



UNIVERSITÀ DI PISA

DIPARTIMENTO DI INGEGNERIA DELL'ENERGIA, DEI SISTEMI,  
DEL TERRITORIO E DELLE COSTRUZIONI

RELAZIONE PER IL CONSEGUIMENTO DELLA  
LAUREA MAGISTRALE IN INGEGNERIA GESTIONALE

***CONVERGENT MESSAGING SYSTEM: INTRODUCTION AND FUTURE  
PERSPECTIVES. THE CASE OF VODAFONE GROUP PLC***

**SINTESI**

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Sessione di Laurea del 19/07/2017  
Anno Accademico 2016/2017  
Consultazione NON consentita

## Sommario

Il presente lavoro di tesi è il risultato di un periodo di stage della durata di cinque mesi, presso *ELIS Consulting&Labs*, nell'ambito del programma *Junior Consulting*. Durante il periodo dello stage il candidato, affiancato da altri due laureandi e un team leader, ha collaborato allo sviluppo del programma *Convergent Messaging System*, presso Vodafone Group Plc, sede di Milano. Il programma prevede l'introduzione di un'unica piattaforma convergente, nella quale convergeranno tutti i servizi di messaggistica offerti in tutte le country Europee dove Vodafone opera.

Il progetto nasce dalla necessità di Vodafone di superare alcuni problemi, riscontrati durante il primo anno di esecuzione del programma. In particolare, il candidato si è occupato di valutare l'impatto organizzativo che l'introduzione della piattaforma comporta, nonché di studiare le prospettive future e nuove opportunità per implementare servizi di messaggistica innovativi nella piattaforma convergente. Sono stati individuati gli strumenti che verranno utilizzati da Vodafone per rendere il processo di introduzione più semplice ed è stato ideato un business model innovativo, sulla base dello studio di trend di mercato e tecnologici.

## Abstract

This dissertation shows the results achieved in a 5-month stage, realized for *ELIS Consulting&Labs* as part of the program *Junior Consulting*. During this time frame the candidate with his team supported the development of the *Convergent Messaging System* program at Vodafone Group in Milan. The CMS program foresees the introduction of a unique convergent platform where all the messaging services offered by Vodafone in Europe are going to be deployed.

The project is due to Vodafone need to overcome some problems occurred during the first year of the program. In particular, the candidate was involved in assessing the organizational impact caused by the platform introduction as well as studying future perspectives and opportunity to deploy innovative messaging services in the convergent platform. Therefore, on one hand tools to make the project seamless were developed and on the other an innovative business model for Vodafone resulting from technological and market analyses was identified.

## 1. Project Context

Messaging market has changed lately due to the impact of digitalization. Over-the-Top (OTT) players such as WhatsApp, Facebook, WeChat and so on have launched messaging services providing users with cheap (or even free) alternative to reach out their contacts. Nevertheless, these applications make it possible to send multimedia contents (e.g. pictures, voice messages, documents, etc.) besides text messages and make calls or video calls. In this scenario, Telcos are losing their major role since the SMS is progressively being abandoned by customers. Accordingly, Telcos' revenues from the messaging market are decreasing year by year and it is getting harder to set a profitable business up from it.

When it comes to SMS, the main problem is that it cannot be ceased because at the moment it is the only technology ensuring ubiquity, global interoperability, service assurance, security, privacy management and trust. Indeed, it is the technology used by companies when they have to communicate important information to customers (e.g. two factors authentication). On the other hand, messaging services requires a huge infrastructure causing high Total Cost of Ownership (TCO). Indeed, often the infrastructure is old and the maintenance as well as the management is burdensome. It is clear that Telcos must take action on one hand to run the business using a lean infrastructure chasing efficiency, and on the other to create new services leveraging on their strengths. Vodafone is not an exception; indeed, it has decided to introduce a new centralized platform in order to deploy all the messaging services in an efficient way and, at the same time, to look at the future of messaging and new opportunities in this market.

