

**UNIVERSITY OF MACEDONIA**  
**DEPARTMENT OF APPLIED INFORMATICS**

**Ph.D. Dissertation**

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**BUSINESS MODEL CHANGE DUE TO ICTs; A RESEARCH ON THE  
TRANSFORMATIONAL EFFECTS OF ICTs INTEGRATION IN HOTELS AND  
THE BUSINESS MODEL EVOLUTION FRAMEWORK**

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Στους γονείς μου

## **Abstract**

This dissertation deals with the Information and Communication Technology advances in the hotels industry and their effect on their business model (BM).

During the last fifteen years, the pace of technological developments in the hospitality industry has exponentially increased, leading hotels to integrate ICTs in the various facets of their daily operations.

From the wide assimilation of in-house technologies to the exploitation of numerous online opportunities, ICTs are dramatically changing the industry's landscape. More than ever before, ICTs enable hotels to compete on a global scale, aiming for both the business and the leisure traveler.

The traditional organizational business model is fundamentally affected, forcing hotels to reformulate their processes, enabling new technological solutions.

Although it is widely accepted that hotels respond to this necessity of ICTs integration, there is insufficient research carried out with regard to the transformation methodology and its effect on the organization's BM. It largely remains a matter of hypothesis, whether hotels follow a specific framework when integrating ICTs and how they manage the BM change process.

This dissertation aims to contribute to this shortfall, by presenting the findings of a research carried out with hotels operating in northern Greece and by introducing a stepwise change methodology, the Business Model Evolution Framework.

Participating hotels of various sizes, classification and technological familiarization, test the validity of the proposed methodology and provide interesting insights in ICTs integration and BM transformation.

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# Table of Contents

<b>Chapter 1. Introduction</b>	<b>1</b>
1.1 Research Motivation and Context	2
1.2 Research Objectives, Questions and Contributions	8
1.3 Research Methodology & Design	12
1.4 Dissertation Structure	17
<b>Chapter 2. Performance Implications of ICTs Integration</b>	<b>21</b>
2.1 The Productivity Paradox	21
2.2 Focusing on Firm-Level Analysis	25
2.3 Impact of ICTs at the Firm Level	26
2.4 Performance Effects of ICT Integration in Hotels	29
2.5 Perceived Benefits of ICT Integration	34
<b>Chapter 3. The Concept of the Business Model</b>	<b>42</b>
3.1 Moving towards a definitional consensus	43
3.2 Business Model Frameworks	51
3.3 Forms of Business Models	63
<b>Chapter 4. Business Model Innovation and Change</b>	<b>66</b>
4.1 The Increasing Value of Business Model Innovation	67
4.2 ICT Induced Business Model Change Frameworks	71
<b>Chapter 5. The Business Model Evolution Framework</b>	<b>97</b>
5.1 Stimulus	99
5.2 Mobilization	101
5.3 Mapping of current BM	102
5.4 Evaluation of missing roles	105

5.5 Design of the new BM	107
5.6 Switch	109
5.7 Manage	111
5.8 Assess	113
5.9 Sequencing the Implementation Stages and the Feedback Loop	115
<b>Chapter 6. Research Methodology</b>	<b>118</b>
6.1 Selecting a Quantitative over a Qualitative Research Methodology	120
6.2 Random Vs Non Random Sampling	121
6.3 Survey Research: Online Questionnaire	123
6.4 Sample Size	126
6.5 Description of Primary Characteristics of the Population	129
6.6 Research Identity	133
6.7 Descriptive Characteristics of Sample Units and Respondents	136
6.7.1 Characteristics of Respondents	136
6.7.2 Characteristics of Hotels	138
<b>Chapter 7. Quantitative Research – Objectives Findings and Results Analysis</b>	<b>146</b>
7.1 The business model evolution framework verification	146
7.2 Sub-elements of the business model evolution framework	158
7.2.1 Factors that would lead hotels to integrate new ICTs in their BM	158
7.2.2 Motivating Stakeholders	160
7.2.3 Business Model Mapping	160
7.2.4 Sources for identifying missing roles	162
7.2.5 Elements of the new Business Model Design	163
7.2.6 Integration of new ICTs & BM switch process	164
7.2.7 Managing and Assessing BM Change	165

7.3 Performance Effects of the Business Model Change due to ICTs integration	166
7.3.1 Effect on Profitability	168
7.3.2 Effect on Market Share Increase	169
7.3.3 Effect on Operational Efficiency	170
7.3.4 Effect on Functional Cost Saving	171
7.3.5 Effect on Time Saving	172
7.3.6 Effect on Employee Productivity	173
7.3.7 Effects of ICT Integration on Operational and Organizational Performance	175
7.3.7.1 The survey instrument	178
7.3.7.2 Statistical analysis	179
7.3.7.3 Results	180
<b>Chapter 8. Conclusions</b>	<b>187</b>
8.1 Research Overview and Findings	187
8.2 Research Contributions	192
8.2.1 Contributions to Theory	193
8.2.2 Contributions to Practice	195
8.3 Limitations and Future Research	198
<b>References</b>	<b>200</b>
<b>Appendices</b>	<b>219</b>
Appendix I	219
Appendix II	220
Appendix III	232

# List of Figures

## Chapter 1

Fig. 1	Total contribution of Travel and Tourism to GDP	4
Fig. 2	Total contribution of Travel and Tourism to Employment	5
Fig. 3	Visitors Exports and International Tourist Arrivals	5
Fig. 4	Capital Investment in Travel and Tourism	6
Fig. 5	Research Design	16
Fig. 6	Dissertation Layout & Objectives of the Study	18

## Chapter 3

Fig. 7	Business Model Definition Framework	46
Fig. 8	Elements of a business model	51
Fig. 9	The Business Model Canvas	54
Fig. 10	Telco's simplified as-is operational business model	56
Fig. 11	The Elements of a Successful Business Model	58
Fig. 12	A Business Model Framework (Shi and Manning)	59
Fig. 13	The Six Components of the Business Model	60
Fig. 14	Elements of Business Model Design	61
Fig. 15	Business Model Definition – The Magic Triangle	62

## **Chapter 4**

Fig. 16 Business Model Innovators Outperform Traditional Innovators Over Time	68
Fig. 17 Venkatraman's Five Levels of IT-Enabled Business Transformation	71
Fig. 18 Poon and Swatman's Internet-to-Internal Applications Systems Integration	72
Fig. 19 Timmers Classification of Internet Business Models	74
Fig. 20 The Evolaris Methodology	78
Fig. 21 Dynamic Business Model framework	80
Fig. 22 The Business Model Life Cycle	82
Fig. 23 Process overview to model BM dynamics	85
Fig. 24 Pateli and Giagli's Scenario-Based Methodology for BM Change	88
Fig. 25 5 phases of the business model design process	90
Fig. 26 The 4I-framework - Phases of the business model innovation process and their key challenges	93

## **Chapter 5**

Fig. 27 The Business Model Evolution Framework	98
Fig. 28 Porter's Five Forces Model	100
Fig. 29 Process overview to model a state of a business model	103
Fig. 30 The Business Model Canvas	104
Fig. 31 Alternative paths to increase the value	105
Fig. 32 Sub-elements of the BM Switch process	110
Fig. 33 The main stages of a change process at operational level in hotel firms	116

## **Chapter 6**

Fig. 34 Star Rating of Population	131
Fig. 35 Gender	136
Fig. 36 Age Group	136
Fig. 37 Level of Education	137
Fig. 38 Level of Technological Familiarization	137
Fig. 39 Professional Capacity	138
Fig. 40 Hotel Rating – Stars	139
Fig. 41 Number of Rooms	139
Fig. 42 Number of Employees	140
Fig. 43 Years of Operation	140
Fig. 44 Seasonal Operation	141
Fig. 45 Location	141
Fig. 46 Level of Central Administration	142
Fig. 47 Hotel Departments	143
Fig. 48 Hotel Elements of Information and Communication Technology	145

## **Chapter 7**

Fig. 49 Integrating ICTs and use of Methodology	146
Fig. 50 The realization of the Need to Integrate New ICTs	148
Fig. 51 Mobilization of Internal Stakeholders and Overcoming Resistance	149
Fig. 52 Mapping of Current Business Model	150
Fig. 53 Evaluation of Missing ICTs and Benefits	151
Fig. 54 Design of new BM with Integrated ICTs	153

Fig. 55 Integration of New ICTs and Transition to the New BM	154
Fig. 56 Managing Change and New Operations Monitoring	155
Fig. 57 Changes Assessment and BM Adjustment	156
Fig. 58 BMEF Sequence Verification	157
Fig. 59 Factors that would lead hotels to integrate new ICTs in their business model	159
Fig. 60 Motivating Stakeholders	160
Fig. 61 Mapping of the Business Model Blocks	161
Fig. 62 Identifying Unexploited ICTs and Missing Benefits	162
Fig. 63 Elements of the New Business Model Design	163
Fig. 64 Elements of ICTs Integration and Switch Process	164
Fig. 65 Managing and Assessing BM Change	165
Fig. 66 Effect on Profitability/Financial Results	168
Fig. 67 Effect on Market Share Increase	169
Fig. 68 Effect on Operational Efficiency	170
Fig. 69 Effect on Operational Costs	171
Fig. 70 Effect on Time Efficiency	172
Fig. 71 Effect on Employee Productivity	173
Fig. 72 BM change due to ICTs integration and performance effects	174
Fig. 73 The operational model	177
Fig. 74 CFA results of hypothesized factor structure	181
Fig. 75 CFA results of single factor structure	181
Fig. 76 The estimated operational model	183

# List of Tables

## Chapter 1

Table 1	Methodologies in IS research	13
---------	------------------------------	----

## Chapter 2

Table 2	Studies of IT in Manufacturing and Services	23
Table 3	Explanations of the Productivity Paradox	24
Table 4	Hotel ICT Components	30
Table 5	Productivity impact of ICT Sophistication	32
Table 6	Cost Related Benefits	35
Table 7	Productivity and Operational Benefits	36
Table 8	Product or Service Improvements and Capabilities	38
Table 9	Suppliers Interaction Benefits	38
Table 10	Customers Relationship Benefits	39
Table 11	Marketing Benefits	40
Table 12	R&D Benefits	40

## Chapter 3

Table 13	Business Model Definitions	47
Table 14	The five basic principles of a business model definition design	48
Table 15	The business model defined	49

Table 16 Osterwalder’s Business Model Design Template: Nine Building Blocks and Their Relationships	53
---	----

Table 17 Basic Forms of Business Models	65
---	----

#### **Chapter 4**

Table 18 Tapscott et al. six steps for b-web strategy design	73
--	----

Table 19 Linder and Cantrell’s Basic Types of Change Models	75
---	----

Table 20 Papakyriakopoulos et al. BM development method	76
---	----

Table 21 Six questions that underlie a business model	81
---	----

Table 22 Typology of BMI – Reconfiguring a Firm’s Activities	83
--	----

Table 23 Santos et al. 2009 Propositions on BMI theory	84
--	----

Table 24 Factors Favoring Scenarios for BM Development	87
--	----

Table 25 Business Model Change: Parameters to consider based on key challenges	94
--	----

Table 26 Business model change methodologies	95
--	----

#### **Chapter 5**

Table 27 Organizational and Finance Design Issues	107
---	-----

Table 28 BM Design Activities, Success Factors and Key Dangers	108
--	-----

Table 29 Adapting and Modifying the Business Model	114
--	-----

## **Chapter 6**

Table 30 Sample Size and Margin of Error in Estimate of P, using SRS, when $P=.5$	127
Table 31 Table for Determining Minimum Returned Sample Size for a Given Population Size for Continuous and Categorical Data	128
Table 32 Hotel Capacity in Greece	129
Table 33 Average Hotel Size	132
Table 34 Allocation of Stayed Room Nights per Administrative Region	132

## **Chapter 7**

Table 35 Mann-Whitney U test results	167
Table 36 Bands of ICT Use	176
Table 37 Means, Standard deviations, Consistency indices, and Correlation coefficients of the constructs used in the study	179

## **Chapter 8**

Table 38 Accomplishments of the Research Objectives	188
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## **List of Abbreviations**

**BM** - Business Model

**BMEF** – Business Model Evolution Framework

**BMI** – Business Model Innovation

**BPR** – Business Process Reengineering

**CAF** – Common Assessment Framework

**CFA** – Confirmatory Factor Analysis

**CFI** – Confirmatory Fit Index

**CEO** – Chief Executive Officer

**CRM** – Customer Relationship Management

**CRS** - central reservation systems

**CVP** - Customer Value Proposition

**FAO** – Food and Agriculture Organisation of the United Nations

**F&B** – Food and Beverage

**GDS** – Global Distribution System

**GFI** – Goodness of Fit Index

**HR** – Human Resources

**ICT** – Information and Communication Technology or Technologies

**LAN** – Local Area Network

**NFI** – Normed Fit Index

**OTA** – Online Travel Agent

**OECD** – Organisation for Economic Co-operation and Development

**PBX** – Private Branch Exchange

**PMS** – Property Management System

**POS** – Point of Sales

**RMSEA** - Root Mean Square Error of Approximation

**SBMO** – Strategic Business Model Ontology

**TQM** – Total Quality Management

**VR** – Virtual Reality

**XML** - Extensible Markup Language

**WTTC** – World Travel and Tourism Council

**Chapter 1.****Introduction**

The evolution of ICTs in the new millennium has significantly altered the business landscape on a worldwide scale.

On an operational level, the World Bank (2006) implies that firms that use ICTs grow faster, invest more, and are more productive and profitable than those that do not. Furthermore, many studies conclude to a positive relationship between ICT use and superior performance (Baldwin & Sabourin, 2002).

On an industry level, ICTs have had a huge impact on service industries with significant positive effects. As a relevant study suggests, ICT is one of the major success factors at the present time, and this particularly holds true in the case of service firms, primarily due to their fundamental characteristics of interactivity and intensity of information, which are highly compatible with this technology (Sapprasert, 2010).

One of the most affected service industries is the hospitality industry and in particular the hotels. With the increasing demand for intensive information from customers and hotel practitioners, hotels have adopted computer-based IT facilities to improve operational efficiency, reduce costs, and enhance service quality (Law & Jogaratnam, 2005).

The positive effects of ICT integration brought up the issue of BM change for a number of hotels that wanted to stay ahead of the competition. The transition to a new, more effective BM is a demanding challenge starting with a sound understanding of the current BM.

However and as discussed by Al-Debei et al. (2008), understanding the BM domain by identifying its meaning, fundamental pillars, and its relevance to other business concepts is by no means complete. Creating a radically new BM is a high-risk strategy, as the probability of getting it right is acknowledged to be low (Kalakota & Robinson, 2001).

Therefore, it is of great interest to study the transformational process and the effects of ICTs integration to the traditional BM, both on a theoretical and on a practical level.

This study attempts a thorough, contemporary analysis of the BM concept and presents the need for a comprehensive framework that entails all elements of the BM transformational process.

Its contribution includes but is not limited to the introduction of the Business Model Evolution Framework (BMEF), a comprehensive stepwise methodology of ICT induced BM change, which is verifiable through the hereby research and could also be potentially applied to other settings and industries.

## **1.1 Research Motivation and Context**

In the twenty years of my theoretical and practical experience in the hospitality industry, I have witnessed the introduction and wide diffusion of new technologies as well as their immense impact on all of its aspects. Recent developments in ICTs have been transforming tourism in myriad ways, with impacts on areas ranging from consumer demand to site management (Buhalis, 2003; Buhalis & Law, 2008).

With an ever-increasing pace, hospitality organizations look for ICT solutions to improve the way they operate, integrating technologies that could facilitate their processes and help them evolve their business model. From the simple computerization of processes to sophisticated property management system (PMS) cloud solutions, businesses are integrating ICTs to boost productivity, cut costs, enhance customer experience, gain competitive advantage and substantially increase their profitability.

Technology also changed the way travelers interact with the industry. The modern traveler can search and book transportation, accommodation and attractions online, easily navigate to a destination and create rich content for others by reviewing each interaction.

The introduction and flourish of internet connected handheld devices, mobile and tablets, gave a completely new set of opportunities to the business and leisure traveler, and challenged hospitality companies to adjust or miss out.

The future looks even more challenging. Virtual reality (VR) is already used in diverse areas including entertainment, design, and simulation training (Guttentag, 2010), followed by the much anticipated augmented reality and its applications in travel and tourism. "We see virtual reality as an innovation that will change the travel business," says Marco Ryan, chief digital officer for Thomas Cook Group, a U.K.-based tour operator that began testing VR content last year to boost sales (Parker, 2015).

It is more than evident that the hospitality sector is “constantly redefining itself and requires continual reorientation in marketing and management along the way” (Egger & Buhalis, 2008).

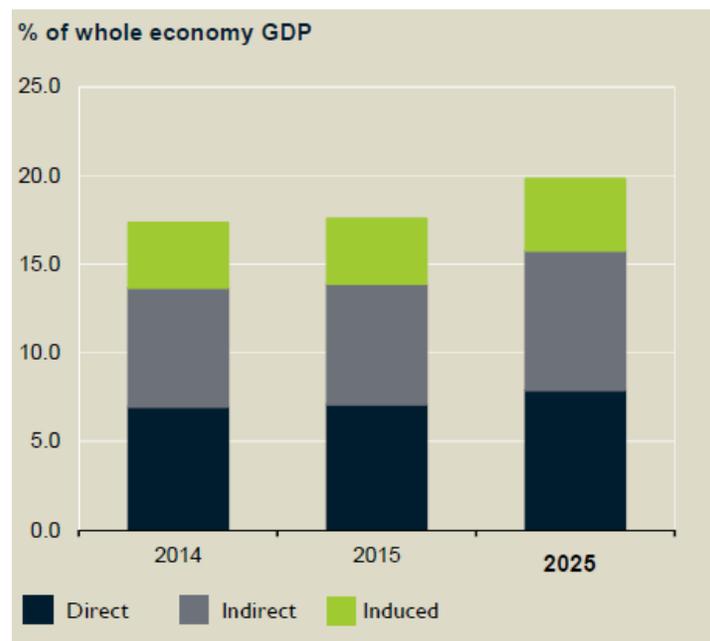
Furthermore, the hospitality industry has an immense significance in terms of economic and social contribution. As per the World Travel & Tourism Council (WTTC) report, the hospitality’s impact on the economic and social development of a country can be enormous; opening it up for business, trade and capital investment, creating jobs and entrepreneurialism for the workforce and protecting heritage and cultural values (WTTC, 2015).

Having identified that the hospitality’s total contribution is much greater than its direct impact, WTTC’s report manages to capture its indirect and induced impacts through its 2015 annual research (Appendix I).

Based on data from 184 countries and 25 regions of the world, WTTC estimates that Travel & Tourism generated US\$7.6 trillion (10% of global GDP) and 277 million jobs (1 in 11 jobs) for the global economy in 2014. Hospitality grows at a faster rate than both the wider economy and other significant sectors such as automotive, financial services and health care. International tourist arrivals also surged, reaching nearly 1.14 billion and

visitor spending more than matched that growth. Visitors from emerging economies now represent a 46% share of these international arrivals (up from 38% in 2000), proving the growth and increased opportunities for travel from those in these new markets (WTTC, 2015).

As per the report's data, this significant trend is reflected on a larger scale on a national level (Greece). In terms of GDP contribution, this climbed to EUR29.4bn (17.3% of GDP) in 2014, and was estimated to increase by 3.2% in 2015, and to rise by 3.7% pa to EUR43.8bn (19.8% of GDP) in 2025 (Figure 1).



*Figure 1: Total contribution of Travel and Tourism to GDP (Source: WTTC – Travel & Tourism Economic Impact 2015 Greece, 2015)*

In terms of employment, the total contribution of Travel & Tourism in 2014, including jobs indirectly supported by the industry, was 19.4% of total employment (700,000 jobs). This was projected to rise by 3.9% in 2015 to 727,000 jobs and rise by 2.7% pa to 951,000 jobs in 2025 (22.2% of total) (Figure 2).

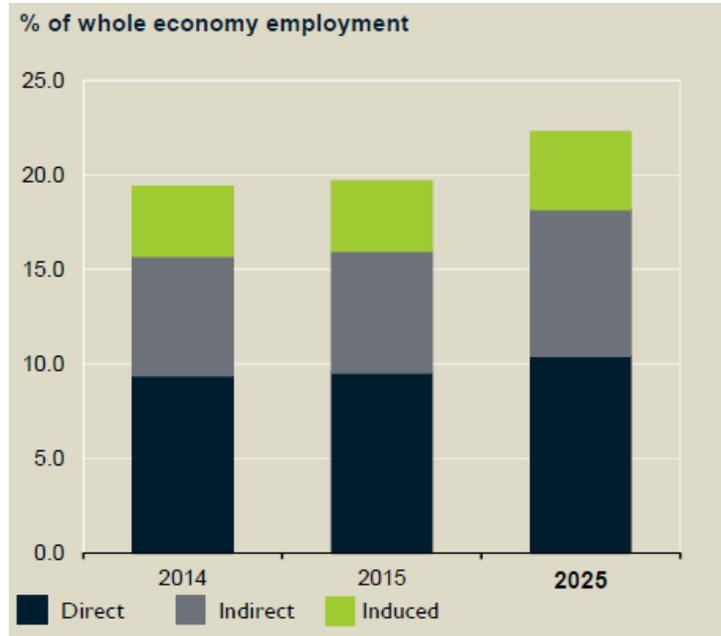


Figure 2: Total contribution of Travel and Tourism to Employment (Source: WTTC – Travel & Tourism Economic Impact 2015 Greece, 2015)

Visitor exports in Greece (money spent by foreign visitors to a country), generated EUR12.2bn (24.5% of total exports) in 2014. This is forecast to grow by 3.0% pa, from 2015-2025, to EUR16.7bn in 2025 (21.4% of total) (Figure 3)



Figure 3: Visitors Exports and International Tourist Arrivals (Source: WTTC – Travel & Tourism Economic Impact 2015 Greece, 2015)

It is estimated that the hospitality sector in Greece, is expected to have attracted capital investment of EUR2.8bn in 2014. It should rise by 4.7% pa over the next ten years to EUR4.4bn in 2025 (14.2% of total).



*Figure 4: Capital Investment in Travel and Tourism (Source: WTTC – Travel & Tourism Economic Impact 2015 Greece, 2015)*

Amid the financial crisis affecting the country, the above estimations and future projections have an increased significance and stand as a motivation alone to further research the topic.

As an additional motivating factor and looking within the hospitality industry, hotels appear to be the most intriguing sector. The nature of the business provides a fertile ground for the development and application of ICTs, allowing hotels to take advantage of the numerous emerging innovations.

Property management and central reservation systems (CRS), customer relationship management (CRM) and point of sales (POS) systems, own websites and online reservations systems, intranets and online travel agents (OTAs) extranets, accounting and human resource management (HR) systems, are only a few examples of hotel ICT applications that altered the processes of the accommodation providers.

As those technologies gained popularity, decreased in cost of purchase and became more accessible, hotels increasingly integrated new solutions, practically transforming to a smaller or larger extent their operation logic.

Not all examples were success stories, as hotels that did not have a sound understanding of their business model, could not foresee the implications of ICTs integration. For example, even though the Internet presented a great opportunity, it was not a guarantee for success and many businesses have failed to utilize their websites effectively and transform them into a competitive advantage (Mihalic et al., 2015).

Hence, the concept of the business model became more critical than ever before especially under the prism of ICTs integration. Consequently, a number of questions emerge. How do hotels integrate new ICTs? Do they simply identify the need or opportunity for a new ICT and integrate it in their operations, or do they follow a specific methodology? How is their business model affected? When a new ICT is integrated, is the BM just modified or radically changed? How do they manage the change process and how do they minimize the risk of failure? What are the implications and results of the business model change due to ICTs?

Although there are a number of studies on business models, there are less research attempts studying the management of change itself. In essence, the existing literature is focused more on the concept of business model as a static representation, rather than the reformulation process due to the integration of ICTs.

The “business model change” topic is an area that needs attention and continuous improvement, especially within the context of hospitality and more specifically hotels, where there is no substantial related research linking the theoretical BM change frameworks with practice. Besides, complementing on the theoretical deficiency and to the best of my knowledge, there is no BM change methodical framework developed for, and tested on hotel organizations.

Consequently, designing BM change frameworks for hotels that can be utilized during ICTs integration is a research opportunity area, with the objective of evolving early theoretical approaches to comprehensive practical solutions.

Motivated by all the aforementioned, this dissertation would attempt to contribute with a new business model evolution framework, that can steer successful ICT induced BM change, through a comprehensive stepwise approach. These logically sequential stages could be followed by hotels that need to reformulate their business model, in their pursuit of enhanced performance and profitability, minimizing the risk of possible failure.

## **1.2 Research Objectives, Questions and Contributions**

Within the context described above, the current research focuses on exploring how hotels can integrate new ICTs, updating their business model with a minimal risk to a more efficient form.

Given the pace of technological advances and the market driven need to adapt, the realization of the hotel's current business model is not adequate by its own to secure the smooth integration of new ICTs. In addition and as Yip (2004) identifies, "all radical (or transformational) strategies are inherently risky as they involve moving from one equilibrium position through disequilibria before arriving at a new equilibrium."

Therefore, attention should be shifted to the management of the BM change, as there are inherent implementation risks that need to be eliminated through standardization of the process. This could be potentially achieved through a comprehensive framework that is coherent with the hotels operating logic and covers all of the essential stages of business model transformation.

Subsequently, the sequential stages until the successful integration of new ICTs and the order of their implementation that will lead to the formulation of an improved BM have an essential role in this study, and the main research challenge is formulated as following:

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*To compose the essential elements into a business model change framework for hotels, that will allow them to incorporate ICTs in their operations, by evolving their business model with a minimum risk, through a standardized sequential and verifiable process, leading to enhanced performance and improved profitability.*

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To accomplish this research target, there is a number of research points that should be examined. These are summarized in the following objectives (see also figure 6):

- Objective 1:** Investigate the performance implications and the perceived benefits of ICTs integration at the firm level and the hotel
- Objective 2:** Analyze the concept of the business model in terms of context and definitions and review the developed theory on contemporary business model frameworks
- Objective 3:** Record the existing BM change methodologies and discuss their typology and limitations
- Objective 4:** Formulate the hypothesis based on the research questions derived from the literature review
- Objective 5:** Develop a theoretical framework for ICT induced business model change in hotels, synthesizing essential change elements and sequencing the process

**Objective 6:** Elaborate on the research findings and establish if the theoretical framework is validated

The successful fulfillment of the research objectives would add to the current theoretical and practical knowledge and provide new grounds for discussion and further analysis.

The theoretical contribution of the study ranges from smaller additions up to the main core of the dissertation, i.e. the development of the “business model evolution framework”.

The literature review reveals that although the business model concept has been adequately studied and represented, there are improvement areas to be considered. More specifically, this thesis adds to the discussion of the term’s definitional consensus by providing a typification of business model definitions.

Furthermore, as the productivity paradox in terms of the contribution of ICTs to productivity is increasingly tackled by academics, the study enforces the argument, especially under the prism of the performance implications in the hospitality industry.

Another consideration emerging from the literature review, is that although there is an increasing number of theoretical approaches on business model change methodologies, there is not an overall overview presenting their attributes and unique elements. This is a side contribution of this study as it attempts a thorough presentation of contemporary ICT induced business model change frameworks.

The main contribution of the thesis however, lies in the design and implementation of the business model evolution framework (BMEF), which is based on critical elements and sub-elements of the business model transformation process, due to the integration of ICT solutions.

This has a high practical value itself as it would enhance the hotels' ability to steer safely through the high risk change process, by implementing each step in a sequence that allows the mobilization of stakeholders, the mapping of the current BM, the evaluation of the missing roles, a BM design effort through scenario planning, the strategy and operational alignment during the BM switch, the monitoring of the new processes and finally the assessment of the final BM configuration.

This work is inspired by BM change frameworks that focus on the management of change; however, it differs from the existing related work in that it covers all of the critical change elements identified in the literature, while suggesting a risk-minimizing specific sequence of actions. Although the framework is constructed with the hotel business in mind, with its validity accordingly verified through research, it allows further testing in other business settings, as its application could be extended in various sectors of the service industry.

### 1.3 Research Methodology and Design

The research method is a strategy of enquiry, which moves from the underlying assumptions to research design, and data collection (Myers, 2009).

Based on the above principal, this paragraph discusses the research design and the methodology adopted to meet the six objectives set earlier in this study. The composition of the business model change framework should be based on the analysis of existing elements, derived from academic sources. This alone however, would not be sufficient to support the research objectives. The research should be expanded outside the academic realm to imprint the current ICT solutions that could be integrated in the hotel's business model.

Furthermore, the hotels' input is considered necessary to verify not only the use of each step of the framework but also the critical factor of the correct sequence of the implementation.

A typical classification of methods is into qualitative and quantitative. As Thomas argues, neither of these methods is intrinsically better than the other; the suitability of which needs to be decided by the context, purpose and nature of the research study in question (Thomas, 2010).

Qualitative data sources include observation and participant observation (fieldwork), interviews and questionnaires, documents and texts, and the researcher's impressions and reactions (Myers, 2009).

Quantitative research makes use of questionnaires, surveys and experiments to gather data that is revised and tabulated in numbers, which allows the data to be characterized by the use of statistical analysis (Hittleman & Simon, 1997).

Moreover, Palvia et al., (2007) outline fourteen types of methodologies in IS research and their definition (Table 1)

*Table 1. Methodologies in IS research (Source: Palvia et al., 2007)*

<b>Methodology</b>	<b>Definition</b>
Speculation/Commentary	Research that derives from thinly supported arguments or opinions with little or no empirical evidence
Frameworks and conceptual model	Research that intends to develop a framework or a conceptual model
Library research	Research that is based mainly on the review of existing literature
Literature analysis	Research that critiques, analyzes, and extends existing literature and attempts to build new groundwork, e.g. it includes meta-analysis
Case study	Study of a single phenomenon (e.g. an application, a technology, a decision) in an organization over a logical time frame
Survey	Research that uses predefined and structured questionnaires to capture data from individuals. Normally, the questionnaires are mailed (now fax, and electronic means are also used)
Field study	Study of single or multiple and related processes/phenomena in single or multiple organizations
Field experiment	Research in organizational setting that manipulates and controls the various experimental variables and subjects
Laboratory experiment	Research in a simulated laboratory environment that manipulates and controls the various experimental variables and subjects
Mathematical model	An analytical (e.g. formulaic, econometric or optimization model) or a descriptive (e.g. simulation) model is developed for the phenomenon under study
Qualitative research	Qualitative research methods are designed to help understand people and the social and cultural contexts which they live. These methods include ethnography, action research, case research, interpretive studies, and examination of documents and texts
Interview	Research in which information is obtained by asking respondents questions directly. The questions may be loosely defined, and the responses may be open-ended
Secondary data	A study that utilizes existing organizational and business data, e.g. financial and accounting reports, archival data, published statistics etc.
Content analysis	A method of analysis in which text (notes are systematically examined by identifying and grouping themes and coding, classifying and developing categories

Speculation/commentary is mainly research based on opinion of others that is not supported by empirical evidence but reflect their knowledge and experience. This research includes limited references of this type as well as the writer's own professional expertise, which point to future developments in ICT solutions and to general technology trends.

The frameworks and conceptual models methodology is highly used in this research as existing BM frameworks as well as elements of BM change frameworks, served as the pool for the composition of the proposed BMEF construct.

Library research is an essential part of the research as it allows the extensive familiarization with the concepts under study and provides the required insight and a thorough understanding of the past research.

Subsequently the literature analysis is also employed as a mean to identify specific points of the grounded theory that can be compared with, criticized and evolved. An extensive library research and analysis is illustrated in the forthcoming chapters of this research, as it provides the necessary knowledge and a stepping-stone towards the achievement of the research objectives.

Although three interviews were conducted in the early stages of the research, they are not included in the dissertation, as they served the purpose of the initial exploration of the theory application to practice.

Similarly, a case study research was conducted by testing the application of theoretical frameworks to organizations, with the objective being limited to the familiarization with the concept and its practical implications in a business context.

As Osterwalder (2004) argues, secondary data is a widespread practice in business disciplines rather than in IS (e.g. in finance where company financial performance data and stock market data are analyzed frequently). This is a method employed in this research, drawing and analyzing significant data from businesses and organizations through the Internet, as well as through relevant published reports.

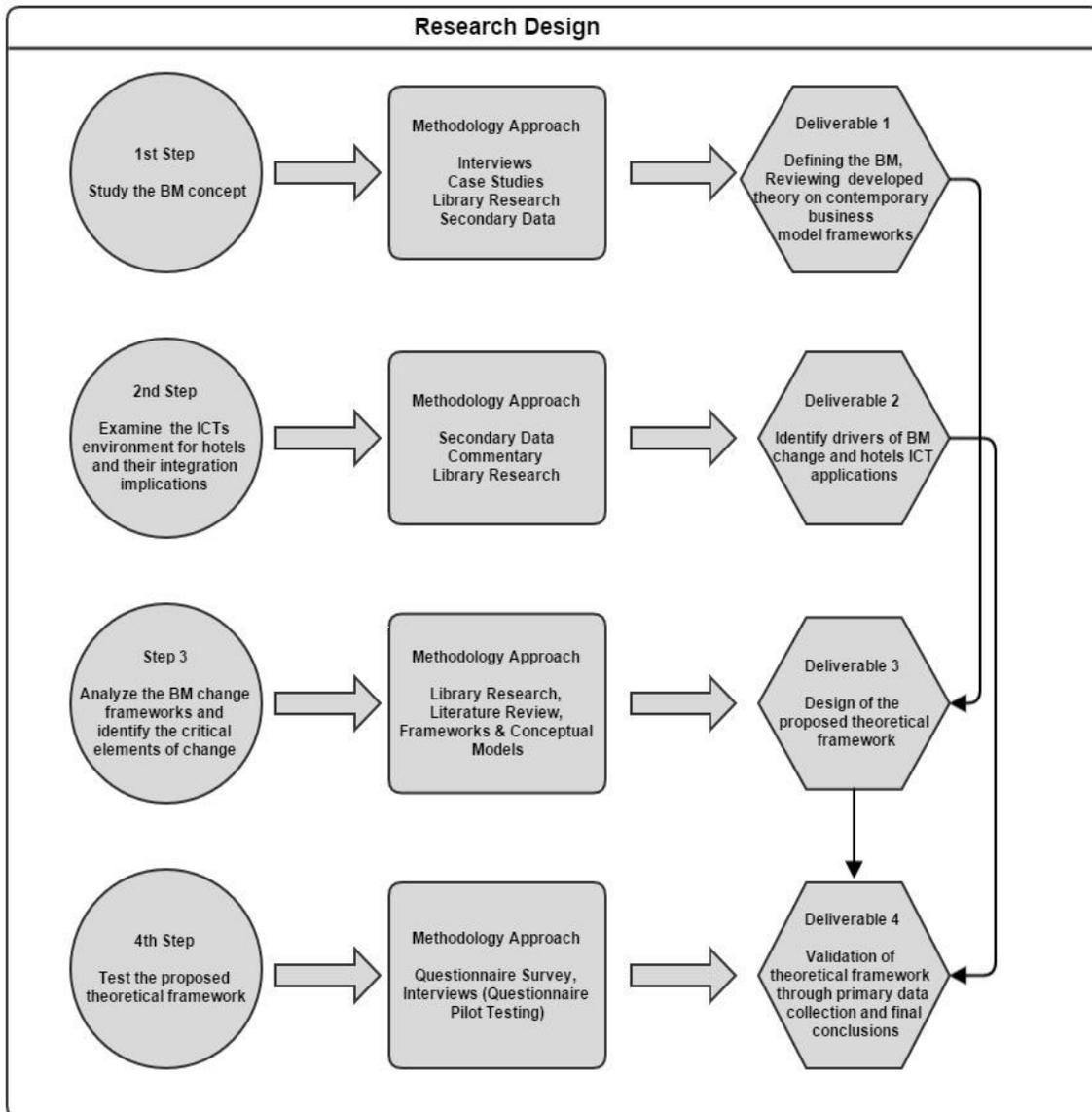
Finally, the survey research is the last methodology type applied in this dissertation's methodology mix, through the form of a questionnaire.

Pinsonneault & Kraemer (1993), suggest that surveys conducted for research purposes have three distinct characteristics regarding the purpose of the survey, the way of collecting information and the size of the sample. First, the purpose of survey is to produce quantitative descriptions of some aspects of the study population. Second, the main way of collecting information is by asking people structured and predefined questions. Third, information is generally collected about only a fraction of the study population--a sample--but it is collected in such a way as to be able to generalize the findings to the population.

In this PhD thesis, the questionnaire survey is the primary tool to collect data and support the research question and objectives. Hotels of various characteristics and classification provide valuable data for further analysis and interpretation. Furthermore, the questionnaire is pilot tested with three of the survey's participants to secure an adequate comprehension.

The research design refers to the overall strategy that is selected to integrate the different components of the study in a coherent and logical way, thereby, ensuring the effective addressing of the research problem; it constitutes the blueprint for the collection, measurement, and analysis of data (De Vaus, 2006).

Figure five exhibits the design structure of the research, showing the methodology selected throughout the process of collecting and analyzing the required data that lead to the formulation, testing and validation of the BMEF theoretical construct. Each step employs a mix of methodologies that produce the desired deliverables that contribute to the accomplishment of the research target.



