer and it is even worst if such needs change often”.*

1.3 Different point of view between supplier and customers.

- *“We have a lot of difficulty in transforming technical issues into specific risk for the business”.*
- *“SLAs are not clearly defined and are not useful”.*
- *“There is a different point of view between the business and us”.*

- *“There is a misunderstanding of the cost of services. People always think that is too expensive”.*
- *“Different points of view for the management of services (between staff and customers (inclusive agreeing KPIs)”.*

1.4 Lack of Strong sponsorship.

- “We do not have enough business sponsorship”.
- “We need better business sponsorship”.
- “A global governance is needed to align everyone to the same view”.
- "Need more top management sponsorship and support”.
- “Need support from top management”.
- “Build relationships, explain things and seek sponsors”.

1.5 Lack of resources

- *“Certainly the lack of means and resources”.*
- *“Not enough human resources”.*
- *“The allocation of resources for process implementation that is done detrimentally for the operations”.*
- *“Lack of resources. It is not possible to interrupt the work to implement processes. It must be done on the going”.*
- *“Lack of budget”.*
- *“Need more resources (people and money)”.*
- *“The workload. If we would have more time we could have made more”.*
- *“Lack of resources. We need to do more with less”.*
- *“Need more resources and more specialized “.*
- *“Convince stakeholders and sponsors to get budget”.*
- *“There is always the factor time. We always miss time. Things go too fast”. Customers expect to have everything right now, besides very cheap”.*
- *“Lack of sponsorship”.*
- *“Too many things to do at the same time. We have a lot of users and new needs so we have a lot of projects and we need to dedicate time for the projects and don’t have enough time for SM. Not enough time for SM due to other tasks and projects”.*

2 IT provider management (internal to the service provider)

2.1 IT collaboration

- *“We are very separated. This is everyone has its own kitchen”.*
- *“There are different initiatives for implementation of ITIL processes. There is no global coordination”.*
- *“Misunderstandings between colleagues”.*
- *“The structure has too many silos. Lack of collaboration between technical teams”.*
- *“Consolidate teams”.*
- *“There is the problem of communication. Systems are now quite complex and require numerous interactions and people from different teams so communication is essential but we do not always communicate correctly”.*
- *“Organization of working teams”.*
- *“Involve all relevant stakeholders”.*

2.2 Lack of Skills and training

- *“More professional guidance”.*
- *“ ITIL is quite vague. It tells what needs to be done but there is a big gap on how to do it”.*
- *“Better skills and more prepared staff”.*
- *“Need more resources and more specialized”.*
- *“Bad perception of ITIL. People think ITIL is a book to read and will explain how to mange the company, but they are just guidelines and we need to decide to use them or not”.*
- *“People are too technically oriented and think they know what they are doing”.*
- *“Better ITIL skills, professional guidance. Train people to better use and implement ITIL”.*
- *“Lack of ITIL skills and understanding. Lack of training. I need to develop skills but we do not have often approval to train the staff in SM (Service Management)”.*
- *“Skills to ever changing technology is a big challenge. Especially with the fast evolution of technology. One feels out dated quite easily. We need to invest a lot of effort and money in maintaining the staff skills”.*

- *“Training of teams. Knowledge acquisition".*
- *“Train resources or hire trained resources with the service mindset. We lost a lot of time with persons that were considered experts but not with the right mindset”.*
- *“Young domain, need to learn and evolve”.*

2.3 Inappropriate tools.

- *“Inappropriate tools”.*
- *“More adapted tools”.*
- *“From new analysis of the existence we have a ticketing tool that is not working“.*
- *“Better and more adapted tools”.*
- *“Having the right tools to implement the framework. It is quite dependent".*
- *“Having the right tools”.*

2.4 Lack of service culture

- *“Understand the real added value of implementing ITIL processes. Some processes are not understood”.*
- *“Understanding that primarily they sell services and not technology”.*
- *“Break the perception that processes are not useful. It is just an administrative burden”.*
- *“Deliver evidence that processes have an added value and are positive”.*
- *“ITIL is more seen as a constraint than an added value so it is not accepted”.*
- *“People are too technically oriented and think they know what they are doing”.*
- *“Old staff not service-oriented”.*
- *“The technical orientation”.*
- *“Motivation”.*
- *“Internal service culture to understand that we sell services and not technology”.*

3 Organizational changes.

- *“Business needs change quite fast and we don’t have the time to adapt”.*
- *“There is a high staff turn over. There is always the need to train and re-explain to new comers”.*

- *“There is a lot of turnover in the business. We spend a lot of time re-explaining the same thing”.*
- *“There is a lot of turnover”.*
- *"Things are done according to the experience of the staff. If they change we loose their experience and need to train someone else again”.*
- *“There was a lot of recent management turnover so people think it was always like that”.*
- *“Missing SM established authority. I am an SM manager but I do not have the necessary authority to make things evolve”.*

From the above information we can observe that from the different difficulties that were expressed in the area of business and customer the most mentioned are missing communication with the business and customers and lack of human resources. There is some lack of business understanding. If the business needs are not clearly understood the IT Service Provider will not be able to deliver useful services providing value to the business. Equally there is some confusion in the communication with the business with differing point of view. If there is not a correct alignment between both views, there will always be some discomfort and dissatisfaction. Another important reason is the lack of sponsorship. Without a strong sponsorship from top management, it will be very difficult for the IT Service Provider to advance, take sound decisions and promote a service culture. Nevertheless these three observations are not weighing compared to the first and last ones. Therefore we would focus all our attention on the latters:

Missing communication with the customers: From the interviews entries it is observed that there are communication problems with the business and customers. This aspect was differentiated from the second and third categories; different point of view and miss understanding of customer needs because they are a consequence from the first one. From the moment there is no communication it would be rather difficult to gather business and customer data to understand their needs. If needs are not understood, services will not be adapted to the needs. Equally, if the point of view or way of communication with the customers is not clear, service decisions will not be aligned with the needs. Anyway, in the recognition of missing communication with the business and customers it is evident that the previous two observa-

tions will be obtained as a consequence. Nevertheless it is not sufficient to communicate. Communication must have a purpose and IT and served customers having different business lines, different objectives and different culture and training, often it is difficult to communicate. IT service providers must learn to communicate with their customers in an understandable way.

As per the lack of resources, it is important to make the difference between 4 types of resources:

- Financial resources
- Human resources
- Time resources
- Technical resources

From the 13 answers related to lack of resources, if we analyze the content of the interview texts it's to be noted that one entry is undefined for the referred type of resource. So we can classify only 12 entries, but one entry mentions both financial resources as well as human resources, which brings back to 13 the entries. There are 2 entries related to time but the text relates to time for people to do things which relates as well to human resources. With this in mind we finish with 9 out of the 13 entries for human resources and 4 for financial resources. There are no entries for the lack technical resources. This makes a clear dominance of the difficulty related to human resources over any other difficulty that IT Service Providers are facing.

When it comes to the internal IT Service provider issues, there is a flatter distribution. Inappropriate tools account for 6 observations while IT collaboration has 9, lack of service culture accounts for 10 and lack of skills and training has 13 entries. If we calculate the total amount of entries it is to be observed that there are 33 External entries while there are 45 internal entries which is interesting considering that external entries depend more form the business decisions than the internal entries for which the IT Service Provider has much more power of decision.

Last but not least the organizational changes issues with 7 entries for which the most mentioned reason is the staff turnover that influences greatly the preservation of knowledge and skills.

Conclusions:

The importance of the recognition of difficulties and specially the categorization of these difficulties allows positioning them in a specific domain for treatment. Remembering the literature articles related to proposed CSFs for ITIL implementations Taylfour (2018) document 48 CSF from 4 articles: Somers and Nelson (2001), Poti et. Al (2001), Pollard and Cater-Steel (2009) and Iden and Langeland (2010), the most mentioned CSFs are: top management support (sponsorship), open interdepartmental communications (communication with the business and customers) and user training and personal development (lack of skills). The found difficulties are consistent with the existing academic literature.

While each of the difficulties should be addressed, it is important to identify which ones are creating the most disturbances for the maturity of the Service Orientation. In this way, they can be treated in the correct order of importance. The biggest difficulties that were encountered are: 1) the lack of communication with the business and the different points of view of the IT Service Provider and the customers, 2) Lack of IT Service Provider resources (human and financial) and 3) the lack of Service skills.

Annex 23: List of ITIL V4 practices

ITIL V4 Practices
General management practices
Architecture management
Continual improvement
Information security management
Knowledge management
Measurement and reporting
Portfolio management
Organizational change management
Project management
Relationship management
Risk management
Service financial management
Strategy management
Supplier management
Workforce and talent management
Service Orientation practices
Availability management
Business analysts
Capacity and performance management
Change control
Incident management

IT asset management
Monitoring and event management
Problem management
Release management
Service level management
Service catalogue management
Service continuity management
Service design
Service desk
Service Configuration Management
Service request management
Technical management practices
Deployment management
Infrastructure and platform management
Software development and management

TABLE 46 : ITIL V4 PRACTICES.
Source: Martin Cross

Annex 24 : Relationship between ITIL V4 and Serv*Or

ITIL V4 Practices	Serv*or
General management practices	
Architecture management	7 State of the art technology 8 Technology is used to build service quality
Continual improvement	
Information security management	
Knowledge management	
Measurement and reporting	21 Service performance is measured and communicated 27 Management measure service quality
Portfolio management	
Organizational change management	
Project management	

Relationship management	**Customer treatment** 1 Employees care for customers 2 They go the extra mile for customers 3 Friendliness towards customers 4 Extra effort to reduce inconvenience for customer **Employee empowerment** 5 Employees can take decisions for the customer without escalation 6 Employee freedom and empowerment 9 Technology is used to support front line 12 Active listening of customers 13 Service complaints
Risk management	
Service financial management	
Strategy management	20 Objectives linked to strategy

	Service vision (culture) 22 true service commitment 23 customers to serve not revenue 24 believe that the organization exists to serve customers **Service Leadership** 25 Management constantly communicates the importance of services 26 Management spend time with customers 28 Managements cares and participate in services 29 Management provides resources for quality services 30 Management is involved in creating quality services
Supplier management	
Workforce and talent management	31 rewards for service quality are in place 32 Excellent service celebration 33 Skill development 34 Training provision 35 Specific training to develop attitudes towards customers
Service Orientation practices	
Availability management	
Business analysts	18 Inform customer needs
Capacity and performance management	
Change control	

Incident management	14 Solve service break downs
IT asset management	
Monitoring and event management	17 tech tools to pinpoint failures
Problem management	10 active customer problems prevention 11 Proactively avoid problems
Release management	
Service catalogue management	19 inform employees about services
Configuration management	
Service continuity management	
Service design	
Service desk	15 follow up service calls
Service level management	13 Service follow up 16 Service warranties
Service request management	
Service validation and testing	
Technical management practices	
Deployment management	
Infrastructure and platform management	
Software development and management	

TABLE 47 : ITIL V4 AND SERV*OR RELATIONSHIP.
Source: Martin Cross

Annex 25: Questionnaire used for maturity assessments

UNIVERSITÉ LYON III
INSTITUT D'ADMINISTRATION DES ENTREPRISES

BUSINESS SCIENCE INSTITUTE

DOCTORATE in BUSINESS ADMINISTRATION

Martin CROSS

IT Service Provider Service Orientation Maturity Assessment

Introduction

Instructions

Scales meaning

NA: Not applicable or No Answer

- Level 0, Initial: 0 to 20% of required tasks realization
- Level 1, Basic: 21 to 80% of required tasks realization
- Level 2, Performed: 81 to 100% of required tasks realization

- Level 3, Controlled: 81 to 100% of required tasks realization with complete measurement control of all composing elements (technically oriented)
- Level 4, Customer aligned: 81 to 100% of required tasks realization with end to end service measurement adapted to specific customers needs
- Level 5, Business value contribution: 81 to 100% of required tasks realization with end to end measurements adapted to the customer needs and aligned with the strategy of the business

Levels

Level 0: Initial

The activity or action is not realized as part of the normal service provider operations. The expected results are not achieved.

Level 1: Basic

The expected activities or actions are present at a basic level. The focalization is more technical and operational, rather than service-oriented. Results are activity based and little concern is given to the results. Expected results are based on best effort. Technical non-collaborative level.

Level 2: Performed

To achieve this level the previous level must be fully achieved. This means that all required actions and activities to obtain specific results have been documented

The expected actions or activity is fully implemented and its objective is fulfilled. Operations are reactive and repeatable. The focalization is output oriented with basic customer relationship activities. Teams begin to work together for the realization of the required activity or action and basic information exchanges are in place. Usually required processes are documented and expected results are known. Activities and actions are more focused on user satisfaction than customer satisfaction. Technical-collaborative level.

Level 3: Controlled

The previous level is fully achieved. This means that the required action or activity is known and fully documented and expected results are known and documented.

The expected action or activity is fully implemented and measured. Their objective is fulfilled and controlled. Operations begin to be proactive as there is enough information on how the activity or action is realized. The focalization is measurement oriented with some customer relationship activities seeking customer satisfaction rather than user satisfaction. Technical measurements are in place, services are documented, basic SLAs are used (more technically oriented than service-oriented) and outputs are warrantied. Output warranty level

Level 4: Customer aligned

The previous level is fully achieved. This means that there are enough controls and data to analyze the current situation to detect improvement opportunities. This sets the basis of customer negotiation with the scope to align to the customer demand.

The expected action or activity is fully implemented and controlled. The objective is fulfilled, and justified from the customer demand perspective. Operations are proactive and service-oriented. The focalization is measurement oriented with strong customer relationship activities. There is a basic service culture and services are documented and agreed with SLAs based on the customer perception. There is enough data and service measurements to demonstrate delivery to customers from their perspective. Outcome warranty level

Level 5: Business value

The previous level is fully achieved. This means that there is enough insight of the customer demands, there is a strong relationship with the customers and delivery is warrantied with specific customer oriented SLAs.

The expected action or activity is fully realized measured and controlled. There is a full understanding of the activities of the customer and the business strategy is known and used to take service decisions to support the business activities. There is a complete governance body to guide and control the activities of the service provider in alignment with the needs of the business. All operations are strongly service-oriented

and there is a well-established service culture in place. All services are fully documented with business value justification. There is a strong focalization in customer relationship and value co-creation. Activities are highly automated and optimized and there is a global culture of improvement at all levels. Business value contribution level

Definitions

Service Orientation: The extent to which the organization main focus of its activities is oriented towards services

Organization: A legal entity

Service Provider: An organization or part of an organization providing services internally or externally to the main legal entity

Customer: A person representative of the business with responsibility and power of decision for negotiating services with the service provider

User: A person (internal or external) who is the beneficiary of the service

ITSM: Information Technology Service Management

Analysis sections

1. Organization's profile
2. Service provider's profile
3. Interviewee's profile
4. Global Service Orientation perceptions
5. Maturity assessment
    a. External service provider aspects
    b. Internal service provider aspects
6. Difficulties

1 Organization's profile

1.1 Indicate the core industry of your customer(s)

1.2 Estimate the position of your customer towards a product/service orientation

100% 50% 100%

Product----------Service

1.3 Specify if the business and customers are subject to specific regulations

❑ Legal constraints

❑ Industry standards

❑ Prudential rules

❑ External Governance

❑ Estimate the number of employees in the company

1.4 Estimate the number of employees in the organization

(If the organization is multinational please estimate the total number of the whole organization as well as the total in Luxembourg)

2 Service provider profile

2.1 Describe the core activities as a Service Provider

2.2 Indicate the type of provider that best describe your organization.

❑ Internal Service provider (type I)

❑ Shared Service Provider (type II)

❑ External Service Provider (Type III)

2.3 Indicate how many services are offered.

2.4 Estimate your position as service provider towards a product/service orientation

100% 50% 100%

Product----------Service

2.5 Estimate the number of employees of the IT provider

3 Interviewee Profile

3.1 Please state your position in the company

❑ Part of the service provider

❑ Part of the customer or business

3.2 Please specify your level

❑ Executive

❑ Senior Management

❑ Management

❑ Staff

❑ External/consultant

3.3 Please indicate how many years you have worked for the company

❑ Less than a year

❑ More than a year and less than 3 years

❑ More than 3 years and less than 6 years

❑ More than 6 years and less than 10 years

❑ More than 10 years

3.4 Please indicate how many years you have been working in your present function

❑ Less than a year

❑ More than a year and less than 3 years

❑ More than 3 years and less than 6 years

❑ More than 6 years and less than 10 years

❑ More than 10 years

3.5 Please state the Service Management certifications you hold

❑ none

❑ ITIL foundation V2

❑ ITIL V2 Service Management

❑ ITIL foundation V3, 2011

❑ ITIL V3, 2011 intermediate (SOA, PPO, RCV, OSA, SS, SD, ST, SO, CSI)

❑ ITIL Practitioner

❑ ITIL Expert (V3, 2011)

❑ ITIL foundation V4

❑ ITIL V4 Intermediate

❑ ITIL V4 Managing professional

❑ CMMI for services

❑ Cobit

❑ IT4IT

❑ ISO20000

❑ Other (please specify)

4 Global Service Orientation perceptions

4.1 Do you think it is important to use a specific Service Management reference (methodology, standard or framework) to guide you on the service orientation practices?

Useless	Not important	Neutral	Important	Very important	Don't know
❑	❑	❑	❑	❑	❑

4.2 Why?

4.3 Which Service Management reference (methodology, standard or framework) is used as guidance for Service Orientation?

❑ none

❑ ITIL foundation V2

❑ ITIL V2 Service Management

❑ ITIL foundation V3, 2011

❑ ITIL V3, 2011 intermediate (SOA, PPO, RCV, OSA, SS, SD, ST, SO, CSI)

❑ ITIL Practitioner

❑ ITIL Expert (V3, 2011)

❑ ITIL foundation V4

❑ ITIL V4 Intermediate

❑ ITIL V4 Managing professional

❑ CMMI for services

❑ Cobit

❑ IT4IT

❑ ISO20000

❑ Other (please specify)

4.4 Which are the reasons to have chosen that specific reference (standard, methodology or framework)?

Delivering value

❑ Understanding your customers

❑ Increase performance

❑ Cost reductions

❑ Controlling risks

❑ Promote improvements

❑ Better understanding of IT operations

❑ Customer satisfaction

❑ Adapt to new technologies

❑ Better control of established processes

❑ Other

4.5 How long have your organization been using or working with that reference (standard, methodology or framework)?

❑ Less than a year

❑ More than a year and less than 3 years

❑ More than 3 years and less than 6 years

❑ More than 6 years and less than 10 years

❑ More than 10 years

4.6 How far do you intend to implement the Service Orientation reference?

❑ 0 to 5% (initial efforts of implementation)

❑ 6 to 20% (partial implementation)

❑ 21 to 50% (middle implementation)

❑ 51 to 80% (largely implemented)

❑ 81 to 100% (almost complete to complete implementation)

5 Maturity assessment

5.1 Global maturity aspects

5.1.1 Which reference (methodology, standard or framework) to measure the Service Orientation maturity and performance?

❑ ISO15504

❑ TIPA

❑ ISO20000

❑ CMMI

❑ SCAMPI

❑ Cobit

❑ Serve*Or

❑ Proprietary

Please specify which one_____

❑ I don't know

❑ None

Why ?

❑ Do not measure the maturity of Service Orientation

Why is maturity not measured?