## 2. Project Scope

Although Vodafone is a group, the messaging services (Voicemail, SMS, RCS and MMS) are deployed separately by each Operating Company (OpCo). Nevertheless, the messaging architecture currently deployed follows a silo approach where every messaging technology has its own infrastructure for the service management. It means that for each country there are different platforms provided by various vendors and specific maintenance teams adopting their own operating model. The current structure leads to:

- Low resource utilization since resources cannot be shared among different platforms
- Low efficiency having multiple vendors and platforms to maintain
- High TCO (Opex and Capex) caused by separated deployment, integration and operations
- Difficult KPI management since there are different services to manage.

In addition, the convergence of messaging technologies towards IP and the key role of web is pushing to see messaging services in a wider way: the exchange of information is related to the delivery and management of different media objects (text, pictures, voice/video recordings, etc.) without dependency on used technology e.g. SMS for text or MMS for pictures.

In order to deal with the issues just shown, in the year 2015 Vodafone Group Plc decided to start a 5-year program called Convergent Messaging System (CMS) which foresees the onboarding of several messaging systems from 12 OpCos on a single platform based on cloud technology. The objective of the program is to deploy the messaging services using only one platform for all the 12 OpCos.

The Group Network Engineering & Delivery (GNE&D) has been entrusted with the Planning, Implementation and Test. Since it is the first time that Vodafone deploys a project of this entity at a group level, the GNE&D has faced some difficulties both on the technical and process management part. The candidate's team helped them out seizing the impact of the project on the organization, understanding which the main business functions and stakeholders involved are and what their needs are, developing useful tools aiming to make the project seamless, designing a formal approval process and assessing the future perspectives regarding the platform.

### 3. Methodological Aspects

In Table 1 it is possible to see the project phases, the activities and methodology as well as the reference chapter of the dissertation and the role played by the candidate (R = directly responsible; C = contributor).

Phase	Activity	Objectives	Methodology	Ch.	Role
Context Analysis	CMS program analysis	Understand the CMS program and the activities carried out during the first year	Internal documentation analysis, meetings and interviews with Vodafone Group management	2	R
	Messaging market analysis	Understand the drivers of the project and how the messaging market has changed over the last years	Web searches, market reports and sector studies analysis	1	R
	Approval process analysis	Define the main steps to achieve the OpCo approval and their scheduling	Internal documentation analysis, meetings as well as interviews with Vodafone Group management, and flowchart to map the process	3	R
	Main stakeholder's identification and stakeholders' needs analysis	Identify the functions involved in the approval process, criticalities and needs	Meetings and interviews with Vodafone Group as well as local management	3	R
Tools Development	Operating model analysis	Map the new operating model, what is changing for the local Operations and the benefits they will get	Meetings and interviews with Vodafone Group Network Operation function, BPMN to map the new operating model, SLA and other internal documentation analysis	4	R
	Platform features analysis	Analyse the features the platform deploys and the benefits the local market will get	Internal documentation analysis, web searches, meetings and interviews with Huawei (vendor) and Vodafone Group management	4	R

	Business cases for VF group for each OpCos	Analyse the costs drivers and define the savings both for the local OpCos and Vodafone Group	Internal documentation analysis, recharge criteria analysis, business case definition both for the local markets and Vodafone Group	4	C
	Security checklist definition	Analyse the platform compliancy with Vodafone Group guidelines and develop checklists to be used for the local markets	Internal documentation analysis, meetings and interviews with Vodafone Group as well as local management	4	C
	Approval process design	Formalize the approval process and develop the second-year plan	Flowchart to map the new process, Gantt to schedule the second-year activities	3	C
Future perspectives analysis	Main technological trends analysis	Analyse which are the technological trends shaping the messaging market and the communication market at large	Web searches, sector studies and consulting company reports analysis	6	R
	Main market trends	Analyse the main trends regarding the messaging landscape	Web searches, sector studies analysis and consulting companies report	1,5	R
	Competitor analysis	Analyse the messaging market offering and the main competitors' strategy	Web searches, CEO's public statements, companies' conferences	5	C
	Business model definition	Redefine Vodafone strategic position in the messaging market	SWOT analysis and Business Model Canvas definition	5	R
	Economic projections	Estimate the economics behind the new business model	Market definition, pricing strategy definition, customer base estimation, revenue forecasting, interviews with digital marketing specialists	5	R