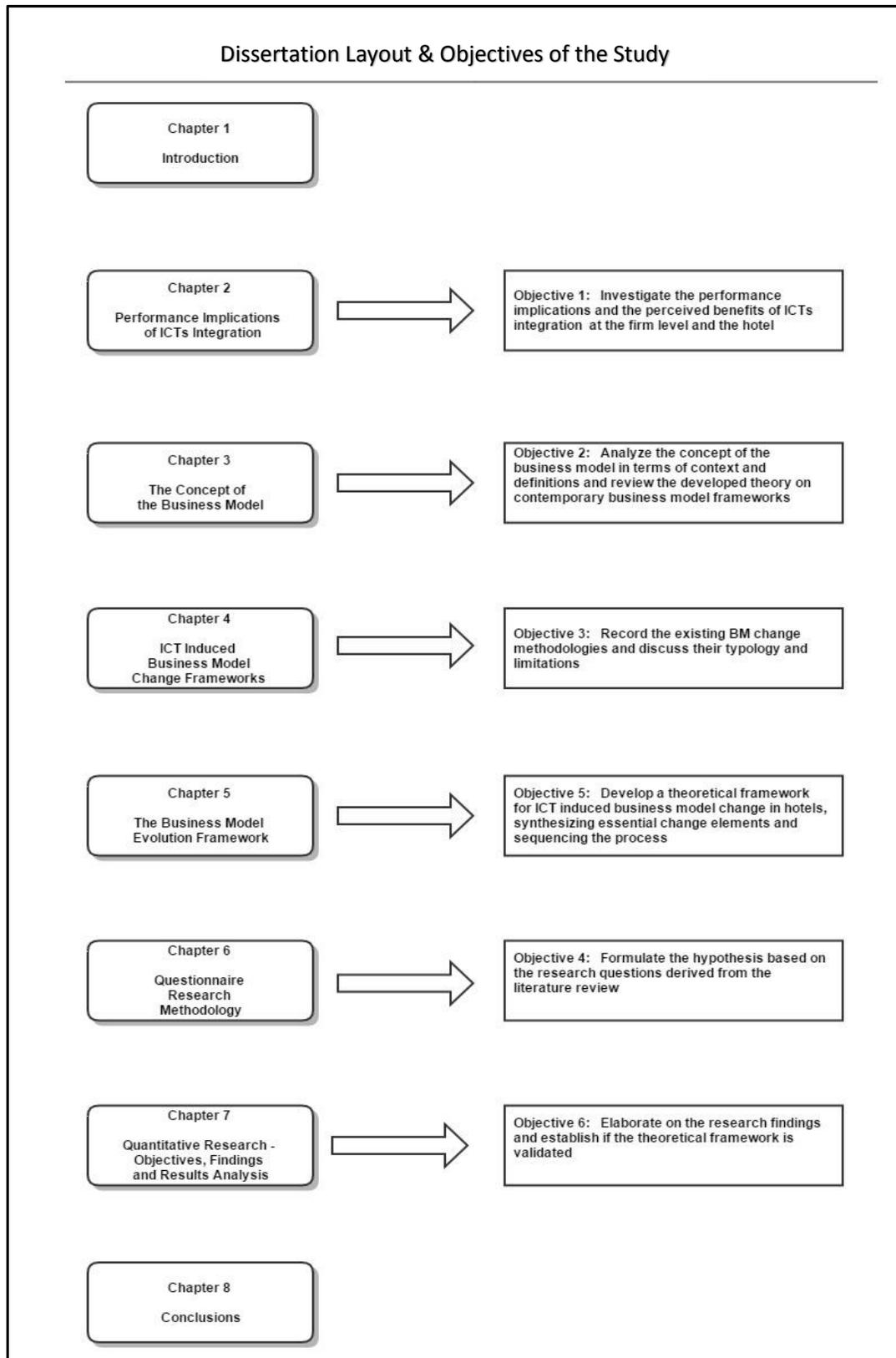
*Figure 5: Research Design*

## 1.4 Dissertation Structure

This PhD thesis is consisted of eight chapters. Every chapter attempts to cover the subject in question thoroughly, contributing to the accomplishment of the research objectives. Figure 6 displays the link between each chapter and the respective objectives.

**Chapter one** introduces the general rational of the dissertation. It is a first attempt to connect ICTs with the concept of the business model in the hospitality sector, and to highlight the importance of a successful BM transformational process. The research motivation and context is explained, with an emphasis on the importance of ICT innovations and on the vast contribution of hospitality in the global, but more significantly in the Greek economy. The research objectives are outlined and the main research challenge is clarified with a concrete statement. The focal point of the chapter is the novelty of the research and its theoretical and practical contribution. Finally, the selected research methodologies are presented with a graphical display of the research design and an overview of the thesis structure.

**Chapter two** investigates the performance implications of ICTs integration. It begins by presenting the basis of the productivity paradox and the reasoning behind its explanation. The limitations of the industry-level analysis are identified and compared to firm-level data, which prove to be more suitable to reflect the relationship between ICT and the performance of the firm. This strong relationship is showcased through a number of studies and further amplified by OECD data, presenting findings in favor of ICT integration and organizational change. This is complemented by relevant research findings in the hotels sector, which is the research environment of this thesis. Finally, in the last section of the chapter and based on respective studies, the anticipated benefits of ICT diffusion are categorized and presented in seven broad categories, highlighting the necessity of ICTs integration in the organization's business model.



*Figure 6. Dissertation Layout & Objectives of the Study*

**Chapter three** introduces the business model concept and identifies the need for a definitional consensus, as the lack of definitional consistency and clarity represents a potential source of confusion and obstructs cumulative research progress. This inconsistency is further analyzed and definitions are classified per context and researcher. To add to the efforts of definitional clarification, a list of most cited definitions is provided along with the suggestion for the adoption of the most comprehensive one. Finally, a review of the contemporary business model frameworks is presented, with an analysis of their BM conceptualizations.

**Chapter four** provides a critical literature review of the ICT induced BM frameworks. The chapter presents the evolution of business model change frameworks, from the first approach of ICT integration to the most contemporary process-transformation frameworks. There is a complete presentation of the grounded theories along with a discussion of their characteristics and inherent limitations. The frameworks are compared to each other and their significant elements are identified and decomposed, to provide the basis for the design of the proposed synthesis, i.e. the Business Model Evolution Framework.

**Chapter five** composes the theoretical construct of this thesis, the Business Model Evolution Framework. Based on the extensive literature review on business models and change frameworks, the BMEF is designed to incorporate all of the essential elements of change, arranged in a sequential order that ensures risk minimization and the efficient transition to a more effective ICT enabled business model. Each step of the process is presented and explained, with the emphasis given on both their significance and their implementation order.

**Chapter six** introduces the research questions and resulting hypotheses, also focusing on the selected research methodology of questionnaires by presenting its grounded theory, description and critical points. The chapter provides the required insight into the questionnaire design and addresses its key issues, elaborating on the quality and on the types of research designs. Further information is provided on the selection of participants, and the followed research protocol. Finally, the questionnaire's variables are presented along with the description of data collection and analysis, followed by descriptive data of the respondents and the sample units.

**Chapter seven** presents the research results in three main parts; the verification of the Business Model Evolution Framework, the delivery of hotel insights with regard to the BMFE's sub-elements, and the presentation of the effects of ICTs integration as perceived by the respondents. Emphasis is given on the validation of the theoretical construct both in terms of selected stages and sequence verification. In addition to the validation of the framework, the research data is analyzed through structural equation modelling, providing a fertile ground for further discussion on the implications of ICTs integration in hotels.

**Chapter eight** summarizes the main research findings along with the drawn conclusions. The research contribution in theory and practiced is further discussed and the thesis concludes with the research limitations and future research directions.

**Chapter 2.****Performance Implications of ICTs Integration**

Like a chain reaction, strategically integrated or not, the diffusion of information and communication technologies in the organization cause a change in its operation processes, triggering further changes in its structure, hierarchy schemes, levels of productivity, cost and labor efficiencies, equally affecting the business relationships with suppliers and customers. In its simplest expression, ICT integration equals an improved organization, thus improved economic figures.

That was the general and sometimes arbitrarily posed hypothesis until 1987, when Robert Solow in his article “We’d better watch out” criticized ICT and its effect on productivity arguing... “You can see the computer age everywhere but in the production statistics”. Solow became the father of the Solow computer paradox, or “the productivity paradox”, which is used to describe the discrepancy between increased investment in ICT and levels of productivity.

**2.1 The productivity paradox**

In his criticism, Solow was troubled about the disproportionate increase in IT spending VS the post 1973 slowdown of the US economy. According to his article, the drastic changes in the productivity methods caused by IT integration seemed to contribute to economic slowdown rather than growth, not only in the U.S. but in other countries as well. There was something wrong with the U.S. manufacturing industry and apparently programmable automation or other IT enhancements were not contributing to the so-called new industry revolution. Quite contrary, Japan and West Germany were overtaking the U.S. industry, transforming the U.S. economy to a service economy.

Solow thought that “We’d better watch out” and he had all the evidence to support his concerns. From 1948 to 1973, multi-factor productivity increased 1.9 percent per year in the U.S., and labor productivity grew at the rate of 2.9 percent; after 1973, these productivity growth rates were 0.2 percent and 1.1 percent. Similar slowdowns have been observed in most of the industrialized economies of the OECD (Triplet, 1999). At the same time, the share of IT equipment in total producer investment in durable equipment in current prices, has more than doubled, from about 17 percent in 1960 to 36 percent in 1992 (Griliches, 1994).

The question now became twofold. Firstly, was there an actual positive relationship between ICT investment and productivity, and secondly if the answer is yes, why did it fail to show in the productivity data? Is there really a productivity paradox or do we possibly miss additional factors that are blurring our view?

Researchers tried to approach the issue through various studies. Brynjolfsson in 1993 gathered and presented the studies of IT in manufacturing and services and presented their findings (Table 2)

Commenting on the presented studies and its findings, Brynjolfsson suggested that “...while a number of the dimensions of the IT productivity paradox have been overstated, the question remains as to whether IT is having the positive impact expected”. To answer these questions, he examined four basic approaches that can be considered adequate explanations for the paradox and are grouped as followed.

1. *Measurement Error*: Outputs (and inputs) of information using industries are not are not being properly measured by conventional methods
2. *Lags*: Time lags in the pay-offs to IT make analysis of current costs versus current benefits misleading
3. *Redistribution*: Information Technology is especially likely to be used in redistributive activities among firms, making it privately beneficial without adding the total output
4. *Mismanagement*: The lack of explicit measures of the value of information make it particularly vulnerable to misallocation and overconsumption by managers

*Table 2. Studies of IT in Manufacturing and Services (Based on Brynjolfsson, 1993)*

<b>Study</b>	<b>Manufacturing (M) / Service (S)</b>	<b>Data Source</b>	<b>Findings</b>
Cron & Sobol, (1983)	S	138 medical supply wholesalers	Bimodal distribution among high IT investors: either very good or very bad
Loveman, (1988)	M	PIMS/MPIT	IT investments added nothing to output
Harris & Katz, (1989)	S	Life office management association information processing database (LOMA)	Weak positive relationship between IT and various performance ratios
Strassman, (1990)	S	Computerworld survey of 38 companies	No correlation between IT ratios and performance measures
Weill, (1990)	M	Interviews and surveys	Contextual variables affect IT performance
Morrison & Berndt, (1990)	M	US Bureau of Economic Analysis (BEA)	IT marginal benefit is 80 cents per dollar invested
Noyelle, (1990)	S	US and French Industry	Severe measurement problems in services
Alpar & Kim, (1990)	S	Federal Reserve Data	Performance estimates sensitive to methodology
Parsons, Gotlieb & Denny, (1990)	S	Internal operating data from 2 large banks	IT coefficient in translog production function small and often negative
Barua, Kriebel & Mukhopadhyay, (1991)	M	PIMS/MPIT	IT improved intermediate outputs, if not necessarily final output
Siegel & Griliches, (1991)	M	Multiple gov't sources	IT using industries tend to be more productive; government data is unreliable
Roach, (1991); Roach, (1989a)	S	Principally BLS, BEA	Vast increase in IT capital per information worker while measured output decreased

Adding to Brynjolfsson's arguments, Triplet (1999) evaluated seven of the most common explanations of the paradox (Table 3).

*Table 3. Explanations of the Productivity Paradox (Triplet, 1999)*

<p><b>1. You don't see computers 'everywhere', in a meaningful economic sense</b> Computers and information processing equipment are a relatively small share of GDP and of the capital stock</p> <p><b>2. You only think you see computers everywhere</b> Government hedonic price indexes for computers fall 'too fast', according to this position and therefore measured real computer output growth is also 'too fast'</p> <p><b>3. You may not see computers everywhere, but in the industrial sectors where you most see them, output is poorly measured</b> Examples are finance and insurance, which are heavy users of information technology and where even the concept of output is poorly specified</p> <p><b>4. Whether or not you see computers everywhere, some of what they do is not counted in economic statistics</b> Examples are consumption on the job, convenience, better user-interface, and so forth.</p> <p><b>5. You don't see computers in the productivity statistics yet, but wait a bit and you will</b> This is the analogy with the diffusion of electricity; the idea that the productivity implications of a new technology are only visible with a long lag</p> <p><b>6. You see computers everywhere but in the productivity statistics because computers are not as productive as you think.</b> Here, there are many anecdotes, such as failed computer design projects, but there are also assertions from computer science that computer and software design has taken a wrong turn.</p> <p><b>7. There is no paradox: some economists are counting innovations and new products on an arithmetic scale when they should count on a logarithmic scale.</b></p>
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Although the research findings did not demonstrate a clear and statistically proven positive relation between ICT capital deepening and productivity figures, researchers have unveiled the paradox by providing a series of comprehensive and valid explanations, concluding that there might not be a paradox after all.

## 2.2 Focusing on firm-level analysis

As Clayton & Crisculolo (2002) have suggested, research work on the impact of ICT integration to the economy has been primarily based on macroeconomic or sector studies using growth accounting approaches. The conclusions are being drawn by relating the ICT inputs to outputs, identifying the differential effect.

However, due to the barriers or ‘explanations’ presented in the previous paragraph, the macroeconomic indicators have failed to reflect the cumulative investment in technological, management, logistical, educational and other improvements aimed at raising efficiency.

In support of this view, Bryonjolfsson & Hitt (2000) argue that macroeconomic measurement approaches fail to capture factors like new products, new services, convenience, timeliness, quality, variety as well as improved business processes and work practices, emphasizing on the advantages of firm level analysis for examining intangible organizational investments (e.g. ICT). Their findings suggest that returns to ICT investment may be substantially higher than what is assumed in traditional growth accounting exercises, as it is difficult to incorporate complementary additional factors into a growth accounting framework. The researchers conclude, “The use of firm-level data has cast a brighter light on the black box of production in the increasingly information-based economy”.

Eustace (2000), suggests that the importance of ICT as a driver of business performance has been well recognized but the processes involved are complex and do not yield readily to analytical methods. According to this view, the inability to directly relate ICT investment to innovation and growth is based on the inability to take into account more complex factors that act as enablers. It is the receptiveness of the entrepreneurial culture than the technology itself that gear the returns of ICT investment. In this sense, high investment in ICT may not only provide a possible competitive advantage but can point in the direction of exploiting unforeseen business opportunities by changing mindsets, organizational flows and work practices sufficiently to bring about real improvements in performance thresholds.

In the 2004 report “The Economic Impact of ICT: Measurement, Evidence and Implications”, OECD concluded that ICT is having substantial impact on economic performance and the success of individual firms, in particular when it is combined with investment in skills, organizational change and innovation. Although the economic benefits of the impacts can be observed in firm-level studies in all OECD countries, they are failing to manifest in aggregate or industry studies. According to the authors, this gap between firm level and aggregate performance may be explained by factors such as aggregation effects, time lags and measurement issues.

The researchers’ views inevitably shift the focus away from the macroeconomic analysis onto a grid of unaccounted factors of a firm-level analysis, that under the influence of ICT investment enable changes in the business processes of the organization, possibly resulting to improved business performance.

### **2.3 Impact of ICTs at the firm level**

Reviewing the studies presented in the 2004 OECD report we find rich evidence on the impact of ICTs at the firm level.

In their work “The effects of ICTs and complementary innovations on Australian productivity growth”, Gretton et al. (2004), use firm-level econometric analysis to show positive and significant relation between ICT use and productivity growth in all industry sectors that were examined.

Analysis from the firm-level data from the Australian Business Longitudinal Study, suggest that although there is an initial productivity boost associated with the uptake of selected ICTs, productivity effects were estimated to diminish over time. This leads to the conclusion that the ultimate productivity effect of a new innovation is initially accelerated, and does not necessarily translate to a permanent increase in the rate of growth.

Hempell, et al., (2004), presented a comparative study between Germany and the Netherlands on ICT, innovation and performance in services. Using broadly comparable panel data for German and Dutch firms in services they show that ICT capital deepening raises productivity and that the productivity improvements are more pronounced when ICT use is combined with a more permanent innovation strategy.

Earlier work on the relationship between performance and technological choice (Baldwin, et al., 1995; Baldwin & Sabourin, 2002) has shown that manufacturing plants that had adopted advanced manufacturing technologies, in particular ICTs, experienced fastest growth in productivity and in market share than those plants that had not managed to incorporate these advanced technologies into their plants. These implications are confirmed in Baldwin & Gellatly 2004 report that investigates the evolution of industrial structure in the Canadian food processing sector and its relationship to technological change, reconfirming that plants that adopted more adaptive technologies enjoyed superior productivity growth.

In “Information Technology, Workplace Organization, Human Capital and Firm Productivity: Evidence for the Swiss Economy”, Arvanitis (2004), is using a cross-section analysis of data for 1382 Swiss firms to show that labor productivity is closely correlated with ICT use. More specifically, the study shows that labor productivity correlates positively with a) ICT indicators measuring the intensity of use of internet and intranet respectively by firms’ employees; b) with variables for new forms of workplace organization such as teamwork, job rotation and decentralization of decision-making; and c) with human capital intensity.

Maliranta & Rouvinen’s (2003) study on ICT and business productivity based on Finnish micro-level evidence, suggest that after controlling for industry and time effects as well as labor and other firm-level characteristics, the additional productivity of ICT-equipped labor ranges from 8% to 18% corresponding to a roughly a 5% to 6% elasticity of ICT capital. The effect is much higher in younger firms as they are optimally designed incorporating ICTs from their birth compared to established firms that probably need to proceed to ICT-complementing organizational changes. Overall, the excess productivity

included by ICT seems to be somewhat higher in services than in manufacturing. Manufacturing firms benefit in particular from ICT-induced efficiency in internal communication (linked to use of LANs) whereas service firms benefit from efficiency in external (Internet) communication.

The researchers of the Office for National Statistics of the United Kingdom, Clayton et al. (2004), brought together evidence from three UK sources, the enterprise e-commerce survey, the annual business inquiry and monthly producer price inquiries over the period 2000-2001. Their findings show that despite the high levels of turbulence and change in electronic markets over that period, electronic network use is associated with productivity gains, while some of them are related to the impact which e-procurement has on market prices. More specifically, adoption of electronic procurement systems by firms is claimed to improve efficiency by cutting internal administration costs and speeding up purchasing processes, by improving price transparency, and by reducing search costs.

In their contribution, Milana & Zeli (2004), studied the role of ICT in Italy by applying data envelopment analysis techniques to firm-level data collected through the annual surveys on the economic accounts of enterprises carried out by the Italian National Statistical Institute. They attempt to measure total factor productivity growth for the period 1996-1999 and examine the impact of ICTs, using micro data of firms. The research results suggested that the slowdown in Italian TFP could have been addressed by more robust investment in ICTs, as the indication is that in all the industries examined, TFP changes are positively affected to increases in ICT intensity. Moreover, the researchers conclude that a substantial portion of the productivity stagnation observed, can be explained by the relatively low accumulation of information and communication technologies.

Atrostic et al. (2004), worked together on a three-country project addressing the impact of ICT in Denmark, Japan and the United States, employing micro data, taking into consideration the underlying differences between the markets and institutional structures. The findings per country are of great interest. For example in the U.S., labor productivity in plants with networks is 5% higher than in plants without networks, if the productivity

measure is based on gross output, and 11% higher if it is based on a value-added measure. In Japan, the findings suggest a strong positive relationship between intra and inter networks and TFP, while in Denmark firms with networks achieved higher growth of value added, particularly after network introduction.

The analysis of firm-level data as shown in OECD and other studies, demonstrate what the respective aggregate studies on an industry level failed to show; the positive relationship between ICT investment and increased productivity for the organization.

Having established the positive relation between ICT integration and productivity, attention should be shifted to the research environment of this dissertation, i.e. the hospitality sector and more specifically hotels.

#### **2.4 Performance effects of ICT integration in hotels**

To facilitate the discussion on the performance effects of ICT integration in hotels, ICT components should be presented and clarified.

Table 4 presents hotel ICT components that are used by individual properties or hotel chains in a smaller or larger extent, along with a short description. These include ICTs that might be enabled in various departments of the hotel, from the front desk and the food and beverage departments, to back of the house, accounting and human resources.

Although positively correlated in the previous paragraph, the discussion of organizational performance in relation with ICTs specifically in hotels is a rather controversial topic. As Sigala et al. (2004) point out, several authors have summarized studies investigating the relationship between ICT and productivity (e.g. Brynjolfsson 1993; Hitt & Brynjolfsson 1996; Lucas 1993). However, the results of those studies are ambiguous as several metrological problems are identified.

*Table 4. Hotel ICT Components*

Hotel ICT Components	Description
PBX phone system – Automatic Wake up service	The Private Branch Exchange (PBX), is a private telephone network used within a company. Employed by hotels for internal and external calls as well as guest automatic wake up service
Check In/Out System	An electronic system that facilitates the guest's arrival and departure procedures. Usually integrated in the hotel's Property Management System (PMS)
Property Management System (PMS)	A comprehensive software application used to manage the operating activities of the hotel, as well as coordinating other functions like front office, sales and planning etc.
OTAs extranets	Online Travel Agencies user interface that allows hotels to supply their room inventory and services through third party websites
Global Distribution System (GDS)	A worldwide computerized reservation network used as a single point of access for reserving airline seats, hotel rooms, rental cars, and other travel related items by travel agents, online reservation sites, and large corporations.
Central Reservation System (CRS)	A tool to reach the global distribution system (GDS) as well as internet distribution systems from one single system. Also referred to as channel manager systems or XML
Front Office Reports and Statistics System	Reports & Statistics generating system, drawing from and delivering data for the front office and the management team
Customer Database System	A record of customers in an electronic database, containing information like personal details, buying habits, last visit, contact information etc. and can be used in services design, personalization and marketing
Housekeeping Management System	A tool to support various housekeeping functions like room status, staff assignment, producing housekeeping reports etc.
Brand.com reservation/Sales Engine	An online reservations/sales engine in the hotel's own website that allows room reservations/sales of services and may facilitate payments
Customer Relationship Management (CRM) System	CRM is a system employed by the hotel to manage and analyze customer interactions and data throughout the customer lifecycle, with the goal of improving business relationships with customers, assisting in customer retention and driving sales growth.
Yield Management System	A software tool that assists the hotel in setting its pricing strategy, by understanding, anticipating and influencing consumer behavior in order to maximize revenue
Brand.com Mobile Application	The hotel's own mobile application, designed to provide a reservation process among other options like checking in & out, accessing special offers, room service, push notifications and messaging

Website/Email	Refers to the hotel's own website (brand.com) and set of corporate email addresses
Inventory Control System	Tool associated with tracking and managing the hotel's inventory in terms of hardware and maintenance
Customer Security System	Electronic systems that guarantee guests' security, via closed circuit television, access control and handling of electronic key cards, automated fire detection systems etc.
Room Energy Control System	Technology that enables the management of room energy consumption via infrared or motion sensing based systems, key card activated systems and programmable digital thermostat technology.
Ordering System (F&B)	It refers to table ordering solutions allowing guests to place their orders via tablets, enhancing efficiency and improving the guests' experience
Restaurant Reservations System	Online system that helps the hotel with the correct management and planning of reservations, minimizing table waste.
Point of Sales System (POS)	Primarily food and beverage (F&B) point of sales tools including electronic cash register systems, touch-screen display, barcode scanners, receipt printers, scales and pole displays
Sales and Procurement Management System	It refers to systems designed for the F&B department to monitor sales of goods and ensure the efficient management of the supply chain
Conference and Banquet Management System	Event management systems assist in streamlining operations, managing and controlling reservations and billing
Wi-Fi / Internet Access	Refers to the ability to connect to the Internet when in hotel, via an Ethernet port or wirelessly
In-room Entertainment System	Technologies that contribute to the guest's experience in terms of room entertainment options like smart TVs, in-room tablets, smartphone docking stations, streaming media devices, light ambience regulators etc.
Business Centre	A working space intended for the guest, usually including an internet enabled computer, printing, faxing and photocopying services
Human Resources Management System	A software that deals with recruiting, payroll, productivity, training and managing personnel

Arguably, there is a group of researchers that report no relationship between ICTs and productivity (e.g. Banker & Kauffman 1988; Byrd & Marshall 1997; Dos Santos et al. 1993; Hitt & Brynjolfsson 1996; Loveman 1994; Mahmood et al. 1998; Strassmann 1990, 1997; Venkatraman & Zaheer 1990; Witt & Witt, 1989; David et al., 1996). At the

same time, others academics support through their work that such a relationship does exist (e.g. Bender 1986; Brynjolfsson 1993; Harris & Katz 1991; Prattipati 1995; Rai et al. 1996; Roach 1991; Ham et al., 2005).

In their work, David et al. (1996), report that hotel managers believe that some applications (e.g., reservation management systems, rooms-management systems) have improved productivity, while others (e.g., vending and entertainment) decreased it.

Using a multivariate, nonparametric technique named Data Envelopment Analysis, Sigala et al. (2004), conclude that the effect of ICT availability only becomes apparent when an integration productivity impact is evident. Their study shows that ICTs have an actual impact only when the exploitation of the network/integration, informational and transformational capabilities are considered. The authors also link the extent of ICTs use with productivity, as the findings reveal that higher PMS and customer database sophistication scores, indicating hotels using PMS and customer database for informational and transformational activities, achieved significantly greater productivity scores than those using ICT for automation only (Table 5)

*Table 5. Sigala et al. – Productivity impact of ICT Sophistication*

PRODUCTIVITY IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) SOPHISTICATION (0.05 LEVEL, TWO-TAILED)											
	<i>p</i> for Oper. + Comb. Efficiency	Market Efficiency <i>t</i> -Tests	Rooms Division			F&B Division			Hotel Property		
			Operational Efficiency	Market Efficiency	Combined Efficiency	Operational Efficiency	Market Efficiency	Combined Efficiency	Operational Efficiency	Market Efficiency	Combined Efficiency
PMS Sophistication	Pearson correlation Significance <i>n</i> = 78	Efficient (51) Inefficient (27) <i>t</i> =	0.17644 0.12226		0.308355 <b>0.006021</b>	0.37099 <b>0.00045</b>		0.45099 <b>0.0096</b>	0.41426 <b>0.00317</b>		0.59277 <b>0.00908</b>
Web site sophistication	Pearson correlation Significance <i>n</i> = 88	Efficient (58) Inefficient (30) <i>t</i> =	0.20771 <b>0.04914</b>	0.155	0.057248 0.596256	0.22761 0.72763	0.871	0.20152 0.05972	0.14410 0.18040	0.762	0.15937 0.13803
E-mail sophistication	Pearson correlation Significance <i>n</i> = 91	Efficient (60) Inefficient (31) <i>t</i> =	0.00860 0.93546	0.281	-0.01138 0.914725	0.16714 0.98291	0.654	-0.0614 0.56296	0.07580 0.47512	0.234	0.10992 0.29964
Intranet sophistication	Pearson correlation Significance <i>n</i> = 30	Efficient (14) Inefficient (16) <i>t</i> =	0.27537 <b>0.04078</b>	0.43	0.168732 0.372752	0.32413 0.64312	0.123	0.11213 0.55522	0.07893 0.67843	0.810	0.27925 0.13506
Customer database sophistication	Pearson correlation Significance <i>n</i> = 72	Efficient (45) Inefficient (27) <i>t</i> =	0.30192 <b>0.00995</b>	<b>0.04*</b>	0.252039 <b>0.032696</b>	0.56488 <b>0.01220</b>	<b>0.04*</b>	0.42458 <b>0.00020</b>	0.24106 <b>0.04135</b>	0.051	0.25946 0.02774

\*Statistically significant differences at 0.05 level.

NOTE: F&B = food and beverage, PMS = property management systems. Numbers in bold indicate efficiency differences that were found to be statistically significant.

Mihalic & Buhalis (2013) adds to Sigala et al. research, following a different methodology. Their CAF model shows that “in traditional economies or in the early ICT implementation stage the ICT paradox does not exist and that ICT has indirect and strong positive potential for firm performance. The ICTs are a complement and enablers of other competitive resources and can no longer be ignored. Failure to employ ICTs can lead to competitive disadvantages as channels to the market will go unexplored, and PR and promotion, service diversity, branding etc. will not reach the potential competitiveness potential, if not properly supported by the ICT.”

In his research with hotels in Kenya in 2014, Victor Onyango Omanyoo studied the relationship between ICT integration and operational performance of hotels. Through a regression analysis, which produces a correlation coefficient of 0.73, he proved that there is a strong positive correlation between ICT integration and operational performance. Additionally he suggested that ICTs ultimately cut costs by enabling the provider to be in direct contact with the consumer. Electronic business offers hotels the opportunity to undertake their business in new and more cost effective ways.

Other researchers have also concluded that the effective use of IT will improve productivity and service quality while impacting value creation for the firm’s customers and for itself in a positive way (Olsen & Connolly, 2000; Greger & Peterson, 2000). Olsen and Connolly in particular, highlight the importance of ICTs by supporting that information and communications technology is the single greatest force effecting change in the hospitality industry.

In their paper, ‘Does ICT adoption enhance hotel performance?’ Sirirak et al. (2011), suggest that ICT adoption has a significant positive relationship with hotel performance, emphasizing that the intensity of ICT usage has a significant, positive relationship with both operational productivity and customer satisfaction.

Adding to that, Bethapudi (2013) also concludes that management within tourism companies use ICTs to undertake a range of tasks that enhance the efficiency of employees in the workplace, notably online reservations.

Salim et al. (2013), also argue that ICT has the potential to change the hotels in improving their productivity at a lower cost and to raise the quality of information.

To further support the argument, in their 2005 work “A study of hotel information technology applications”, Law and Jogaratnam, suggest that hotels have adopted computer-based IT facilities to improve operational efficiency, reduce costs, and enhance service quality. By integrating IT in their operations, hotel managers anticipate increased profit margins and financial returns.

As a conclusion, although there seems to be a fragment of academics that do not see a direct and positive relation between ICTs and hotel performance, the majority of contemporary studies successfully prove the opposite and this especially holds true for the hotels sector. The aforementioned academics provide sufficient data in support of this positive relation and lead to the direction of identifying the anticipated benefits of the integration as described in the following paragraph.

### **2.5 Perceived Benefits of ICT integration**

Information technology has the broad power to reduce the cost of coordination, communications and information processing, enabling firms to increase output quality leading to organizational transformation and higher productivity (Bryonjolfsson & Hitt, 2000). However, the benefits of ICT integration in the organization are not limited to cost savings.

Cost saving as well as other significant benefits, have been recorded by researchers and are presented by category in the following tables. The categories are drafted based on related studies outlined per author, level of analysis and ICT input.

Surely, the first benefits category managers would look on is the cost related benefits category. According to studies on ICTs integration and cost effects on the organization, ICTs can significantly contribute to cost reductions through savings on equipment,

inventory, operations, transactions, communication and coordination, information processing, price of inputs, procurement and labor (Table 6).

*Table 6. Cost Related Benefits*

Authors	Level of Analysis	ICT Input	Cost Related Benefits
Arvanitis, 2004	Firm-level	General ICT, Monitor Technologies	Increased utilization of equipment
Basker, 2011	Store-level data	Electronic procurement and payments, Radio Frequency Identification (RFID)	Improved inventory tracking and management leading to reduced need for buffer inventories and spoilage of perishable goods
Bresnahan, Brynjolfsson & Hitt, 2002	Firm-level data	General ICT	Reduced transaction costs due to elimination of double handling of information
Brynjolfsson & Hitt, 2000	Firm-level data and Case Examples	General ICT, EDI, Internet-based procurement systems, online markets, Internet	Reduced communication coordination and information processing costs
Eustace, 2000	Firm-level	General ICT	Lower customer interaction costs
Hempell & Zwick, 2005	Firm-level	General ICT	Reduced price of inputs due to increasing price transparency
Hollenstein, 2004	Firm-level	General ICT	Reduced direct costs of purchase order and invoice processing
Pilat, 2004	Firm-level	General ICT	Savings on Labor or on some specific labor skills including reduced back office costs. Reduced number of supervisors required in in the production process due to improved monitoring. Lower work in progress costs through improved forecasting
Law & Jogaratnam, 2005	Firm-level	General ICT	Cost savings
Salim et al. 2013	Firm-level	General ICT	Lower productivity cost
Omanyo, 2014	Firm-level	General ICT	Reduced production costs

The findings of the ICTs effect on productivity and operations suggest that there is a strong relation between ICTs integration, productivity and operational benefits. More specifically ICTs have proven to positively affect production time, communication, business processes and work practices, complementary organizational investments, organizational flexibility and efficiency, process innovation, labor, multi factor productivity and total factor productivity figures, decision making and returns to investment (Table 7).

*Table 7 Productivity and Operational Benefits*

Authors	Level of Analysis	ICT Input	Productivity and Operational Benefits
Arvanitis, 2004	Firm-level	General ICT, Monitor Technologies	Reduced production time
Basker, 2011	Store-level data	Electronic procurement and payments, Radio Frequency Identification (RFID)	Improved communication possibilities
Brynjolfsson & Hitt, 2000	Firm-level data and Case Examples	General ICT, EDI, Internet-based procurement systems, online markets, Internet	Improved, faster business processes and work practices
Clayton & Criscuolo, 2002	Firm-level	E-commerce and electronic processes	Enabling complementary organizational investments
Haltiwanger, Jarmin & Schank, 2003	Firm-level	General ICT	Improving organizational flexibility and increasing efficiency, allowing for the exploitation of economies of scale
Hempell, Zwick, 2005	Firm-level	General ICT	Stimulates process innovation
Hernando & Nunez, 2004	Firm-level	General ICT	Increased productivity through employee participation
Hollenstein, 2004	Firm-level	General ICT	Increased output and productivity growth
Matteucci, O'Mahony, Robinson & Zwick, 2005	Industry and Firm-level Data	General ICT	Optimizing the production process, improving internal communication and/or decision-making, reducing costs
Pilat, 2004	Firm-level	General ICT	Increased labor and multi factor productivity, and accelerated total factor productivity growth
Wilson, 2004	Firm-level	General ICT	Increasing returns to investments

Sigala et al, 2004	Firm-level	PMS, Customer Database	Greater productivity
David, Grabski & Kasavana, 1996	Firm-level	ICT Applications, Reservations Management Systems, Rooms Management Systems	Improved productivity
Mihalic & Buhalis, 2013	Firm-level	General ICT	Improved performance, competitive advantage
Omany, 2014	Firm-level	General ICT	Improved performance
Olsen & Connolly, 2000	Firm-level	General ICT	Improved productivity
Greger & Peterson, 2000	Firm-level	General ICT	Improved productivity
Sirirak et al, 2011	Firm-level	General ICT	Enhanced operational productivity
Bethapudi, 2013	Firm-level	General ICT – Online	Efficiency of employees
Salim et al, 2013	Firm-level	General ICT	Improved productivity
Law & Jogarathnam, 2005	Firm-level	General ICT	Improved operational efficiency, increased profit margins and financial results

ICTs also contribute in product or service improvements and enhanced product capabilities through better product development conditions, improved product/service quality, improved timeliness, convenience and product variety, and greater production efficiency (Table 8)

*Table 8 Product or Service Improvements and Capabilities*

Authors	Level of Analysis	ICT Input	Product or Service Improvements and Capabilities Benefits
Arvanitis, 2004	Firm-level	General ICT, Monitor Technologies	Better product development conditions
Bresnahan, Brynjolfsson & Hitt, 2002	Firm-level	General ICT	Improved product quality
Brynjolfsson & Hitt, 2000	Firm-level data and Case Examples	General ICT, EDI, Internet-based procurement systems, online markets, Internet	Timeliness, Convenience, Variety
Hollenstein, 2004	Firm-level	General ICT	Greater Production Efficiency
Olsen & Conolly 2000, Greger & Peterson, 2000	Firm-Level	General ICT	Improved Service Quality

Furthermore, ICT integration introduces important benefits for the organization with its interaction with its suppliers due to reduced cost and elimination of time and other difficulties, ease of access to markets and shorter procurement process and delivery times (Table 9).

*Table 9 Suppliers Interaction Benefits*

Authors	Level of Analysis	ICT Input	173
Brynjolfsson & Hitt, 2000	Firm-level data and Case Examples	General ICT, EDI, Internet-based procurement systems, online markets, Internet	Timeliness, Convenience, Variety
Clayton & Criscuolo, 2002	Firm-level	E-commerce and electronic processes	Reduced cost of access to markets for suppliers
Eustace, 2000	Firm-level	General ICT	Shorter procurement process and delivery times

Customer relationships are also positively affected by the introduction of ICTs. Relative studies have shown that ICTs allow configuration, ordering and technical support capabilities and the design of build-to-order production systems, contributing in improved integration between sales and production planning, improved responsiveness to customers, reduced cost of search for buyers, improved commercial communication and of course time savings to customers (Table 10).

*Table 10 Customers Relationship Benefits*

Authors	Level of Analysis	ICT Input	Customers Relationship Benefits
Brynjolfsson & Hitt, 2000	Firm-level data and Case Examples	General ICT, EDI, Internet-based procurement systems, online markets, Internet	Allowing configuration, ordering and technical support capabilities through the Web
Clayton & Criscuolo, 2002	Firm-level	E-commerce and electronic processes	Build-to-order production systems
Eustace, 2000	Firm-level	General ICT	Improved integration between sales and production planning
Griliches, 1994	Macro-level	General ICT	Improved responsiveness to customers, handling of customer inquiries resulting to improved customer service  Reduced cost of search for buyers  Improved commercial communication  Strengthen customer relationships and improve spend effectiveness by segment of one targeting  Improved communication through declining distances  Time savings for consumers
Sirirak et al, 2010	Firm-level	General ICT	Customer Satisfaction

The organization is also benefited by the introduction of ICTs in terms of its marketing efforts. ICTs enable the organization to achieve a better understanding of the customer's needs and to address them in a more profitable way. The range of customers is increasing giving access to wider markets, reaching new segments and geographies. The effectiveness in promoting new products and services is improved, while automation results to reduced sales and distribution costs (Table 11).

*Table 11 Marketing Benefits*

Authors	Level of Analysis	ICT Input	Marketing Benefits
Clayton & Criscuolo, 2002	Firm-level	E-commerce and electronic processes	Increasing the range of customers and accessing wider markets
Eustace, 2000	Firm-level	General ICT	Reach new user segments and geographies Improved effectiveness in promoting new products and services Reduce sales and distribution costs through automation

Equally important is the effect of ICTs on the organization's research and development. The product development is improved by capturing customer input more effectively, collaborate development across companies and development is enabled. Product innovation is stimulated and accelerates through ICTs integration (Table 12).

*Table 12 R&D Benefits*

Authors	Level of Analysis	ICT Input	R&D Benefits
Clayton & Criscuolo, 2002	Firm-level	E-commerce and electronic processes	Improved product development by capturing customer input more effectively
Eustace, 2000	Firm-level	General ICT	Enables collaborate development across companies and geographies
Hempell & Zwick, 2005	Firm level	General ICT	Stimulates product innovation
Pilat, 2004	Firm level	General ICT	More rapid Innovation

Although the productivity paradox stood like a wall of doubt against the positive effects of ICT on economic figures, further analysis proved the inefficiency of macroeconomic analysis compared to rich firm-level data, which provided a clear perspective of the relationship between ICTs and the performance benefits of their integration.

This chapter presented an overview of the productivity paradox and the reasoning behind its explanation. Firm-level data was qualified over industry analysis to represent the relationship between ICT and organizational performance, and a number of studies were chosen to suggest their positive relation, including the persuasive findings included in the OECD (2004) report.