5.1.2 What is the percentage of Service Management practices that have been implemented?

❑ 0 to 5% (initial efforts of implementation)

❑ 6 to 20% (partial implementation)

❑ 21 to 50% (middle implementation)

❑ 51 to 80% (largely implemented)

❑ 81 to 100% (almost complete to complete implementation)

5.2 External provider maturity aspects

5.2.1 Business relationship

5.2.1.1 Is there a well established relationship between the provider and the business at strategic level?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.1.2 Does the provider understands and is aware of the business strategy?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.1.3 Does the provider organization understand the business of its customers?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.1.4 Does the provider organization communicate clearly with the business to demonstrate the provider added value?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.1.5 Are there a clear established sponsorship from the business to the provider for Service Orientation matters?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.1.6 Has the provider established clear financial tools to valuate services and inform customers about service costs?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.2 Customer care

5.2.2.1 Is there a well-established point of contact for customers?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.2.2 Has the organization established tools for managing customer relationships?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.2.3 Does staff who are in contact with customers meet regularly with the customer to understand gather and maintain updated their needs?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.2.4 Has the organization clearly documented customer needs?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.2.5 Does the provider cares for customer treatment (empathy, kindness, politeness) as a priority?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.2.6 Are staff in contact with customers focused on value to be delivered to their customers?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.2.7 Is the provider management willing to take extra efforts to serve and satisfy the customers?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.2.8 Has the organization a clear catalogue to inform customers abut offered services?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.2.9 Has the organization clear service targets and levels of service agreed with the customers?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.2.10 Does the organization meets regularly with the customer to demonstrate commitments achievement?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.2.11 Does the organization's management controls regularly services achievements?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.2.12 Does staff who communicate with customers use a language adapted to their customers?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.2.13 Are there formal mechanisms to inform customers on security issues and gather continuity and security needs?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.3 User care (define user)

5.2.3.1 Has the provider established a specific point of contact for users to deal promptly with user issues (requests incidents and complaints)?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.3.2 Has the provider established tools for managing users relationships?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.3.3 Does the provider cares for users treatment (empathy, kindness, politeness) as a priority?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.3.4 Is the organization's management willing to take extra efforts to serve and satisfy the users?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.3.5 Are staff in contact with users focused on delivering a good service to their users?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.3.6 Has the organization implemented regular surveys to gather data about users satisfaction?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.3.7 In case of service failure, does the impacted users are correctly informed?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.2.2.8 Does staff who communicate with users use a language adapted to their users?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3 Internal provider maturity aspects

5.3.1 Service provider culture and collaboration

5.3.1.1 Are there specific service quality procedures and controls in place?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.1.2 Is people committed to use technology to support services rather than being technically oriented?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.1.3 Does the different departments communicate and work together on behalf of services with the scope of delivering quality services?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.1.4 Are there formal service-oriented practices, processes and procedures in place?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.1.5 Are there mechanisms in place to reorganize and maintain the internal structural organization to align to service provision?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.1.6 Are implemented service-oriented practices, processes and procedures followed by technical staff?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.1.7 Are there specific documented mechanism to identify improvements?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.1.8 Are continuous improvements procedures in place?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.1.9 Is there a specific team to coordinate improvement activities?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.1.10 Are security requirements documented and informed to all provider's staff?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.1.11 Are there specific mechanisms in place to warrant the security of information according to business needs?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.1.12 Do continuity requirements translated and fulfilled in technical terms according to business needs on a regular basis?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.1.13 Are service risks conveniently identified, analyzed, documented and managed?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.1.14 Are service costs correctly accounted and understood?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.2 Service provider strategy and Leadership

5.3.2.1 Does the organization have a clear documented strategy to serve customers?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.2.2 Is the staff aware of the organization's strategy?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.2.3 Is the organization's strategy aligned with the customers strategy?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.2.4 Is there a well established mechanism to analyze and decide which service to provide?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.2.5 Is service performance measured?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.2.6 Does management follow up on service performance?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.2.7 Are management decisions based on services (value to be delivered to customers rather than income)?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.2.8 Is management concerned and participate in services creation?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.2.9 Does the organization's management controls regularly services achievements?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.3 Human Resources

5.3.3.1 Is the organization's staff specifically trained for services?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.3.2 Is there management recognition for excellent services delivery?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.3.3 Are there specific staff rewards for excellent quality services delivered?

LevLevel 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.3.4 Does the organization provide and manage sufficient resources to meet customer services required performance?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.4 Service failure prevention and treatment

5.3.4.1 Are there specific procedures in place to prevent users issues?

LLevel 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.4.2 Is there a proactive attitude instead of a reactive attitude to prevent users issues?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.4.3 Are there specific procedures in place to solve systems breakdowns?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.4.4 Are there procedures in place to avoid reoccurrence of known dysfunctions

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.5 Technology Management

5.3.5.1 Are systems changes conveniently managed and controlled?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.5.2 Are services fully tested before deployment?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.5.3 Is there a well performed knowledge transfer to users and support staff before deployment?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.5.4 Is there a strong design of services to cover availability needs?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.5.5 Is there sufficient capacity of resources to respond to specific performance needs?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.5.6 Are the organization's projects focused on services creation?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.5.7 Is there a system in place to document service components and interactions between components?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.5.8 Are there specific procedures in place to manage licenses, user profiles and accesses?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.5.9 Is there assurance of data recovery in case data loose?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

5.3.5.10 Are archives secured and regularly tested for retrival?

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Initial	Basic	Performed	Controlled	Customer Aligned	Business Value
❑	❑	❑	❑	❑	❑

6 Benefits and difficulties

6.1 Expected benefits of a mature Service Orientation

Which are the expected benefits of being a mature service-oriented provider?

6.1.1 Become a leading innovator in the industry

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.1.2 Make the best use of technology

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.1.3 Ability to respond rapidly to new business needs

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.1.4 Reaching a strong and stable IT operation

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.1.5 Better decision making

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.1.6 Better communication with the business and customers

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.1.7 Improved relationships with customers and users

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.1.8 Cheaper operations

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.2 Expected benefits of a maturity assessment

Which are the expected benefits of carrying out a service-oriented maturity assessment for the service provider?

6.2.1 Better understanding of operations

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.2.2 Departure point for improvement initiatives

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.2.3 Guidance on Service Management practices to implement

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.2.4 Define improvement to implement

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.2.5 Compare with other providers

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.2.6 Marketing recognition

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.2.7 Increased credibility of the provider

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.3 Business relationship difficulties and blocking factors

Which are the main difficulties in the relationship with customers and users?

6.3.1 Difficulty to communicate with the business.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.3.2 Difficulty to understand business needs.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.3.3 Different point of view between service provider and customers.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.3.4 Lack of Strong sponsorship.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.3.5 Lack of financial resources.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.3.6 Lack of human resources.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.3.7 Others

6.4 Internal service provider difficulties and blocking factors

Which are the main difficulties in the implementation and usage of Service Management practices?

6.4.1 Missing or difficult collaboration between service provider team members.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.4.2 Lack of technical staff skills and training.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.4.3 Lack of specific Service Orientation frameworks training.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.4.4 Inappropriate tools to support Service Management operations.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.4.5 Others

6.5 Service Provider's cultural and organizational difficulties and blocking factors.

Which are the main structural, organizational and cultural difficulties for implementing a mature Service Orientation?

6.5.1 Lack of service culture in the service provider organization.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.5.2 Misunderstanding of Service Management goals

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.5.3 Difficulty to implement Service Management practice aligned with the operational teams

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.5.4 Lack of a specific Service-oriented functional structure

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.5.5 Missing or poorly defined Service Management responsibilities and authorities

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
❑	❑	❑	❑	❑

6.5.6 Others

7 Maturity assessment appreciation

Please provide your appreciation of the following maturity assessment aspects (1 being the lowest (most negative) score and 5 being the highest (most positive) score:

	1.	2.	3.	4.	5
7.1 Simplicity of usage	★	★	★	★	★
7.2 Cost effectiveness	★	★	★	★	★
7.3 Time consumption	★	★	★	★	★
7.4 Exhaustiveness	★	★	★	★	★
7.5 Usefulness	★	★	★	★	★
7.6 Is it valuable	★	★	★	★	★

Annex 26 : Individual organizations questionnaire data sheet

	EDBA SOMM Interview Analysis
5.2	**External Provider Maturity Aspects**
5.2.1	**Business Relationship**
5.2.1.1	Is there a well established relationship between the provider and the business at strategic level?
5.2.1.2	Does the provider understands and is aware of the business strategy?
5.2.1.3	Does the provider understand the business of its customers?
5.2.1.4	Does the provider communicate clearly with the business to demonstrate the provider added value?
5.2.1.5	Is there a clear established sponsorship from the business to the provider for Service Orientation matters?
5.2.1.6	Has the provider established clear financial tools to valuate services and inform customers about service costs?
5.2.2	**Customer care**
5.2.2.1	Is there a well-established Single Point Of Contact for customers?
5.2.2.2	Has the provider established tools for managing customer relationships?
5.2.2.3	Does staff in contact with customers meet regularly with them to understand, gather and maintain their needs?
5.2.2.4	Has the provider clearly documented customers and users needs and follow up on them?
5.2.2.5	Does the provider cares for customer treatment (empathy, kindness, politeness) as a priority?
5.2.2.6	Are staff in contact with customers focused on value to be delivered to customers?
5.2.2.7	Is the provider management willing to take extra efforts to serve and satisfy the customer?
5.2.2.8	Has the provider a clear catalogue to inform customers about offered services?
5.2.2.9	Are services offered in the catalogue exhaustive and covering your needs?
5.2.2.10	Has the provider clear service targets and levels of service agreed with the customer?
5.2.2.11	Does the provider meets regularly with the customer to demonstrate commitments achievement?
5.2.2.12	Does the provider management controls regularly services achievement?
5.2.2.13	Is the provider used language adapted to the customer needs and explain issues in a clear manner?

	EDBA SOMM Interview Analysis
5.2.2.14	Are there formal mechanisms to inform customers on security issues and security needs?
5.2.2.15	Are there formal mechanisms to gather business continuity needs?
5.2.3	**User care**
5.2.3.1	Is there a well-established SPOC for users to deal with user issues (requests incidents and complaints)?
5.2.3.2	Has the provider established tools for managing users relationships?
5.2.3.3	Does the provider cares for users treatment (empathy, kindness, politeness) as a priority?
5.2.3.4	Is the provider management willing to take extra efforts to serve and satisfy Users?
5.2.3.5	Is staff in contact with users focused on delivering a good service to users?
5.2.3.6	Has the provider implemented regular surveys to gather data about users satisfaction?
5.2.3.7	In case of service failure, does impacted users are correctly informed?
5.2.3.8	Does staff who communicate with users use a language adapted to the users?
5.2.3.9	Is there a clear documented catalogue with specific services for users?
5.3	**Internal Provider Maturity Aspects**
5.3.1	**Service Provider Culture and Collaboration**
5.3.1.1	Are there specific service quality procedures and controls in place?
5.3.1.2	Is provider's staff committed to use technology to support services rather than being technically oriented?
5.3.1.3	Do different departments communicate and work together with the scope of delivering quality services?
5.3.1.4	Are there formal service-oriented practices, processes and procedures in place?
5.3.1.5	Are there mechanisms to organize and maintain the provider's organization to align to service provision?
5.3.1.6	Are implemented service-oriented practices, processes and procedures followed by the provider's staff?
5.3.1.7	Are there specific documented mechanisms to identify improvements?
5.3.1.8	Are continuous improvements procedures in place to choose and implement improvements?
5.3.1.9	Is there a specific team to coordinate improvement activities?

	EDBA SOMM Interview Analysis
5.3.1.10	Are security requirements documented and informed to all provider's staff?
5.3.1.11	Are there specific mechanisms in place to warrant the security of information according to business needs?
5.3.1.12	Are continuity requirements fulfilled in technical terms according to business needs on a regular basis?
5.3.1.13	Are service risks conveniently identified, analyzed, documented and managed?
5.3.1.14	Are service costs correctly accounted, understood and maintained?
5.3.2	**Service Provider Strategy and Leadership**
5.3.2.1	Does the provider have a clear documented strategy to serve customers?
5.3.2.2	Is the staff aware of the provider's strategy and use it as a reference for their work?
5.3.2.3	Is the provider's strategy aligned with the customers and business strategy?
5.3.2.4	Is there a well-established mechanism to analyze and decide which service to provide?
5.3.2.5	Is service performance measured considering the end-to-end service?
5.3.2.6	Does the provider's management follow up on service performance?
5.3.2.7	Are provider's management decisions based on services (value to be delivered to customers rather than income)?
5.3.2.8	Is the provider's management concerned and participate in services creation?
5.3.2.9	Does the provider's management control regularly services achievements?
5.3.3	**Human Resources Management**
5.3.3.1	Is the provider's staff competent and specifically trained for services?
5.3.3.2	Is there management recognition for excellent services delivery?
5.3.3.3	Are there specific staff rewards for excellent quality services delivered?
5.3.3.4	Does the provider manage and hire sufficient resources to meet services required performance?
5.3.4	**Service failure prevention and treatment**
5.3.4.1	Are there specific procedures in place to prevent users issues?

	EDBA SOMM Interview Analysis
5.3.4.2	Is there a proactive attitude instead of a reactive attitude to prevent users issues?
5.3.4.3	Are there specific procedures in place to solve systems breakdowns?
5.3.4.4	Are there procedures in place to avoid reoccurrence of known dysfunctions?
5.3.5	**Technology Management**
5.3.5.1	Are systems changes conveniently managed and controlled?
5.3.5.2	Are services fully tested and dully informed before deployment?
5.3.5.3	Is there a well-performed knowledge transfer to users and support staff before deployment?
5.3.5.4	Is there a strong design of services to cover availability needs?
5.3.5.5	Is there sufficient capacity of resources to respond to specific performance needs?
5.3.5.6	Are the provider's projects focused on services and value creation?
5.3.5.7	Is there a system in place to document service components and interactions between components?
5.3.5.8	Are there specific procedures in place to manage licenses, user profiles and accesses?
5.3.5.9	Is there assurance of data preservation and recovery in case of data loose?
5.3.5.10	Are archives and preserved information secured and regularly tested for retrieval?
7	**Maturity assessment appreciation**
	Please provide your appreciation of the following maturity assessment aspects (1 being the lowest (negative) score and 5 being the highest (most positive score.
7.1	Simplicity of usage
7.2	Cost
7.3	Time
7.4	Exhaustiveness
7.5	Usefulness
7.6	Value

TABLE 48 : INDIVIDUAL ORGANIZATIONS QUESTIONNAIRE

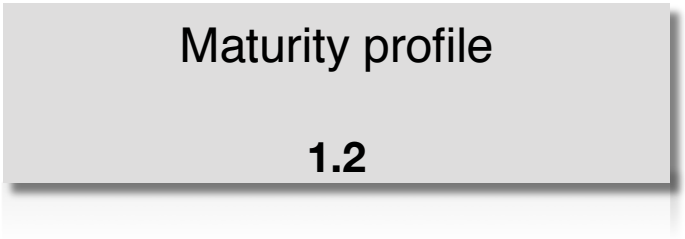
Source: Martin Cross

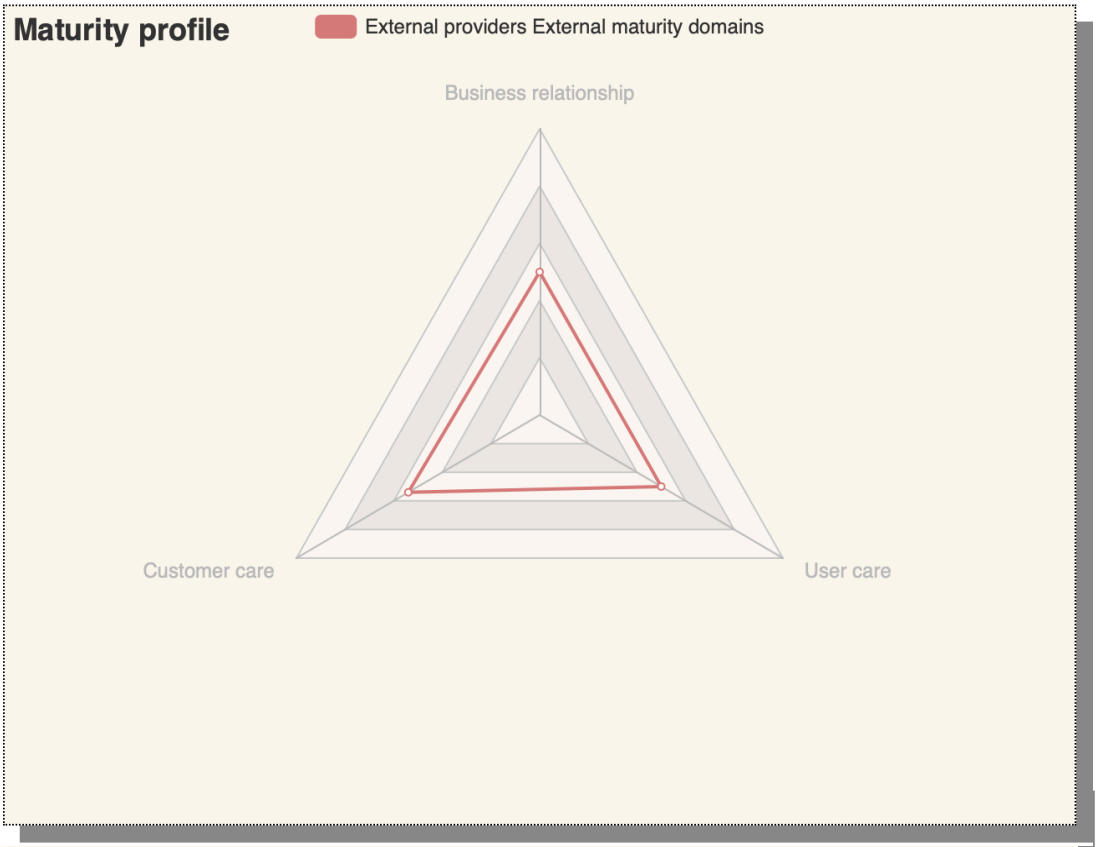
Annex 27: Example of assessment report

This report was built from several organizations to avoid the potential recognition of the profile of a specific organization. The presented report is for documentation purposes only and do not represent any influence in the analysis of the maturity profile of organizations.

