CLOUD COMPUTING SOLUTIONS AND BUSINESS MODEL INNOVATION

A case study in the financial services industry

Master thesis submitted to Delft University of Technology

in partial fulfilment of the requirements for the degree of

MASTER OF SCIENCE

in Management of Technology

Faculty of Technology, Policy and Management

by

Davide Frisardi

Student number: 4786785

To be defended in public on August 21st, 2020

Graduation Committee:

First supervisor:	Dr.ir. Z. (Zenlin) Roosenboom-Kwee, Economics of Technology and innovation
Second supervisor:	Dr.ir. R.A. (Rudi) Hakvoort, Engineering Systems and Services
Chairman:	Dr.ir. R.A. (Rudi) Hakvoort, Engineering Systems and Services

TU Delft Delft University of Technology

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Acknowledgments

This thesis is the result of a five months graduation project for the MSc in Management of Technology. The research has been carried out alongside a working experience in Accenture that played an important role in the fulfillment of my graduation path. By joining Accenture, I have developed some practical skills that will complement my academic knowledge and help me to acquire a broader perspective of the professional career.

However, many contributed to the results obtained during my studies in TU Delft and to the completion of my thesis during these last months. First and foremost, I need to thank my supervisor Dr. ir. Zenlin Roosenboom-Kwee for her professional supervision throughout the whole duration of the project and the invaluable enthusiasm showed by motivating me to reach the final goal. I must also thank my chairman Dr.ir. Rudi Hakvoort for the critical feedbacks that contributed to the attainment of a remarkable work. The spreading of the COVID-19 pandemic has forced all of us to work remotely, but they never chased to be present and ready to guide and advise me even during such demanding times.

I would also like to thank Accenture and my colleagues from the Technology Advisory unit that gave me the opportunity to write this thesis. They kindly assisted me with their experience and knowledge for the whole duration of the project and were always excited to teach me new things while balancing my time between work tasks and project related tasks.

Finally, I am very grateful to my parents for their support throughout all my studies in TU Delft and abroad. All of my achievements would not have been possible without their sacrifices, their financial and moral aid and without making sure I was always focused on the final objective.

Executive Summary

The rise of the so called Insurtechs (insurance technology companies), leveraging digital technologies to offer superior and personalized offerings, has shaken the insurance industry leading to a new age of innovation and business models. In addition, the importance of a digital customer experience is increasing as the number of sales completed online are rising. Customers expect wide availability of personalized options and offerings tailored to their specific risk scenarios. Traditional insurers should react fast to face the threat of new players and remain competitive in this fast-paced market environment. A customer-centric approach to digitalization is required to meet demanding requests from customers while targeting benefits including financial flexibility, lower Total Cost of Ownership (TCO), speed to market, and availability of information anywhere and anytime. At the same time, the rise of cloud computing technologies spark interests in traditional players that have an opportunity to tackle these challenges by transforming their IT infrastructure to generate value for clients while substantially improving the enterprise's operations.

However, there is very little or no contribution concerning the technological and organizational change needed to face the fierce competition of modern and dynamically advanced startups, particularly in the context of the financial services industry. Besides, the literature is lacking contents weighting the cloud computing advantages in the insurance industry and exploring the business model's innovations necessary to welcome the use of the cloud in their IT systems. The goal of this research is to address this research gap and additionally to explore the barriers hindering cloud adoption in the financial services industry together with the mitigation strategies expected to reduce such risk factors.

To address these gaps, in the first place, publications on R&D, firm size, business models innovation and cloud adoption have been reviewed, to integrate the present status of the literature and derive the route for subsequent research. Then an exploratory approach has been used to combine primary and secondary data collected through semi-structured interview and internal records from Accenture to perform a single-case study analysis. In addition, the research encompasses a practical method to evaluate the robustness of a business model, called Business Stress Testing, a supplementary tool to evaluate the results obtained by the case study analysis and draw further conclusion on the topic of business model innovation and cloud computing adoption for insurance multinationals.

The results obtained suggest that the cloud has the potential to drastically transform the insurance industry as we know it. The numerous benefits stemming from the adoption of said technology have been investigated by the research, particularly in terms of its cost savings advantages and the operational performances of an insurer's core activities. The research highlights a decrease in

spending for a typical insurer's IT and compares the accounting methodology for a cloud computing solution with a traditional on-premise architecture.

Furthermore, the case study analysis and the BM stress test have highlighted the urgency for a change in the business model for a specific case in the financial services industry in light of forthcoming scenarios that are to be expected in the near future. By leveraging cloud computing tools, the business can rewrite its value proposition to achieve a more flexible customer-centric business model and retain or increase market share to strengthen the competitive edge against the new entrants.

The findings from this research are a valuable contribution and a source of specific knowledge for the management of insurance firms. Thanks to this study they can reflect on the potential of cloud computing for their own organizations and assess the robustness of their business model in light of the market trends outlined. The aim is to inspire managers to perceive the need for innovation and structural change and provide them with the tools and key recommendations to tackle the challenge. These include the employment of an omnichannel servicing strategy for customers' interaction, modular policies offering, the decentralization of innovation activities coupled with a centralization of the governance and the adoption of the cloud computing technology as the common denominator.

Future research should address the limitations of this dissertation by applying similar tools and principles while making a distinction among insurers types. The reliability of the information could also be improved by drawing from a wider sample of respondents and business cases. Lastly, additional studies might consider applying other scientific methods for data collection and analysis to quantitatively evaluate the revenues and costs advantages stemming from these recommendations.

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1. Introduction

1.1 Background

The financial services industry has been characterized with the recent emergence of process disruptions and technology innovations. Digital technologies have transformed the way we interact with products and services across the board, with fintech innovations rapidly becoming a key driver of value for financial services firms (Gomber et al., 2018). Consumers increasingly interact with technology in other parts of their lives and, as a consequence, they demand more integration, efficiency and enhanced experiences from their providers of financial services (Calvo, 2020). Consequently, many new fintech start-ups are seeking innovative business models, that may enhance customer experience and reduce costs and time to market. Rather than a set of less impactful changes, experts believe this to be a revolution where the long-standing dominance of leading firms is at stake and where large corporations that are not able to figure out how to effectively interface with the "Fintech Revolution" will surrender to the more innovative and dynamic small new firms (Gomber et al., 2018).

Traditional insurers are forced to redesign their processes, strategies and organizational structures because of changes in customer behaviors and modern digital technologies that also foster innovative value configurations and business models (Pousttchi & Gleiss, 2019). At the same time, they face the advent of new players boasting modern business models while exploiting new technologies' advantages and adequately responding to the needs of digital customers (Naylor, 2017). As a result of technological progress, customer expectations have risen significantly in recent years and they expect to be served immediately and smoothly on the internet while having access to information at all times (Andreas Eckstein, Axel Liebetrau, 2018). Adjusting existing business models to be customer oriented, is the biggest challenge of digitalization and Information Technologies can help redefine the strategic direction in the insurance industry. To this end, there are increasing interests in cloud computing technologies that can potentially change the means though which a business operates creating values for customers in ways unthinkable in the past and tackling the challenge of digitalization with efficiency and ease.

According to Accenture research, Financial Services firms find legacy systems to be the biggest obstacle to digital transformation: 42% of Financial Services firms report poor comprehension of digital innovation, while 44% exhibit difficulty integrating new technology into existing structures (Gomber et al., 2018). Moreover, the increasing trend of mergers and acquisitions (M&A), resulted in a record-breaking year for M&A of insurance brokers in 2018, hinders Technology consolidation that often results in a strained, inefficient processes and a workforce culture that is heterogeneous and unable to collaborate (R. Smith, 2019).

The unpredictable nature of innovation is therefore averse to the culture of larger and layered firms that tend to prefer stable environments and unchanging situations while smaller, entrepreneurial firms, embrace the innovation process and manage to achieve a competitive advantage over their competitors (Mahoney, 1992). A shorter time to market and a faster introduction of new products are obtained emphasizing innovative initiatives in small businesses, that achieve higher market share at the expenses of their larger competitors (Mahoney, 1992). Moreover, in today's marketplace, firms reacting quickly and effectively to rapid changes, hold a competitive advantage over their competitors. Smaller firms are usually more flexible and cross-functional and can respond efficiently to everchanging consumers' demands while large organizations are stiffed by an higher categorization of problems and a mechanistic system (Mahoney, 1992). Flexibility and dynamicity are also hampered in large organizations by a large number of management levels and by the significant amount of bureaucracy. Therefore, small firms can take advantage of an organizational structure characterized by almost inexistent management layers and advanced communication across the company.

1.2 Practical Problem and Urgency of the Research

Customers have become more demanding and critical and want to access information independently at any time; consequently, information technology (IT) becomes a key driver for optimizing core services and staying competitive. Insurers should then pursue a customer-centric approach to digitalization in order to meet the new customers' needs while introducing the necessary technological solutions to back up the strategic transition. It becomes necessary to exploit technologies that focus on IT infrastructures in order to target benefits including financial flexibility, lower TCO (Total Cost of Ownership), speed to market, and availability of information anywhere and anytime. For large corporations this is challenging as they still use an old physical database, that may not be effective in reducing operational costs, improving business efficiency and enhancing client satisfaction.

Insurtechs, as digitally empowered businesses, benefit from the potential of the cloud and other digital technologies (Pousttchi & Gleiss, 2019). Their success stems from a modern and innovative value proposition based on online products that are easy to reach and attractive for the digital public (Pousttchi & Gleiss, 2019). By leveraging streamlined processes and automated services, they offer premium customer experience and interaction that is missed with traditional insurance companies (Pousttchi & Gleiss, 2019). Customers can then enjoy a service that never ceases and is accessible at any time, from any device. Such players usually gain competitive advantage by innovating multiple processes of an insurers' value chain as they provide modern policy management, online consulting, comparison, but also assistance following a reported loss or

accident (Pousttchi & Gleiss, 2019). Therefore, traditional players need to catch up with attractive interfaces and services if they want to eliminate the risk of new insurtechs preserving their leads.

Traditional insurers should react fast to face the threat of new players and remain competitive in the fast-paced market environment. They need to reconsider their organizational structures, products, IT capabilities and core competencies to express their full potential in the value network and exploit cutting edge technologies to retain their customer base (Loebbecke & Picot, 2015). However, even though technology adoption is critical, it's not enough and in order to advance their digital transformation, firms should integrate an organizational focus and a cultural mind-shift in combination with the process and technology approach (Conwai, 2019).

This situation requires a holistic, strategic approach to transformation that allows large providers of financial services to remain competitive while navigating change. Big corporations should be able to move quickly, rival their smaller contenders and maintain competitiveness in the digital age. Therefore, traditional insurance organizations should reassess their value creation strategies accordingly, embracing disruption and preparing for the development of more effective organizational strategy in financial services by properly leveraging the cloud computing technology (Grover & Kohli, 2013).

1.3 Research Objective and Questions

1.3.1 Research Objective

There is yet little knowledge of how the adoption of cloud computing can transform the insurance industry or how insurers should adjust their business model to welcome the use of the cloud in their IT systems. The primary goal of this research is to address this research gap by exploring both the technological and the organizational solutions that are expected from large corporations in the financial services industry to compete with lean and flexible small firms that set a trend in customer-centric digitalization. To achieve this goal, a specific case study of an insurance company within the context of the European market will be investigated. The secondary goal of this research is to create a guideline to help firms decide if and how to implement such organizational changes and technologies, enabling them to estimate the advantages in the long period and in relation with the market they are competing in.

1.3.2 Research Questions

In order to address the abovementioned research objectives, the following main research question has been formulated:

How does cloud computing technology help large insurance corporations innovating their business model to remain competitive and how to overcome barriers during the implementation?

Business model change is defined as the extent and timing to which existing businesses adjust in response to changing environmental demands. Since new business models are achieved by the combination of new technologies, data processing techniques and improved business operations, insurance companies try exploiting this potential to innovate and create new value for their customers (Naylor, 2017; Nicoletti, 2016).

Besides the main research question, developing a number of sub-questions is necessary in order to break down the topic in a logical and sequential manner, highlighting the relevant information and meeting the research objective outlined above. To begin with, it is important to identify whether the cloud computing technology has any added value in the context of multinational insurance firms.

1. *What are the benefits and the added value of the adoption of the cloud computing technology for large multinational insurance firms?*

The organizational change goes hand in hand with the introduction of disruptive technologies that are essential to meet the goal of customers satisfaction and to facilitate the restructuring of the organization. This question triggers an analysis of cloud computing, judged as a technological solution to drive digitalization in order to support and optimize processes, reduce costs and develop demand-oriented product and services.

2. *How should insurance firms innovate their business model to adopt cloud computing to be customer-oriented and cost-effective?*

The significant increase of customers' expectation due to the technological progress, requires a different approach of large firms, that tend to be extremely structured and bureaucratic while neglecting customers' wants and needs and falling for the Icarus Paradox. Answering to the above research question present a necessary step to understand how insurance firms develop business models coupled with cloud computing to achieve the competitiveness goal.

3. *What are the barriers and the difficulties during the digital transformation process?*
4. *How do managers overcome these barriers?*

These last two questions' goal is to produce a comprehensive investigation on the findings obtained from the first two sub-questions and describe the obstacles and the complications encountered during the reorganization and the introduction of a new technology, both in terms of culture shift and business processes efficiency.

1.4 Research Gap and Contribution

In chapter 2, the literature review points out that the majority of factors influencing a large multinational's decision to adopt Cloud Computing as an IT services sourcing, are external to the company and part of the external environment. The literature has extensively debated on the influence that these elements exercise on insurance firms, such as an intensively competitive market characterized by new entrants, the rapid change in customers' behavior coupled with a trend in digitalization and the accelerating pace of technological advancement. Insurance organizations that are not able to respond adequately and in a timely manner to such factors, may incur in severe competitive disadvantages, losing market share to the new players. Besides the external factors, this research, in the attempt to point out the necessary measures for a competitive strategy, addresses the variables internal to the organization. In particular, the factors explored are subject to managerial influence and are essential for the organizational change that is required to address the above-mentioned challenges.

The main assumption is that, the cloud, offering major opportunities for insurers to build a more flexible customer-centric business model, can help them achieve high performance in the industry while driving profitable growth. At the same time, the innovation of the business model, through the establishment of an independent subsidiary, detached from the large and bureaucratic central organization, would lend the necessary qualities typical of organic structures, to achieve a more customer-oriented approach. The offering would be complemented by the introduction of low-priced products, through advanced digital interaction platforms accessible by the customer in any moment and from any device. Appealing for the younger public, that cannot find the same type of interaction and connectivity in traditional insurers, this strategy is a long-term revenue-based approach needed to retain or increase market share and strengthen the competitive edge against the new entrants.

This study, by investigating the interdependencies among technology adoption, business processes and strategy formulation, contributes to the business model innovation literature. While, the authorities in the field of strategy and organization have been debating on the relationship between business model innovation and operational efficiencies (Achtenhagen et al., 2013), little or no contribution is available regarding what technological and organizational change is needed to face the fierce competition of modern and dynamically advanced startups, particularly in the context of the financial services industry.

In addition, this study improves the general understanding of cloud computing tools and resources explaining why and how a firm should modify its structure, strategies, operational methods, technologies or culture to adapt and remain competitive on the market. Based on the case study available, the research becomes relevant from a managerial perspective as well, by addressing the need for understanding the dynamics behind the adoption of cloud computing solutions in a

general context and in the more specific context of large insurance multinationals. Drawing on the existing theories of Ambidexterity and modularity and on past debates on alternative transition strategies, it will be discussed why it is challenging for an insurance corporate to redesign its strategy and comply with a trend in digitalization that is customer oriented (Khanagha et al., 2013). The result of this study will uncover the process of business model innovation for a specific case study and why cloud computing is a game changer to address the growing need of customers for dedicated digital services.

1.5 Thesis Structure

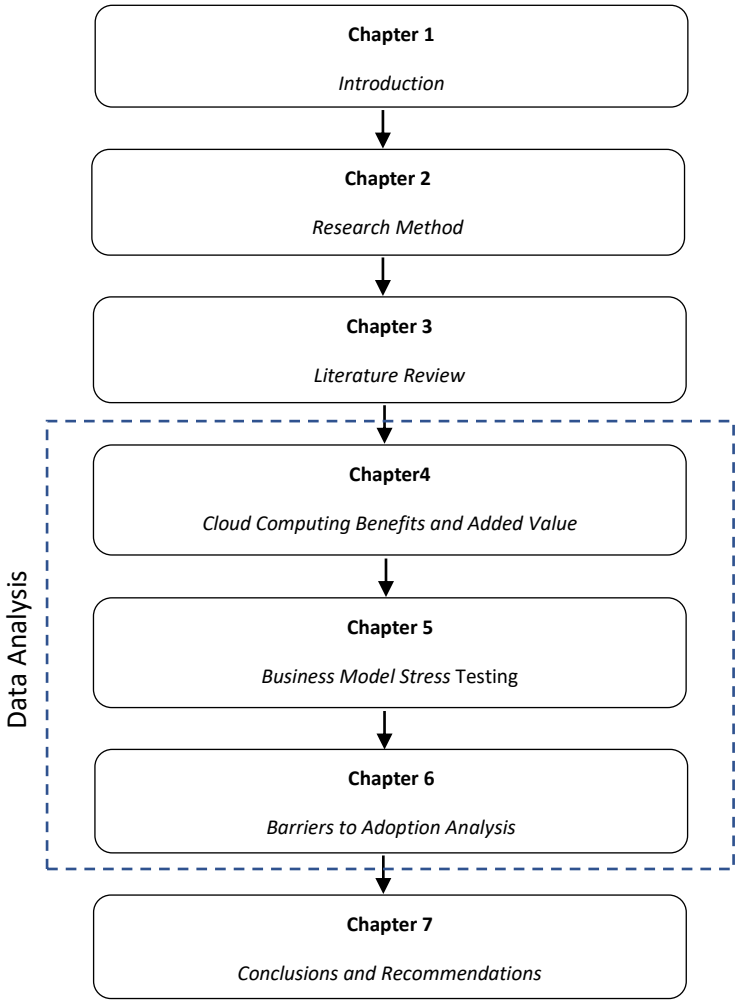

Figure 1 - Thesis structure

Figure 1 outlines the general thesis' structure by displaying the chapters' sequence. The paper will continue from here by explaining in chapter 2 the methodologies used for the research. Then, a literature review will follow, to integrate the literature available on the debated topics and acquire the starting point to answer the research questions later on. The successive three chapters (4,5,6), report the process of data collection and analysis by employing tools and methodologies pointed out in chapter 2. These chapters follow the logical sequence of the research questions and will tackle each of them before reaching the conclusion. The thesis concludes with chapter 7, comprising a "key findings" section (7.1), that will complement the analysis from the previous chapters, and a reflection concerning the limitations of the research and the expected future research.

2. Research Method

This research follows an exploratory approach and it applies a qualitative method, gathering primary and secondary data. To answer the research questions, a combination of different research methods has been employed and combined following the framework of the case study research illustrated by Yin (2014). In the previous chapter, first a literature review on the topics of digital disruption and cloud technology adoption was provided to evaluate the impact and effects of technological and organizational trends in the insurance industry. Secondly a literature review on cloud computing specifically, served to evaluate the knowledge available on the technology itself and further as a theoretical framework to contextualize the information and data gathered in the following section. This section lays down the structure and the methodology used in this research to first collect and later analyze the data in order to answer the research questions.

2.1 Context of the Research

In order to explore the knowledge gaps identified, this research will investigate the dynamics of a business model innovation and a structural reorganization in an insurance multinational within the financial services industry. The Technology Advisory unit for Financial Services of Accenture is the sponsor of this research project, contributing by offering the knowledge and the resources to carry out the research process. A global multinational such as Accenture has been chosen as the setting for the research given the incredible access that a consulting organization can provide both to internal records and external customers. In particular, working for the Technology Advisory unit has the advantage of connecting with many IT experts and managers that with their experience can validate the insights obtained. Furthermore, the vast repository of past and on-going projects of the company will be a valuable resource to capture and study business models innovation and cloud computing adoption across different contexts. Lastly, the expertise developed by working in the Technology Advisory units will be essential to deepen the understanding of a quite unique industry, where innovation is achieved by developing modern applications working in the backend and not visible to the end user.

2.1.1 Technology Advisory for Financial Services

Technology has become a key driver of future value for financial services and as consumers continue to expect more integration, efficiency and enhanced experiences from their FS providers, firms should embrace digital technologies and put customers at the center of what they do. Connected platforms, analytics, automation and artificial intelligence can help firms increase productivity, speed to market, and allow them to continually adapt to changing markets. But,

despite the threats from industry disruption, firms don't have to disruptively replace their technology right now. Accenture Financial Services Technology Advisory is uniquely positioned to help firms extract value from legacy technologies while simultaneously adopting new ones, joining complex ecosystems and helping the workforce adapt inline.

Accenture's FS Technology Advisory's mission is to help financial services clients transform their core technology systems, unlock hidden value and position themselves for sustainable growth. Accenture's consultants advise FS firms on how to transform their technology architecture and extract value from their legacy tech while embracing new technologies and ways of working. They help firms develop a holistic view of their technology landscape and implement solutions that allow them to transform with minimal business interruptions.

2.2 Research Strategies

The opportunity offered by Accenture allows the use of a single-case study as the research design of this work. The conditions favor the fourth rationale for a single-case study introduced by Yin (2014), also named the revelatory case (Yin, 2014). This research design suits the situation in which the researcher has the opportunity to observe and analyze a phenomenon otherwise inaccessible, resembling the exact conditions that are presented by the chance to work and access the vast data and knowledge repository of Accenture (Yin, 2014).

The qualitative approach of the single-case study will be combined with a practical method to evaluate the robustness of a business model, called Business Stress Testing. The technique designed by professor Bouwman et al. (2018), makes use of a so called "heat map" that tracks the robustness of pre identified components of the business model contextualizing them with some "stress factors", such as trends and uncertainties typical of the context. This approach will serve as an additional tool to evaluate the results obtained by the case study analysis and draw further conclusion on the topic of business model innovation and cloud computing adoption for insurance multinationals. However, as a starting point, a desk research will be carried out in the form of a theoretical framework. The framework will help building a theoretical background that will accompany the reader throughout the following sections while providing a valuable resource to answer the questions appointed by the current research.

Lastly, an evaluation of cloud solution will be carried out together with an analysis of the monetized benefits of the cloud technology adoption. Cloud computing, emerging as a promising technology, offers a variety of services at different prices using various pricing schemes and techniques. End users will choose running an evaluation of the service providers and setting for the offering that best suits them at the lowest price. As outlined before, one of the most cited benefit of the cloud, is the reduced cost of its solutions compared with dated physical machines

and all the running and maintenance costs related. Few studies have explored the performance of several pricing mechanisms abilities to provide cloud services at low cost to large scale organizations, from cost, availability and performance perspective; however, these works do not consider the end user evaluation and computational effort to select the best available option (Mvelase et al., 2017). This research will then take a more quantitative step towards the assessment of the best possible cloud solution and the advantages in cost deriving by leveraging this new technology instead of dated legacy systems.

2.2.1 Case Study Analysis

Yin further distinguishes two different variants of a single-case study called holistic and embedded case study. For the purpose of this research, the second design will be employed where the same single-case study involves units of analysis at more than one level. This occurs when, within a single case, attention is also given to a subunit or subunits. Such is the case with this research that will investigate the organization as a whole as the main unit while distinguishing among smaller subunits such as the organizational structure and the IT systems adopted. At each level of analysis, different data collection techniques will be used, ranging from historical data to unstructured interviews. The interpretation of these data will take place on a qualitative level and on a quantitative level as well, through a cost benefit analysis that will compare business performance KPIs and the operating costs of cloud computing compared with the previous situation.

Each of these variants of a single-case study have their strengths and weaknesses. The holistic design is advantageous when no logical subunits can be identified or when the relevant theory underlying the case study is itself of holistic nature (Yin, 2014). However, a global approach may allow the whole case to be conducted at an improper abstract level, lacking sufficiently clear measures or data. A further problem with the holistic design is that the entire nature of the case study may shift unconsciously during the course of the research (Yin, 2014). The initial research questions may have reflected one orientation, but as the case study proceeds, a different orientation may emerge, and the evidence begins to address different aspects. On the other hand, incorporating subunits of analysis within the single-case study, allows the development of a more complex (or embedded) design for the research (Yin, 2014). The subunits can often add significant opportunities for extensive analysis, enhancing the insights into the single case (Yin, 2014). However, Yin recommends that the subunits should not be given too much attention to avoid ignoring the larger and holistic aspects of the case and to prevent shifting the orientation and changing its nature.

2.2.1.1 Data Collection for a Case Study

Yin identifies six sources of evidence that he considers all potentially relevant even for the same single case study. He argues that the various sources are highly complementary and relying on as many sources as possible is considered a good practice to investigate a case study. In support to the six sources of evidence in fact, Yin specifies four principles for data collection: (a) multiple, not just single, sources of evidence; (b) creating a case study database; (c) maintaining a chain of evidence; and (d) exercising care in using data from electronic sources of evidence, such as social media communications. The principles are extremely important for doing high-quality case studies and are relevant to all six types of sources of evidence.

For the purpose of reliability of multiple sources, will be used documentation, archival records, interviews, direct and participant observation. Regarding the documentation for case study research, the most essential use of documents will be to corroborate and augment evidence from other sources. Sometimes documents are helpful in verifying the correct spellings and titles or names of people and organizations that might have been mentioned in an interview (Yin, 2014). In case it will be possible to make inferences from such documentation, they will be treated as clues worthy of further investigation rather than as definitive findings.

The archival records provided instead, will be used in conjunction with other sources of information and it will be assessed their relevance before drawing theories and conclusions. Despite their qualitative nature, internal documents and records from Accenture, constitute an important source of information that will be arranged as the theoretical framework for this research and the starting point for an analysis of the current state of the industry and of the technology investigated.

The most important source of evidence will be the interviews. Even pursuing a consistent line of inquiry, the actual stream of questions in a case study interview should be fluid rather than rigid (Rubin J & Rubin S, 2005). This type of interview has alternatively been called an “intensive interview,” “in-depth interview,” or “semi-structured interview” (Marris, 1994). This method will be beneficial during the data collection phase by increasing the willingness of the respondents to share detailed information. The interviews will follow a predefined line of inquiry, as reflected by the case study protocol, and the questions will be asked in an unbiased manner that also serves the needs of the line of inquiry. Due to the unfortunate circumstances of the COVID-19 pandemics, it will not be possible to carry out face to face interviews. The interviews will be conducted through the integrated communication platform of Microsoft Teams widely employed for the company’s internal communication. The interviews will follow a snowball sampling method, starting from individuals directly connected to the technology advisory team in Accenture and advancing further thanks to the recommendations and the recruitment of future subjects as the following potential interviewees. As the sample builds up, it should be possible to gather enough data useful for

research, nevertheless based on the first interviews the approach may be revised in order to obtain the best result possible. In addition, the data collection phase will follow the saturation principle (Miles & Huberman, 1994), and the interviews will stop when it will not be possible to gather any new insight and when the interviewees' contribution will be repetitive.

Lastly, because the case study takes place in the real-world setting of the case, the opportunity is created for direct observations. Direct or Participant observation are indicated by Yin as one of the six sources of evidence and may involve observations of meetings, daily activities or those occasions during which other evidence, such as that from interviews, is being collected (Yin, 2014).

2.3 Data collection and Analysis Design

Case studies involve in-depth, contextual analyses of similar situations in other organizations, where the nature and definition of the problem happen to be the same as experienced in the current situation. Case study, as a problem-solving technique, is not often undertaken in organizations because such studies dealing with problems similar to the one experienced by a particular organization of a particular size and in a particular type of setting are difficult to come by. Moreover, authentic case studies are difficult to find because many companies prefer to guard them as proprietary data. However, by carefully scrutinizing a documented case study, a manager is in a position to obtain several clues as to what factors might be operating in his/her situation and how the problem might be solved. Picking the right cases for study and understanding and correctly translating the dynamics to one's own situation, are critical for successful problem solving and the purpose of this research is to be a valuable input for future problem solver in the insurance industry. It should be noted that case studies usually provide qualitative rather than quantitative data for analysis and interpretation. However, the application of case study analysis to certain organizational issues is relatively easy like in this case for example, where a study of what contributes to the successful introduction of a disruptive technology in an organization might be of use to a similar company and the practical application of that knowledge would be very functional (Catterall, 2000).

2.3.1 Interviews Design

One of the most important sources of case study evidence is the interview. Since business is largely a social phenomenon, much of the information needed to make decisions in the work setting has to come from people: for instance, from employees, consumers, managers, investors, and/or suppliers. For this reason, interviews are very popular in business research; these methods allow

the researcher to collect a wide variety of different sorts of data from human respondents (Catterall, 2000).

2.3.1.1 Interviewees Selection

The circumstances and the research settings point to the use of Judgment sampling as the method of selecting the right individuals for the interviews. Judgment sampling is adopted when the circumstances require to choose subjects for the data collection phase, who are most likely to possess the information needed or are in the most advantageous position to retrieve them (Sekaran & Bougie, 2000). In such cases, any type of probability sampling across a cross-section of the entire population is purposeless and not useful. Judgment sampling may curtail the generalizability of the findings, due to the fact that we are using a sample of experts who are conveniently available to us. However, it is the only viable sampling method for obtaining the type of information that is required from very specific pockets of people who alone possess the needed facts and can give the information sought. In organizational settings, opinion leaders who are very knowledgeable are included in the sample. Enlightened opinions, views, and knowledge constitute a rich data source. Judgment sampling calls for special efforts to locate and gain access to the individuals who do have the requisite information. As already stated, this sampling design may be the only useful one for answering certain types of research question, however, judgment sampling have been supported by the use of snowball sampling as well: another nonprobability sampling technique where existing interviewees recruit future subjects or are asked to suggest other valuable individuals from among their acquaintances (Sekaran & Bougie, 2000).

Therefore, the starting subjects of the sample have been selected among experienced managers of Accenture that boast broad knowledge of the cloud computing technology and have participated and contributed to the project analyzed by the business case. These managers not only can provide valuable information to the research but can additionally supply further candidates to carry on the data collection phase.

Table 1 displays the complete list of interviewees with their position and the role covered in their respective teams. The interviewees names have been concealed for privacy reasons while a fourth columns exhibits the years of experience of each interviewee to express the degree of expertise that each of them possess.

Table 1 - Interviewees' profiles

INTERVIEWEE NUMBER	SENIORITY	ROLE	YEARS OF EXPERIENCE
1	IT Manager (External Client)	Project Management	10
2	Application Developer (Accenture)	Code Development (Java)	3
3	Digital Integration Manager (Accenture)	Solution Design Project Management	9
4	Technology Consultant (Accenture)	Architecture Design Code Development	6
5	Technology Consulting Analyst (Accenture)	Architecture Implementation Cloud Development Data Analyst	3
6	Application Developer (Accenture)	Code Development (Java)	2
7	Digital Integration Consultant (Accenture)	Cloud Expert Code Development	5
8	Technology Consulting Senior Manager (Accenture)	High Level Architecture Solutions Design	12
9	Technology Consulting Analyst (Accenture)	Code Development Artificial Intelligence Expert	2

Appendix B displays an additional table that gathers all the most important quotes from the interviewees during the data collection phase.

2.3.1.2 Semi-structured vs structured and unstructured interviews

While the main purpose of the unstructured interview is to explore several factors, to determine what need further in-depth investigation, structured interviews elicit more in-depth information to helps identify the details of a problem as well as ways of solving it. In unstructured interviews, the interviewer does not enter the interview setting with a planned sequence of questions to be asked of the respondent, whereas structured interviews are conducted when it is known at the outset what information is needed, and a precise set of questions is arranged in advanced and accurately followed during the interview (Catterall, 2000).