Finally, in the last section of this chapter and based on relative studies, the anticipated benefits of ICT diffusion are categorized and presented in seven broad categories, as supported by indicative respective studies. Improved productivity and reduced costs, enhanced services and strengthened customer relations, a more efficient supply chain, a better way to engage in research and development and a whole new set of marketing opportunities, could be the driving force for integrating new ICTs in the organization's business model. The integration process though, starts with a sound understanding of the concept of the business model, which is presented and analyzed in the following chapter.

**Chapter 3.****The Business Model Concept**

The term “business model” appeared for the first time in an academic article in 1957 (Bellman et al.) and it was first used in the title of an academic article in 1960 (Jones). It is more widely spread from the 1990’s onwards in an Internet context (Afuah & Tucci, 2001; Osterwalder, 2004), as new internet start-ups with game-changing technologies began challenging conventional bricks-and-mortar industries (Boons and Ludeke-Freund 2013).

The BM term becomes even more popular and is used widely by academics, analysts, businessmen and journalists who interpret it widely and approach it from different angles, leading Rappa (2001) to conclude that it is perhaps the most discussed but least understood aspect on the Web.

The growing popularity of the business model concept is also reflected in academia where there has been as rapid growth in publications addressing business models from a variety of perspectives (Zott et al. 2011). Furthermore and as per Burkhart et al. (2011), since the beginning of this more academic perspective, the number of publications on this topic have been constantly rising and the concept of business models became not only popular in the of e-Business area, but also in the fields of information systems and strategic management research.

More recently, business models have been broadened and discussed in relation to, for example, material efficiency services, innovation in the healthcare sector, mobile (m)-services, small and medium-sized high-tech enterprises, strategy formulation and execution, and the creation and renewal of business in general (Cavalcante et al., 2011).

Still, in the electronic version of the Harvard Business Review, Ovans (2015) quotes Michael Lewis’s realization that the business model phrase is ‘a term of art’; and like an art, it is easier for people to recognize when they see it instead of defining it.

However, the starting point for any discussions on business model change should be based on the understanding of what a business model actually is (Osterwalder & Pigneur, 2010), beginning with the challenging quest for a definitional consensus.

### 3.1 Moving Towards a Definitional Consensus

Although the “business model” as a concept exists for over 50 years, the academic and business community has not reached a commonly agreed definition. In fact, our literature review produced 93 business model definitions, presented from 1985 to 2010 (Appendix A).

Throughout the total population of available definitions, the business model has been referred to as an approach (Brandenburger & Stuart, 1996), a totality (Slywotsky, 1996), an architecture (Timmers, 1998; Dubosson-Torbay et al., 2002), a plan (Venkatraman & Henderson, 1998; Miles et al., 2000), a system (Tapscott et al., 2000; Tikkanen et al., 2005), a description (Chesbrough and Rosenbloom, 2002; Applegate, 2001; Petrovic et al., 2001; Weill & Vitale, 2001; Beinstock et al., 2001; Auer & Follack, 2002; Bowman, 2002; Hawkings, 2003; Ghaziani & Ventresca, 2005; Humel et al., 2010; Moingeon & Legmann, 2010; Osterwalder et al., 2010), an innovation (Hamel, 2000); a statement (Stewart & Zhao, 2000); a logic (Linder & Cantrell, 2000; Baden-Fuller et al., 2008, Casadessus & Ricart, 2010), a focal point (Eriksson & Penker, 2000), a method (Rappa, 2000; Afuah & Tucci, 2001); a blend (Mahadevan, 2000), a concept/conceptualization (Feng et al., 2001; Camponovo & Pigneur, 2003; Hamel, 2007), a set (Winter & Szulanski, 2001; Leem et al., 2004; Seelos & Mair, 2007; Doz & Kosonen, 2010), an abstraction (Betz, 2002; De Reuver, 2009); a model (Chesbrough & Rosenbloom, 2002; Stahler, 2002); a story (Magretta, 2002; Tavlaki & Loukis, 2007), a way (Colvin, 2001; Faber et al., 2003; Rajala and Westerlund, 2005; Voelpel et al., 2005), a framework (Joo, 2002), a collection (Casadesus-Masanell, 2004), a decision (Lecocq et al., 2006), a blueprint (Haaker et al., 2004), a combination (Mitchell & Coles, 2004), a choice (Warnier et al., 2004), a conceptual tool (Osterwalder, 2005), a mean (Kallio et al.,

2006), an explanation (Fiet & Patel, 2008), a pattern (Zott & Amit, 2008), a reflection (Teece, 2009), and a configuration (Santos et al., 2009).

Other than what a business model is, many definitions describe what a business model does. More specifically, a business model may refer to something (Mayo & Brown, 1999; Tapscott, 2001), depict something (Amit & Zott, 2001), define something (Malone et al., 2006; Chesbrough, 2006; Patzelt et al., 2008; Jovarauskiene & Pilinkiene, 2015), outline something (Porter, 1985; Fisker & Rutherford, 2002; Seddon et al., 2004), represent something (Benavent & Verstraete, 2000; Mansfield & Fourie, 2004; Morris et al., 2005; Shafer et al., 2005), determine something (Boulton et al., 2000; Anderson et al., 2006); have a goal (Gordijn et al., 2000), specify something (Elliot, 2002), denote something (Engelhardt, 2004), must account for something (Pateli & Giaglis, 2005) and depict something (Gunzel & Wilker, 2009).

A third category of definitions describe what a business model consists of (Maître and Aladjidi, 1999; Kraemer et al., 2000; Alt & Zimmermann, 2001; Chesbrough, 2003; Hedman & Kalling, 2003; Bely 2005; Rajala & Westerlund, 2007; Mason & Leek, 2008; Johnson et al., 2008; McGrath, 2010).

Shaffer et al. (2005), suggest that this overwhelming definitional variety may be due to emanation from so many different perspectives (i.e., e-business, strategy, technology, and information systems), with the viewpoint of each author driving term definition; by peering through different lenses, authors are seeing different things.

This is also supported by Tavlaki & Loukis (2005), who conclude that the diversity of definitions converge towards the approach that the business model is related to a number of managerial concepts. It captures key components of a business plan, but a business plan deals with a number of additional start-ups and operational issues that transcend the model; it is not a strategy but includes a number of strategy elements; similarly, it is not an activity set, although activity sets support each element of a model.

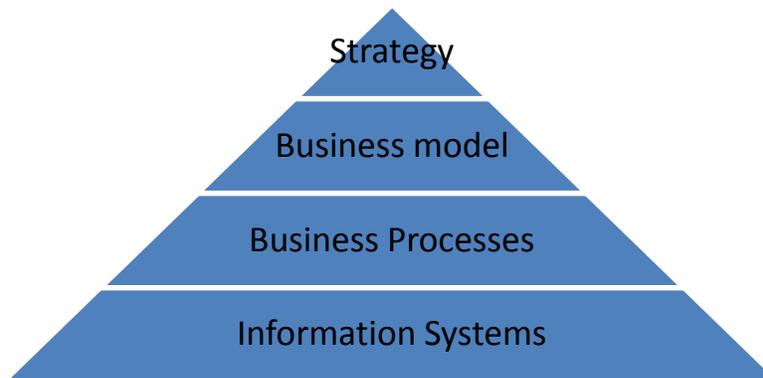
Gunzel & Wilker (2009), argue that some definitions are quite abstract and business network focusing, whilst others are detailed and encompassing of all business functions, mainly due to the fact that the definitions and the attributes of the business model are established according to the business model's intended use.

Addressing the same issue, Morris et al. (2005), identify that the diversity in the available definitions poses substantive challenges for delimiting the nature and components of a model and determining what constitutes a good model. As the authors suggest, this diversity leads to confusion in terminology, as business model, strategy, business concept revenue model and economic model, are used often interchangeably.

Linder & Cantrell (2000), suggest that when people speak about business models they could be speaking about three distinct things: components of business models, real operating business models, and what they consider as change models.

In their contribution towards better understanding of the concept, Pateli & Giaglis (2003), provide an explanatory framework that classifies research into six research sub-domains: definitions, components, taxonomies, representations, change methodologies and evaluation models. In the domain of definitions the authors conclude that some researchers perceive the business model as a purely business concept that explains the logic of making business for a firm (Timmers, 1998; Linder & Cantrell, 2000; Petrovic, 2001; Rappa; 2001), while some others consider it as a link between strategy, business processes, and information systems (Nilsson, 1999; Dubosson-Torbay et. al, 2002).

They identify that the difference between these two interpretations relates to the relationship of business model with the concepts of strategy, business processes, and technology, suggesting that in the first interpretation the three concepts are included in the description of the term, while the second interpretation considers them as inter-linked components set in different levels of the pyramid construct shown in Figure 7 below.



*Figure 7. Business Model Definition Framework (Based on Pateli and Giaglis, 2003)*

Throughout the literature review, many authors identify and address the definitional problem. Petrovic et al. (2001), highlight the necessity to ground the definition of the business model on an established theory, in order to make its application resistant to constant challenges.

Hedman & Kalling (2003), suggest that a theoretical sound definition of the business model would also help the field of IS strategy research.

Arend (2013) adds that the current variation of definitions appears too wide and that without some level of consensus regarding the idea and its drivers and boundaries, it is difficult to make headway on its theoretical value.

As per Pedersen et al. (2016), the challenge is that the term ‘business model’ is a multidimensional construct that cuts across several academic disciplines and functional areas and cannot easily be captured in a single, all-encompassing definition.

It is now more evident and in favor of Zott’s et al. (2010) argument, that the lack of definitional consistency and clarity represents a potential source of confusion, promoting dispersion rather than convergence of perspectives, and obstructing cumulative research progress on business models.

Table 13 includes some of the most frequently cited definitions so as to cover as many aspects of the BM concept (Zarmpou, 2013)

*Table 13. Business Model Definitions (Zarmpou, 2013)*

Definition	Source
<i>“The totality of how a company selects its customers, defines and differentiates its offerings, defines the tasks it will perform itself and those it will outsource, configures its resources, goes to market, creates utility for customers and captures profits</i>	Slywotsky, (1996)
<i>“Definition of a business model: -An architecture for the product, service and information flows, including a description of the various business actors and their roles; and -A description of the potential benefits for the various business actors; and -A description of the sources of revenues”</i>	Timmers, (1998)
<i>“The design of key independent systems that create and sustain a competitive business”</i>	Mayo & Brown, (1999)
<i>“A statement of how a firm will make money and sustain its profit stream over time”</i>	Stewart & Zhao, (2000)
<i>“ A business model is concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets”</i>	Morris et al., (2005)
<i>“We define Business Model as a representation of a firm’s underlying core logic and strategic choices for creating and capturing value within a value network”</i>	Shafer et al., (2005)
<i>“A business model is a conceptual tool containing a set of objects, concepts and their relationships with the objective to express the business logic of a specific firm. Therefore we must consider which concepts and relationships allow a simplified description and representation of what value is provided to customers, how this is done and with which financial consequences”</i>	Osterwalder et al., (2005)
<i>“The business model is an abstract representation of an organization, be it conceptual, textual, and/or graphical, of all core interrelated architectural, co-operational, and financial arrangements designed and developed by an organization presently and in the future, as well as all core products and/or services the organization offers, or will offer, based on these arrangements that are needed to achieve its strategic goals and objectives”</i>	Al-Debei et al., (2008)

In their work “Defining the Business Model in the New World of Digital Business”, (2008), Al-Debei et al. identify the lack of consensus regarding the business model definition and its meaning and provide further clarification using a three step approach.

First, they present a classification of definitions, acknowledging that the term is fuzzy and vague and still in its conceptualization phase, despite its perceived importance.

Second, they propose guidelines on which to develop a more comprehensive definition in order to reach consensus.

Third, they identify the four main business model concepts and values and their interaction, concluding to five basic principles that may lead to a new definition (Table 14).

*Table 14. The five basic principles of a business model definition design. Based on Al Debei et al., 2008*

- 1. The definition should be comprehensive and general*
- 2. It is not sufficient to define the business model only in terms of its components*
- 3. The business model is defined for a single organization*
- 4. The definition should synthesize the different points of view presented in earlier research*
- 5. The definition should incorporate the future element of business planning*

The authors, using a systematic methodology followed by the proposed principles presented above, manage to deduce a well-structured definition that can serve as the basis of definitional consensus of the term business model (Table 15).

Table 15. *The business model defined. Al Debei et al. (2008)*

*The business model is an abstract representation of an organization, be it conceptual, textual, and/or graphical, of all core interrelated architectural, co-operational, and financial arrangements designed and developed by an organization presently and in the future, as well as all core products and/or services the organization offers, or will offer, based on these arrangements that are needed to achieve its strategic goals and objectives.*

In this research, we will adopt Al Debei's et al. definition and suggest that it has a vast contribution towards the most desired definitional consensus, as it encompasses the following characteristics.

**1. It is comprehensive and general.**

The definition includes all of the important value related components; the value architecture, value network and value finance. The organizational resources, capabilities and their configuration are reflected within the value architecture component. The external arrangements that allow the organization to communicate and collaborate within its network in order to be able to offer its products and/or services, are also covered by the value network component. The financial arrangements that are necessary to facilitate the transactions are equally reflected by the value finance component. Finally, by including in the definition all of the organizations offered core products/services, the value proposition is consistently depicted.

**2. It demonstrates the flexibility of the business model representation.**

Any attempt to describe the organization's business model would either be conceptual, textual and/or graphical. The definition displays the necessary flexibility by not being restrictive to a single form of description.

**3. It identifies the location of the business model within the business organization.**

The business model offers an intermediate level of information necessary for the manager, between the process model (which focuses on the processes) and the business strategy (which focuses on the organization's performance compared to the competition). As per Al-Debei et al. (2008), the inclusion of "strategic" in this definition shows that the business model mainly serves the strategic level of different business organizations. This is further supported by Cavalcante (2011) as per the following points:

- Not all processes are equally relevant, only core standard repeated processes –those that are of key importance to the business and performed on a continuous basis;
- It is not necessary to describe the operationalization of the processes in detail (a common practice in methods such as TQM and BPR); and
- In addition to current core processes, non-existing processes also deserve attention, since this is where much of the greatest potential often lies.

**4. It represents the importance and the reasons behind designing and developing the business model.**

In the aforementioned definition, emphasis is given on the kind of arrangements that are necessary to provide the intended value proposition, so that the organization's strategic goals and objectives can be accomplished.

Al Debei's definition of the business model meets the above definitional criteria and provides the grounds on which the discussion around the concept can revolve.

Consequently, the business model concept can serve as a means of communication, for instance by presenting the business idea of prospective founders to different stakeholders, e.g. potential investors (Shi and Manning, 2009).

### 3.2 Business Model Frameworks

A literature review on contemporary BM theory shows that various authors have tried to describe and present the framework of a BM, mainly by decompressing it into separate model components (Hamel, 2000; Petrovic et al, 2001; Weill & Vitale, 2001; Alt & Zimmermann, 2001; Methlie, 2001; Linder & Cantrell, 2000; Gordijn, 2000; Osterwalder, 2004; Hruby, 2006).

In 2004, Professor George Yip of the London Business School presented a clear overview of the elements of a business model. (Figure 8)

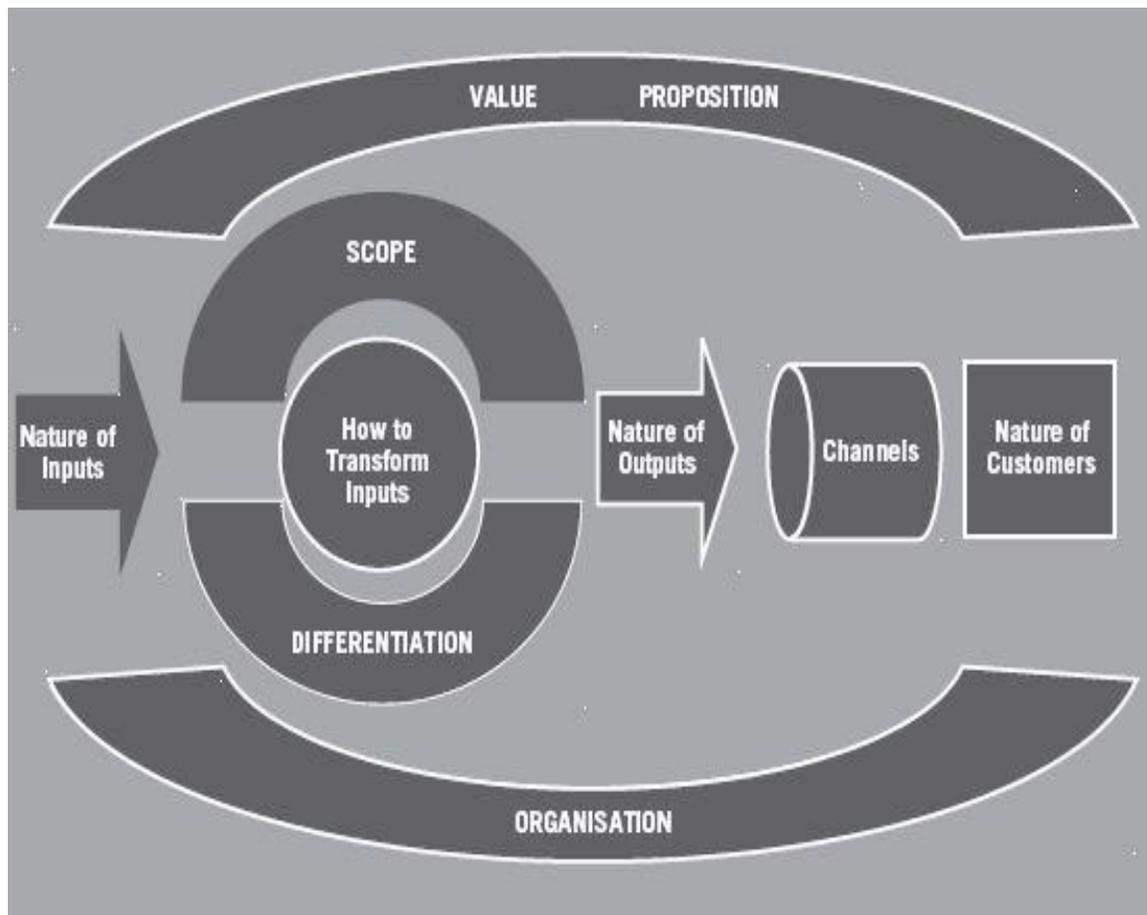


Figure 8. Elements of a business model (Source: Yip, 2004)

Prof. Yip differentiates the business model from strategy by highlighting that a radical (versus a routine) strategy is needed to change a business model which comprises of the following elements:

- Value proposition
- Nature of inputs
- How to transform inputs (including technology)
- Nature of outputs
- Vertical scope
- Horizontal scope
- Geographic scope
- Nature of customers
- How to organize

In the same year, the ontology approach of Osterwalder (2004) integrates all the important elements of a BM and becomes widely accepted as an adequate conceptual representation of the developed theory on BMs (Table 16).

Years later and in their book “Business Model Generation”, Osterwalder and Pigneur (2010), suggest that the business ontology concept can become a shared language that allows the organization to easily describe and manipulate business models to create new strategic alternatives.

They also argue that without such a shared language it is difficult to systematically challenge assumptions about one’s business model and innovate successfully, claiming that the proposed concept has been applied and tested around the world and is already used in organizations such as IBM, Ericsson, Deloitte, the Public Works and Government Services of Canada, and many more.

*Table 16. Osterwalder's Business Model Design Template: Nine Building Blocks and Their Relationships*

<b>Pillar</b>	<b>Building Block of Business Model</b>	<b>Description</b>
Product	Value Proposition	A Value Proposition is an overall view of a company's bundle of products and services that are of value to the customer
Customer Interface	Target Customer	The Target Customer is a segment of customers a company wants to offer value to
	Distribution Channel	A Distribution Channel is a means of getting in touch with the customer
	Relationship	The Relationship describes the kind of link a company establishes between itself and the customer
Infrastructure Management	Value Configuration	The Value Configuration describes the arrangement of activities and resources that are necessary to create value for the customer
	Capability	A Capability is the ability to execute a repeatable pattern of actions that is necessary in order to create value for the customer
	Partnership	A Partnership is a voluntarily initiated cooperative agreement between two or more companies in order to create value for the customer
Financial Aspects	Cost Structure	The Cost Structure is the representation in money of all the means employed in the business model
	Revenue Model	The Revenue Model describes the way a company makes money through a variety of revenue flows

Osterwalder's conceptualization allows the organization to identify and describe its BM. It acts as a photo camera, giving the tool to the company to take a snapshot of its current operations, also serving as a blueprint for a strategy to be implemented through organizational structures, processes and systems.

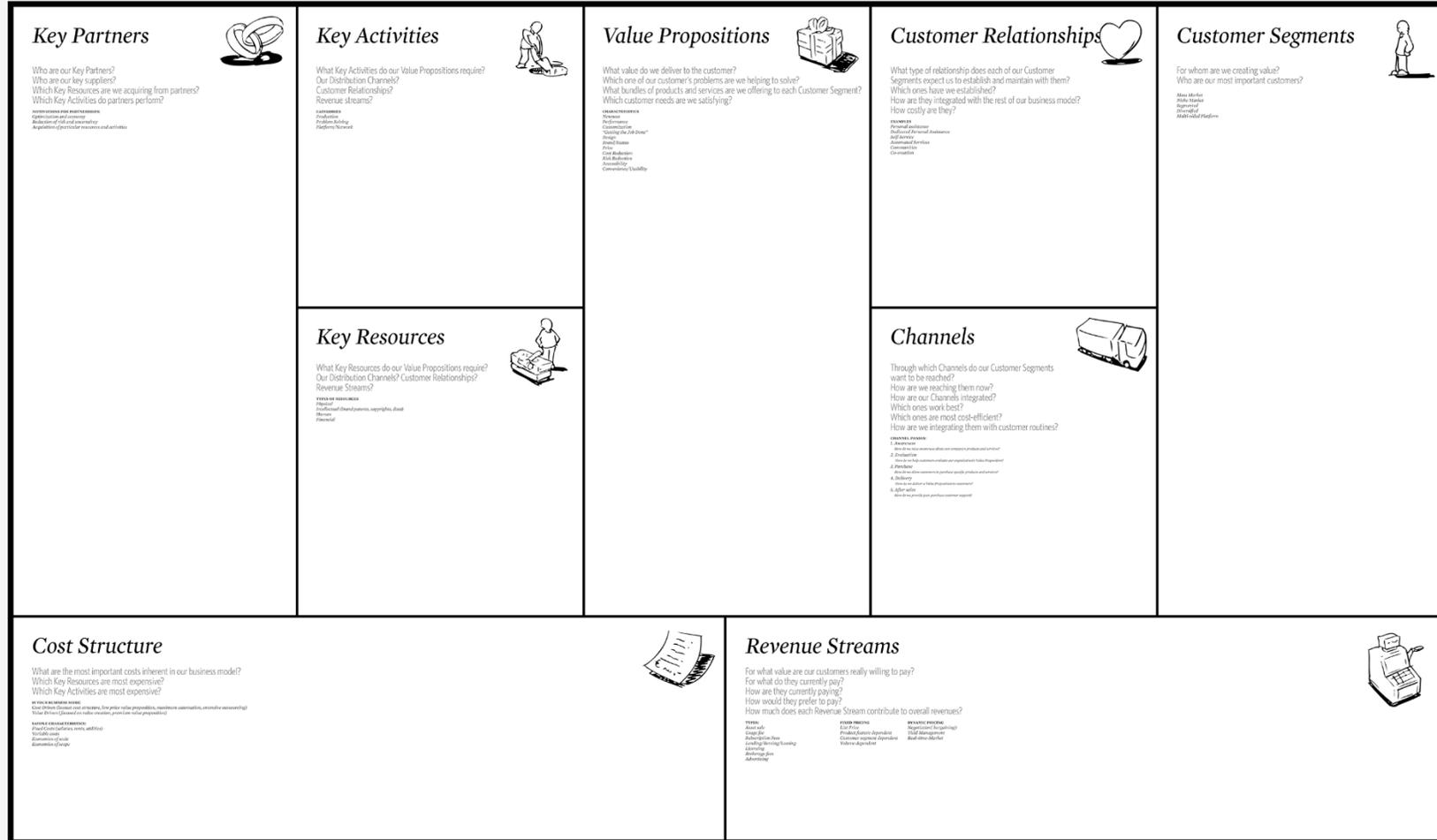
To further enhance the understanding of their proposed visualization, the authors introduced the Business Model Canvas, a tool that can be used to map the business model of the organization and to reflect the components of the four main areas of a business: customers, offer, infrastructure, and financial viability (Figure 9).

# The Business Model Canvas

Designed for:

Designed by:

On: Day Month Year  
Iteration: No.



www.businessmodelgeneration.com

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Figure 9. The Business Model Canvas (Source: www.businessmodelgeneration.com)

Samavi et al., (2008), criticizes previous BM frameworks for not taking into consideration the competitive landscape and critical strategic issues, arguing that an effective business-modeling framework should bring closer the concepts of business model ontology and strategy modeling techniques.

Their strategic business model ontology (SBMO) framework aims to address this gap by extending business model ontology with strategy modeling features and by providing a visual modeling framework with rich semantics that is suitable for describing and analyzing a firm's strategy, business actor's goals, intentions, and motivations, and the exploration of alternate ways of exploiting business mechanisms.

The building blocks of the SBMO ontology are defined by four intuitions:

1. *Network of dependencies*

In SBMO, a business model is seen as a network of dependencies among stakeholders trying to achieve their goals, each with their internal motivations and rationales.

2. *Reasoning*

Capturing and representing the intentions or goals in a BM allows the modeler to explore the motivations and rationales of the participants

3. *Stakeholders' autonomy*

Participants such as customers, partners or channels have freedom for their actions, even if the relationships are bound to an agreement. The modeler in the SBMO, by using goals and methods is able to explicitly define the spaces of possible freedoms.

4. *Strategic reflectivity*

The reflective process of comparing tasks is strategic because participants in a BM want to determine which changes would better serve their strategic interests.

The authors present the main components of SBMO by employing a case study of a telecommunication company (Telco) as depicted in Figure 10.

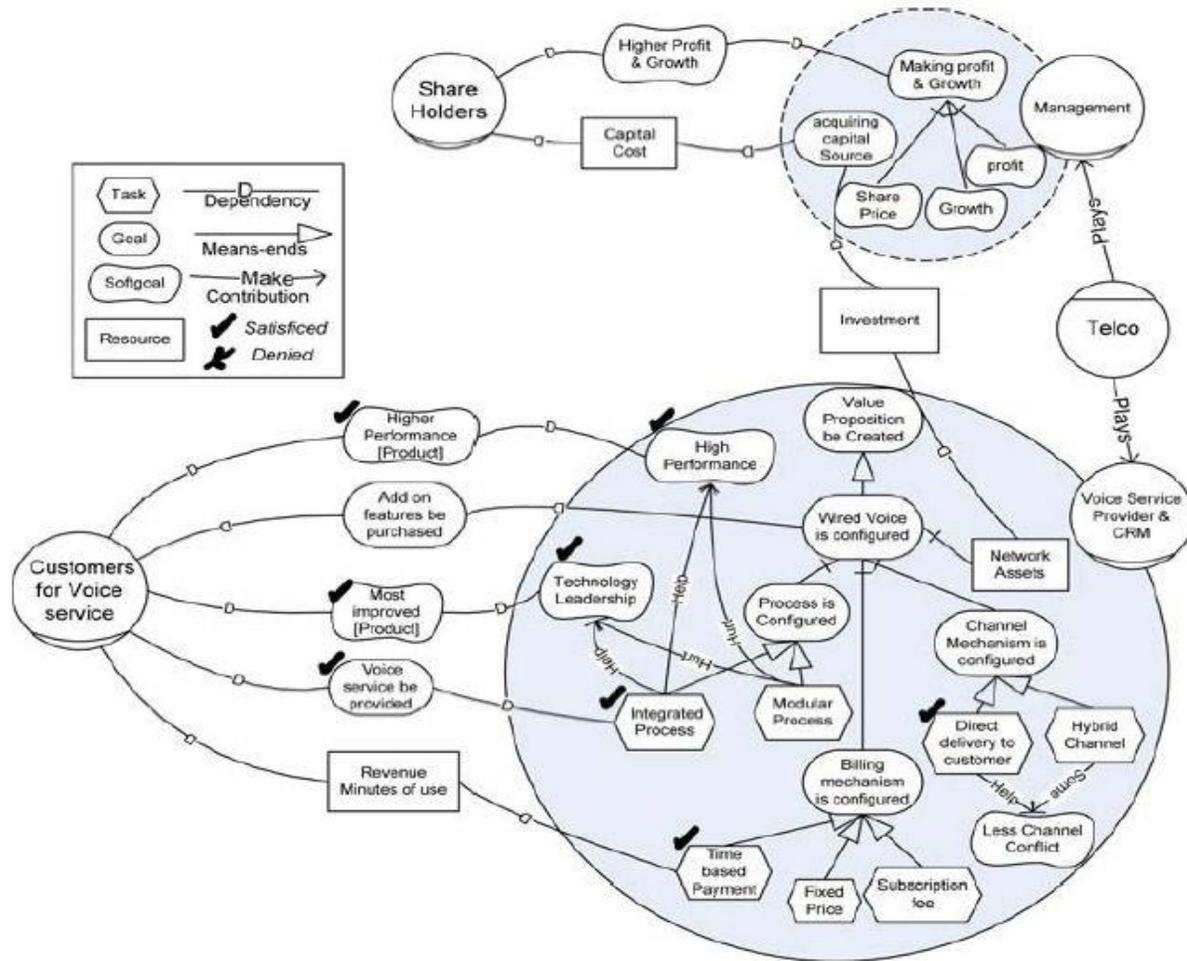


Figure 10: Telco's simplified as-is operational business model (Source: Samavi et al., 2008)

Johnson et al. (2008), provide their own conceptualization that consists of four interlocked elements: The customer value proposition (CVP), the profit formula, the key resources and the key processes (Figure 11).

The CVP is based on the relationship between the customers' need to get a job done (i.e. a fundamental problem in a given situation that needs a solution), and the organization's ability to address this problem with an offering in the most effective way. This creates a value for the customer, which is at its most potent when existing options are not designed with that specific need in mind and the organization finds a way to satisfy that need in the most perfect way, with the lowest possible price. Therefore, creating value is the cornerstone of the organization's success.

The profit formula describes the arrangement of the financial elements that create value for the organization while delivering the CVP to the customer. As outlined by Johnson et al., this consists of the below:

- Revenue model: price x volume
- Cost structure: direct costs, indirect costs, economies of scale.
- Margin model: given the expected volume and cost structure, the contribution needed from each transaction to achieve desired profits.
- Resource velocity: how fast we need to turn over inventory, fixed assets, and other assets—and, overall, how well we need to utilize resources—to support our expected volume and achieve our anticipated profits.

The key resources refer to the key, rather than the generic, elements that are required to deliver the CVP. These include the organization's assets like the people, technology, products, facilities, equipment, channels, etc.

Finally, the key processes refer to recurrent managerial and operational processes that allow the organization to deliver the CVP, such as training, development, manufacturing, budgeting, planning, sales, service, as well as the company's rules, metrics and norms.

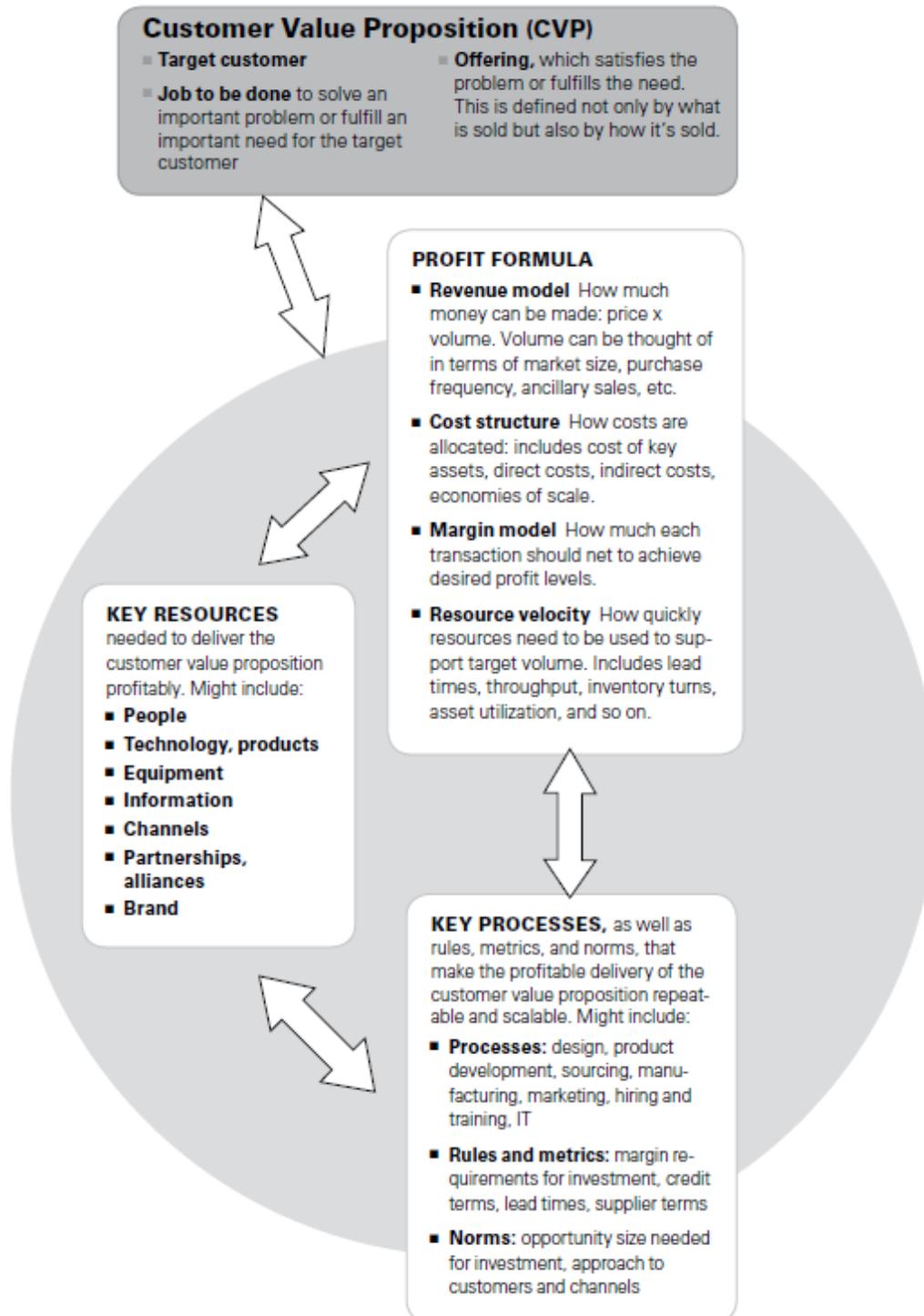
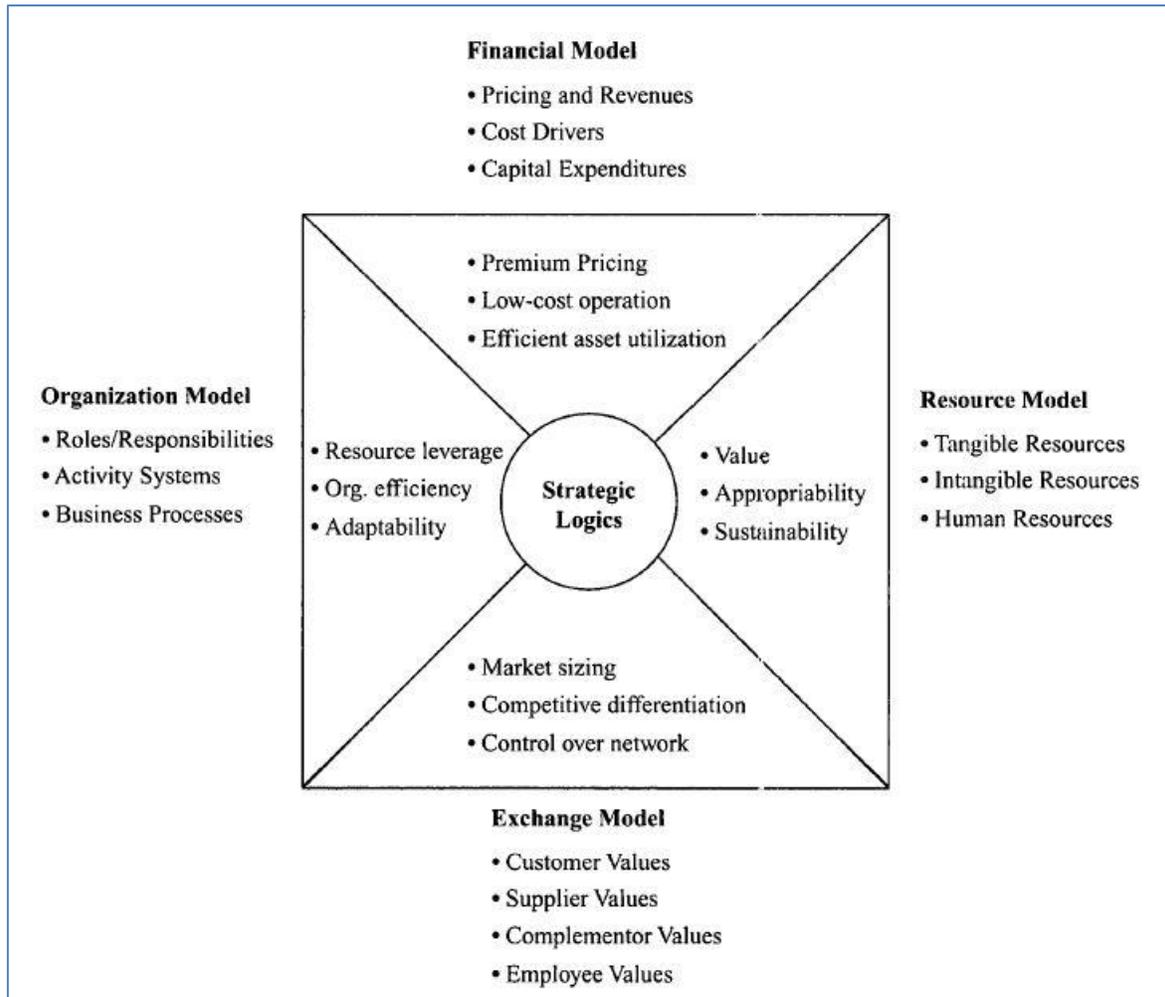


Figure 11. The Elements of a Successful Business Model

Shi & Manning (2009), present a business model framework that offers a comprehensive look of how a firm creates value for its stakeholders, while distinguishing itself from various depictions of a firm's business, such as firm's strategy, enterprise model, business process model, revenue model or financial model (Figure 12).