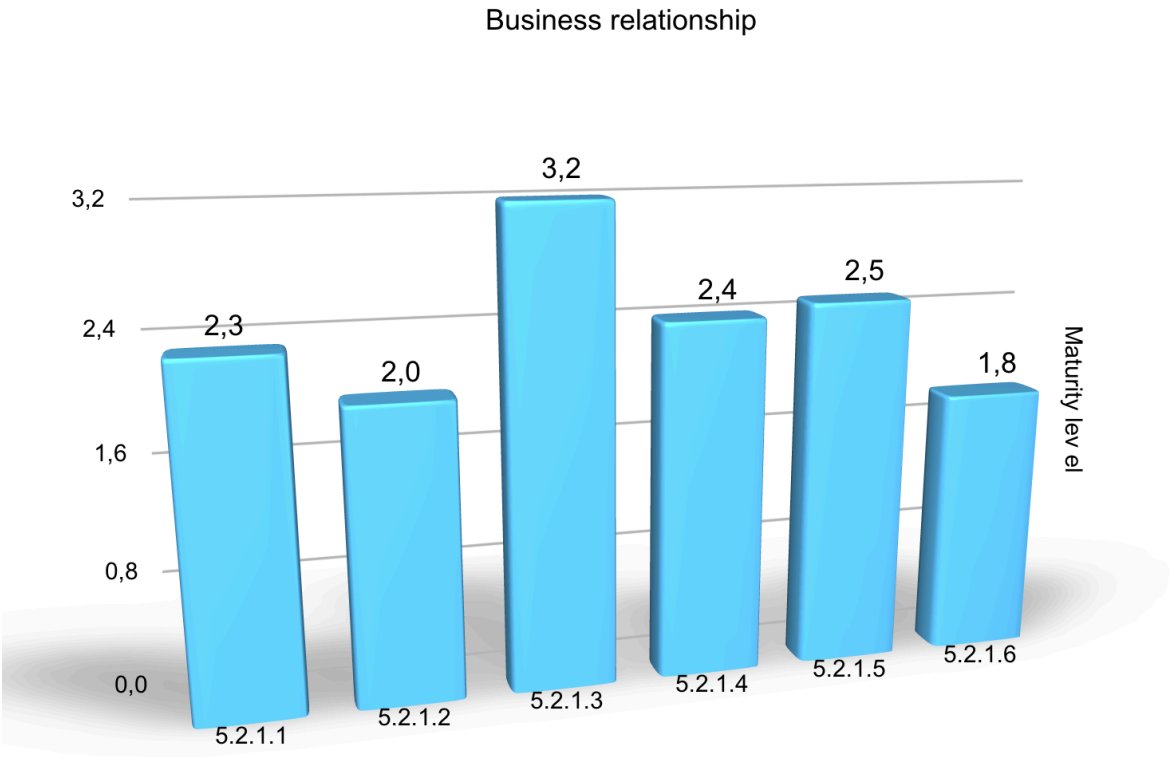
Global maturity assessment

Organization X Maturity profile




Maturity profile
External providers External maturity domains
Business relationship
Customer care
User care

Culture and collaboration
Strategy and leadership
Technical management
Human Resources Management
Failure preventioand treatment


Business relationship
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2,4
1,6
0,8
0,0
2,3
2,0
3,2
2,4
2,5
1,8
5.2.1.1
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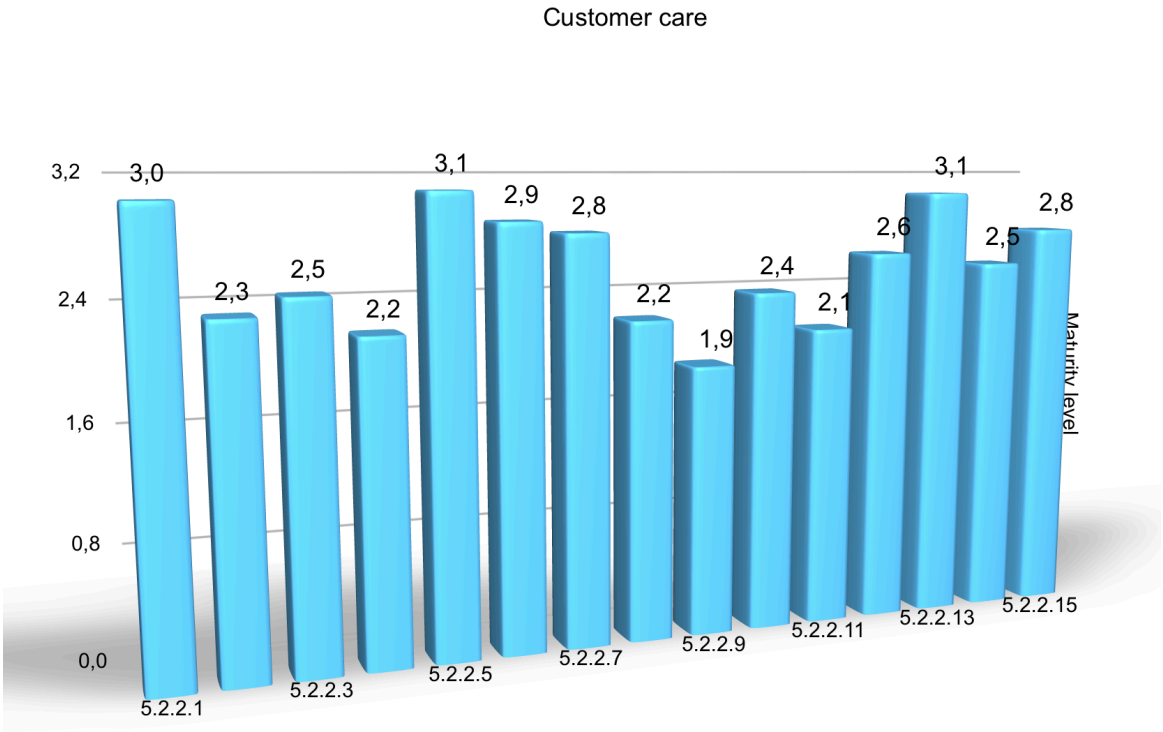
5.2.1.6
Maturity lev el


Customer care
3,2
2,4
1,6
0,8
0,0
3,0
2,3
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2,2
3,1
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2,2
1,9
2,4
2,1
2,6
3,1
2,5
2,8
5.2.2.1
5.2.2.3
5.2.2.5
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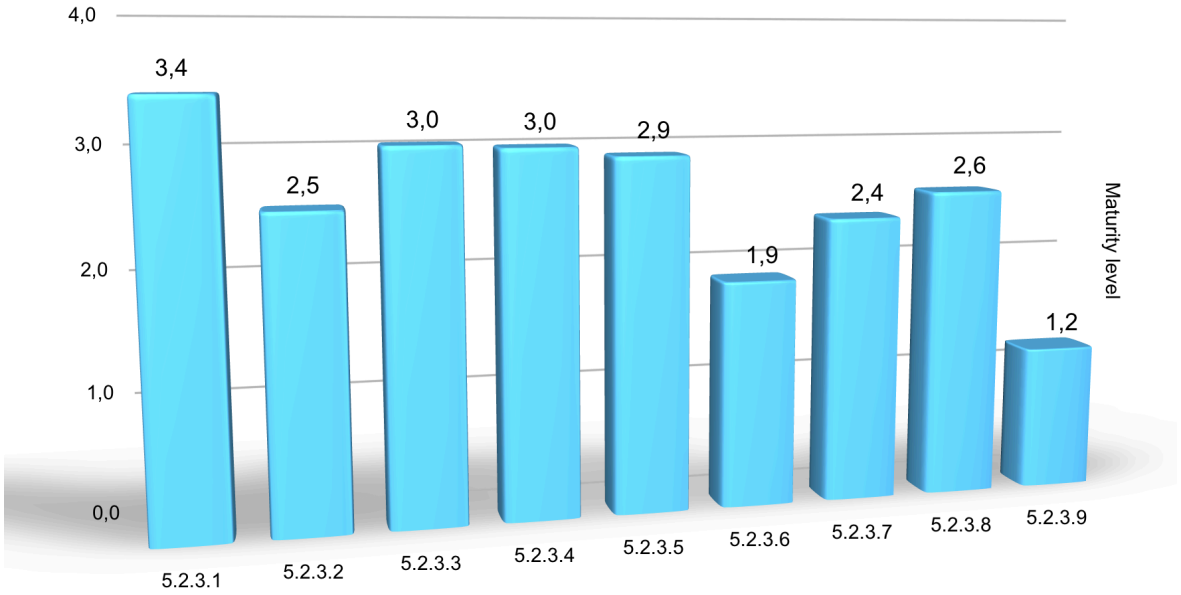
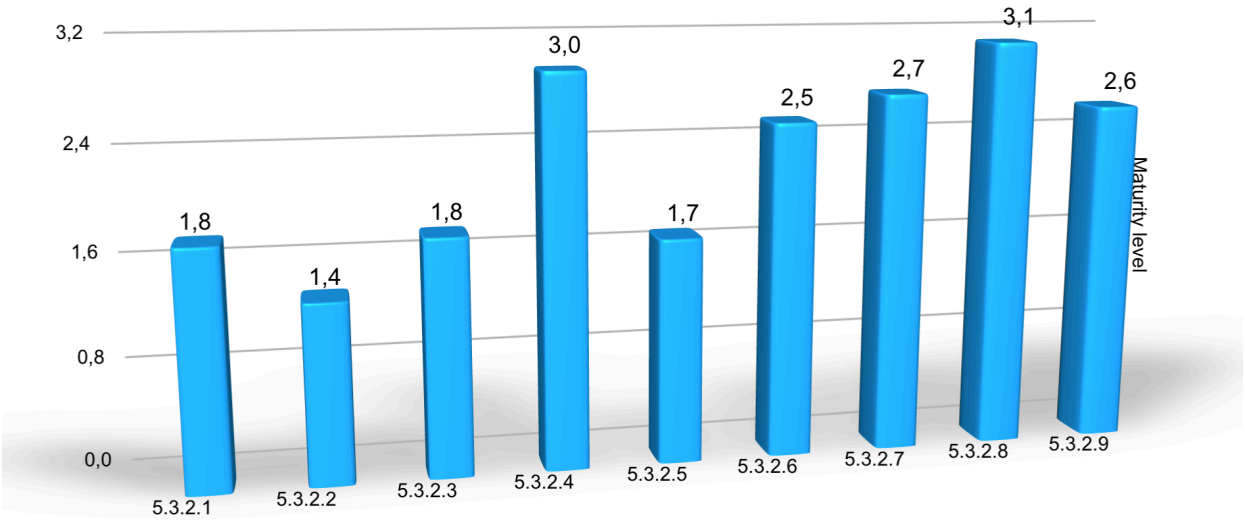
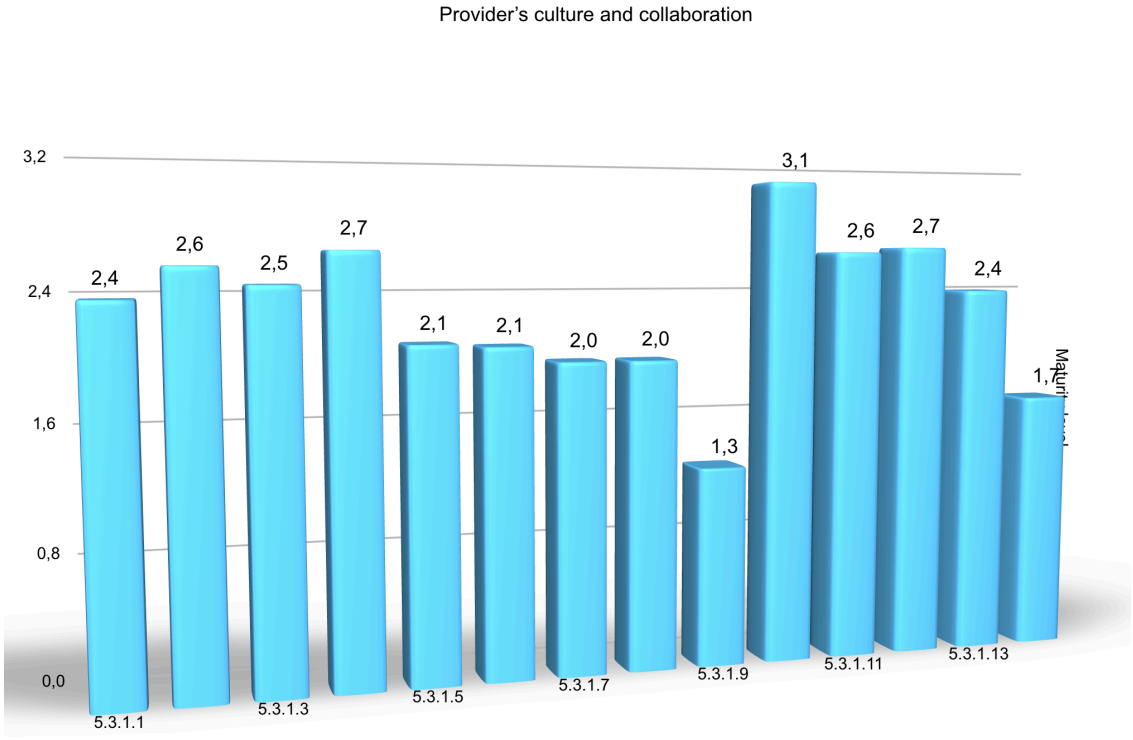
5.2.2.11
5.2.2.13
5.2.2.15
Maturity level

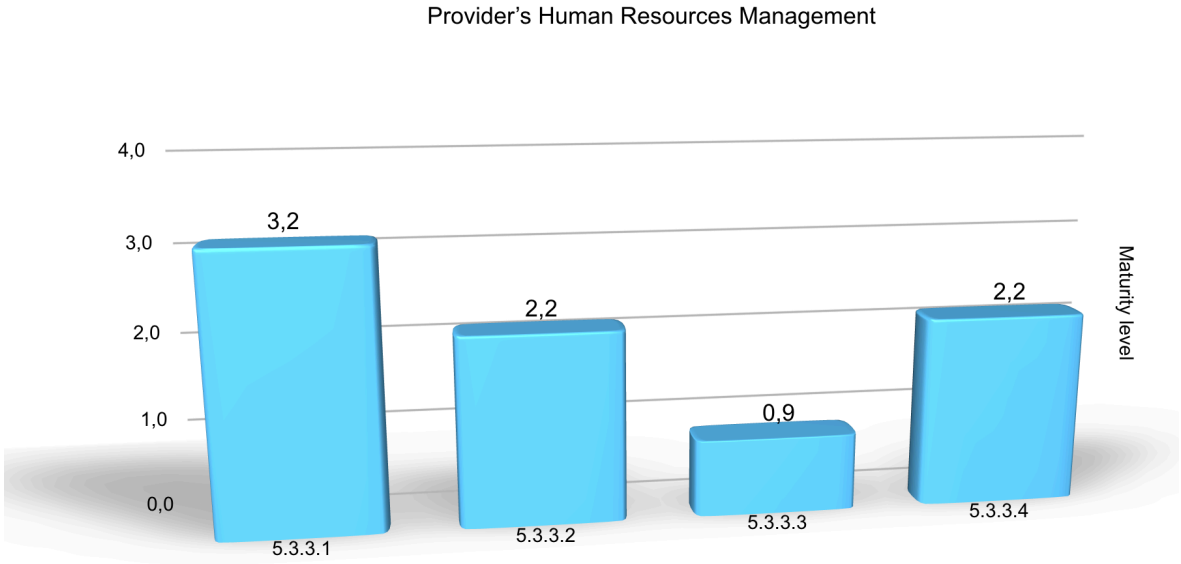
User care



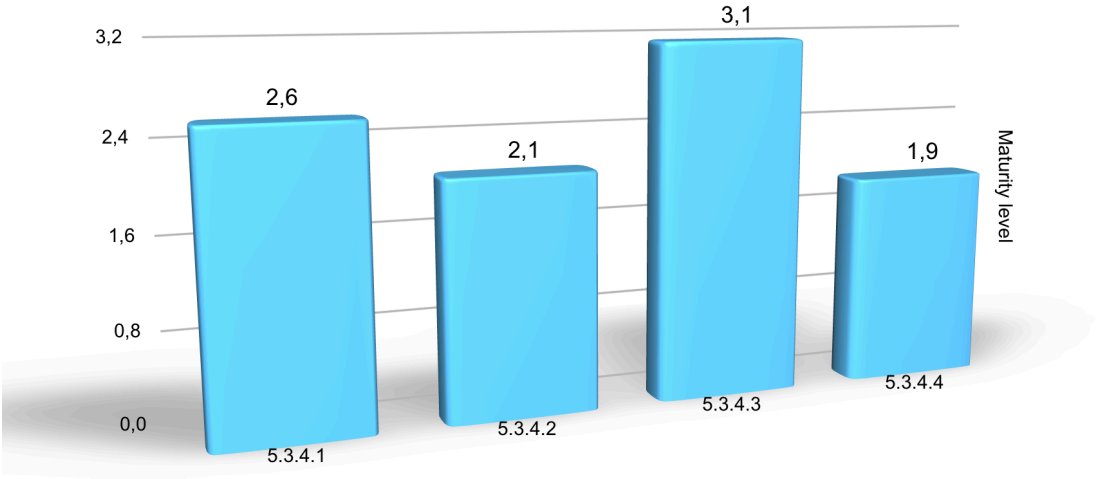
Provider's strategy and leadership



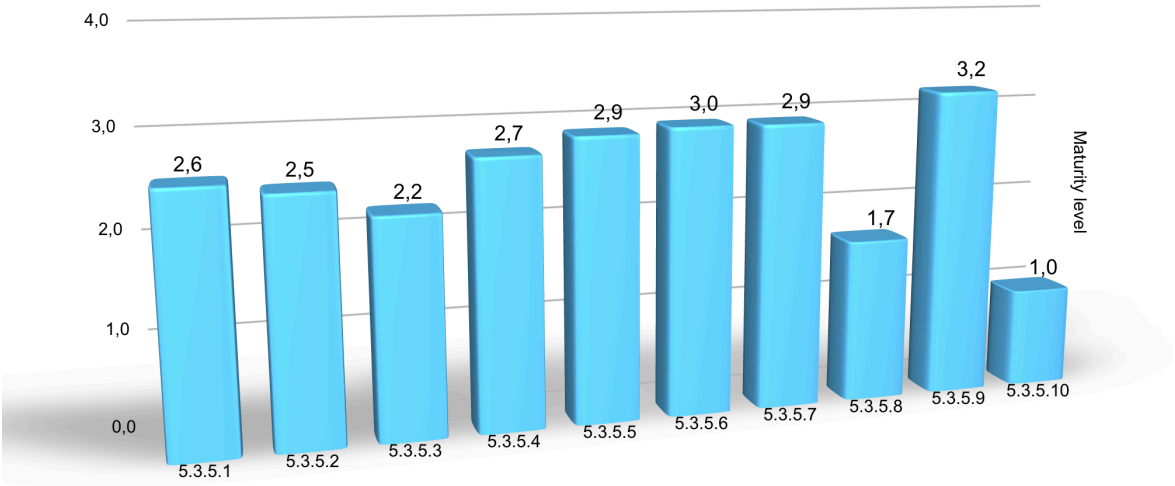

Provider’s culture and collaboration
3,2
2,4
1,6
0,8
0,0
2,4
2,6
2,5
2,7
2,1
2,1
2,0
2,0
1,3
3,1
2,6
2,7
2,4
1,7
5.3.1.1
5.3.1.3
5.3.1.5
5.3.1.7
5.3.1.9
5.3.1.11
5.3.1.13


Provider’s Human Resources Management
4,0
3,0
2,0
1,0
0,0
3,2
2,2
0,9
2,2
5.3.3.1
5.3.3.2
5.3.3.3
5.3.3.4
Maturity level

Service failure treatment and prevention



Technology management



Conclusions

A maturity assessment provides a view based on the data gathered at the different interviews and depend on the perception of the interviews persons, their role and their representativity related to the provides practices. It is a representation of a perceived reality at a specific historical moment. The intention is to understand the operations at the moment of the assessment and by no means shall be used to judge the organization and people.
The assessment results shall be used as a departure point and guide for an improvement plan. From any achieved level there will always be improvement possibilities to achieve a desired intermediate level to a final desired state.

The global maturity of the provider is 1,4, which means that the provider works on a basic technical level. There is a balance for the three main external domains. Level 1 must be consolidated before intending to reach level 2. Globally there is the need to improve the documentation of services and the communication with customers and users.
From the internal perspective financial activities should be implemented and promote a service culture and transversal teamwork. A specific IT strategy shall be documented and informed. A program to implement excellency recognition shall be initiated. To advance towards level 2 (performed) it is needed a better control of the used technology and train staff in service collaboration and communication.

SWOT

Considering that the global maturity profile is 1,1, there is substantial room for improvement. Strengths and opportunities are based on the best scores, which are close to 2 or over it. In the same manner weaknesses and Threats are based on the lowest scores inferior to 0,7. This scale is dependent of the actual result and may vary overtime for new assessments.

Strengths

Provider's management decisions are based on services
There are specific implemented procedures to solve breakdowns
There is sufficient capacity and performance
Projects are focused on services improvement
There is assurance of data preservation and recovery

Weaknesses

There are almost no service-oriented procedures and controls in place
Teamwork and collaboration can is limited
Missing service improvement culture
There is no specific team to coordinate, implement and control improvements
The provider's staff is not aware of the strategy or strategy definitions are missing
Service performance is not conveniently measured
There is no specific mechanism in place to recognize excellent service provision
There are no specific rewards for excellent service provision

Opportunities

The provider understands the business of its customers
The provider cares for customer treatment
The provider is willing to take extra efforts to serve the customer
There are formal mechanisms to keep customers informed on Security and continuity issues
There is a clear known SPOC for users
The provider is willing to take extra efforts to serve the customer
Security requirements are well informed

Threats

There are no financial mechanisms in place to valuate and inform services expenditure
There are no tools in place to manage customer relationships
There are no regular surveys to gather data about user satisfaction
There is no specific user's view of the service catalogue

Recommendations

Recommendations are based on the achieved level as a departure point for an improvement program. There is no obligation of execution and each organization must decide on the actions to take and their priority. The following recommendations are the main topics suggested but are by no means neither exhaustive nor detailed. Other issues might be addressed as well according to the providers needs. While choosing any of the presented areas, a detailed improvement plan shall be documented with the specific actions, timeframes and roles needed to improve the specific area.