Although a consistent line of inquiry needs to be followed, the actual stream of questions should be fluid rather than rigid, to easily be adapted and accepted by the settings of the current research

(Rubin & Rubin, 2011). For these reasons, the type of interview chosen for this research is a combination of structured and unstructured interviews, called semi-structured interview. To do this, the researcher uses a preplanned interview guide to ask participants relatively focused but open-ended questions about a specific topic. Thus, when interviewing, the researcher does not think of the guide as a strict schedule in which he or she asks all participants a set of identical preestablished questions in the same order. Rather, in semi-structured interviewing, the researcher uses a preplanned interview guide to direct the interaction while giving the participants the opportunity to report on their own thoughts, behaviors, and feelings. The interviewer then exerts some control, but the amount of control he/she exerts over what a participant can say and how he/she can say is quite small (B. Smith, 2019). Therefore, throughout the interview process a predefined line of inquiry, as reflected by the case study protocol has been followed, while asking actual conversational questions in an unbiased manner that also served the needs of data collection for the research.

2.3.1.3 Online interviews

All the interviews have been carried out online, more precisely through the Microsoft Teams client also used by Accenture for internal communication, that can be considered the direct equivalent of a modern telephone.

The main advantage of telephone interviewing is that many different people can be reached (across the company and even internationally) in a relatively short period of time. From the respondents' standpoint it eliminates any discomfort that some of them might feel in facing the interviewer. It is also possible that most of them might feel less uncomfortable disclosing confidential information over the phone than face to face.

On the other hand, the main disadvantage is that the respondent might be undisposed to a telephone interview, given the numerous calls mangers are bombarded with on a daily basis. To minimize this type of problem, the interviewees have been contacted ahead of time to request participation, to give an approximate idea of how long the interview would have lasted, and setting up a mutually convenient time. (Sekaran & Bougie, 2000)

2.3.1.4 Questioning Techniques

Becker (Becker, 2008), has pointed the important difference in posing a “why” question to an informant (which, in his view, creates defensiveness on the informant’s part) in contrast to posing a “how” question—the latter in fact being his preferred way of addressing any “why” question in an actual conversation. Thus, case study interviews require to operate on two levels at the same

time: satisfying the needs of the line of inquiry while simultaneously putting forth “friendly” and “nonthreatening” questions in an open-ended interview.

To obtain honest information from the respondents, the researcher should be able to establish rapport and trust with the interviewees. In other words, the researcher should be able to make the respondent sufficiently at ease to give informative and truthful answers without fear of disclosure of information. During the course of the interview, the researcher may ask information that is not known to the general public (“Confidential Information”). Confidential Information might include, among other things, the client’s technology, facilities, methods, processes, assets, systems, business partners, investors, customers, vendors, business plans, marketing plans or data, finances and other information. Confidential Information may be contained in tangible materials such as drawings, data, specifications, reports or may be in the nature of unwritten knowledge such as verbal description of the interviewee. This Confidential Information is essential to the effective operation of the client and it is a competitive advantage over the firms pursuing related business activities. Thus, it is important to ensure that everyone concerned is aware of the researchers' purpose as being one of merely understanding the true state of affairs in the organization without disclosing the identity of the individuals or the organization itself to the public. To this end, the researcher has stated the purpose of the interview and assured complete confidentiality about the source of the responses and the anonymity of the client. This should have encouraged the respondents to feel secure about responding.

Furthermore, the respondents have been told about the purpose of the study in advance and how he or she was chosen to be one of those interviewed to ensure better communication between the parties. A document has been sent in advance with a list of topics for the interviews and the general line of inquiry to be followed during the interview. The interviewees have been motivated to offer honest and truthful answers by explaining to them that their contribution will indeed help the organization, and that they themselves may stand to gain from such a research, that might lead to an improvement of the quality of life at work through significant improvements of the IT infrastructure of the company.

Lastly, even though audiotapes certainly provide a more accurate rendition of any interview rather than taking notes, a recording device has not been used to avoid the interviewees to feel uncomfortable in its presence. Registering the interviewees further creates distractions during the interview and leads to a systematic listening of the contents of the electronic record, a process that takes enormous time and energy.

2.3.2 Business Model Stress Testing

The business model stress testing is a tool designed by Bouwman et al. (2018), to evaluate the robustness of a business model. Building upon concepts from scenario planning and business model innovation, this method allows to test individual business model components as well as their interrelation to visualize challenges and suggests ways to increase the robustness of a business model. This section is therefore dedicated to the description of the test designed by professor Bouwman and colleagues, that will serve, in the following chapters, as an additional qualitative tool to investigate the case study central to the current research.

2.3.2.1 Introduction

Bouwman et al. (2018) define "robustness" as "the ability of a business model to remain feasible and viable in a changing business environment". This ability is increasingly important especially in the financial services industry, in which the market is highly dynamics and the fast pace of digital technologies makes it particularly unpredictable. A tool such as the BM Stress Test would help managers understand if their business is equipped to face external market conditions and potential regulatory and technical changes. The test, estimating the impact of different scenarios, facilitates the analysis of BM components and the identification of the most vulnerable elements that require additional attention to ensure competitiveness in the market. The ultimate goal of the BM evaluation is to be able to intervene and enhance the agility and responsiveness of the BM to different market situations, especially in uncertain contexts where government's or competitors' behavior is unexpected and the technology development too fast. Generally, this method would be ideal to help newcomers develop a business strategy to outperform leading companies, often providing large customer segments with efficient products at a lower cost. However, the test can be employed by a leading company to maintain its competitiveness on the market and face the threats of newcomers wishing to increase their market share with a low-end type of market disruption.

2.3.2.2 Six Steps Approach

In their conceptual paper, the authors elaborate their method consisting of six important steps eventually leading to a set of recommendations to make the business model more robust according to the findings revealed by the test. In this approach, the test is supported by a heatmap that compares the BM components with external trends and uncertainties in the form of a matrix.

2.3.2.2.1 Describe BM

The first of the BM stress testing steps, is to describe the business model of the desired company. Sometimes, the business model might be described in some documents or websites; however, to have a specific understanding of the case at hand, the information have been collected through the interviews and structured following the framework of the business model CANVAS, that will be described in more details later.

2.3.2.2.2 Identify and select stress factors

The second step consist of the selection of uncertainties and trends that will be used as the stress factors in the heatmap, in accordance with the scenario planning. The authors suggest that trends and uncertainties should be derived through brainstorming sessions with the stakeholders or derived from existing scenarios. For these reasons, archival records and the literature have been used as the data collection method to extrapolate the stress factors later discussed with the semi-structured interviews. The authors further suggest that up to five trends and uncertainties should be selected to keep the approach manageable and that for each of them should also be defined the extreme outcomes deriving. The quality of the test obviously depends on a clear and understandable description of the BM together with a relevant list of trends and uncertainties.

2.3.2.2.3 Map BM to stress factors

In this intermediate step, it is important to clarify which BM components and stress factors have the most straightforward causal relationship. This is an important step to gain an overview of which BM components are affected by the stress factors, leaving to the following step, a deeper investigation of such causal relationships.

2.3.2.2.4 Heat Map

The heat map is the most important tool within the BM stress test and is used to model in which way the stress factors affect the business model components previously identified. To achieve this result, BM components and stress factors are mapped as column and rows in a matrix and different colors are used to specify the effect of a stress factor on a specific BM component. The stress factors could in fact, negatively or positively impact the BM components, influencing their feasibility and viability. The main purpose of the heat map is to identify these positive or negative effects and understands the relationship that caused them. Therefore, the reasons that led the

use of a specific color should also be included in the heat map, as an input of the last step of the method that entails the formulation of recommendation based on the findings.

2.3.2.2.5 Analyze results

Eventually, the heat map should make clear which components of the business model are not robust. At this point, an analysis of the results is carried out to gain more insight on the specific problems of the business model while structuring an investigation on the varying robustness of the different components. A second analysis is then carried out to reveal certain patterns concerning the BM in relation with the stress factors identified. The BM components might still be consistently coherent with the outcome of the external analysis, whereas in other cases, the heat map might reveal a major inconsistency with current and future scenarios of the external environment.

2.3.2.2.6 Formulate improvements and actions

The final step of the BM stress test consists in formulating recommendations to improve the current BM model. The improvements should focus on increasing the robustness of the BM while enhancing the consistency across its components. The final process of improvements formulation is essential to reach the ultimate goal of revising the business model. The business model stress test and its outcomes are extremely helpful in order to answer the second sub question of this research, as well as informing the management about future scenarios and the readiness of the business to be subject of given trends.

2.4 Methodology Approach

The table 1 is a general representation of the thesis' approach to the research objective, based on the research methodologies employed. Each chapter includes several pieces of analysis or tools that have been applied to the purpose of responding to the research questions. The second column contains the specific sub question tackled by each section of the research.

Table 2 - Thesis structure based on research methodologies

DETAILS OF METHOD	SUB-QUESTION TACKLED	SUBCHAPTER	DATA COLLECTION METHOD
Analysis of the financial services industry and cloud trends.	SQ1: What are the benefits and the added value originating from the adoption of the cloud computing technology for an insurance multinational? SQ2: How should insurance firms innovate their business model to welcome the adoption of cloud computing while developing an organizational structure that is customer oriented and cost effective?	4.1 Market Trends and Uncertainties	Archival Records
General overview of an insurer's operations and how they are affected by the cloud computing technology.	SQ1: What are the benefits and the added value originating from the adoption of the cloud computing technology for an insurance multinational?	4.2 Cloud Impact on Insurance Value Chain	Archival Records Semi-structured Interviews
Analysis of the cost savings opportunities of the cloud computing technology.	SQ1: What are the benefits and the added value originating from the adoption of the cloud computing technology for an insurance multinational?	4.3 Cloud Economics	Archival Records
A study on the barriers hindering cloud adoption in the financial services industry.	SQ3: What are the barriers and the difficulties faced during the transformation process?	5.1 Barriers analysis	Semi-structured Interviews

	SQ4: How do managers overcome the barriers emerged during the transition?		
A tool designed to evaluate the robustness of a business model.	SQ2: How should insurance firms innovate their business model to welcome the adoption of cloud computing while developing an organizational structure that is customer oriented and cost effective?	5.2 Business Model Stress Testing	Archival Records Semi-structured Interviews

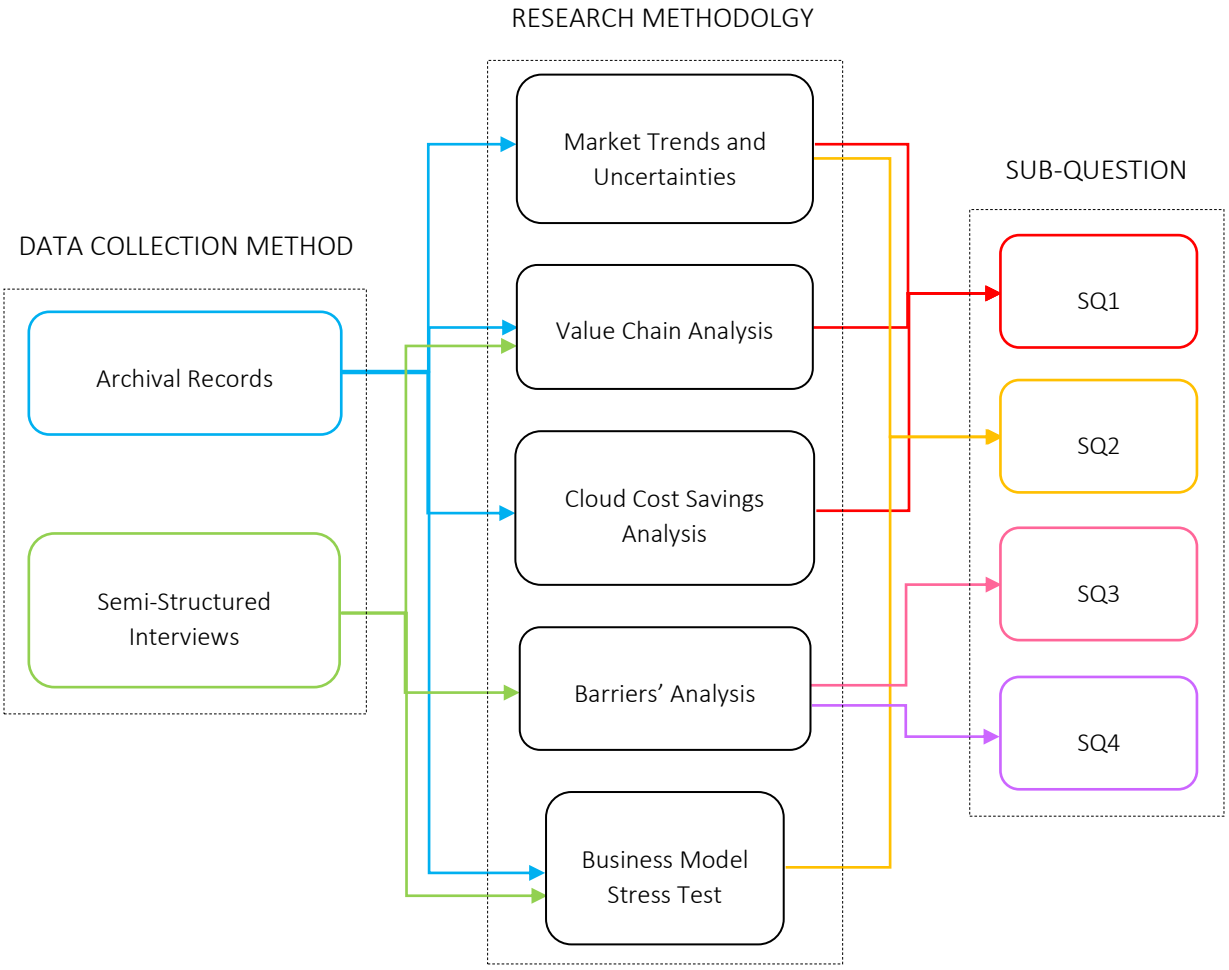

Figure 2 – Visual representation of table 2

3. Literature Review

The following chapter documents the state of the art with respect to the topics of business models innovation and cloud computing technology. Each section is an evaluation of the available literature on the topics at hand and synthesizes the information to present them in an organized way that facilitates the reader.

Furthermore, each section will partially contribute to answering the first two sub research questions outlined in the first chapter. The literature analyses the information available from past researches to identify gaps that will be filled by this research, when a more accurate data collection method is applied in later chapters.

3.1 Industry Drivers and Technology Trends

A large body of literature is dedicated to the topic of innovation and the organization-wide structural dimensions that shape the firm's propensity and ability to innovate effectively and efficiently (Symeonidis, 1996). However, only a relatively small number of papers have focused on a comparison between the available firms' configurations and how these affect the firm's ability to compete in the market (Symeonidis, 1996). On the one hand, it is often argued that flexible and small businesses with low formalization and procedures would foster experimentation and creativity, leading to breakthrough innovations. On the other hand, it is also frequently pointed out that high standardization and well-developed procedures can ensure better development investment decisions by the organization that is then quicker and more efficient at implementing new projects Symeonidis, 1996).

In the following sections, first, the role and structure of research and development for insurers will be investigated, following by a chapter that will critically analyze the body of research existing concerning advantages and disadvantages of different organizational configurations. Moreover, the financial services sector is being transformed by rapid advances in digital technology, from artificial intelligence to the cloud, creating both challenges and opportunities for service providers, consumers and regulators alike.

The second half of this section will then review the literature regarding the developments in this new wave of technological innovations, focusing on cloud adoption and its impact on the financial services industry.

3.1.1 The role of R&D in the financial service industry

Even though R&D activities are traditionally not of value-creation for insurance companies, that are usually not involved in creating or improving physical products, the innovation of digital services and application become increasingly important to retain competitive advantage (van Rossum et al., 2002). In order to foster research on innovative insurance services, insurers increasingly cooperate with other companies, to contribute to cross-industry services as well where insurance know-how is required or at least beneficial (Pousttchi & Gleiss, 2019).

Hence, the literature is populated by articles that highlight the importance of R&D for insurance companies, in light of digitalization and innovation processes and beyond the simple support of product development. Michael Naylor in his book (Naylor, 2017), explores how a range of disruptive technologies might revolutionize the insurance industry by enhancing business models and processes to keep themselves ahead of the competition. The main argument of his work is that insurers should reimagine their industry away from the sale of a one-off product, into the sale of a series of real-time, data-based risk services (Naylor, 2017). Axel (1993) however, claims that the increasing competitiveness of the insurance marketplace now requires companies to change their offerings more frequently than before and that an important role in the insurers' value chain is covered by the product design and development that leverages data to originate tailored insurance policies and services. Ideally, companies will need to adopt both a proactive and innovative approach to developing new products. This will entail a change of emphasis away from exploiting asset strengths and towards exploiting market opportunities and it will almost certainly require assets to be used differently than before (Axel, 1993).

3.1.2 Firms' size advantages

As Melissa A. Schilling reminds in her book Strategic Management of Technological Innovation (2005), in the 1940s Joseph Schumpeter was the supporter of two theories linking innovation and firm's size:

- large sales volume allows firms to spread the fixed costs of R&D that, as a consequence, yields larger returns than firms with lower sales;
- large firms obtain financing for R&D projects easier than their smaller competitors.

Moreover, continues Schilling, spending a considerable amount of investments in R&D may lead to learning curve advantages and economies of scale: thanks to the substantial investments, new product development(NPD) processes competencies are improved over time, better resources and equipment are introduced and the firm gains experience and capabilities in selecting and financing the project that have a higher likelihood of success (Schilling, 2005).

In a study from 1988 by Acs & Audretsch, a sample consisting of 172 innovative and 42 highly innovative industries is modeled to estimate the differences between large and small firms' innovative rates. The authors' conclusion acknowledges the Schumpeterian hypothesis and restates that the total number of innovation is closely related to R&D expenditure (Acs & Audretsch, 1988). It should be pointed out that the relative innovative advantage of these two types of firms is determined by the extent to which imperfect competition characterize the market in which they compete. Large firms tend to gain their competitive advantage in capital-intensive and advertising intensive industries, whereas small firms' superiority occurs in the birth and growth stages of an industry. This analysis, however, does not take into consideration the fast-paced change in the needs and wants of the customers and the new trend in digitalization that in the financial services industries is being exploited by newly founded businesses to the detriment of the dated big corporates.

In contrast, the disadvantages faced by large corporations within the innovation process, have also been documented by the literature. Rotemberg and Saloner (1994) argue that the large bureaucratic inertial typical of large firms, caused by the numerous layers of authority and high formalization, make them less dynamic and responsive to the changes of the market (Rotemberg & Saloner, 1994). The growth of a business inevitably leads to a loss of managerial control: the increasing difficulty for individual researchers or entrepreneurs to appropriate the return of their efforts causes a drop in their incentives and in the efficiency of the firm's R&D (Rotemberg & Saloner, 1994).

Miller (1992) further delineates the difficulties faced by large organizations in a dynamic context, introducing the Icarus Paradox, a behavior that traps numerous outstanding firms, excessively extending the very factors that contributed to their success. He argues that what may initially be the causes of success, might successively become the causes of failure when taken too far, hindering a firm's ability to respond to new technological generations (Miller, 1992). As a matter of fact, the old legacy systems hosted by traditional insurers perfectly fit in the theory of Miller and demonstrate why they need to integrate digital transformation and cloud computing technologies in their strategy (Matt et al., 2015).

Symeonidis (1996), another author that refuted the Schumpeterian hypothesis, reported in 1996 two early influential studies based on a sample of 448 firms from the 500 largest US industrial firms in 1955. The studies were built on a regression ran between the R&D employment intensity and sales and the number of patents produced. Evidence was found of an inverted relation between R&D employment intensity and sales and of a non-proportional increase of patents in respect of sales growth. The result were interpreted as a clear rejection of the Schumpeterian hypothesis and of a positive relationship between firm size and innovation (Symeonidis, 1996).

Conversely, a large body of research agrees on the numerous advantages of small firms, often considered more entrepreneurial and flexible than their more structured competitors, due to a leaner structure, smaller fixed assets and lower number of employees (Melissa A. Schilling, 2005). Mahoney (1992) argues that small firms cannot be dominated anymore by their large competitors and while big corporates enjoy more significant investments in NPD processes, their smaller counterparts take advantage of enhanced employee creativity and motivation, quicker customer service and response time and more focused and synergized teams (Mahoney, 1992). For Mahoney, successful large companies have to think and act small and behave in an entrepreneurial manner if they want to secure their competitive position in the marketplace.

Menon et al. (2000), for instance, believe that a speed-based strategy is critical to acquire the necessary competitive drive in the market. They describe it as the capacity to quickly react to changing situations and satisfy the demands of the customer base in a market with emerging conditions while uncovering or rectifying mistakes or deviations from original plans. Their study contends that organizations with a flatter structure have the ability to reduce the density of information flow typical of hierarchical bureaucracies, retaining a competitive advantage over 'taller' or multilayered organizations. A few large corporations for example, have attempted to combine the two organizational configurations by structuring their companies into groups of smaller, often more specialized, autonomous divisions. This phenomenon, often called modular organization, is characterized by a large-scale downsizing, with many functions and layers of management eliminated and the disaggregation into networks of smaller independent firms that can access the large corporation's resources while retaining a small company's simplicity and flexibility (Menon et al., 2002).

In their publication on process management's productivity, Brenner and Tushman (2001) introduce a new form of organization whose ability lies in its capacity to both integrate and build upon its current competencies while simultaneously developing fundamentally new capabilities. The authors argue that process management activities are only beneficial for organizations in stable contexts, but need to be coupled with explorative activities when incremental innovation and change are needed (Benner & Tushman, 2001). These forms of organizations are called Ambidextrous or dual organizational forms and are designed with both small and decentralized units with loose cultures and processes, and larger exploitation units, more centralized with tight cultures and processes. Ambidextrous organizational forms provide the complex contexts necessary to dynamically innovate while retaining current competencies, thanks to a dynamic approach to both exploitative and exploratory activities (Benner & Tushman, 2001).

Brenner and Tushman believe that ambidexterity should be developed in order to achieve innovation in the long period while obtaining success in the short. Other researchers however, such as Christensen and Bowe (1996) or Yu and Hang (2010) propose that since disruptive innovations usually register an inferior performance in the initial period, managers and existing

customers consequentially overlook the opportunity of leveraging existing competencies. In addition, organizations find difficult to pursue disruptive strategies while taking advantage of existing assets as the research on radical innovation implies (Christensen & Bower, 1996) (Yu & Hang, 2010).

Table 3 - Summary of research papers on firm size and innovation

STUDY	AUTHOR	KEY FINDINGS	METHOD
The Debate on the Insurance Value Chain	Van Rossum et al. (2002)	Innovation has become increasingly important for insurance companies	Qualitative research
Surrounded by middlemen - how multi-sided platforms change the insurance industry	Pousttchi & Gleiss, (2019)	Insurers increasingly cooperate with other companies, to contribute to cross-industry services as well where insurance know-how is required.	Case Study Analysis
Insurance Transformed	Naylor (2017)	Disruptive technologies are developing innovative business models and revolutionizing firms' processes in order to keep pace with the competition while transforming the insurance industry.	Qualitative research
Insurance Product Development: Managing the Changes	Axel (1993)	The increasing competitiveness of the insurance marketplace now requires companies to change their offerings and product development plays an important part in value creation.	Case Study Analysis
Capitalism, Socialism, and Democracy	Joseph Schumpeter (1942)	R&D yields larger returns in large sales volume firms. Large firms obtain financing for R&D projects easier than smaller competitors.	
Strategic Management of Technological Innovation	Melissa A. Schilling (2005)	High spending in R&D leads to learning curve advantages and economies of scale.	Qualitative research

Innovation in Large and Small Firms: An Empirical Analysis	Acs & Audretsch (1988)	The total number of innovations is closely related to R&D expenditure.	Explanatory research: Regression Analysis
Benefits of Narrow Business Strategies	Rotemberg and Saloner (1994)	Large firms are more bureaucratic, less dynamic and responsive to changes.	Theory-building research
The icarus paradox: How exceptional companies bring about their own downfall	Miller (1992)	Icarus Paradox	Exploratory Research
Innovation, Firm Size and Market Structure: Schumpeterian Hypotheses and Some New Themes	Symeonidis (1996)	Inverted relation between R&D employment intensity and sales and a non-proportional increase of patents in respect of sales growth.	Literature Review
Is bigger really better? One entrepreneur's view	Mahoney (1992)	Smaller firms take advantage of enhanced employee creativity and motivation, quicker customer service and response time and more focused and synergized teams.	Exploratory Research
Antecedents and outcomes of new product development speed. An interdisciplinary conceptual framework	Menon et al. (2000)	Organizations with a flatter structure have the ability to reduce the density of information flow typical of hierarchical bureaucracies, retaining a competitive advantage over multilayered organizations.	Qualitative research
Exploitation, exploration, and process management: The productivity dilemma revisited	Brenner and Tushman (2001)	Process management activities are only beneficial for organizations in stable contexts but need to be coupled with explorative activities when incremental innovation and change are needed.	Qualitative research
Customer Power, Strategic Investment, and the Failure of Leading Firms	Christensen and Bowe (1996)	Disruptive innovations' initial inferior performance inevitably leads managers and existing customers to	Exploratory Research

		pay less attention to the exploitation of existing competencies.	
A Reflective Review of Disruptive Innovation Theory	Yu and Hang (2010)	Organizations cannot pursue disruptive opportunities while exploiting existing assets.	Literature Review

3.1.3 Digital Disruption in the Insurance Industry

In order to study business model dynamics applied to the rapid technological shifts, it has become increasingly relevant to investigate the literature on business models in IT industries, as they are, in highly dynamic markets, heavily dependent on Information Systems as enablers and trigger of innovation (Rai & Tang, 2014). A large body of studies has dealt with the potential impact of emerging technologies on conventional business models. However, the majority of the literature investigated the actual changes without further examining the reason that led these organizations to adopt their business models from an intra-organizational perspective (Kranz et al., 2016).

Existing literature reveals that a firm's propensity to adopt a technology is inversely proportional to how much such technology consumes the business' existing resources (Afuah, 2000). Afuah et al. (2000) further provide evidence that the pressure of technological shifts on big corporations is attenuated if the companies possess uncommon assets that can hardly be reproduced, resulting in considerable switching costs for existing customers (Afuah, 2000). The literature further proposes that both absorptive capacity and organizational ambidexterity play a fundamental role in a firm's ability of perceiving and responding to changes in order to adapt the business model, while research is lacking regarding how they influence the business model innovation process (Khanagha et al., 2013).

With regard to the value creation of insurances, the research addresses the impact of digital technologies on strategies, performance, process automation and innovation. More importantly, the availability of new data sources opens up further possibilities for risk assessment, forecasting and underwriting processes. The generation and exploitation of telematics data, the method of monitoring a moving asset (i.e. a car) with GPS and onboard diagnostics producing an extraordinarily large and fast-moving stream of data, has gained increased attention within the literature. Over the past years, the premium calculation methodology for motor insurance companies was mainly based on general factors (Baecke & Bocca, 2017). Vehicle specific characteristics and drivers' socio-demographical data were the only input for the calculations. Through the use of In-Vehicle Data Records (IVDRs), the insurer is now able to collect driving behavior data of each customer (Baecke & Bocca, 2017). These records include the kilometers driven, subdivided based on location and time of the day. Baecke et al. argue that insurance

companies can gain a strong competitive advantage by correctly using and analyzing these data. Extra services such as automatic emergency calls, stolen vehicle monitoring and diagnostic services, including economically more convenient and safer driving suggestions, can simultaneously be implemented with the same device (Baecke & Bocca, 2017). The majority of present studies, however, focus on how digital technologies are impacting sales in light of new CRM tools and marketing strategies. On the other hand, some studies explore how could insurance companies improve their customers' interaction: through multichannel strategy, where a company offers medium through which its customers can communicate with the brand, giving customers options they can choose from based on their preferred channel or issue at hand (Klotzki et al., 2017) and through automated communication, such as the use of robots to substitute human frontline employees (FLEs) (van Doorn et al., 2016).

3.1.4 Cloud Computing and Business Model adoption

From the literature can be deduced that there has been a heightened interest in the adoption of cloud computing by enterprises over the past decade. Promising to reshape the way enterprises acquire and manage their needs for computing resources efficiently and cost-effectively, cloud computing is considered an innovative model for IT service sourcing that generates value for the adopting enterprises. It increases productivity, enabling enterprises to focus on their core business activities (Garrison et al., 2012). Thanks to the scalability, flexibility, agility, and simplicity it offers, the adoption of cloud computing is growing rapidly and a recent cross-sectional survey on the adoption rates of cloud computing by enterprises reported that 77% of large enterprises and 73% of small and medium-sized enterprises (SMEs) are adopting the cloud (El-Gazzar, 2014).

However, in previous literature, less consideration is given to business issues regarding the adoption of cloud computing, whereas more attention is paid to the technical issues (Yang & Tate, 2012). Further, in-depth studies are lacking regarding issues related to the cloud computing adoption process in the context of enterprise users (Yang & Tate, 2012). Other studies suggest that the benefits of cloud adoption are very evident to the insurance industry and while costs savings is the most frequently cited benefit, many insurers also believe that the cloud could improve reliability, help with integrations following mergers and acquisitions, accelerate their ability to bring new products and services to market and result in a better customer experience (Dague, 2020).

As a matter of fact, the capabilities of cloud have implications across an insurer's business, extending its scope to cloud-based platforms, applications and business processes creating new opportunities in terms of how insurers reach and interact with customers, create and deliver products and services, manage their value chains, collaborate with partners, generate revenues

and assess and manage risk (Accenture, 2010). Insurers will be able to break new ground by exploiting the cloud to do new and innovative things that might have not been identified yet. The cloud offers major opportunities for insurers to build a more flexible customer-centric business model that can help them achieve high performance in the industry while driving profitable growth, meaning that it could be appreciated by non-IT decision makers at insurance companies (Accenture, 2010).

Although the literature is quite exhaustive regarding cloud computing adoption factors, plenty of issues remain unclear such as, for instance, the relationship between the firm's size and the likelihood to adopt cloud computing, that require further in-depth studies (El-Gazzar, 2014). As mentioned above, the technology is mainly recognized as a cost-reduction solution; however, as reported by a survey study conducted in India this cost reduction may not be significant, particularly in the context of SMEs (Krishna Iyer, 2013). On the other hand, maintaining on-premise backups on legacy servers covers enormous costs as well. Therefore, further studies should focus on the evaluation of the actual cost reduction of IT-related costs for enterprises and of the benefits introduced by cloud computing adoption. Moreover, the literature lacks studies that further explore the impact of IT governance processes throughout the implementation process, while many legal, ethical and organizational issues need to be investigated in order to improve laws and standards. Lastly, EL-Gazzar (2014) underlines the need to explore the role of cloud service brokers and to address the issues of trust and security that are claimed to be vital for the success of cloud computing (El-Gazzar, 2014).