*Figure 12: A Business Model Framework (Source: Shi & Manning, 2009)*

As the authors suggest, their business model framework addresses the interests of the key stakeholders of a business. It describes how the business works internally and externally with the key stakeholders. It depicts what resource base the business has that enables it to work and it defines the business's objectives in a set of functions that tie together the stakeholders' interests, the interest realization systems, and their enabling resource base.

In a Boston Consulting Group publication, Lindgardt et al. (2009), depict the two essential elements of business models; the value proposition and the operating model (Figure 13).

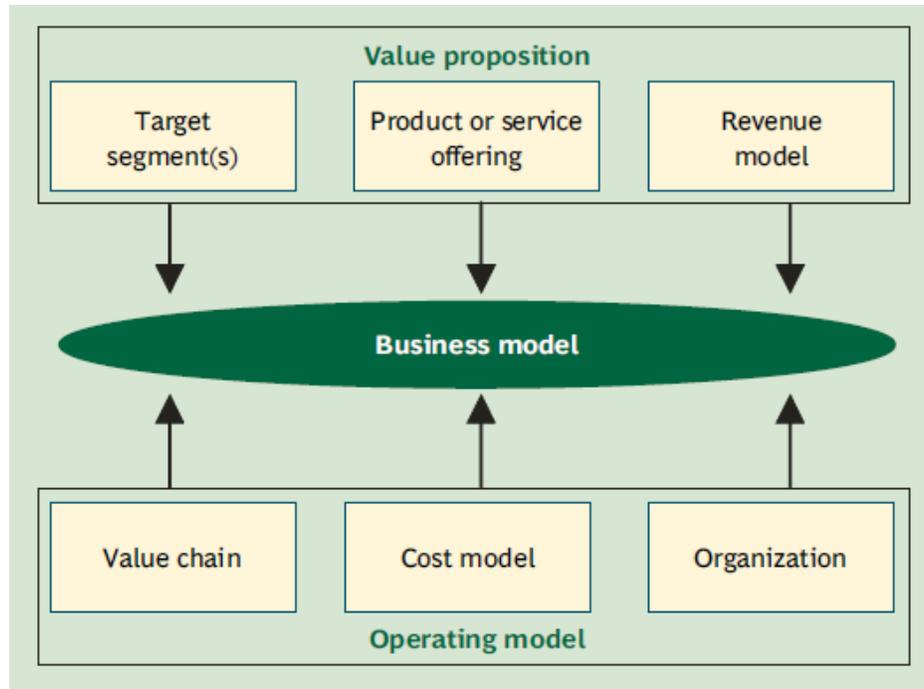


Figure 13. The Six Components of the Business Model (Source: Lindgardt et al., 2009)

Each element is consisted of three sub elements with the value proposition consisting of the target segments, the product/service offering and the revenue model, while the operational model includes the value chain, the cost model and the organization. Lindgardt et al. provide further descriptions per element as per below:

- Target Segment(s). Which customers do we choose to serve? Which of their needs to we seek to address?
- Product or Service Offerings. What are we offering the customers to satisfy their needs?
- Revenue Model. How are we compensated for our offerings?
- Value Chain: How are we configured to deliver on customer demand? What do we do in-house? What do we outsource?

- Cost Model. How do we configure our assets and costs to deliver on our value proposition profitably?
- Organization. How do we deploy and develop our people to sustain and enhance our competitive advantage?

Teece (2010) emphasizes on the value creation for the customers through a circular representation of the business model concept (Figure 14), that it contains implicit assumptions about customers, the behavior of revenues and costs, the changing nature of user needs, and likely competitor responses. In essence, ‘it outlines the business logic required to earn a profit (if one is available to be earned) and, once adopted, defines the way the enterprise ‘goes to market’ (Teece, 2010).

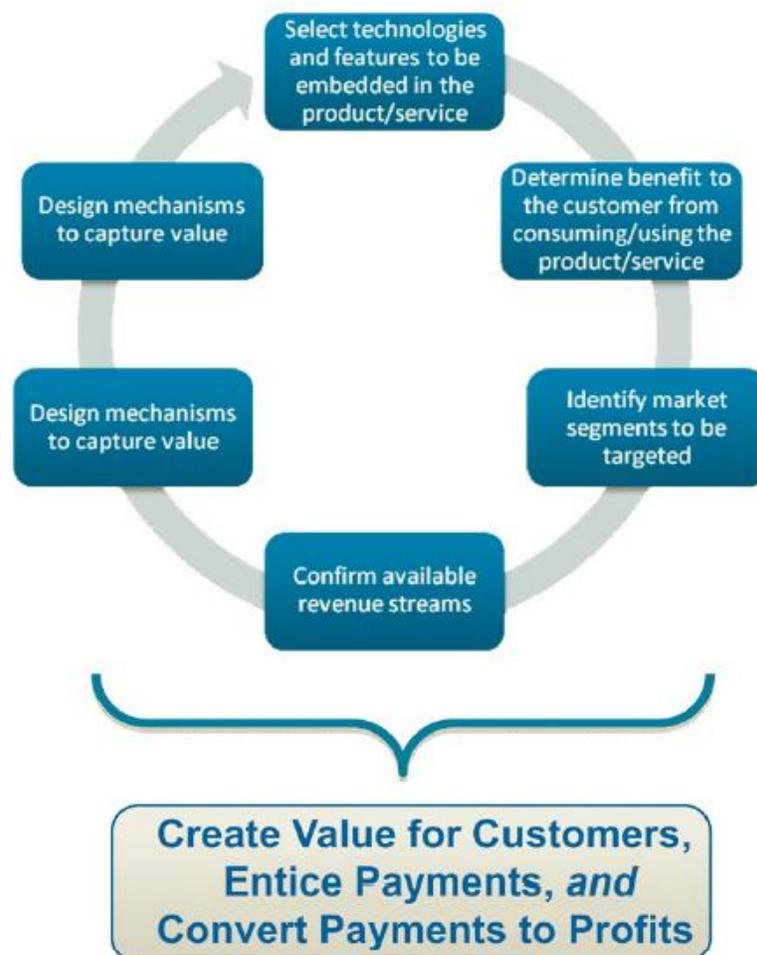
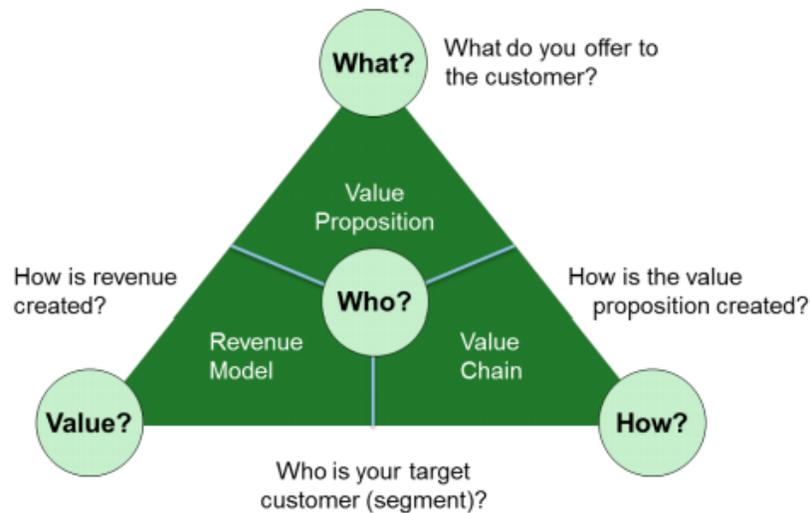


Figure 14. Elements of Business Model Design (Source: Teece, 2010)

Gassman et al. (2013) employed a BM conceptualization that consists of four central dimensions: the Who, the What, the How, and the Value, claiming that due to the reduction to four dimensions the concept is easy to use, but, at the same time, exhaustive enough to provide a clear picture of the business model architecture (Figure 15).



*Figure 15. Business Model Definition – The Magic Triangle (Source: Gassman et al., 2013)*

The “Who” refers to the served customer group, answering the question “Who is the customer?” According to Gassman et al. and drawing on the argument from Morris et al. (2005) that the ‘failure to adequately define the market is a key factor associated with venture failure’, this is the heart of the business model.

The “What” answers the question “What do you offer to the customer?” or put differently what the customer values. This is also referred as customer value proposition (Johnson et al. 2008) or value proposition (Osterwalder, 2004), or just value (Shi & Manning, 2009; Teece, 2010) and can be defined as a holistic view of a company's bundle of products and services that are of value to the customer (Osterwalder, 2004).

The “How” refers to the organizational processes and activities, along with the involved resources and capabilities that are orchestrated to build and distribute the value proposition.

The “Value” represents the fourth dimension of the business model and explains why the business value is financially viable, thus it related to the revenue model (Gassman et al., 2003). Essentially, it answers the question how to make money in the business by looking into the cost and revenue mechanisms within the organization.

The aforementioned authors present a descriptive framework in a given point in time, which allows describing an operational BM and observing its alignment with strategy. However, how is theory reflected in practice? What forms of business models do the theoretical frameworks support?

This is depicted in the following paragraph with a short overview of some of the most popular forms of business models and their respective corporate examples.

### **3.3 Forms of Business Models**

The forms of business models have constantly evolved throughout the years and have had a long history. A very basic and popular model, since ancient times, has been the "shopkeeper model", which involves establishing one's store in such a location that is most likely to attract potential customers and that makes it easier to advertise the products or services being offered.

The "bait-and-hook business model", and the "razor-and-blades business model", emerged in the first half of the 20th century. This model often involves presenting a common good at an extremely low price that in fact puts the seller at loss (bait), and then asking for repeat purchases of associated products, services, or refills (hook). Examples include: razor (bait) and blades (hook); cell phones (bait) and air time (hook) and computer printers (bait) and ink cartridge refills (hook).

Throughout the years, new business models emerged, the Internet was commercially utilized and we witnessed the birth and boom of business models like Amazon, eBay, YouTube and of course Facebook. Nevertheless, what we also witnessed was a big number of poorly thought out dot.com business models that led to the infamous dotcom bubble about fifteen years ago.

Today, the type of business models might depend on how technology is used. Entrepreneurs on the internet have also created entirely new models that depend entirely on existing or emergent technology.

In his book ‘Seizing the white space: business model innovation for growth and renewal’ (2010), Mark Johnson lists some of the basic forms of business models, how they work, along with respective examples (Table 17).

In general, companies follow different business models depending on their customer value proposition and the projections for profit. Business models can follow an established form and compete on the CVP, or they might introduce a disruptive way of delivering their offering to the customers and become pioneers.

Given that business models do not last long due to their dynamic nature (de Reuver et al., 2009; Linder & Cantrell, 2000), organizations should continuously consider modifications in their BM, to remain aligned with changes in the business environment, e.g. technological advances, a shift in customer preferences, changes in the political or legal landscape etc.

This chapter analyzed the concept of the business model in terms of context and definitions and reviewed the developed theory on contemporary business model frameworks.

Chapter 4 investigates the value of the business model innovation and elaborates into the theory of the existing ICT induced BM change methodologies, which paves the path for the formation of the proposed theoretical framework.

Table 17. Basic Forms of Business Models. Based on Mark Johnson (2010)

ANALOGY	HOW IT WORKS	EXAMPLE
Affinity Club	Pay royalties to some large organization for the right to sell your product exclusively to their customers	<ul style="list-style-type: none"> <li>• MBNA</li> </ul>
Brokerage	Bring together buyers and sellers, charging a fee per transaction to one or another party	<ul style="list-style-type: none"> <li>• Century 21</li> <li>• Orbitz</li> </ul>
Bundling	Package related goods and services together	<ul style="list-style-type: none"> <li>• Fast-food value meals</li> <li>• iPod/iTunes</li> </ul>
Cell phone	Charge different rates for discrete levels of a service	<ul style="list-style-type: none"> <li>• Sprint</li> <li>• Better Place</li> </ul>
Crowdsourcing	Get a large group of people to contribute content for free in exchange for access to other's people's content	<ul style="list-style-type: none"> <li>• Wikipedia</li> <li>• YouTube</li> </ul>
Disintermediation	Sell direct, sidestepping traditional middlemen	<ul style="list-style-type: none"> <li>• Dell</li> <li>• WebMD</li> </ul>
Fractionalization	Sell partial use of something	<ul style="list-style-type: none"> <li>• NetJets</li> <li>• Time-shares</li> </ul>
Freemium	Offer basic services for free, charge for premium service	<ul style="list-style-type: none"> <li>• LinkedIn</li> </ul>
Leasing	Rent, rather than sell, high-margin, high-priced products	<ul style="list-style-type: none"> <li>• Cars</li> <li>• MachineryLink</li> </ul>
Low-touch	Lower prices by decreasing service	<ul style="list-style-type: none"> <li>• Walmart</li> <li>• IKEA</li> </ul>
Negative operating cycle	Lower prices by receiving payment before delivering the offering	<ul style="list-style-type: none"> <li>• Amazon</li> </ul>
Pay as you go	Charge for actual, metered usage	<ul style="list-style-type: none"> <li>• Electric companies</li> </ul>
Razor/blades	Offer the high-margin item below cost to encourage sales of the high-margin companion product	<ul style="list-style-type: none"> <li>• Kindle</li> <li>• iPod/iTunes</li> </ul>
Reverse auction	Set a ceiling price and have participants bid as the price drops	<ul style="list-style-type: none"> <li>• Elance.com</li> </ul>
Product to service	Rather than sell a product, sell the service the product performs	<ul style="list-style-type: none"> <li>• Zipcar</li> </ul>
Standardization	Standardize a previously personalized service to lower costs	<ul style="list-style-type: none"> <li>• MinuteClinic</li> </ul>
Subscription	Charge a subscription fee to gain access to a service	<ul style="list-style-type: none"> <li>• Netflix</li> </ul>
User communities	Grant members access to a network, charging both membership fees and advertising	<ul style="list-style-type: none"> <li>• Angie's List</li> </ul>

**Chapter 4.****Business Model Innovation and Change**

Having reviewed the theory on BMs, it is evident that understanding and communicating the architecture of the company is an essential task, yet sometimes it is proven insufficient in a turbulent and dynamic technological environment.

Calvacante (2011), suggest that a firm's business model serves two interlinked purposes: to provide some stability for the development of a company's activities and, at the same time, to be flexible enough to allow for change. In addition, managers might fail to recognize, explore, seize and exploit valuable new technological and/or market opportunities in time, since this may require commercial approaches that are not consistent with the present business model.

Gunzel & Wilker (2009) adds that the BM is not static. Start-ups, as well as existing businesses must revise their BM over time to keep up with changing technology, market and regulatory conditions, etc. However, as Teece (2009) argues, technological innovation by itself does not automatically guarantee business or economic success, and a good business model design and implementation coupled with careful strategic analysis, are necessary for technological innovation to succeed commercially.

Lindgardt et al. (2009), emphasize that business model innovation (BMI) is more than mere product, service or technological innovation, as it goes beyond single-function strategies and can be only characterized as such, when two or more elements of a BM are reinvented to deliver value in a different way. Furthermore, BMI involves a multidimensional and orchestrated set of activities, making it challenging to execute and at the same time difficult to imitate.

At the same time, innovations to improve processes and products are often expensive and time-consuming, requiring a considerable upfront investment in everything, from research and development to specialized resources, new plants and equipment, and even

entire business units (Amit & Zott, 2012). This is why more companies are increasingly turning to business model innovation as an alternative or complement to product or business innovation.

It is more than evident, that business model innovation and business model change have an accelerating significance, a fact reflected in Gassman et al.'s (2013) statement: 'In future, competition will take place between business models, and not just between products and technologies.'

Therefore, and before reviewing the business model change frameworks, we discuss the increasing value of business model innovation, which follows in the following paragraph.

#### **4.1 The Increasing Value of Business Model Innovation**

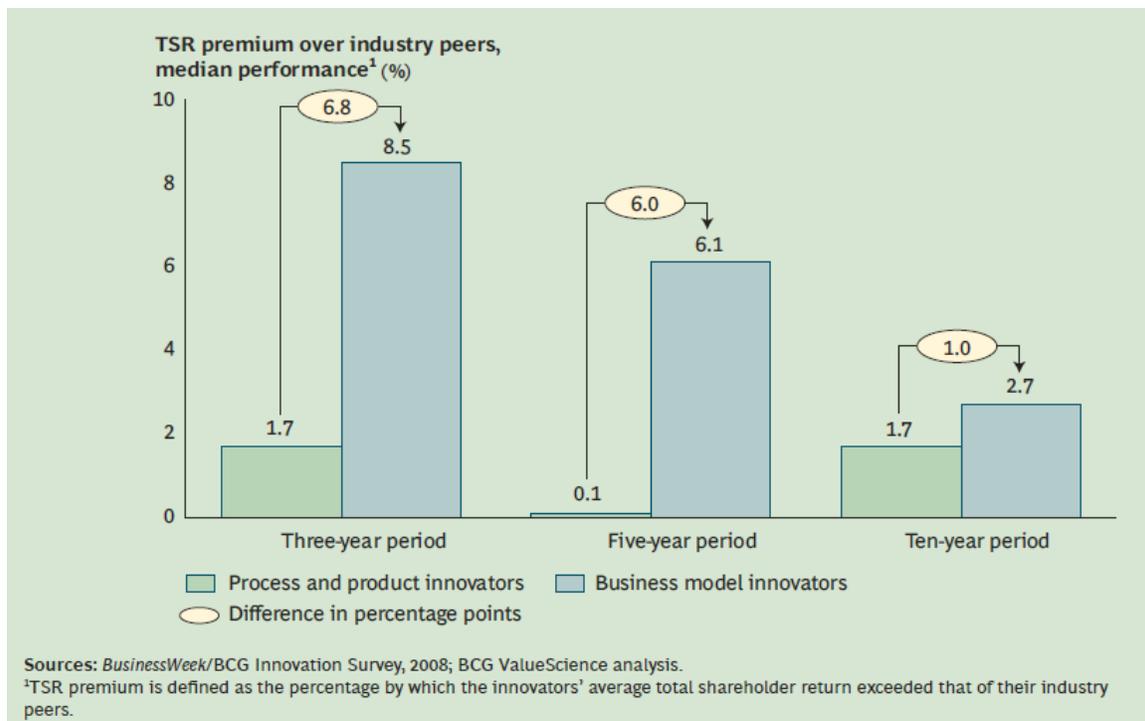
Even though there are many companies with excellent technological products and many firms continuously introduce innovations to their products and processes, yet many companies will not survive in the long term despite their product innovation capabilities (Gassman et al., 2013). Firms such as AEG, Grundig, Nixdorf Computers, Triumph, Brockhaus, Agfa, Kodak, Quelle, Otto, and Schlecker are vanishing from the business landscape one after the other, as they have failed to adapt their business models to the changing environment.

Moreover, Chesbrough (2007) identifies that many organizations have a business model innovation leadership gap; that is, no one person in the organization has the authority and the capability to innovate the business model.

But how important is the business model innovation and why does it have to be among the top organizational priorities?

Lindgardt et al. (2009) commented on the value of BMI especially in times of instability. When deciphered, business models can become easy to imitate, competitors might copy a winning strategy and the competitive advantage might be lost. BMI can help companies break out intense competition and address environmental disruptions that demand fundamentally new competitive approaches. BMI also enables the company to respond more effectively to crisis, by leveraging the crisis to reinvent themselves, rather by simply deploying defensive financial and operational tactics.

Based on data from the annual Boston Consulting Group survey, Lindgardt et al. conducted a very interesting analysis that shows the performance superiority of companies that invest in BMI compared to those that invest in process or product innovation. The results indicated that business model innovators earned an average premium than was four times greater than that enjoyed by product or process innovators, with more sustainable returns as even after ten years, business model innovators continued to outperform competitors and process innovators (Figure 16).



*Figure 16. Business Model Innovators Outperform Traditional Innovators Over Time.*

(Source: Linderdt et al. 2009)

Likewise, this also supported by Amit & Zott (2010), who advocate the benefits of BMI over product and process innovation as it is less costly, more effective, and the appropriate approach in times of capital scarcity, such as the latest global economic downturn.

In their 2012 work, Amit & Zott referred to two studies; a global survey of more than 4000 senior managers held by the Economist Intelligence Unit, and a global study conducted by IBM, in which over 750 corporate and public sector leaders were interviewed on the subject of innovation. The findings were similar, as the majority of respondents favored BMI over new products and services, indicating that BMI is much higher than expected in the organizations' priority lists. Furthermore, the IBM study found that companies whose operating margins had grown faster than their competitors over the previous five years, were twice as likely to emphasize business model innovation, as opposed to product or process innovation (Amit & Zott, 2012).

In their 2010 work, Sosna et al. (2010) argue that several studies show that business model changes are among the most sustainable forms of innovation, and while great and winning business models often appear to have gone straight from drawing board into implementation leading the firm to glory and success, in reality new business models rarely work the first time around, since decision makers face difficulties at both exploratory and implementation stages. Additionally, it is supported that firms begin with a business model and then - in response to certain triggers (typically external) - plan, design, test and re-test alternative business model variants until they find the one that best suits their objectives. Sosna et al. emphasize the importance of BMI, by stating 'that business model development through experimentation, evaluation and adaptation - in a trial-and-error learning approach involving all echelons of the firm - is an important organizational renewal mechanism.' To further support this claim, the authors present the Naturhouse case study where its business model innovations had allowed it to grow at nearly 40% per year for more than 10 years.

Schaltegger et al. (2012), suggest that the business model is not only a facilitator of technological and organizational innovations, but can become itself subject to strategic innovation in order to share and leverage resources such as knowledge, managerial and entrepreneurial skills, or to enable reconfigurations of the underlying value chain or value network. In that sense, the business model can be considered as a strategic asset to improve the organizational performance and may define a leadership agenda on strategic business model management and innovation.

Mitchell & Coles (2003), argue that ongoing BMI helps a company become more successful in two ways. First, it can overpower established advantages and size, and second, it protects the company from competitors. The authors conducted a study on 100 public companies, trying to identify what works and what not, and concluded to a very interesting and significant finding as quoted below:

*“.. it was clear that perennial top performers were frequently making fundamental improvements in several dimensions (the ‘who’, ‘what’, ‘when’, why’, ‘where’, ‘how’ and ‘how much’ of delivering value to customers and getting paid for it), of their business models at once for serving their customers, end users and other important stakeholders (such as employees, partners, suppliers, distributors, lenders, shareholders, and the communities the company serves). The most effective companies were making these multidimensional business model shifts every two to four years.” [Mitchell & Coles, (2003), p.16]*

Schaltegger et al. (2012), comment on Mitchell & Cole’s study, noticing that the most important finding is the strategic leverage effect of BMI, as top performers appeared to be using BMI to amplify their strategic effectiveness.

As displayed, business model innovation is vital for the organization, allowing it to protect their customer value proposition from possible threats that may come from the environment or from the competition. Under the light of the studies highlighting the positive relation between superior business performance and BMI, it is of high interest to

review the theoretical frameworks that enable the BM change, with regard to one of its main driving forces, the integration of ICTs.

## 4.2 ICT Induced Business Model Change Frameworks

Existing literature mainly examines the BM and its components as a static representation of how the company creates and delivers value to its customers. However, the need to inter-relate ICT developments and BMs started to express through the work of Venkatraman (1994) and his “five levels of IT-enabled business transformation” model (Figure 17), and Poon and Swatman’s (1997) “Internet-to-internal applications systems integration” model (Figure 18).

Venkatraman’s (1994) first approach to IT integration, examines the range of potential benefits in relation to the adoption of IT-enabled business transformation through a sequential five-stage process. This stretches from the evolutionary level of localized exploitation all the way to the revolutionary level of business scope redefinition.

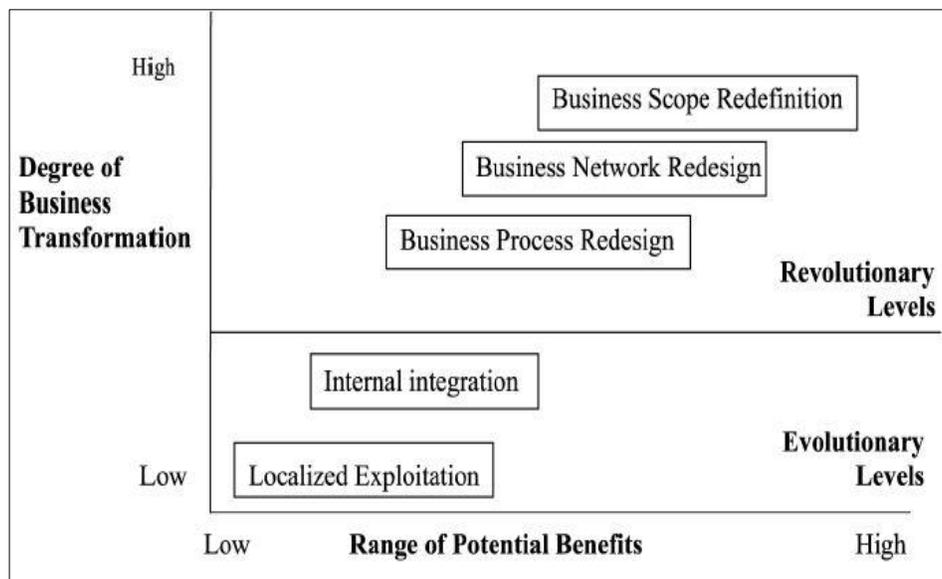
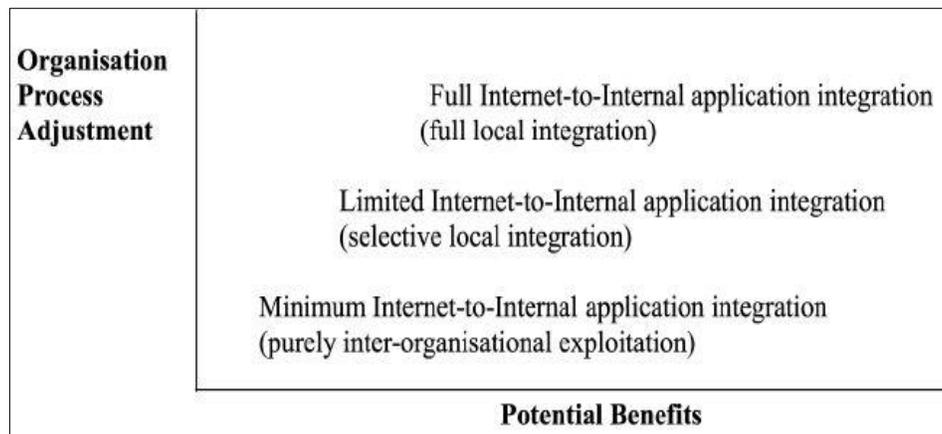


Figure 17. Venkatraman’s Five Levels of IT-Enabled Business Transformation

Venkatraman's framework constitutes the starting point for theoretical BM change frameworks and in that sense it offers a two dimensional correlation, focusing on the description of each level of business transformation, rather than acting as a change methodology.

Poon & Swatman's (1997) work on adoption and exploitation of ICTs by small and medium-sized enterprises (SMEs) produced a model, which was based on Venkatraman's variables identifying the levels of Internet integration, starting from the inter-organizational level to the full benefits of full organizational integration.



*Figure 18. Poon & Swatman's Internet-to-Internal Applications Systems Integration*

Although suggesting a BM transformational process, their representation does not address the issue of BM change due to ICTs integration, as it is limited to the study of the effects of Internet integration in small businesses.

In 1998, Tapscott et al. introduced the term "b-web" which they define as "a distinct system of suppliers, distributors, commerce service providers, infrastructure providers, and customers that use the Internet for their primary business communications and transactions".

They argue that business webs are inventing new value propositions, transforming the rules of competition, and mobilizing people and resources to unprecedented levels of

performance. Managers are called to design a new agenda for b-web strategy by describing, disaggregating and re-aggregating the core value proposition.

The authors suggest a six-step methodology for b-web strategy design, shifting from the traditional BM to the web integrated BM (Table 18).

*Table 18: Tapscott et al. six steps for b-web strategy design*

- 1. Describe the current value proposition from the customer's view-point, that is, why the system exists*
- 2. Disaggregate: Consider the contributors and their contributions, strengths, and weaknesses. Compare the parts and capabilities of your business to those in other systems*
- 3. Envision b-web-enabled value through brainstorming and other creative design techniques. Decide what the new value proposition will be*
- 4. Re-aggregate: Define what it will take to deliver the new value proposition, including processes, contributors, contributions, applications and technologies, and other success factors*
- 5. Prepare a value map: Design a visual map that depicts value exchanges in the b-web*
- 6. Do the b-web mix: Define a b-web typing strategy that will improve your competitive advantages*

Tapscott et al. contributes to the formulation of a more comprehensive methodology as they are the first to shift the attention to the organization's value proposition, employ a components dis-aggregation and re-aggregation system, envision the missing (ICT) roles and use a visual map that depicts value exchanges. However, their approach emphasizes on the feature of "network", which they claim will be prevalent in almost all future Business Models (Pateli & Giaglis, 2003), missing other important BM change elements and a schematic representation.

During the same year (1998), Timmers studies the effect of technology innovation on the BM, and more specifically the effect of the Internet on traditional businesses. Based on the degree of innovation and functional integration, Timmers presents eleven business models, some of which are essentially an electronic re-implementation of traditional BMs, while others go far beyond and seek innovative ways to add value through information management and a rich functionality.

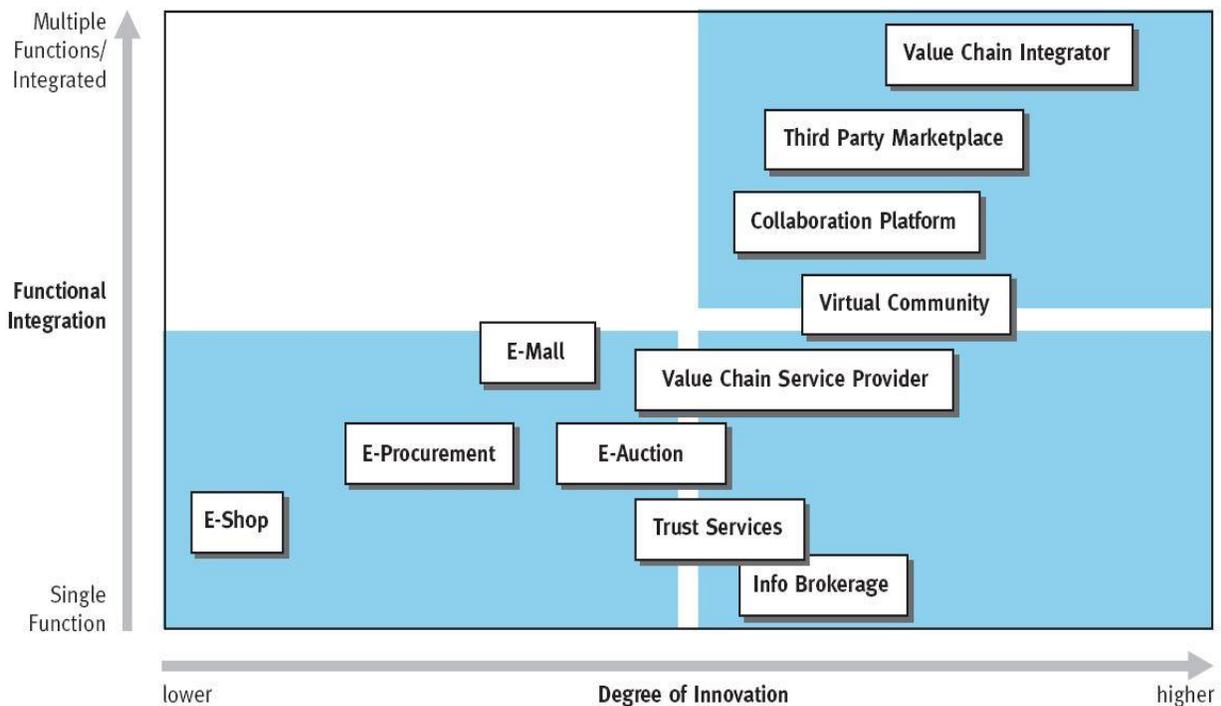


Figure 19: Timmers Classification of Internet Business Models

Focused on the transformational effects of the electronic commerce, Timmer's provides a useful classification of e-commerce enabled business models, and although implementing a de-construction and re-construction of the value chain, it is not intended to serve the purpose of a BM change methodology.

Linder & Cantrell (2000) identified that most BMs are under constant pressure to change. Innovations in technology, changes in the law, competitive moves, or shifts in consumer

tastes can sap an operating model's profitability. Based on empirical data they presented four basic types of change models: realization, renewal, extension, and journey models (Table 19). They define a change model as "*the core logic for how a firm will change over time to remain profitable in a dynamic environment*".

*Table 19: Linder & Cantrell's Basic Types of Change Models*

<b>Realization Models</b>	<b>Renewal Models</b>	<b>Extension Models</b>	<b>Journey Models</b>
Brand maintenance	New service offerings	Backward integration	Commoditization: from product to price
Product line extensions	New brands	Forward integration	Globalization
Geographic expansion	Untouched markets	Horizontal integration	Avoiding commoditization: from product to service to solution
Penetration	New retailing formats	Externalizing an internal capability	Up market in products: from price to speed and agility
Incremental product or service line expansion in one-stop shops	Disruptive new product or service platforms		Up market in services: from price to brand or expertise
Additional sales or service channels			
Roll up			

However, their approach is rather generic and does not address specifically the issue of BM change due to ICT integration. Furthermore, there is no reference to the management of the change process.

Based on the realization that in current BMs "...Information and Communication technology changes dramatically the way activities are performed", Papakyriakopoulos et al. (2001), presents a roadmap for the construction of e-Business models (Table 20).

*Table 20: Papakyriakopoulos et al. BM development method (based on Pateli and Giaglis, 2002)*

1. *Identification of players*
2. *Defining current business objectives for each key player*
3. *Identification of current value flows in the marketplace*
4. *Identification of key competitive drivers in the market*
5. *Synthesis of the current business model*
6. *Embedding the innovative technology framework into the current business model*
7. *Defining requirements for technological capability development for existing key players*
8. *Defining the mediating functions performed by the service provider*
9. *Developing a new co-operation scheme in the marketplace: exploiting the existence of the new service provider*
10. *Synthesis of the proposed business model*

Their contribution extends the preceding stepwise frameworks, incorporating new elements such as defining the business objectives and mapping the existing BM before the integration of new ICTs. Nevertheless, as identified by Pateli & Giaglis (2003), the primary limitations of their work concern the driver of the change, which is considered to be a technology innovation rather than a business opportunity. Moreover, and taking into consideration the discussion around firm-level and industry-level analysis presented earlier in this thesis, Papakyriakopoulos et al. analysis is focused on industry-level change only and the authors argue in favor of defining new market roles during the transition of current to future business models.

Complementing the work of Petrovic et al. (2001), Auer & Follack (2002), suggested nine prerequisites for a methodology developing a business model.

1. The methodology should be able to handle complex systems
2. The methodology should support the structuring and sharing of knowledge and the change of mental models
3. The methodology should be able to predict the outcomes more accurately through the support of risk free experiments
4. The methodology should create a learning environment for managers

5. The methodology has to support iterative expansion and change
6. The methodology should be grounded on theory and practically applicable
7. The methodology requires (inter)-action as an integral part of the process itself
8. The methodology is based on the researcher's professional values rather than methodological considerations
9. The methodology has to support structured reflection of learned lessons and academic discourse

Having followed the above prerequisites the authors present the Evolaris three phase methodology for improving existing models (Figure 20)

The first phase of the methodology is labeled “understand” and it is composed of four steps:

1. Identify the BM from different angles  
Taking into account different perspectives, including the positions of as much different stakeholders, leading to a complete overview and a BM definition
2. Identify the key factors of the BM  
Analyzing and defining all influencing variables within the BM
3. Model the core reinforcing and balancing feedback loops  
Involving the organization's people and reinforcing acceptance
4. Expand the BM to the full network  
Identifying specific clusters of variables

The second phase “identify the Internet's influence” describes the next two steps in the process

1. Identify the influence of the Internet on the BM  
Identifying all variables of the BM which are influenced by the Internet
2. Identify and interpret the changing possibilities of the BM  
Seeking options for changing the business model in order to use the influence of the internet.

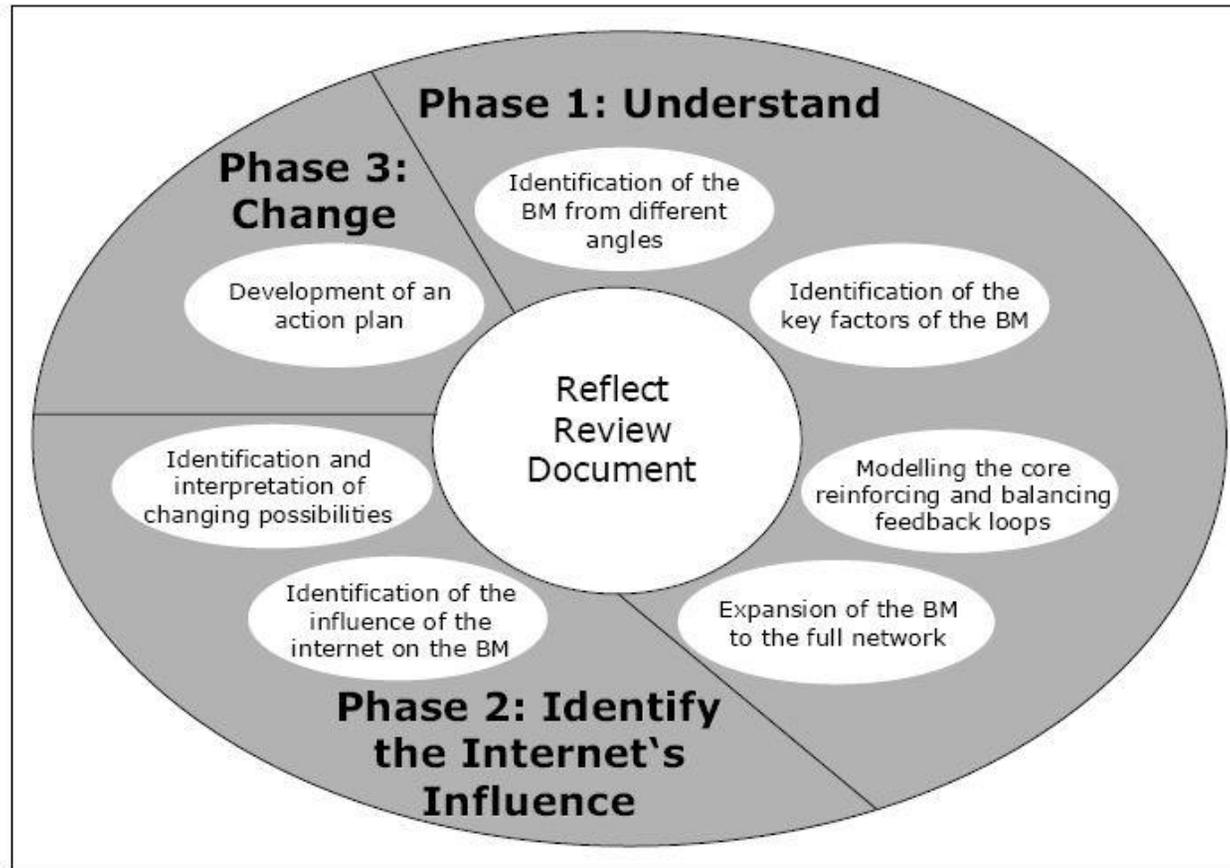


Figure 20: The Evolaris Methodology (Source Auer and Follack 2002)

Phase three is about the actual “change” of the business model entailing the final step of the methodology

3. Develop an action plan

Documenting and structuring the knowledge gained during the phases and steps before, leading to an action plan for changing the BM

At this stage, it is important to note that the authors argue that this methodology should be seen as a network rather as a linear sequence of steps. Moving back and forth during the application of the methodology is not just allowed but also encouraged, in order to take into consideration the effect of new variables in the formulating business model.