Considering the context of the organization it is recommended:

1. Consolidate the ticketing tools for incidents treatment
2. Define a specific improvement team to detect, analyze, priorities and implement improvements
3. Promote team work and transversal teams to develop a service orientation culture
4. Document and inform a service strategy
5. Define basic SLAs for each service (this will be the basis for future SLA negotiations with customers)
6. Promote a service culture within provider's staff (ITSM trainings, communication and teamwork workshops, information exchanges and clarification of end-to-end services contribution by each team)
7. Begin definitions of a recognition and reward system for excellent service recognition
8. Define regular meetings with customers to demonstrate achievements and gather customers needs
9. Implement regular user relationship surveys
10. Implement a basic financial structure to allow for service accounting
11. Promote tools to gather and follow-up on customers and customers needs
12. Improve the actual service catalogue (service documentation, exhaustiveness of documented services and a user view)
13. Improve communication for incidents tickets treatment
14. Define specific procedures to monitor and avoid incidents
15. Promote a more homogeneous approach for user and customer treatment (not dependent on individuals but rather a global established approach)
16. Specifically train staff in contact with customers and users on soft and relations skills
17. Promote a clearer (non technical) language by all teams when interfacing with customers and users.

Annex 28: Global maturity profile data sheet

	EDBA OSOMM Global Maturity Analysis	O21 OE1	O2 OE2	O3 OE3	O10 OE4	O11 OE5	O22 OE6	External	O20 OI1	O5 OI2	O6 OI3	O12 OI4	O14 OI5	O1 OI6	O4 OI7	Internal	Organisation's Maturity Average	Domain Average	Maturity
5	**Global Maturity Profile**		EB	EB	EM	EM	ES	2,6	IB	IM	IS	IS	IS	IM	IM	2,1	2,3	2,3	2,3
5.2	**External Provider Maturity Aspects**							2,6								2,3	2,5	2,5	2,5
5.2.1	**Business Relationship**	4,1	2,0	1,6	3,3	1,9	2,5	2,6	1,3	1,3	3,1	1,0	4,2	2,3	1,9	2,2	2,4	2,4	2,4
5.2.1.1	Is there a well established relationship between the provider and the business at strategic level?	3,5	2,1	2,4	3	1,9	2	2,5	1,6	1,6	2,5	0,8	4	3	1,4	2,1	2,3		
5.2.1.2	Does the provider understands and is aware of the business strategy?	3,8	1,8	0,8	2,3	1	1,8	1,9	1,1	1,1	3	1,1	4	3	1,4	2,1	2,0		
5.2.1.3	Does the provider understand the business of its customers?	4,6	2,3	3	3,8	3,1	2,6	3,2	2	1,9	4	2,3	5	3,3	2,6	3,0	3,1		
5.2.1.4	Does the provider communicate clearly with the business to demonstrate the provider added value?	4,3	1,9	1,4	3,5	2,4	3,3	2,8	1,3	1,4	3,3	0,9	3,8	2,8	1,8	2,2	2,5		
5.2.1.5	Is there a clear established sponsorship from the business to the provider for Service Orientation matters?	4	2,5	1,9	3,8	2,4	1,9	2,8	0,9	1,3	3,3	1,1	3,8	1,8	1,3	1,9	2,3		
5.2.1.6	Has the provider established clear financial tools to valuate services and inform customers about service costs?	4,1	1,6	0,3	3,5	0,6	3,4	2,3	0,7	0,5	2,5	0	4,4	0	2,9	1,6	1,9		

	EDBA OSOMM Global Maturity Analysis	O21 OE1	O2 OE2	O3 OE3	O10 OE4	O11 OE5	O22 OE6	External	O20 OI1	O5 OI2	O6 OI3	O12 OI4	O14 OI5	O1 OI6	O4 OI7	Internal	Organisation's Maturity Average	Domain Average	Maturity
5.2.2	**Customer care**	4,2	2,4	1,9	3,6	2,3	2,1	2,7	1,3	1,2	3,2	1,5	4,1	2,4	2,2	2,3	2,5	2,5	2,5
5.2.2.1	Is there a well-established Single Point Of Contact for customers?	4,6	2,8	1,8	4	3,3	3,2	3,3	1,2	1,3	4	2,7	4,7	3	4	3,0	3,1		
5.2.2.2	Has the provider established tools for managing customer relationships?	4,3	2,4	2	3,7	2,5	2,3	2,9	0,4	0,7	4	0,3	3	2,3	3,7	2,1	2,5		
5.2.2.3	Does staff in contact with customers meet regularly with them to understand, gather and maintain their needs?	3,6	2,3	1,2	3,3	1,5	2,8	2,5	1	1,5	4,3	1,3	4,5	2	1,7	2,3	2,4		
5.2.2.4	Has the provider clearly documented your needs and follow up on them?	4	1,9	1,3	3	2	2,3	2,4	1,1	0,8	2,3	1	4,5	2,3	1,3	1,9	2,2		
5.2.2.5	Does the provider cares for customer treatment (empathy, kindness, politeness) as a priority?	4,4	2,6	2,3	3,3	3,3	2,5	3,1	1,8	2	4	2,7	4,5	3,3	2,7	3,0	3,0		
5.2.2.6	Are staff in contact with customers focused on value to be delivered to customers?	4,4	2,2	1,8	3,7	2,3	3,2	2,9	1,2	1,5	4,3	3	4,5	3,3	2,3	2,9	2,9		
5.2.2.7	Is the provider management willing to take extra efforts to serve and satisfy the customer?	4,2	2,4	1,8	3,7	2,8	2,7	2,9	1,9	1,3	3,7	2	4,3	3	2,7	2,7	2,8		
5.2.2.8	Has the provider a clear catalogue to inform customers about offered services?	4,3	1,7	2,2	3,7	1,8	1,8	2,6	1,4	0,5	2,3	0,3	4	2,7	2,3	1,9	2,3		
5.2.2.9	Are services offered in the catalogue exhaustive and covering your needs?	4,6	1,3	1,8	3,3	1,5	1,5	2,3	0,7	0,3	1,7	0	3,7	1	3	1,5	1,9		
5.2.2.10	Has the provider clear service targets and levels of service agreed with the customer?	4,1	2,9	2	3,3	2,8	1,5	2,8	0,7	0,5	2,7	1	3,8	2	1,3	1,7	2,2		
5.2.2.11	Does the provider meets regularly with the customer to demonstrate commitments achievement?	3,4	2,8	1,5	2,7	1,8	1,3	2,3	0,9	0,7	2,3	1,3	3,7	1,7	0,7	1,6	1,9		
5.2.2.12	Does the provider management controls regularly services achievement?	4,9	2,7	2,3	3,3	2	2,2	2,9	1,1	1,2	3	2	3,8	1,7	2,7	2,2	2,6		
5.2.2.13	Is the provider used language language adapted to the customer needs and explain issues in a clear manner?	4,7	2,6	2,2	4	2,8	2	3,1	1,2	1,7	4	2,3	5	4,3	2,3	3,0	3,0		
5.2.2.14	Are there formal mechanisms to inform you on security issues and gather security needs?	3,4	3	2,2	3,7	2,7	1,2	2,7	2,6	1,8	2	0,7	3,3	1,7	1	1,9	2,3		
5.2.2.15	Are there formal mechanisms to gather business continuity needs?	3,8	3	2,2	4,7	1,2	1,3	2,7	2,8	2,3	2,7	1,3	3,8	2,3	0,7	2,3	2,5		

	EDBA OSOMM Global Maturity Analysis	O21 OE1	O2 OE2	O3 OE3	O10 OE4	O11 OE5	O22 OE6	External	O20 OI1	O5 OI2	O6 OI3	O12 OI4	O14 OI5	O1 OI6	O4 OI7	Internal	Organisation's Maturity Average	Domain Average	Maturity
5.2.3	**User care**	**4,2**	**2,2**	**1,8**	**3,1**	**2,6**	**1,7**	**2,6**	**1,2**	**1,4**	**2,9**	**1,8**	**4,1**	**3,6**	**2,0**	**2,4**	**2,5**	**2,5**	**2,5**
5.2.3.1	Is there a well established SPOC for users to deal with user issues (requests incidents and complaints)?	4,2	3,1	3,4	4	4	1,6	3,4	2,1	2,4	3,8	2,8	4,4	4	2,6	3,2	3,3		
5.2.3.2	Has the provider established tools for managing users relationships?	3,8	2,7	2	3,8	2,4	1,4	2,7	1,5	1,5	2,5	1,3	3,9	2,3	2,1	2,2	2,4		
5.2.3.3	Does the provider cares for users treatment (empathy, kindness, politeness) as a priority?	4,4	2,7	2,6	3,3	2,9	2,5	3,1	1,7	2,1	4	2	4,5	3,8	2,9	3,0	3,0		
5.2.3.4	Is the provider management willing to take extra efforts to serve and satisfy you?	4,3	2,9	2	3,3	3	2,1	2,9	1,9	1,9	3,3	2,5	4,8	3,3	2,5	2,9	2,9		
5.2.3.5	Are staff in contact with users focused on delivering a good service to users?	4,8	3	2,1	3,3	3,3	2,6	3,2	1,1	1,3	3,8	2,3	4,1	4	2,4	2,7	2,9		
5.2.3.6	Has the provider implemented regular surveys to gather data about users satisfaction?	4,2	1,7	1,1	2,3	2,1	0,8	2,0	0	0,6	1,5	1,5	3,8	3,3	1,1	1,7	1,9		
5.2.3.7	In case of service failure, does impacted users are correctly informed?	3,8	2,2	1,8	2,5	2,4	2	2,5	0,8	1,3	2,8	2	4,1	4	2,1	2,4	2,4		
5.2.3.8	Does staff who communicate with users use a language adapted to the users?	4,8	1,4	1,4	3,3	2,9	2	2,6	1,1	1,2	3,3	1,8	4,5	4,3	2	2,6	2,6		
5.2.3.9	Is there a clear documented catalogue with specific services for users?	3,8	0,3	0	2	0,4	0,4	1,2	0,5	0,6	1,3	0,3	2,8	3,3	0,5	1,3	1,2		

	EDBA OSOMM Global Maturity Analysis	O21 OE1	O2 OE2	O3 OE3	O10 OE4	O11 OE5	O22 OE6	External	O20 OI1	O5 OI2	O6 OI3	O12 OI4	O14 OI5	O1 OI6	O4 OI7	Internal	Organisation's Maturity Average	Domain Average	Maturity
5.3	**Internal Provider Maturity aspects**							**2,6**								**1,8**	**2,2**	**2,2**	**2,2**
5.3.1	**Service Provider Culture and Collaboration**	**4,1**	**2,1**	**2,0**	**3,4**	**1,6**	**2,0**	**2,5**	**1,1**	**1,3**	**2,1**	**1,5**	**3,6**	**1,6**	**1,8**	**1,9**	**2,2**	**2,2**	**2,2**
5.3.1.1	Are there specific service quality procedures and controls in place?	3,2	2,3	2,3	3,5	1,8	1,8	2,5	0,3	0,8	2,5	3	4	2	2,5	2,2	2,3		
5.3.1.2	Is provider's staff committed to use technology to support services rather than being technically oriented?	3,7	1,8	1,3	3,5	2,3	3	2,6	1,2	1,8	3	3	4	2,5	2	2,5	2,6		
5.3.1.3	Do different departments communicate and work together with the scope of delivering quality services?	4,2	1,7	1,8	3	1,8	3	2,6	0,5	1,5	3	3	4	2,5	2	2,4	2,5		
5.3.1.4	Are there formal service oriented practices, processes and procedures in place?	4,8	3,4	2,5	4	2,8	2,8	3,4	1,7	1,8	0,5	1,5	3,5	2,5	3	2,1	2,7		
5.3.1.5	Are there mechanisms to organise and maintain the provider's organisation to align to service provision?	4,8	2,7	1,3	2,5	0,8	3	2,5	1	0,8	1,5	1,5	4	2	1,5	1,8	2,1		
5.3.1.6	Are implemented service oriented practices, processes and procedures followed by the provider's staff?	4	2,3	2	2,5	1,8	3	2,6	1,3	0,8	0,5	2	3,5	2	2	1,7	2,2		
5.3.1.7	Are there specific documented mechanisms to identify improvements?	4,2	1,8	1,8	2,5	1,5	1,5	2,2	0,6	0,8	2	1	3,5	1	1,5	1,5	1,9		
5.3.1.8	Are continuous improvements procedures in place to chose and implement improvements?	4	1,2	1,5	3	0,8	0,8	1,9	0,4	1,3	2,5	1,5	3,5	0,5	1,5	1,6	1,7		
5.3.1.9	Is there a specific team to coordinate improvement activities?	4,3	0,9	0,8	1,5	0	0,5	1,3	0,3	0	1,5	0,5	3	1	0,5	1,0	1,2		
5.3.1.10	Are security requirements documented and informed to all provider's staff?	4,2	2,8	3,3	4	2,3	2,3	3,2	2,4	2,3	3,5	2	4	1,5	2	2,5	2,8		
5.3.1.11	Are there specific mechanisms in place to warranty the security of information according to business needs?	3,2	3,4	2,5	4,5	1,8	2,3	3,0	1,7	1,8	3	1,5	3	1	0,5	1,8	2,4		
5.3.1.12	Are continuity requirements fulfilled in technical terms according to business needs on a regular basis?	4,8	2,3	3,3	5	1,5	1,8	3,1	1,8	1,5	2,5	0,5	3,5	2	1,5	1,9	2,5		
5.3.1.13	Are service risks conveniently identified, analysed, documented and managed?	3,8	1,6	2,8	4,5	2,3	1	2,7	1,6	1,8	2	0	3,5	1,5	2	1,8	2,2		
5.3.1.14	Are service costs correctly accounted, understood and maintained?	4,2	0,9	0,8	3,5	0,5	1,8	2,0	0,8	0,5	1,5	0	4	0,5	2,5	1,4	1,7		

	EDBA OSOMM Global Maturity Analysis	O21 OE1	O2 OE2	O3 OE3	O10 OE4	O11 OE5	O22 OE6	External	O20 OI1	O5 OI2	O6 OI3	O12 OI4	O14 OI5	O1 OI6	O4 OI7	Internal	Organisation's Maturity Average	Domain Average	Maturity
5.3.2	**Service Provider Strategy and Leadership**	**4,5**	**1,7**	**1,7**	**3,5**	**1,7**	**1,7**	**2,5**	**0,8**	**0,8**	**2,4**	**1,0**	**4,0**	**1,3**	**1,5**	**1,7**	**2,1**	**2,1**	**2,1**
5.3.2.1	Does the provider has a clear documented strategy to serve customers?	5	0,6	0,5	4	0,5	1	1,9	0,8	0,5	1	0,5	4,5	0,5	1,5	1,3	1,6		
5.3.2.2	Is the staff aware of the provider's strategy and use it as a reference for their work?	4,3	0,2	0	2,5	0	1	1,3	0,6	0	2	0	4	1	0,5	1,2	1,2		
5.3.2.3	Is the provider's strategy aligned with the customers and business strategy?	4,8	1,3	0	2,5	0	1,5	1,7	1	0,8	3,5	0	4	0,5	2	1,7	1,7		
5.3.2.4	Is there a well established mechanism to analyse and decide which service to provide?	5	2,6	3,5	5	2,3	1,8	3,4	0,8	1,3	4	0,5	4,5	1	2,5	2,1	2,7		
5.3.2.5	Is service performance measured considering the end-ti-end service?	4,2	0,4	1,3	4,5	1,5	1,3	2,2	0,2	0	1	0,5	3,5	2	0,5	1,1	1,7		
5.3.2.6	Does the provider's management follow up on service performance?	4	2,8	2,5	3,5	2,8	1,5	2,9	1	1,3	2	1,5	4	2	0,5	1,8	2,3		
5.3.2.7	Are provider's management decisions based on services (value to be delivered to customers rather than income)?	4	1,9	2,8	4,5	2,5	1,5	2,9	1,6	1	3	1,5	4,5	2	2	2,2	2,5		
5.3.2.8	Is the provider's management concerned and participate in services creation?	4,8	3,3	2,5	5	2,3	2,3	3,4	1,3	1,8	3,5	2	4,5	2	1,5	2,4	2,9		
5.3.2.9	Does the provider's management controls regularly services achievements?	4,2	3,4	2,8	3,5	2,8	2,8	3,3	0,8	1,5	2,5	1	3,5	2,5	2,5	2,0	2,6		

	EDBA OSOMM Global Maturity Analysis	O21 OE1	O2 OE2	O3 OE3	O10 OE4	O11 OE5	O22 OE6	External	O20 OI1	O5 OI2	O6 OI3	O12 OI4	O14 OI5	O1 OI6	O4 OI7	Internal	Organisation's Maturity Average	Domain Average	Maturity
5.3.3	**Human Resources Management**	**4,6**	**1,6**	**1,7**	**2,8**	**2,0**	**2,0**	**2,4**	**0,7**	**0,7**	**2,3**	**1,1**	**3,6**	**0,8**	**1,5**	**1,5**	**2,0**	**2,0**	**2,0**
5.3.3.1	Is the provider's staff competent and specifically trained for services?	5	2,8	3,3	3	3,3	2,5	3,3	1,3	1,8	3,5	3	4,5	1,5	3	2,7	3,0		
5.3.3.2	Is there management recognition for excellent services delivery?	4,5	1,6	1,5	3,5	2,3	2,5	2,7	0,3	0,3	2,5	1	4	1	1	1,4	2,0		
5.3.3.3	Are there specific staff rewards for excellent quality services delivered?	3,8	0,2	0	1,5	0	1	1,1	0,2	0	0,5	0	2,5	0,5	0	0,5	0,8		
5.3.3.4	Does the provider manage and hire sufficient resources to meet services required performance?	5	1,6	1,8	3	2,3	2	2,6	0,8	0,5	2,5	0,5	3,5	0	2	1,4	2,0		

	EDBA OSOMM Global Maturity Analysis	O21 OE1	O2 OE2	O3 OE3	O10 OE4	O11 OE5	O22 OE6	External	O20 OI1	O5 OI2	O6 OI3	O12 OI4	O14 OI5	O1 OI6	O4 OI7	Internal	Organisation's Maturity Average	Domain Average	Maturity
5.3.4	**Service failure prevention and treatment**	**4,3**	**2,3**	**2,1**	**3,8**	**2,7**	**2,3**	**2,9**	**1,4**	**1,4**	**1,5**	**1,8**	**3,0**	**2,0**	**2,8**	**2,0**	**2,4**	**2,4**	**2,4**
5.3.4.1	Are there specific procedures in place to prevent users issues?	4,2	1,6	2,5	4,5	3,3	3	3,2	1,4	1,8	1	2,5	3	1,5	3	2,0	2,6		
5.3.4.2	Is there a proactive attitude instead of a reactive attitude to prevent users issues?	4	1,7	1,3	4	2,3	1,5	2,5	1	1	1,5	1,5	2,5	1	2,5	1,6	2,0		
5.3.4.3	Are there specific procedures in place to solve systems breakdowns?	4,8	3,8	3	3,5	3,8	3,3	3,7	2	2,5	2,5	2,5	3	3,5	3,5	2,8	3,2		
5.3.4.4	Are there procedures in place to avoid reoccurrence of known dysfunctions?	4,2	2,1	1,5	3	1,5	1,5	2,3	1,1	0,3	1	0,5	3,5	2	2	1,5	1,9		