Table 1. Activities carried out

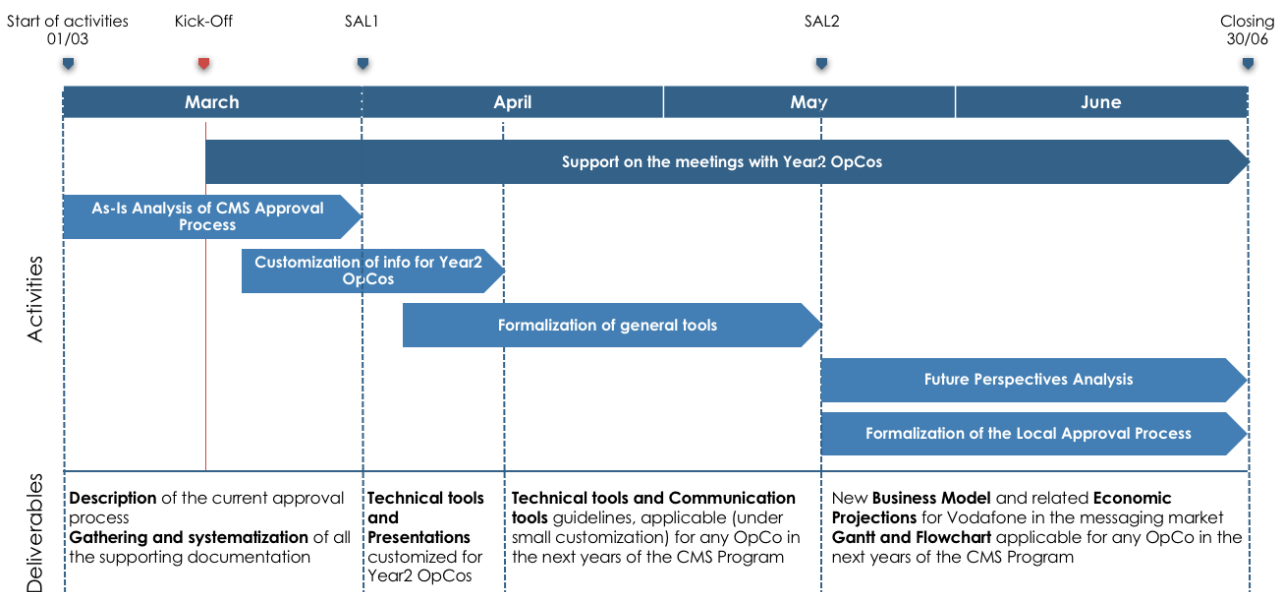


Figure 1. GANTT

## 4. Tools Development

In this §, the criticalities and the tools developed for the GNE&D team are described. The first organizational problem the GNE&D team faced regards the approval process. Indeed, to take the project forward it is needed to receive the formal approval from the OpCos. Therefore, at first several meetings and interviews with Vodafone Group management were accomplished in order to understand and map the approval process. In this way, it was possible to define the main business functions involved and the steps needed to get the approval.

### 4.1 Approval Process

With the kick-off meeting the Head of Messaging at Vodafone Group gives a general comprehension of the CMS program to the CTO as well as the responsible of the following business functions: Finance, Marketing, Operations and Security. After that, individual meetings with each business function must be set up. If in those meetings some problems occur the program will slow down creating delays in the overall roadmap. To get the approval from the OpCo's CTO each business function must agree on it. For this reason, the candidate's team analysed the previous meeting results interviewing the attendees and analysing the related documentation in order to gather each stakeholder's needs (see Table 2).