Table 4 - Summary of research papers on Cloud Computing and Business Models

STUDY	AUTHOR	KEY FINDINGS	METHOD
IT-Enabled Business Models: A Conceptual Framework and a Coevolution Perspective for Future Research	Rai & Tang (2014)	Business models are, in highly dynamic markets, heavily dependent on Information Systems as enablers and trigger of innovation.	Qualitative Research
Understanding the influence of absorptive capacity and ambidexterity on the process of business model change	Kranz et al. (2016)	There is scarcity of research that determine how and why incumbents adapt established business models.	Case Study Analysis
How much do your co-opetitors' capabilities matter	Afuah (2000)	The less an emergent disruptive technology destroys the value of a firm's existing resources, expertise	Quantitative Research

in the face of technological change?		and skills, the higher is the firm's propensity to make use of the technology.	
Business model transformation and ambidexterity: Renewal through recursive structural alteration	Khanagha et al. (2013)	Absorptive capacity and organizational ambidexterity lack rich empirical evidence on how they affect the process of business model innovation.	Theory-building research
The value of vehicle telematics data in insurance risk selection processes	Baecke & Bocca (2017)	Insurance companies can gain a strong competitive advantage by correctly using and analyzing In-Vehicle Data Records (IVDRs).	Quantitative Research
The Cost of Life Distribution in Europe	Klotzki et al. (2017)	Addresses possible measures from insurance companies to enhance customer interaction such as a multichannel strategy.	Mixed Research
Emergence of Automated Social Presence in Organizational Frontlines and Customers' Service Experiences	Van Doorn et al. (2016)	Addresses possible measures from insurance companies to enhance customer interaction such as the use of robots to substitute human frontline employees (FLEs).	Exploratory Research
Success Factors for Deploying Cloud Computing	Garrison et al. (2012)	Cloud Computing increases productivity, enabling enterprises to focus on their core business activities.	Qualitative Research
A Literature Review on Cloud Computing Adoption Issues in Enterprises BT - Creating Value for All Through IT	El-Gazzar(2014)	Cloud computing is growing rapidly, and it is adopted by both large and medium sized enterprises.	Literature Review
A descriptive literature review and classification of cloud computing research	Yang & Tate (2012)	In the literature, less consideration is given to business issues regarding the adoption of cloud computing, whereas more attention is paid to the technical issues.	Literature Review

How Insurers Can Boost Their Readiness for Cloud Adoption	Dague (2020)	The benefits of cloud adoption are very evident to the insurance industry and while costs savings is the most frequently cited benefit, many others are the advantages of cloud adoption.	Grey Literature
Analysis of Dissatisfiers That Inhibit Cloud Computing Adoption Across Multiple Customer Segments	Krishna Iyer (2013)	The cost reduction benefit introduced by cloud adoption may not be significant, particularly in the context of SMEs.	Quantitative research: Survey analysis

3.1.5 Conclusion: R&D, Size, Cloud Computing and Business Models

In conclusion, it is evident that the rise of digital technologies and a transforming customers' behavior are affecting the insurance industry, giving rise to new players and consequently igniting the process of business models innovation within the established multinationals.

The literature on Information Systems as enablers and trigger of innovation is in rapid growth, especially considering the recent development of artificial intelligence and cloud computing technology. The review has discussed the benefit of different firm's sizes and the existing theories to face the challenges ahead. However, further in-depth studies are required to investigate the relationship between the firm's size and the potential adoption of cloud computing. In addition, the review emphasized that the literature poorly addresses how insurers should innovate their business model in combination with the adoption of cloud computing while recognizing a consistent gap exists regarding the insurers' organizational behavior needed to face the threat of insurtech companies.

This research will focus on providing a study in recognition of this gaps and based on a real case data gathering it will serve as the theoretical framework to develop new theories and methodologies. This approach is needed to address the practical problem outlined above and deal with the urgency of hindering the consolidation of competitors' strength in the market.

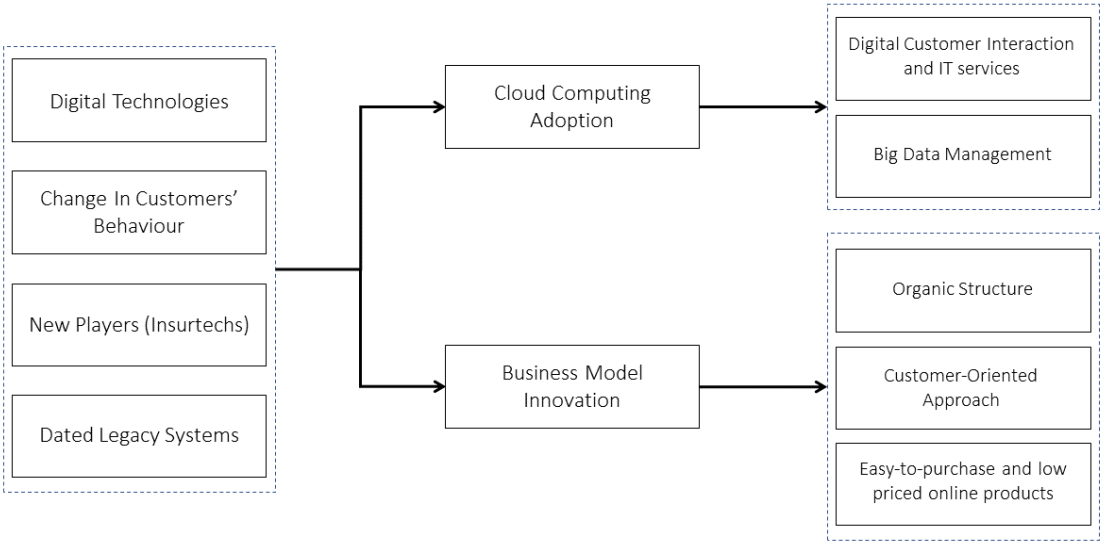

Figure 3 - Literature Review Framework

3.2 Cloud Computing Technology

The goal of this section is to provide a clear definition of Cloud Computing technology and the key characteristics that make it central to any business development strategy. As Weinman nicely points out in his book Cloudonomics (2012), the best definition for the cloud technology is easily reminded by the name itself:

- **C**ommon infrastructure
- **L**ocation independence
- **O**nline accessibility
- **U**tility pricing
- on-**D**emand resources

It can be defined as common because of its shared infrastructure and pooled resources; it provides an ubiquitous service and is therefore independent from any specific location; it is accessed over a network and thus online; the usage sensitive pricing model resemble the value creation feature of a utility; and lastly an on-demand service, delivering the right amount of resources or service only when they are needed (Weinman, 2012). Another widely used and inclusive definition is provided by the US National Institute of Standards and Technologies (NIST): "Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider

interaction. This cloud model is composed of five essential characteristics, three service models, and four deployment models" (Mell & Grance, 2011).

The following sections will sequentially recall these concepts to give a well-structured overview of the technology and its features in order to ensure a basic knowledge and understanding of some of the findings from the current research. The review is structured with a top-down approach starting with a general overview of the essential cloud characteristics and later moving to the description of the network structure, without diving into extremely technical details.

Cloud computing, offering valuable opportunities to reduce the capital cost of IT assets of a company, has a great impact over its finances. The main drivers for the wide spread of the cloud technology are without a doubt the economical advantage and the simplicity of the service delivery (Buyya et al., 2013). Therefore, a section has also been dedicated to a discussion regarding the innovative pricing model introduced by the cloud.

3.2.1 Defining the Cloud

With cloud computing we refer to both the hardware in the data centers and the system software and the services delivered sometimes as application over that hardware (Armbrust et al., 2010). The "Cloud" is in practice the mean through which various services such as computing power, computing infrastructure, applications, business processes are delivered to the client wherever and whenever he wants. As its name suggest, its core characteristics is the ability to easily expand and contract, meaning that the user is able to request additional resources when needed, and release them in case they are no longer employed (Hurwitz et al., 2010). This kind of elasticity could not be replicated by traditional data center, where it has always been possible to add and release resources, but not in an automated or on demand manner. This briefly explains the main reason that is driving many individuals, business, and IT users to move to the cloud (Hurwitz et al., 2010). As mentioned above, five key cloud characteristics are outlined by the NIST definition of cloud computing: "on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service" and all of them must be true in order to give birth to a cloud offering (Mell & Grance, 2011).

3.2.1.1 On-Demand Self-Service

An On-demand self-service is the ability by a consumer to request and receive access to a service offering, interfacing with a completely automated tool and without the need of a physical administrator or support staff having to fulfill the request manually (Rountree & Castrillo, 2014). This means that the resources needed by the client are auto-provisioned or self-supplied by the client himself with minimal configuration (Sitaram & Manjunath, 2012). This solution obviously offers enormous advantages for both the user and the provider of the services: the users can thus quickly and easily procure and access the services they want while the provider does not sustain any additional cost (Rountree & Castrillo, 2014). This solution in fact, replace the traditional workflow typical of in-house IT systems and processes, that usually require interaction with an IT administrator, often resulting in long approvals and time intervals to provision any new resource (Sitaram & Manjunath, 2012). Self-service implementations, even if difficult to build, reduce the administrative burden on the provider and they are definitely worth the time and money, and allow an organization's IT staff to focus on other, hopefully more strategic, activities (Rountree & Castrillo, 2014).

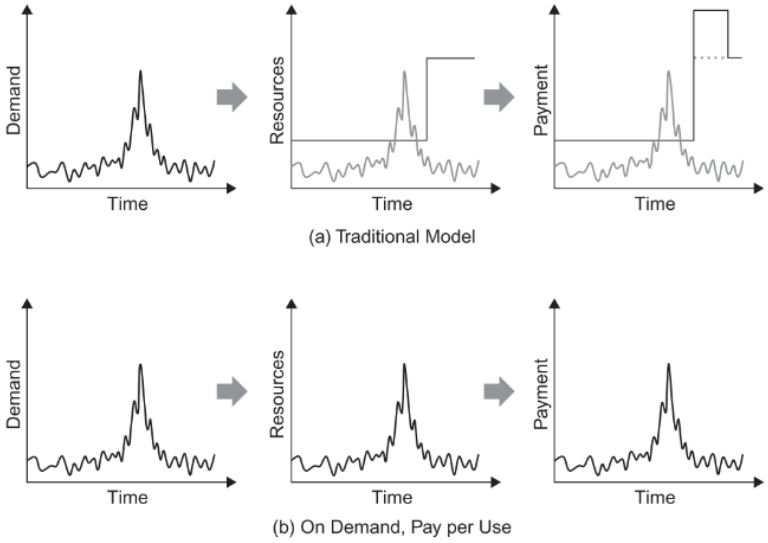

Figure 4 - Traditional versus Cloud Model
Retrieved from: Weinman, 2012, p. 71

The scheme above compares the on-demand, pay-per-use model of the cloud with a traditional model. As demand varies over time, fixed resources are overprovisioned to serve varying capacity. When a demand spike occurs, there are insufficient resources, leading to lost productivity and poor customer satisfaction. By the time additional resources are deployed, it is too late to serve the spike, and there are now more excess resources than before. On-demand resources, on the

other hand, ensure that exactly the right quantity of resources are available at exactly the right time, ensuring that the financial obligation incurred, exactly matches the level of resources utilized. Therefore, the on demand model ensures that the resources curve exactly follows the demand curve, and pay-per-use ensures that the payment curve exactly follows the resources curve. All three are perfectly synchronized (Weinman, 2012)

3.2.1.2 Broad Network Access

This characteristic of the cloud includes a few features that are essential to make sure that the cloud is easily accessed by anyone. Therefore, the users should only be required to have a basic network connection such as some type of internet connection. However, even with the constant technological advancement of Internet connections' bandwidth, they might still be considerably slow when compared with a local area network (LAN) connection. For these reasons, the provider should not assume that every user can afford a large amount of bandwidth to use the service, leading to the conclusion that a cloud service should require either no client or a lightweight client. Lastly, these services should as well be accessed by a multitude and a wide array of client devices, identified not only by the common laptop and desktop computer, but also by tablets and smartphones for instance (Rountree & Castrillo, 2014). Thus, ubiquitous access to cloud applications is a critical requirement when computing moves to the cloud, making connectivity essential for effectively accessing the services needed. For instance, services like Amazon, Google, and Yahoo are globally available via the Internet and accessible by a great variety of devices, such as PCs, iPads and mobile phones (Sitaram & Manjunath, 2012).

3.2.1.3 Resource Pooling

The principle of resource pooling is based on the need of the cloud provider to optimize its resources without sacrificing performance and customer satisfaction. Considering that clients do not have a constant need for all the resources requested, the provider make them available to others when they are not being employed. This way, when these resources are not being used, they can be employed by other customers instead of sitting idle wasting potential profits. This cloud's quality gives service providers the power to service more customers achieving flexibility and lower costs compared to a solution where dedicated resources are allocated to each customer (Rountree & Castrillo, 2014). As a consequence, cloud services are able to support millions of simultaneous users, numbers otherwise impossible to achieve if each of them constantly needs dedicated hardware (Sitaram & Manjunath, 2012). While Facebook supported 7 million concurrent users in 2009, Skype, in part because of the COVID-19 pandemic, supports approximately 40 million people daily: sharing resources between clients and users to reduce costs,

the company is seeing a 220% increase in Skype-to-Skype call minutes also thanks to the high reliability of its service (Lardinois, 2020).

3.2.1.4 Rapid Elasticity

The cloud's rapid elasticity is a core feature that explains the ability to easily expand and shrink to satisfy the users' needs. Considering that the cloud's hardware architecture is made of machines running in a data center, it is logical to say that the provider should have already in place the infrastructure needed to satisfy a users' peak in requests for capacity. However, as mentioned already, resources might still not be needed even if available. Through automation, a trigger is set off when resource usage hits a certain point, and the system automatically carry out the deployment of additional resources needed to handle that peak in usage volume. Once the traffic diminishes, the resources usage shrinks proportionally, to save on consumption costs such as power and cooling and ensure the resources are not wasted (Rountree & Castrillo, 2014). For example, the cloud platform called Amazon EC2, allow the users to specify a minimum and a maximum number of virtual servers to be allocated, with a very short time needed to provision a new server, and a high speed of deployment for the service needed compared with a traditional IT environment where an organization would need to have internal additional capacity to support the increase of usage (Sitaram & Manjunath, 2012).

3.2.1.5 Measured Service

Lastly, a cloud service must be able to quantify the usage through different metrics such as volume of data, time or bandwidth used (Rountree & Castrillo, 2014). This feature is what make possible the peculiar pricing method applied by cloud providers: the ability to "pay as you go," is among the most compelling business application of the cloud, because of the freedom to pay only for the resources that are actually used (Sitaram & Manjunath, 2012). For different metrics, specific rates are usually applied to determined how much a customer should be charged for the service, making possible to bill the client based on consumption levels (Rountree & Castrillo, 2014).

3.2.2 Cloud Service Models

Following the NIST definition, the cloud computing model is further composed of three basic service models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) (Mell & Grance, 2011) each focusing on a precise layer in a computer's call stack: the hardware, the platform and the application (Sitaram & Manjunath, 2012). Cloud service models group and classify what is offered by cloud providers as a Service (XaaS), and represent

the 3 classes of services that cloud providers guarantee to the users on a high-level abstraction (Hamdaqa & Tahvildari, 2012). A service is a packaged task that can be automated and delivered to the users in a consistent manner by either a public cloud service provider or through someone's own internal data center. It is critical to understand how each model works in order to develop a general understanding of cloud computing and its applications (Hurwitz et al., 2010).

3.2.2.1 Infrastructure as a Service

An Infrastructure as a Service is a cloud deployment model that allows the consumer to lease infrastructure capabilities based on demand (Hamdaqa & Tahvildari, 2012). the physical hardware (servers, disks, and networks) is abstracted into virtual servers and virtual storage that can be allocated on demand by the cloud users, to deploy services such as computing power, network, storage, or any other essential resources that can be exploited to run platforms, such as an operating system, and the applications developed on top (Hamdaqa & Tahvildari, 2012). As a result, this architecture has the greatest flexibility, but also the least application automation from the user's viewpoint (Sitaram & Manjunath, 2012). The NIST definition further reflects on the flexibility of this solution, specifying that the consumer is not in control of the underlying cloud infrastructure but only over deployed applications, storage, operating systems, and some limited control of selected networking components (Mell & Grance, 2011). Consumers do not receive direct access to resources but have single ownership of the hardware infrastructure allotted and can select and configure resources as required based on their needs as if they were their own machines on a remote network and they had control over the operating system and softwares (Sitaram & Manjunath, 2012). The cloud user can manage the virtual resources as desired, while the IaaS provider has control over the actual hardware; therefore IaaS is well suited for users who want complete control over the software stack that they run and benefit from a pool of storage and computing resources (Sitaram & Manjunath, 2012). For these reasons, and since it utilizes virtualization technologies to partition physical resources, IaaS is sometimes referred to as the "Virtualization Layer" (Hamdaqa & Tahvildari, 2012).

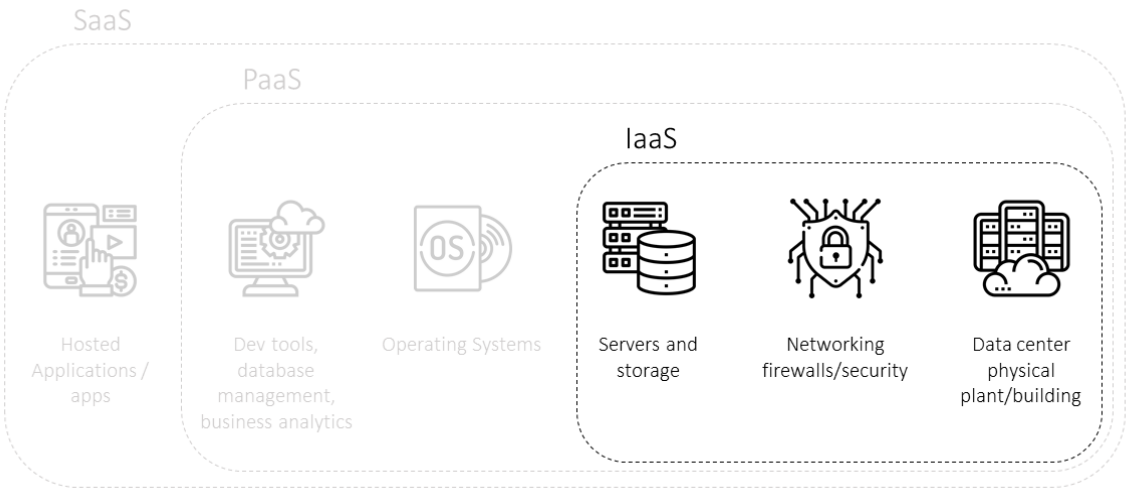

Figure 5 - Cloud Service Models (IaaS)

3.2.2.2 Platform as a Service

A Platform as a service model allows the consumer to configure, manage, develop, deploy, and monitor cloud applications (Hamdaqa & Tahvildari, 2012). The NIST defines PaaS as the ability provided by a Cloud offering, to deploy onto the cloud's infrastructures mentioned above, customized applications generated with programming tools and languages supported by the cloud providers (Mell & Grance, 2011). Differently from IaaS, with a PaaS model the customer is not allowed to manage or control the underlying cloud infrastructure such as operating systems, network, servers or storage, but has control over the deployed applications running over the system and the applications hosting environment configurations (Mell & Grance, 2011). PaaS services provide easy to access and easy to use interfaces abstracting the communications with the lower-level infrastructure (Hamdaqa & Tahvildari, 2012). The hardware then, and any virtual servers, are controlled by the PaaS provider, that additionally supports the middleware selected by the user, such as a database. At this point, the user is allowed to build on top of this middleware, for example defining a new table in the database, while the provider maps the table directly in the cloud infrastructure. Finally, the user is provided with the tools to manage the database and develop application that rely on the database (Sitaram & Manjunath, 2012).

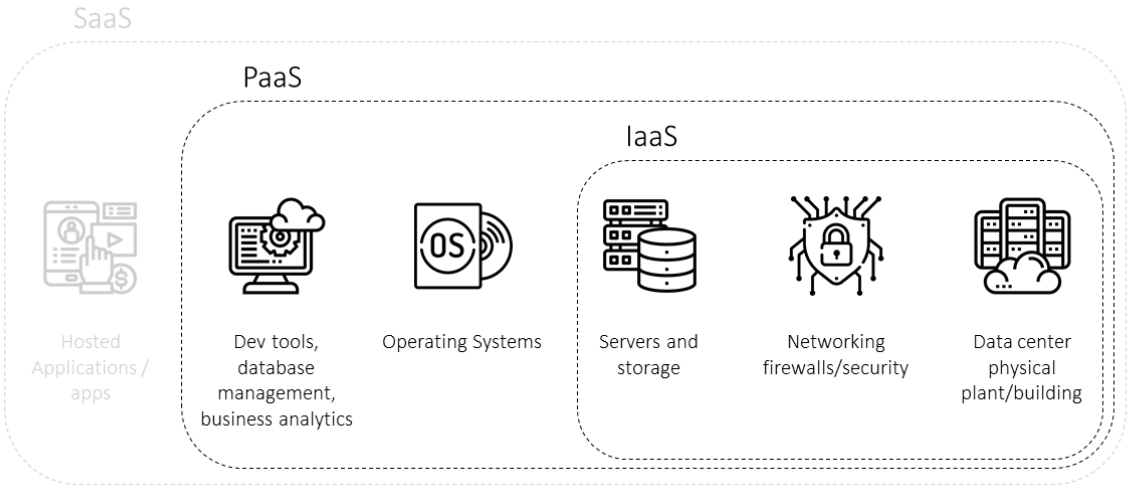

Figure 6 - Cloud Service Models (PaaS)

3.2.2.3 Software as a Service

Above the two layers of IaaS and PaaS, the Software as a Service model equips the user with the ability to access and use a software application that is hosted and managed by the cloud provider, without worrying about all the complexities of hardware, OS or even application installation. The NIST official definition describes the SaaS model as the ability to access the providers' applications from various client devices through a thin client interface such as a web browser, where the consumer is not give the possibility to manage or control the underlying cloud infrastructure or any individual application capabilities with the exception of limited application configuration settings (Mell & Grance, 2011). Therefore, any application possibly accessed using a browser could hypothetically be considered a SaaS (Sitaram & Manjunath, 2012). Practically, while the provider is in control of all the layers below the application, the users are allowed to configure the application for their use requesting additional space for storage for instance or adding additional fields to the customer data. The SaaS infrastructure will then take care of the management of any task in the backend such as any allocation of additional storage, and support the changes introduced on the application (Hamdaqa & Tahvildari, 2012). Even if SaaS models usually target consumers that normally do not need more than a limited control over the application, advanced users may request some freedom for small amount of programming or scripting that could be necessary in order to customize the application for business purposes (Sitaram & Manjunath, 2012).

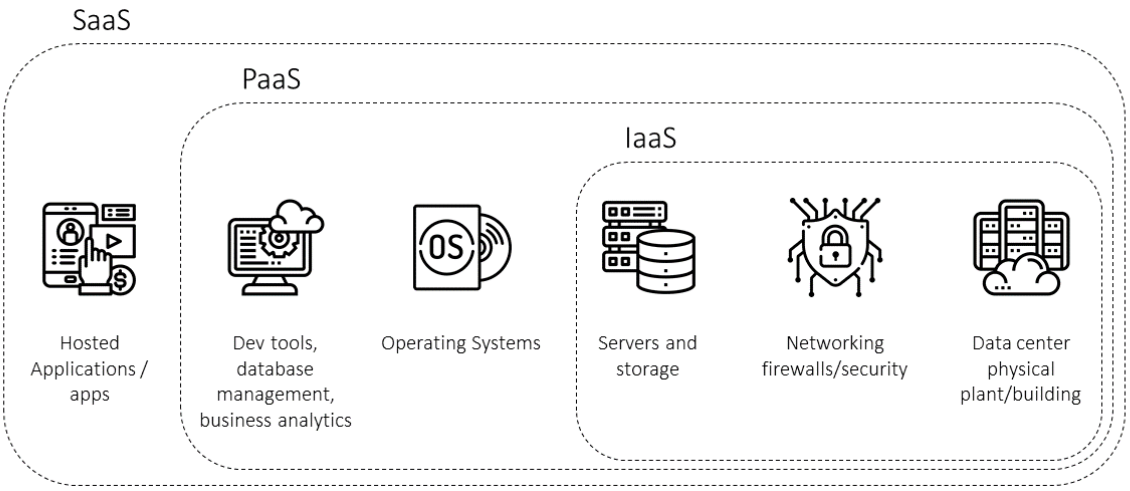

Figure 7 - Cloud Service Models (SaaS)

3.2.3 Cloud Deployment Models

The NIST definition of cloud computing ends with a reference to the four deployment models by which the cloud can be further classified: Private Cloud, Public Cloud, Community Cloud and Hybrid Cloud (Mell & Grance, 2011). In this section has been gathered in brief some literature to explain the difference among these models.

3.2.3.1 Public Cloud

Among the four deployment models, public cloud is the most common and what the term 'cloud computing' was initiated for and usually refers to (Yang & Tate, 2012). Most of the examples and application of the cloud explained in the previous sections, were generally referring to this deployment model, in which an established third-party service provider makes an infrastructure available to any consumer on a subscription basis. In its most general definition, the cloud exists externally to the users and with no restriction to who may purchase the service (Buyya et al., 2013). Therefore, the public cloud exists in its most available form as applications accessed via the internet or as a service owned and operated by independent vendors and accessible to the general public, making it subject of tremendous development in recent years and resulting in very sophisticated Infrastructure-as-a-Service (Winkler, 2011). This cloud model is appealing to users that need to quickly leverage computing, storage, and application services and do not mind their data being stored elsewhere and applications deployed on cloud datacenters on the vendor's premises (Buyya et al., 2013). As a result, identity, access control, and encryption becomes very

important and are at the center of discussion when a choice between public and private cloud needs to be made (Winkler, 2011).

3.2.3.2 Private Cloud

With time, large organizations owning massive computing infrastructures decided to replicate the cloud IT service delivery model in-house, giving birth to the concept of private cloud (Buyya et al., 2013). A private cloud is then a cloud computing infrastructure internally hosted and built for a single enterprise, representing the modern evolution of a corporate IT infrastructure that is shared within the enterprise (Sitaram & Manjunath, 2012). The use of a private cloud is also driven by the need to keep confidential data safe and within the organization's system, as commonly required by institutions such as banks and governments that have high security, privacy, and regulatory concerns (Buyya et al., 2013).

3.2.3.3 Community Clouds

A community cloud is a cloud infrastructure shared by several organizations identified as a one community, but independent form each other (Yang & Tate, 2012). The advantages of this solution, are the cost benefits of a shared nonpublic cloud and the avoidance of security and regulatory concerns that might be associated with using a generic public cloud (Winkler, 2011). The organizations part of the community usually share a common purpose and might be subject to the same legal restriction or regulations (Sitaram & Manjunath, 2012). For example, various types of community clouds are being contemplated in the EU's governments, at the national and local level, to ensure continuity of operations and security at a lower overall cost for all parties involved (Winkler, 2011).

3.2.3.4 Hybrid Cloud

Hybrid clouds are formed when private cloud resources are unable to meet users' requirements or for instance, when an organization implementing a private cloud, wishes to leverage public or community clouds in conjunction with its private infrastructure for a particular purpose (Buyya et al., 2013). Hybrid clouds, as the name itself might suggest, are a mixtures of the previously outlined deployments taking place when there is a combination between an enterprise's private cloud and a service rented from a third party (Yang & Tate, 2012). Sometimes, an organization that has already built a private cloud, might not be able to ignore the additional advantages of exploiting a public cloud–based architecture or while designing the internal infrastructure realize that certain

needs aren't economical to build out internally and may consider the benefits of adopting a public–private hybrid model.

3.2.4 Private vs. Public Clouds

Three major factors were quoted as inhibiting factors of public cloud. The first is a concern for security since the data is not being stored by the enterprise (Sitaram & Manjunath, 2012). However, Winkler (2011) suggests that if an IT infrastructure is private, it does not necessarily mean that it is more secure. While in a public cloud you would rely on the provider for security, in a private cloud many security aspects need to be taken in account, concerning for instance the physical hardware and the virtualization environment, making it very difficult to assess which of the two options is highly more secure (Winkler, 2011). Winkler invites to reflect on the scarce investment on IT security by the average company, which does not consider it a core investment when managing its own private cloud, and therefore believes that the only true advantage of a private solution is a tailored interface that perfectly matches the needs of the tenant (Winkler, 2011). These discussion leads to the second most cited inhibiting factors, the interoperability and vendor lock-in, referring to the inconvenience arising in case the users decide to migrate away from a public cloud. If softwares and operating procedures have all been tailored for that particular cloud in fact, the provider would have considerable leverage in negotiations with the user (Sitaram & Manjunath, 2012). There are additional factors that the cloud user needs to use to select between a public or private cloud: the amount of time over which the storage is to be deployed is an important factor. Sitaram et al. (2012) explain it with a simple model, showing that, the user planning to make use of a physical storage for a long time, might benefit from investing in its own private, instead of renting it from a public provider that would price it higher than its market value (Sitaram & Manjunath, 2012). However, the model does not take into consideration the depreciation of the storage and most importantly the fast pace of technology advancement, that could make the same storage obsolete in a very short time. In addition, another disadvantage of owning a private infrastructure is the IT maintenance costs and management, which requires highly skilled administrators and that would be eliminated by relying on a public provider. Therefore, businesses do not need a very high upfront capital investment in hardware when using a public cloud and unlike in a traditional IT purchase model, the enterprise can start with a small capacity hardware from the cloud vendor and expand based on how business progresses (Sitaram & Manjunath, 2012).

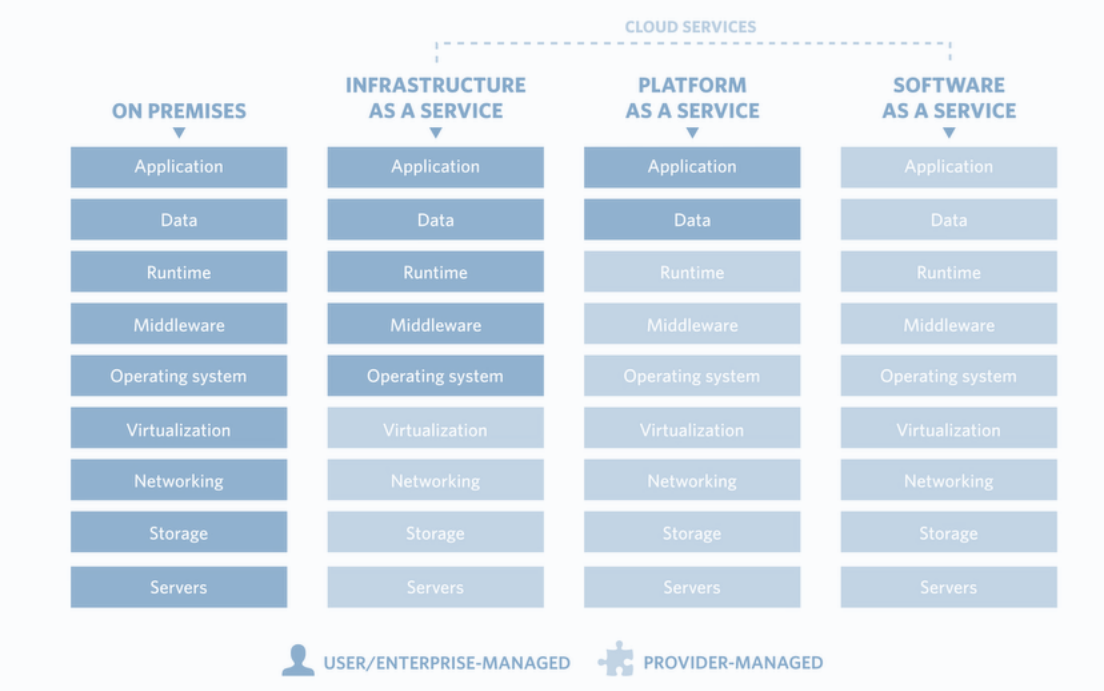

Figure 8 - Cloud Service Models
Retrieved from: https://searchcloudcomputing.techtarget.com/

3.2.5 Conclusion

In this last section of the literature review, the main tools and characteristics of the cloud computing technology have been explored by drawing from the existing books, documents and research works on the topic. This knowledge is extremely valuable to understand and interpret data, theories and strategies that might emerge throughout the project, especially during the data collection and interpretation phases of the research. Concepts and principles obtained from the literature will be fundamental to have a conversation about cloud computing with experts and carry out the interviews necessary to obtain further insights into the benefits of the technology.