Auer and Follack’s contribution is more than considerable, as it introduces a number of well-thought prerequisites for the formulation of the Evolaris methodology. Arvai (2006), points out that all of the authors’ requirements may seem intuitive except perhaps requirement 8, as it is focused on the researchers’ contribution to the project and entails that they considers the goal of a project instead of blindly following methodological guidelines.

The Evolaris methodology is based on the three learning stages of Senge & Sterman (1994), as well as a number of system theories such as system dynamics (Pateli & Giaglis, 2005). However, it is limited to the development of e-business models focusing on the web transformational effects, and although it incorporates a number of BM change elements, it leaves out important elements such as the stimulus factor, objectives setting and the final assessment of the transformed BM. The suggested methodology builds up to the development of an action plan for the BM change, without going further into the management of the change process or into an evaluation of the impact of changes. Nonetheless, it is the first approach that introduces a feedback loop that enables the organization to move back and forth the implementation stages and engage in corrective actions where necessary.

Doz & Kosonen (2009), based on findings from their empirical work on strategically agile companies, identified five determinants of a successful business model renewal.

1. Decoupling: gaining flexibility
2. Modularizing: disassembling and reassembling business systems
3. Dissociating: separating resource use from ownership
4. Switching: using multiple models
5. Grafting: acquiring to transform oneself

Their analysis, although defining necessary organizational qualities and actions that may facilitate the BM change process, does not constitute a change framework, as there is no reference to important change elements, a sequential process and a schematic representation.

In 2009, de Reuver et al., produced a model that describes the impact of external drivers on the life cycle of business models, which proved to be more applicable to small startups rather than established firms (Figure 21).

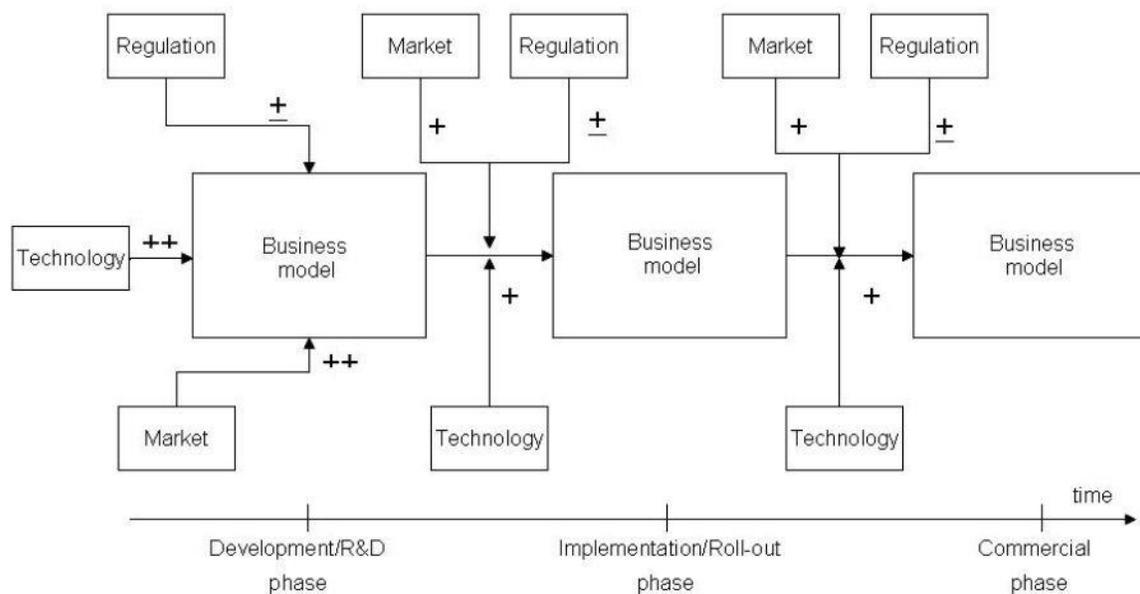


Figure 21: Dynamic Business Model framework (Source: Mark De Reuver et al. 2009)

The proposed model derived from a case survey of over sixty case descriptions of business models and contributed in the understanding of what drives business models dynamics rather than suggesting a BM change methodology.

Morris et al. (2005), proposed a framework that consists of three levels of decision making, termed the ‘foundation’, ‘proprietary,’ and ‘rules’ levels. Further, at each level, six basic decision areas are considered (Table 21)

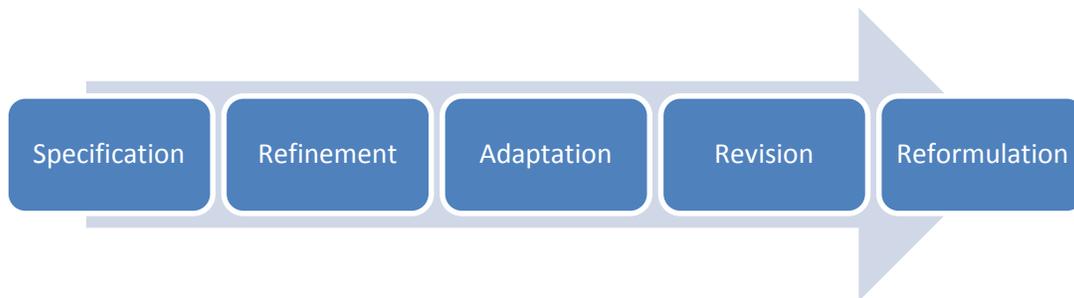
*Table 21. Six questions that underlie a business model (Source: Morris et al., 2005)*

<p><b>Component 1 (factors related to the offering): How do we create value?</b></p> <ul style="list-style-type: none"> <li>. offering: primarily products/primarily services/heavy mix</li> <li>. offering: standardized/some customization/high customization</li> <li>. offering: broad line/medium breadth/narrow line</li> <li>. offering: deep lines/medium depth/shallow lines</li> <li>. offering: access to product/ product itself/ product bundled with other firm’s product</li> <li>. offering: internal manufacturing or service delivery/ outsourcing/licensing/ reselling/ value added reselling</li> <li>. offering: direct distribution/indirect distribution (if indirect: single or multichannel)</li> </ul>	<p><b>Component 2 (market factors): Who do we create value for?</b></p> <ul style="list-style-type: none"> <li>. type of organization: b-to-b/b-to-c/ both</li> <li>. local/regional/national/international</li> <li>. where customer is in value chain: upstream supplier/ downstream supplier/ government/ institutional/ wholesaler/ retailer/ service provider/final consumer</li> <li>. broad or general market/multiple segment/niche market</li> <li>. transactional/relational</li> </ul>
<p><b>Component 3 (internal capability factors): What is our source of competence?</b></p> <ul style="list-style-type: none"> <li>. production/operating systems</li> <li>. selling/marketing</li> <li>. information management/mining/packaging</li> <li>. technology/R&amp;D/creative or innovative capability/intellectual</li> <li>. financial transactions/arbitrage</li> <li>. supply chain management</li> <li>. networking/resource leveraging</li> </ul>	<p><b>Component 4 (competitive strategy factors): How do we competitively position ourselves?</b></p> <ul style="list-style-type: none"> <li>. image of operational excellence/consistency/dependability/speed</li> <li>. product or service quality/selection/features/availability</li> <li>. innovation leadership</li> <li>. low cost/efficiency</li> <li>. intimate customer relationship/experience</li> </ul>
<p><b>Component 5 (economic factors): How we make money?</b></p> <ul style="list-style-type: none"> <li>. pricing and revenue sources: fixed/mixed/flexible</li> <li>. operating leverage: high/medium/low</li> <li>. volumes: high/medium/low</li> <li>. margins: high/medium/low</li> </ul>	<p><b>Component 6 (personal/investor factors): What are our time, scope, and size ambitions?</b></p> <ul style="list-style-type: none"> <li>. subsistence model</li> <li>. income model</li> <li>. growth model</li> <li>. speculative model</li> </ul>

As per the authors, the proposed framework allows the user to design, describe, categorize, critique, and analyze a business model for any type of company. Moreover, by specifying the elements that constitute a model, the framework enhances the ability to assess model attributes.

Essentially, the authors identify critical BM components that every manager needs to be aware of and decide for.

With regard to a BM change proposal, Morris et al. rather approach it through the concept of the BM life cycle (Figure 22).



*Figure 22: The Business Model Life Cycle (Based on Morris et al., 2005)*

The above conceptualization of the BM life cycle incorporates significant elements of testing, assessment and evaluation that contributes to risk minimization of the new BM configuration.

“...an initial period during which the model is fairly informal or implicit is followed by a process of trial and error, and a number of core decisions are made that delimit the directions in which the firm can evolve. At some point, a fairly definitive, formal model is in place. Subsequently, adjustments are made and ongoing experiments are undertaken”. (Morris et al., 2005)

Although posing important BM design questions, Morris et al. do not provide a stepwise BM change methodology that can have a practical application for the organization when integrating new ICTs.

Santos et al., 2009, argue that managers do not need to await breakthrough technology or invest heavily in new products, new business ventures, or new market development to gain the advantages of business model innovation. They suggest that change within the BM can be achieved through the reconfiguration of activities and more specifically through re-linking, re-partitioning, relocating and reactivating.

*Table 22: Typology of BMI – Reconfiguring a Firm’s Activities (Source: Santos et al., 2009)*

Classification	Type	What changes	Examples
<b>Relinking</b> – altering the linkages between units performing activities	Regoverning	The governance of transactions among units	An arms-length relation with a supplier becomes an alliance
	Resequencing	The order in which activities are performed	Design and procurement activities become mutually reciprocal instead of sequential
<b>Repartitioning</b> – altering the boundaries of the focal firm by moving activities and the units that perform activities	Insourcing	Moving inside activities that were performed outside the focal firm	A manufacturer opens its own retail stores to supplement its dealers
	Outsourcing	Moving outside activities that were performed inside	A firm outsources its IT activities
<b>Relocating</b> - alerting the (physical, cultural, and institutional) location between units performing activities	Off-shoring	Moving activities from a unit in the firm’s home country to a foreign country	A bank moves back-office activity to a foreign subsidiary
	On-shoring	Moving activities from a foreign country unit into the home country of the firm	A call center is moved back to the original country
<b>Reactivating</b> – altering the set of activities performed by the firm	Augmenting	Adding a new activity to the firm	A free give-away newspaper adds people to hand out the paper at subway stops.
	Removing	Removing an activity from the firm	An airline removes cooking hot meals from its service.

Based on the presented concepts and supported through various case studies, the authors propose a theory of business model innovation that builds on four propositions (Table 23).

*Table 23: Santos et al. Propositions on BMI theory*

*Proposition #1 – A firm’s business model juxtaposes two systems of relationships: one involves transactional linkages among activities and the other involves governance linkages between the organizational units that perform those activities.*

*Proposition #2 – Because business models involve relationships among organizational units, alterations in business models require transformational behavioral change within the impacted units.*

*Proposition #3 – When a business unit is a part of a corporation (rather than a free standing business), the corporation presents both constraints on and opportunities for BMI. The constraints arise from the potential impact of unit-level BMI on corporate scope and risk as well as the potential impact on the operations and strategies of fellow units.*

*Proposition #4 – A combination of loose horizontal coupling among the corporation’s business units combined with mutual engagement and organizational justice between the units and the corporate center will maximize opportunities and minimize constraints on business unit level BMI.*

Rich in examples and case studies analysis, Santos et al. focus on the organization’s reconfiguration of activities rather than providing a BM change methodology. There is no schematic representation of the proposed theory nor a sequential guide of how to integrate new ICTs in the business model of an incumbent firm. The authors purposely concentrate on BMI that does not rely on new technologies, new products, and/or new markets, as it is suggested that the BMI itself may lead to new value offers and new markets.

Samavi et al. (2008) has not only contributed with the strategic business model ontology presented in 3.2 but also has presented a methodology to incorporate change. (Figure 23)

The methodology is divided into two major bands, one is about “understanding the change” in the market place and the second describes the “transitional states”

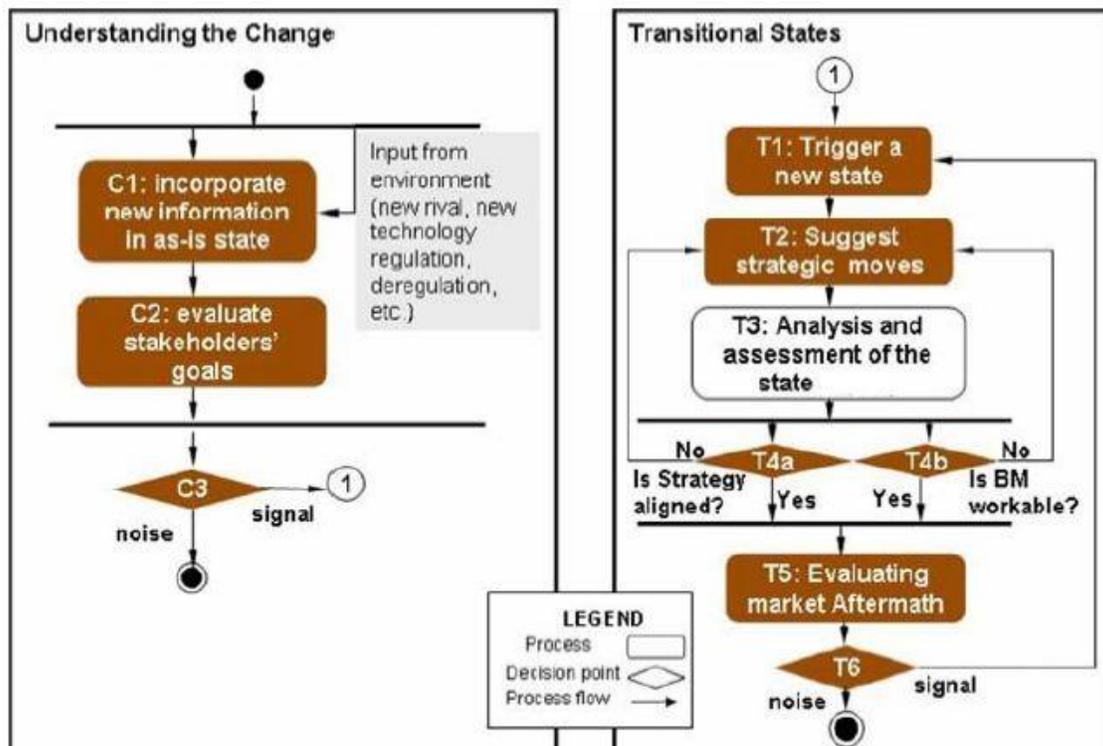


Figure 23: Process overview to model BM dynamics (Source: Samavi et al., 2008)

### *Understanding the change*

The first step comes as a consequence of one or multiple environmental disruptions as shown earlier in de Reuver’s et al framework. Those could be regulatory changes, technological advances or even a major change in the market condition, e.g. the entry of a new player. Whichever the case, the new information is incorporated in the current state of the company (C1). Then the significance of the change will be weighed against the objectives of the stakeholders (C2) to determine whether is a signal or just a noise that can be ignored (C3).

***Transitional states***

Once the signal from C3 is received, a new state is triggered (T1), new assumptions are added resulting to the suggestion of innovative strategic moves. With the help of the SBMO model presented in 3.2 a feasibility analysis takes place (T3) in terms of business model functionality (T4b) and strategic alignment to the goals of the company (T4a). If by incorporating the innovative strategic moves, the strategy is aligned to the goals and the BM is working, then what follows is an evaluation of the market's aftermath (T5) to investigate the market's reaction to the change. At this final stage (T6), the market's reaction might cause another signal of change that would result to the continuation of the investigation. The whole process should produce a final fully operational and aligned business model.

Samavi's et al. (2008) work produced one of the most complete depictions of the BM change process, incorporating the majority of the significant change elements. However, the representation of the framework is rather a process overview to business model dynamics, emphasizing the process of transition from "as is" to "to be", not going into detail and missing some of the BM change elements met in other frameworks (e.g. the mobilization of stakeholders).

In their paper, Pateli & Giaglis (2005) proposed a stepwise methodology, which allows companies to design alternative scenarios for BM evolution or extension under the impact of technology innovation (Figure 23).

Having identified the limitations of previous methodologies for BM change (Petrovic et al., 2001; Kulatilaka & Venkatraman, 2001; Pramataris et al., 2001), the authors constructed a 3 phase comprehensive methodology, which is supplemented by a series of factors favoring scenarios for BM development.

The advantage of this methodology compared to other BM change models is that, it can be applied to unstable business environments as it incorporates scenario planning, which aims at reducing the level of risk in BM transformation.

The first phase is a detailed documentation of the current business model. Tools, such as Osterwalder's (2004) design template, can be used to provide a complete understanding of the operations and the relationship between the key elements comprising the BM.

The second phase is decomposed into two different steps, the assessment of the influence of technology innovation and the identification of the missing roles. Those two factors are combined to identify the technology's influence to the current BM.

Change is completed in the third phase of the methodology, which comprises three distinct steps, defining scenarios, describing the new BMs and evaluating the impact of changes.

However, Pateli & Giaglis (2004) admit that although the aforementioned steps define a well-grounded methodology for BM change under the impact of technology innovation, they are by no means sufficient on their own to guide the BM design effort. This is why they add a series of industry-related and firm-specific factors that help the company to assess scenarios more effectively (Table 24).

*Table 24. Factors Favoring Scenarios for BM Development (Pateli and Giaglis, 2005)*

<b>Industry-Related Factors</b>	<b>Firm-Specific Factors</b>
Industry structure	Strategic objectives
Balance between transaction costs and costs of internal development	Firm capabilities and assets
Type of players	

The firm and industry's unique characteristics are balanced carefully, helping the organization to choose the right scenario to evolve into its future BM. The methodology suggested by Pateli & Giaglis (2005) allows the company to identify its current BM, evaluate its ICT options, move safely to the realization of the new BM through scenario analysis, and evaluate the effectiveness of the new BM. The authors use as a real life case study, involving the commercialization of a mobile application.

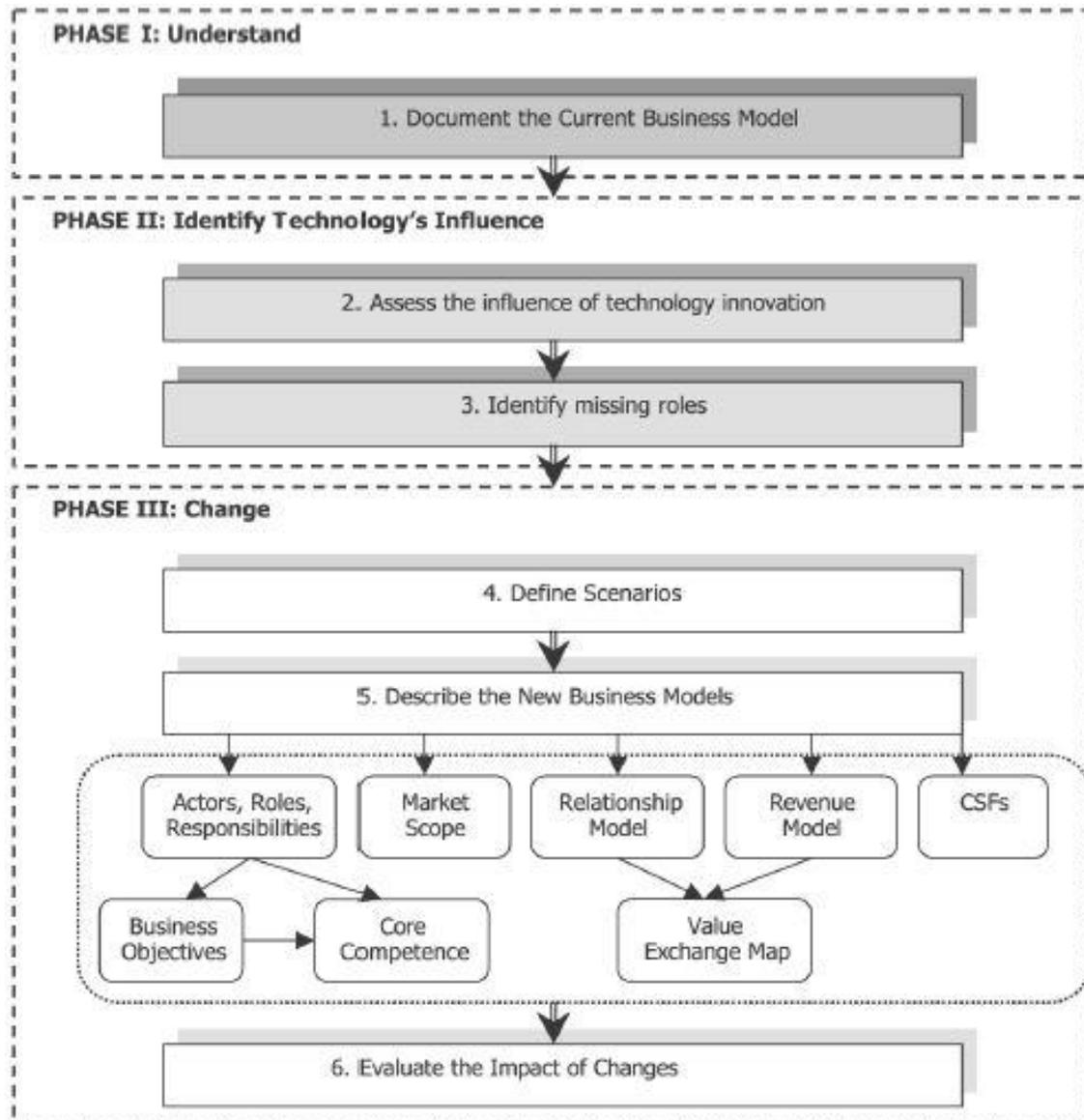


Figure 24. Pateli & Giagli's Scenario-Based Methodology for BM Change (Pateli and Giaglis, 2005)

The contingency approach of Pateli & Giaglis contributes massively in the BM change under the impact of technology innovation topic, as it introduces scenario planning and components analysis. Nonetheless, it omits discussing the origin/stimulus that triggers the change process, the objectives of the organization, the mobilization of the stakeholders, and possibly a process feedback loop, all essential elements of a comprehensive BM change framework.

In their 2010 book “Business Model Generation”, Osterwalder & Pigneur do not only provide a comprehensive BM framework, they also suggest a 5 phase methodology of implementing the BM design process (Figure 25).

As per the authors’ suggestion, the business model design process has five stages: Mobilize, Understand, Design, Implement, and Manage, highlighting that the progression through these phases is rarely linear and stages can be revisited if needed.

The first phase of preparing for a successful BM design process includes activities that frame the project objectives, testing preliminary ideas, planning the project and assembling the team. The danger at this preliminary lies with the tendency of executives to overestimate the potential of initial BM ideas, which can lead to a closed mindset and limited exploration of other possibilities.

The “understanding” phase involves a good understanding of the context the business model will evolve. The BM’s environment should be scanned, including market research, studying and involving customers, interviewing domain experts, and sketching out competitor BMs. Excessive researching might prove to be a barrier of evolution as it can lead to “Analysis paralysis”, while at the same time industry assumptions and established BM patterns must be questioned.

The phase of “design” is about adapting and modifying the BM in response to market response. Expansive thinking leads to breakthrough ideas, abandoning the status quo and exploring different paths. Experimentation is an important element of this phase, different partnership models, alternative revenue streams or even multiple distribution channels must be considered before selecting the final BM.

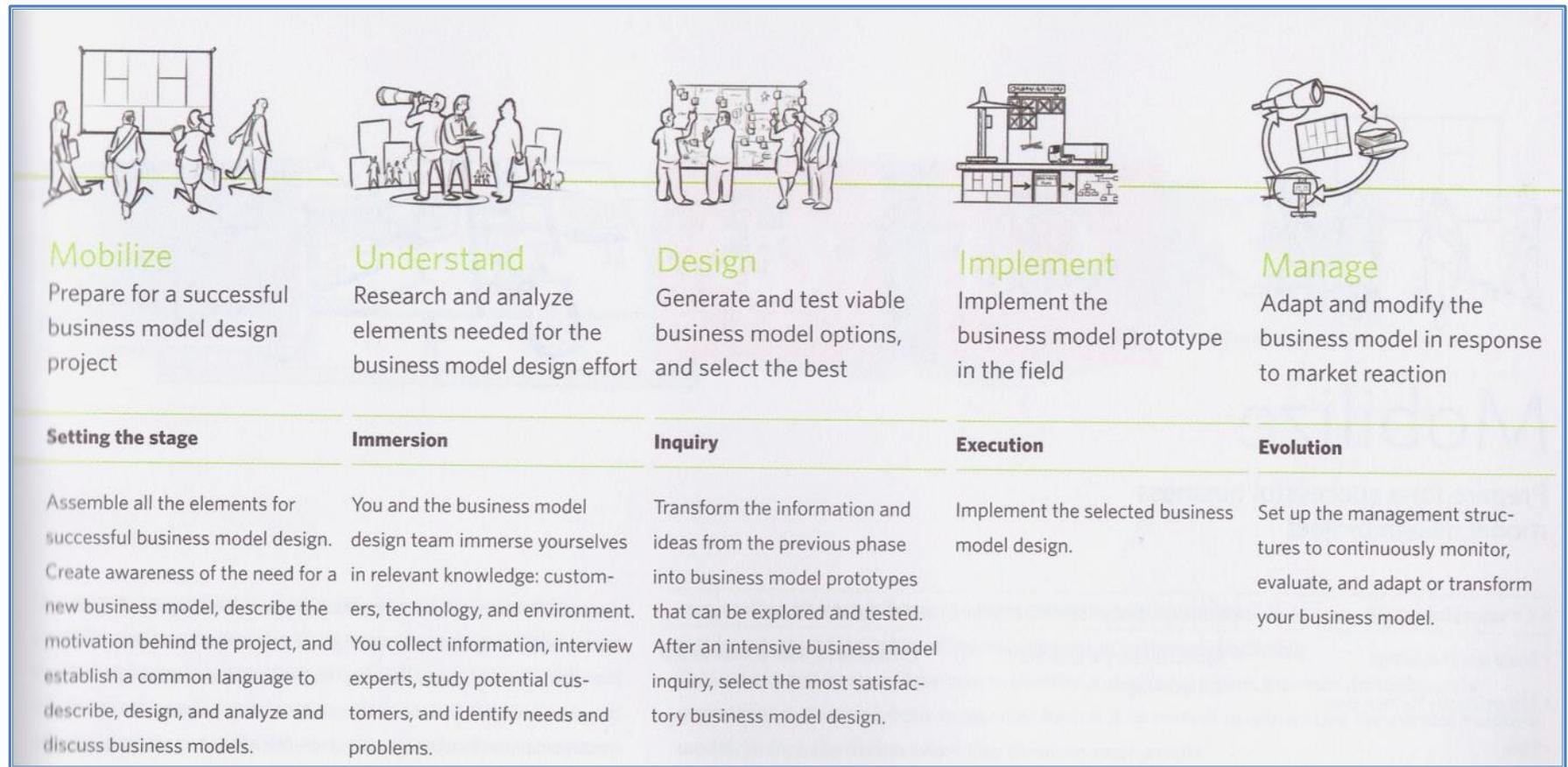


Figure 25. Five phases of the business model design process (Source: Osterwalder & Pigneur, 2011)

The result of the former phases, a prototype BM must now be implemented with the aid of an implementation design. According to the authors, this includes defining all related projects, specifying milestones, organizing any legal structures, preparing a detailed budget and project roadmap, and so forth, while particular attention needs to be paid to managing uncertainties.

At the last phase, “manage” refers to adapting and modifying the business model in response to market reaction. It includes continuously assessing the model and scanning the environment to understand how it might be affected by external factors in the long term. A “portfolio” of possible BMs might prove to be useful in the future, since BMs have an increasingly reduced life cycle and need to be replaced on time to ensure longevity of the organization.

In their contribution, Osterwalder & Pigneur emphasize on the BM construct rather than the BM design process. The relationship between the phases of implementation is not reflected, at least not with a schematic representation.

Furthermore, their work is criticized in one of the latest contributions in the discussion of BM change by Frankenberger et al. (2013). In their paper, the “4 I framework of business model innovation”, Osterwalder and Pigneur are criticized for lacking “the ambition of describing the business model’s innovation process as a whole and in the form of an integrative framework”.

Instead, the authors present a comprehensive framework that structures the business model innovation process and highlights the specific challenges which managers face during the initiation, ideation, integration, and implementation of new business models (Figure 26).

Fourteen business model innovation cases were studied and data was collected through questionnaires and through focus groups. The key points of the data were subsequently

used to support the 4I (Initiation, Ideation, Integration, Innovation) BM innovation process.

The initiation phase focuses on the organization's external sources which might be other players or/and change drivers that have the potential to change the entire ecosystem. For example understanding the customer is a key affecting factor as well as legislative or technological changes.

At the following stage of ideation, the authors argue that the key challenges are to overcome the current business logic, to focus on business model thinking, and to develop tools for the creation of business model ideas.

Ideation leads to the integration stage, which refers to the design of business models around the new idea. All aspects of the former two phases come together to form a unique and fully functional business model that will have the support of motivated stakeholders.

Finally, at the last stage of the innovation process, the new BM is implemented, overcoming any internal resistance to change and optimizing through trial and error.

As per other previously presented methodologies, the authors highlight the necessity to revisit each of the stages if needed, and this is represented schematically with iteration loops between them.

Frankenberger's et al. contemporary theoretical construct, constitutes the most comprehensive BM change frameworks. Nonetheless, there is some room for improvement though, as it overlooks pertinent change elements such as defining current business objectives for each key player (as described by Pramataris et al., 2001), it does not disaggregate or map the existing BM (as per Pateli & Giaglis) and does not include a distinct assessment system that will evaluate the impact of changes to the organization and signal the definite adoption of the new BM.

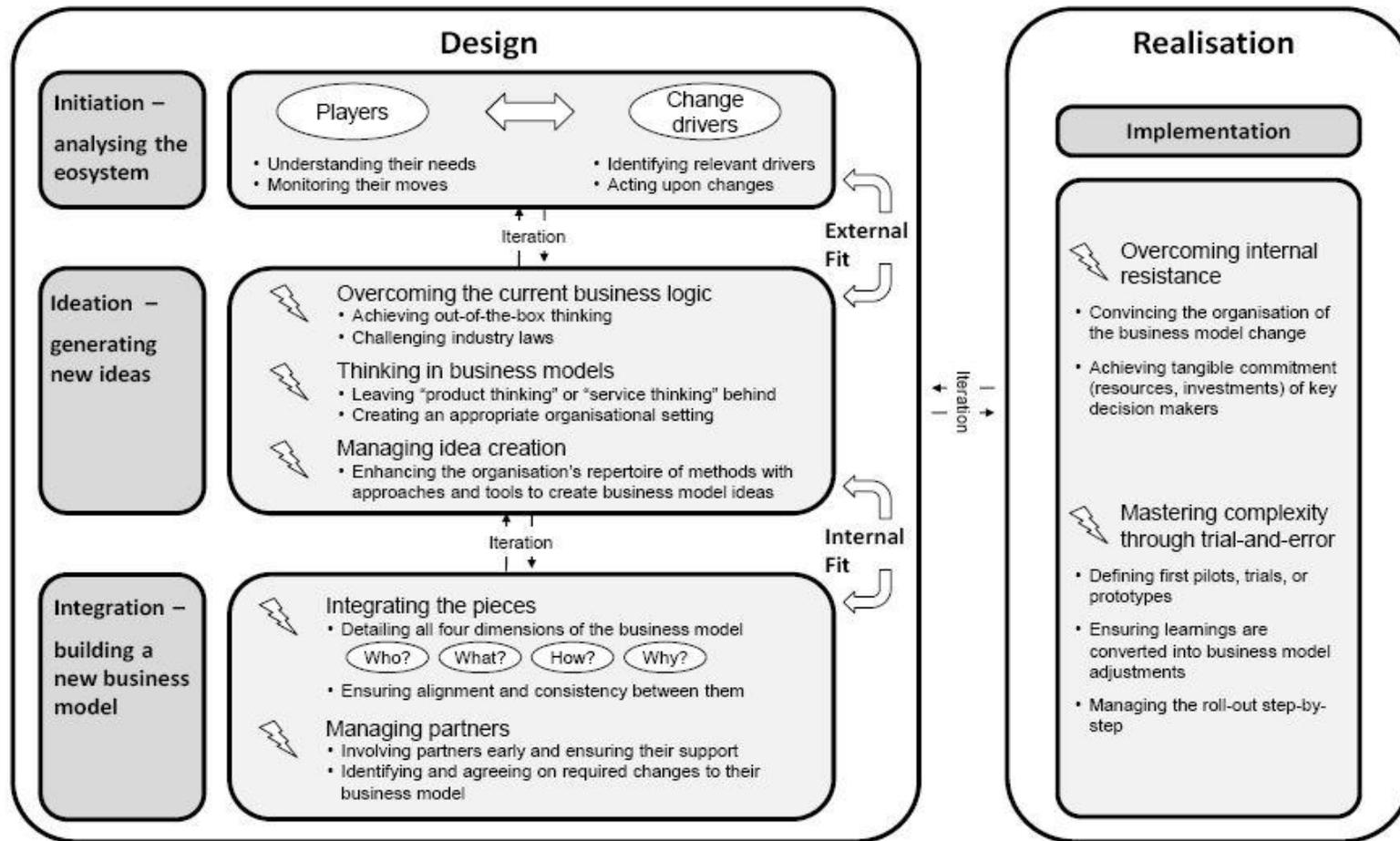


Figure 26: The 4I-framework - Phases of the business model innovation process and their key challenges.

Cavalcante et al. (2011) identified that the process of implementing organizational change is often fraught with difficulties and suggested that only changes that affect the core standard repeated processes of a business model constitute a change in the business model.

Therefore, the authors proposed four different types of business model change. Each type of change involves specific challenges and difficulties. These different types of business model change are illustrated in Table 25. The distinction is rooted in the association of business models with core standard repeated processes.

*Table 25. Business Model Change: Parameters to consider based on key challenges (Source: Cavalcante et al., 2011)*

Type of change	Characterization	Key challenges
Business model creation	Creation of new processes	Uncertainty and ambiguity (failure and inefficiency) Lack of knowledge and skills Lack of resources
Business model extension	Adding new processes	Controlled risk Some shortage of resources
Business model revision	Changing existing processes	Uncertainty and ambiguity Lack of knowledge and skills Path dependence, inertia Blinders, cognitive manifestations Resistance
Business model termination	Terminating existing processes	Resistance

Cavalcante's et al. approach cannot be considered as a change framework, but it rather serves the purpose of highlighting various parameters during different types of BM change.

As depicted in Table 26, each framework focuses on different elements of the change process. Within 20 years of studies on the subject, there is a progression from generic attempts to contemporary analytical methodologies that aim to cover all of the BM change elements.

Table 26: Business model change methodologies

BM Change Methodologies / Typology and elements of change	Sequential Process	Schematic Representation	Stimulus/Initiation	Objectives Setting	Mobilization	Mapping/Disaggregation of current BM	Identification and evaluation of Missing Roles	Design process/Feasibility analysis of scenarios	Switch process	Manage process	Assessment process	Feedback loop
Venkatraman's Five Levels of IT-Enabled Business Transformation	X	X										
Poon & Swatman's Internet-to-Internal Applications Systems Integration	X	X										
Tapscott et al. six steps for b-web strategy design	X					X	X	X				
Timmers Classification of Internet Business Models		X										
Linder & Cantrell's Basic Types of Change Models		X										
Papakyriakopoulos et al. BM development method	X			X		X	X	X				
Auer & Follack - The Evolaris Methodology	X	X			X	X	X	X	X			X
Doz & Kosonen – Determinants of a BM renewal			X		X	X		X				
Mark de Reuver et al - Dynamic Business Model framework	X		X					X		X		
The Business Model Life Cycle – Morris et al.						X	X				X	X
Typology of BMI – Reconfiguring a Firm's Activities - Santos et al.		X						X				
Process overview to model BM dynamics - Samavi et al.	X	X	X	X		X	X	X	X		X	X
Pateli and Giagli's Scenario-Based Methodology for BM Change	X	X				X	X	X	X		X	
5 phases of the business model design process - Osterwalder & Pigneur	X			X	X	X		X	X	X	X	X
Frankenberger's et al. 4 I framework of business model innovation	X	X	X		X		X	X	X	X		X

Fifteen theoretical constructs were reviewed, analyzed and compared to each other, to produce a set of critical change components and characteristics. A sequential process and a schematic representation were identified as significant characteristics of well build frameworks.

Furthermore, the following components are considered as fundamental and indispensable parts of the BM change process, with the respective justification following in the next chapter.

- *Stimulus/Initiation*
- *Mobilization*
- *Mapping of current BM*
- *Evaluation of missing roles*
- *Design process of the new BM*
- *Switch process*
- *Managing the change process*
- *Assessment process*
- *Feedback loop*

With the ever-increasing pace of ICT developments and the inevitable implications to the organizations' BM, an empirically tested comprehensive framework could provide the basis for further evolution and a practical foundation for organizations to implement.

This is attempted in Chapter 5, where the Business Model Evolution Framework is presented and thoroughly analyzed.

**Chapter 5.****The Business Model Evolution Framework**

Complementing on the existing theory, this part of the dissertation introduces a comprehensive framework that aims to include all of the essential elements of a BM change (Figure 27).

The Business Model Evolution Framework is a product of the analytical review of contemporary theoretical BM change frameworks presented in the previous chapter, and the incorporation of strategically relevant sub-elements that aim to enhance its cogency.

The BMEF is composed of critical change elements sequenced in a linear order that allows the practitioner to integrate ICT solutions in the organization's business model, through a coherent and risk minimizing process.

Its objective is to transcend being a mere synthesis of change components, but to constitute a strategic tool that will help organizations evolve their business model by enabling ICT solutions.