Stakeholder	Needs
Chief Technology Officer	<ul style="list-style-type: none"> <li>- Have a positive local business case;</li> <li>- Ensure the service quality, sustainability and efficiency.</li> </ul>
Head of Finance Local	<ul style="list-style-type: none"> <li>- Have a positive local business case;</li> <li>- Understand how the yearly recharge is composed and what is the rationale behind it.</li> </ul>
Head of Operations Local	<ul style="list-style-type: none"> <li>- Have access to KPI's, data traffic, and in general check the end-to-end service;</li> <li>- Ensure the service quality, sustainability and efficiency;</li> <li>- Get savings avoiding old infrastructure maintenance.</li> </ul>
Head of Marketing Local	<ul style="list-style-type: none"> <li>- Have the basic features they already have in the local market;</li> <li>- Understand what are the new or interesting features the platform offers and their implementation time.</li> </ul>
Head of Security Local	<ul style="list-style-type: none"> <li>- Compliancy with EU regulation;</li> <li>- Compliancy with local regulation;</li> <li>- Contracts with particular customers (big companies) must not be violated.</li> </ul>

*Table 2. Stakeholders' needs*

Clearly, specific needs to be satisfied could show up and they will be considered separately during the approval process taking suitable actions.

### 4.2 Finance

The main driver of the program is the cost efficiency. Centralization will bring to every OpCo relevant cost savings since the activities needed to implement and maintain the platform as well as the investments required to keep it up-to-date will be deployed once for every OpCo. Furthermore, the budget will be centrally funded. This is attractive for the OpCos because their budget is shrinking year by year and it is getting harder for them to find money for new investments. With This approach, the investments will be

made at a Group level and then the total amount will be charged according to the recharge criterion to each OpCo. This way, it makes it possible to turn CapEx into OpEx from the OpCo standpoint. The team supported the GNE&D in the formalization of the recharge criterion and then developed the business cases both for Vodafone Group and for each OpCo. In Table 3 it is possible to see the savings that will be achieved by Vodafone Group in 5 and 10 years adopting the CMS compared with the AS IS situation. It was also required to detail the business case for each OpCo in order to make them understand the recharge criterion and how the total cost is obtained.

	5 Years	10 Years
Capex Saving	6.667.447 €	12.926.353 €
Opex Saving	9.135.076 €	30.182.143 €
<b>Total Saving</b>	<b>15.802.524 €</b>	<b>43.108.496 €</b>

Table 3. Savings for Vodafone Group

### 4.3 Operations

The CMS is the first centralized platform for Vodafone. It involves the accountability separation from the operational point of view. The Group Data Center (GDC) will be accountable for the infrastructure and virtualization, whereas Group Network Operations (GNO) will take care of CMS application and will be accountable for the service end-to-end. This way, OpCos will lose their control on the platform management. The service quality and sustainability will be guaranteed by a Service Level Agreement (SLA) where the performance as well as the procedures are established. In particular, there are three kind of processes related to the new operating model that the candidate analysed and represented using the BPMN methodology:

- *Incident Management*, it provides a solution to problems happening to the local market;
- *Change Management*, it ensures a standardized method to handle the changes concerning the platform;
- *Problem Management*, it aims to detect root causes in order to provide sustainable final solutions and prevent problem re-occurrence.

Local Operations will be also able to access to two monitoring tool: Infovista and I2000. The former will make them able to see usage logs, basic subscriber configurations, performance graphs and KPIs in order to troubleshoot customer actions and minor misconfigurations for individual customers. Whereas the latter is used to check alarms providing the Local Operations with the possibility to identify platform-wide issues. These two tools will be accessible in read-only mode by the OpCos since they must not change any parameter as established by the new operating model.

Moreover, the CMS will bring efficiency since the infrastructure itself is centralized, high scalability and easy resources allocation since the platform is cloud-based. Centralization will also result in a large maintenance and FTE costs reduction.