4. Cloud Computing Benefits and Added Value

The following chapter focuses on the analysis of the financial services industry by looking at the external factors and exploring how the cloud technology and its applications have been perceived by different players. Having access to the big data repository of Accenture is an exclusive advantage and provide visibility on a great amount of data in form of market analysis and surveys. Therefore, the following section interprets and contextualizes studies and analysis carried out by Accenture and its partners on the topic of cloud computing and financial services and provides insights into trends and best practices that will help answering the research questions.

Next, an analysis on insurers' operations and on costs saving opportunities will be carried out. The internal documents retrieved will be a valuable starting point to develop models and theories validated by the literature and by the semi-structured interviews carried out with expert managers.

4.1 Market Trends and Uncertainties

4.1.1 Financial Services Market Trends

To collect data on cloud computing, industry trends as well as related technologies, the Accenture's database was filtered by the search terms "Cloud and Insurance" and "InsurTechs", which led to a sample size of 1224 documents. The search was filtered further by selecting documents generated within the last year in order to work with the most recent data possible, which led to 233 publications. Screening the data, only works that included references to the cloud and industry trends were considered relevant hence, shortening the data set to a total of 19 documents. The selected firm internal reports were considered valuable archival records resources and searched for useful insights on the financial services industries that have been carefully collected and arranged in the following pages.

Based on the selected 19 documents, four major trends have been identified as the drivers of the financial services market in 2020:

- Growth will continue to be driven by emerging markets with them gaining an increasing share of the market over time.
- Major technology challenges continue to be internal for most insurers, both property and casualty (P&C) and Life, with both groups citing talent shortage as major hindrance to implementation.

- Digital transformation is the top business priority of insurance CIOs, superseding revenue & business growth. There is sustained focus on core system improvements to modernize back-end systems in order to better execute through digital front ends
- There is a sustained interest in InsurTechs through partnerships & investments.

Furthermore, the threat remains high of new non-traditional players aiming to take a spot in the industry. Rising threat comes from "insurtech carriers" who are underwriting their own policies and redesigning policies with superior and often targeted offerings. These players are leveraging technology for personalized offerings while keeping a check on costs. The importance of a digital customer experience is increasing as the number of sales completed online are rising. Customers expect personalized options available to them and tailored offerings for their specific risk scenarios.

The market is dominated by a focus on building intelligent operations that can support differentiation and new value propositions across key value chain elements. Therefore, Insurers continue to leverage technology to transform core business and generate operational efficiencies. On the other hand, while AI and automation continues to gain momentum, cyber security is becoming increasingly important for insurers.

4.1.1.1 Building Cybersecurity Capabilities

The rise of cyber vulnerabilities is inevitable as an increasing number of organizations adopt new technologies. IoT for instance makes an individual as well as a firm susceptible to cyber threats. Confidential data and customer information must be protected not only to meet compliance, but to maintain strong relationships with policyholders and agents. Insurers have ramped up their efforts towards cybersecurity, not just to protect customer data but also to provide cyber management solutions to their enterprise customers in addition to cyber insurance solutions.

As insurers begin to collect and analyze a greater amount of data, and regulation around protection of data becomes more robust firms are likely to increase their spending to ensure their data is kept safe. In addition, hackers are always looking for new ways to infiltrate a system, hence insurers will need to continuously keep up with the latest cybersecurity developments to protect one of their most valuable assets data.

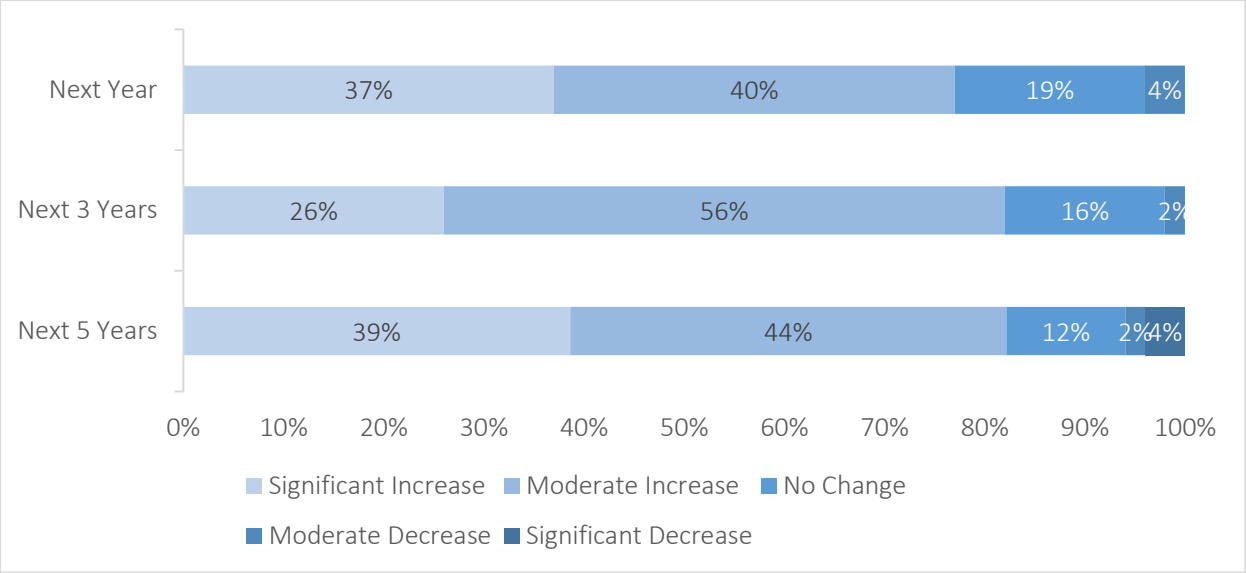

Figure 9 - Business Spend on Cybersecurity

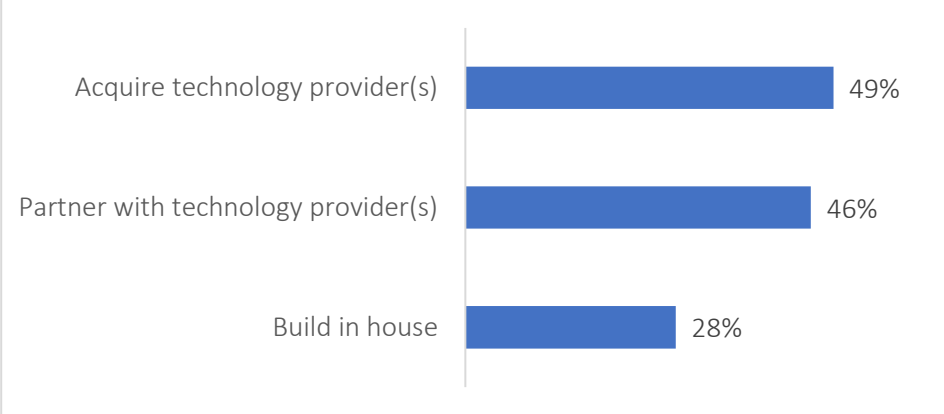

Figure 10 - Cybersecurity Expertise Investments

Figure 8 and 9 display the average organization's change in spending on cybersecurity for the following years, and also how organizations are looking to develop in the area of cybersecurity, with the acquisition of cybersecurity providers as the desired route to developing expertise in this matter.

Cybersecurity and cloud computing are the most popular emerging technologies in the industry, with the majority of firms currently investing in these fields as pictured by figure 10. The trend could be explained by the symbiotic relationship between cloud and cyber security: insurers hold millions of different data points about their customers and as more of their systems go online, this

data is put at a greater risk. However, mastering data analysis and the improved utilization of data provide organizations with the intelligence to augment decision making, personalize customer engagements and streamline processes.

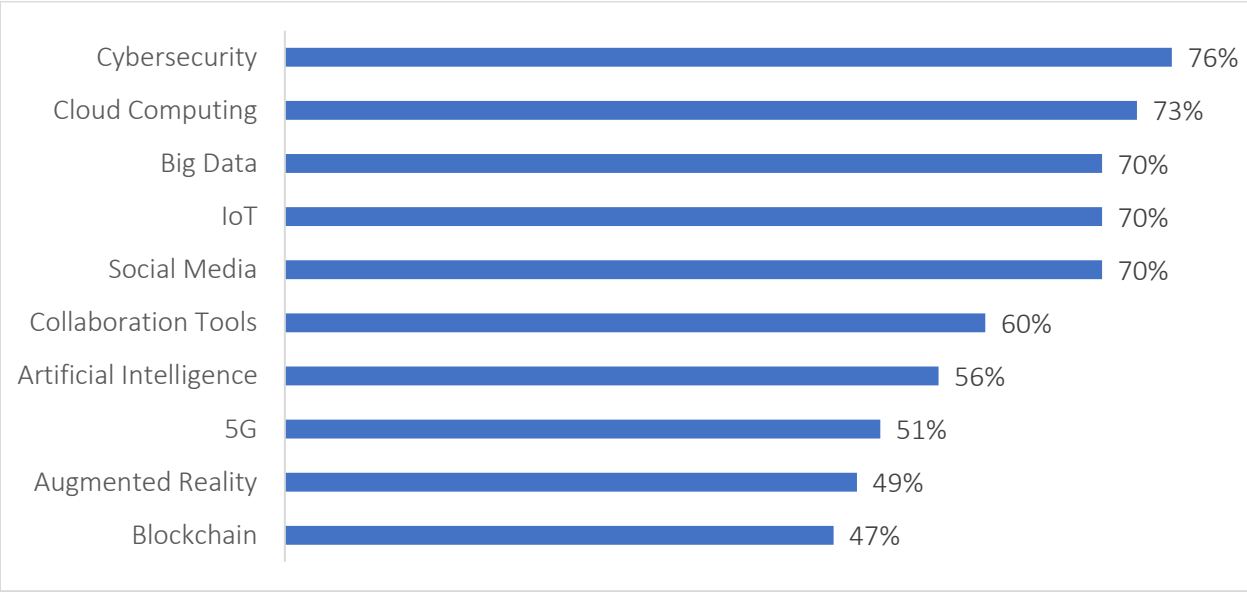

Figure 11 - Emerging Technologies Firms are Investing In

4.1.2 Cloud Trends in the Financial Services Industry

The cloud isn't just IT technology, it's about solving business problems with the latest technologies and customers now see cloud as the core platform for long-range strategic initiatives.

To date, insurers have been more likely to adopt public cloud for noncore support functions, but this will likely change moving forward. The study of 400 senior CIOs in the financial services industry revealed that a 67% believe that SaaS will completely transform the Insurance industry in five years or less – with 20% of the entire sample falling into the "two years or less" category (Accenture, 2019). In addition, the cloud is the third highest priority area for technology investment for nearly a fourth of insurers surveyed, and represent one of the top three technology areas to receive the highest amount of new or discretionary funding in 2019

4.1.2.1 Retool Existing Applications for The Cloud

As shown in Figure 11, insurance companies mostly (73%) prefer to either rewrite applications or write them natively for the cloud, instead of replacing existing applications with SaaS alternatives

or running hybrid applications partly on-premises and off-premises. These preferences are to avoid higher integration complexity that comes with hybrid applications, potentially not addressing resilience requirements. In addition, moving from legacy, often mainframe-based core insurance applications to a cloud environment is a major leap for insurance IT organizations, which usually is not feasible without dramatically reducing the complexity of the existing IT landscape.

Apart from that, life insurers in particular will avoid a replacement because of the migration of existing books of business. Instead, CIOs prefer to deploy cloud solutions only for specific markets or lines of business. The chart below showcases the results of a survey intended to make a general picture of the current types of applications running on the cloud, with the majority of respondents opting for the use of applications rewritten to run smoothly on the cloud.

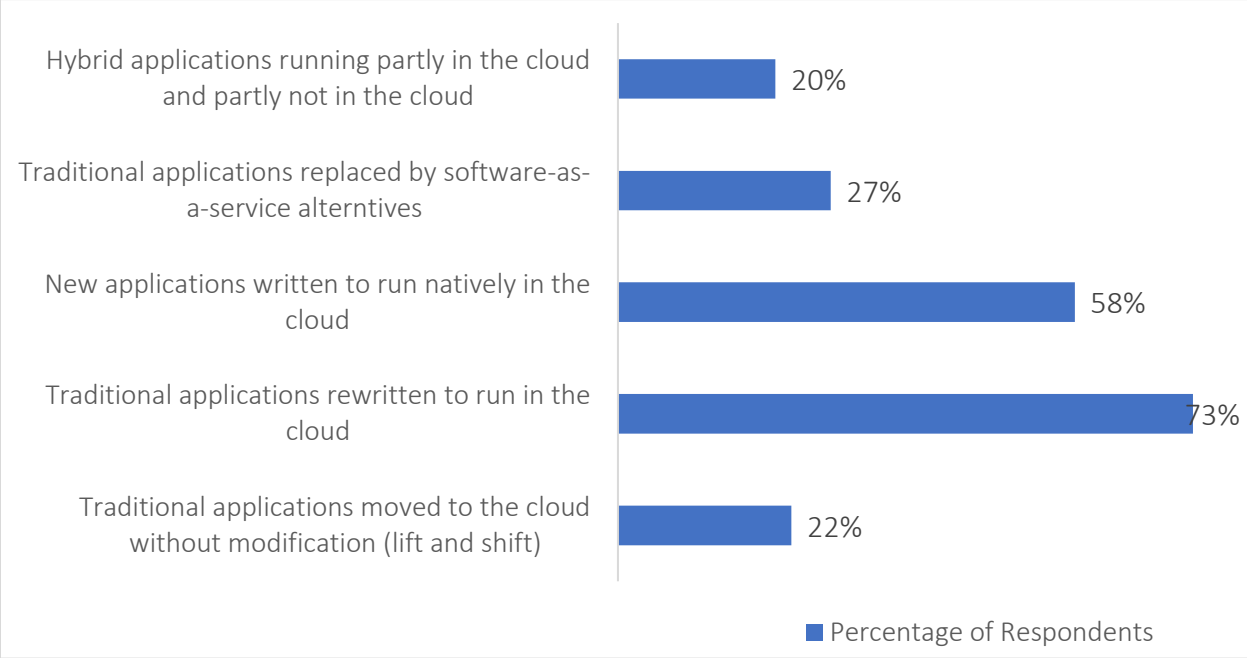

Figure 12 - Types of Applications Currently Running in The Cloud

4.1.2.2 Business and IT Agility

Cloud computing was originally viewed as a tactical approach to IT cost reduction but now customers are focused on broader benefits such as business and IT agility and more rapid application deployments. With greater pressure to reduce the time to market for new products and services in an increasingly competitive global insurance market, cloud computing enables insurers to increase revenue by delivering greater IT agility and shorter project implementation time.

Nevertheless, it is clear from figure 12 that the majority of organizations still make use of the cloud for costs reductions purposes.

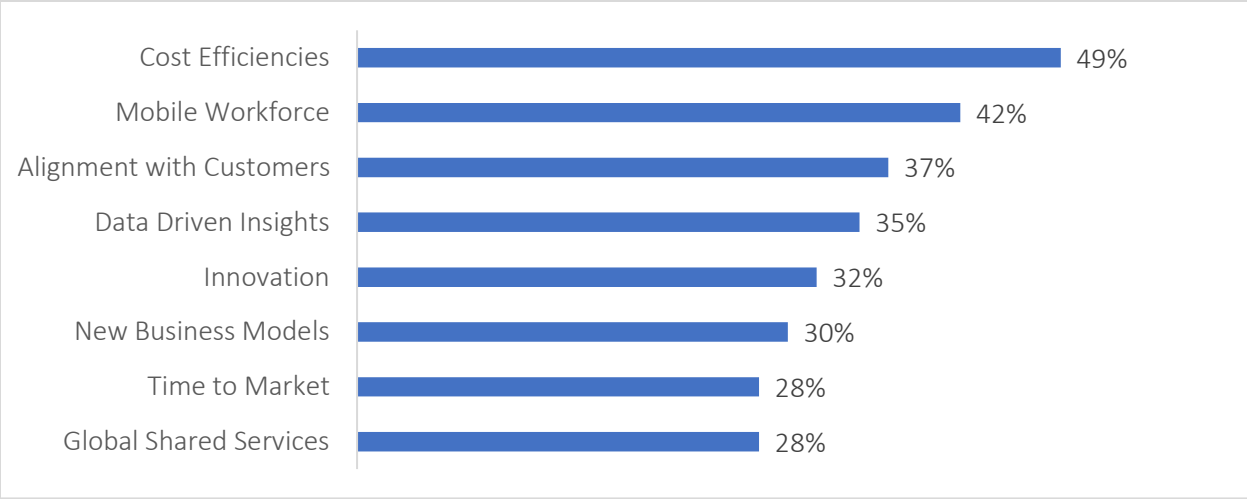

Figure 13 - Top Ways Organizations Are Using Cloud to Drive Value

4.1.2.3 Trust in Cloud Potential

According to a 2015 cloud survey from insurance, 95% of the respondents claimed to have a cloud-first strategy with cloud technology much more common in horizontal, noncore, non-mission-critical applications. Insurers are more likely to adopt public cloud for noncore support functions because of lower data privacy risk considerations and a higher degree of standardization.

For example, a firm today might rely on the public cloud mainly for SaaS applications that aren't core to run the business, such as HR management and expense reporting. On the infrastructure side, it might use IaaS largely for experimentation.

On the other hand, many organizations are still hesitant to do major projects due to regulatory concerns such as audits, and internal risk assessments that make public cloud deployment difficult. Gartner's digital insurance maturity assessment has shown that 74% of respondents believe that less than 10% of all transactions in their application landscape are actually cloud-based. Therefore, the penetration in the vertical core of insurance domain is significantly lower because of three main reasons:

- Geographical market differences due to local insurance regulations or specific competitive market structures.
- Risk-averse decision makers in the insurance industry.

- A lack of vendor readiness and proven deployments.

Many P&C insurers are seeking to expand their global footprint to reduce the risk of overdependence on any particular market and cloud computing services help these insurers foster a high level of flexibility and standardization across multiple geographies. Furthermore, insurance CIOs have accumulated a significant amount of IT debt (an estimated of over $113 Bn), and they struggle to keep their IT application portfolios in a state that will allow them to adequately support business needs. According to Gartner's 2016 insurance CIO survey, insurance IT spending is still stagnant in many companies and 45% of respondents expect their IT budgets to either stay the same or even decrease. Therefore, many insurance executives are looking for options that can help them achieve their cost-cutting objectives.

4.1.3 Market Opportunities by Segments

- Horizontal applications: insurance can leverage cloud services in order to simplify and streamline noncore processes, such as payroll, expense management, HR, ERP, email, backup, service desk and many more. While CRM is used across industries, there is an increasingly virtualization of these horizontal cloud computing offerings. One example is FinanceFox, a Swiss provider that delivers an insurance agency CRM application on the Salesforce platform.
- Vertical use cases: core insurance solutions and business processes such as policy administration, claims management or billing management are the focus for these cloud computing solutions. The two segments of vertical insurance solutions that are more prevalent in the market are: cloud-hosted applications and pure SaaS offerings.
- Building their own cloud: building a cloud will primarily be an option for IT insurance executives of larger insurers that are typically present in multiple markets. IT departments are acting as cloud brokers or setting up hybrid clouds that combine public and private clouds. Also, insurers have formed their own "greenfield“operations to develop their own cloud-based core insurance apps. One example is the Dutch SaaS provider CynoSure, which was set up in 2015 as a spinoff of InShared, a digital insurance brand formed by Achmea.
- Community Cloud: Insurance community clouds have been set up by industry associations to form an environment that allows community members and third parties to collaborate. For example, the Trusted German Insurance Cloud was formed by the German Insurance Association, that help members to promote market standards for data exchange, contribute to higher straight-through processing rates, and reduce integration costs for redundant point-to-point connections.

4.2 Cloud Impact on Insurance Value Chain

The following chapter provides a general overview of the typical structure of an insurer's operations, resembling the one of the case study investigated by this research. The analysis is specifically conducted following the framework of the company's value chain and is particularly relevant for this research because it outlines the critical activities for an insurer and how they are affected by the cloud computing technology. The goal is to provide greater insight on insurers operations to the reader, while contributing to answering to the main research question.

4.2.1 The Value Chain

The value chain approach stems from the hypothesis that understanding competitive advantage is only possible by breaking down the company into strategically relevant activities to the achievement of a competitive advantage (Porter, 1985). The Value Chain allows therefore to represent the whole of the activities carried out by a company to achieve their business goals and simultaneously display the company's history and strategies. The Value Chain allows to define how an insurance company operates on the market in working model terms, determining:

- how it creates value for its own customers;
- how it achieves its business objectives generating profits;
- how it interacts with the external environment.

This tool allows to represent the company system as a set of processes logically interrelated and in continuous evolution, based on the competitiveness, organizational structure and strategic guidelines, voted to pursue the objectives of business (Porter, 1985).

To develop a generic value chain configuration of the insurance industry, the Accenture database was once again used to retrieve documents investigating existing companies and startups. The terms "Insurance" and "operations" where used to find documents mentioning the core activities for an insurer, leading to a total of 1994 results. Then, it was possible to refine the search further by making use of a preset filter available in the system called "Business Operations" leading to a much manageable pool of 79 documents. These final documents were mostly reports and presentations carried out by Accenture consultants to propose a business solution to a customer or to promote a product internally developed for insurance companies. Therefore, the results were searched for references to roles and core activities making up an insurer's value chain.

After deriving roles and primary activities in the value chain by drawing on data from these 79 documents, a cross analysis was carried out to match the insights on cloud computing obtained until this point from the literature and from the documents previously examined. The model was

eventually validated with semi-structured interviews performed among Accenture and insurance experts.

4.2.2 Insurance Ecosystem

The production cycle in the insurance market is reversed with respect to the industrial one, since the collections of payments take place before the delivery of services to the customer or compensation for damages. This is the peculiarity that has always characterized the sector making it unique. Over time, this peculiarity has not prompted companies to focus on the organization but to focus on the study and design of products, subsequently managing the operating machine.

The scheme below illustrates the results obtained from the cross-case analysis of Accenture projects and reports, adapted to the value chain framework. It is important to point out that this model cannot be applied to any insurance company in particular but resembles the most essential structures and core activities that are required by insurance businesses.

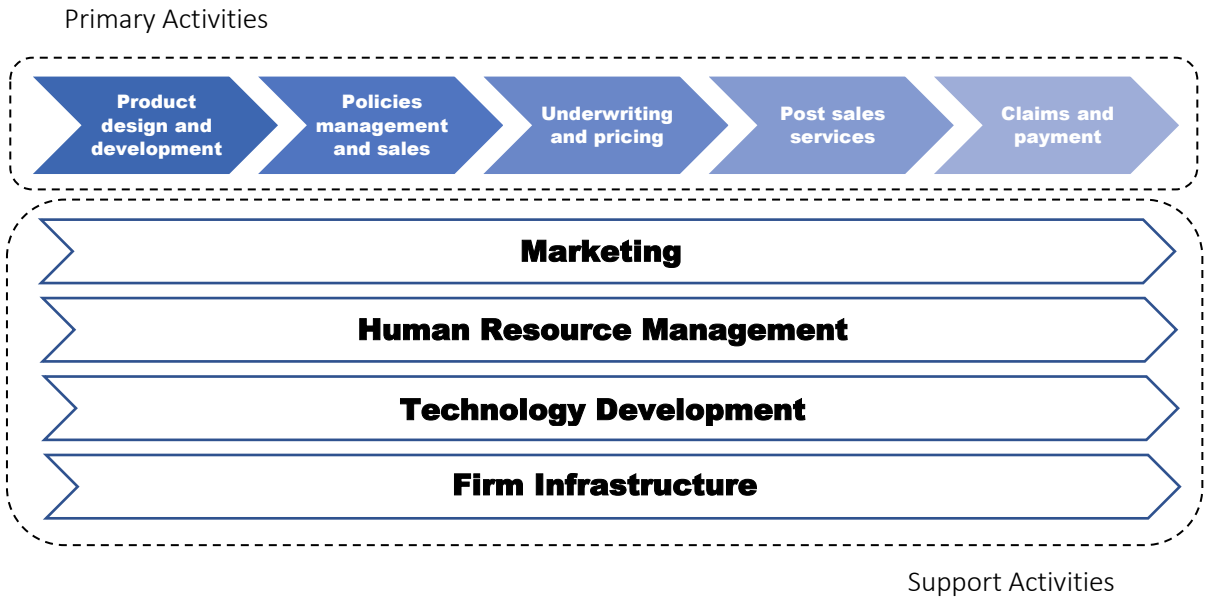

Figure 14 - Insurer's Value Chain

The processes can be divided into three categories:

Strategic processes: fundamental processes for the control of corporate effectiveness, responsible for defining business objectives and determining the guidelines to be followed for achieving the

same objectives in line with the risk strategy (Porter, 1985). In essence they translate high-level goals into operational objectives, but they have not been included in the framework since they were not relevant for the current analysis.

Business processes: include end-to-end processes aimed at the development, production, distribution and management of products; meet customer requirements, create value for customers and business. They differ from sector to sector, and sometimes, between companies in the same sector (Porter, 1985). They are the core activities in the value chain framework and have been represented by the big colored arrows in the first line.

Business support processes: they do not have an immediate impact on the end customer, but they support operations and focus their effort on internal customer satisfaction. They indirectly contribute to creating value for the external end customer by supporting business and strategy processes. They define and organize the resources, infrastructures, skills and knowledge necessary for the other processes (Porter, 1985). They have been represented by the long thin arrows stretching across the core activities as they are the support activities and are carried out along and in parallel with the whole value chain.

- Product Design and Development: The product design and development activity entails an effort of the insurer towards the realization of policies that are tailored around ever-changing customer's needs. The goal of this activity is to create new products or services for an optimal customer experience, and at the same time, design and innovate the distribution channels employed to reach new or existing customers (Academy, 2012).

- Policy Management and Sales: This is considered the basic administrative function of an insurer. In this phase, an insurance agent commercially handles the insurance contracts and the relationship with the customer, by looking after her related issues and requests (Academy, 2012).

- Underwriting and pricing: Underwriting is the essential process within an insurer operations, that involves risk assessment and categorization of insurance applications, in order to finalize them and charge the appropriate rate. Therefore, the underwriter is the individual in charge of deciding whether or not to issue a policy and how much the applicant should be charged based on many characteristics that vary with the type of policy (Academy, 2012).

- Post sales services: The post sales services involve the activities carried out by the insurer once the policy has been approved by the underwriter and sold. After the records have

been established and premiums collected, customers can benefit from the company's customer service, submitting inquiries concerning changes in the policy, changes of address, the availability of other types of insurance, and other routine matters (Academy, 2012).

- Claims and Payment: The last core activity in the value chain is the claim adjusting process that result in the payment or the rejection to the insureds once they have claimed a loss. The claim adjuster is the person intitled to the investigation of the circumstances surrounding a loss, determining whether the policy contract covers or excludes the loss, determining the extent of the payment and eventually paying valid claims promptly (Academy, 2012).

An insurer's operations obviously comprise a wider array of processes that have not been described in this section. Some of these can be found among the support activities and are common even to organizations outside of the boundaries of the insurance industries.

4.2.3 Cloud Influence Analysis

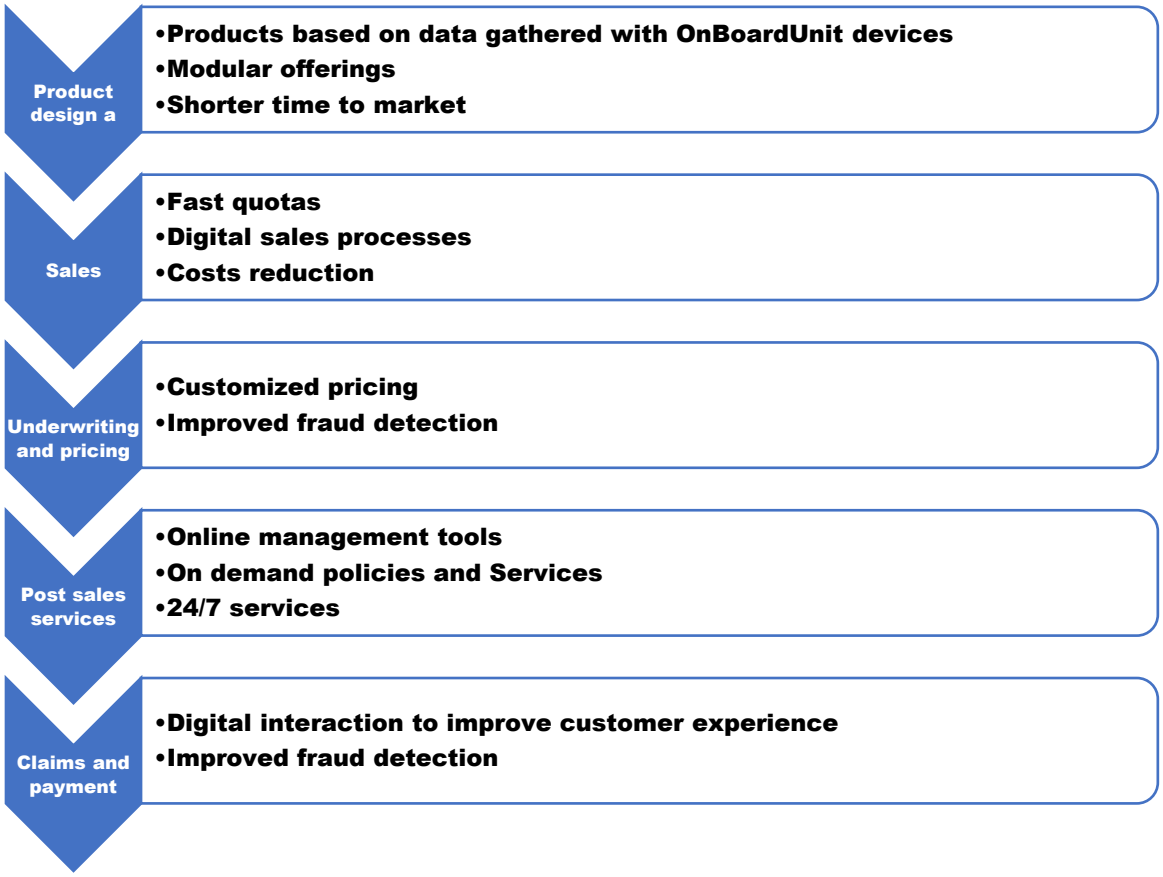

Figure 15 - Cloud impacts on operations

For an insurance firm, adopting a cloud technology strategy offers the opportunity to create value for the clients and grow the business while substantially improve the enterprise's operations. Although the cloud is often justified by only a reduction in costs, its full potential is unleashed when it is applied to new ways of operating and running the core activities of a business. This is particularly true for insurers that can take advantage of the cloud to not only reduce costs, but also to increase revenues by reducing time to market, enable new business models, attract new customers segments, increase customers loyalty and others.