Although identifying that there are multiple triggers for a change in the organization's business model, the suggested framework is designed specifically for the effective and efficient integration of ICTs in incumbent firms.

Furthermore and albeit designed with the hotels industry in mind, the suitability of the BMEF could also be tested in other business environments. It is also intended for the future researcher as it provides a complete theoretical foundation for further discussion on the theory of BM change.

In the following paragraphs, each stage of the BMEF is analyzed along with the sub-elements that enable the integration of ICTs in the organization and the evolution of its business model.

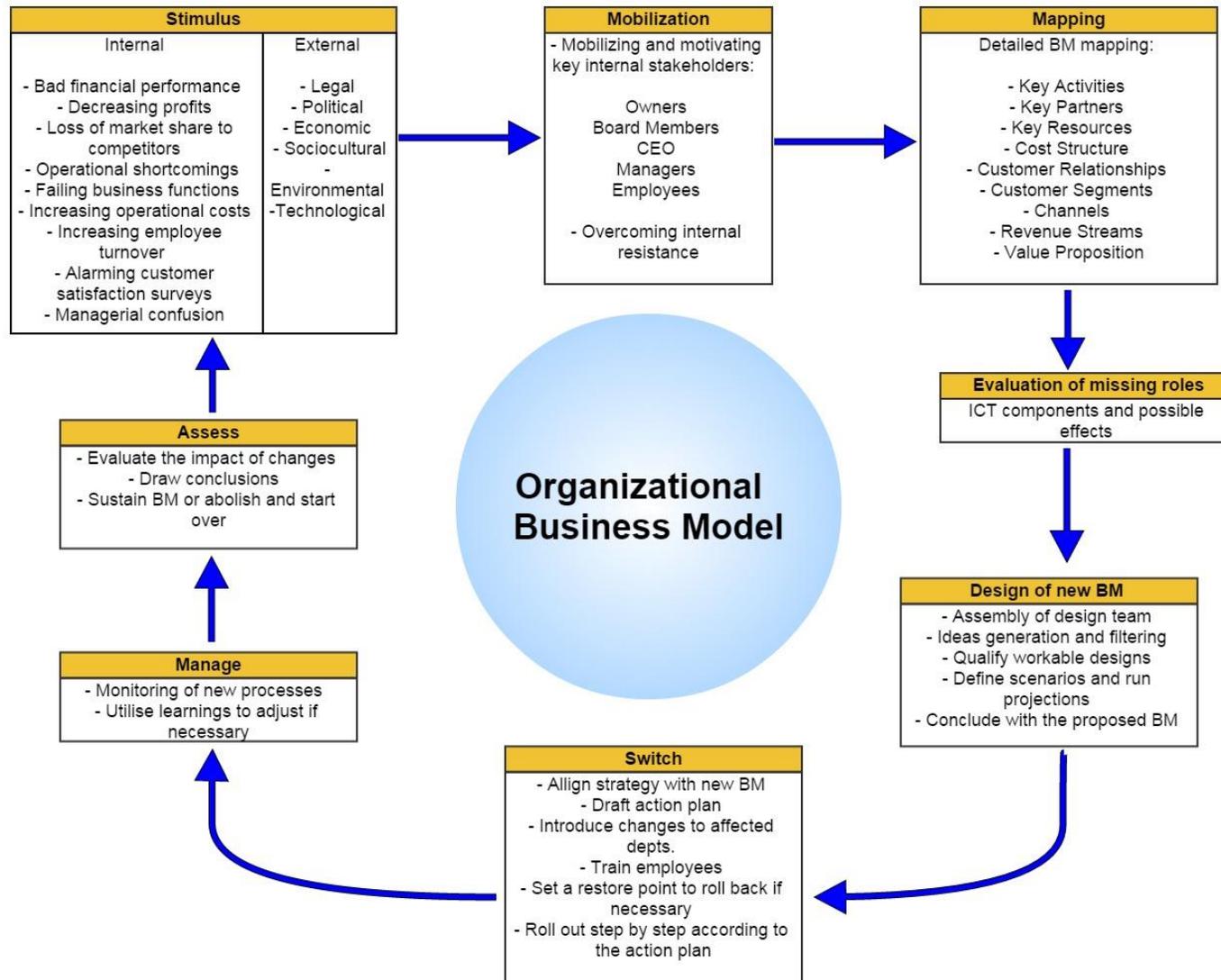


Figure 27: The Business Model Evolution Framework

## 5.1 Stage 1 – Stimulus

BM transformation does not occur overnight. A successful BM is less likely to initiate a change, compared to a defective model. The urge to evolve could be an outcome of an internal or external organizational stimulus.

Samavi et al., (2008), note that a current state of a business model continues to work unless an input triggers a change. This could be any input from the organization's environment, such as the arrival of a new rival, the emergence of a new technology, new regulations and deregulations, etc. Another trigger could be a competitor capitalizing on a specific opportunity. The authors suggest that change in the BM only occurs if the organization perceives the change in the market as signal and not just noise.

Doz & Kossonen (2009), identify strategic discontinuities and disruptions, convergence and global competition as the main factors that force BM change, however they advocate that BM change should be triggered from superior anticipation and greater foresight.

Frankenberger et al. (2013), refer to this stage as 'initiation' phase, posing two challenges which were frequently outlined throughout their research; the understanding of the needs of the players and the identification of change drivers. The first refers to possible changes of the "players" such as customers, suppliers, competitors, universities, or governments (e.g. competitor moves such as business model or pricing changes, as well as new offerings might trigger the BM change process). The second refers to technology or regulatory changes, for example a regulatory change might add unexpected competition into the market and oblige the organization to rethink its BM. Hence, the authors highlight the necessity of identifying those changes in the environment and in technology in order to be able to respond to those changes with adequate innovations.

Among others, internal indicators could also be decreasing profits and financial performance, loss of market share to competitors, operational shortcomings, failing business functions, increasing operational costs, increasing employee turnover, alarming

results of customer satisfaction surveys, managerial confusion, all factors suggesting a failing BM.

Furthermore, a change might be triggered by other input like sheer managerial ingenuity, an adoption of a “me too” business strategy following a competitor’s move, or even by government or EU incentives for the modernization of organizations.

External indicators comprise of the organization’s ecosystem, e.g. a change or shift in the pertaining legal, political, economic, socio-cultural, environmental, or in this case technological environment.

A well-established tool to analyze the organization’s competitive environment is Porter’s five forces (1979), which reflects changes from all possible sources of competition (Figure 28).

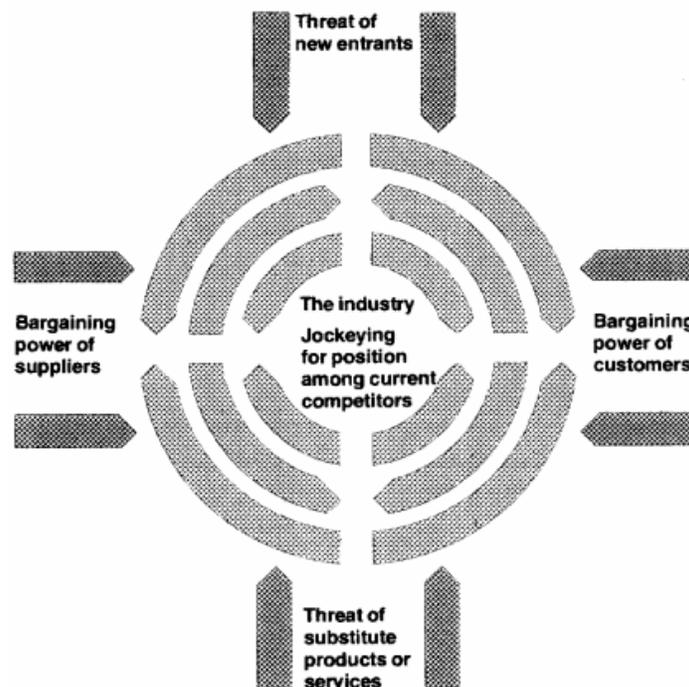


Figure 28. Porter’s Five Forces Model (Source: Porter, 1979)

It is more than evident that a BM change framework should start by identifying the stimulus of the change, thoroughly analyze it and ideally have foreseen it.

## 5.2 Stage 2 - Mobilization

During business reconfiguration, the organization needs to act as a single unit. Any attempt to change without the consensus of the key internal stakeholders is doomed to fail.

At the second stage of this methodology, the awareness of a new business model is raised and the participation of the qualified organization members is secured. Key stakeholders are engaged and motivated for the forthcoming change.

Within their theoretical framework, Auer & Follack (2002) suggest that one of the main aims of this phase is the communication of the improved business model within the organization so that the employees, consultants and customers are able to adapt their own mental models.

This is consistent with Doz & Kosonen (2009) view of interests alignment, as they recognize that it is a mechanism often understood only narrowly and mechanistically, as a problem of incentives. Their work reflects the importance of leadership, as top management should *'be able to achieve collective commitment to taking the risks necessary to venture into new business models and (more difficult) to abandon old ones.'* (Doz & Kosonen, 2009).

Frankenberger et al. (2013) identify the issue as a major challenge during the 'Integration' phase of their framework. The involvement and management of partners is a prerequisite for the BM change, as complexity arises that requires *"a lot of energy and ability to convince"* and *"long discussions that resulted in complex agreements"* (quotes from their questionnaire survey). The authors conclude that the new BM can only work if all involved stakeholders support it and adjust their BMs accordingly.

Osterwalder & Pigneur (2005), incorporate stakeholder motivation in the first phase of their proposed BM design process, as they encourage the creation of awareness of the

need for a new BM, describing the motivation behind the project and establishing a common language to describe, design, analyze and discuss business models.

The consensus to change should come from all the organization's stakeholders, including owners, the CEO and members of the board, managers and employees. The challenge lies with not only motivating the aforementioned, but also succeeding to overcome any internal resistance to change.

### **5.3 Stage 3 - Mapping of current BM**

Since the stimulus has been identified and the need to investigate change is established throughout, the organization should map its current BM. A thorough analysis should be performed in all organizational aspects, including its key activities, partners and resources, its cost structure, its customer relationships and segments, its channels and revenue streams and predominately its value proposition.

The need to map the existing BM is reflected in the majority of the BM change frameworks (Tapscott et al., 1998; Papakyriakopoulos et al., 2001; Auer & Follack, 2002; Doz & Kosonen, 2009; Morris et al., 2005; Samavi et al., 2008; Pateli & Giaglis; 2005; Osterwalder & Pigneur; 2010).

Pateli & Giaglis (2005), argue that a detailed analysis and documentation of the existing BM is required to gain an in-depth understanding of the current situation and establish benchmarks against which technology innovation impacts can be assessed.

Using one of the BM analysis frameworks presented in Chapter 3, the organization can have a complete understanding of the key elements of a specific BM and their relationships, communicating and sharing this knowledge within the firm, specifying

valid requirements for technology innovation, and identifying options for changing and extending the current BM.

Samavi et al. (2008), organize the BM change process by prioritizing the modelling (mapping) the current state of a given business. This is reflected in two layers, the operational and the strategy (Figure 29), producing an explicit representation of strategy and operational aspects of a firm in a point of time.

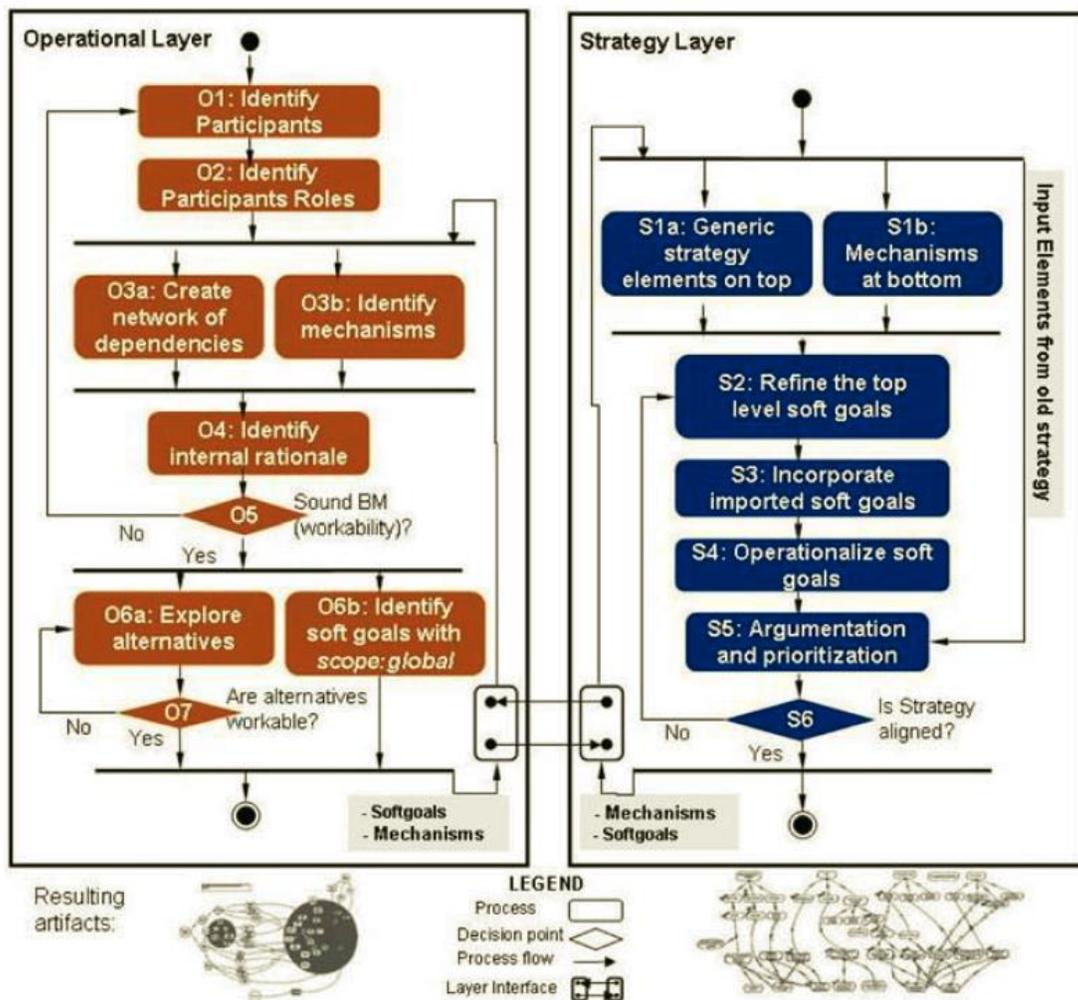


Figure 29. Process overview to model a state of a business model (Samavi et al., 2008)

However, the BM analysis framework embodied in the BMEF is Osterwalder & Pigneur's (2010) conceptualization, which includes the totality of BM elements and value flows within the company and constitutes a better fit in a hotel context (Figure 30).

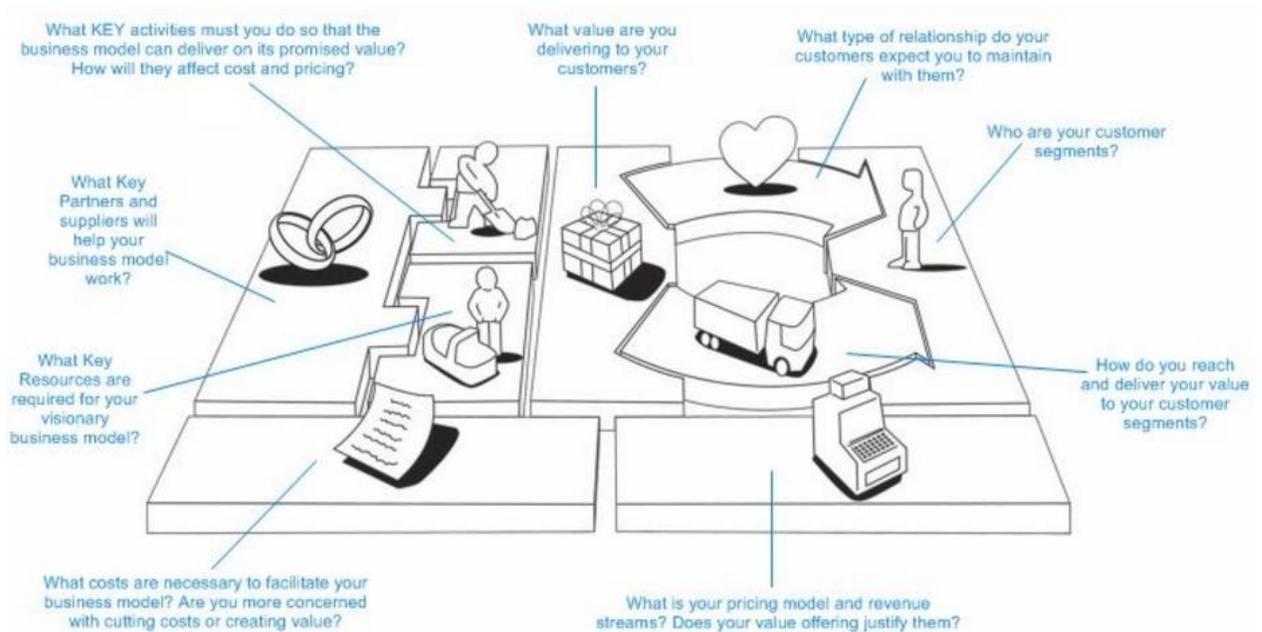


Figure 30. The Business Model Canvas (Osterwalder & Pigneur, 2010)

Using the business model canvas the hotel can depict its current BM structure:

- Key Activities: What key activities must the hotel engage in, so that the business model can deliver on its promised value? How will they affect cost and pricing?
- Key Partners: What key partners and suppliers will help the hotel's BM work?
- Key Resources: What key resources are required for the hotel's BM so it can keep delivering the promised value?
- Cost Structure: What costs are necessary to facilitate the hotel's business model?
- Revenue Streams: What is the hotel's pricing model and revenue streams?
- Customer Relationship: What type of relationship do the hotel's customers expect to maintain them?
- Customer Segments: Who are the hotel's customer segments?
- Channels: How does the hotel reach and deliver value to its customer segments?
- Value Proposition: What value does the hotel offer to its customers?

The analysis of each of the BM building blocks is a vital part of the BM change process as it provides a critical understanding of the organization and its processes, and provides the necessary cognitive foundation for the forthcoming stages of the BMEF.

#### 5.4 Stage 4 - Evaluation of missing roles

At this stage, the organization gathers and evaluates all available ICT elements that could be integrated in its BM (see also Table 4, Chapter 2). Using all sources of external and internal information, the management or an assigned team collects data on available ICT tools and their possible positive effects. Having established a good understanding of the current BM, all missing roles are identified and matched to respective ICT solutions.

Papakyriakopoulos et al. (2001) argue that the only way to gain higher value is to invest in new technologies or get a great business opportunity, suggesting two alternative paths (Figure 31).

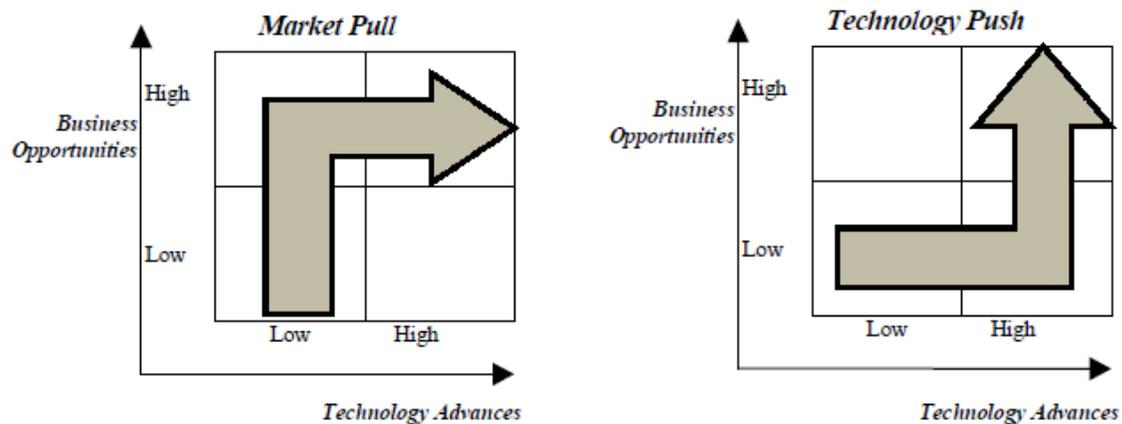


Figure 31. Alternative paths to increase the value

In the first path technological integration is driven by business opportunities (market pull), while in the second path it is the technology push that raises first and the value and the market pull follow afterwards.

In Auer & Follack's (2002) Evolaris methodology, the evaluation of missing roles is reflected in phase two, labelled 'Identify the Internet's Influence'. Although restricted to the influence of the Internet, this phase is critical as it allows the organization to examine the possibilities of changing the business model towards gaining competitive advantage.

The way to achieve this goal is by gaining a deep knowledge of the missing roles and being able to supply a learning environment for the managers enabling them to change their mental models. The process includes pointing out the involved risks and opportunities of the available (ICT) options and helps to generate a variety of change opportunities that are evaluated by the organization.

Pateli & Giaglis (2005), highlight the importance of this stage, as it constitutes an important phase of their BM change methodology, aiming to identify the possibilities for evolution or extension of the current BM.

This phase is divided in two separate steps, the assessment of the influence of technology innovation and the identification of missing roles. The first focuses in the identification of the benefits and impacts that a given technological solution brings to key elements of the BM and a specification of the changes imposed on the current BM's structure. The second includes an identification of the requirement for one or more new roles that accomplish new business functions, and a description of the activities and the functions of each of these roles (Pateli & Giaglis, 2005).

Following these two aspects of the identification of the influence of ICTs, changes can be better planned, leading to an effective exploitation of the capabilities of the proposed technology innovation.

The contemporary hotel has to evaluate countless ICT solutions that may enhance its business model, transforming it to a more efficient form. However, the challenge of this stage lies in acquiring the required knowledge to be able to:

- Identify organizational processes for improvement
- Assess available ICTs and their possible influence on the BM
- Look beyond the anticipated benefits and identify possible risks
- Identify the requirements in terms of new resources that may be needed to support the new technology

This stage is an integral part of the BMEF and its successful completion is a prerequisite for next critical stage of the design of the new business model.

### 5.5 Stage 5 - Design of the new BM

The success or failure of the new business model will be most likely determined during this phase of the methodology. Having identified all missing roles, the level of ICT integration is decided and tested in various versions of the desired BM. All ideas and knowledge gained during the previous stages is presented, questioned and tested, to produce a variety of scenarios that will lead to the formulation of the most suitable business model.

For Tapscot et al. (1998), this is a process of re-aggregating the previously dis-aggregated business model. It includes determining what it will take to deliver the new value proposition, including processes, contributors, contributions, applications and technologies, and other success factors. This leads to the design of a new value map that can be implemented throughout the organization.

De Reuver et al. (2008), explain that design choices in the organization and finance domain, may serve the strategic interests of the involved actors, identifying the below design issues (Table 27). By successfully addressing those issues, the organization can design a balanced new business model, creating value despite the complexity of the BM design process.

*Table 27. Organizational and Finance Design Issues (Based on De Reuver et al., 2008)*

Organizational Domain	Finance Domain
Partner selection	Pricing of service
Network openness	Division of investments
Orchestration of activities	Division of costs and revenues
Managing relations with partners	Valuing the contributions and benefits
Outsourcing	Investment planning over time

As discussed in chapter 4, Pateli & Giagli's (2005) contribution in the BM change topic is considered highly significant as they engage in scenario planning. The organization should not rest its efforts in one new BM design, but minimize risk of failure by defining a set of scenarios, each of which proposes a different cooperation scheme and way of

distributing responsibilities between new and existing players in the new business environment. This step of BM design experimentation allows the organization to evaluate the implications of alternative process and value configurations, concluding to the most suitable BM design.

Pateli & Giagli's (2005) contend that the final scenario that will guide the development of future BMs will be determined by a number of factors affecting the organization, both external (industry-related) and internal (firm-specific), outlined in table 24. These factors should be analyzed and taken into consideration during the design of the future BM, as they might decide the success or failure of the organization's BM evolution effort.

On a more practical level, Osterwalder & Pigneur (2010), suggest that the critical success factor of this stage is expansive thinking, allowing a design team consisted of people of different business units to brainstorm and explore multiple ideas. As per the below table, the authors argue that an inquiry-focused design attitude should be encouraged, along with testing and experimentation with outside experts of prospective clients, avoiding early suppression of bold ideas or "falling in love" with ideas too early.

*Table 28. BM Design Activities, Success Factors and Key Dangers (Based on Osterwalder & Pigneur, 2010)*

ACTIVITIES	CRITICAL SUCCESS FACTORS	KEY DANGERS
Brainstorm	Co-create with people from across the organization	Watering down or suppressing bold ideas
Prototype	Ability to see beyond status quo	Falling in love with ideas too quickly
Test	Taking time to explore multiple business model ideas	
Select		

During this critical stage of the BMEF, the hotel should assemble a cross-departmental design team to generate and filter ideas, qualifying the workable BM designs, and through scenario planning and implementation projections, conclude to the BM design that is the best possible fit to the organization.

## 5.6 Stage 6 – Switch

Having decided on the final version of the new BM, its organizational implementation takes place. Depending on the level of ICT integration, the actual change involves all the organization or only the affected departments. The new BM is implemented following a carefully drafted action plan to avoid any operational anomalies and to secure organizational alignment.

Auer and Follack (2012) reflect the implementation of the new BM design in the third stage of the Evolaris methodology, firstly by developing an action plan. Subsequently the organization documents and structures all knowledge gained from the previous stages and utilize it throughout the change process.

In their conceptualization of the BM change process, Samavi et al. (2008), explains that at this stage it is important to secure that strategy is aligned with the workable new design. This is to establish that “...*the business model is sustainable to respond to the change, otherwise more strategic moves need to be investigated and source of conflicts between firm’s strategy and operation need to be explored.*”

Pateli & Giaglis (2005) suggest during the implementation process that the new BM should be comprehensively described, by indicating the value provided by each player in the future model, as well as defining financial and communication flows among players.

Frankenberger et al. (2013), note that this is a crucial point in time for business model innovation, as it typically involves investments to be made and risks to be taken by the organization, quoting a statement from a member of a focus groups participating in their study: “*The most challenging thing with business model innovation is to successfully implement the new business model...*”. There is a certain degree of reluctance to change, as members of the organization might be skeptical or even negative of the new configurations, as they might have limited information. Again, the authors quote for one the studied cases that “*many employees did not understand the product and how we*

*wanted to sell it*". That raises the issue of the adequate communication and presentation of the new BM to all affected department and employees, and the necessity to organize and conduct training sessions where necessary.

Osterwalder & Pigneur (2010) explain that this is the stage where an implementation design is applied, including defining all related projects, specifying milestones, organizing any legal structures, preparing a detailed budget and project roadmap, etc. The process might be outlined in an action plan, which will secure the alignment between the old and the new BM and entail a highly visible, multi-channel communication campaign announcing the new BM.

Adding to the above and before the switch to the new BM, it would be safe for the organization to set a restore point to maintain the option of rolling back if necessary. If for example a hotel would choose to upgrade its website to a completely new reservations enabled and PMS connected solution, it would be wise to keep a backup of the current website in case something goes wrong with the integration of the new technology.

Also and in accordance with Frankenberger's et al. (2013) approach, big changes are rarely preferred when a new business model is implemented. A cautious strategy of taking small steps toward the realization of the business model moves to the direction of mitigating risk in the implementation process.

Hence, the hotel can safely go through the business model switch process by encompassing the below sub-elements (Figure 32)



*Figure 32. Sub-elements of the BM Switch process*

### 5.7 Stage 7 - Manage

Following the implementation of the new business model, the organization is facing the aftermath of its operational reconfiguration. Close monitoring of execution of new processes allows for necessary adjustments and operational tuning where needed.

This stage is included in de Reuver et al.'s (2009) 'commercialization' phase, which the organization enters after the market experiments have proven successful. Once initiated, attention is given to the management of the commercial exploitation on a day-to-day basis, focusing on operations and maintenance.

In their '4-l framework', Frankenberger et al. (2013), stress the need for alignment between the design phase and the realization phase, as experiences made during the BM switch can require adjustments of the business model. Since there is always the possibility that the planned design might not work in real life, this iterative loop is crucial so to finally develop a business model that can be successful. It is considered critical that learnings occurred at this stage are then used to fine-tune the business model or to perform larger adjustments if required. This approach is supported by the findings in their study, as "*...in almost all of the cases that applied it, subsequent adjustments were made to the new business model. Only after one or several iterations of the cycle, these companies decided to fully roll out the new business model.*" Frankenberger et al. (2013)

Johnson et al. (2008), emphasize that companies have to focus on learning and adjusting as much as on executing. This is further supported by Sosna et al.'s (2010) view, that an emerging dynamic perspective sees business model development as an initial experiment followed by constant revision, adaptation and fine tuning based on trial-and-error learning.

Although the “manage” stage is the least discussed in existing literature, it constitutes an important part of the BM change process and it must not be confused with the assessment stage of the newly implemented BM. This stage differs from assessing the implications of the BM switch, as it utilizes observation to yield any potential learning that can be immediately exploited to make critical adjustments.

Following the completion of the BM switch, the organization is required to closely monitor the seamless operation of the new processes and identify any possible emerging issues that may disrupt its operations and value flows.

This operational ‘tuning’ does not have a definite character but it is rather based on an iteration principal, since the members of the organization assigned with this responsibility should continuously engage in identifying possible issues, while ensuring the continuous alignment of the new roles with the organizational strategy and objectives.

If for example a hotel modified its business model to integrate a key card technology, the front office, housekeeping, engineering and I.T. departments should work together to ensure the correct implementation of the processes throughout the guests’ experience. Any possible issues with the door installation, the front office’s hardware and software integration or anything reported by customers, should be taken into consideration and immediately ameliorated.

The ‘manage’ stage acts as an introduction to the final stage of the BMEF, as it allows the organization to assess a fully operational, tested and amended where required new business model.

### 5.8 Stage 8 - Assess

As the selected ICTs are fully integrated in the new BM and as the first data emerge, the effects of the switch are being evaluated against the desired outcome. Using the provided feedback, the organization utilizes the knowledge to continuously finding ways of improving the new BM, or to abolish it and start a new cycle from stage one.

Evaluating the aftermath of the new BM, holds a central role in Samavi et al.'s (2008) conceptualization of the business model dynamics (Figure 23). During this stage (T4), the new model is reassessed to produce new findings that may trigger further investigation of the BM configuration.

Similarly, Pateli & Giaglis (2005), emphasize the importance of including the evaluation of the impact of changes in a BM change methodology, as it is considered necessary to conclude the proposed BM description by estimating the impact of the transformed BM on the structure and dynamics of the markets concerned. As per the authors, this step can also serve as a link to subsequent change implementation programs, since it defines the metrics by which alternative BMs will be evaluated.

The assessment stage is also thoroughly analyzed by Osterwalder & Pigneur (2010) in their book 'Business Model Generation'. Even though referred as 'manage', the final stage of the BM change process includes continuously assessing the model and scanning the environment to understand how it might be affected by external factors over the long term. The importance of continuous assessment is magnified by the authors who suggest that improving and rethinking the organization's business model should be every employee's obsession rather than something it preoccupies only top management. The importance of proactiveness is stressed as a response to market evolutions and the establishment of an organizational business model governance is encouraged to manage synergies and conflicts, and to track the evolution of the organization's business model (Table 29).

*Table 29. BM Adapting and Modifying the Business Model (Based on Osterwalder & Pigneur, 2010)*

ACTIVITIES	CRITICAL SUCCESS FACTORS	KEY DANGERS
Scan the environment	Long-term perspective	Becoming a victim of your own success, failing to adapt
Continuously assess your BM	Proactiveness	
Rejuvenate or rethink your model	Governance of BMs	
Align BMs throughout the enterprise		
Manage synergies or conflicts between models		

Granted that new business models are often highly uncertain, making it *"difficult to know in advance how best to take of advantage of them"* (McGrath, 2010), it is imperative for the organization to evaluate the impact of changes enforced by the new BM and draw definite conclusions for each and every building block, as well as for the overall seamless operability of the new BM.

At this stage the hotel having evaluated the new business model and its implications with regard to the desired outcome, processes, stakeholders, value flows, strategic alignment and organizational objectives, makes the final decision to sustain, pursue further improvement or at the worst scenario abolish the ICT enabled business model.

A relevant example in the hotels environment could be a business model change due to the integration of a channel manager (XML) solution. The incorporation of such a technology would enable the hotel to distribute its inventory of rooms to its distribution channels automatically, gaining on operational efficiency and minimizing the risk for error. After the completion of the switch, the new business model would require managers and employees to be familiar with the new interface, and the provider's software to be perfectly integrated with the hotel's systems. Even though issues might have been addressed and ameliorated in the 'manage' stage of the BM change process, the new ICT enabled BM might not be as effective as visualized and there are numerous cases in the industry that hotels have rolled back to their previous business model.

This is why a continuous assessment of the new BM is considered critical, leading the discussion to the necessity of a feedback loop that will carry essential information throughout the process and contribute to the sustainability of the new BM.

### **5.9 Sequencing the Implementation Stages and the Feedback Loop**

One of the main contributions of the Business Model Evolution Framework, is that it attempts to sequence the stages of the BM change in a businesswise rational order, that acts as an implementation guide for the organization.

The stepwise and linear approach of actions in BM change frameworks was firstly introduced by Papakyriakopoulos in 2001 and adopted by the majority of subsequent frameworks (Auer & Follack, 2002; Pateli & Giaglis; 2005; de Reuver et al., 2008; Samavi et al., 2008; Osterwalder & Pigneur; 2010; Frankenberger et al.; 2013). This can be partially attributed to the need to introduce methodologies that may have a practical application to the firm that wishes to have an analytic ‘blueprint’ of the change process.

In a hotel context, this was supported in 1998 when Okumus & Hemmington published a research on the management of the change process in hotel companies. In their work, they criticized Lewin’s (1951) early simplistic model and presented five basic process categories. Those were presented in the below sequence and verified by their qualitative research of in-depth data with UK hotels (Figure 33).

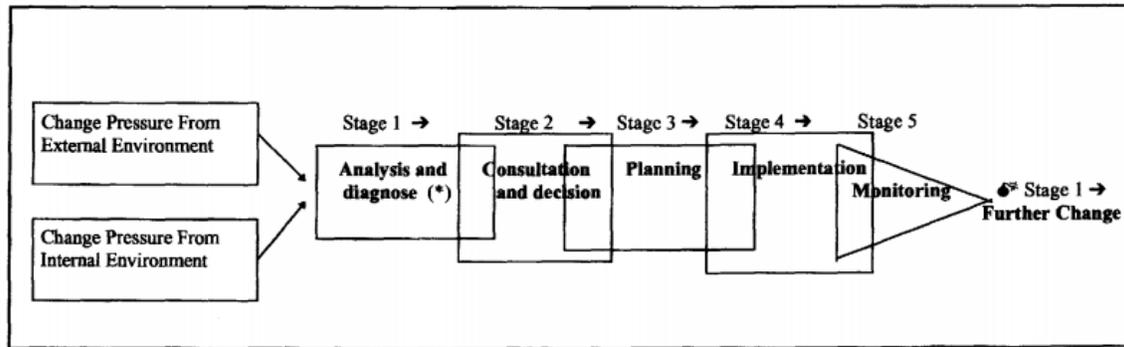


Figure 33. The main stages of a change process at operational level in hotel firms

The aforementioned studies manifest the usefulness of sequencing the implementation stages and it is left to the current research to verify the specific ranking of stages.

The discussion around the BMEF's stages sequence raises the issue of the link between them, reflected in the theoretical construct by a continuous feedback loop. This can be considered as an information and knowledge highway that facilitates the communication within the BM change process and allows for flexibility and instant modifications where needed.

The feedback loop is an integral part of the process and is supported in preceding studies, like in Auer & Follack's (2010) work, who argued that during the application of the methodology a continuous review and documentation process is obligatory. As they emphasize, moving forward or backward from one-step to another is explicitly allowed, and this can be triggered by exploiting the feedback loop.

This process of information exchange enables the continuous review of the framework, which remains optimally calibrated. Frankenberger et al. (2013), identify that as all factors change over time, it is important to review the framework and especially the existence of the fits or misfits between the stages of integration

The importance of the feedback loop is also highlighted by Papakyriakopoulos et al. (2001). Labelled as feedback chain, its purpose is to examine and collect all the

information resources that could help and empower some processes that are placed on the value chain. Essentially, “...*the feedback chain affects the structure of the business model indirectly through the information provision, which investigates the real divergence between actual and expected indicators.*”

The diffusion of information within the BMEF via the feedback loop, contributes to the early anticipation of changes in the market. As Morris et al. (2005) suggest, a basically sound model will typically withstand economic downturns and modest disturbances but can become dysfunctional if major discontinuities occur; to be complemented by Teece’s (2010) argument, that changing technology and enhanced competition will require more than defenses against imitation.

Having established the theoretical suitability of each stage as well as the rationale of the Business Evolution Framework design, the interest is now shifted to the framework’s practicality and validation through the conducted research on its application to hotels.

**CHAPTER 6****Research Methodology**

Chapter six elaborates on the selection of the research methodology that was employed to reach the set objectives. The characteristics of quantitative research are compared with the ones of the qualitative research and the methodology selection is defended through the respective justification. The sampling method is also discussed and suitability of random sampling for this research is adequately explained. Subsequently, various methods of collecting primary data through surveys are explored, to conclude to the appropriateness of online questionnaires. Research design issues are further examined regarding the size of the sample, the characteristics of participating hotels and the research identity, leading to the presentation of the research findings in the following chapter.

Based on the literature review, the following research questions and resulting hypotheses are formulated:

**RQ1:** Do hotels follow a specific methodology when changing their BM due to the integration of new ICTs?

**H1:** The majority of hotels do not follow a specific methodology when changing their BM due to the integration of new ICTs.

**RQ2:** When integrating new ICTs, do hotels rank the stages they would choose to implement in an orderly sequential manner?

**H2:** When integrating new ICTs, hotels would follow an orderly sequential process by prioritizing the stages they choose to implement.