	EDBA OSOMM Global Maturity Analysis	O21 OE1	O2 OE2	O3 OE3	O10 OE4	O11 OE5	O22 OE6	External	O20 OI1	O5 OI2	O6 OI3	O12 OI4	O14 OI5	O1 OI6	O4 OI7	Internal	Organisation's Maturity Average	Domain Average	Maturity
5.3.5	**Technology Management**	**3,6**	**2,4**	**2,4**	**4,2**	**1,9**	**2,0**	**2,7**	**1,7**	**1,6**	**2,2**	**2,0**	**2,8**	**2,1**	**2,1**	**2,1**	**2,4**	**2,4**	**2,4**
5.3.5.1	Are systems changes conveniently managed and controlled?	3,2	3,4	3,3	4	2,3	2,5	3,1	1,4	1,8	2	1,5	3	2,5	3	2,2	2,6		
5.3.5.2	Are services fully tested and dully informed before deployment?	3	3,6	2	5	2,3	2,3	3,0	1,7	1,3	1,5	1,5	3	2,5	2,5	2,0	2,5		
5.3.5.3	Is there a well performed knowledge transfer to users and support staff before deployment?	3,8	2,2	1,3	4,5	2	1,5	2,6	1	1	2,5	1	3	1,5	1	1,6	2,1		
5.3.5.4	Is there a strong design of services to cover availability needs?	4	2,8	3,3	5	2,8	3	3,5	1,7	1,8	2,5	0,5	3	4	3	2,4	2,9		
5.3.5.5	Is there sufficient capacity of resources to respond to specific performance needs?	4,8	2,3	3,3	5	2,3	2,5	3,4	2,3	2	2,5	2	2,5	3	3	2,5	2,9		
5.3.5.6	Are the provider's projects focused in services and value creation?	4,2	3,1	2,8	4,5	2,5	2,3	3,2	2,1	2,3	3,5	1,5	3	1,5	2,5	2,3	2,8		
5.3.5.7	Is there a system in place to document service components and interactions between components?	3,3	1,4	2,3	4	1	0,8	2,1	1,9	2	1,5	9	3	1,5	1,5	2,9	2,5		
5.3.5.8	Are there specific procedures in place to manage licenses, user profiles and accesses?	2,8	1,7	1,3	3	0,5	1,5	1,8	1,6	1	2	0,5	2,5	2	1	1,5	1,7		
5.3.5.9	Is there assurance of data preservation and recovery in case of data loose?	4	2,8	3	5	2,3	2,8	3,3	2,6	2,8	3,5	2,5	3,5	2,5	3	2,9	3,1		
5.3.5.10	Are archives and preserved information secured and regularly tested for retrieval?	2,8	0,4	0,9	2	0,6	0,4	1,2	0,9	0,4	0,5	0,3	1,5	0,3	0,5	0,6	0,9		

TABLE 49 : SERVICE ORIENTATION MATURITY DATA SHEET

Source: Martin Cross

Annex 29: Global IT service provides maturity report

UNIVERSITÉ LYON III INSTITUT D'ADMIN-ISTRATION DES ENTRE-PRISES

BUSINESS SCIENCE INSTITUTE

DOCTORATE in BUSINESS ADMINISTRATION

Martin CROSS

Global maturity assessment

Sample of 13 IT service providers of financial insti-

Maturity profile

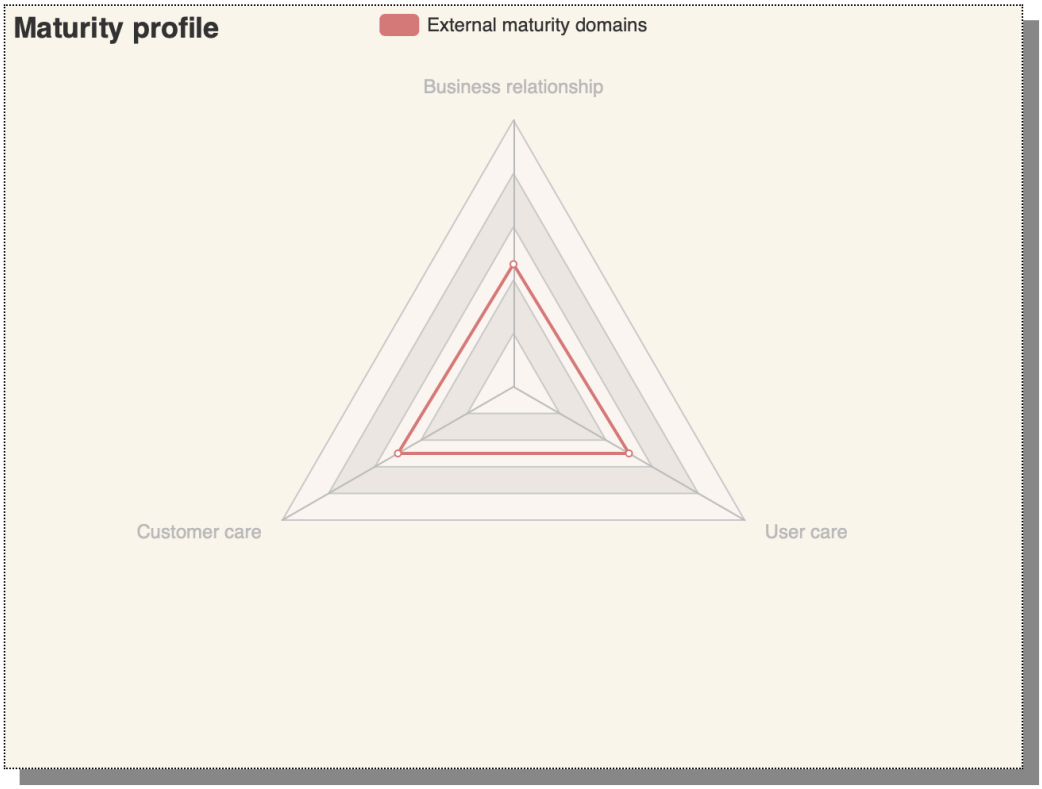
2.3

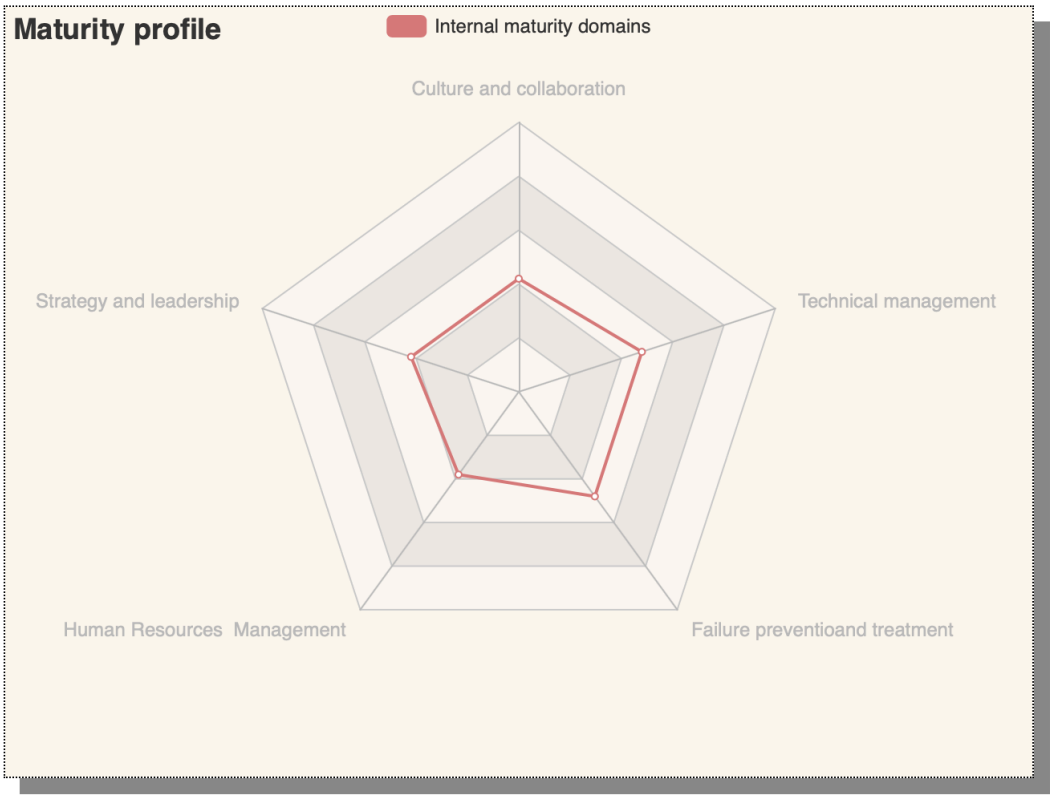
tutions in Luxembourg

The above maturity profile was calculated from data of 13 IT service providers of financial institutions in Luxembourg using the OSOMM maturity model. This report is based on the standard OSOMM report as described in the OSOMM model. This profile represents the current status of the studied organizations and is subject to change overtime. Assessment period:

November 2019- March 2020

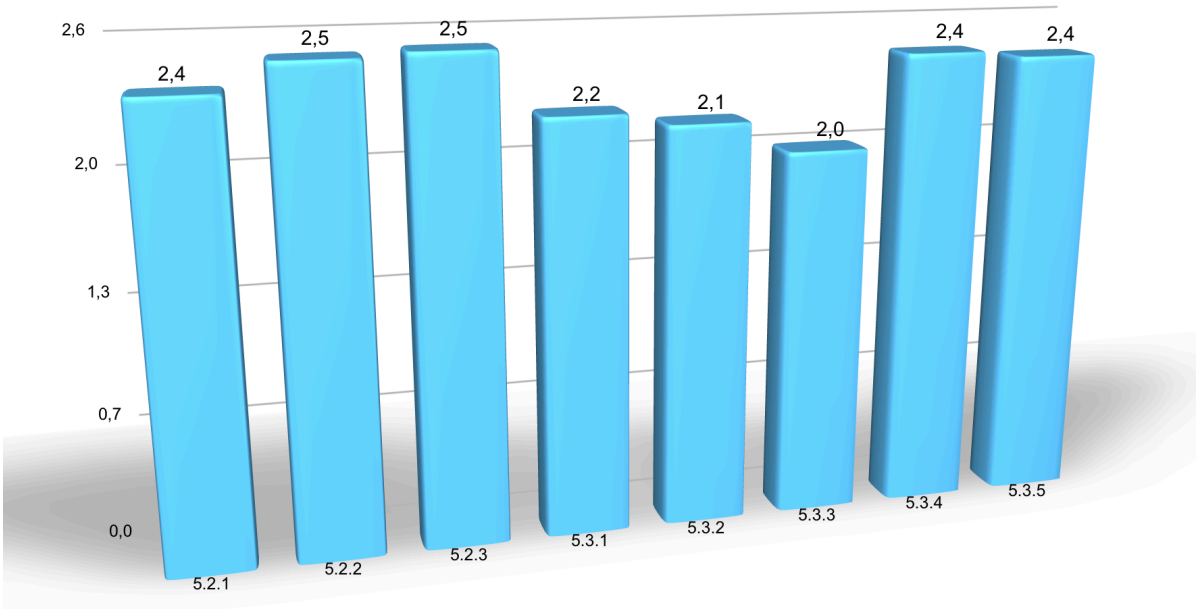
Global IT service providers of Financial Institutions in Luxembourg Maturity profile





	EDBA OSOMM Global Maturity Analysis	2,3
		Global
5.2	External Provider Maturity Aspects	2,5
5.2.1	Business Relationship	2,4
5.2.2	Customer care	2,5
5.2.3	User care	2,5
5.3	Internal Provider Maturity aspects	2,5
5.3.1	Service Provider Culture and Collaboration	2,2
5.3.2	Service Provider Strategy and Leadership	2,1
5.3.3	Human Resources Management	2,0
5.3.4	Service failure prevention and treatment	2,4
5.3.5	Technology Management	2,4

Global maturity profile



Conclusions

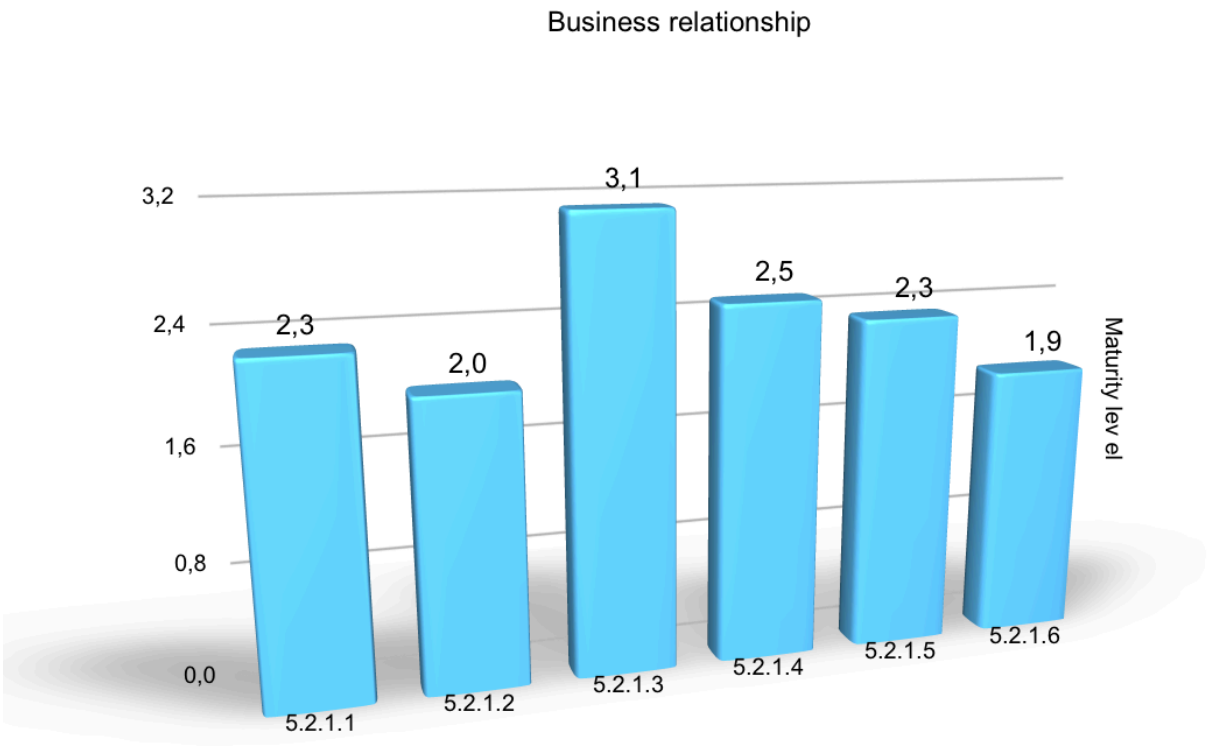
A maturity assessment provides a view based on the data gathered at the different interviews and depend on the perception of the interviews persons, their role and their representativity related to the provides practices. It is a representation of a perceived reality at a specific historical moment. The intention is to understand the operations at the moment of the assessment and by no means shall be used to judge the organization and people. The assessment results shall be used as a departure point and guide for an improvement plan. From any achieved level there will always be improvement possibilities to achieve a desired intermediate level to a final desired state.

The global maturity of the studied organizations is 2,3, which means that all required actions and activities to obtain specific results have been documented and are known. The expected actions or activities are fully implemented and their objective is fulfilled. Operations are reactive and repeatable. The focalization is output oriented with basic customer relationship activities. Teams begin to work together for the realization of the required activity or action and basic information exchanges are in place. Required processes are documented but not completely implemented and expected results are known and achieved. Activities and actions are more focused on user satisfaction than customer satisfaction.

Technical-collaborative level.

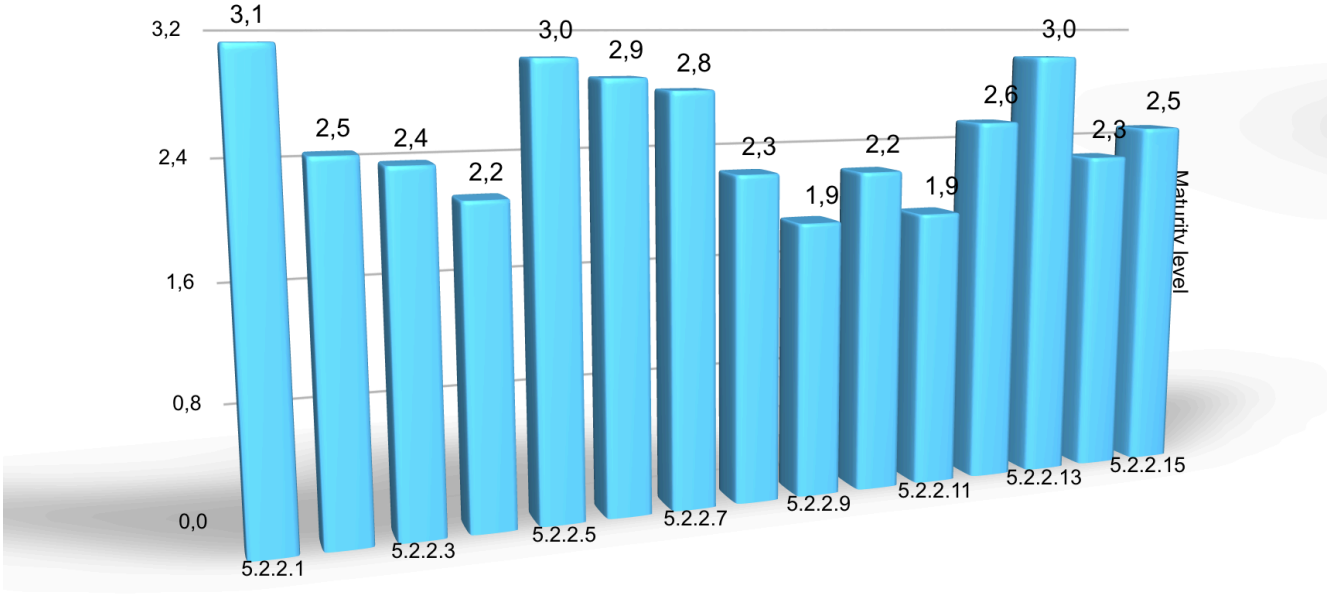
The highest scores are obtained in external aspects for customer care and user care which denotes a strong customer and user focalization. Nevertheless business relationship is as well strong. For internal aspects there is a strong technical control and failure treatment. More emphasis is needed in culture and collaboration and strategy and leadership to prepare the path for level 3. The weakest point is human resource management, which is the only value below 2. This is it is still at level 1 but close to level 2.

All together level 2 is well established but needs improvements to evolve into level 3. For that it will be required to get more involved with the customers and the business to better understand their needs. More specific documentation in the catalogue and more measurements to control services end-to-end. It is required to evolve from a controlling technology perspective into a more controlling contribution to fulfill the customer's needs.



The global maturity for this domain is 2,3

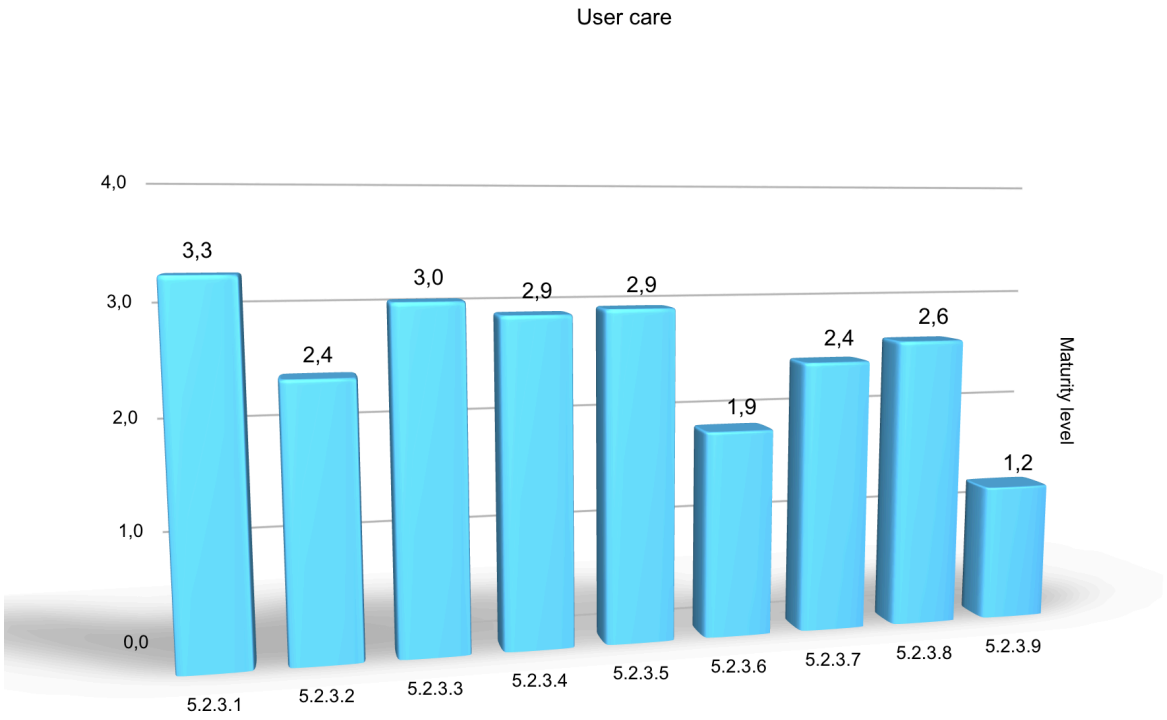
In the business relationship domain, there is an average slightly above 2. The strongest point is The point 5.2.1.3 Understanding the business of the customers, which is not surprising considering the high level of specialization of the country in financial services (as exposed in the context description). What is surprising is he lack of financial tools to control the expenditure and costs of services, shown in point 5.2.1.6. Another point to note is the lack of understanding of the business strategy. These two points need to be addressed as a priority to increase maturity. The relationship with the business, communication with the business and the business sponsorship are slightly above 2. This means that organizations are still in the transformation struggle to evolve from a technically oriented provider into a more customer oriented organization. The studied providers need to make some efforts to get more involved with the business and better present their role within the business. They need to evolve form a business view of a cost center into a collaborative view to help the business in the achievement of their objectives.