#### 4.4 Marketing

The CMS aims to provide the local market with new features besides the basic ones that a messaging platform must have. Whereas the GNE&D analysed the basic features required by the local market in order to formalise the RFQ, they did not analyse what are the innovative features that can be attractive to the OpCos' marketing function. Therefore, the candidate on one hand analysed what the platform's capabilities are, studying Huawei's and Vodafone's documentation and carrying out different meetings both with Huawei and Vodafone management. On the other, he studied both specific OpCo's requests and the main market trends. This way, it was possible to produce a feature list with a description and some use cases.

Although the messaging services have turned into commodities because the offering from different carriers are similar, the market Application-to-Person (A2P) is soaring. In order to monetize from companies, carriers need security features. Indeed, it is needed to avoid phenomena such as *grey route* and *SIM farm* using security features such as SMS firewall and SIM boxes detection. Huawei solution provides companies with open APIs as well as high security standard in order to integrate third party applications with the platform. On the other side, Huawei product offers interesting features to the users as well. Regarding the SMS service the *SMS over IP* is one of the most requested by OpCos. This feature allows carriers to deliver GSM-native message over a LTE network. It is important as part of the transformation that will bring messaging and voice services to the LTE network. Other attractive features regard the Voicemail. The mains are the Visual Voicemail and the Voice2Text. The former allows users to browse the voicemail through a graphical interface making the interaction user friendly, whereas the latter converts voice messages deposited on the VMS into text messages and send them to the recipient.

#### 4.5 Security

Security has been an important topic for the CMS program for several reasons. First of all, messaging services have high security standard since they deliver sensitive customer information. Indeed, it is not enough to respect both Vodafone Security Guidelines and EU regulations because some countries might have tighter laws that must not be violated. Moreover, it has been difficult to accept that customer data will be hosted outside the country since the platform is centralized. The main reason is that some OpCos have got particular contracts with governmental organizations (e.g. police corps). In order to handle these issues the candidate's team studied the platform security requirements in order to produce a checklist. This checklist will be delivered to the OpCos to make them aware of the basic security requirements and ask to add supplementary ones if needed. These cases will be analysed by the GNE&D and the Vendor to find suitable solutions.

#### 5. Future Perspectives Analysis

The CMS embraces evolution since its compatibility with the *Rich Communication Service* (RCS). RCS is a new communication protocol aiming to upgrade SMS to a richer, simpler, and more fluid messaging experience.



RCS brings to text messaging the best features of OTT apps such as real-time chat, high resolution images, one to one or group chats, video calls, IP voice calls, large file transfer, geolocation exchange, content sharing, audio messaging and network based blacklist. In addition, it satisfies the unique operator propositions of ubiquity, global interoperability, service assurance, security, privacy management and trust as a service provider. The RCS protocol is supported by Google that has partnered with GSMA and is trying to gather all the Telcos under his lead to launch on the market a new platform enhancing the SMS capabilities offering companies new possibilities to interact with customers. In light of this, the candidate was asked to analyse the main market and technological trends in order to define a new business model for the Vodafone in the messaging market.

### 5.1 Market and Technological Trends

The analysis conducted outlined precious information about market trends that Telcos should take into account when planning their strategy for the next future. First of all, the *Average Revenue Per Unit (ARPU)* has fallen down over the last decade and this trend is supposed to persist. Moreover, when analysing the projected revenue from the mobile ecosystem it is clear that the market is growing even though the revenue from voice and SMS will drastically shrink. Those two trends outline that the revenues are shifting towards other kind of services.