**RQ3:** Among hotels, is there a positive impact of ICT-induced BM change upon profitability?

**H3:** ICT-induced BM change has a positive impact upon profitability of hotels.

**RQ4:** Among hotels, is there a positive impact of ICT-induced BM change upon cost reduction?

**H4:** ICT-induced BM change has a positive impact upon cost reduction of hotels.

**RQ5:** Among hotels, is there a positive impact of ICT-induced BM change upon staff productivity?

**H5:** ICT-induced BM change has a positive impact upon staff productivity of hotels.

**RQ6:** Among hotels, is there a positive impact of ICT-induced BM change upon operational effectiveness?

**H6:** ICT-induced BM change has a positive impact upon operational effectiveness of hotels.

**RQ7:** Among hotels, is there a direct and positive impact of ICT integration upon operational performance?

**H7:** ICT integration has a direct and positive impact upon operational performance of hotels.

**RQ8:** Among hotels, is there a direct and positive impact of operational performance upon organizational performance?

**H8:** Operational performance has a direct and positive impact upon organizational performance of hotels.

**RQ9:** Among hotels, is there a direct and positive impact of ICT integration upon organizational performance?

**H9:** ICT integration has a direct and positive impact upon organizational performance of hotels.

## 6.1 Selecting a Quantitative over a Qualitative Research Methodology

As discussed in the short overview of the research methodology in Chapter 1, a typical classification of methods is into qualitative and quantitative. As Thomas argues, neither of these methods is intrinsically better than the other; the suitability of which needs to be decided by the context, purpose and nature of the research study in question (Thomas, 2010). The two research approaches clearly differ in terms of their purpose and how data are collected and analyzed.

Roberts and Wilson (2002), note that the philosophy underpinning information and communication technology (ICT) is not wholly compatible with that which underpins qualitative research. ICT is based largely on logical, objective and quantifiable procedures whereas qualitative research requires a more subjective, interpretative stance and seeks to explore meaning. As the authors suggest, “*Qualitative research aims to uncover meanings as they are apparent to an individual respondent; quantitative research relies on aggregation, quantification and categorization as an adequate method to arrive at a scientific truth.*” (Roberts and Wilson, 2002). The authors argue that a qualitative approach is more suitable when the aim of the research is to move towards theory, rather than test it. A qualitative approach may be used when there is limited knowledge about a subject and the researcher may have few pre-conceived ideas about the subject or about the data that will be gained.

With regard to the hospitality industry, Lewis et al. (1995) observe the purpose of qualitative research is usually to provide information for developing further quantitative research.

Furthermore, Walle notes that hospitality scholarship “...bear(s) the imprints of logical positivism, statistical investigation... A truism of scientific method asserts that the phenomenon under consideration must be empirically verifiable and observable...” (Walle, 1997)

Riley & Love (2000) add to the discussion of selecting the appropriate research methodology, by referring Crawford-Welch & McCleary's work (1992), who questioned the methodological soundness of qualitative research, suggesting that multivariate techniques were more appropriate for the complexity of hospitality issues.

Finally, in a review of quantitative techniques, Reid & Andereck (1989) implied that the increase of the statistical sophistication was a necessary and sufficient condition for progress in the field of tourism research, enforcing the appropriateness of quantitative methodology in this environment.

The nature of the research questions set in Chapter one, in conjunction with the element of ICTs in the hospitality environment, qualify the quantitative methodology of online questionnaire, as it is more suitable and it bears important advantages over qualitative methodologies.

Hence, the quantitative approach is considered more reliable and objective, as it deals with a sample that is representative of the population, can utilize statistics to generalize findings and it is used to test the theoretical framework along with the research questions.

## **6.2 Random Vs Non-Random Sampling**

Following the decision on the research methodology, the researcher must conclude on the suitable sampling method.

Chisnall (1997) thoroughly analyzes both methods of sampling, the probability sampling (random sampling) and the non-probability sampling. As he defines, "*Probability sampling, also known as random sampling, results in every sampling unit in a finite population having a calculable and non-zero probability of being selected in the sample. This means that the chance of a unit being included in a sample can be calculated*".

In contrast, non-probability sampling “...occurs when selection of the sample is dependent on human judgement and not on the rigorous application of the probability theory”. The author comments on the wide adoption of probability sampling by leading research bodies because of its sound theoretical basis, which allows the legitimate use of the mathematics of probability, also adding that it is statistically sounder and that it avoids the bias arising from interviewers.

Given the research objectives, the simple random probability sampling was qualified as a more appropriate method compared to the non-probability sampling. The latter is based on the subjective judgement of the researcher, selecting units from the population in question, as opposed to the former, where there is an equal chance of selecting each unit from the population.

Simple random sampling was selected for theoretical and practical reasons, as it minimizes sampling bias, produces statistical inferences, ensures a high degree of representativeness and it represents the most relevant method to answer the thesis research question.

The appropriateness of this method to the pertaining research can be also attributed to the availability of access to the total of population, which includes all 1746 licensed hotels in the selected administrative regions. The administrative authorities of Western Macedonia, Central Macedonia, Eastern Macedonia, and Thrace were contacted regarding the required details of the research population, which they officially provided via email.

Moreover, this region includes a diverse range of hotels in terms of location and is to a great extent representative of the whole country with regard to the hotel operation (rating via stars, number of rooms, seasonal operation, etc.).

The final sample emerged by excluding hotels with false or not complete contact details, producing a complete list of 870 hotels.

### 6.3 Survey Research: Online Questionnaire

Following the decision to engage in a quantitative simple random research, it is critical to collect the necessary primary data through the most appropriate survey method.

Proctor (1997), notes that when using surveys to help answer a problem, relevance, accuracy, timeliness and cost must be taken into account. Other decisive factors also include the coverage of target population, the flexibility of asking questions and the respondent's willingness to participate. The author explores some of the methods of collecting primary data through surveys; postal surveys, personal interviews, telephone surveys; completely self-administered surveys, panels, and omnibus studies.

Kotler et al. (1999), identify there are four basic research approaches: observational, focus group, survey, and experimental.

Observational research gathers data by observing the relevant actors and settings. It is an exploratory research aiming to produce relevant hypotheses.

Focus-groups involves the assembling of a team of participants, typically six to ten persons, who are invited with a skilled moderator to discuss a product, service, organization, or other marketing entity. Again, this method can be considered as an exploratory step to take before designing a large-scale survey.

Experimental research is best suited for causal research as *"...it calls for selecting matched groups of subjects, subjecting them to different treatments, controlling extraneous variables, and checking whether observed responses differences are statistically significant...The purpose of experimental research is to capture cause-and-effect relationships by eliminating competing explanations of the observed findings"*. (Kotler et al., 1999)

Among all available research approaches, the most suitable way to collect the required primary data is through a survey research, as it is best suited for descriptive research, in contrast with other methods like observational and focus group approaches, who are best suited for exploratory research.

Chisnall (1997), clarifies that survey questionnaires may be applied in several different ways: by personal interview, by telephone, by email, or self-administered, suggesting that the type of questionnaire depends on the method of survey, and this will be depended on the nature of the problem being investigated, the kind of population sampled, and the sample size.

Postal surveys use the traditional post office to send a questionnaire to a potential respondent and the person writes in the replies and posts it back. Although it is a low cost approach that avoids any possible interviewer bias and favors lengthy questionnaires, it presents some significant drawbacks, excluding it as a research method in this occasion.

First and most important, the response rate is typically low, whereas one of the goals of the specific research was to achieve a high response rate, securing the efficient representation of the whole population and allowing a safe generalization on a national level.

Second and even though this method favors long questionnaires, the time needed by the responded to fill in the ten-page questionnaire was considerably higher than other available methods (i.e. online questionnaire).

Third, the questionnaire was designed and intended to be answered by specific people within hotels. Postal surveys include the risk of being answered by someone who is not qualified to do so, endangering the validity of responses.

Personal interviews involves the arrangement of a personal appointment in physical location, where the respondent and the interviewer speak face-to-face. This has been identified by Proctor (1997), as an expensive and time-consuming method that generates a low response rate unless a great deal of time is spent in making callbacks. Furthermore,

there were some additional considerations leading to the dismissal of this method. Given the time it takes an interview to produce the required data and the anticipated time-constraints due to the position of the respondents (hotel owners, CEOs, Managers, etc.), this method could potentially risk the quality of the responses.

What is more, the research aimed for objective un-guided responses; hence, the goal was to minimize the influence of the interviewer. This would not be possible if the personal interview method was employed, a fact amplified by the preexisting professional relationship of the interviewer with the respondents.

As Kotler et al. (1997) suggest, telephone surveys is the best method for gathering information quickly, although they have to be short and not too personal. They are usually cheaper than personal interviews since there is no travelling cost for interviewers and collection is usually faster than for personal interviews (Statistics Canada, 2010). However, this method was not considered for this research, as it is limited by the length of the interview and complexity of the questionnaire. For example, an important number of questions included in the ten page questionnaire had more than five potential answers, making it difficult for the respondent to recall their options. Furthermore, confidentiality might be an issue, as the respondents might not want the conversation to be overheard by staff members. Finally, telephone interviews are less suitable for this research compared to other methods that allow the respondents to fill-in the survey in their own time, whenever their busy schedule would allow them to do so.

Online surveys include two different options to collect primary data. The first is via email containing an embedded questionnaire, or providing a link, which directs the respondent to the online questionnaire (e.g. google forms). The second is through an active website that is open to any visitor that can convert to a respondent (e.g. online polls).

The online questionnaire is the selected method employed in this research as it presents significant advantages over the other alternatives and is more relevant to the nature of the research questions and research environment. A decision was made to address to the

whole of the sample, i.e. all 870 hotels in the region and online questionnaires was the most appropriate method to do so. In addition, since the focal point of the research is the use ICTs in hotels, there is a high relevance to the choice of the research method as hotels have the needed infrastructure (computers and internet access) to participate. Moreover, given the length and complexity of the questionnaire, its online version provided the necessary convenience to the respondents to fill-in the questionnaire in their own time or partially complete it and resume later. Scaled and multi-choice questions could also be incorporated and despite the length of the questionnaire, a user-friendly environment was designed with google forms. An additional advantage was that the process was fully automated, securing real time access to the responses as well as an overall monitor of the process. Finally, any effect of the interviewer's influence was avoided, as respondents were not guided verbally through the process of completing the questionnaire.

#### **6.4 Sample Size**

Having established online questionnaire as the vehicle to collect the required data, what follows is the determination of the sample size.

As per the Statistics Canada report (2010), *“There is no magical solution and no perfect recipe for determining sample size. It is rather a process of compromise in which the precision requirements of the estimates are weighed against various operational constraints such as available budget, resources and time.”* The formula to calculate the size of the sample needed to satisfy a specific level of precision, must take into account factors such as the variability of the population, the size of the population, the sample design and estimator and the response rate.

This is also supported by Chisnall (1997), who notes that the size of the sample depends on the basic characteristics of the population, the type of the information required from the survey, and the cost involved.

Proctor (1997), suggest that marketing researches use at least four different methods of determining sample size; intuition, statistical precision, cost limitations, and industry standards.

It is accepted that the larger the size of the sample, the greater the precision or reliability, but there are constraints (i.e. time, staff and cost), which practical researchers must acknowledge (Chisnall, 1997). This is evident in the case of simple random sample (SRS) used in this research, since precision improves as the sample size increases (Table 30).

*Table 30. Sample Size and Margin of Error in Estimate of P, using SRS, when P=.5  
(Statistics Canada, 2010)*

<b>Sample Size</b>	<b>Margin of Error</b>
50	.139
100	±.098
500	±.044
1,000	±.031

This example is used to illustrate that there is no linear relationship between the sample size and margin error as they fluctuate disproportionately, so it is up to the researcher to decide whether it is worth the effort and resources required to increase the sample size in order to improve the precision.

When random sampling techniques are to be used in as survey, it is possible to calculate mathematically the size of a sample designed to give a degree of precision in the survey findings (Chisnall, 1997). A number of formulas can be used to calculate the sample size required to provide a given level of precision for an estimated average or proportion (Statistics Canada, 2010).

Furthermore, Kotrlik et al. (2001), developed a table for determining the minimum returned sample size for a given population size for continuous and categorical data (Table 31)

*Table 31. Table for Determining Minimum Returned Sample Size for a Given Population Size for Continuous and Categorical Data (Kotrlík et al. 2001)*

<b>Table 1: Table for Determining Minimum Returned Sample Size for a Given Population Size for Continuous and Categorical Data</b>						
Population size	Sample size					
	Continuous data (margin of error = .03)			Categorical data (margin of error = .05)		
	alpha = .10 $t = 1.65$	alpha = .05 $t = 1.96$	alpha = .01 $t = 2.58$	$p = .50$ $t = 1.65$	$p = .50$ $t = 1.96$	$p = .50$ $t = 2.58$
100	46	55	68	74	80	87
200	59	75	102	116	132	154
300	65	85	123	143	169	207
400	69	92	137	162	196	250
500	72	96	147	176	218	286
600	73	100	155	187	235	316
700	75	102	161	196	249	341
800	76	104	166	203	260	363
900	76	105	170	209	270	382
1,000	77	106	173	213	278	399
1,500	79	110	183	230	306	461
2,000	83	112	189	239	323	499
4,000	83	119	198	254	351	570
6,000	83	119	209	259	362	598
8,000	83	119	209	262	367	613
10,000	83	119	209	264	370	623

NOTE: The margins of error used in the table were .03 for continuous data and .05 for categorical data. Researchers may use this table if the margin of error shown is appropriate for their study; however, the appropriate sample size must be calculated if these error rates are not appropriate. Table developed by Bartlett, Kotrlík, & Higgins.

However, the sample size of this research is not approached mathematically nor by the above table, as it has been decided to address to all units of the sample, i.e. to all 870 hotels with complete contact details.

## 6.5 Description of Primary Characteristics of the Population

Chisnall (1997), defined the population as “...any group of people or objects which are similar in one or more ways, and which form the subject of study in particular survey”

According to the Hellenic Chamber of Hotels (2014), there were 9851 licensed hotels of various star classification, located in 13 administrative regions throughout Greece (Table 32).

The population of this research consists of hotels operating in Northern Greece, which is composed of the administrative regions of Western Macedonia, Central Macedonia, Eastern Macedonia and Thrace.

*Table 32. Hotel Capacity in Greece (Hellenic Chamber of Hotels, 2014)*

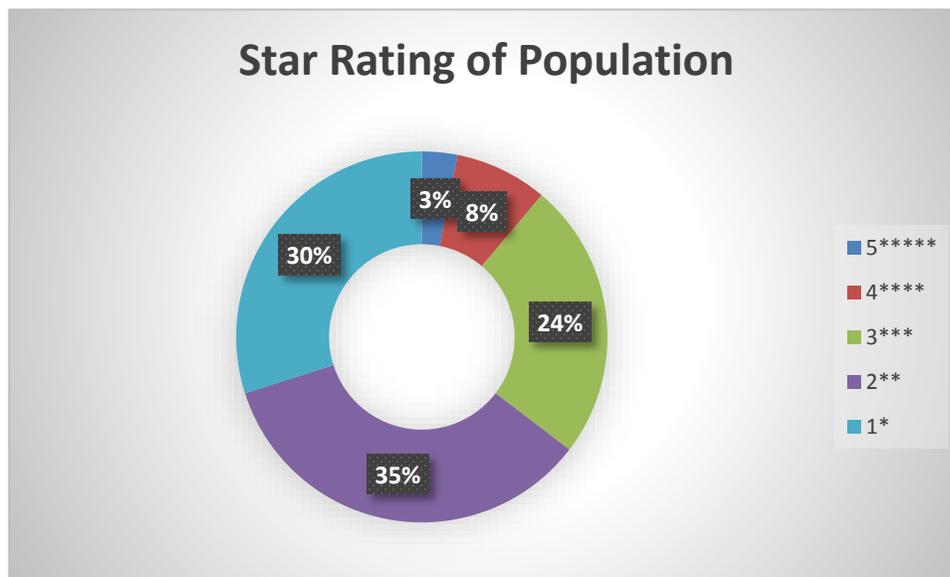
Administrative Region		5****	4****	3***	2**	1*	SUM
Eastern Macedonia and Thrace	Units	10	27	92	180	75	384
	Rooms	954	1865	2951	4000	1120	10890
	Beds	1926	3754	5730	7782	2188	21380
Attica	Units	29	98	139	269	114	649
	Rooms	6192	7907	7009	8235	2191	31534
	Beds	11663	14760	12792	15177	4134	58526
North Aegean	Units	6	33	127	179	50	395
	Rooms	784	163	4430	4265	734	11816
	Beds	1595	2920	8367	8020	1418	22320
Western Greece	Units	5	38	87	113	29	272
	Rooms	2109	2042	2959	2898	377	10385
	Beds	4459	392	5605	5529	799	20312

<b>Western Macedonia</b>	<b>Units</b>	<b>4</b>	<b>18</b>	<b>67</b>	<b>37</b>	<b>4</b>	<b>130</b>
	<b>Rooms</b>	<b>70</b>	<b>415</b>	<b>1768</b>	<b>680</b>	<b>57</b>	<b>2990</b>
	<b>Beds</b>	<b>156</b>	<b>879</b>	<b>3597</b>	<b>1322</b>	<b>112</b>	<b>6066</b>
Epirus	Units	11	70	149	138	29	<b>397</b>
	Rooms	756	1185	3058	2544	487	<b>8030</b>
	Beds	1587	2452	6025	4825	949	<b>15838</b>
Thessaly	Units	29	111	136	243	78	<b>597</b>
	Rooms	1352	2988	3966	5600	1449	<b>15355</b>
	Beds	2765	5943	7747	10693	2830	<b>29978</b>
Ionian Islands	Units	25	101	211	521	75	<b>933</b>
	Rooms	4027	10602	14308	17597	1520	<b>48054</b>
	Beds	7950	20308	27540	33623	2956	<b>92377</b>
<b>Central Macedonia</b>	<b>Units</b>	<b>40</b>	<b>96</b>	<b>265</b>	<b>390</b>	<b>441</b>	<b>1232</b>
	<b>Rooms</b>	<b>6814</b>	<b>8751</b>	<b>11097</b>	<b>10547</b>	<b>9733</b>	<b>46942</b>
	<b>Beds</b>	<b>13821</b>	<b>17180</b>	<b>21996</b>	<b>20369</b>	<b>17704</b>	<b>91070</b>
Crete	Units	91	234	346	690	211	<b>1572</b>
	Rooms	18410	24371	16273	24687	5720	<b>89461</b>
	Beds	37297	47157	30737	44452	10532	<b>170175</b>
Southern Aegean	Units	106	353	472	930	226	<b>2087</b>
	Rooms	16377	34211	19873	25952	3556	<b>99969</b>
	Beds	33812	66611	38497	49227	6943	<b>195090</b>
Peloponnese	Units	19	102	209	251	80	<b>661</b>
	Rooms	3043	3772	6132	6106	983	<b>20036</b>
	Beds	6382	7498	11875	11581	1878	<b>39214</b>
Central Greece	Units	10	37	126	297	72	<b>542</b>
	Rooms	666	2852	3919	7014	1248	<b>15699</b>
	Beds	1472	5500	7421	13208	2357	<b>29958</b>
<b>SUM</b>	<b>Units</b>	<b>385</b>	<b>1318</b>	<b>2426</b>	<b>4238</b>	<b>1484</b>	<b>9851</b>
	<b>Rooms</b>	<b>61554</b>	<b>102564</b>	<b>97743</b>	<b>120125</b>	<b>29175</b>	<b>411161</b>
	<b>Beds</b>	<b>124885</b>	<b>198882</b>	<b>187929</b>	<b>225808</b>	<b>54800</b>	<b>792304</b>

As depicted in table 32, the geographical dispersion of hotels is nothing but balanced between the administrative regions, nor within them in terms of hotels located in mountain, seaside and city locations. The majority of units is concentrated in the regions of South Aegean and Crete, followed by Central Macedonia and the Ionian islands. This is a growing trend and can be attributed to the attractiveness of the Greek islands.

The population however, is representative of the hotels on a national level, as it includes hotels of various size, classification, location and period of operation (seasonal and non-seasonal).

Hotels are typically classified by star rating ranging from one star to five stars. It is an international accepted standard that indicates homogeneous quality characteristics. Greek hotels are classified by the star hotel rating, whereas other forms of accommodation (e.g. self-catered apartments) are using the “keys” rating which is only applicable though domestically. Figure 34 depicts the classification of the population, which is similar to the star classification of the whole country.



*Figure 34. Star Rating of Population (Hellenic Chamber of Hotels, 2014)*

In terms of the size of hotels, the largest units are located in Crete (GNT0, 2015) shaping upwards the average of 80.5 rooms per hotel for the country (Table 33).

*Table 33. Average Hotel Size (GNT0, 2015)*

Average Hotel Size (in beds)	
	beds/unit
<b>Greece Total</b>	<b>80.5</b>
Eastern Macedonia and Thrace	55.7
Central Macedonia	74.1
Western Macedonia	46.1

Finally, the selected regions absorb a significant percentage (13.4%) of the total national stayed room nights (Table 34).

*Table 34. Allocation of Stayed Room Nights per Administrative Region (GNT0, 2015)*

Stayed Room nights - 2014			
	Domestic	International	Total
<b>Greece Total</b>	<b>13049668</b>	<b>60901973</b>	<b>73951641</b>
Eastern Macedonia and Thrace	771913	909677	1681590
Central Macedonia	2074872	5850424	7925296
Western Macedonia	264417	38559	302976

Overall, the selected administrative regions provide the required statistical ground to draw the necessary inferences, as they are representative of all the licensed hotels in Greece.

## 6.6 Research Identity

As indicated in the previous paragraphs, an online questionnaire was employed as the method for collecting the required primary data.

Out of the population of 1746 hotels operating in the administrative regions of Western Macedonia, Central Macedonia, Eastern Macedonia and Thrace, 870 hotels had complete contact details and were eligible to be shortlisted as the definite sample.

Data were collected from 17 January to 28 March 2015, and a total of 173 replies were secured, a number that represents approximately 10% of the licensed hotel properties in the area. Considering the size of the sample, the response percentage is estimated at 20% of the total sample.

A structured questionnaire was used, consisting of scaled and multiple-choice questions. (Appendix III). It was divided in four main sections labeled as below:

- Demographics
- Hotel Information
- Integration of new ICTs and Business Model Change
- Effects of Business Model Change due to the Integration of ICTs

The questionnaire was designed and created using google forms, a free collaborative software that allows the real time collection of responses in google spreadsheets. Google forms are responsive, that is they are comfortable to fill in on all screen sizes and they leave a timestamp when a respondent submits the questionnaire. Google forms, spreadsheets and documents, are stored in google drive, a cloud service that allows access from any internet enabled device.

Once created, the link to the questionnaire form was sent via email, containing an explanatory paragraph. The researcher has also the option to share the questionnaire link

via social networks such as google+, Facebook and Twitter, but this was not utilized in this occasion.

To secure the comprehensiveness of the questionnaire and to avoid any design flaws, a pilot test was conducted with three hotels. Two city and a seasonal hotel were contacted via telephone and were monitored through the questionnaire completion.

Upon the completion of the pilot test of the questionnaire, all 870 hotels were contacted via telephone, aiming to reinforce the response rate.

Responses were accepted until 28 March 2015 and then the link was deactivated. The final version of the google spreadsheet contained 173 unique responses.

Data were processed in Microsoft Excel and IBM SPSS/AMOS software. In terms of the SPSS analysis, the Mann-Whitney U test and Structural Equation Modeling (SEM) were employed as sound methods of drawing conclusions on the research data (Byrne 2001, Bentler 1992, Fornell & Larcker 1981, Joreskog 1993, Yoon & Chen 2000, Hooper et al. 2008)

The Mann-Whitney U test, which is also known as the Wilcoxon rank sum test, tests for differences between two groups on a single, ordinal variable with no specific distribution (Mann & Whitney, 1947). This non-parametric test is appropriate when the dependent variable is an ordinal one and the independent variable consists of two categorical, independent groups.

SEM can address many different kinds of research questions. It is particularly suitable in situations where the key concepts that the researcher is interested in are complex and multifaceted. These kind of concepts can be quite difficult to measure and are often measured with error. One of the useful aspects of SEM is its ability to make corrections for errors of measurement.

Other kinds of research questions that SEM is well suited to are ones that specify systems of relationships rather than a dependent variable and a set of predictors. Structural equation models may have numerous different outcomes or dependent variables, each of which is affecting other dependent variables in a more complex system. If a researcher is interested in modeling a causal system SEM models are particularly suitable.

Another kind of research question that structural equation models are often used to address, is where the researcher is interested in indirect or mediated effects. In many research questions, the interest lies in the effect of variable X on variable Y. That would be thought of the direct effect of X on Y, although in many research contexts more complex kinds of relationships are studied, where the first variable X perhaps influences a second variable Z, which then has a second effect on Y. That would be seen as an indirect effect and SEMs are very well suited to addressing those kinds of mediated research questions.

Hence, SEM analysis was employed as a mean to associate multi factors in a more complex network like structure, also allowing for the investigation of causal relationships.

With SEM, a wide variety of statistical tests and indices were run to describe the goodness of fit of the proposed SEM model to the data.

The measures presented further on, are either absolute fit indices ( $\chi^2$ , GFI), incremental fit indices (CFI, NFI, Normed Chi-Squared), and measures based on the population discrepancy (RMSEA).

Following in the next paragraph, is a presentation of the descriptive characteristics of the respondents and the hotels, constituting the research sample.

## 6.7 Descriptive Characteristics of Sample Units and Respondents

This paragraph presents the descriptive characteristics of the respondents and the hotels who participated in the survey.

### 6.7.1 Characteristics of Respondents

The whole sample consisted of 64% of the respondents were male, whereas 36% female.

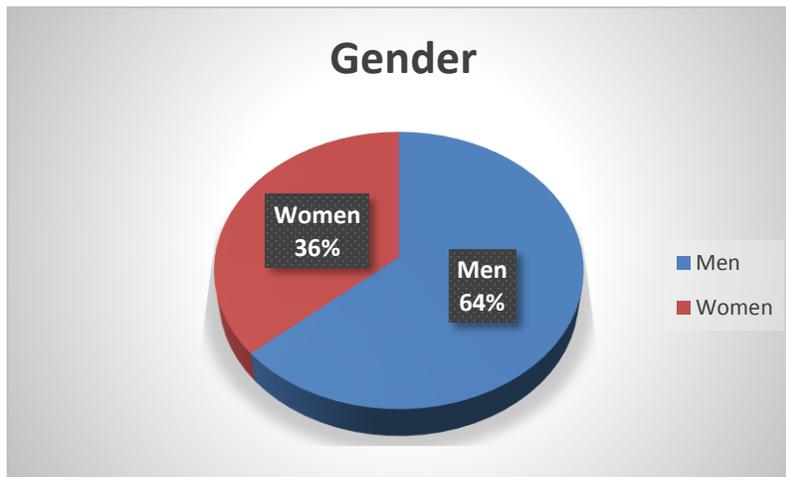


Figure 35. Gender

Half of the respondents were in the age group of 36-49, followed by those who were between 25 and 35 (37%).

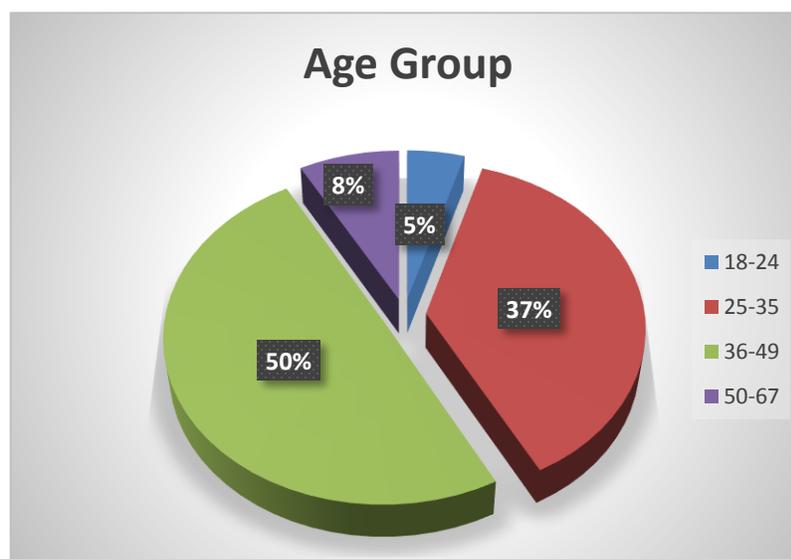
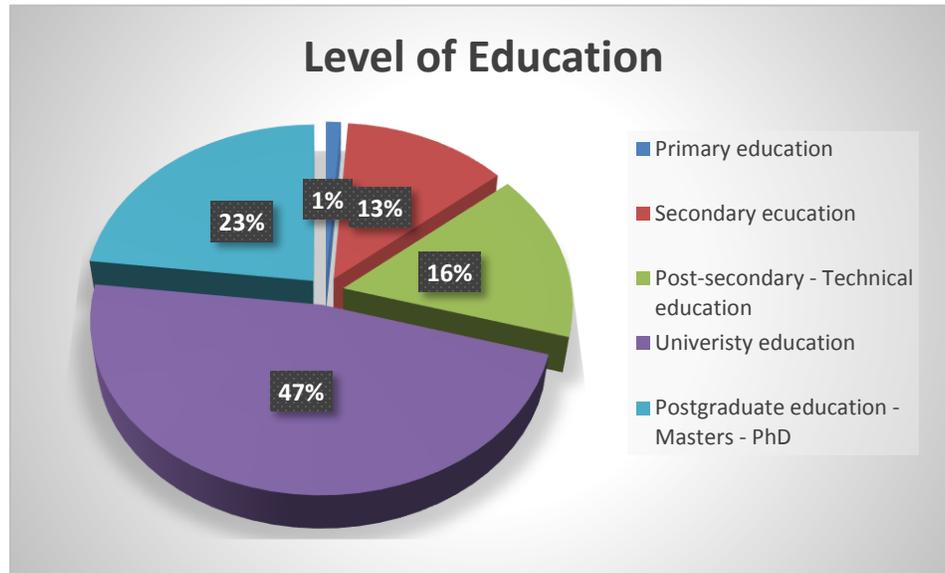


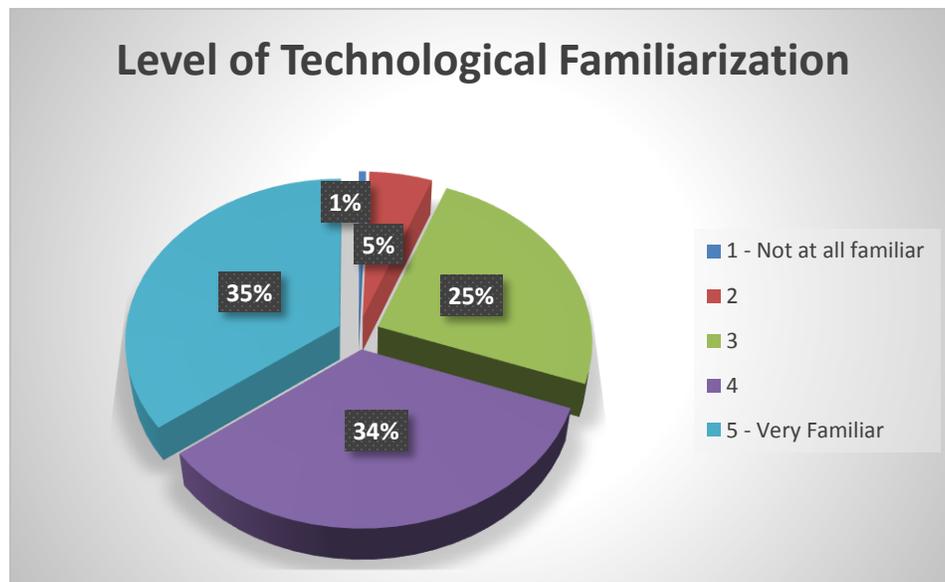
Figure 36. Age Group

A combined 70% of the sample is qualified with a university degree or above, while the remaining respondents divide almost equally between those who have continued their studies to an intermediate level after high school (16%) and those who have not (13%).



*Figure 37. Level of Education*

On a scale of 1 to 5, respondents appear to be comfortable with technology (69%), 25% of them being neutral and 6% feeling rather uncomfortable.



*Figure 38. Level of Technological Familiarization*

Over half of the sample (52%) was represented by hotel owners, with the remaining percentage mainly attributed to managerial positions (24%) and the role of CEO/GM (20%).

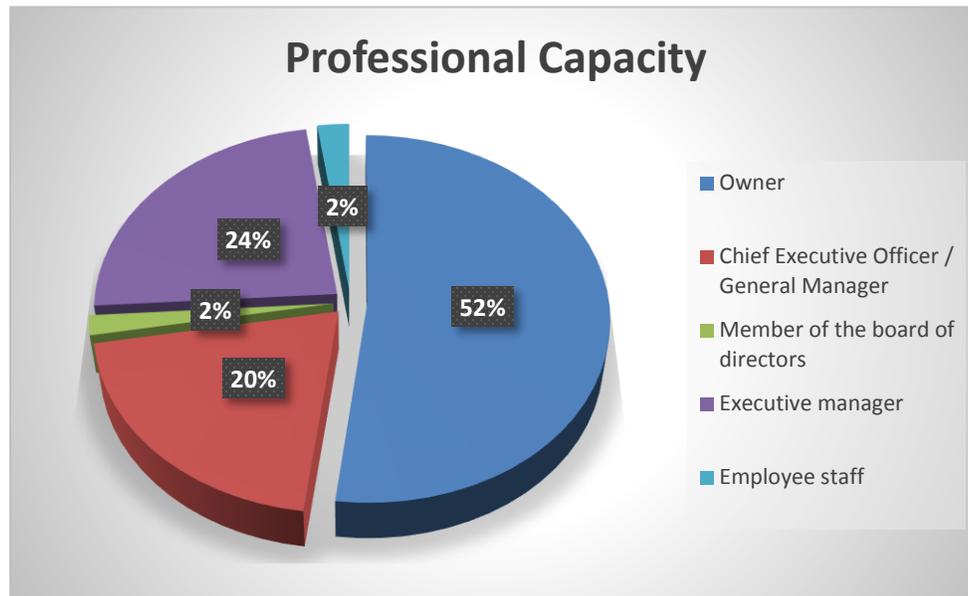


Figure 39. Professional Capacity

Hence, the demographic profile of the typical survey's respondent is a male, between 36 and 49 years old, with a university education, who is very familiar with technology and is also the owner of the business.

### 6.7.2 Characteristics of Hotels

The participating sample represents the general hotel rating classification in Greece, with the majority of properties being either a two star (35%) or a three star (29%) hotel. Hotels of higher star rating are equally divided with 4 star properties holding a 15% of the sample and luxury 5 star hotels a 13%. The smallest group (8%) is represented by 1 star classified properties (Figure 40).

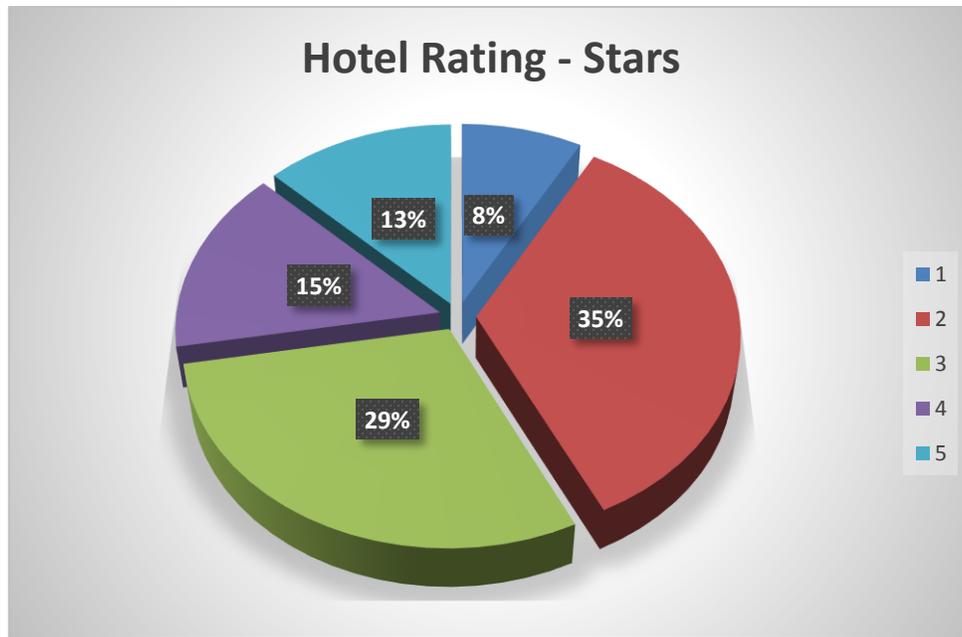


Figure 40. Hotel Rating - Stars

Very small (1-20 rooms) or small (21-50 rooms) properties amount to 72% of the sample, with the remaining equally divided between medium (51-100 rooms) and large (over 100 rooms) properties.

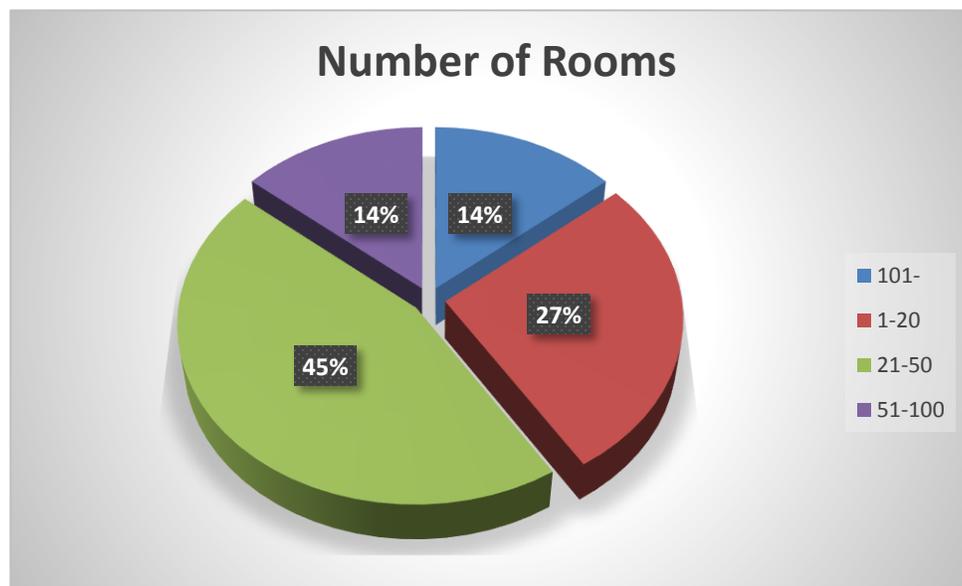
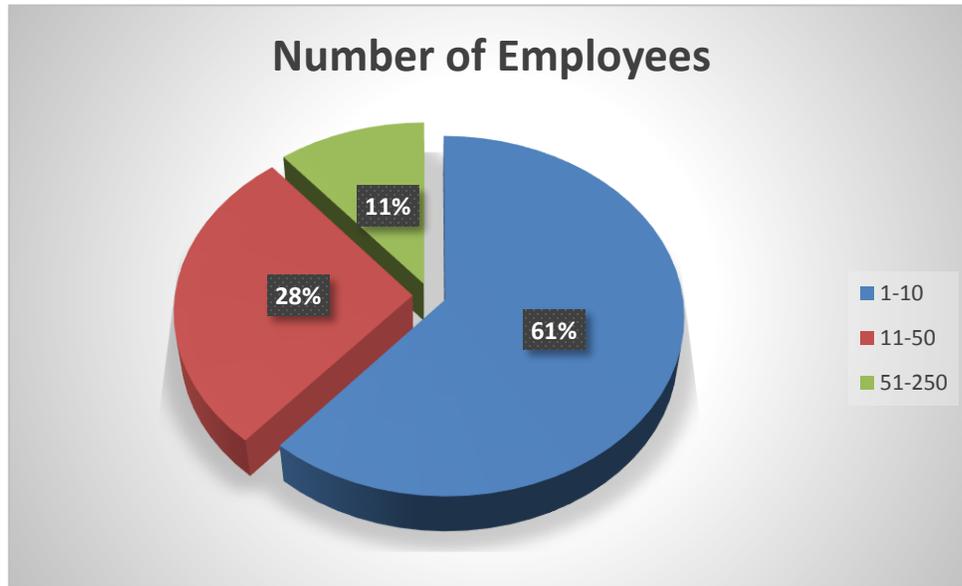


Figure 41 Number of Rooms

In terms of number of employees, the majority of the sample (61%) employs 1-10 employees, a 28% employs 11-50 and an 11% of a considerable size, employs 51-250 employees.