Starting from the design of new products that can be based on a greater amount of data retrieved from on board devices, being able to make use of advanced cloud-based tools can consistently reduce the time to market. Moreover, the use of cloud based modular services and microservices enables the implementation of modular product offerings to increase customization and customer satisfaction consequently. Therefore, to develop new and innovative products it is important to

understand customer behavior. This will also help in retaining new customers while optimizing claims and policy design capabilities. Cloud technologies equip insurers with the analytical tools to process the enormous and extremely valuable amount of data and deliver personalized services and marketing effort that are relevant to every customer.

The fast industry digitalization affects the sales and policy management department where the insurance agents are not required to commercially handle the insurance contracts and the relationship with the customer anymore, substituted by online services and the direct purchase of insurance policies packages that address every need of the customers for a lower cost. Sales can also be driven by cloud-based analytics based on customer behavior and opinions, that can be investigated by the agents that have now more time to focus on the analysis of data pushed automatically to their devices.

Reinforcing and optimizing core activities such as underwriting, and claims can substantially improve the attractiveness of the business while lowering costs. Insurers need to adapt their pricing strategies to dynamic markets and the competitive response of their competitors. A customer centric approach combined with analytics helps to take better underwriting decisions, assessing with more precision the risk related to a customer and the policy he is asking for.

The cloud can also improve fraud detection while systematically addressing risks. Fraud detection is essential both during the process of underwriting and before making a claim payment to an insured. Integrating within a single environment all the risks related data and loss events with key risk indicators, it becomes possible to run complex calculation to compute quotas for insured but also individuate fraud when claims are made upon a false loss. Claims with a high risk of being fraudulent can be identified earlier in their lifecycle and across a wider array of fraud schemes, thanks to the help of cloud technologies. Furthermore, sophisticated risk modeling calculations are facilitated by the additional computing power of the cloud, supporting the development of the clients' complete risk profiles by making use of historical and real-time data, improving risk management activities and the financial planning of the business.

4.3 Cloud Economics

The goal of this last section based on data gathered from archival records is to provide a general idea of the cost savings opportunity of the cloud computing technology. The findings from the following pages are a valuable contribution to answering the first sub research question by exploring the most cited benefit of the cloud computing technology: cost reduction.

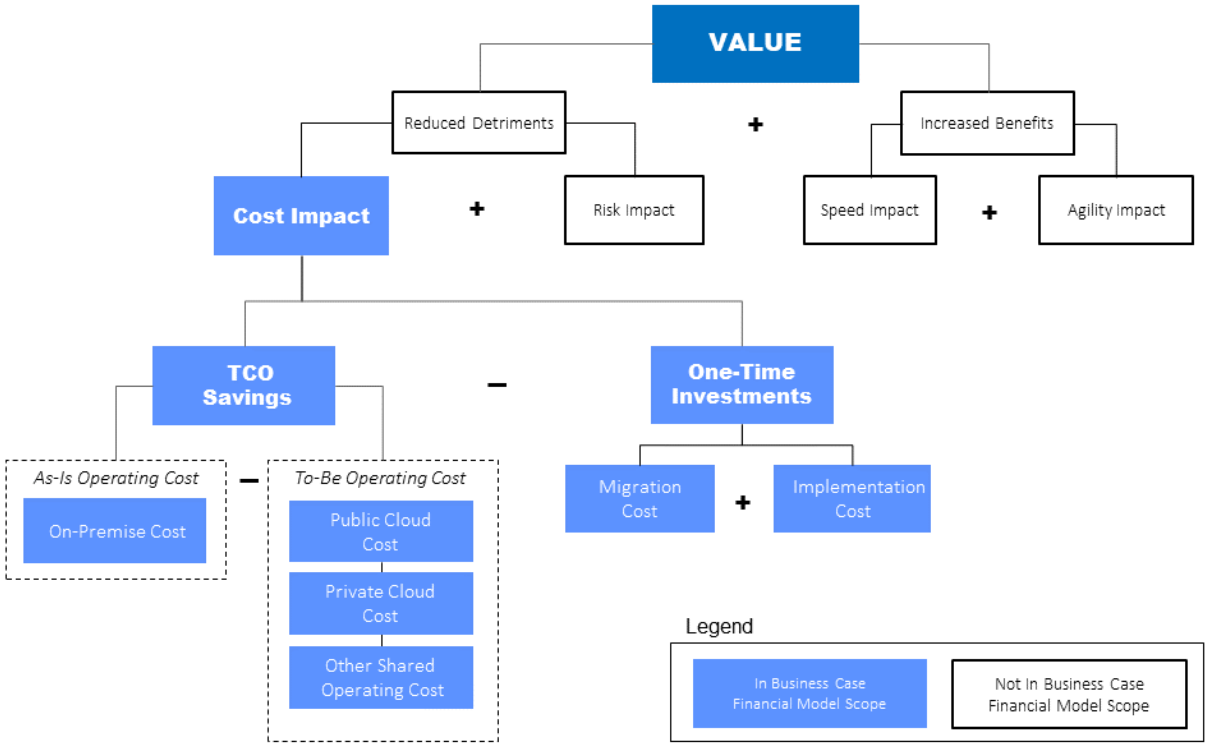

Figure 16 – Overview of Cloud Computing Economics

The scheme above serves as a guideline and an overview of the analysis outlined in this chapter. It remarks that the total value of the cloud solution implemented is the result of two components: reduced addressable spend savings and tangible benefits that include savings from specific efficiency KPIs. The second however are not in scope for the performed analysis. On the other branch, risk impact quantifies benefits and costs related to business value realization targets and complexity factors that are not included for this assessment as well. Therefore, the chapter will focus solely on the cost impact of the transformation, calculated as a difference between TCO savings and the investments required for the implementation.

4.3.1 Research Approach

First, an analysis has been carried out processing data from the case study investigated by this research. With supporting cost data retrieved from the company's management it was possible to evaluate to what extent, the migration of Infrastructure and Hosting Platforms to IaaS, PaaS and SaaS benefitted the company's financials. The results were then compared to estimations on savings and costs avoidance generated by a sample of other 11 case studies from the insurance sector that underwent a migration towards a cloud infrastructure. Table 5 sums up the case studies evaluated in the analysis and further details can be found in Appendix C at the end of this document.

Table 5 – Summary of the 11 case studies sample

ID	BUSINESS SERVICE	GEO	PRACTICE	PROJECT DESCRIPTION
1	Life	EALA	TC, Operations	A large European insurance company: Developing a cloud-based, global data center consolidation strategy
2	Life (Core systems)	NA	TC, Operations	A leading global insurer developing security frameworks for transition to business in the cloud.
3	Life	NA	Digital strategy, analytics, big data	A leading north American financial services firm design its big data analytics technology infrastructure.
4	P&C	EALA / ASG	IT Infrastructure	A major insurance group transitioning to a single, integrated IT system accessible across the organization and newly merged entities.
5	P&C	EALA	TC, Operations	Optimizing operations and cost: future-proofing SAP HANA enterprise cloud creates new efficiencies.
6	P&C Claims	NA/Canada	Digital Strategy	Canadian insurer evolving to digital with new infrastructure strategy
7	ADMS, Strategy, Life	EALA - Italy	Digital Strategy	Leading European Insurance Company: Reducing operating costs by approximately

				$44 million with Accenture-managed infrastructure migration
8	Life	EALA / ICEG	Digital (AI), Mobility, Tech Strategy	Global FS Company Launches First of its Kind ALIP Platform for Fixed Index Annuities
9	Life	EALA - Germany	Tech Strategy	An international insurance company optimizing its processes and infrastructure for cost savings and performance.
10	P&C	NA	ERP Cloud Technology	leading insurance brokerage company transforming business with cloud-based oracle ERP.
11	P&C	EALA	Operations, TA	Insurer using cloud to fuel transformation to real-time operations.

The degree to which savings can be realized within each case depends on the cloud deployment model chosen, therefore for each cost entry in the infrastructure breakdown, a range of estimated costs savings has been recognized in which the result should be included. These ranges are displayed in table 6 below.

Table 6 – Cost Savings estimations and descriptions

COSTS ENTRIES	ESTIMATED SAVINGS / COST AVOIDANCE		COST SAVING DESCRIPTION
	PRIVATE	PUBLIC	
LABOR	15-20%	25-33%	• Labor costs are improved through reduction of FTE - level to which this drives savings dependent on level of existing outsourcing of resources. • Redesign of processes to reflect changing infrastructure services delivery approach.
SOFTWARE	17-25%	21-30%	• License / instance consolidation e.g. buy IaaS / PaaS packages • Changed consumption model e.g. on-demand licensing • Avoid major upgrade SW-related costs – ever-green model
SERVER	24-34%	36-47%	• Flexible architecture e.g. automated shutdowns • Optimizable architecture e.g. right sizing / scaling • Reduced refresh cycle costs e.g. no appreciations

STORAGE	18-23%	31-36%	• Increased storage consumption in public/hybrid cloud • Re-engineering of archive storage to use cloud
NETWORK	15-20%	18-27%	• Network infrastructure savings / cost avoidance, potential circuit consolidation, and traffic compression • Consider scalable pipe to cloud provider to facilitate bursting
DATA CENTRE	27-36%	20-30%	• Space consolidation / rack density (e.g. cages) and power savings (heating, cooling, electrical, UPS)
SECURITY	15-20%	18-27%	• IaaS public/hybrid savings / cost avoidance due to security platform migration • Cloud provider will manage datacenter security • IaaS / PaaS / SaaS server security inherited

Finally, semi structured interviews were once again used to validate findings from the financial evaluation and start a discussion around the costs benefits of a cloud strategy. It is important to understand that this evaluation does not want to be a comprehensive and detailed financial analysis of the technology adopted but will be a careful observation and interpretation of some data to start a reflection on the costs advantages of the cloud computing technology.

To further strengthen and validate the results obtained from the case studies analysis, additional research on the cost saving advantages of the cloud computing has been reviewed. As an example, Forbes published in 2016 an article based on the TCO analysis carried out by a company called Moor, that was able to achieve a 37% in savings thanks to Rackspace cloud solution (Longoria, 2016). Another research paper from Aggarwal and McCabe shows instead how IT Infrastructure costs are completely absent in a cloud solution compared to an on-premise architecture and reports how the overall cost of running the solution is more predictable than on-premise. Even though the benefits of the cloud depend on numerous variables, and the savings obtained will vary depending on the type of the organization, it is evident that some advantages in costs can be captured by employing the correct solution for the business (Aggarwal & McCabe, 2009).

4.3.2 TCO savings through cloud transformation

Each company has its own infrastructure maturity and a way of operating it. One crucial factor to achieve TCO saving through the Cloud is the maturity of the current infrastructure. The more mature the infrastructure is already the less additional savings can be reached. Even if the company's IT Infrastructure is highly optimized and outsourced, the Cloud will mostly be the next step for a further cost optimized IT infrastructure, aside from all the qualitative benefits which will be achieved.

Calculating cost savings might become challenging due to soft savings, that include factors such as the improved productivity of the employees or the customer satisfaction due to a reduced time to market. Furthermore, the TCO of the cloud can change greatly depending on the industry and the company's environment. Other factors influencing the impact of the cloud on the company's savings are for example the type of organization, the regulatory framework and the law of different countries, making it very complicated to produce a holistic financial evaluation of the technology.

Another important aspect to take in consideration is that there is a tendency to over acquiring hardware due to uncertainty of the required resources and because of an inclination of purchasing according to the available budget without a cost minimizing perspective. As a consequence, companies end up buying more than what they actually need even after conducting a detailed business growth analysis (Rynes, 2018).

4.3.3 The Case Study

To start with, the following table outlines the key IT budget metrics and sub-components decomposition. The colors red and yellow have been used to highlight the cost components that impact on the budget the most. Every cost component could have been broken down further to be aligned with the current operating model, but it would not have been beneficial to the purpose of this analysis.

Table 7 – IT components spending breakdown

 *LABOR* *50%*	 *SOFTWARE* *5%*	 *SERVER* *14%*	 *STORAGE* *12%*	 *NETWORK* *7%*	 *DATA CENTRE* *10%*	 *SECURITY* *2%*
Outsourced	OS	Windows	SAN	Bandwidth	Space	Datacenter
62,7%	49,7%	95,7%	79,5%	69,8%	48,0%	17,4%
Insourced	Middleware	Linux	NAS	Infrastructure	Energy	Network
35,2%	39,9%	1,3%	0,0%	30,2%	50,0%	44,2%
Managed	SQL database	Mainframe	Backup		Telecom	End Point Security
2,1%	5,2%	0,0%	20,5%		2,0%	7,4%
	Oracle Database	AS400				Applications
	1,6%	3,0%				0,1%
	Other Database					Operations
	3,6%					30,9%

Every subcomponent of cost contributes with a certain amount to its general cost lever. This particular decomposition can only be applied to the case study investigated but could also be taken as a general reference for other settings, since many cost brackets could be applied to different contexts. For example, the labor, responsible for the company's IT, has been divided between outsourced, therefore managed by a third-party organization, managed internally and insourced, which means that part of the activities once managed externally were insourced together with the labor that conducted them. The following table instead, summarize the savings obtained by leveraging the cloud strategy in 1-year span. The two columns on the left outline all the cost related to the as-is situation in which the IT infrastructure was completely on-premise, while in the right two columns can be observed the savings registered for each cost lever previously defined.

Table 8 - Cost savings results

Savings Summary by Cost Type				
Cost Levers	Current State Infrastructure and Platform Hosting spending breakdown		Savings breakdown	
LABOR	50%	64.350.000,00 €	13.484.319,00 €	20,95%
SOFTWARE	5%	6.435.000,00 €	1.316.755,00 €	20,46%
SERVER	14%	18.018.000,00 €	6.545.296,00 €	36,33%
STORAGE	12%	15.444.000,00 €	4.386.121,00 €	28,40%
NETWORK	7%	9.009.000,00 €	2.493.647,00 €	27,68%
DATA CENTRE	10%	12.870.000,00 €	4.316.032,00 €	33,54%
SECURITY	2%	2.574.000,00 €	729.257,00 €	28,33%
tot	100%	128.700.000,00 €	33.271.427,00 €	
			25,85%	

However, various tasks and efforts need to be considered to estimate the whole cost for a cloud migration. One-time investment cost is often underestimated and, in this case, add up to about the 20% of the total savings, driving down the result to about 20,68%. The one-time investments required are summarized in the table below:

Table 9 - One-time investments required

Change enablement & communication	Change management
	Central communication
	Training development
Central cloud transformation management	Transformation control
	Application assessment
	Application modernization
	Infrastructure migration
	Application migration

Local cloud transformation execution	Local migration project management
	Assessment support
	Modernization support
	Migration support
	Operational handover

The same results are achieved by looking at the savings from another perspective. For example, the savings can be distributed among the three different service models of the cloud: by investigating the cloud strategy specifically for each component of the IT infrastructure, it is possible to determine how softwares or other internal services are deployed on the cloud regardless of the cloud type (private, public, hybrid). Some softwares might even be substituted by an external offer of a cloud provider, thus saving the company time, effort and costs related to a migration.

Table 10 - Cost savings results based on service type

Savings Summary by Service Type		
Service Type	Savings Breakdown	
IaaS	26.223.785,00 €	78,82%
PaaS	3.441.872,00 €	10,34%
SaaA	3.605.770,00 €	10,84%
128.700.000,00 €	33.271.427,00 €	
	25,85%	

However, the most interesting division is probably the one concerning the cloud types. Savings are broken down in the table below based on the cloud strategy adopted. The possibility to address costs in these many ways, demonstrate the versatility of the technology and how it can adapt also to the context of financial management.

As explored by the literature review, the three service models above can coexist with a cloud strategy that combine the three types of cloud in the table below. However, managing costs based on different cloud types impact the balance sheet very differently and might present the opportunity to improve the profitability indexes of the company. Migrating operations from an on premise or private cloud to a public cloud solution involves the shifting of cost allocation from capital expenditures (CapEx) to operating expenditures (OpEx) affecting greatly the company's budget.

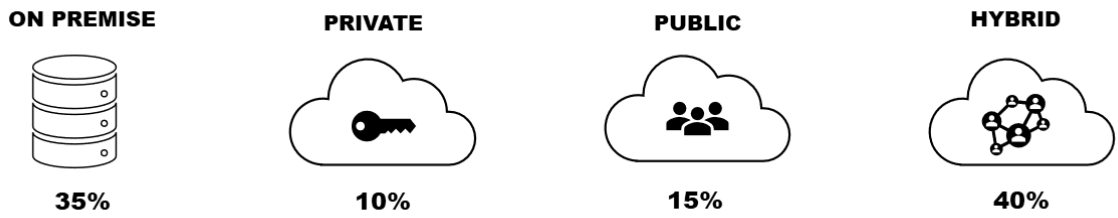

Figure 17 – Cloud types distribution in the case study

Table 11 - Cost savings results based on cloud type

Savings Summary by Cloud Type		
Cloud Type	Savings Breakdown	
PUBLIC	8.545.047,00 €	25,68%
PRIVATE	5.272.512,00 €	15,85%
HYBRID	19.453.868,00 €	58,47%
128.700.000,00 €	33.271.427,00 €	
	25,85%	

4.3.4 OpEx vs CapEx

Capital expenditure consist of investments that companies make to acquire new assets, major physical items such as new machines or computer hardwares or services that the company will use for several years. The main consequence of managing this type of cost is that capital expenditures are recorded as assets on the balance sheet and since the beginning of their use they will start losing value, or depreciating, spreading their cost over their full life span. At the same time they are also accounted as investing activities in the cash flow statement, as a cash outflow during the period of the purchase. On the other hand, operating expenditures are the ordinary costs occurring on a regular basis in order for the business to operate, including for instance wages, repairing costs, rent and utilities. OpEx are also accounted differently in the balance sheet by being deduced completely in the period they are incurred (Rynes, 2018).

While in the past IT related costs where all processed as very capital intensive, with cloud adoption we experienced a major shift between these two accounting methods in many companies. Before cloud services were accessible, businesses had to plan, build and manage their own private server system to be able to meet user demand of services. This entailed investing in enormous and highly costly datacenters with numerous physical machines and networking components that had to be coupled with licensed software generally processed as capital expenditures as well on the firm's balance sheet. The cloud, however, does not require any up-front hardware investment. The services guaranteed by the provider, such as storage, computing power or networking are all treated as operating expenditure much like utilities or rent expenses, and are delivered upon request to the customer, that make use of them right away (Rynes, 2018).

Even though OpEx are usually convenient for a firm, since the cloud provides the financial flexibility to quit costs at any time by terminating the request for services when they are no longer needed, this might not always be beneficial to a company's attractiveness. From a financial perspective it may be argued that the investors interests in a company highly depends on its financial performances often displayed by metrics such as the EBITDA. The reason why the EBITDA is usually employed as a proxy for profitability is because it is a good indicator of the performances of a business without being affected by the tax system that varies greatly among different countries. Different interest rates and tax systems can impact the calculation of a company's net profit and its depreciation expenses. Therefore, CapEx are a mean to exploit the advantages of amortization and depreciation, positively impacting the balance sheet and displaying higher total assets. A higher book value not only increases the company's attractiveness, but might also increment net profits, since asset expenses are not deduced from the income statement. At the same time OpEx could still be favored if depreciation expenses are too high (Rynes, 2018).

The chart below displays the distribution of CapEx and OpEx based on the combination between service models and IT infrastructure components. An on-premise IT infrastructure provides the most freedom to customize products and services and is also completely financed by investments in hardware, networks and facilities that will be used and owned by the company for several years. Shifting towards less customizable services instead, there is also an adjustment towards OpEx, meaning that the company will take advantage of the pay-as-you-go pricing model and purchase software and services from the cloud provider without modifying them.

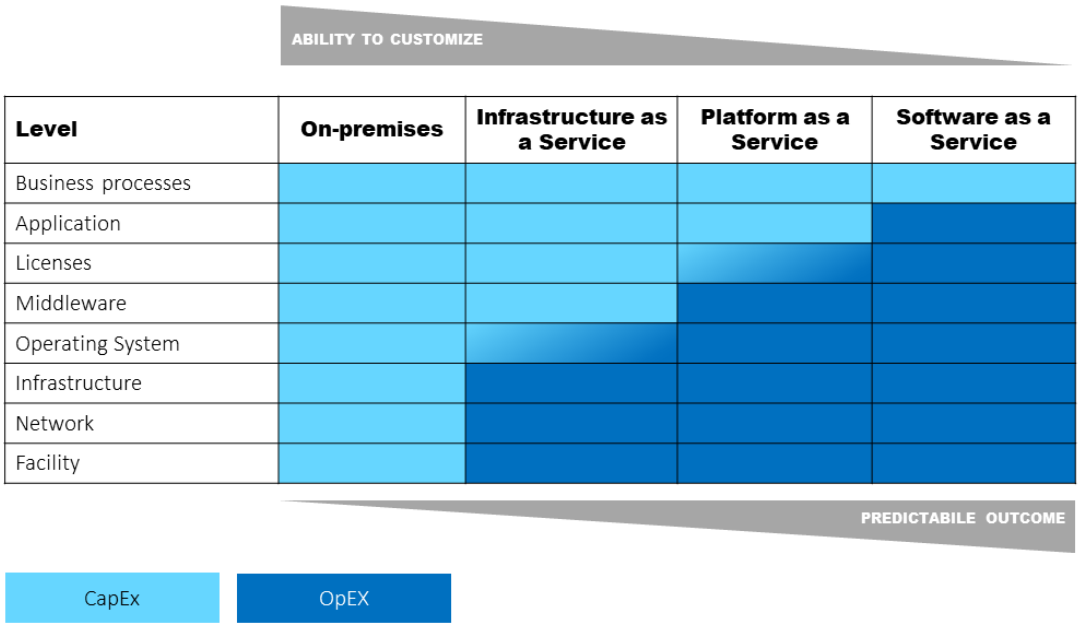

Figure 18 - Distribution of CapEx and OpEx based on the combination between service models and IT infrastructure components

In conclusion, many reasons are in favor of both models. It is responsibility of the management, and in particular of CFOs and CIOs, to work together in order to understand the importance of financial management and accounting when it comes to design a tailored IT strategy for the firm. In this chapter, an example of costs breakdown has been provided with an overall result of cost savings generated by the migration towards a cloud solution. In addition, the distribution of IT services among cloud service models and cloud types has been offered, thus prompting a discussion over the allocation of costs in the company's balance sheet.

5. Business Model Stress Testing

In this section, the tool of the BM Stress Testing described in chapter 3 will be applied to a case study, to evaluate the robustness and readiness of an insurer business model to welcome a cloud migration and the impacts of a constantly evolving and digitalized market. Following the 6 steps method described, first the as-is state will be described thanks to the use of the BM Canvas tool, then the PESTLE analysis will outline the major external factors involved that will be later mapped together with the BM components in a so called Heat Map. The relationship between external factors and BM components will be investigated giving a different perspective of the BM and identifying patterns or inconsistencies that will need to be resolved.

5.1 Business Model Description

The business model canvas is a strategic tool. It is presented in the form of a graphic diagram and is useful for developing new business models or improving existing ones. By business model, we mean the set of organizational and strategic solutions that allow the company to create, distribute and acquire value.

5.1.1 Customer segments

The insurer under analysis serves millions of customers in over 70 countries around the world. It can obviously be considered a global insurance player and many different types of customers entrust it with their insurance. For the sake of simplicity, the customers segments will be grouped into two main clusters:

- Private clients
- Corporate clients

The first one clearly includes any ordinary individual that need to insure either his/her life or any of his/her properties, including vehicles or animals. Private clients can be further categorized based on age and income. The second segment, however, is made of customers making use of corporate insurance, therefore small, medium or large organizations that need to safeguard various operational risks such as accidents, thefts or financial losses. This type of insurance may also include health benefits for the employees or a general protection for the company's assets.

5.1.2 Value Proposition

The company's goal is to become the most trusted financial institution and a global leader in the insurance industry. To achieve this goal the insurer's primary purpose is to help customers recover from their losses outperforming its competitors, by providing higher value offerings.

The insurer's products are divided in two main categories called: property-casualty and life-health. The company offers a wide range of policies from these two categories to both private and corporate customers. The Property-Casualty group these includes motor, accident, property, general liability, travel insurances, and assistance services while the Life-Health segment offers savings and investment-oriented products in addition to life and health insurance.

5.1.3 Channels

The communication channels differ based on the type of customer. Ordinary clients have multiple ways to access the insurer's services such as by phone, through the website, or by showing up in one of the physical branches and benefit from in person consultation with an agent. Corporates clients enjoy a preferential channel as they are considered special customer that usually request policies for a much higher value and therefore can benefit from on-site consulting. This means that one or more of the insurer's consultant travels to the client's facilities to stipulate a contract without the need for the clients to worry about reaching the insurer in any way, aside from communicating his/her willingness to acquire an insurance policy.

The company's goal is to communicate transparently and empathetically when they market their products. They continuously review and improve their means of communication considering the latest knowledge in science and market research, making digital interaction with customers as transparent and intuitive as possible. An example of this is the online portal where customers can easily and conveniently manage their contracts and find all the relevant documents. However, the best communication is still the personal conversation and numerous questions are still clarified on the phone.

5.1.4 Customer relationship

The relationship established with both types of customers can be considered very personal. For the customers in contact with the insurer is generally very important that the agents take care of their concerns from the beginning till the end of the contract. The agents' advice is in fact often the customers' first experience with the insurer, therefore it is crucial to meet their requirements at the beginning of the relationship and ensure continuous support along the whole duration of their deal.

5.1.5 Revenue streams

As mentioned before, in the insurance industry the revenue strategy is reversed compared to other industries since the collections of payments take place before the delivery of services to the customer or compensation for damages. To make a profit therefore, the insurer needs to sell a lot of policies and keep them active for as long as possible. This very profitable revenue system relies on the fact that the clients are never going to claim a cover for a loss all together at the same moment except in very rare cases of natural catastrophes or other disasters. Therefore, probability and statistical analysis cover an essential role by being employed as the basis for any pricing and claim calculation. The insurer will then generally use the money collected from the majority of policy holders to pay the claims from the minority who actually suffer a loss.

5.1.6 Key resources

The majority of resources that the company possess in order to run its business are common to numerous multinational that provide services to their customers: the human resources, the physical branches or points of sale, the intangibles such as the brand, the copyrights or the licenses and lastly the financials (loans, credit lines, cash). The company, however, can be compared to an IT organization since most of its operations are managed through digital services, from the handling of the policies to the overseeing of claims and the relationship with customer. Therefore, the real value generated for the customer is provided by the human resources, but also by data management and analysis. The first category includes the sales team, appointed to establish and maintain good customer relationship, the analysts, processing customers' data and revealing trends and new products opportunities, and the rest of the staff, responsible for the management of policies, claims and other internal process. The second category consist of the physical resources and intangibles that are needed to store and process data, run internal processes or facilitate the CRM. These are for example the physical datacenters holding the precious customers' data, software, applications and other hardware resources used internally by the company or accessed by the customers to manage their policies, gather information or review their profiles.

5.1.7 Key Activities

The key activities are the same outlined with the value chain tool and have been already described in the previous section.

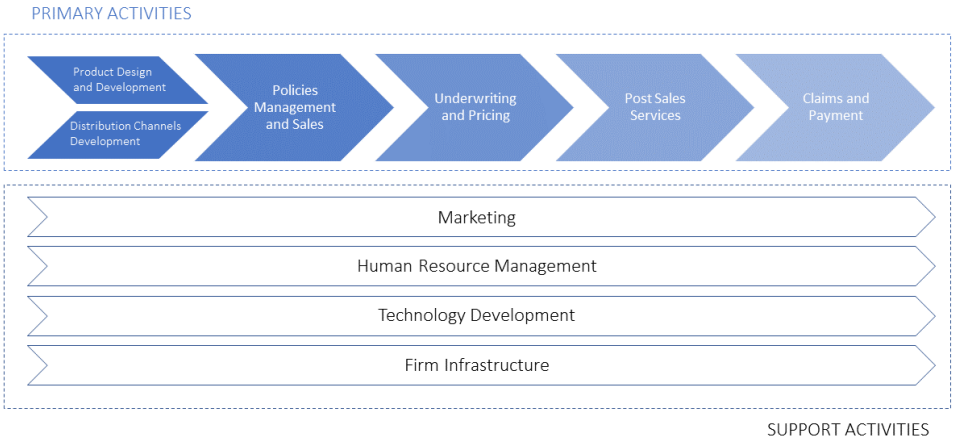

Figure 19 - Insurer's Key Activities based on the value chain

These are:

- Product Design and Development
- Policy Management and Sales
- Underwriting and pricing
- Post sales services
- Claims and Payment

5.1.8 Key partners

Even if the company's operations highly rely on IT services, developing software is not the core business, therefore, some of the key partnerships established by the insurer have taken place with technologies vendors and software developers. In addition, when is not the company itself hosting software and applications, another strategic partnership is established with the cloud providers. Lastly, the company relies on external knowledge to improve business processes or the IT infrastructure itself, and for this reason secures a working relationship with consulting companies such as Accenture that provide consultants and programmers that can design and realize new technological solutions.

5.1.9 Costs Structure

Apart from the overhead costs related to running the business, the major costs buckets are the costs of the IT and the cost of the claims that the insurer need to pay to the policyholders when they demonstrate a loss. The IT costs include the operating costs related to the public cloud subscriptions as well as costs related to owning a private infrastructure. These costs can be further broken down into costs of maintenance, depreciation and management of the infrastructures.

5.2 Identify and select stress factors

Following, the list of stress factors or uncertainties has been provided, and for each of them two extreme possible outcomes have been identified that will be included in the final heat map providing additional insight into the robustness of each BM components.

- Threats of insurehechs

The first uncertainty is the threat of new non-traditional players aiming to take a spot in the industry. These players, the so called insuretechs, are leveraging technology for superior and personalized offerings while keeping a check on costs. These are often young firms and start-ups, seeking new successful business models, enhanced customer experience and new strategic approaches that result in reduced costs and time to market. The strength of their value offerings is undeniable, but the uncertainty remains on whether traditional players are still appealing to the large public by eliciting safety and experience.

Outcome 1: Brand strength remains relevant.

Outcome 2: Trust in traditional insurers is less relevant than value offering.

- Change in customer need

The importance of a digital customer experience is increasing as the number of sales completed online are rising. Customers expect personalized options available to them and tailored offerings for their specific risk scenarios. One success factor of customer-oriented insurtechs is based on their modern, innovative applications, which appeal to digital customers who miss such interaction and communication tools from their (traditional) insurance companies, while sacrificing the customer care provided by personal agents.

Outcome 1: One on One Customer care prevails.

Outcome 2: DIY policies and multichannel strategy prevails.

- Increasing Effects of Climate Change:

The visible increase in the effects of climate change directly affects the insurance industry that might be increasingly flooded by claims due to the damages caused by natural catastrophes. Insurers can either increase their prices to face this new threat or reduce costs dramatically to avoid incurring in a negative balance. On the other hand, the positive outcome of these changes is that the topic of climate change and sustainability moves mainstream in public debates, creating new opportunities for insurance.

Outcome1: Increased Costs due to higher claim costs.

Outcome 2: Increased Revenues due to increase of demand reflecting protection gaps in natural catastrophes.

- Rise of cyber vulnerabilities:

The rise of cyber vulnerabilities is inevitable as an increasing number of organizations adopt new technologies. IoT for instance makes an individual as well as a firm susceptible to cyber threats. Confidential data and customer information must be protected not only to meet compliance, but to maintain strong relationships with policyholders and agents. In the near future, new regulations may address the need for stronger cyber security measures and companies will have to reevaluate their data security compliance. However, having a cyber insurance policy will become more attractive, hence increasing the demand.

Outcome 1: Increased demand in cyber policies and augmented trust in traditional insurers.