The global maturity for the Customer care domain is 2,5

In the customer care domain there is a well-established SPOC (5.2.2.1), a strong focalization for customers (5.2.2.5) and an adapted language to communicate with the business (5.2.2.13). These points reach level 3. Even if not at level 3, it is interesting to note a strong focalization for value delivery for customers (5.2.2.6) and a strong willingness to satisfy the customer (5.2.2.7).

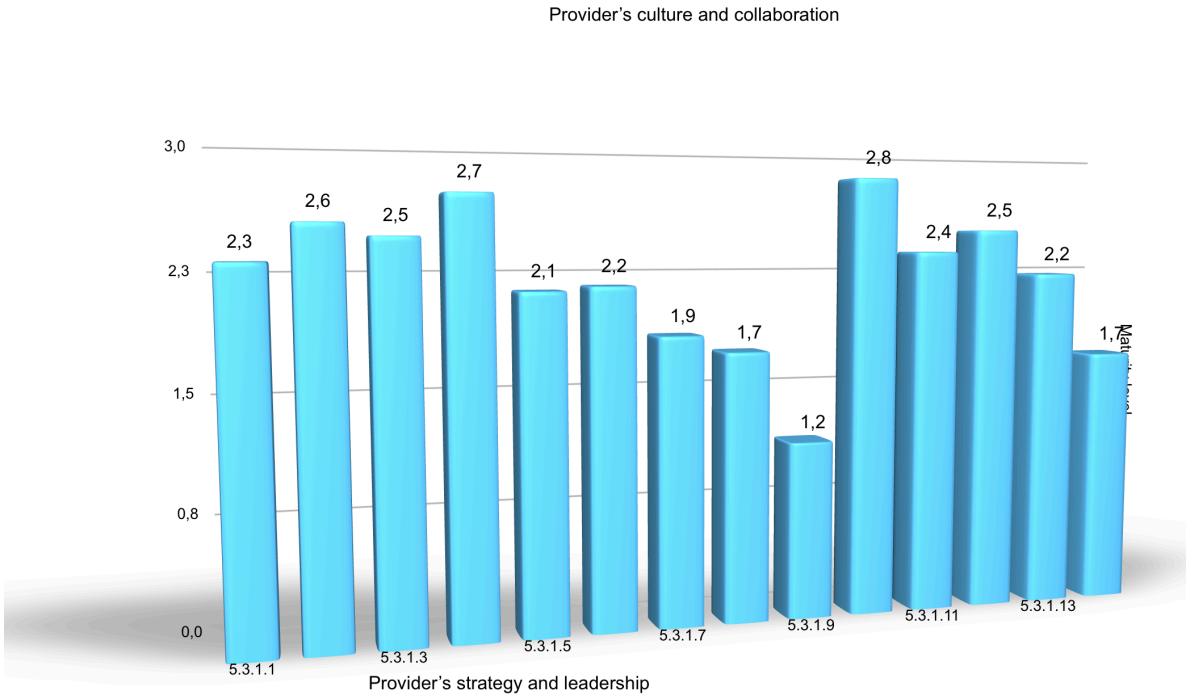
The weakest points in this domain are the exhaustivity of a service catalogue (5.2.2.9) and meeting regularly with he customers (5.2.2.13). More attention needs to be taken into the documentation of the needs of the customers and specifically follow up the actions taken to fulfill them (5.2.2.4) and of course in the documentation of a service catalogue (5.2.2.8). Two other points that need attention are the negotiation more service-oriented SLAs (5.2.2.10) and work on information security and the distribution of security information to all incumbent stakeholders (5.2.2.14).



The global maturity for the User care domain is 2,5

There is a well-established SPOC for users (5.2.3.1) as well as a strong focalization for user treatment and satisfaction (5.2.3.3). Interesting to note as well the management and staff commitment to satisfy the users (5.2.3.4 and 5.2.3.5). Nevertheless there is little information about the user satisfaction. It is important to promote the usage of surveys to gather data on users satisfaction (5.2.3.6) and the availability of a user view of services in a catalogue.

This maturity is consistent with the field observations and the exploratory research results in which it was not detected any issue related to the management of technical aspects specific for users.



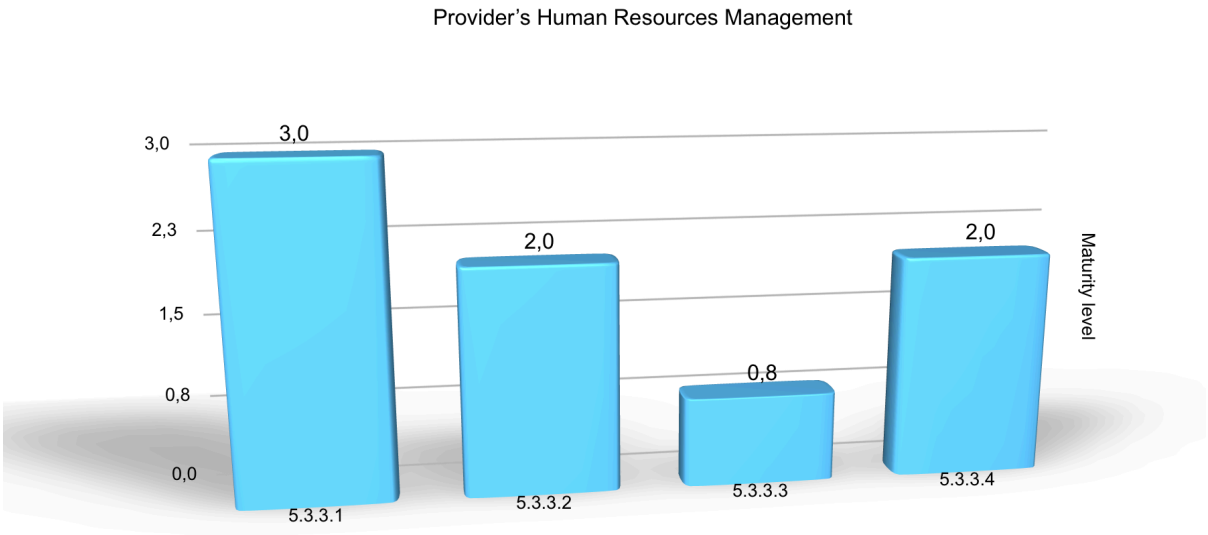
The global maturity for the provider's culture and collaboration domain is 2,2

This domain scores slightly lower than all of the external domains. The strongest point is clearly the information to all staff members about security issues (5.3.1.10), which is interesting considering that in the customer area this is one point of attention. Nevertheless both values are in the range of level 2, which will require similar actions to increase the maturity level to the third level. Another strong point is the established processes and procedures (5.3.1.4). This is consistent with field observations in which providers are implementing ITIL guidance version 2011, which is based on processes. As a reminder the field observation is that organizations are implementing ITIL practices but are struggling to do it. Considering the maturity level of this point 2,6 means that organizations are implementing the ITIL recommended processes but a re not mature enough in terms of quantity of recommended processes implemented as well as in the maturity of these processes being still quite technical and not enough customer oriented. The weakest point is the lack of a specific improvement team (5.3.1.9) and the understanding of service costs (5.3.1.14). Both points need treatment.

The global maturity for the provider's strategy and leadership domain is 2,1

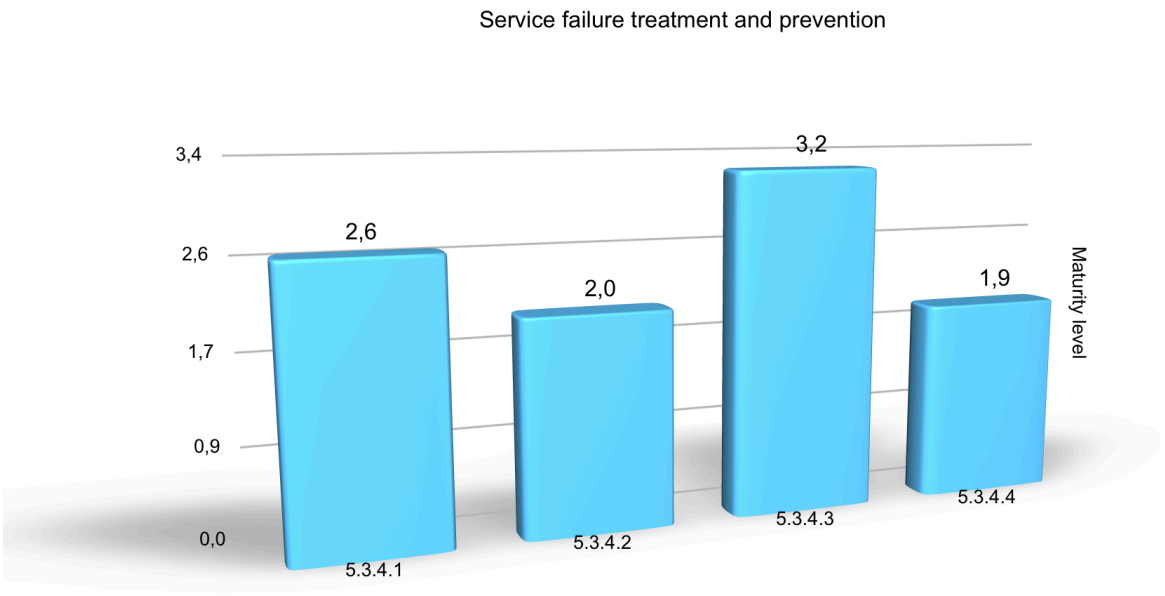
While most of the points are well established in level 2 there are 4 points that scored less than two. This is the case of the lack of a clear documented IT service provider strategy to support he customers (5.3.2.1). The lack of this strategy complexifies the relationship and communication with the customer and the understanding of their needs. The weakest point of this domain is obviously the lack of knowledge about the provider's strategy and the alignment with the strategy of the business (5.3.2.2 and 5.3.2.3). Finally the lack of service measurements (5.3.2.5) with is consistent with the lack of customer oriented SLAs. This means that providers are still struggling with the evolution towards a service-oriented organizations and are more technically oriented. It is important that providers focus on the usage of technology to support the needs of the business.

The strongest point is the involvement and concern of the IT provider's management participating in the creation of services. It is interesting to note as well points related to the mechanisms to analyze and decide on service provision (5.3.2.4) and the management involvement in controlling service achievements (5.3.2.9)



The global maturity for the Human Resources management domain is 2,0

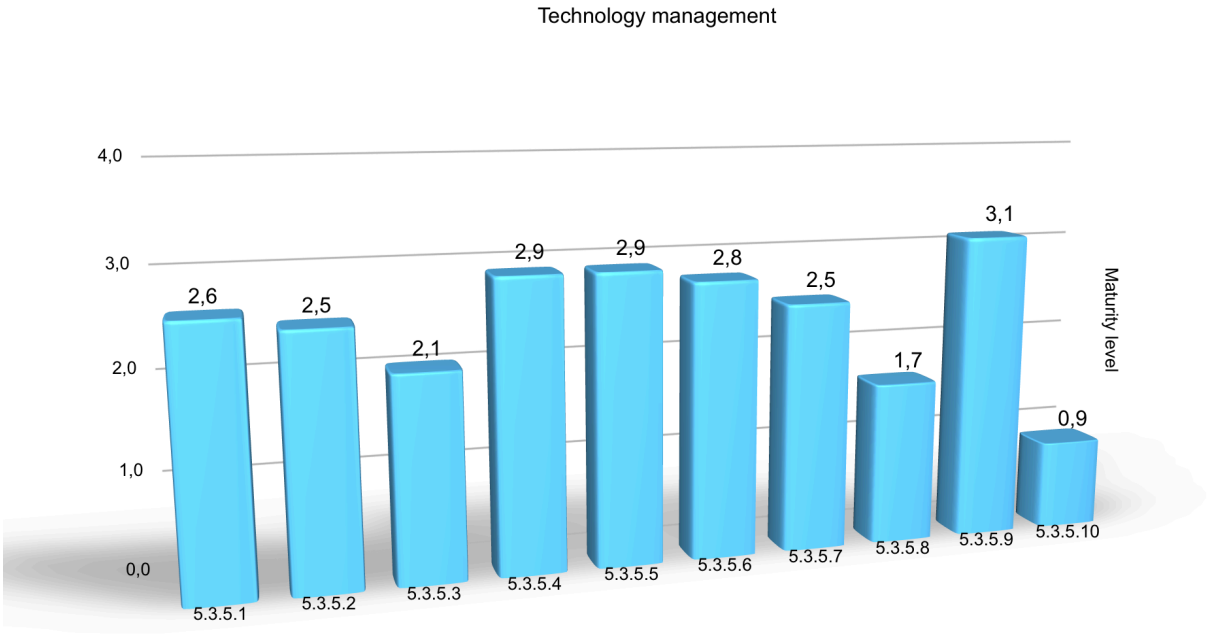
This score is the lowest of all the domains, so globally a special attention needs to be taken into account to improve the management of internal resources to maintain motivation and commitments. The strong point is that staff is competent in technical matters and they have been specifically trained for services (5.3.3.1). The weakest point is the recognition of staff performance and rewards (5.3.3.3). This point is rather important because if staff his not recognized on their efforts to maintain a high service quality standard, motivation will slowly drop down. This aspect might be influenced as well by the fact that there is no specific improvement team because if staff members recognize improvement opportunities and there is no channel of communication to promote them or their suggestions are not taken into account, the improvement spirit will was well drop down.



The global maturity for the Failure treatment and prevention domain is 2,4

The strongest point in this domain is the mature implemented procedures to handle and solve user incidents and breakdowns. This score is consistent with the field observations that the most implemented processes of ITIL are Incident Management and Change Management. These processes help a lot in the activities of this domain. As well consistent with the exploratory research results for the level of ITIL implementation that show as well that the above-mentioned processes are the most implemented.

Nevertheless proactivity and avoidance of recurring incidents and dysfunctions (5.3.4.2 and 5.3.4.4 scored relatively low (1,9 and 1,8 respectively). This means that organizations are struggling with the treatment of dysfunctions and are not investing time in the avoidance of such dysfunctions. This will have as a consequence that the dysfunctions will reoccur, having to treat similar cases many times instead of eradicate them.



The global maturity for the Technology management domain is 2,4

The strongest point is the assurance of data preservation and recovery in case of data loose (5.3.5.9). While this aspect is essential for the well functioning of the organization and the manipulation of the information, it remains a technical activity. This consolidates the maturity view of providers still technically oriented. Curiously the weakest point is as well related to data preservation, in this case related to the archives. While backups warrant the recovery in case of system failures, archives warrant the preservation of important information according to business needs and legal implications. Therefore it is essential to warrant archive recovery. If preserved data is not tested for recovery it might be impossible to retrieve if once needed. It is a common field observation that organizations that do not test regularly archives for retrieval find themselves in a situation in which the devices for data retrieval are not anymore available or not compatible with the actual systems. Interesting to note as well the wackiness of licenses and access management with is an essential issue for security.

SWOT

Considering that the global maturity profile is 2,3, there is substantial room for improvement to reach level 3. Level 2 is still quite technically oriented with low team collaboration and weak relationship with customers and the business. These aspects need to improve as well as consolidating the results of the services by measuring them more precisely and more service-oriented. More controls in the results are required and a specific attention to the management of the provider's staff and recognition of service performance and rewards.

Strengths and opportunities are based on the best scores, which are over 3 or slightly lower. In the same manner weaknesses and Threats are based on the lowest scores inferior to 1,6.

Strengths

Security requirements are documented and informed to all IT staff

Provider's management is concerned and participates in service creation

Provider's staff is highly competent and trained for services

There are strong-implemented procedures to solve systems breakdowns

There are sufficient available resources to cover the availability needs of the business

There is sufficient capacity and performance

Projects are focused on services improvement

There is assurance of data preservation and recovery

Weaknesses

Lack of a specific team to coordinate and work on improvements

Service costs are not correctly accounted

Lack of a clear and documented IT provider's strategy

IT provider's staff unawareness of the provider's strategy

Lack of end-to-end service performance measurement

There are no specific mechanisms in place to recognize excellent service provision

There are no specific rewards for excellent service provision

Missing procedures in place to manage licenses and accesses

Lack of regular tests of archives retrieval

Opportunities

There is a strong understanding of the business of the customers

There is a well-established SPOC for customers

Provider care for customer treatment

Staff in contact with customers is focused on value delivery

Provider is willing to take extra efforts to serve their customer

Staff in contact with customers uses an adapted language

There is a well-established SPOC for users

Providers care for user treatment

Providers are willing to take extra efforts to serve the users

Security requirements are well informed

Threats

There is no specific user's view of the service catalogue

Recommendations

Recommendations are based on the achieved level as a departure point for an improvement program. There is no obligation of execution and each organization must decide on the actions to take and their priority. The following recommendations are the main topics suggested but are by no means neither exhaustive nor detailed. Other issues might be addressed as well according to the providers needs. While choosing any of the presented areas, a detailed improvement plan shall be documented with the specific actions, timeframes and roles needed to improve the specific area.