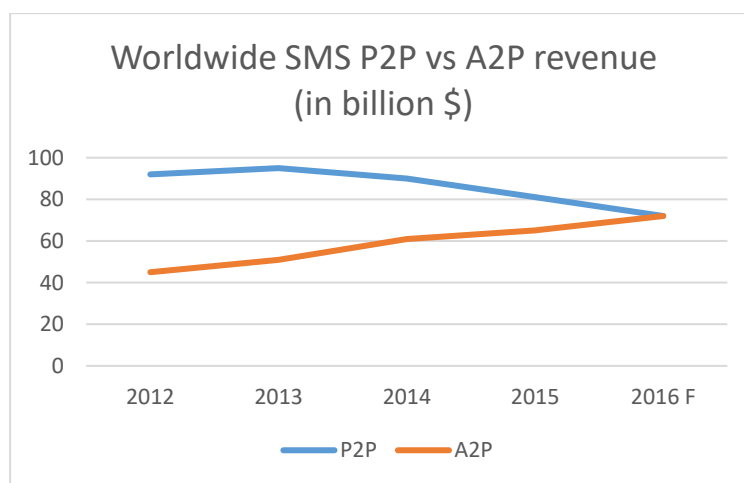


Figure 2. Worldwide P2P vs A2P revenue (Source: Telefonica)

Another important market trend is represented by the fast growth of the revenues coming from the *Application-to-Person* segment, while the revenues related to the *Person-to-Person* segment have plummeted (Figure 2). It is worth mentioning that even though in 2016 revenues from the A2P segment are supposed to catch up the one from the segment P2P, the traffic generated from the former in the same year was nearly a quarter of the latter.

OTTs have a major role on these findings given that they have acquired a huge customer base since their appearance in the messaging market in 2011. The problem with OTTs is that the market is fragmented,

therefore there is not a unique standard. It is a fact that not every user can be easily reached using OTT services. Another fact is that customers are using more and more messaging applications and less other kinds of apps. A shared prediction is that in the future customers will interact with businesses in messaging application rather than in companies' app.

Automatization and artificial intelligence is supposed to be one of the main trends of next 10 years and it enables companies to create personalized customer experience with little effort. In the messaging context, it is already possible to see the use of these technology with chatbots. Moreover, m-commerce is growing year by year and customers are getting used to buy products and services using their smartphones. M-commerce is supposed to made up 45% of the total e-commerce worldwide by the year 2020 equalling 284 billion \$ in sales. Another trend worth mentioning is the rising importance of the voice as means of communication with smartphones.

As regards competitors, other Telcos are joining Google and GSMA in the new platform. Whereas, when it comes to platform competitors i.e. the OTT players, Facebook is already on this market and there are evidences that WhatsApp and Apple are entering as well.

## 5.2 Business Model Generation

The SWOT analysis in Figure 3 is produced from a telecom company standpoint with regard to the messaging market and it is the starting point to design the business model.

<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• A2P market is growing</li> <li>• OTT market is <b>fragmented</b></li> <li>• Telcos are joining Google and GSMA developing the <b>RCS protocol</b></li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>• OTTs are entering on the A2P market</li> <li>• <b>Digitalization</b> is disrupting the telecommunication market</li> </ul>
<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• Telcos are predominant in the <b>A2P market</b></li> <li>• Telcos has a direct access to the <b>customer base</b></li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Telcos need <b>partnerships</b> to compete with OTTs</li> <li>• Telcos need to change their <b>business model</b> to deal with the digitalization</li> </ul>

Figure 3. SWOT Analysis

The business model proposed is a two-sided platform therefore it envisages two customer segments, one subsidizes the other (Figure 4). In this Business Model, Vodafone is supposed to partner with Google since the CMS will be linked with Google RCS called Android Messages. Therefore, Vodafone will have its own

platform interoperable with Google ones. The service will be developed and deployed by Google together with the carriers. Companies that want a richer way to communicate with customers must pay a subscription and the amount of money earned will be distributed to the telecoms according to the customer base. The advantage for Google consists of getting customers' information and preferences. This way, they could offer to companies other services advertising-based. Nonetheless, Google will get a percentage of the total amount of revenue.