Outcome 2: Stricter governmental regulations leading to higher costs.

5.3 Map BM to stress factors and Heat Map

In this section, BM components are mapped to the stress factors and following the complete Heat Map is created. Different colors are used to describe the impact that the stress factor has on the BM component. Following has been reported the coloring logic reported by the tool's creators:

- Red: The BM component is incompatible with the outcome arising from the stress factor and could potentially compromise the overall business model (Haaker et al., 2017).

- **Orange**: The BM component is in incompatible with the outcome arising from the stress factor and it needs to be revisited to avoid compromising the business model (Haaker et al., 2017).
- **Green**: The BM component is affected by the outcome, but not in a negative manner and the stress factor positively influences the viability of the BM component (Haaker et al., 2017).
- **White**: The BM component is not affected by the outcome arising from the stress factor (Haaker et al., 2017).

The first table gives a preliminary overview on how the stress factors affect each business model components without differentiating between the two extreme outcomes and providing a short reasoning regarding the chosen color. Here, the two stress factors "threats of Insurtechs" and "Change in customers' needs" have been grouped together, since this preliminary table is not capable of stressing the difference in impact of each of them.

Table 12 - Heatmap preliminary view

Outcome	BM Component	Impact and coloring
Threats of Insuretechs and Change in Customers' Needs	Customer Segments	Particular attention should be given to young and digital customers representing a valuable opportunity for insurers.
	Value Proposition	The current value proposition is no longer feasible and need to be revisited to be competitive.
	Channels	Communication strategy with customers need to be updated.
	Customers Relationship	The relationship with the young digital customer segment can be less personal.
	Cost Structure	Less costs for managing customers that prefer DIY policies.
Increasing Effects of Climate Change	Value Proposition	The current value proposition need to be revisited with new offerings and services.

	Revenue Streams	Demand for policies increases.
	Cost Structure	Higher claim costs
Rise of cyber vulnerabilities	Key Partnerships	New partnerships should be signed with cyber security providers.
	Revenue Streams	Demand for cyber policies increases.
	Cost Structure	Costs increase due to higher spending in cybersecurity.

BM component no longer feasible

The stress factor may positively influence the BM component.

The stress factor requires revisiting the BM component

Below, the complete heat map in matrix form visualizes how each BM component is affected by the stress factors chosen, distinguishing even between the two possible outcomes. When the result in the heatmap reveals a consistent red color across the two different outcomes chances are high that the robustness of the business model is compromised. A repeated orange coloring instead, suggests that the company should reconsider the activities related to that specific BM components in relation with the future developments predicted. Lastly, multiple green cells, show that a stress factor is favorable to that specific BM components, that should not therefore be corrected.

Table 13 - Complete Heatmap

	Threats of Insuretechs		Change in Customers' Needs		Increasing Effects of Climate Change		Rise of cyber vulnerabilities	
	Brand strength remains relevant	Trust in traditional insurers is less relevant than value offering	One on One Customer care prevails	DIY policies and multichannel strategy prevails	Increased Costs due to higher claim costs	Increased profits	Increased demand in cyber policies	Stricter governmental regulations leading to higher costs
Customer Segments								
Value Proposition								
Channels								
Customers Relationship								
Revenue Streams								
Key Resources								
Key Activities								
Key Partnerships								
Cost Structure								

BM component no longer feasible

The stress factor may positively influence the BM component.

The stress factor requires revisiting the BM component

The stress factor does not affect the BM component.

5.4 Results Analysis

The BM component compromising the overall robustness of the business model is obviously the value proposition, as the numerous red and orange cells suggest. For almost every uncertainty described and every probable outcome, we are confident that the current value proposition will not satisfy the needs of the market, affecting the profitability of the business. However, other components are at risk and definitely need to be addressed to ensure growth and competitiveness for the insurer that will experience the scenarios discussed.

Starting from the “threats of new insuretechs” and the “change in customers’ needs” the insurer is faced with four trends. The first one in which these new players successfully size a large customer segment exploiting the potential of digital technologies. They benefit from automated, streamlined processes to offer easy-to-purchase online products by leveraging advanced channels for product distribution and customer communication which people can access from any device, at any place and any time. We extensively described this scenario, where another trend will prevail, namely the success of a multichannel strategy coupled with low cost do-it-yourself policies that do not require the service of insurance agents or in person consultation. However, other two less likely outcomes might take place, favoring traditional insurers for their advanced customer care and experience. The heat map takes in consideration the possibility that big multinationals might still prevail thanks to their brand strength and the safety conveyed to their customers that are happy to pay a premium for top notch service and plans. In conclusion, the heat map reveals that for each scenario, the BM model components present different level of reliability, except for the value proposition and the channels that must be modernize regardless of any outcome. The same could be said for the revenue structure, that would probably change together with the value proposition, particularly if new services or products are introduced and put side by side with traditional policies.

This leads to a discussion addressing the last two scenarios investigated by the heatmap. First, the increase in the effects of climate change that often manifest in natural catastrophes is one of the biggest threats for insurers, that might find themselves submerged by an enormous number of claims due to the damages and losses suffered by their customers. Conversely, despite the highly volatile nature of such events, insurers might also benefit from an increase in demand of policies due to a lack of protection from natural catastrophes, especially from emerging markets that will continue to drive growth. In both cases, the current customer segmentation and the revenue structure will benefit from this scenario, with corporate clients most likely worrying about protecting their assets and private customers insuring their residences in areas with high risk of disasters. The costs are here negatively affected in both outcomes; therefore, the costs structure needs to be revisited in order to lower all the other components that can possibly be reduced.

Lastly, the rise of cyber vulnerabilities may impact both positively and negatively the insurance industry and the current BM might need to be reexamined to take advantage of opportunities or reduce risk. The Insurer should then ramp up its efforts towards cybersecurity, not just to protect customers’ data but also to provide cyber management solutions to its enterprise customers in addition to cyber insurance solutions. As a consequence, the value proposition should be updated to include new types of offerings, and new key partnerships should be established with cybersecurity providers as the desired route to developing expertise in this matter. Furthermore, as insurers begin to collect and analyze a greater amount of data, and regulation around protection of data becomes more robust, firms are likely to increase their spending to ensure their

data is kept safe. Hackers are always looking for new ways to infiltrate a system, hence insurers will need to continuously keep up with the latest cybersecurity developments to protect one of their most valuable assets. As a consequence, cybersecurity should be included among the key activities in the company's operations and the cost structure should be adapted to welcome another high spending entry.

6. Barriers to Adoption Analysis

From the study of the literature on Cloud Computing has emerged a consistent focus on the characteristics and advantages of the technology itself, its deployment models, service levels and security issues. However, migrating towards a cloud computing architecture, disrupting an organization's IT apparatus is not a simple and straightforward procedure, and require a certain degree of understanding of the possible obstacles that might arise in the process. A lack of research on the barriers hindering cloud adoption in the financial services industry has prompted the need to address this topic by drawing from the valuable knowledge of experienced managers on the field.

Nevertheless, few authors have tried to address this topic on a general level, by collecting all the most debated challenges arising when investing in a cloud strategy or, with a more quantitative approach, by surveying the management of some small medium enterprises.

Avram for example, gathers 7 barriers to the adoption of cloud computing in her paper, with the intent of informing the management of any company for which adopting the cloud would bring some benefits. She believes that whether a company decides to adopt the cloud or not, the management should first extensively comprehend the technology before taking a decision (Avram, 2014).

Security and Privacy: There is a lot of uncertainty regarding security and privacy at all levels such as the network, application and host. The suspicion sprouts from the fact that cloud computing represent a new computing model, leading executives in the ITs to put security at the first place of their concerns in cloud computing together with the ability to address privacy regulations (Avram, 2014).

Connectivity and Open Access: The full potential of the cloud can only be achieved when high-speed access and connectivity will be available to all and a new era of industrialization will be led by the cloud and more sophisticated consumer products (Avram, 2014).

Reliability: Companies' managements want to be reassured about the reliability and availability of services 27/7, while also counting on contingency plans that must take place in the event of failure, outages or even catastrophic events (Avram, 2014).

Interoperability: Organizations need to be able to adapt cloud services to their business processes with speed and efficiency without sacrificing costs. IT infrastructures, that have been designed around standardized processes and data, find it difficult to respond to the fast-paced changes imposed by the markets. It is critical to integrate SaaS applications delivered by cloud providers with traditional applications that may be residing in a separate cloud or on premise (Avram, 2014).

Economic Value: While cost related benefits of the clouds are often cited in favor of the technology, other cost categories need to be considered that might hinder the adoption by an organization. Some hidden costs may entail application modification, support, disaster recovery, and data loss insurance, changing the cost and benefit equation, and hence the solution that should be employed (Avram, 2014).

Changes in the IT Organization: Uncertainty regarding the new role of the IT with the adoption of the cloud is considered by Avram another barrier. Organizations need to consider that a set of new skills should be acquired in order to deploy the cloud, especially in a context of business problem solving and that technological changes might shift the roles in the IT and the focus of the core activities (Avram, 2014).

Political Issues Due to Global Boundaries: Policies and regulations vary across countries and sometimes regions within the same country. Different laws may apply that regulate the way that data are accessed and processed leading to different approaches to the technology by firms. Avram argues that for the cloud technology to evolve, politics should be a separate entity and there should not be different laws across borders that negatively impact its development (Avram, 2014).

In another paper, Preciado et al. have investigated which factors act as barriers by employing both qualitative and quantitative research methods. First, they carried out meetings and interviews with the management of some small and medium enterprises to brainstorm the main features of cloud computing and its application in industrial SMEs. This helped improve their knowledge about the problems of the application of cloud computing in Industrial SMEs and identify the main concerns of these companies in order to proceed to the collection of data through a survey. The information were then coded and statistically processed to identify the barriers to cloud computing implementation.

The first finding from their research is that there is a very low degree of knowledge about cloud computing within SMEs, while they observed that when the knowledge about the technology is present the chances are high that the company decides to adopt it. This led them to consider the companies' ignorance about cloud computing, the main barrier to its adoption (Preciado et al., 2013). Next, they discovered that two other relevant barriers are to be considered the security issues and the distrust towards the transfer of data to third parties cloud providers: something already mentioned multiple times in this research project and in common with the work of Avram (2014) outlined just above (Preciado et al., 2013). In particular, the respondents cited the loss of control of data as their main concern since, when making use of a public cloud service, it is inevitable the transfer of company data to third parties and the loss of control over the infrastructures that manage them. Another barrier identified by Preciado et al. that figures in the paper from Avram (2014) as well, is the struggle of managers to accurately measure and quantify

the benefits generated by the technology and consequently carry out a proper cost benefit analysis to assess the potential of the technology. Lastly the **data lock-in**, stemming from the transferring of data to cloud providers, makes it difficult for clients to change to another provider whenever they have the need to, resulting in the last most cited barrier in the work of Preciado et al (2013).

A last resource worth mentioning when investigating the barriers to adoption of cloud computing, is a data survey carried out by IDC in 2019, asking about companies' issues with adopting cloud services across many application types and including respondents from many industries. The survey focuses on responses from senior IT management and LOB but includes staff and line management as well.

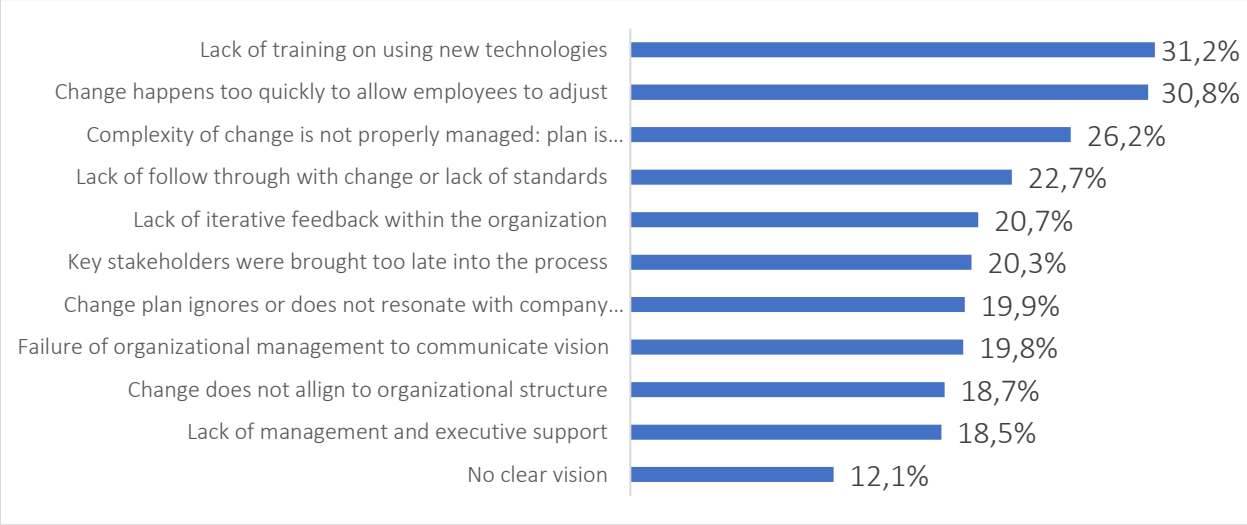

Figure 20 - Cloud computing barriers to adoption survey results

The respondents' top issue (31%) is a lack of training when adopting new technologies, supporting the findings from Preciado et al. that projects are more successful when users are well trained and engaged. Furthermore, implementing new applications (and business models) can significantly impact how work is done. Therefore, having empathy for employees and anticipating their appetite for change to give them enough time to adjust, ensures they develop the ability to become efficient with the new technology. Stakeholder who will be affected in the project early should be identified and get involved to increase the success of the project. The leadership should engage all affected stakeholders by communicating the benefits of the project to the company and especially how employees will benefit personally from the project: by acquiring new skills for example, doing less repetitive jobs and simplifying tasks.

6.1 Barriers hindering public cloud adoption

Following the exploratory nature of the current research, no quantitative method has been used to process and code data retrieved from surveys and questionnaires, but rather by collecting information with semi-structured interview with industry experts. Every interviewee has been asked to reflect on the barriers to the adoption of cloud computing and in particular to reflect on what their organizations struggled with during and after the transformation in a cloud-based business. Interestingly, while at the beginning of the interviews all the respondents reflected on the very general features of the cloud and on the same barriers explored by the literature, when encouraged to dive deeper into details they contributed with some unique information.

All the barriers to the adoption of cloud computing have been transcribed below. Someone with a keen eye might realize that most of these barriers are somewhat related to the unexpected or unplanned costs from public cloud consumption that need to be considered, controlled, and mitigated, also one of the barriers identified in the paper of Avram (2014) and Preciado et al. (2013). The reason why most of the barriers from the literature have lost importance in the eye of these interviewees, is the technological advancement that took place in the years following the publications of those papers. Things like security issues, distrust in data transfer and ignorance about a technology so widely diffused have stopped being of any concern to the management of the companies that now focuses solely on the financial risks of the adoption.

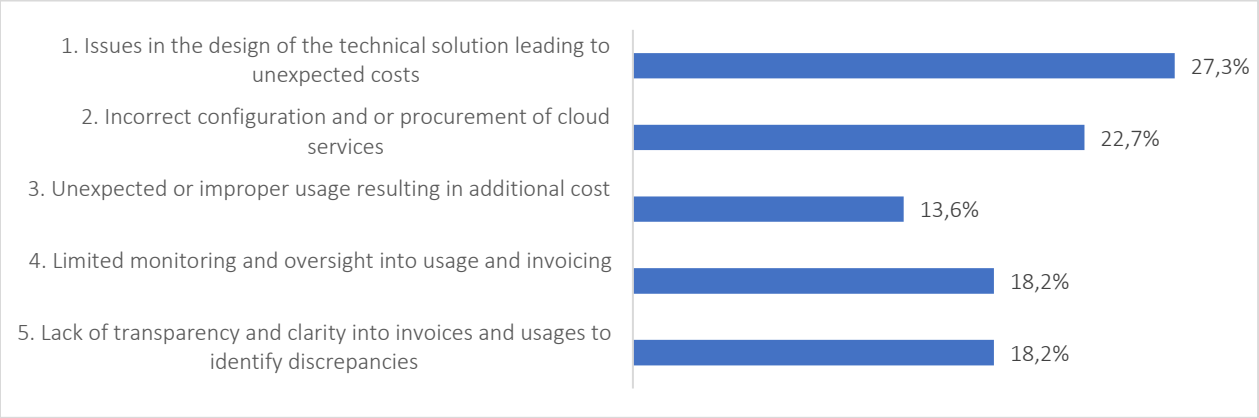

Figure 21 - Barriers to adoption citation frequency

Table 14 - Barriers cited by each interviewee

Barrier \ Interviewee	1	2	3	4	5	6	7	8	9
1		•	•		•	•	•	•	•
2	•		•		•		•	•	
3	•		•	•					
4		•				•	•		•
5	•		•		•			•	

The chart in Figure 21 highlights how frequently these barriers have been mentioned in total during the semi-structured interviews, whereas table 14 shows with more details which barriers have been discusses with each interviewee based on their ID number (see table 1 in 2.3.1.1).

1. Issues in the design of the technical solution leading to unexpected costs

Adopting a cloud strategy generally means migrating the IT infrastructure on the cloud. However, the typical scalability of the cloud requires an ad hoc system of back end communication among services that is usually costly and complicated to achieve. To exploit the full potential of the cloud, the architecture should be based on microservices that are called by different endpoints, avoiding higher integration complexity that comes with hybrid applications. The point is that the management should take in consideration the efforts and costs to redesign the workloads that are not designed for scalability and elasticity.

Furthermore, another source of unexpected costs may stem from applications without plans for scaling down during low peak times. Both internal services and applications delivered to the customers live moments of extreme usage, alternated with periods in which they are completely unused or just accessed by a few. Companies face a challenge when migrating to the cloud, because they need to come up with new deployment strategies for their resources risking incurring in even higher costs compared to the original on-premise model.

2. Incorrect configuration and or procurement of cloud services

Another barrier shared by the respondents was the lack of familiarity with multiple, constantly evolving, service configurations with various price points and models. The complexity of multi-faceted contracts, spanning across various services makes it very hard to make a precise evaluation on which service configuration is the most appropriate. When in fact the company subscribes one or more cloud services, it has the opportunity to choose the deployment model and the amount

of resources necessary. Not only the number of configurations makes it very intricate to establish the correct contract to subscribe but is very hard for the company to estimate the correct amount of resources needed from the beginning. This often leads to a few trials and errors before the best combination is found and consequently to additional costs for the organizations. Lastly, it seems that exiting public clouds contracts is not always a very clear and simple process but requires unexpected time and efforts especially when data need to be transferred away from a cloud provider to a private infrastructure or to another provider.

3. Unexpected or improper usage resulting in additional cost

Closely related to the first one, this risk generates from the inadequate use or deployment of resources from the cloud, by the IT developers in their daily job. When instances are not chosen appropriately by developers, they may lead to the over-provisioning of resources and additional unnecessary costs for the company. Moreover, development, testing, and proof of concept application servers that are left running continuously or are not terminated, are another source of avoidable costs, since contrarily to the services available to the customers, they can be shut down when developers are not making use of them.

4. Limited monitoring and oversight into usage and invoicing

The interviewees also complained a lack of policy-based governance to guardrail consumption with thresholds, especially during times in which the provider allows resources to be scaled up to face moment of peak usage. If, for example, a threshold of a maximum of machines to be deployed in peak moments is not fixed, the company can incur in extremely high costs that it might not be able to sustain. A company may also be willing to sacrifice performance for lower operating costs; therefore, a system should always be in place preventing budget overruns and cost spikes with automated environment alerts, reviews and notifications.

Furthermore, it seems that another obstacle lamented by the respondents is the limited ability of cloud providers to monitor who is using resources and how, making it hard to “right size” resources based on need.

5. Lack of transparency and clarity into invoices and usages to identify discrepancies

Lastly, linked with the previous barrier, there is the improper metering of the cloud services, leading to inaccurate invoices due to a mismatch of metered data to users. As a consequence, it is very complex to compute precisely the cost of different tasks or full processes, complicating the life of project managers that need to constantly monitor and compare costs and schedule with performance indexes such as the CPI (Earned value/Actual cost) or the SPI (Earned Value/Planned

Value). Furthermore, the trivial billing system of the cloud could also encompass additional overhead costs due to complex consolidation of bills from various providers.

6.2 Mitigation Strategies

Stated risk factors can be mitigated through various strategies, largely focused on automation, education and rule-based governance. Following recommendations have been collected on how the barriers to the adoption of cloud computing should be approached by organizations, together with some of the strategies that have already been put in place.

- Issues in the design of the technical solution leading to unexpected costs

To overcome this barrier, the use of a microservices based architecture would be extremely beneficial. To push further the efficiency of the migration however, it may be of use to define architecture standards and reusable blueprints. Moreover, it is important to establish Architecture Review Boards to govern and challenge target infrastructure design and requirements based on industry standards. Lastly, schedules to scale / shut down instances based on use should be developed, after monitoring the traffic on determined services throughout the day.

- Incorrect configuration and or procurement of cloud services

To deal with the problem of complexity of cloud contracts spanning across various services, organizations should develop vendor management trainings specific to Cloud and leverage discounts and economies of scale in negotiations with Cloud providers. For example, Reserved Instance pricing should be leveraged for virtual machines require to run 24/7, lowering the hourly rate significantly. Clear exit strategies to avoid lock-in should also be established to avoid loss of time and efforts if an unexpected circumstance require to shift to another provider.

- Unexpected or improper usage resulting in additional cost

The improper usage of cloud resource by developers in the IT department can be solved with trainings to prepare them adequately to the new workflows. Policies and rules should be assigned to monitor developer's Cloud usage by capping API usage for projects, meaning that requests for a service are limited to a certain number per day or per minutes avoiding getting billed for usage beyond the free courtesy usage limits for example.

- Limited monitoring and oversight into usage and invoicing

To address this barrier, companies should become better at analyzing usage reports and forecast capacity to assess and re-size resources. Greater investments in this field could bring advantages in term of costs and efficiency to the company that should be able to monitor instance schedules

and deploy resources without waste. It might be beneficial to implement a system preventing budget overruns and cost spikes with automated alerts and notifications.

- Lack of transparency and clarity into invoices and usages to identify discrepancies

Finally, to overcome the improper metering of the cloud services, dedicated trainings in Cloud financial management should be considered. Companies ITs can consider developing tools to monitor billing and related resource usage to be able to estimate costs buckets in projects, such as IT chargeback systems, accounting strategies providing end users with more clarity into wich tasks are creating expenses and helping to achieve greater profitability. Cloud bills should be compared to the initial forecast and cost quotas for projects should be based on the combined cost of each single deliverable.

Table 15 – Barriers to adoption and mitigation strategies summary

AREA	BARRIER	DESCRIPTION	MITIGATION STRATEGY
DESIGN	Issues in the design of the technical solution leading to unexpected costs	• Workloads that are not designed for scalability and elasticity • Applications without plans for scaling down during low peak times	• Define architecture standards and reusable blueprints • Establish Architecture Review Boards to govern and challenge target infrastructure design • Develop schedules to scale / shut down instances based on use
PURCHASE	Incorrect configuration and or procurement of cloud services	• Lack of familiarity with multiple, constantly evolving, service configurations with various price points and models • Complexity of multi-faceted contracts, spanning across various services • Pursuing contracts without clear exit strategies	• Leverage discounts and economies of scale in negotiations with Cloud providers • Procure Reserved Instance pricing for VMs that are required to run 24/7 • Develop vendor management trainings specific to Cloud

			• Develop clear exit strategies to avoid lock-in
CONSUME	Unexpected or improper usage resulting in additional cost	• Instances that are not chosen appropriately by developers, leading to over-provisioning of resources • Development, testing, and proof of concept application servers that are left running continuously or are not terminated	• Train developers on using Cloud right • Assign policies and rules to monitor developer's Cloud usage (e.g. capping Cloud usage for projects) • Setup auto-scaling mechanism via automation script • Automate usage monitoring
MANAGE	Limited monitoring and oversight into usage and invoicing	• Lack of policy-based governance to guardrail consumption with thresholds • Limited visibility into who is using resources • Immature forecasting capability leading to limited predictability • Lack of automated environment alerts, reviews and notifications about budget overruns and cost spikes	• Analyze usage reports and forecast capacity to assess and re-size resources • Monitor instance schedules • Set up system preventing budget overruns and cost spikes with automated alerts and notifications
REPORT	Lack of transparency and clarity into invoices and usages to identify discrepancies	• Incorrect metering • Mismatch of metered data to users, leading to inaccurate invoices • Additional overhead from complex consolidation of bills from various providers	• Leverage tools to automate billing and sights • Dedicate and train individuals in Cloud financial management • Develop total cost of compute and chargeback methodology and communicate approach to developers and business

7. Conclusions and Recommendations

Despite the large interest and diffusion of the cloud computing technology, its applications are still limited in some industries and many businesses struggle to adapt their business model to a dynamic market and to prepare their organizations to embrace innovation. In the previous chapters, an analysis on the business model of a global insurer has been carried out together with a study concerning the benefits of the cloud and the barriers faced amid the transition towards the adoption of such technology. In this closing chapter, the key findings have been gathered from the semi structured interviews that will serve as final recommendations for the business model stress test and will contribute to answering the research questions. Next, some personal recommendations ad data interpretations from the researcher will follow, before concluding with a section on limitations and future research.

7.1 Key Findings and Results

In chapter 1, the research objectives have been translated into research questions that have guided the researcher throughout the data collection and data analysis phases. The key findings for each sub-question will now follow in the attempt to provide a brief summary of the results obtained.

1. *What are the benefits and the added value of the adoption of the cloud computing technology for large multinational insurance firms?*

Starting from the literature review and continuing in chapter 4, the benefits of the cloud computing technology have been extensively discussed. In particular, we have first analyzed archival records to gather insights on market trends and uncertainties to understand how the technology is currently being employed by the industry. Then, an investigation on the impact of the technology on an insurer's value chain has revealed the potential for organizations to create value for the clients while substantially improve the enterprise's operations. The cloud capabilities make reinforcing and optimizing core activities such as underwriting and claims possible to substantially improve the attractiveness of the business. Finally, archival records were once more searched with a more quantitative approach to investigate the cloud advantages in terms of IT spending for an organization. Promising results for the case study examined have been validated by data from other organizations and show a consistent advantage in cost savings by employing the cloud as the underlying technology. The degree to which savings can be realized depends on the cloud deployment model selected and on the accounting method chosen to report the costs.

2. *How should insurance firms innovate their business model to adopt cloud computing to be customer-oriented and cost-effective?*

In chapter 5, by collecting data through semi-structured interviews and by employing the business model stress test as the data analysis tool, we have evaluated the robustness of the business models of an organization, in lights of some uncertain future scenarios. First, the business model investigated has been described thanks to the BM canvas tool and afterwards, the stress test has been carried out following the six steps framework designed by the authors. The analysis has revealed the BM components compromising the overall robustness of the business model (value proposition and channels), commencing the discussion on what business model innovation should take place and how the new configuration would take advantage of the cloud computing technology. Key findings from the interviews and additional recommendations from the researcher have been gathered in the following pages of this chapter and include the implementation of an omnichannel strategy, the decentralization of innovation activities and the introduction of modular policies and modular applications.

3. *What are the barriers and the difficulties during the digital transformation process?*
4. *How do managers overcome these barriers?*

To tackle these last two sub-questions, first a literature review was performed, to acquire an understanding of the existing expertise in this specific field. From the review emerged that some authors had tried to address the issue of cloud technology adoption, but none of them had carried out a research in the context of financial services. Therefore, by interviewing industry experts it has been possible to gather additional insights on the barriers hindering the cloud adoption and the mitigation strategies that the management plans to or should follow in order to reduce risk and uncertainty. Among these, the "issues in the design of the technical solution leading to unexpected costs" has been the most cited barrier within the respondents, that worry about costs stemming from applications without plans for scaling down during low peak times or back end applications that are not designed for the cloud.

The goal of the interviews is ultimately to collect information to help answer the research questions stated in chapter 1.3.2, focusing on the response strategy expected by a multinational financial services company in light of digitalization, new customers' needs and increasing competition in the market. At the same time the goal is to understand how the cloud would fit in the new organizational structure while enabling an innovative business model. As a consequence, the information collected can be grouped into two main areas: one directly related to the organizational changes of the company as well as some of the business model components (6.1.1), and one focusing on the improvements and the benefits introduced by the cloud technology.

7.1.1 Business Model Innovation

The company chosen to be subject of the case study, is a multinational financial services firm headquartered in Europe and client of Accenture. Its core businesses are insurance and asset management.

The company has already undergone a business model modernization in the past by applying what BCG calls an hybrid approach to business model innovation (BCG, 2020). In the past the group had already established its presence in large part of the European countries, following a divisional type of organizational structure with a branch from each country reporting to the central headquarter. Only few functions remained centralized since the high diversity of foreign markets with different product needs and operating forms, prompted the decentralization of many responsibilities to take advantage of local information and market needs.

Later on, the sudden change in market scenario and the increasing presence of the so called insurtechs in local markets, urged a change in the business model. Indeed, the management, instead of relying on their exiting competences, scaling up the core business, perceived the importance of exploring the new market trends, betting on novel applications: an approach requiring considerable awareness of the company's competitive advantage. To do so, instead of shifting the focus of each branch of the multinational, a choice was made to fund new businesses that could handle with a certain degree of independence, a different operating model and a new value proposition that could accommodate a new customer segment and new trends in digitalization.

7.1.1.1 Omnichannel Servicing

The main strength of establishing subsidiaries focusing on local markets, is the personalization of the product mix, that can be tailored on local needs and wants. A new value proposition coupled with modern means to reach customers are two essential requirements identified by the BM stress test, that need to be addressed by the new business model. Therefore, starting by employing an omnichannel strategy, the business has the possibility to enhance the robustness of its channels in light of the stress factors identified. We live in a world where purchasing and servicing are done digitally and instantly through any device, consequently customers should be presented with the right information based on their preferences and be allowed to perform various transaction across channels, taking into account that they may begin in one channel and end in another (Memmo et al., 2020). Omnichannel servicing, by integrating data across channels, allow consumers to receive consistent service and information while moving seamlessly from one touchpoint to another within the context of one or more transactions. This way, policyholders do not need to repeat or reenter information when they change a service channel and they can continue to benefit from

their insurer's service without worrying about slow and repetitive bureaucratic processes. In addition, all data should be available to provide customized customers' service based on their preferences.

The insurer should also take in consideration the expansion of self-service functionalities, as customers increasingly favor do-it-yourself policy services and to perform other simple transactions on their own. In 2014 already, as highlighted by the Global Consumer Insurance Survey from EY, 80% of policyholders were willing to use digital channel options to carry out simple transactions and settings adjustments (Memmo et al., 2020). In order to realize this change, business processes must be designed accordingly whereas a suitable technology environments should be in place with some advanced tools, integrated data and effective data management capabilities (Memmo et al., 2020).

The cloud covers a fundamental role in the success of an omnichannel strategy, by providing the tools to deliver an outstanding customer service throughout a wide range of communication channels. At the same time, the cloud technology is responsible for the deployment of the required resources at any point in time and is capable of automatically carry out the deployment of additional resources needed to handle the peak in usage volume. The respondents particularly stressed the need for the typical scalability of the cloud technology, that becomes essential in periods following a strong marketing campaign usually designed to promote a new service or product or simply to increase sales. The interviewees have in fact reported that a strong correlation exists between a marketing effort and the traffic on the company's website, that increases drastically during and shortly after a campaign. Therefore, customers need to be able to access the company's services and products as soon as they are reached by a promotion or whenever they feel the need to.