Considering the context of the organization it is recommended:

1. Improve the service catalogue to include missing services
2. Promote an agenda to meet more regularly with customers to demonstrate service achievements
3. There is no specific user's view of the service catalogue
4. Promote the establishment of regular surveys to control user's satisfaction
5. Establish financial tools to valuate services and make financial analysis
6. Promote procedures to identify improvements
7. Promote procedures to choose improvements and follow up their implementation
8. Lack of a specific team to coordinate and work on improvements
9. Promote specific service accountancy
10. Document IT provider's strategy aligned to the strategy of the business
11. Inform IT provider's staff about of the provider's strategy
12. Promote and end-to-end service performance measurement
13. Promote specific mechanism to recognize and rewards excellent service provision
14. Missing procedures in place to manage licenses and accesses
15. Establish specific procedures to control human resources needs and performance
16. Promote a proactive attitude to avoid dysfunctions and prevent incidents
17. Establish procedures for the management of licenses and accesses
18. Establish regular procedures to tests archives retrieval

Annex 30: Internal/External providers maturity profile

	EDBA OSOMM Global Maturity Analysis	External	Internal	Organisation's Maturity Average	Domain Average	Maturity	2,3
5	Global Maturity Profile	2,5	2,1	2,3	2,3	2,3	
5.2	External Provider Maturity Aspects	2,6	2,3	2,4	2,4	2,4	

5.2.1	Business Relationship	2,5	2,2	2,3	2,3	2,3
5.2.1.1	Is there a well established relationship between the provider and the business at strategic level?	2,3	2,3	2,3		
5.2.1.2	Does the provider understands and is aware of the business strategy?	1,8	2,2	2,0		
5.2.1.3	Does the provider understand the business of its customers?	3,1	3,1	3,1		
5.2.1.4	Does the provider communicate clearly with the business to demonstrate the provider added value?	2,7	2,3	2,5		
5.2.1.5	Is there a clear established sponsorship from the business to the provider for Service Orientation matters?	2,5	2,0	2,3		
5.2.1.6	Has the provider established clear financial tools to valuate services and inform customers about service costs?	2,3	1,4	1,8		

5.2.2	Customer care	2,7	2,3	2,5	2,5	2,5
5.2.2.1	Is there a well-established Single Point Of Contact for customers?	3,4	2,8	3,1		
5.2.2.2	Has the provider established tools for managing customer relationships?	3,0	1,8	2,4		
5.2.2.3	Does staff in contact with customers meet regularly with them to understand, gather and maintain their needs?	2,3	2,4	2,4		
5.2.2.4	Has the provider clearly documented your needs and follow up on them?	2,3	2,0	2,1		
5.2.2.5	Does the provider cares for customer treatment (empathy, kindness, politeness) as a priority?	3,0	3,1	3,0		
5.2.2.6	Are staff in contact with customers focused on value to be delivered to customers?	2,8	3,0	2,9		
5.2.2.7	Is the provider management willing to take extra efforts to serve and satisfy the customer?	2,9	2,7	2,8		
5.2.2.8	Has the provider a clear catalogue to inform customers about offered services?	2,5	1,9	2,2		
5.2.2.9	Are services offered in the catalogue exhaustive and covering your needs?	2,4	1,2	1,8		
5.2.2.10	Has the provider clear service targets and levels of service agreed with the customer?	2,6	1,8	2,2		
5.2.2.11	Does the provider meets regularly with the customer to demonstrate commitments achievement?	2,0	1,8	1,9		
5.2.2.12	Does the provider management controls regularly services achievement?	2,9	2,1	2,5		
5.2.2.13	Is the provider used language language adapted to the customer needs and explain issues in a clear manner?	2,9	3,1	3,0		
5.2.2.14	Are there formal mechanisms to inform you on security issues and gather security needs?	2,5	2,0	2,2		
5.2.2.15	Are there formal mechanisms to gather business continuity needs?	2,4	2,5	2,5		

5.2.3	**User care**	**2,5**	**2,5**	**2,5**	**2,5**	**2,5**
5.2.3.1	Is there a well established SPOC for users to deal with user issues (requests incidents and complaints)?	3,3	3,3	3,3		
5.2.3.2	Has the provider established tools for managing users relationships?	2,6	2,2	2,4		
5.2.3.3	Does the provider cares for users treatment (empathy, kindness, politeness) as a priority?	3,0	3,0	3,0		
5.2.3.4	Is the provider management willing to take extra efforts to serve and satisfy you?	2,9	3,0	2,9		
5.2.3.5	Are staff in contact with users focused on delivering a good service to users?	3,1	2,8	2,9		
5.2.3.6	Has the provider implemented regular surveys to gather data about users satisfaction?	1,9	1,8	1,8		
5.2.3.7	In case of service failure, does impacted users are correctly informed?	2,4	2,5	2,5		
5.2.3.8	Does staff who communicate with users use a language adapted to the users?	2,5	2,7	2,6		
5.2.3.9	Is there a clear documented catalogue with specific services for users?	1,1	1,5	1,3		

5.3.1	**Service Provider Culture and Collaboration**	**2,4**	**1,9**	**2,1**	**2,1**	**2,1**
5.3.1.1	Are there specific service quality procedures and controls in place?	2,5	2,1	2,3		
5.3.1.2	Is provider's staff committed to use technology to support services rather than being technically oriented?	2,5	2,6	2,5		
5.3.1.3	Do different departments communicate and work together with the scope of delivering quality services?	2,5	2,4	2,5		
5.3.1.4	Are there formal service oriented practices, processes and procedures in place?	3,3	1,9	2,6		
5.3.1.5	Are there mechanisms to organise and maintain the provider's organisation to align to service provision?	2,4	1,8	2,1		
5.3.1.6	Are implemented service oriented practices, processes and procedures followed by the provider's staff?	2,5	1,7	2,1		
5.3.1.7	Are there specific documented mechanisms to identify improvements?	2,1	1,5	1,8		
5.3.1.8	Are continuous improvements procedures in place to chose and implement improvements?	1,8	1,6	1,7		
5.3.1.9	Is there a specific team to coordinate improvement activities?	1,2	1,1	1,1		
5.3.1.10	Are security requirements documented and informed to all provider's staff?	3,0	2,6	2,8		
5.3.1.11	Are there specific mechanisms in place to warranty the security of information according to business needs?	2,6	2,0	2,3		
5.3.1.12	Are continuity requirements fulfilled in technical terms according to business needs on a regular basis?	2,9	2,0	2,4		
5.3.1.13	Are service risks conveniently identified, analysed, documented and managed?	2,6	1,7	2,2		
5.3.1.14	Are service costs correctly accounted, understood and maintained?	2,0	1,2	1,6		

5.3.2	**Service Provider Strategy and Leadership**	**2,4**	**1,7**	**2,1**	**2,1**	**2,1**
5.3.2.1	Does the provider has a clear documented strategy to serve customers?	1,9	1,3	1,6		
5.3.2.2	Is the staff aware of the provider's strategy and use it as a reference for their work?	1,2	1,3	1,2		
5.3.2.3	Is the provider's strategy aligned with the customers and business strategy?	1,7	1,6	1,7		
5.3.2.4	Is there a well established mechanism to analyse and decide which service to provide?	3,2	2,0	2,6		
5.3.2.5	Is service performance measured considering the end-ti-end service?	2,0	1,2	1,6		
5.3.2.6	Does the provider's management follow up on service performance?	2,5	2,0	2,2		
5.3.2.7	Are provider's management decisions based on services (value to be delivered to customers rather than income)?	2,7	2,3	2,5		
5.3.2.8	Is the provider's management concerned and participate in services creation?	3,1	2,5	2,8		
5.3.2.9	Does the provider's management controls regularly services achievements?	3,1	2,0	2,6		

5.3.3	**Human Resources Management**	**2,3**	**1,5**	**1,9**	**1,9**	**1,9**
5.3.3.1	Is the provider's staff competent and specifically trained for services?	3,3	2,6	2,9		
5.3.3.2	Is there management recognition for excellent services delivery?	2,4	1,5	2,0		
5.3.3.3	Are there specific staff rewards for excellent quality services delivered?	0,9	0,6	0,8		
5.3.3.4	Does the provider manage and hire sufficient resources to meet services required performance?	2,5	1,3	1,9		
5.3.4	**Service failure prevention and treatment**	**2,9**	**1,8**	**2,4**	**2,4**	**2,4**
5.3.4.1	Are there specific procedures in place to prevent users issues?	3,2	1,9	2,5		
5.3.4.2	Is there a proactive attitude instead of a reactive attitude to prevent users issues?	2,5	1,4	1,9		
5.3.4.3	Are there specific procedures in place to solve systems breakdowns?	3,7	2,7	3,2		
5.3.4.4	Are there procedures in place to avoid reoccurrence of known dysfunctions?	2,3	1,4	1,8		

5.3.5	**Technology Management**	**2,6**	**2,1**	**2,4**	**2,4**	**2,4**
5.3.5.1	Are systems changes conveniently managed and controlled?	3,1	2,0	2,6		
5.3.5.2	Are services fully tested and dully informed before deployment?	3,0	1,9	2,4		
5.3.5.3	Is there a well performed knowledge transfer to users and support staff before deployment?	2,3	1,7	2,0		
5.3.5.4	Is there a strong design of services to cover availability needs?	3,4	2,3	2,8		
5.3.5.5	Is there sufficient capacity of resources to respond to specific performance needs?	3,3	2,4	2,8		
5.3.5.6	Are the provider's projects focused in services and value creation?	3,1	2,3	2,7		
5.3.5.7	Is there a system in place to document service components and interactions between components?	2,0	3,2	2,6		
5.3.5.8	Are there specific procedures in place to manage licenses, user profiles and accesses?	1,7	1,6	1,6		
5.3.5.9	Is there assurance of data preservation and recovery in case of data loose?	3,3	2,9	3,1		
5.3.5.10	Are archives and preserved information secured and regularly tested for retrieval?	1,1	0,7	0,9		

Table 50 : Maturity profile per type of provider (Internal/External)

Source: Martin Cross

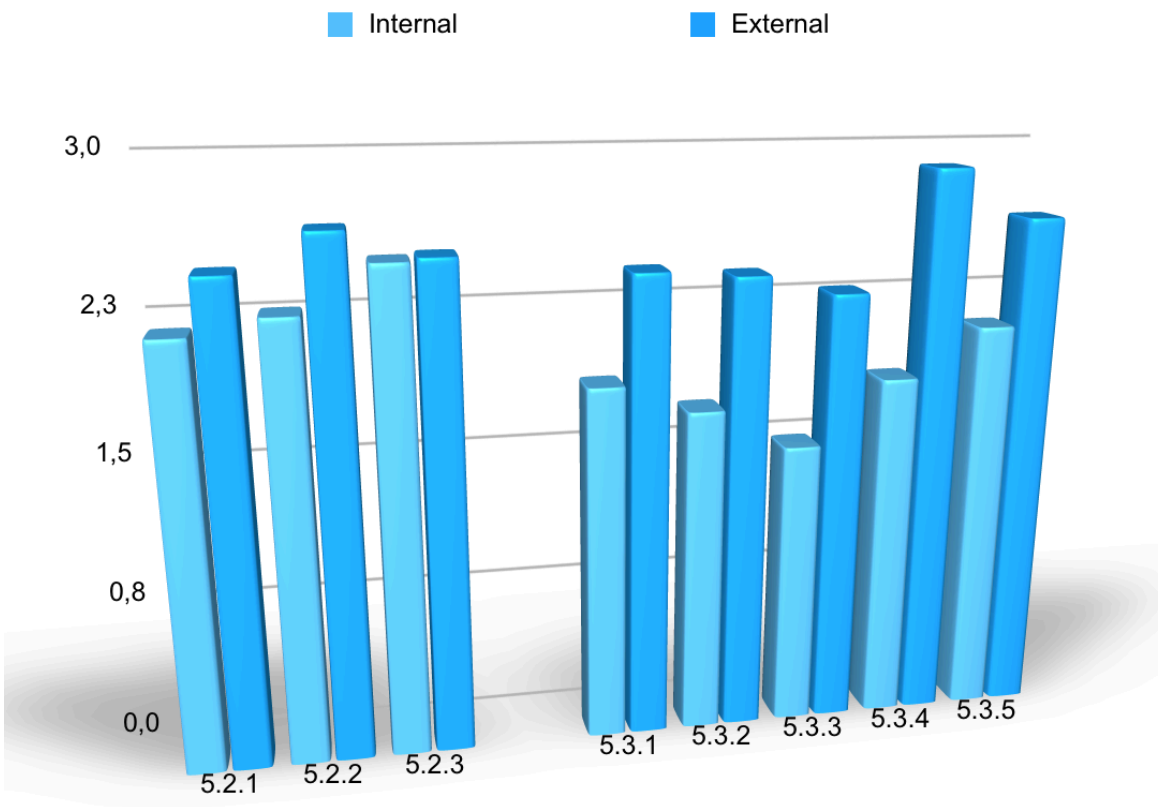


FIGURE 52 : MATURITY DATA SHEET PER TYPE OF PROVIDER (INTERNAL/EXTERNAL)
Source: Martin Cross

Annex 31: Table of maturity per size of IT provider

	EDBA OSOMM Global Maturity Analysis	Big	Medium	Small
5	**Global Maturity Profile**	**1,8**	**2,2**	**2,9**
5.2	**External Provider Maturity Aspects**	**1,8**	**2,4**	**3,0**
5.2.1	**Business Relationship**	**1,71**	**2,21**	**3,02**
5.2.1.1	Is there a well established relationship between the provider and the business at strategic level?	1,88	2,38	2,59
5.2.1.2	Does the provider understands and is aware of the business strategy?	1,28	1,85	2,75
5.2.1.3	Does the provider understand the business of its customers?	2,48	3,03	3,68
5.2.1.4	Does the provider communicate clearly with the business to demonstrate the provider added value?	1,60	2,53	3,23
5.2.1.5	Is there a clear established sponsorship from the business to the provider for Service Orientation matters?	1,65	2,33	2,84
5.2.1.6	Has the provider established clear financial tools to valuate services and inform customers about service costs?	1,38	1,15	3,03

	EDBA OSOMM Global Maturity Analysis	Big	Medium	Small
5.2.2	**Customer care**	**1,96**	**2,37**	**3,02**
5.2.2.1	Is there a well-established Single Point Of Contact for customers?	2,45	2,90	3,85
5.2.2.2	Has the provider established tools for managing customer relationships?	2,13	2,30	2,87
5.2.2.3	Does staff in contact with customers meet regularly with them to understand, gather and maintain their needs?	1,55	2,08	3,28
5.2.2.4	Has the provider clearly documented your needs and follow up on them?	1,40	2,03	2,88
5.2.2.5	Does the provider cares for customer treatment (empathy, kindness, politeness) as a priority?	2,35	2,98	3,59
5.2.2.6	Are staff in contact with customers focused on value to be delivered to customers?	1,88	2,70	3,87
5.2.2.7	Is the provider management willing to take extra efforts to serve and satisfy the customer?	2,20	2,70	3,39
5.2.2.8	Has the provider a clear catalogue to inform customers about offered services?	1,90	2,18	2,63
5.2.2.9	Are services offered in the catalogue exhaustive and covering your needs?	1,70	1,53	2,43
5.2.2.10	Has the provider clear service targets and levels of service agreed with the customer?	1,73	2,15	2,65
5.2.2.11	Does the provider meets regularly with the customer to demonstrate commitments achievement?	1,48	1,73	2,39
5.2.2.12	Does the provider management controls regularly services achievement?	2,20	2,05	3,24
5.2.2.13	Is the provider used language language adapted to the customer needs and explain issues in a clear manner?	2,08	3,20	3,56
5.2.2.14	Are there formal mechanisms to inform you on security issues and gather security needs?	2,20	2,48	2,15
5.2.2.15	Are there formal mechanisms to gather business continuity needs?	2,18	2,63	2,58

5.2.3	**User care**	**1,81**	**2,68**	**2,96**
5.2.3.1	Is there a well established SPOC for users to deal with user issues (requests incidents and complaints)?	**2,80**	**3,60**	**3,28**
5.2.3.2	Has the provider established tools for managing users relationships?	**2,08**	**2,50**	**2,58**
5.2.3.3	Does the provider cares for users treatment (empathy, kindness, politeness) as a priority?	**2,48**	**3,03**	**3,48**
5.2.3.4	Is the provider management willing to take extra efforts to serve and satisfy you?	**2,33**	**2,88**	**3,37**
5.2.3.5	Are staff in contact with users focused on delivering a good service to users?	**2,15**	**2,98**	**3,55**
5.2.3.6	Has the provider implemented regular surveys to gather data about users satisfaction?	**0,98**	**2,08**	**2,38**
5.2.3.7	In case of service failure, does impacted users are correctly informed?	**1,73**	**2,55**	**2,93**
5.2.3.8	Does staff who communicate with users use a language adapted to the users?	**1,48**	**2,93**	**3,30**
5.2.3.9	Is there a clear documented catalogue with specific services for users?	**0,33**	**1,58**	**1,78**
	EDBA OSOMM Global Maturity Analysis	**Big**	**Medium**	**Small**
5.3	**Internal Provider Maturity aspects**	**1,8**	**2,1**	**2,7**
5.3.1	**Service Provider Culture and Collaboration**	**1,74**	**1,96**	**2,74**
5.3.1.1	Are there specific service quality procedures and controls in place?	**1,85**	**2,03**	**2,83**
5.3.1.2	Is provider's staff committed to use technology to support services rather than being technically oriented?	**1,58**	**2,53**	**3,34**
5.3.1.3	Do different departments communicate and work together with the scope of delivering quality services?	**1,50**	**2,20**	**3,47**
5.3.1.4	Are there formal service oriented practices, processes and procedures in place?	**2,65**	**2,78**	**2,82**
5.3.1.5	Are there mechanisms to organise and maintain the provider's organisation to align to service provision?	**1,63**	**1,53**	**3,12**
5.3.1.6	Are implemented service oriented practices, processes and procedures followed by the provider's staff?	**1,90**	**1,78**	**2,75**
5.3.1.7	Are there specific documented mechanisms to identify improvements?	**1,43**	**1,45**	**2,51**
5.3.1.8	Are continuous improvements procedures in place to chose and implement improvements?	**1,15**	**1,40**	**2,45**
5.3.1.9	Is there a specific team to coordinate improvement activities?	**0,63**	**0,63**	**2,03**
5.3.1.10	Are security requirements documented and informed to all provider's staff?	**2,63**	**2,53**	**3,21**
5.3.1.11	Are there specific mechanisms in place to warranty the security of information according to business needs?	**2,03**	**2,28**	**2,63**
5.3.1.12	Are continuity requirements fulfilled in technical terms according to business needs on a regular basis?	**2,23**	**2,50**	**2,73**
5.3.1.13	Are service risks conveniently identified, analysed, documented and managed?	**2,00**	**2,53**	**2,12**
5.3.1.14	Are service costs correctly accounted, understood and maintained?	**1,25**	**1,25**	**2,42**

5.3.2	**Service Provider Strategy and Leadership**	**1,50**	**1,98**	**2,77**
5.3.2.1	Does the provider has a clear documented strategy to serve customers?	**0,85**	**1,38**	**2,50**
5.3.2.2	Is the staff aware of the provider's strategy and use it as a reference for their work?	**0,33**	**0,88**	**2,33**
5.3.2.3	Is the provider's strategy aligned with the customers and business strategy?	**1,08**	**0,95**	**2,83**
5.3.2.4	Is there a well established mechanism to analyse and decide which service to provide?	**2,35**	**2,40**	**3,20**
5.3.2.5	Is service performance measured considering the end-ti-end service?	**0,60**	**2,00**	**2,21**
5.3.2.6	Does the provider's management follow up on service performance?	**1,70**	**2,40**	**2,63**
5.3.2.7	Are provider's management decisions based on services (value to be delivered to customers rather than income)?	**2,08**	**2,50**	**2,88**
5.3.2.8	Is the provider's management concerned and participate in services creation?	**2,15**	**2,78**	**3,44**
5.3.2.9	Does the provider's management controls regularly services achievements?	**2,38**	**2,58**	**2,92**

5.3.3	**Human Resources Management**	**1,34**	**1,53**	**2,81**
5.3.3.1	Is the provider's staff competent and specifically trained for services?	**2,60**	**2,40**	**3,71**
5.3.3.2	Is there management recognition for excellent services delivery?	**1,10**	**1,78**	**3,00**
5.3.3.3	Are there specific staff rewards for excellent quality services delivered?	**0,10**	**0,50**	**1,70**
5.3.3.4	Does the provider manage and hire sufficient resources to meet services required performance?	**1,55**	**1,45**	**2,83**

5.3.4	**Service failure prevention and treatment**	**2,13**	**2,47**	**2,70**
5.3.4.1	Are there specific procedures in place to prevent users issues?	**2,13**	**2,78**	**2,88**
5.3.4.2	Is there a proactive attitude instead of a reactive attitude to prevent users issues?	**1,63**	**2,08**	**2,29**
5.3.4.3	Are there specific procedures in place to solve systems breakdowns?	**3,08**	**3,33**	**3,36**
5.3.4.4	Are there procedures in place to avoid reoccurrence of known dysfunctions?	**1,68**	**1,70**	**2,26**

5.3.5	**Technology Management**	**2,14**	**2,46**	**2,56**
5.3.5.1	Are systems changes conveniently managed and controlled?	**2,78**	**2,65**	**2,51**
5.3.5.2	Are services fully tested and dully informed before deployment?	**2,45**	**2,78**	**2,33**
5.3.5.3	Is there a well performed knowledge transfer to users and support staff before deployment?	**1,38**	**2,25**	**2,41**
5.3.5.4	Is there a strong design of services to cover availability needs?	**2,70**	**3,40**	**2,75**
5.3.5.5	Is there sufficient capacity of resources to respond to specific performance needs?	**2,73**	**3,08**	**2,99**
5.3.5.6	Are the provider's projects focused in services and value creation?	**2,63**	**2,70**	**2,96**
5.3.5.7	Is there a system in place to document service components and interactions between components?	**1,78**	**2,13**	**3,28**
5.3.5.8	Are there specific procedures in place to manage licenses, user profiles and accesses?	**1,40**	**1,63**	**1,91**
5.3.5.9	Is there assurance of data preservation and recovery in case of data loose?	**2,85**	**3,15**	**3,28**
5.3.5.10	Are archives and preserved information secured and regularly tested for retrieval?	**0,68**	**0,83**	**1,18**

TABLE 51 : MATURITY DATA SHEET PER SIZE OF PROVIDER
Source: Martin Cross

Annex 32: OSOMM academic description

According to Metller, Rohner and Winter (2010) recommendation for describing academically documented maturity models

Maturity model (OSOMM) structure

OSOMM: Organizational Service Orientation Maturity Model.
ITIL V4 oriented
ISO15504 structured
Serve*Or basis

OSOMM scope

1. Understanding the actual status of the assessed organization
2. Guidance for an improvement plan according to a best practices reference
3. Control the evolution

OSOMM covered areas

- People and Organization
- Information and technology
- Suppliers and partners
- Practices and results
- Maturity model description

Dimension	Attribute	
General model attributes	Name	Organizational Service Orientation Maturity Model
	Acronym	OSOMM
	Primary source	ITIL V4
	Secondary sources	Serv*Or, Iso15504, TIPA
	Addressed topic	Global service provider organization's service orientation and ITSM
	Origin	Academic
	Audience	Management oriented
	Year	2019
	Access	Public
Maturity model design	Maturity concept	Organizational service orientation; maturity level for improvement capability
	Documentation	Documented model
	Mutability	Any Digital Service-oriented organization
Maturity model use	Method of application	Assisted self assessment
	Support	Electronic forms
	Evidence	Documented evidence

OSOMM sections structure

1. Organization's profile
2. Service provider's profile
3. Interviewee's profile
4. Global Service Orientation perceptions
5. Maturity assessment
    a. External service provider aspects
    b. Internal service provider aspects
6. Difficulties

OSOMM structure detail

1. Organization's profile

   Description of the Organization (customer of the service provider)

   4 questions to understand the context of the organization

2. Service provider's profile

   Description of the servcie provider

   5 Questions to understand the context of the service provider.

3. Interviewee's profile

   Description of the interviewee

   5 questions to documnt the function , skills and profile of the interviewee.