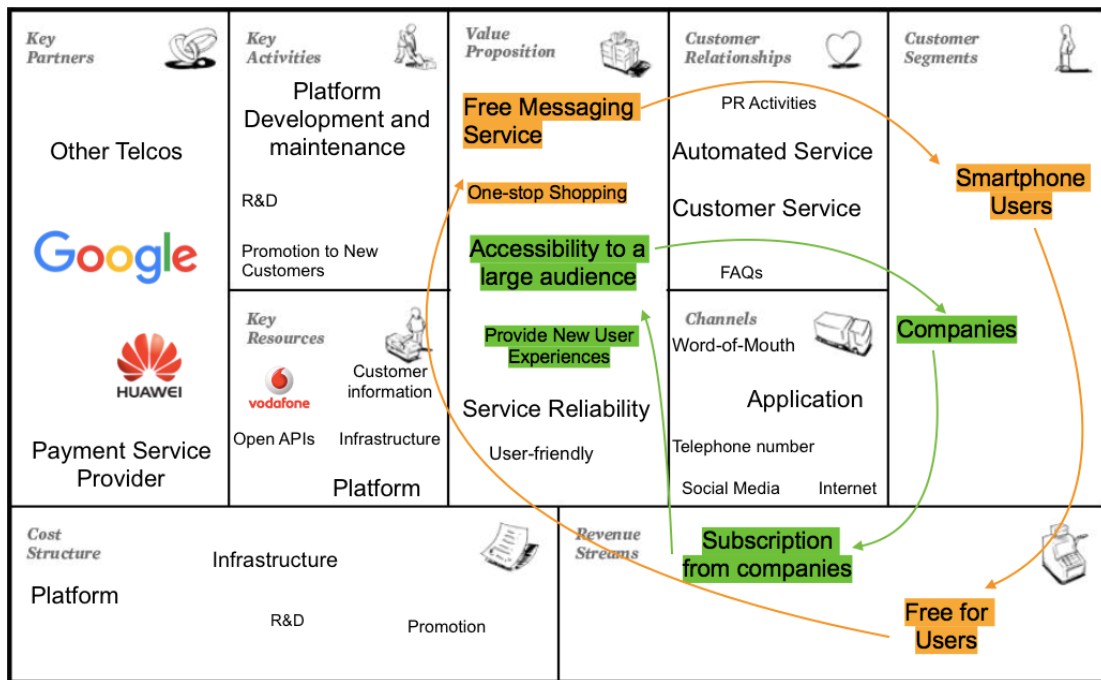


Figure 4. Business Model Canvas

### 5.3 Economic Projections

Companies pay a yearly subscription according to the number of sessions they generate. It is supposed to have three customer segments that are charged according to the Table 4.

Customer Segment	% of the Customer Base	Yearly Subscription
Low number of sessions	80%	Free
Medium/high number of sessions	15%	1.500 \$
Very high number of sessions	5%	15.000 \$

Table 4. Pricing Strategy

The assumptions made as well as the pricing strategy derives from reports analysis, interviews with digital marketing specialists, analysis of Facebook patterns and analysis of the actual Vodafone's revenue from the A2P market. According to the analyses performed the number of subscribers are shown in Table 5.

	2018	2019	2020	2021	2022	2023	2024	2025
Fast Adoption Scenario	37.879	216.064	1.236.732	4.437.590	10.117.706	21.247.183	34.147.258	40.066.116
Slow Adoption Scenario	5.500	28.571	151.515	540.161	1.855.098	6.212.626	12.647.132	24.282.494

Table 5. Number of Android Message Subscription

The *Fast Adoption Scenario* assumes that companies are already used to chatbots therefore the adoption is easier, whereas according to the *Slow Adoption Scenario* it takes time for companies to deploy their own chatbot. The prospected revenues for Vodafone shown in Figure 5 are based on its market share.