On the opposite side, the company must be ready to handle the increase in customer demand for information. For example, the company's website and app might allow their visitors to calculate a free and anonymous quote for their car or motorbike just by introducing the license plate and the date of birth of the owner. The system is then able to automatically locate all the other information it needs, making it possible for the customer to make a comparison with other insurers and take a decision without the need of an insurance broker or a call center. In the modern digital world, call centers and other conventional service channels can no longer be relied upon and must be flanked by the new and less operationally expensive channels of the web. Two fundamental benefits also stem from offering various channels to interact with: customer satisfaction increases thanks to the opportunity to reach services in the way the want, while operational costs decrease, thanks to a lower interaction of the policyholders with the phone customer care thus allowing agents to concentrate on other important tasks.

7.1.1.2 Centralizing vs decentralizing innovation activities

As we explained, international markets, not only differ in sources of information, but they present highly different operating norms and product needs. This prompted the initial decentralization of the company in multiple local branches and later, the creation of subsidiaries focusing on a specific market niche, that became, with time, one of the biggest revenue streams for the multinational. The great success of this initiative, testified by an increase in revenues and the impressive interaction with the customers through the web services, urged the management to capitalize the advantage and innovate further to stay ahead of the competition.

With the birth of these satellite businesses, it became imperative decentralizing also some of the main functions of the company such as the R&D, in order to benefit from local information and tailor innovation activities to the local needs. However, since the customization of processes and products makes it very hard to be successful also in other markets, the innovations developed in one specific market, is never transferred to other branches. A phenomenon called not-invented-here-syndrome may also take place sometimes, meaning that the subsidiaries become reluctant to embrace other divisions' innovations, since they are not developed locally and could not suit different markets (Melissa A. Schilling, 2005). To solve this dilemma, Shilling suggests for instance to employ a so-called center-for-global strategy, entailing the centralization of all innovation activities at a centralized hub (Melissa A. Schilling, 2005). Following this strategy, new products and services would then be deployed throughout all the subsidiaries, with the management coordinating all the product development activities, exploiting economies of scale and avoiding duplication. However, this approach suits companies that have a big focus on innovation with a desire to protect and control their technologies' development and related activities (Melissa A. Schilling, 2005). This approach would in fact be very stiff and unresponsive to a fast changing and dynamic market. Local subsidiaries may also become reluctant to adopt a centralized strategy to innovation for the same reasons outlined before and the products developed centrally would not probably fit the local needs.

Therefore, the company at hand, faces the major challenge of determining what activities need to be centralized and which other should be carried out locally. Consequently, a second entity, equivalent to the company's headquarters, should be created, with the purpose of uniting and coordinating the previously funded subsidiaries at the local level, centralizing part of the activities or functions with a rigorous logic and achieving coherence across the corporation. This new entity should make sure that the local products, services and other types of innovation, are leveraged and diffused across the local subsidiaries, by examining local innovative developments and the synergies that might occur with other markets. The goal should be to make innovation and product development more efficient, by leveraging the results accomplished in a single subsidiary and deploying them to those that are most suitable, exploiting synergies and eliminating redundancies (Melissa A. Schilling, 2005).

The expected benefit of this strategy is threefold:

- Reduced Costs: overhead costs are dramatically reduced when functions are centralized. The redundancy of activities across the subsidiaries in Europe not only limits the efficiency and the coordination of innovation activities, but also implies an unnecessary cost that can be easily cut by centralizing tasks that are shared among all the divisions. This is particularly true for the front-end development or, simply speaking, the visual component of the company's website. In the original configuration, each subsidiary has its own website with different layouts and services from the others. What should now be achieved, is a new operating model where a central IT is responsible for the development of a common front end while the subsidiaries, that will eventually become branches of the same single entity, are responsible for their own product offering tailored on the local market. Such configuration would then save time and costs for the development of many different frontends.
- Simplicity: with the new configuration, internal processes are optimized and more efficient. The key to achieve maximum productivity, however, is to design very straightforward and understandable processes followed by a simple product offering. These results are achieved thanks to the centralization approach discussed, that make it easier internally to oversee one value proposition across all the branches (with some local exceptions), instead of distinct products and value propositions conceived individually by each subsidiary.
- Best practices: the third outstanding benefit of this approach, is the possibility to take advantage of models, ideas and innovations conceived locally and leverage them across the whole group. The goal of this strategy is to be able to capture something that is being successfully applied in one location, and replicate it in other locations as well, without the necessity to recreate from scratch the infrastructure or the resources needed to back it up. To do so, it has become essential to master and apply the notion of modularity to the delivery of product offerings and to the internal development of IT services.

7.1.1.3 Modular Products

The modularity is a characteristic of a system whose components can be separated to be rearranged and recombined in different configurations, exponentially increasing the possibilities achievable from a given set of elements (Melissa A. Schilling, 2005). This approach becomes even more valuable in the financial services industry, increasingly characterized by the heterogeneous demands of customers and the struggle of insurers for meeting them. With the increase in highly diverse demand in insurance policies, it diminishes the likelihood of customers agreeing on a few configurations. By applying the principle of modularity instead, customers with different necessities can assemble their own personal configuration, adding and subtracting components to meet their needs.

Modular policies are the first step to revolutionize the insurer's value proposition found unsuitable for a number of future scenarios and represent a cost-effective strategy to meet customers' demand in the current market. The concept of modularity can be applied both to the design of services offered to the client and to the design of the IT infrastructure and backend services, thanks to microservices architectures patterns and APIs. From the company's point of view, modularity allows to upgrade a component without affecting the others, therefore making it easier for the insurer to change part of an offering or upgrade a new component without having to replace the entire system.

Making products modular, additionally allows the entire product development system to become modular. Implementing standardized interfaces as outlined before, entails less coordination needed between developers that can focus on different components without worrying about integrating their work with other developers or respect the hierarchy expected in a typical organization (Melissa A. Schilling, 2005). A modular product architecture with standard interfaces, enables enhanced coordination in a geographically dispersed organization, because offices from different locations can easily leverage new product variations conceived and realized elsewhere without the need of replicating them (Sanchez & Mahoney, 1997). In this way, the firm's ability to generate new offerings is improved and products from different market can be easily tested, adapted and launched in other environments.

7.1.2 IT services and software development

The topic of cloud computing impacting IT resources and infrastructures has been covered extensively in the preceding sections. In particular, the cloud cost saving advantages as been estimated based on a real case study and we have investigated the benefits of a cloud infrastructure in terms of efficiency, ease and time to market thanks to the study of the literature available. The goal of this section is to cover in more details how the cloud is beneficial to the process of software development and the management of core services necessary for the proper and effective functioning of internal processes and external services available to the customer, in the context of the case study at hand.

As we said, an insurance company can be compared to an IT business since everything, from policy management to claims payments happens digitally through IT services specifically conceived for those purposes. At the root of the IT services management there is obviously a process of software development that need to take place in order to generate the services that the insurer's staff will use or that will automate tasks that had been carried out manually until that moment.

7.1.2.1 API, Microservices and event-driven architecture models

To advance technologically and exploit the full potential of cloud computing technologies, the insurer needs to initiate its journey towards digital decoupling. In the modern era of software architecture, functionalities are entrusted to individual microservices that make up the so-called monolithic applications. Through the use of APIs (Application Programming Interface), software developers can interact with microservices to use an application's functionalities or access its data. This software architecture, echoing the concept of modularity explored in the preceding section, makes it easier to develop, integrate, and maintain applications. Treating each element separately, ensures that the entire applications will always be up and running without the risk of breaking, thus increasing customers satisfaction at the end point. In addition, large companies further benefit from a microservice architecture by allowing teams of developers to work separately on different elements without worrying about integrating lines of codes.

When the cloud is integrated, the systems achieve consistency and efficiency while reducing risks. By deploying microservices on a cloud infrastructure, businesses reduce the risk of under provisioning resources while distinguishing the services with highest impact on the application. If for example, a new campaign raises interest on a new policy package, the system's module handling the policies management could be overloaded with requests. Thanks to the cloud scalability, the service will receive additional resources to keep functioning smoothly; at the same time, if any problem occurs and that specific service is broken, the characteristic modular configuration will allow the system to remain active and provide access to all the other services available.

7.1.2.2 Software development process

To understand in what other ways the cloud technology is beneficial for an insurer's IT, we need to investigate the process of software development taking place when the business decides to improve its service offering by adding new tools to improve customers' experience or even internal instruments to improve processes' efficiency.

The process described by some of the interviewees is made of six different steps and can be grouped into three phases: the first focusing on the raw coding of the application, the second grouping different types of tests to check the performances of the code and the third and last devoted to launching the app and making it available for the end user. For each of these steps, developers always need some sort of data to validate the code and make sure that what they are coding actually works. These data assume different forms, but most importantly, they resides in database that have different restrictive accesses depending on the level of seniority or responsibility since, the more the application advances forward in the three phases, the more the

data are similar or even the same as the real data of the customers, protected as we know by numerous privacy norms. For example, the developers are not allowed to access the real data from the company when they are coding the first version of the app. Therefore, when the app advances in the test environments, it will be accessing certain types of data, residing on different databases accessible only by the testers.

As a consequence, the company needs to take in account the need for resources during the software development process and has to come up with a precise enough calculation to arrange the correct number of servers to back up different testing environments with different data levels. Thanks to the cloud, the burden of this calculation and the risk of deploying a number of machines that would be otherwise unused, disappears. While with the conventional configuration, provisioning physical resources would require a large team of IT experts, thanks to the cloud, anyone from the developers/testers team can easily obtained the needed resources with a few clicks. In addition, when they need to try a new feature, they do not need to update the whole application before testing it, but they can provision a dedicated environment to develop and test it before integrating lines of code in the complete version.

7.2 Additional Recommendations

As BCG experts remind, business model innovation comprises the ability to deliver value creation by simultaneously making changes to the organization's operating model and value proposition to customers (BCG, 2020). For the operating model, a company needs to reflect on how to drive profitability while retaining competitive advantage, whereas on the value proposition level, it needs to rethink the product or service offering and how to hypothetically address a new customer segment. In the previous sections, these two elements have been extensively addressed. However, additional recommendations are needed to touch all the business model components deemed critical by the BM stress test in light of the 4 scenarios identified.

As we have seen, the BM component compromising the overall robustness of the business model is the value proposition, that has been quite addressed above through the introduction of modular policies. However, in order for the insurer to reach its full potential, the value proposition should be further innovated and despite offering products and services more in line with customers necessities, insurers should reflect on the primary purpose of their business. While for centuries the company's mission was to assist its customers in recovering from a loss, now its effort should be directed towards helping customers avoiding losses in the first place. The misconception that fewer problems for consumers would lead to less policies sold, has guided the industry for a long time and should now be abandoned in favor of a strategy that can reduce costs deriving from claims.

Therefore, it is required that insurers start developing the partnership culture needed to acquire the necessary competences to help their costumers and sign collaboration with businesses that can maximize the values generated by their value chains. This could mean for example, focusing on cybersecurity issues and tailoring new policies that cover losses caused by cyber breaches into a customer's datacenter. The subscription of said policies could then be coupled with data security solutions designed by a partner cybersecurity provider for the insurers' customers.

Insurers should also develop data management systems that are more robust and provide quicker real time analytics and sharing of information. By leveraging cloud computing tools, insurers just need to make use of the collected data, analyze them and use them to deliver superior value across core functions from underwriting to marketing or claims management. Speed and readiness are essential to deliver competitive advantage over the competitors and real time data need to be interpreted right away to take better and faster decisions. Wearable technologies for instance, are a great opportunity to make special offers to healthy customers that prove to maintain a healthy lifestyle while trying to be in shape. They can also customize the communication strategy based on data retrieved from customers' behavior on the web such as their browsing or purchase histories (Memmo et al., 2020).

Firms now need more employees with the skills to uncover latent customer demands, design solutions, and win customers in a crowded and increasingly commoditized market. Firms with better customer experience are more likely to see policyholders stay and deepen the relationship. AI and automation play a key role in powering empathy, as data driven insights translate into real time actions that make customers feel known by the firm.

7.3 Limitations and Future Research

This research alone represents a valid contribution to the literature of cloud computing and financial services organizations. However, some limitations must be recognized and addressed with additional future research.

Because of time and cost constraints, a relatively small sample of only 9 interviews has been used to collect data on the case study. Even though the interviews have been carried out with expert colleagues willing to share their knowledge on the topic, a wider number of respondents would have definitely improved the reliability of the information and the quality of the research. In addition, because internal processes and technologies were often discussed, the interviewees were generally concerned about disclosing confidential information that might have affected the competitive advantage of the firm over other players. Therefore, additional investigation should follow in the future, spanning across multiple organizations and comprising a wider range of data collection sources.

The exploratory nature of the current research does also limit the generalization of theories and conclusions deduced, since the interpretation of the data can be judgmental and biased. Future researchers might consider using a different approach to tackle similar research questions and employ a quantitative method to collect and interpret data. Starting from this paper it may be interesting to collect data through a multiple-choice survey and apply statistical analysis to uncover relationships and trends within the financial services industry.

Regarding the business stress test realized in chapter 5, Bouwman et al. (2018), the tool's creators, suggest that the analysis should be carried out in a group meeting with people familiar with the BM, with an expert to help avoiding biased conclusions and tunnel vision and a facilitator to guide the session. However, because of the impracticability of realizing such circumstances, the information necessary to the description of the business model have been obtained through the interviews and the documents retrieved from the company's records. The authors also reflect on the subjectivity of selecting the different colors when filling the heat map. For these reasons, in their paper they suggest that, when completing the heat map, extensive discussions should be carried out among the stakeholders to resolve contrasting opinions and reveal underlying reasoning. In addition, after completing the heat map, relevant debates should be performed to interpret the results and draw conclusions. The researcher covers here the role of the stress test facilitator and of the individual knowledgeable about the stress test tool. The researcher is also in charge of describing the BM components and selecting the stress factors, taking over the final discussion around the topic of the BM recommendations.

Finally, no distinction is made in the research among types of insurers. While this paper covers the topic of business model innovation and cloud adoption for an insurance multinational, the conceptual framework does not consider if and how these instances would affect distinct type on insurers in the industry. Therefore, future research should address this limitation by applying similar tools and principles while making a distinction among insurers types and judge each business model's robustness and technologies' adoption acceptability.

7.4 Research Contributions and MOT Fit

In conclusion, the thesis fits the MOT programme by combining contributions on managerial and technological research. This paper has covered thoroughly all the areas of interest of the MOT programme such as technology, innovation and organization, by applying the scientific method to research the cloud computing technology and business model innovation in the context of the financial services industry. From a managerial perspective, the thesis reflects on the potential of cloud computing for insurance organizations and assess the robustness of their business model in light of the market trends outlined. Thanks to this study, the management can now be inspired to

perceive the need for innovation and structural change and provide their organizations with the tools and best practices to tackle the challenges ahead. From a scholastic point of view, this study has investigated the interdependencies among technology adoption, business processes and strategy formulation, contributing to the business model innovation literature. In addition, the focus on cloud computing and its numerous benefits and applications enriches the knowledge on the technology and its applications. From an academic perspective, developing an understanding of such widespread and utilized technology constitutes an invaluable advantage.

The study, mainly qualitative in nature, emphasizes business related findings by applying an exploratory research approach. In chapter 4.3 however, some quantitative analysis has been carried out as well, to assess with higher level of details the benefits in cost savings stemming from the adoption of the technology investigated.

Even though the findings can be generalized for the most part to the rest of the insurance industry, what could potentially change the outcome of the research is the analysis of a completely different case study that does not display the same intrinsic characteristics and challenges of the one investigated. Furthermore, the appearance of the COVID-19 virus and the crisis suffered at the global level might have changed the future scenarios identified and, as a consequence, the theories developed by this study.

Therefore, if there was a chance to do something differently, the research should have integrated an analysis of the COVID pandemic's consequences on the insurance industry and on the evaluations of the stress factors employed in the business model stress test of chapter 5. By identifying different stress factors, the outcome of the model would have drastically changed as well, making it interesting to compare the first version with a second interpretation of external data.

References

Academy, S. (2012). *Risk Management for Enterprises and Individuals*. https://saylordotorg.github.io/text_risk-management-for-enterprises-and-individuals/index.html

Accenture. (2010). *How Cloud Computing will Transform Insurance*. 16.

Achtenhagen, L., Melin, L., & Naldi, L. (2013). Dynamics of Business Models – Strategizing, Critical Capabilities and Activities for Sustained Value Creation. *Long Range Planning*, *46*, 427–442. https://doi.org/10.1016/j.lrp.2013.04.002

Acs, Z. J., & Audretsch, D. B. (1988). Innovation in Large and Small Firms : An Empirical Analysis. *Journal of Economics and Management Strategy*, *78*(3), 678–690. https://doi.org/10.2139/ssrn.1084874

Afuah, A. (2000). How much do your co-opetitors' capabilities matter in the face of technological change? *Strategic Management Journal*, *21*(3), 397–404. https://doi.org/10.1002/(SICI)1097-0266(200003)21:3<397::AID-SMJ88>3.0.CO;2-1

Aggarwal, S., & McCabe, L. (2009). *The Compelling TCO Case for Cloud Computing in SMB and Mid-Market Enterprises*. https://www.netsuite.com/portal/pdf/wp-hurwitztco-study-dynamics.pdf

Andreas Eckstein, Axel Liebetrau, A. F.-M. (2018). The Transition of Customer Behavior Due to Digitalization. In *Insurance & Innovation 2018*. https://books.google.de/books?hl=en&lr=&id=9aRSDwAAQBAJ&oi=fnd&pg=PA109&dq=customer+segmentation,+digitalization&ots=wOZ61X6jqK&sig=p-Ag54xRtkB-NB7tlUax0dbcdPY&redir_esc=y#v=onepage&q&f=false

Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., Lee, G., Patterson, D., Rabkin, A., Stoica, I., & Zaharia, M. (2010). A view of cloud computing. *Communications of the ACM*, *53*(4), 50–58. https://doi.org/10.1145/1721654.1721672

Avram, M. G. (2014). Advantages and Challenges of Adopting Cloud Computing from an Enterprise Perspective. *Procedia Technology*, *12*, 529–534. https://doi.org/10.1016/j.protcy.2013.12.525

Axel, J. (1993). Insurance Product Development: Managing the Changes. *International Journal of Bank Marketing*, *11*(3), 5–14. https://doi.org/10.1108/02652329310027693

Baecke, P., & Bocca, L. (2017). The value of vehicle telematics data in insurance risk selection processes. *Decision Support Systems*, *98*, 69–79. https://doi.org/https://doi.org/10.1016/j.dss.2017.04.009

BCG. (2020). *Business Model Innovation Delivers Competitive Advantage*. Innovation Strategy and Delivery. https://www.bcg.com/capabilities/innovation-strategy-delivery/business-model-innovation.aspx

Becker, H. S. (2008). *Tricks of the Trade: How to Think about Your Research While You're Doing It*. University of Chicago Press. https://books.google.it/books?id=eh_w-gLHZHgC

Benner, M. J., & Tushman, M. L. (2001). Exploitation, exploration, and process management: The productivity dilemma revisited. *Academy of Management Review*, *28*(2), 238–256. https://doi.org/10.5465/AMR.2003.9416096

Bouwman, H., Heikkilä, J., Heikkilä, M., Leopold, C., & Haaker, T. (2018). Achieving agility using business model stress testing. *Electronic Markets*, *28*(2), 149–162. https://doi.org/10.1007/s12525-016-0243-0

Buyya, R., Vecchiola, C., & Selvi, S. T. (2013). Cloud Computing Architecture. In R. Buyya, C. Vecchiola, & S. T. B. T.-M. C. C. Selvi (Eds.), *Mastering Cloud Computing* (pp. 111–140). Morgan Kaufmann. https://doi.org/https://doi.org/10.1016/B978-0-12-411454-8.00004-8

Calvo, M. (2020). Getting Real with Digital Transformation for Financial Services. *Financial Services Technology Advisory Blog*. https://fstechadvisory.accenture.com/getting-real-digital-transformation-financial-services/?linkId=100000010394625

Christensen, C. M., & Bower, J. L. (1996). Customer Power, Strategic Investment, and the Failure of Leading Firms. *Strategic Management Journal*, *17*(3), 197–218. http://www.jstor.org/stable/2486845

Conwai, K. (2019). Advancing the Financial Services Digital Transformation with Agility. *Financial Services Technology Advisory Blog*. https://fstechadvisory.accenture.com/advancing-the-financial-services-digital-transformation-with-agility/

Dague, D. (2020). How Insurers Can Boost Their Readiness for Cloud Adoption. *Accenture Insurance Blog*. https://insuranceblog.accenture.com/how-insurers-can-boost-their-readiness-for-cloud-adoption

El-Gazzar, R. F. (2014). *A Literature Review on Cloud Computing Adoption Issues in Enterprises BT - Creating Value for All Through IT* (B. Bergvall-Kåreborn & P. A. Nielsen (eds.); pp. 214–242). Springer Berlin Heidelberg.

Garrison, G., Kim, S., & Wakefield, R. (2012). Success Factors for Deploying Cloud Computing. *Communications of the ACM*, *55*, 62–68. https://doi.org/10.1145/2330667.2330685

Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services. *Journal of Management Information Systems*, *35*(1), 220–265. https://doi.org/10.1080/07421222.2018.1440766

Grover, V., & Kohli, R. (2013). Revealing your hand: Caveats in implementing digital business strategy. *MIS Quarterly*, *37*, 655–662.

Haaker, T., Bouwman, H., Janssen, W., & de Reuver, M. (2017). Business model stress testing: A practical approach to test the robustness of a business model. *Futures*, *89*(April), 14–25. https://doi.org/10.1016/j.futures.2017.04.003

Hamdaqa, M., & Tahvildari, L. (2012). *Cloud Computing Uncovered: A Research Landscape* (A. Hurson & A. B. T.-A. in C. Memon (eds.); Vol. 86). Elsevier. https://doi.org/https://doi.org/10.1016/B978-0-12-396535-6.00002-8

Hurwitz, J., Bloor, R., Kaufman, M., & Halper, F. (2010). *Cloud Computing For Dummies*.

Khanagha, S., Volberda, H. W., & Oshri, I. (2013). Business model transformation and ambidexterity: Renewal through recursive structural alteration. *Academy of Management Proceedings*, *2013*, 15162. https://doi.org/10.5465/AMBPP.2013.15162abstract

Klotzki, U., Gatzert, N., & Muenstermann, B. (2017). The Cost of Life Distribution in Europe. *The Geneva Papers on Risk and Insurance - Issues and Practice*, *42*(2), 296–322. https://doi.org/10.1057/s41288-016-0036-x

Kranz, J. J., Hanelt, A., & Kolbe, L. M. (2016). Understanding the influence of absorptive capacity and ambidexterity on the process of business model change – the case of on-premise and cloud-computing software. *Information Systems Journal*, *26*(5), 477–517. https://doi.org/10.1111/isj.12102

Krishna Iyer, E. (2013). *Analysis of Dissatisfiers That Inhibit Cloud Computing Adoption Across Multiple Customer Segments*. https://doi.org/10.13140/2.1.4924.3843

Lardinois, F. (2020). *Microsoft Teams is coming to consumers — but Skype is here to stay*. Techcrunch. https://techcrunch.com/2020/03/30/microsoft-teams-is-coming-to-consumers-but-skype-is-here-to-stay/

Loebbecke, C., & Picot, A. (2015). Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda. *Journal of Strategic Information Systems*, *24*, 149–157. https://doi.org/10.1016/j.jsis.2015.08.002

Longoria, G. (2016). TCO Analysis Demonstrates How Moving To The Cloud Can Save Your Company Money. *Forbes*. https://www.forbes.com/sites/moorinsights/2016/04/11/tco-analysis-demonstrates-how-moving-to-the-cloud-can-save-your-company-money/#2603fe047c4e

Mahoney, P. F. (1992). Is bigger really better? One entrepreneur's view. *International Competitiveness and Business Techniques in Advanced Optics and Imaging*, *1617*(May 1992), 250–262. https://doi.org/10.1117/12.58929

Marris, P. (1994). Reviews : Learning From Strangers: The Art and Method of Qualitative Interview Studies Robert S. Weiss The Free Press, New York, 1994. 246 pages. $24.95 (HB). Doing Naturalistic Inquiry: A Guide to Methods David A. Erlandson, Edward L. Harris, Barbara L. . *Journal of Planning Education and Research*, *13*(4), 305–306. https://doi.org/10.1177/0739456X9401300411

Matt, C., Hess, T., & Benlian, A. (2015). Digital Transformation Strategies. *Business & Information Systems Engineering*, *57*(5), 339–343. https://doi.org/10.1007/s12599-015-0401-5

Melissa A. Schilling. (2005). *Strategic Management of Technological Innovation*.

Mell, P., & Grance, T. (2011). The NIST Definition of Cloud Computing. *U.S. Department of Commerce*.

Memmo, F., Knopp, R., O'Mara, M., & Mishra, K. (2020). Adapting to the omnichannel world. *EY Publications*. https://www.ey.com/Publication/vwLUAssets/ey-adapting-to-the-omnichannel-world/$File/ey-adapting-to-the-omnichannel-world.pdf

Menon, A., Chowdhury, J., & Lukas, B. A. (2002). Antecedents and outcomes of new product development speed. An interdisciplinary conceptual framework. *Industrial Marketing Management*, *31*(4), 317–328. https://doi.org/10.1016/S0019-8501(01)00163-8

Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis: An Expanded Sourcebook*. SAGE Publications. https://books.google.it/books?id=U4lU_-wJ5QEC

Miller, D. (1992). The icarus paradox: How exceptional companies bring about their own downfall. *Business Horizons*, *35*(1), 24–35. https://doi.org/10.1016/0007-6813(92)90112-M

Mvelase, P., Sithole, H., Modipa, T., & Mathaba, S. (2017). The economics of cloud computing: A review. *Proceedings - 2016 3rd International Conference on Advances in Computing, Communication and Engineering, ICACCE 2016*, *January 2018*, 159–166. https://doi.org/10.1109/ICACCE.2016.8073741

Naylor, M. (2017). Insurance Transformed. *Insurance Transformed*, *January 2017*. https://doi.org/10.1007/978-3-319-63835-5

Nicoletti, B. (2016). *Digital Insurance: Business Innovation in the Post-Crisis Era*.

Porter, M. E. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. Free Press. https://books.google.it/books?id=H9ReAijCK8cC

Pousttchi, K., & Gleiss, A. (2019). Surrounded by middlemen - how multi-sided platforms change the insurance industry. *Electronic Markets*, *29*(4), 609–629. https://doi.org/10.1007/s12525-019-00363-w

Rai, A., & Tang, X. (2014). IT-Enabled Business Models: A Conceptual Framework and a

Coevolution Perspective for Future Research. *Information Systems Research*, *25*, 1–14. https://doi.org/10.1287/isre.2013.0495

Rotemberg, B. J. J., & Saloner, G. (1994). *Benefits of Narrow Business Strategies*. *84*(5), 1330–1349.

Rountree, D., & Castrillo, I. (2014). The Basics of Cloud Computing. In D. Rountree & I. Castrillo (Eds.), *The Basics of Cloud Computing*. Syngress. https://doi.org/https://doi.org/10.1016/B978-0-12-405932-0.00001-3

Rubin J, H., & Rubin S, I. (2005). *Qualitative interviewing : the art of hearing data* (C. S. P. Thousand Oaks (ed.)).

Rynes, A. (2018). *The Role of Corporate Finance in Evaluating a Cloud Computing Strategy A Chief Financial Officer perspective*. https://www.modul.ac.at/uploads/files/Theses/Master/MBA_2018/1402004_Andreas_Rynes__Final_MasterThesis.pdf

Sanchez, R., & Mahoney, J. T. (1997). Modularity, flexibility, and knowledge management in product and organization design. *IEEE Engineering Management Review*, *25*(4), 50–61. https://doi.org/10.1002/smj.4250171107

Sekaran, U., & Bougie, R. (2000). Research Methods for Business Students. In *Qualitative Market Research: An International Journal* (Vol. 3, Issue 4). https://doi.org/10.1108/qmr.2000.3.4.215.2

Sitaram, D., & Manjunath, G. (2012). Moving To The Cloud. In D. Sitaram & G. Manjunath (Eds.), *Moving To The Cloud*. Syngress. https://doi.org/https://doi.org/10.1016/B978-1-59749-725-1.00001-9

Smith, B. (2019). *Dictionary of Sport Psychology*. https://doi.org/10.1016/B978-0-12-813150-3.00019-X

Smith, R. (2019). Insurance brokerage M&A hits record in 2018. *Insurance Business Magazine*. https://www.insurancebusinessmag.com/ca/news/breaking-news/insurance-brokerage-manda-hits-record-in-2018-123567.aspx

Symeonidis, G. (1996). Innovation, Firm Size and Market Structure: Schumpeterian Hypotheses and Some New Themes. *OECD Economics Department Working Papers*, *161*.

Trigueros-Preciado, S., Pérez-González, D., & Solana-González, P. (2013). Cloud computing in industrial SMEs: Identification of the barriers to its adoption and effects of its application. *Electronic Markets*, *23*(2), 105–114. https://doi.org/10.1007/s12525-012-0120-4

van Doorn, J., Mende, M., Noble, S. M., Hulland, J., Ostrom, A. L., Grewal, D., & Petersen, J. A. (2016). Domo Arigato Mr. Roboto: Emergence of Automated Social Presence in

Organizational Frontlines and Customers' Service Experiences. *Journal of Service Research*, *20*(1), 43–58. https://doi.org/10.1177/1094670516679272

van Rossum, A., de Castries, H., & Mendelsohn, R. (2002). The Debate on the Insurance Value Chain. *The Geneva Papers on Risk and Insurance - Issues and Practice*, *27*(1), 89–101. https://doi.org/10.1111/1468-0440.00156

Weinman, J. (2012). *Cloudonomics: The Business Value of Cloud Computing (Google eBook)*. http://books.google.com/books?id=A_4GN9ssivMC&pgis=1

Winkler, V. J. R. (2011). Cloud Computing Architecture. In V. (J. R. . B. T.-S. the C. Winkler (Ed.), *Securing the CLoud* (pp. 29–53). Syngress. https://doi.org/https://doi.org/10.1016/B978-1-59749-592-9.00002-6

Yang, H., & Tate, M. (2012). A descriptive literature review and classification of cloud computing research. *Communications of the Association for Information Systems*, *31*(1), 35–60. https://doi.org/10.17705/1cais.03102

Yin, R. K. (2014). *Case Study Research: Design and Methods*.

Yu, D., & Hang, C. C. (2010). A Reflective Review of Disruptive Innovation Theory. *International Journal of Management Reviews*, *12*(4), 435–452. https://doi.org/10.1111/j.1468-2370.2009.00272.x

Academy, S. (2012). *Risk Management for Enterprises and Individuals*. https://saylordotorg.github.io/text_risk-management-for-enterprises-and-individuals/index.html

Accenture. (2010). *How Cloud Computing will Transform Insurance*. 16.