4. Global Service Orientation perceptions

   An introduction of the interview domains

   6 questions to understand the perceptions of the interviewee related to the ITSM domain. These questions are related to the initial domains adressed in the exploratory research. Namly :

   Importance of ITSM

   References used for ITSM

Time using the references

Desired percentage of practices to implement

5. Maturity assessment

This is the main section to analyse the service orientation maturity. It is composed of 3 sections

Global maturity issues
External service provider aspects
Internal service provider aspects

5.1 Global maturity issues

Document if maturity is measured and what is used to measure it. Percentage of ITIL practices implemented.
2 questions to know what is used to measure maturity and the percentage implemented.

5.2 External service provider aspects

The objective is analyze the interactions of the service provider with customers and users.
There are three areas.

5.2.1 Business relationship

Analyze the business relationship related to the objectives and strategy
6 questions

5.2.2 Customer care

Analyze the implemented practices to manage the customer relationship
13 questions

5.2.3 User care

Analyze the implemented practices to manage the user relationship
8 questions

5.3 Internal service provider aspects

This section contains 5 areas to investigate the internal service provider practices to manage service creation deployment and delivery.

5.3.1 Service provider culture and collaboration

Investigates the service-oriented culture
14 questions covering costs, risks, security and improvements

5.3.2 Service provider strategy and Leadership

Investigates how does management participate in the control of services.

9 questions covering management implication, controls, measurement and strategy.

5.3.3 Human Resources

Investigates how human resources are managed
4 questions covering resource availability, trainings, recognition and skills control.

5.3.4 Service failure prevention and treatment

Investigate IT issues treatment.
4 questions covering how issues are resolved and prevented

5.3.5 Technology Management

Investigates how technology is managed
10 questions covering capacity, continuity, availability, service creation, integration, tests and deployments

6. Benefits and Difficulties

This section is not part of the maturity assessment but is intended to analyze the difficulties discovered during the exploratory phase to be able to measure the determinants of the difficulties related to the maturity.
This section contains 5 areas.

6.1 Expected benefits of service orientation

8 questions covering the expected benefits mentioned during the exploratory research phase

6.2 Expected benefits of maturity assessments

7 questions covering the expected benefits mentioned during the exploratory research phase

6.3 Business relationship difficulties and blocking factors

7 questions covering the expected difficulties mentioned during the exploratory research phase

6.4 Internal service provider difficulties and blocking factors

5 questions covering the expected difficulties mentioned during the exploratory research phase

6.5 Service Provider's cultural and organizational difficulties and blocking factors.

6 questions covering the expected difficulties mentioned during the exploratory research phase

OSOMM questionnaire link to literature

Sections were built using Lytle, Serv*Or domains as the main reference
Questions were built using ITIL V4 as the main reference.
The structure was built adapting ISO15504 proposal.
Several other sources were analyzed and inspired the questionnaire some of them are:
Albiwi and Arshed 2014
Axelos 2011
Becker 2009
Domingues, Sampiao and Areses 2016
Kuikka 2018
Pöpelbus et al 2011
Pullen 2007
Tinkenreich, Santos and Barcellos 2015
Wangenheim et al 2010
Wulf 2015

Annex 33: Maturity perceptions per role

Maturity perception (internal/external staff)							
Organization	IT Management	IT Staff	Internal staff	Customers	Users	External staff	Difference
O1	1.9	2.8	2.35	3.5	3.1	3.3	-0.95
O2	2.6	2.0	2.3	2.4	1.7	2.05	0.25
O3	1.6	2.2	1.9	1.7	1.4	1.55	0.35
O4	2.4	2.3	2.35	1.8	1.4	1.6	0.75
O5	1.8	1.4	1.6	1.0	1.0	1.0	0.6
O6	3.2	2.9	3.05	3.3	2.8	3.05	0
O10	3.2	3.0	3.1	3.6	3.3	3.45	-0.35
O11	2.7	2.4	2.55	2.0	1.9	1.95	0.6
O12	1.7	1.6	1.65	1.2	1.2	1.2	0.45
O14	4.5	3.7	4.1	4.0	4.3	4.15	-0.05
O20	1.3	1.5	1.4	1.2	1.0	1.1	0.3
O21	4.1	4.0	4.05	4.3	4.1	4.2	-0.15
O22	2.9	1.9	2.4	1.9	1.6	1.75	0.65
			2.5230769230			2.3346153846	0.18846153

TABLE 52 : MATURITY DATA SHEET PER ROLE
Source: Martin Cross

Annex 34: Maturity levels of the main existing maturity models

	0	1	2	3	4	5
TIPA	Incomplete	Performed	Managed	Established	Predictable	Optimizing
ISO20000	Not achieved	Achieved				
ISO15504	Incomplete	Performed	Managed	Established	Predictable	Optimizing
Cobit	Non Existent	Initial	Repeatable	Defined	Managed & measurable	Optimizing
CMMI		Initial	Managed	Defined	Quantitatively Managed	Optimizing
Serv*Or	NA	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Gartner ROI		Basic	Opportunistic	Systematic	Differentiating	Transformational
Gartner Production		Stand alone	Site excellence	Integrated manufacturing	Outcome driven	Solution driven
Gartner data governance	Unaware	Aware	Reactive	Proactive	Managed	Effective
Gartner service Excellence		Awareness	Committed	Proactive	Service Aligned	Business partner
Gartner ITSM[36]	Chaotic	Reactive	Proactive	Service	Value	
Axelos		Initial	Repeatable	Defined	Managed	Optimized
Short Serv*or	NA	Strongly disagree	Disagree	Neutral	Agree	Strongly agree

[36] Nolan (1974), Gartner (2003)

Mount view	Absent (Chaos)	Initial (reactive)	Repeatable (active)	Defined (proactive)	Managed (preemptive)	Optimized
ITIL Self As	None	Initial	Repeatable	Defined	Managed	Optimized
IT Maturity	Technology	Product	Service	Customer	Business	Value
BSM enablement	Manual	Reactive	Dynamic	Proactive	Situational	Predictive
BSM		Essential	Predictive	Aligned	Optimized	Pervasive
3I learning	Initial	Intent	Intelligent			
KPMG Business Mat Model		Fragmented	Subscaled	Scaled	Integrated	Strategic
Process Maturity Model		Not organized	Some processes organized	Most processes organized	Managed processes	Controlled Implemented Processes
OSOMM proposal	**Initial** Not realized	**Basic** Partially realized, best effort	**Performed** Objectives fulfillment. Reactive and repeatable	**Controlled** Managed. Proactive and results oriented	**Customer aligned** Outputs are aligned with business objectives. Customer and service-oriented	**Business value** Fully service-oriented. Measurement contribution of business objectives
OSOMM Domains	NA	Operational	Operational-tactic	Tactic	Tactic-strategic	Strategic

TABLE 53 : MATURITY LEVELS OF DIFFERENT MATURITY MODELS

Source : Martin Cross

Annex 35: OSOMM maturity levels description

Level 0

Initial level

The required tasks are not executed as part of the normal service provider operations. The expected results are not achieved. This level will always be the departure point for initiating an activity.

Initial efforts level

Benefit: The benefit of this level is the recognition of the required tasks that must be realized in order to preparation for implementation and operation.

Level 1
Basic level

The expected tasks are present at a basic level but not controlled. The focalization is more technical and operational, rather than service-oriented. Results are activity based and little consideration is given to the results. Expected results are based on best effort.

Technical non-collaborative level.

Benefit: There is the recognition of the need of the different tasks despite that there is little concern for their value. This level is a first step towards the evolution journey because it defines the necessity for the execution of specific tasks. The need for technical expertise and specific skills for the execution of the tasks is perceived. The IT service provider is perceived as a cost center.

Level 2
Performed level

To achieve this level the previous levels must be fully achieved. This means that all required tasks to obtain specific results have been documented and executed.

The expected tasks are fully implemented and their objective is fulfilled. Operations are reactive and repeatable. The focalization is output oriented with basic customer relationship activities. Teams begin to work together for the execution of the required

tasks and basic information exchanges are in place. Usually required processes are documented and expected results are known. Activities are more focused on user satisfaction than customer satisfaction.

Technical collaborative level

Benefit: All required tasks are executed and the expected results are known and documented. This is the needed basis for measuring and controlling. The IT service provider is perceived as useful but its contribution is not yet fully understood.

Level 3
Controlled

To achieve this level the previous level must be fully achieved. This means that the required tasks are known fully documented and expected results are known and documented.

The expected tasks are fully implemented and measured. Their objective is fulfilled and controlled. Operations begin to be proactive as there is enough information on how the tasks are executed and controlled. The focalization is measurement-oriented with some customer relationship activities seeking customer satisfaction rather than user satisfaction. Technical measurements are in place, services are documented, basic SLAs are used (more technically oriented than service-oriented) and outputs are guaranteed.

Output warranty level

Benefit: There is enough data to analyze gaps and take corrective actions. This level promotes team collaboration and the service provider can ensure a specific result that can be agreed in SLAs. The relationship with customers is reinforced and a better insight of their needs is understood and documented. This level set the basis for customer alignment level. The IT service provider is perceived as a technical added value.

Level 4
Customer aligned level

The previous level needs to be fully achieved. This means that there are enough controls and data to analyze the current situation of the organization and it is possible to

detect improvement opportunities. This sets the basis for customer negotiation with the scope to adapting to the customer demand.

The expected tasks are fully implemented and controlled. The objective is fulfilled, and justified from the customer demand perspective. Operations are more proactive and service-oriented. The focalization is measurement oriented with strong customer relationship activities. There is a good service culture and services are documented and agreed with SLAs based on the customer perception. There is enough data and service measurements to demonstrate delivery to customers from their perspective.

Outcome warranty level

Benefit: There is a better perception of customer's needs with the possibility to adapt resources to meet the demand. There is a strong relationship with users as well as with customers. There is a correct alignment between the users' needs and the customers' needs. The delivery can be demonstrated from the customer perspective. The IT serve provider is perceived as an important contributor to fulfill the customers' needs.

Level 5
Business value level

To achieve this level all the previous levels must be fully achieved. This means that there must be enough insight of the customers' demands, there is a strong relationship with the customers and delivery is guaranteed with specific customer oriented SLAs.

The expected tasks are fully realized measured and controlled. There is a full understanding of the activities of the customers. The business strategy is known and understood by all service providers' staff. There is a documented service providers' strategy aligned with the business strategy, and it is used to take service decisions to support the business activities. There is a strong governance body that guides and controls all activities of the service provider in alignment with the needs of the business. All operations are strongly service-oriented and there is a well-established service culture in place. All services are fully documented with business value justification. There is a strong focalization on customer relationship and the co-creation of

value. Activities are highly automated and optimized and there is a global culture of improvement at all levels.

Business value contribution level.

Benefit: Achievement of a fully implemented strategic alignment with the business to support their activities through the co-creation of value that is required to attain the business' strategic objectives. This allows an organization to make the best usage of technology and make the correct decisions to support the business. The IT service provider is perceived as a strategic partner for the business.

Annex 36: Maturity models evaluation template

According to the proposal of Salah, Peige and Cairn (2014)

Name: OSOMM , Organizational Service Orientation Maturity Model

Organization: MCS Associates

Owner Martin Cross

Maturity levels:

The maturity levels are sufficient to represent all stages of the domain (Sufficiency)

There is no overlap detected between description of maturity levels (Accuracy)

Processes and practices:

The processes and practices are relevant to the domain (Relevance)

Processes and practices cover all aspects of the domain (Comprehensiveness)

Processes and practices are clearly distinct (Mutual exclusion)

Processes and practices are correctly assigned to their respective maturity level (Accuracy)

Maturity model understandability:

The maturity levels are understandable

The assessment guidelines are understandable

The documentation is understandable

Maturity model ease of use:

The scoring schema is easy to use

The assessment guidelines are easy to use

The documentation is easy to use

Usefulness and practicality:

The maturity model is useful conducting assessments

The maturity model is practical for use in industry

Annex 37: OSOMM relationship with ITIL V4 and Serv*Or

TIPA, ISO15504, Axelos Mountain View and Maturity research are not covered because there is a one to one relationship with V3

ITIL V4 Practices	OSOMM questionnaire	Serv*or	Serv*Or short form
General management practices			
Architecture management	52. - Is the usage of technology focused on services creation and value delivery?	7 State of the art technology 8 Technology is used to build service quality	7 State of the art technology 8 Technology is used to build service quality
Continual improvement	63. - Are continuous improvements procedures in place? Mechanism to identify improvements		
Information security management	Link with business to understand information security needs Mechanism in place to warrant the security of information Mechanism to inform customers on security issues		

Knowledge management	Mechanisms to share knowledge, experience and lessons learnt		
Measurement and reporting	39. - Is service performance measured? 40. - Does management follow up on service performance?	21 Service performance is measured and communicated 27 Management measure service quality	
Portfolio management	Is there a well established process to analyze and decide which service to provide		
Organizational change management	Are there mechanisms in place to align internal structural organization to service provision		
Project management	62. - Are the organization's projects focused on services creation?		
Relationship management	16. - Does the organization cares for customer treatment (empathy, kindness, politeness) as a priority?	**Customer treatment** 1 Employees care for customers 2 They go the extra mile for customers 3 Friendliness to-	2 They go the extra mile for customers 3 Friendliness towards customers 9 Technology is

	17. - Is the organization's management willing to take extra efforts to serve and satisfy the customers? 18. - Does the organization understand the business of its customers? 19. - Has the organization clearly documented customer needs? 21. - Has the organization established tools for managing customer relationships? 25. - Does the organization meet regularly with the customer to demonstrate commitments achievement? 27. -Does staff that is in contact with customers listens actively to the customer to understand their needs? 43. - Is staff in con-	wards customers 4 Extra effort to reduce inconvenience for customer **Employee empowerment** 5 Employees can take decisions for the customer without escalation 6 Employee freedom and empowerment 9 Technology is used to support front line 12 Active listening of customers 13 Service complaints	used to support front line 12 Active listening of customers

	tact with customers empowered to take decision with the customer?		
Risk management	61. - Are service risks conveniently identified, analyzed, documented and managed?		
Service financial management	29. - Has the organization established clear financial tools to valuate services and inform customers about service costs?		

Strategy management	22. - Does the organization understands and is aware of the customer's strategy? 36. - Does the organization have a clear documented strategy to serve customers? 37. - Is the staff aware of the organization's strategy? 38. - Is the organization's strategy aligned with the customer's strategy?	20 Objectives linked to strategy	
	23. - Is the organization focused on value to be delivered to customers? 26. - Does the organization's management controls regularly services achievements? 28. - Does staff who communicate with customers use a language adapted to their customers?	**Service vision (culture)** 22 true service commitment 23 customers to serve not revenue 24 believe that the organization exists to serve customers **Service Leadership** 25 Management constantly communicates the importance of services	26 Management spend time with customers 28 Managements cares and participate in services 29 Management provides resources for quality services 30 Management is involved in creating quality services

	42. - Is management concerned and participate in services creation? 50. - Does technical staff follow implemented service-oriented practices and procedures? 53. - Does the different departments communicate and work together on behalf of services to deliver quality services? 55. - Does the organization uses technology to support services rather than being technically oriented? 60. - Are there specific service quality procedures and controls in place?	26 Management spend time with customers 28 Managements cares and participate in services 29 Management provides resources for quality services 30 Management is involved in creating quality services	

Supplier management	Are there specific role to interface with suppliers Is supplier performance measured Are there mechanism in place to follow up and control suppliers delivery		
Workforce and talent management	44. - Is the organization's staff specifically trained for services? 45. - Is there management recognition for excellent services delivery? 46. - Are there specific staff rewards for excellent quality services delivered? 54. - Does the organization provide and manage sufficient resources to meet customer services required performance?	31 rewards for service quality are in place 32 Excellent service celebration 33 Skill development 34 Training provision 35 Specific training to develop attitudes towards customers	33 Skill development 34 Training provision 35 Specific training to develop
Service Orientation practices			

Availability management	Are availability needs documented Does technical teams work proactively to create an infrastructure specifically to cope with availability needs Is availability really measured		
Business analysts	Check with BRM	18 Inform customer needs	
Capacity and performance management	Does usage of resources is measured regularly Are there mechanisms in place to convert performance requirements into capacity of service components		
Change control	58. - Are changes in the customers and users environment managed and controlled? IS there an implemented mechanisms and procedures to decide on changes		

Incident management	49. - Are there specific procedures in place to solve systems breakdowns? Are incidents managed according to the business priorities	14 Solve service break downs	
IT asset management	Are there procedures to control assets and obsolesce		
Monitoring and event management	Are there tools to monitor systems that allow fast identification of deviations	17 tech tools to pinpoint failures	
Problem management	47. - Are there specific procedures in place to prevent users issues? 48. - Is there a proactive attitude instead of a reactive attitude to prevent users issues? 51. - Are there procedures in place to avoid reoccurrence of known dysfunctions	10 active customer problems prevention 11 Proactively avoid problems	10 active customer problems prevention 11 Proactively avoid problems

Release management	Are there specific procedures to integrate components and validate them prior to delivery to a production environment Is communication to stakeholders clear prior to a deployment		
Service catalogue management	20. - Has the organization a clear catalogue to inform customers offered services?	19 inform employees about services	
Configuration management	64. - Is there a system in place to document service components and interactions between components?		
Service continuity management	56. - Are there specific procedures for warranting continuity of services? 57. - Does the continuity procedures are aligned with customer needs?		

Service design	Services documentation?		
Service desk	30. - Does the organization cares for users treatment? (Empathy, kindness, politeness)? 31. - Is the organization's management willing to take extra efforts to serve and satisfy the users? 32. - Has the organization established tools and skills for managing users relationships? 33. - Has the organization implemented regular survey to gather data about users satisfaction? 34. - In case of service failure, does the impacted users are correctly informed? 35. - Are there specific channels to receive complaints from users?	15 follow up service calls	

Service level management	24. - Has the organization clear service targets and levels of service agreed with the customers?	13 Service follow up 16 Service warranties	
Service request management	Procedures to receive and treat users demands		
Service validation and testing	59. - Are services fully tested before deployment?		
Technical management practices			
Deployment management			
Infrastructure and platform management			
Software development and management			
	65. - Are there specific procedures in place to manage licenses, user profiles and accesses?		

TABLE 54 : OSOMM RELATIONSHIP WITH ITIL (V4) AND SERV*OR
Source: Martin Cross

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