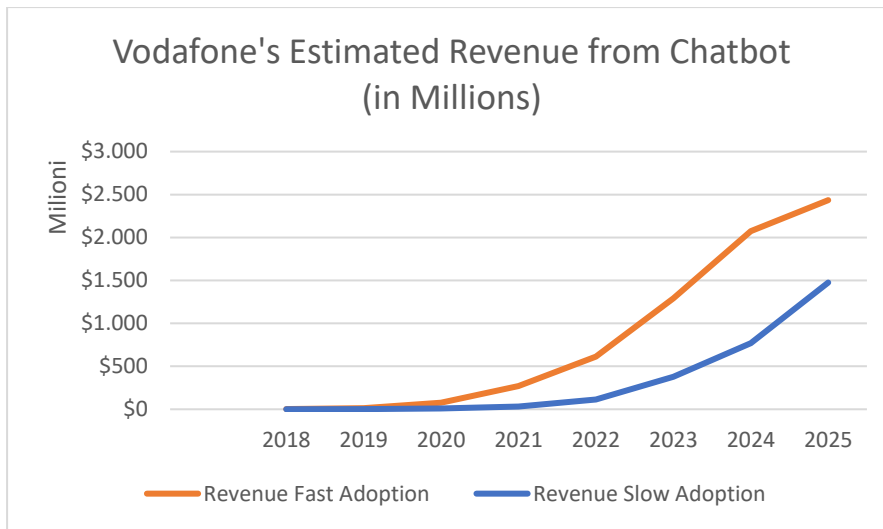


Figure 5. Vodafone's Estimated Revenues from Chatbot

## 6. Conclusions and Future Developments

This dissertation has outlined that digitalization is drastically changing the telecommunication market and it could be dangerous for Telcos to persist with the same services especially in the messaging context. On one hand, they have to make the old services less costly thanks to efficiency. On the other hand, they have to look for new opportunities. RCS can be a possibility for Vodafone since the CMS is open to embed it but the actual costs of this strategy has to be analysed carefully as it evolves further.

Nonetheless, Vodafone is already working to make the messaging services cost efficient deploying the convergent platform. In this work, some tools to be used by GNE&D to make the approval project seamless are described. Some of them have already been tested in the process set up to on board the Ireland. The main criticalities encountered regard the VMS since according to the 5-year roadmap there is only one SMSC to be migrated in the first year. Therefore, it is recommended to keep testing the tools developed and modifying them according to new OpCos' needs that may show up. Nonetheless, as the process is taken forward the approval process can be further studied to acquire best practices. Indeed, it is the first time for Vodafone to deploy a project of this entity at a global level. Yet, it will not be the last time since to make services more efficient and cope with a high competitive market centralization is needed.

## Appendix

The scope of the Appendix is to describe in detail the experience offered by the program *Junior Consulting* provided by *Elis Consulting&Labs*.

I joined the 30<sup>th</sup> edition of Junior Consulting program in February 2017 since I was looking for an internship that would allow me to develop my masters' degree dissertation. I decided to go for Junior Consulting since I would have the opportunity to challenge myself on a real consulting project and yet develop new skills useful form my future professional life. At the end of this experience I can say I have no regret.

The program is divided in two parts: the training and the project. The first part is held in Rome at ELIS headquarter. In this period, I met with my future colleagues and I had the opportunity to develop important skills that prepared me for the second part. In particular, the training part consists of different modules about topics such as Project Management, Team Building, Time and Stress Management, Microsoft Tools, Decision Making, Presentation skills and so on. In my opinion, the skills I learned during the training period are valuable for my professional life because they are complementary to the ones I have been taught during my academic career. Therefore, it advisable to get the most out of this period.



After the training period, I was assigned to a specific project. Therefore, I moved to Milan to work at Vodafone in the main Italian office. The team I worked for consisted of four people. Besides me, there were two other students just like me and a team leader. I am not going to talk of the project since it is widely described in the main part of the summary. Anyway, it is worth to mention that the CMS program was very interesting since it is the first time for Vodafone to deploy a project of this entity at a Global level. Therefore, it was useful to learn how a leading company deals with such challenges on a global scale.

Nonetheless, I had the opportunity to learn from my team members, my team leader and Vodafone employees.

This experience helped me also understand what it means to work in a multicultural environment. Indeed, in this 5 months I had the opportunity to work with people from all Europe and also with the Asian company Huawei. This way, I had the chance to see how cultural differences can affect the project success and how they characterise interaction between people working for the same company and between different companies as well.