Achtenhagen, L., Melin, L., & Naldi, L. (2013). Dynamics of Business Models – Strategizing, Critical Capabilities and Activities for Sustained Value Creation. *Long Range Planning*, *46*, 427–442. https://doi.org/10.1016/j.lrp.2013.04.002

Acs, Z. J., & Audretsch, D. B. (1988). Innovation in Large and Small Firms : An Empirical Analysis. *Journal of Economics and Management Strategy*, *78*(3), 678–690. https://doi.org/10.2139/ssrn.1084874

Afuah, A. (2000). How much do your co-opetitors' capabilities matter in the face of technological change? *Strategic Management Journal*, *21*(3), 397–404. https://doi.org/10.1002/(SICI)1097-0266(200003)21:3<397::AID-SMJ88>3.0.CO;2-1

Aggarwal, S., & McCabe, L. (2009). *The Compelling TCO Case for Cloud Computing in SMB and Mid-Market Enterprises*. https://www.netsuite.com/portal/pdf/wp-hurwitztco-study-dynamics.pdf

Andreas Eckstein, Axel Liebetrau, A. F.-M. (2018). The Transition of Customer Behavior Due to Digitalization. In *Insurance & Innovation 2018*. https://books.google.de/books?hl=en&lr=&id=9aRSDwAAQBAJ&oi=fnd&pg=PA109&dq=customer+segmentation,+digitalization&ots=wOZ61X6jqK&sig=p-Ag54xRtkB-NB7tlUax0dbcdPY&redir_esc=y#v=onepage&q&f=false

Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., Lee, G., Patterson, D., Rabkin, A., Stoica, I., & Zaharia, M. (2010). A view of cloud computing. *Communications of the ACM*, *53*(4), 50–58. https://doi.org/10.1145/1721654.1721672

Avram, M. G. (2014). Advantages and Challenges of Adopting Cloud Computing from an Enterprise Perspective. *Procedia Technology*, *12*, 529–534. https://doi.org/10.1016/j.protcy.2013.12.525

Axel, J. (1993). Insurance Product Development: Managing the Changes. *International Journal of Bank Marketing*, *11*(3), 5–14. https://doi.org/10.1108/02652329310027693

Baecke, P., & Bocca, L. (2017). The value of vehicle telematics data in insurance risk selection processes. *Decision Support Systems*, *98*, 69–79. https://doi.org/https://doi.org/10.1016/j.dss.2017.04.009

BCG. (2020). *Business Model Innovation Delivers Competitive Advantage*. Innovation Strategy and Delivery. https://www.bcg.com/capabilities/innovation-strategy-delivery/business-model-innovation.aspx

Becker, H. S. (2008). *Tricks of the Trade: How to Think about Your Research While You're Doing It*. University of Chicago Press. https://books.google.it/books?id=eh_w-gLHZHgC

Benner, M. J., & Tushman, M. L. (2001). Exploitation, exploration, and process management: The productivity dilemma revisited. *Academy of Management Review*, *28*(2), 238–256. https://doi.org/10.5465/AMR.2003.9416096

Bouwman, H., Heikkilä, J., Heikkilä, M., Leopold, C., & Haaker, T. (2018). Achieving agility using business model stress testing. *Electronic Markets*, *28*(2), 149–162. https://doi.org/10.1007/s12525-016-0243-0

Buyya, R., Vecchiola, C., & Selvi, S. T. (2013). Cloud Computing Architecture. In R. Buyya, C. Vecchiola, & S. T. B. T.-M. C. C. Selvi (Eds.), *Mastering Cloud Computing* (pp. 111–140). Morgan Kaufmann. https://doi.org/https://doi.org/10.1016/B978-0-12-411454-8.00004-8

Calvo, M. (2020). Getting Real with Digital Transformation for Financial Services. *Financial Services Technology Advisory Blog*. https://fstechadvisory.accenture.com/getting-real-digital-transformation-financial-services/?linkId=100000010394625

Christensen, C. M., & Bower, J. L. (1996). Customer Power, Strategic Investment, and the Failure of Leading Firms. *Strategic Management Journal*, *17*(3), 197–218.

http://www.jstor.org/stable/2486845

Conwai, K. (2019). Advancing the Financial Services Digital Transformation with Agility. *Financial Services Technology Advisory Blog*. https://fstechadvisory.accenture.com/advancing-the-financial-services-digital-transformation-with-agility/

Dague, D. (2020). How Insurers Can Boost Their Readiness for Cloud Adoption. *Accenture Insurance Blog*. https://insuranceblog.accenture.com/how-insurers-can-boost-their-readiness-for-cloud-adoption

El-Gazzar, R. F. (2014). *A Literature Review on Cloud Computing Adoption Issues in Enterprises BT - Creating Value for All Through IT* (B. Bergvall-Kåreborn & P. A. Nielsen (eds.); pp. 214–242). Springer Berlin Heidelberg.

Garrison, G., Kim, S., & Wakefield, R. (2012). Success Factors for Deploying Cloud Computing. *Communications of the ACM*, *55*, 62–68. https://doi.org/10.1145/2330667.2330685

Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services. *Journal of Management Information Systems*, *35*(1), 220–265. https://doi.org/10.1080/07421222.2018.1440766

Grover, V., & Kohli, R. (2013). Revealing your hand: Caveats in implementing digital business strategy. *MIS Quarterly*, *37*, 655–662.

Haaker, T., Bouwman, H., Janssen, W., & de Reuver, M. (2017). Business model stress testing: A practical approach to test the robustness of a business model. *Futures*, *89*(April), 14–25. https://doi.org/10.1016/j.futures.2017.04.003

Hamdaqa, M., & Tahvildari, L. (2012). *Cloud Computing Uncovered: A Research Landscape* (A. Hurson & A. B. T.-A. in C. Memon (eds.); Vol. 86). Elsevier. https://doi.org/https://doi.org/10.1016/B978-0-12-396535-6.00002-8

Hurwitz, J., Bloor, R., Kaufman, M., & Halper, F. (2010). *Cloud Computing For Dummies*.

Khanagha, S., Volberda, H. W., & Oshri, I. (2013). Business model transformation and ambidexterity: Renewal through recursive structural alteration. *Academy of Management Proceedings*, *2013*, 15162. https://doi.org/10.5465/AMBPP.2013.15162abstract

Klotzki, U., Gatzert, N., & Muenstermann, B. (2017). The Cost of Life Distribution in Europe. *The Geneva Papers on Risk and Insurance - Issues and Practice*, *42*(2), 296–322. https://doi.org/10.1057/s41288-016-0036-x

Kranz, J. J., Hanelt, A., & Kolbe, L. M. (2016). Understanding the influence of absorptive capacity and ambidexterity on the process of business model change – the case of on-premise and cloud-computing software. *Information Systems Journal*, *26*(5), 477–517.

https://doi.org/10.1111/isj.12102

Krishna Iyer, E. (2013). *Analysis of Dissatisfiers That Inhibit Cloud Computing Adoption Across Multiple Customer Segments*. https://doi.org/10.13140/2.1.4924.3843

Lardinois, F. (2020). *Microsoft Teams is coming to consumers — but Skype is here to stay*. Techcrunch. https://techcrunch.com/2020/03/30/microsoft-teams-is-coming-to-consumers-but-skype-is-here-to-stay/

Loebbecke, C., & Picot, A. (2015). Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda. *Journal of Strategic Information Systems*, *24*, 149–157. https://doi.org/10.1016/j.jsis.2015.08.002

Longoria, G. (2016). TCO Analysis Demonstrates How Moving To The Cloud Can Save Your Company Money. *Forbes*. https://www.forbes.com/sites/moorinsights/2016/04/11/tco-analysis-demonstrates-how-moving-to-the-cloud-can-save-your-company-money/#2603fe047c4e

Mahoney, P. F. (1992). Is bigger really better? One entrepreneur's view. *International Competitiveness and Business Techniques in Advanced Optics and Imaging*, *1617*(May 1992), 250–262. https://doi.org/10.1117/12.58929

Marris, P. (1994). Reviews : Learning From Strangers: The Art and Method of Qualitative Interview Studies Robert S. Weiss The Free Press, New York, 1994. 246 pages. $24.95 (HB). Doing Naturalistic Inquiry: A Guide to Methods David A. Erlandson, Edward L. Harris, Barbara L. . *Journal of Planning Education and Research*, *13*(4), 305–306. https://doi.org/10.1177/0739456X9401300411

Matt, C., Hess, T., & Benlian, A. (2015). Digital Transformation Strategies. *Business & Information Systems Engineering*, *57*(5), 339–343. https://doi.org/10.1007/s12599-015-0401-5

Melissa A. Schilling. (2005). *Strategic Management of Technological Innovation*.

Mell, P., & Grance, T. (2011). The NIST Definition of Cloud Computing. *U.S. Department of Commerce*.

Memmo, F., Knopp, R., O'Mara, M., & Mishra, K. (2020). Adapting to the omnichannel world. *EY Publications*. https://www.ey.com/Publication/vwLUAssets/ey-adapting-to-the-omnichannel-world/$File/ey-adapting-to-the-omnichannel-world.pdf

Menon, A., Chowdhury, J., & Lukas, B. A. (2002). Antecedents and outcomes of new product development speed. An interdisciplinary conceptual framework. *Industrial Marketing Management*, *31*(4), 317–328. https://doi.org/10.1016/S0019-8501(01)00163-8

Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis: An Expanded Sourcebook*. SAGE Publications. https://books.google.it/books?id=U4lU_-wJ5QEC

Miller, D. (1992). The icarus paradox: How exceptional companies bring about their own downfall. *Business Horizons*, *35*(1), 24–35. https://doi.org/10.1016/0007-6813(92)90112-M

Mvelase, P., Sithole, H., Modipa, T., & Mathaba, S. (2017). The economics of cloud computing: A review. *Proceedings - 2016 3rd International Conference on Advances in Computing, Communication and Engineering, ICACCE 2016*, *January 2018*, 159–166. https://doi.org/10.1109/ICACCE.2016.8073741

Naylor, M. (2017). Insurance Transformed. *Insurance Transformed*, *January 2017*. https://doi.org/10.1007/978-3-319-63835-5

Nicoletti, B. (2016). *Digital Insurance: Business Innovation in the Post-Crisis Era*.

Porter, M. E. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. Free Press. https://books.google.it/books?id=H9ReAijCK8cC

Pousttchi, K., & Gleiss, A. (2019). Surrounded by middlemen - how multi-sided platforms change the insurance industry. *Electronic Markets*, *29*(4), 609–629. https://doi.org/10.1007/s12525-019-00363-w

Rai, A., & Tang, X. (2014). IT-Enabled Business Models: A Conceptual Framework and a Coevolution Perspective for Future Research. *Information Systems Research*, *25*, 1–14. https://doi.org/10.1287/isre.2013.0495

Rotemberg, B. J. J., & Saloner, G. (1994). *Benefits of Narrow Business Strategies*. *84*(5), 1330–1349.

Rountree, D., & Castrillo, I. (2014). The Basics of Cloud Computing. In D. Rountree & I. Castrillo (Eds.), *The Basics of Cloud Computing*. Syngress. https://doi.org/https://doi.org/10.1016/B978-0-12-405932-0.00001-3

Rubin J, H., & Rubin S, I. (2005). *Qualitative interviewing : the art of hearing data* (C. S. P. Thousand Oaks (ed.)).

Rynes, A. (2018). *The Role of Corporate Finance in Evaluating a Cloud Computing Strategy A Chief Financial Officer perspective*. https://www.modul.ac.at/uploads/files/Theses/Master/MBA_2018/1402004_Andreas_Rynes__Final_MasterThesis.pdf

Sanchez, R., & Mahoney, J. T. (1997). Modularity, flexibility, and knowledge management in product and organization design. *IEEE Engineering Management Review*, *25*(4), 50–61. https://doi.org/10.1002/smj.4250171107

Sekaran, U., & Bougie, R. (2000). Research Methods for Business Students. In *Qualitative Market Research: An International Journal* (Vol. 3, Issue 4). https://doi.org/10.1108/qmr.2000.3.4.215.2

Sitaram, D., & Manjunath, G. (2012). Moving To The Cloud. In D. Sitaram & G. Manjunath (Eds.), *Moving To The Cloud*. Syngress. https://doi.org/https://doi.org/10.1016/B978-1-59749-725-1.00001-9

Smith, B. (2019). *Dictionary of Sport Psychology*. https://doi.org/10.1016/B978-0-12-813150-3.00019-X

Smith, R. (2019). Insurance brokerage M&A hits record in 2018. *Insurance Business Magazine*. https://www.insurancebusinessmag.com/ca/news/breaking-news/insurance-brokerage-manda-hits-record-in-2018-123567.aspx

Symeonidis, G. (1996). Innovation, Firm Size and Market Structure: Schumpeterian Hypotheses and Some New Themes. *OECD Economics Department Working Papers*, *161*.

Trigueros-Preciado, S., Pérez-González, D., & Solana-González, P. (2013). Cloud computing in industrial SMEs: Identification of the barriers to its adoption and effects of its application. *Electronic Markets*, *23*(2), 105–114. https://doi.org/10.1007/s12525-012-0120-4

van Doorn, J., Mende, M., Noble, S. M., Hulland, J., Ostrom, A. L., Grewal, D., & Petersen, J. A. (2016). Domo Arigato Mr. Roboto: Emergence of Automated Social Presence in Organizational Frontlines and Customers' Service Experiences. *Journal of Service Research*, *20*(1), 43–58. https://doi.org/10.1177/1094670516679272

van Rossum, A., de Castries, H., & Mendelsohn, R. (2002). The Debate on the Insurance Value Chain. *The Geneva Papers on Risk and Insurance - Issues and Practice*, *27*(1), 89–101. https://doi.org/10.1111/1468-0440.00156

Weinman, J. (2012). *Cloudonomics: The Business Value of Cloud Computing (Google eBook)*. http://books.google.com/books?id=A_4GN9ssivMC&pgis=1

Winkler, V. J. R. (2011). Cloud Computing Architecture. In V. (J. R. . B. T.-S. the C. Winkler (Ed.), *Securing the CLoud* (pp. 29–53). Syngress. https://doi.org/https://doi.org/10.1016/B978-1-59749-592-9.00002-6

Yang, H., & Tate, M. (2012). A descriptive literature review and classification of cloud computing research. *Communications of the Association for Information Systems*, *31*(1), 35–60. https://doi.org/10.17705/1cais.03102

Yin, R. K. (2014). *Case Study Research: Design and Methods*.

Yu, D., & Hang, C. C. (2010). A Reflective Review of Disruptive Innovation Theory. *International Journal of Management Reviews*, *12*(4), 435–452. https://doi.org/10.1111/j.1468-2370.2009.00272.x

Appendices

Appendix A. Interview Protocol

This document was handed to the interviewees ahead of the meeting as a reference for the semi-structured interviews:

I am currently working on my thesis graduation project and I am trying to research the cloud adoption strategy in the context of insurance companies focusing both on the IT infrastructure and the organizational change. I am interested in the business case of "*******" and its challenge to adopt the cloud to face a dynamic market, increasingly populated by lean and flexible insurtechs and by a trend in digitalization that is customer centric.

I would like to understand first the business model of the company, how this has changed throughout the adoption of the cloud, and the organizational structure of the company with its IT infrastructure. I would also like to know about how the BM has improved with strategies to address new customers' needs such as the use of multi-channel platforms or innovative products.

- First, an overview of the company's business model should be obtained by simply following the framework of the business model canvas.

- Secondly, an overview of the company structure and its IT services is needed to understand the changes brought by the introduction of the cloud.

Following, a series of questions have been laid out to understand how does cloud computing technology helps the company innovating its business model to remain competitive within the financial services industry and face the fierce competition of newly founded insurtechs.

- What are the benefits originating from the adoption of the cloud computing technology?
    - How should the cloud be employed in the organization?
    - Why has the cloud been chosen over other technologies?
    - What Cloud Computing Service Provider has been considered and why?

- How is the company planning to innovate its business model to welcome the adoption of cloud computing?
    - What organizational changes has the company undergone?
    - How is the company planning to cope with digitalization and the increasing need of interaction with the customers?
        - Do you think the value proposition should be revised? How?
        - Did the customer segmentation change? How?
        - How has the revenue mechanism changed?

- What are the barriers and the difficulties faced by the company during the transformation process?

- How is the management planning to overcome the barriers that might emerge during the transition?

Appendix B. Quotes from interviewees

Table 16 - Significant quotes from interviewees

INTERVIEWEE NUMBER	SENIORITY	QUOTE
1	IT Manager (External Client)	Insurance companies have moved from a no cloud policy to a cloud first policy.
2	Application Developer (Accenture)	Previously it was necessary to calculate the number of servers to be used for the development process while now the cloud automatically adapts to the developers' needs.
3	Digital Integration Manager (Accenture)	In cloud migration, more emphasis has been placed on native cloud services: websites, front ends.
4	Technology Consultant (Accenture)	The value in data analytics stems from how fast I retrieve and analyze data and not from the data itself.
5	Technology Consulting Analyst (Accenture)	The cloud provides the flexibility to decide which services to migrate and which to keep on-premise.
6	Application Developer (Accenture)	The management should take in consideration the efforts and costs to redesign the workloads that are not designed for scalability and elasticity, when migrating towards a cloud solution.
7	Digital Integration Consultant (Accenture)	It is not possible to centralize the IT in one step. Therefore, several components are slowly migrated: front ends and apps are the first components that are easily centralized.
8	Technology Consulting Senior Manager (Accenture)	In subsidiaries' services there can be peaks in resource usage due to advertising campaigns (the cloud becomes essential to manage loads due to scalability), while traditional services have constant loads.
9	Technology Consulting Analyst (Accenture)	Focus on centralized and reusable projects where individual countries extend functionalities

Table 22 summarizes some of the most significant quotes retrieved trough the semi-structured interviewees during the data collection process.

Appendix C. Case Studies Data

Table 17 - Business Data from Case Study N°1

BUSINESS CHALLENGE	SOLUTION	COST ENTRY	CLOUD DEPLOYMENT MODEL	ESTIMATED SAVINGS / COST AVOIDANCE
Many companies are embarking on digital transformations, but it's data that's giving some a competitive edge. The company had ambitious targets for its two-year plan. It wanted to become a lifetime partner to its customers through personalized offerings and an ecosystem of connected products. It knew the only way to accomplish this goal was to have data driving decisions.	Accenture leveraged a partnership with Google to use its Cloud Platform to develop a robust data portal. they took the raw data and presented it in a more structured way, using dashboards to make it easy to understand. They made data and KPI management simple and fast, while establishing a dedicated laboratory environment to experiment with advanced analytics and create a center of expertise. Throughout this project, they ensured a seamless integration between the client's on-site systems and the cloud platforms that was being implemented.	LABOR	Private	16%
			Public	28%
		SOFTWARE	Private	24%
			Public	23%
		SERVER	Private	25%
			Public	44%
		STORAGE	Private	20%
			Public	35%
		NETWORK	Private	16%
			Public	20%
		DATA CENTRE	Private	34%
			Public	30%
		SECURITY	Private	19%
			Public	19%

Table 18 - Business Data from Case Study N°2

BUSINESS CHALLENGE	SOLUTION	COST ENTRY	CLOUD DEPLOYMENT MODEL	ESTIMATED SAVINGS / COST AVOIDANCE
The insurer is making a transition to the cloud and needs robust security policies, procedures and tools for new and existing applications and online infrastructure. Accenture was selected to advise on closing critical security	Accenture's approach to providing a cloud security enablement assessment for the insurer's cloud strategy was based on a five-stage framework to help meet business objectives while remaining within risk tolerances. This process entailed evaluating the	LABOR	Private	18%
			Public	32%
		SOFTWARE	Private	19%
			Public	28%
		SERVER	Private	26%
			Public	42%

gaps and to provide well-established technical and business frameworks around cloud security, in large part due to a track record of similar work successfully providing the required outcomes.	existing security policy, operating model and governance processes from a cloud perspective, then suggesting overall readiness improvements, and helping to develop roadmaps for deployment. Accenture also provided an analysis of the security vision and reference architecture, a Cloud Access Service Broker (CASB) roadmap, and a cloud fit assessment model.	STORAGE	Private	21%
			Public	34%
		NETWORK	Private	20%
			Public	22%
		DATA CENTRE	Private	34%
			Public	30%
		SECURITY	Private	16%
			Public	22%

Table 19 - Business Data from Case Study N°3

BUSINESS CHALLENGE	SOLUTION	COST ENTRY	CLOUD DEPLOYMENT MODEL	ESTIMATED SAVINGS / COST AVOIDANCE
The company wanted to profitably grow its deferred annuity product by expanding globally, beginning with Australia. It sought a single technology platform that would enable rapid expansion by supporting global growth and scale.	The company selected the Accenture Life Insurance & Annuity Platform (ALIP) as its global platform, as an end-to-end policy administration system in the Microsoft Azure cloud. The solutions consist of: An ALIP software license Maintenance and implementation services Shared infrastructure using Microsoft Azure A secure network Managed hosting services including ALIP infrastructure outsourcing and application outsourcing	LABOR	Private	17%
			Public	25%
		SOFTWARE	Private	23%
			Public	29%
		SERVER	Private	27%
			Public	47%
		STORAGE	Private	22%
			Public	32%
		NETWORK	Private	16%
			Public	27%
		DATA CENTRE	Private	30%
			Public	21%
		SECURITY	Private	17%
			Public	27%

Table 20 - Business Data from Case Study N°4

BUSINESS CHALLENGE	SOLUTION	COST ENTRY	CLOUD DEPLOYMENT MODEL	ESTIMATED SAVINGS / COST AVOIDANCE
In this competitive, high-churn market, a large insurer faced several challenges: customers weren't sticking around and they were buying fewer products, and legacy technology prevented front line employees from accessing data and insights in a timely manner. To boost customer loyalty, the insurer knew it needed to improve its salesforce and technology capabilities to offer more personalized service and drive cross-sells and up-sells.	The solution was approached from two key angles: empowering the workforce to deliver improved customer service and drive sales and building the technology capabilities to support them. An end-to-end analytics system on the Google Cloud Platform was built, that will enable personalized customer experiences and support the workforce in making data-driven decisions. New marketing campaign management and customer retention applications will also help the client improve customer communication and engagement.	LABOR	Private	19%
			Public	30%
		SOFTWARE	Private	24%
			Public	26%
		SERVER	Private	32%
			Public	40%
		STORAGE	Private	22%
			Public	36%
		NETWORK	Private	20%
			Public	25%
		DATA CENTRE	Private	27%
			Public	26%
		SECURITY	Private	15%
			Public	25%

Table 21 - Business Data from Case Study N°5

BUSINESS CHALLENGE	SOLUTION	COST ENTRY	CLOUD DEPLOYMENT MODEL	ESTIMATED SAVINGS / COST AVOIDANCE
The company's existing strategy called for further improving operational and cost efficiency while maintaining high quality products and services for its customers in an evolving pension market driven by regulatory changes and increasing customer needs. Though the company had already been running SAP ECC, it sought to implement SAP s/4 HANA to replace the legacy pension fund	The project began with a high-level fit-gap analysis, in which all of APG's customers (pension funds) were assessed. This led to the development and implementation of a SAP HANA kernel with a goal of a one-size-fits-all platform. Accenture drew upon its long-term relationship with SAP to complete the technical setup for HEC and helped unify the backend of APG's premium collection and financial services. Connections	LABOR	Private	18%
			Public	30%
		SOFTWARE	Private	18%
			Public	22%
		SERVER	Private	32%
			Public	46%
		STORAGE	Private	18%
			Public	33%
		NETWORK	Private	17%

applications. This would future-proof the SAP platform via digitalization and optimize operations.	between the new platform and all interacting systems were made in the Cloud via Mulesoft, an integration platform that will eventually become the standard integration platform for APG.		Public	18%
		DATA CENTRE	Private	32%
			Public	22%
		SECURITY	Private	20%
			Public	25%

Table 22 - Business Data from Case Study N°6

BUSINESS CHALLENGE	SOLUTION	COST ENTRY	CLOUD DEPLOYMENT MODEL	ESTIMATED SAVINGS / COST AVOIDANCE
With multiple operational entities across the world, the client was burdened with a disparate and costly information technology (IT) landscape that made it hard to communicate internally and centralize business operations. It recognized the need to integrate its data centers and move to cloud to better position itself for the future. It engaged Accenture to develop a cloud-based, global data center consolidation (DCC) strategy.	The Accenture Infrastructure Services team helped the client develop a cloud-based and global DCC strategy that would integrate its more than 140 data centers into six regional centers. Key features of Accenture's DCC strategy include: - Creating a dedicated IBM Pure Systems-based private cloud to establish a common global IT platform that would improve operational agility, employee productivity and service efficiency. - Designing client-specific architecture with global identity and access management (IAM) to centralize control and improve compliance to security regulations. - Migrating more than 24,000 legacy servers to the cloud to reduce hardware maintenance costs. - Establishing automatic failover capabilities for data centers to ensure business continuity.	LABOR	Private	17%
			Public	28%
		SOFTWARE	Private	22%
			Public	24%
		SERVER	Private	29%
			Public	46%
		STORAGE	Private	21%
			Public	32%
		NETWORK	Private	20%
			Public	20%
		DATA CENTRE	Private	34%
			Public	20%
		SECURITY	Private	17%
			Public	25%

Table 23 - Business Data from Case Study N°7

BUSINESS CHALLENGE	SOLUTION	COST ENTRY	CLOUD DEPLOYMENT MODEL	ESTIMATED SAVINGS / COST AVOIDANCE
The client was looking to reduce its cost of operations by consolidating IT infrastructure and its governance by creating a European IT infrastructure company where local companies could merge. It also wanted to: Consolidate 12 data centers into two. Operate across borders using integrated technologies and platforms. Track IT infrastructure expenditure. Reduce IT infrastructure costs. Prepare for a post-consolidation phase to achieve further efficiencies.	Accenture leveraged its global presence and a team of 50 professionals to ensure close integration among all business units. The team also powered the client's decision-making process. Accenture managed the entire IT infrastructure consolidation program, including: Collecting input data in its current form to create technology blueprints and standards for the new consolidated IT infrastructure. Producing a detailed technical design for the new local area network, x86 servers, UNIX servers, storage and storage area network (SAN), and new data center facilities. Implementing IT service management tools (based on ServiceNow), ensuring workplace harmonization and providing support to financial processes by tracking and streamlining IT infrastructure expenditure.	LABOR	Private	19%
			Public	28%
		SOFTWARE	Private	24%
			Public	25%
		SERVER	Private	24%
			Public	42%
		STORAGE	Private	19%
			Public	36%
		NETWORK	Private	17%
			Public	23%
		DATA CENTRE	Private	32%
			Public	28%
		SECURITY	Private	17%
			Public	24%

Table 24 - Business Data from Case Study N°8

BUSINESS CHALLENGE	SOLUTION	COST ENTRY	CLOUD DEPLOYMENT MODEL	ESTIMATED SAVINGS / COST AVOIDANCE
Finding one tool that does multiple jobs at a global scale can be a challenge. A large financial services leader wanted to expand its fixed index annuity (FIA) product globally. It sought a single technology platform that would enable it to scale quickly. Cloud provides	The project allowed the client to expand its FIA product globally while managing it from a single ALIP application based in the United States. The solution includes ALIP software licenses, maintenance and implementation services, managed hosting services, including ALIP infrastructure outsourcing and application	LABOR	Private	20%
			Public	32%
		SOFTWARE	Private	24%
			Public	30%
		SERVER	Private	26%
			Public	47%
		STORAGE	Private	21%

the best basis for this kind of platform, though cybersecurity is a key concern. Accenture's industry experience and existing relationship with the client made them the ideal choice to take on this challenge, by building a secure, cloud-based, end-to-end system using the Accenture Life & Annuity Software (ALIP).	outsourcing, all built on a Microsoft Azure shared infrastructure. ALIP is now the global platform for the client's annuities.		Public	34%
		NETWORK	Private	17%
			Public	27%
		DATA CENTRE	Private	28%
			Public	21%
		SECURITY	Private	16%
			Public	18%

Table 25 -Business Data from Case Study N°9

BUSINESS CHALLENGE	SOLUTION	COST ENTRY	CLOUD DEPLOYMENT MODEL	ESTIMATED SAVINGS / COST AVOIDANCE
Financial services companies can no longer afford to be held back by legacy technology. This large financial institution was using a custom, multi-layered IT architecture which required a lot of processing power and long development cycles. The company was pursuing a new digital strategy involving cloud-based platforms and microservices but needed an agile IT infrastructure to achieve its desired business outcomes. As a trusted partner with DevOps solutions and experience modernizing financial services systems, Accenture was chosen to develop a digital and cloud-native architecture with lower maintenance costs and the flexibility to meet future needs.	To help the client meet its desired outcomes, Accenture proposed a cloud-native IT architecture based on new and agile frameworks. The architecture framework development tools were defined and implemented and the solution delivered using an iterative approach combined with several proposals and demonstrations. The solution includes microservices run on a new PaaS/CaaS platform. The client's system has been evolved from a monolithic set of applications to scalable, dynamic services. With a flexible cloud-native IT architecture, the client's application development cycles will run faster. This will improve time-to-market for new applications by 20 to 40 percent. Hardware and infrastructure costs will also decrease by using the cloud.	LABOR	Private	20%
			Public	30%
		SOFTWARE	Private	25%
			Public	29%
		SERVER	Private	28%
			Public	40%
		STORAGE	Private	18%
			Public	32%
		NETWORK	Private	16%
			Public	19%
		DATA CENTRE	Private	31%
			Public	26%
		SECURITY	Private	15%
			Public	27%

Table 26 - Business Data from Case Study N°10

BUSINESS CHALLENGE	SOLUTION	COST ENTRY	CLOUD DEPLOYMENT MODEL	ESTIMATED SAVINGS / COST AVOIDANCE
The company was seeking ways to accelerate growth and improve margins while retaining its entrepreneurial culture and decentralized, region-based operational structure. Having grown organically and through more than 300 acquisitions in twenty years, the company had many disparate applications in place across its business and lacked capabilities to quickly gain overviews of performance across its 26 regional hubs, and enforce consistent financial processes and controls. The company also recognized that to support its dynamic future growth plans it needed a platform that could easily scale to new requirements while minimizing associated IT costs.	The company turned to Accenture to assess the current landscape of financial systems, processes and resources and help the company select an ERP solution. Oracle ERP Cloud, a cloud-based solution, scored higher than other products and was implemented to: centralize and automate many time-intensive financial processes; standardize processes and accounting controls; provide new insight into regional and local finance costs and processes; establish an ERP platform scalable to the company's future growth.	LABOR	Private	18%
			Public	32%
		SOFTWARE	Private	19%
			Public	28%
		SERVER	Private	26%
			Public	42%
		STORAGE	Private	21%
			Public	34%
		NETWORK	Private	20%
			Public	22%
		DATA CENTRE	Private	34%
			Public	30%
		SECURITY	Private	16%
			Public	22%

Table 27 - Business Data from Case Study N°11

BUSINESS CHALLENGE	SOLUTION	COST ENTRY	CLOUD DEPLOYMENT MODEL	ESTIMATED SAVINGS / COST AVOIDANCE
Facing an increasing claims loss ratio—which could negatively affect its business results—this insurer recognized the need to review its claims handling process. With the goals to reduce insurance claims leakage, improve claims handling	Attracted to Accenture's cloud-based claims data analysis managed service, the insurer engaged the company to identify areas of leakage and improvements in its claims handling process. Leveraging its claims data analysis tool, hosted on Microsoft's Azure cloud	LABOR	Private	17%
			Public	29%
		SOFTWARE	Private	20%
			Public	21%
		SERVER	Private	32%
			Public	37%

productivity and accelerate claims settlement, the insurer sought help in conducting a claims data analysis.	platform, Accenture worked closely with the insurer to conduct a gap analysis. This analysis looked at how each of the insurer's claims was processed and how that may have differed from industry best practices. After the analysis, Accenture recommended key actions for increased efficiency.	STORAGE	Private	18%
			Public	32%
		NETWORK	Private	15%
			Public	19%
		DAT A CENTRE	Private	33%
			Public	29%
		SECURITY	Private	17%
			Public	23%