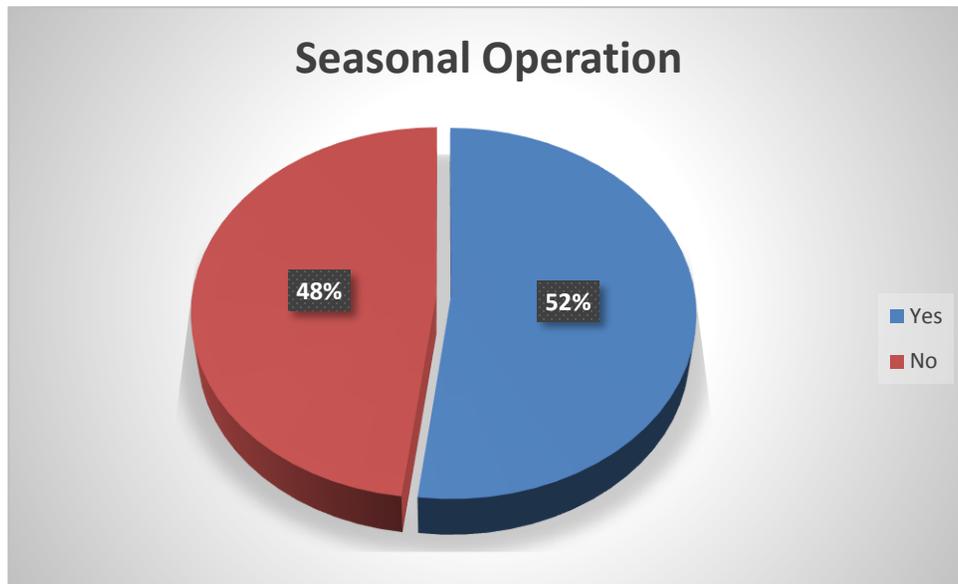
*Figure 42. Number of Employees*

Half of the sample are fairly new properties (1-20 years of operation), 32% lie in the category of 21-40 years, whereas oldest properties (16%) are operating between 41-60 years.



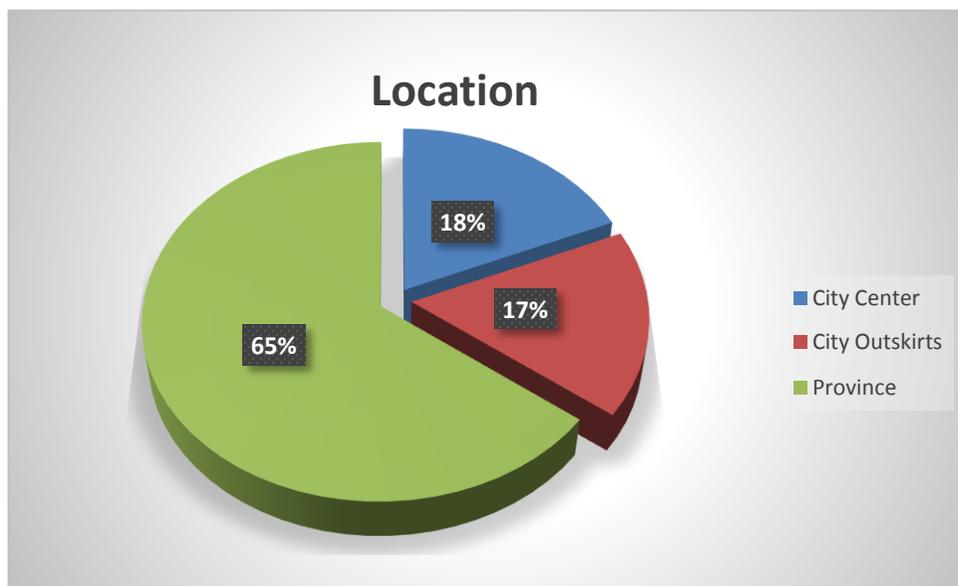
*Figure 43. Years of Operation*

Participating hotels are almost evenly divided between properties operating seasonally (52%) and hotels operating throughout the year (48%).



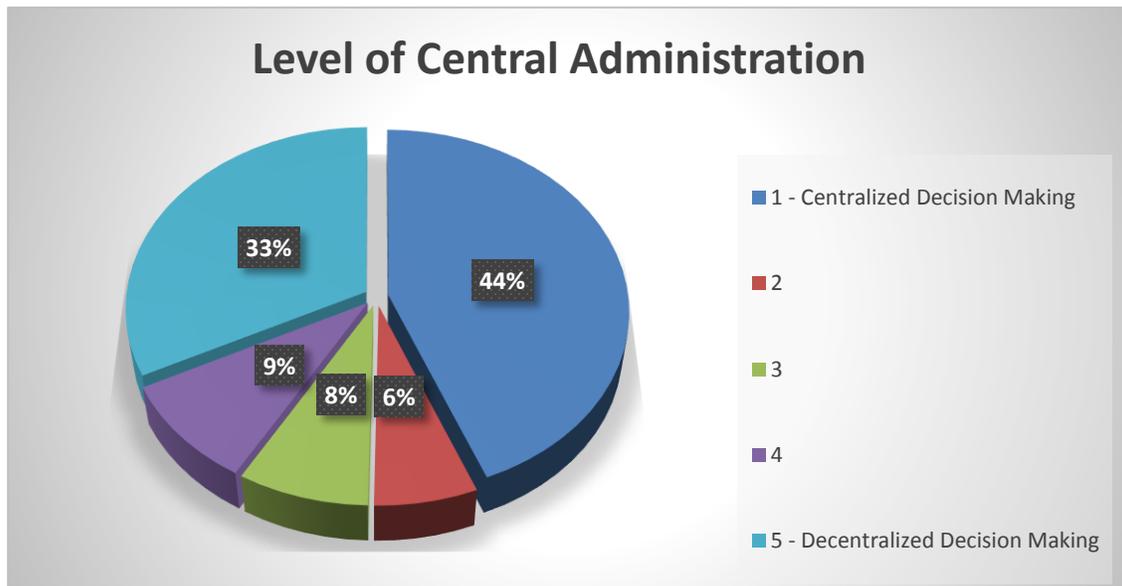
*Figure 44. Seasonal Operation*

Nearly one third (35%) of the hotels amount to properties located either in the city or in its outskirts, while the remaining 65% are hotels operating in the province.



*Figure 45. Location*

Regarding decision-making, and on a scale of 1 to 5, participating properties were asked if administration is carried out centrally (marked on the scale as 1), or locally (marked on the scale as 5).



*Figure 46. Level of Central Administration*

Two main poles emerged, with 44% of the participants replying that decisions come from central administration, compared to 33% of participants making decisions locally

Participants were required to choose the distinct departments they operate within the hotel. The gap between small properties with a basic general/operations manager and more complex structures operating various departments is clearly depicted in Figure 47.

Multi structured properties appear to operate a maintenance department (53%), a rooms-division department (53%), food and beverage (45%), a procurement department (44%), finance (42%), sales (40%) and housekeeping departments (36%).

31% of the participants have a human resources department, 26% a marketing department and numbers further decrease for in-house stores (16%), security (16%), legal (11%) and sports and recreation departments (9%).

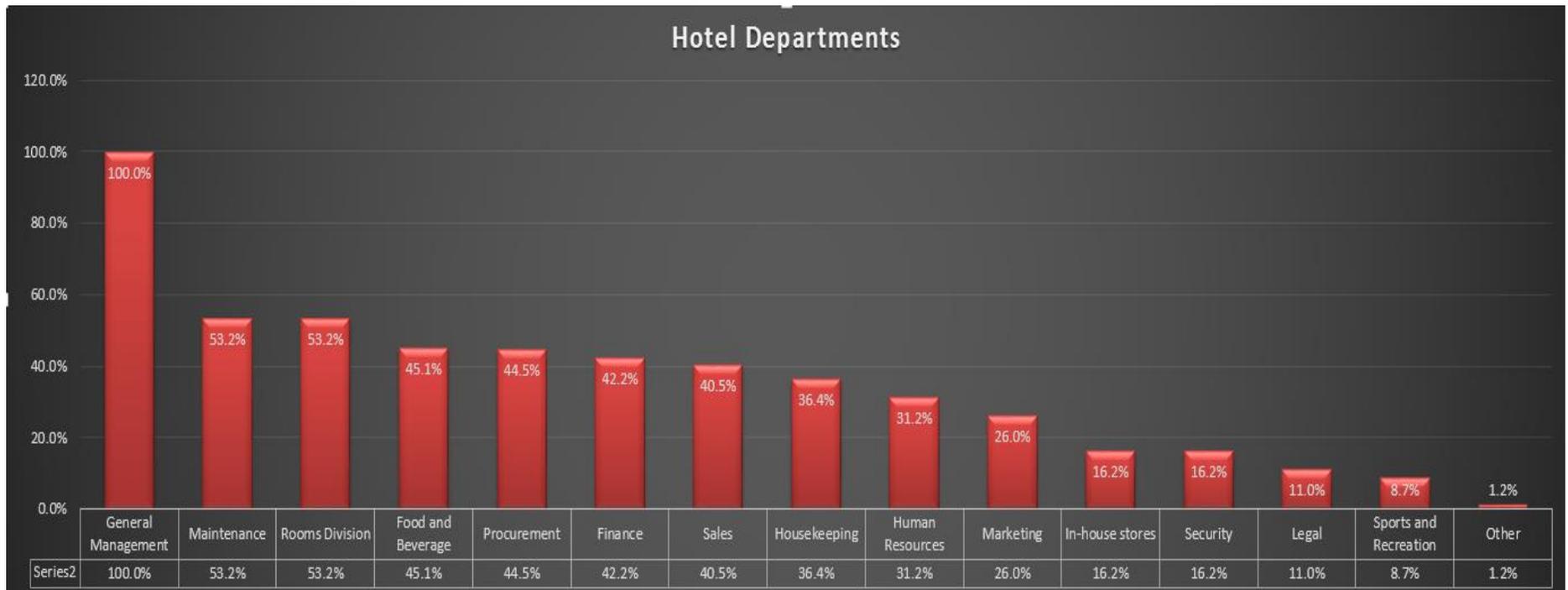


Figure 47. Hotel Departments

The research participants were presented with the main elements of hotel ICTs and were required to tick the ones they employ.

The results as shown in Figure 48, depict the popularity of each element, with the brand.com website and third party extranets being the most popular.

The guests' highly appreciated Wi-Fi is provided by 63% of the participating hotels, while 58% have a reservation engine on their website.

At the other end, a mere 8% utilize a human resource management system, a 10% operate a restaurant reservations system and just 12% offers an advanced in-room entertainment system.

To conclude, the typical profile of the hotel participating in the survey is a relatively new and small 2 star hotel, located in the province and operating seasonally, employing 1-10 employees.

It is centrally managed and except the role of the GM it has a maintenance, a rooms division and a food and beverage department.

In terms of ICT usage, it has its own website with a reservation engine, it provides Internet access via Wi-Fi and it operates extranets of third party online travel agents.

Chapter six elaborated on the selected research methodology of questionnaires by presenting its theory, description and critical points. A description of the primary characteristics of the population was provided, followed by the research identity and the descriptive characteristics of the sample units and respondents.

Chapter seven is focusing on the presentation of the survey's results and the verification of the Business Model Evolution Framework. It also provides the survey's findings on the effects of ICTs integration as perceived by the respondents.

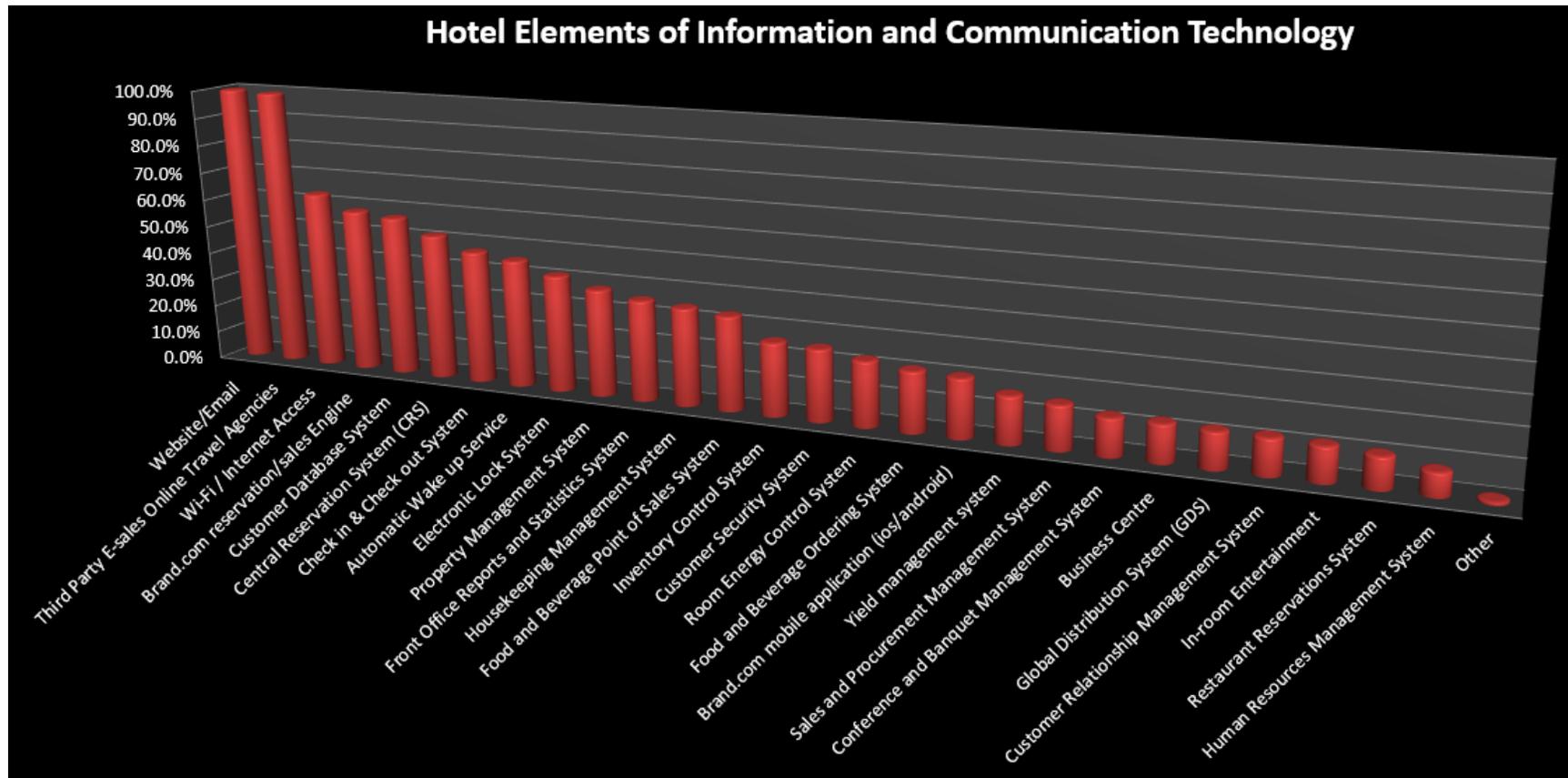


Figure 48. Hotel Elements of Information and Communication Technology

## Chapter 7.

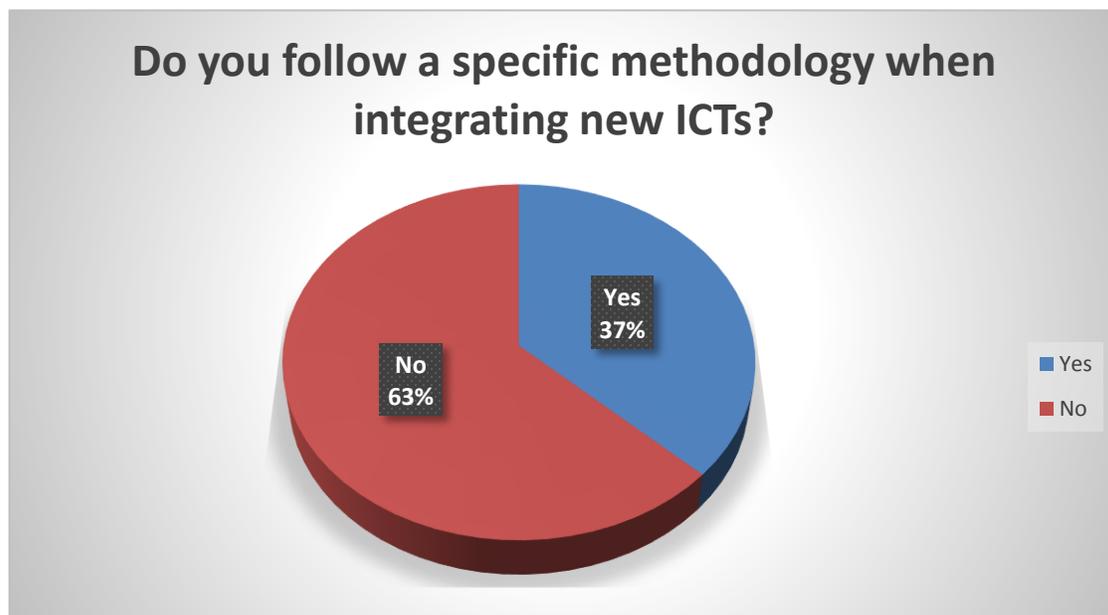
### Research Results

The research results presented below are divided in three main sections; the verification of the Business Model Evolution Framework, the delivery of hotel insights with regard to the BMFE's sub-elements, and the presentation of the effects of ICTs integration as perceived by the respondents.

The Business Model Evolution Framework goes under verification through a two way process. First, by determining if the participating hotels would employ suggested BM change stages and if they would do so following the recommended sequence. Second, by establishing the usage of the stages sub-elements.

#### 7.1 The Business Model Evolution Framework verification

This section of the research aims to explore if a methodology is followed when integrating new ICTs and the specifics of the integration process. Investigating various implementation parameters, the suggested framework goes under verification.



*Figure 49: Integrating ICTs and use of Methodology*

Two thirds of the participating properties appear not to follow a specific methodology when integrating new ICTs. This validates the research hypothesis (H1) that hotels do not employ a methodological approach when enhancing their business model with new technological solutions.

This finding could be attributed to a number of factors, from the management's propensity to follow a structured way to implement changes, up to the unfamiliarity of the integration processes and the nescience of potential integration risks affecting the organizational performance.

Today, following a specific methodology might look like an option for most hotel managers. However, given the immense growth of the technological advances in the industry, their ICT integration decisions could determine if they will be on the 'wave', or sink under it.

Similar lessons are taught from other industries, e.g. Nokia's failure to adapt to the new era of smartphones and Kodak's inability to see digital photography as a disruptive technology. A significant number of organizations do not take a consistent, holistic approach to changing themselves, nor do they engage their workforces effectively. It might be a case of "too little, too late" corrective attempts, for a number of hotels that rely on their current well-being and fail to adapt to new trends and industry expectations in a sufficient methodological manner.

Additionally, poor or incomplete information and seriously flawed assumptions could lead the hotel's management to the wrong direction. Whatever the assumption regarding ICTs and their integration method in the hotel's business model should be supported by data and deeply understood.

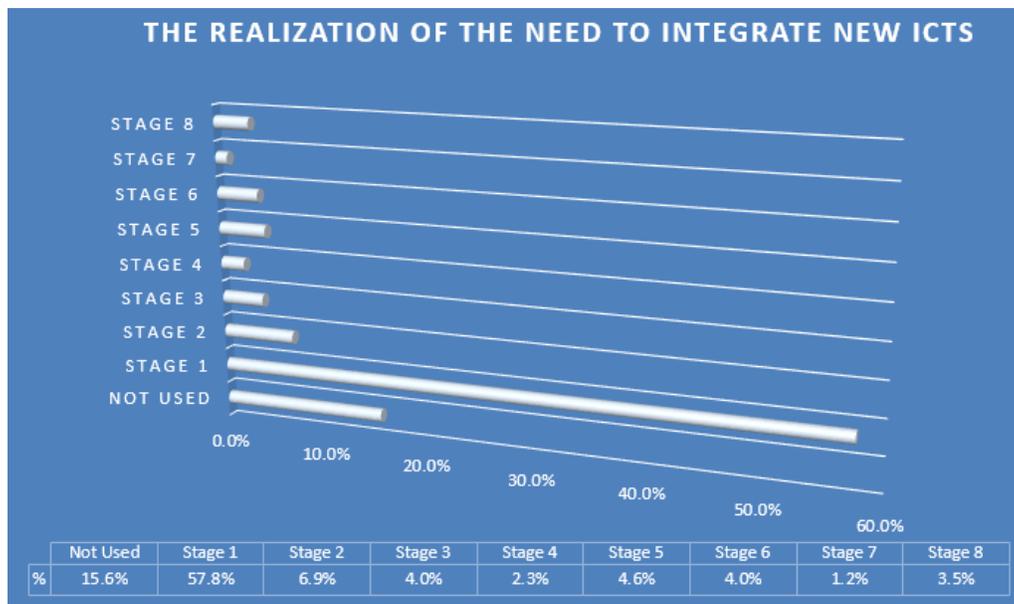
The above further highlight the need for a comprehensive way of change, through a holistic stepwise framework, herewith delivered by the proposed Business Model Evolution Framework.

With regard to the BMEF's verification, the questionnaire was structured in a way that would allow all participants to proceed with methodology related questions. In that sense, the research was not restrictive, so it could reflect how properties are actually implementing new ICTs, as well as how properties would do so if they were following a methodology. This way the proposed model is put under a complete verification.

Based on the suggested Business Model Evolution Framework, participants were presented with eight ICT integration stages and were asked to tick them, based by order of implementation. They were also presented with the option of choosing "not used" for stages that would not employ in the process.

### Stage 1 – Stimulus

The first stage of the process is the change stimulus. This is the starting point for the majority of respondents, as 57.8% of them would start the implementation from there.

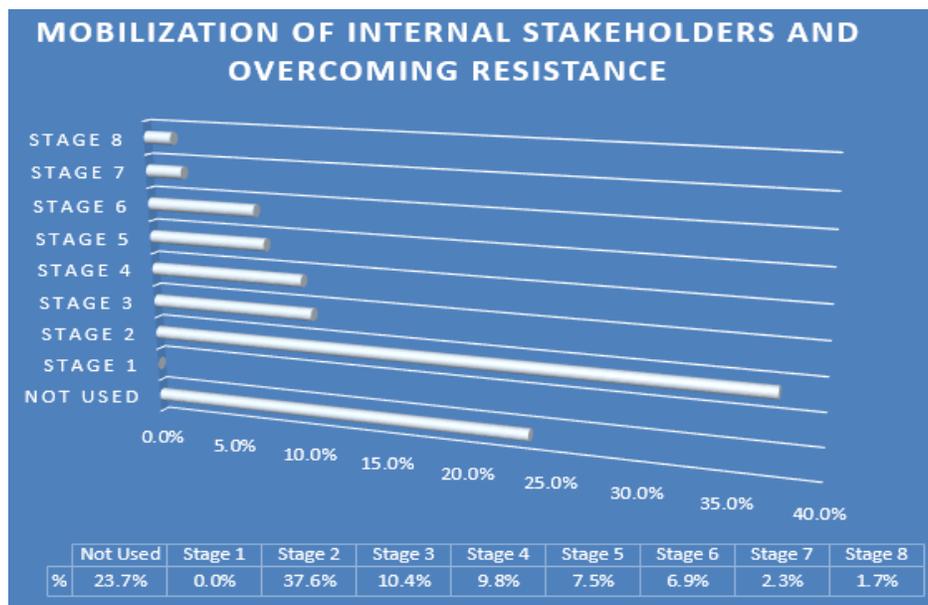


*Figure 50: The realization of the Need to Integrate New ICTs*

It is an overwhelming percentage compared to the following stages of implementation, as respondents comprehend the sequential logic of initiating the change process by identifying the stimulus, be it internal, external or competitive.

## Stage 2 – Mobilization

Although a considerable number of participants might omit this stage (23.7%), the majority of the remaining would pick this step as the second one (37.6%) in the sequence of actions needed.



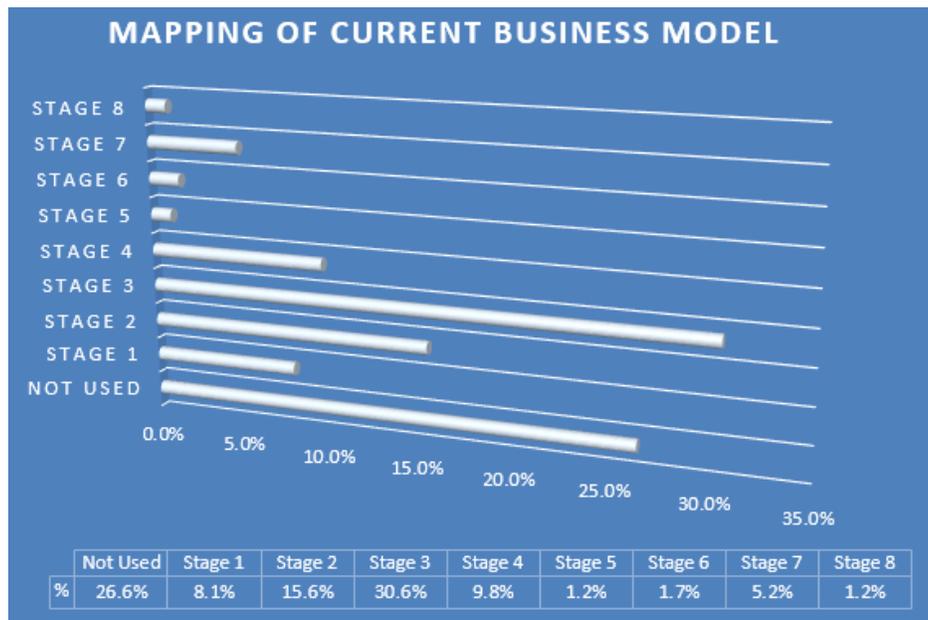
*Figure 51: Mobilization of Internal Stakeholders and Overcoming Resistance*

The relatively high percentage of respondents who would not implement this stage might be explained by the characteristic of the respondents, which is predominately owners of small hotels. An owner might not feel inclined to mobilize other stakeholders when integrating ICTs as it might be a business decision that has to be acknowledged and accepted by everyone else in the organization.

Furthermore, especially in small hotels that in many cases are family run, changing the hotel's business model might be a unanimous decision without the need for further motivation among stakeholders and internal resistance might be non-existent.

### Stage 3 – Mapping

Mapping the current business model would be implemented as a third stage by 30.06% of the respondents, while a significant number of them (26.6%) would not use it in the process.



*Figure 52: Mapping of Current Business Model*

This is a close call with regard to the percentage of respondents selecting to omit this stage. The 26.6% of the respondents that would not map their current business model before switching to a new one, might be indicative of the misconceptions around the concept of the business model. As discussed in the presentation of the BMEF, mapping the BM before the switch is critical, providing an in-depth understanding of the current

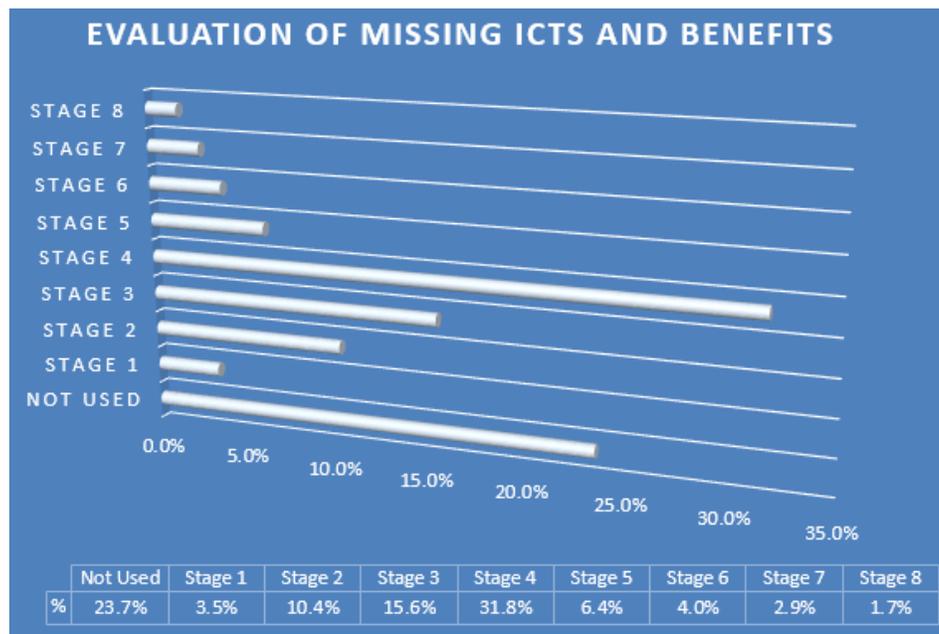
situation and establish benchmarks against which technology innovation impacts can be assessed.

The hotel's BM building blocks, i.e. its key activities, partners and resources, cost structure, revenue streams, customer relationships and segments, channels and value proposition, constitute the operational substance of the hotel and need to be well understood before attempting any ICT integration.

Still, and as the research results show, the majority of the participants comprehend the necessity of this stage and would correctly implement it as the third stage in the process.

#### Stage 4- Evaluation of missing roles

As depicted in Figure 53, the stage of missing roles evaluation would come 4<sup>th</sup> in the implementation sequence (31.8%), while others might not use it at all (23.7%).



*Figure 53: Evaluation of Missing ICTs and Benefits*

The sequencing as selected by the respondents is coherent with the BMEF, thus this stage is also verified in terms of usage and order of action.

This stage includes both the identification of ICT elements that might be beneficial for the hotel, but also the identification of the missing roles that would be required to support the new technological solutions.

Taking for example the identification of a need for a yield management system, the analysis should not be restricted to the foreseen benefit of maximizing sales efficiency, but also include the missing roles to implement this technology, i.e. a qualified member of the staff with sufficient knowledge of revenue yielding.

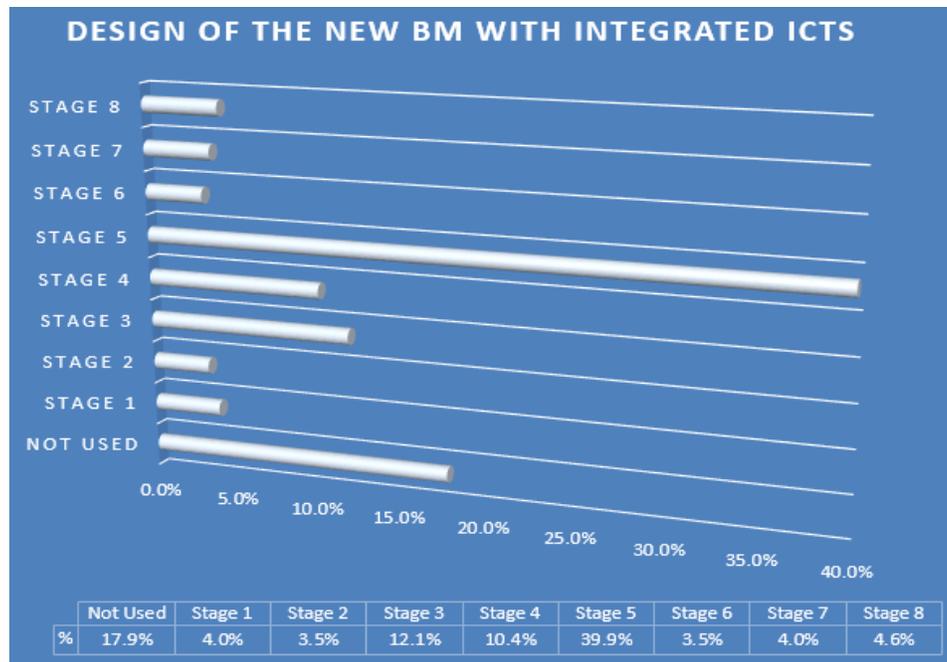
As a 23.7% would not incorporate this stage in the BM change process, a discussion could open around the understanding of the importance of the topic, fortunately anticipated by the majority of the respondents.

### **Stage 5 – Design of new BM**

Stage 5 in the process is the “Design of the new BM with integrated ICTs” option, which was picked by 39.9% of the research participants.

The necessity of including the design stage in the BM change process is widely understood by the research participants (82.1%), compared to 17.9% who would just integrate new ICTs without pre-designing the emerging business model.

This would compromise the success of the new organizational shape as there numerous factors that need to be accounted for.



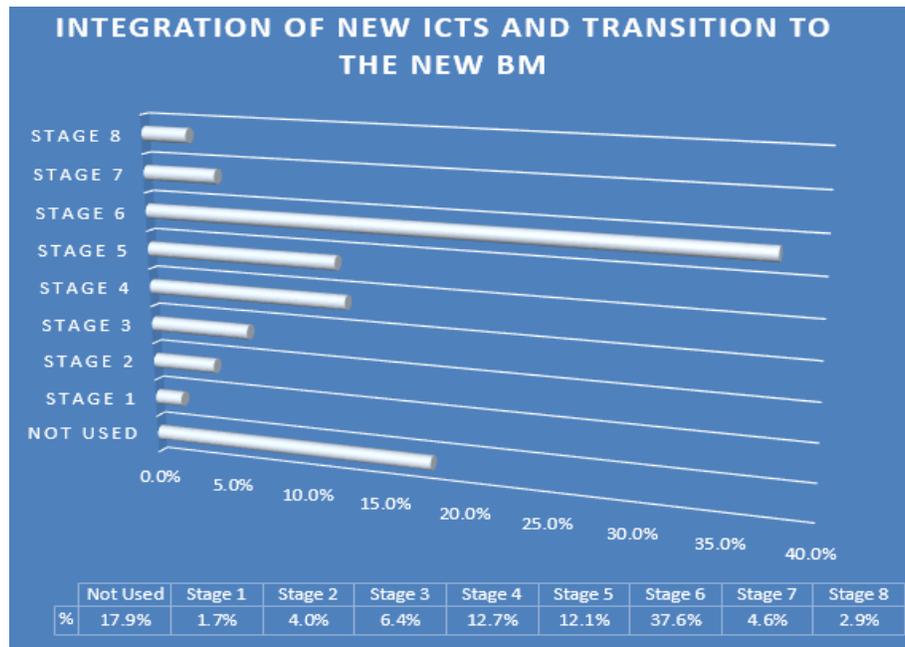
*Figure 54: Design of new BM with Integrated ICTs*

Scenario planning and business model design projections are considered critical elements, contributing to risk minimization and increasing the hotel's potential for succeeding in its new business model form.

### Stage 6 – Switch

Again, the sequence of action is verified by the majority of the participants, as 37.6% would choose to integrate new ICTs and move to the new BM as their sixth step.

Part of respondents (17.9%) would not engage in detailed actions during the integration of new ICTs. However, a hotel switching its business model, faces the challenge of completing the task successfully with the minimum possible risk, as significant resources might have been invested to produce an improved BM result.



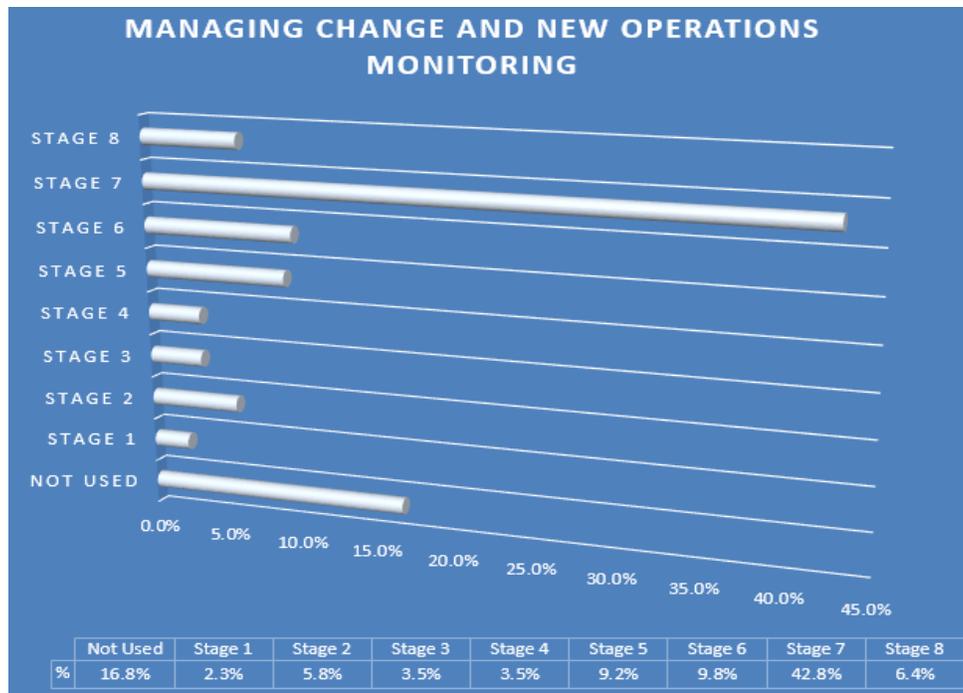
*Figure 55: Integration of New ICTs and Transition to the New BM*

Following a carefully drafted action plan, communicating changes effectively, engaging in training where needed, creating a restore point and securing alignment with the old business model and the hotel’s strategy, could be success factors utilized by the hotel during this stage.

### **Stage 7 – Manage**

42.8% of the research participants ticked “Managing change and new operations monitoring” as their seventh step of the methodology.

This is another important stage of the process, as displayed in the respondents’ results in the following figure (56). It is imperative for a hotel to incorporate this stage in the change process, as it allows it to monitor new processes and utilize new learnings to make possibly critical adjustments.



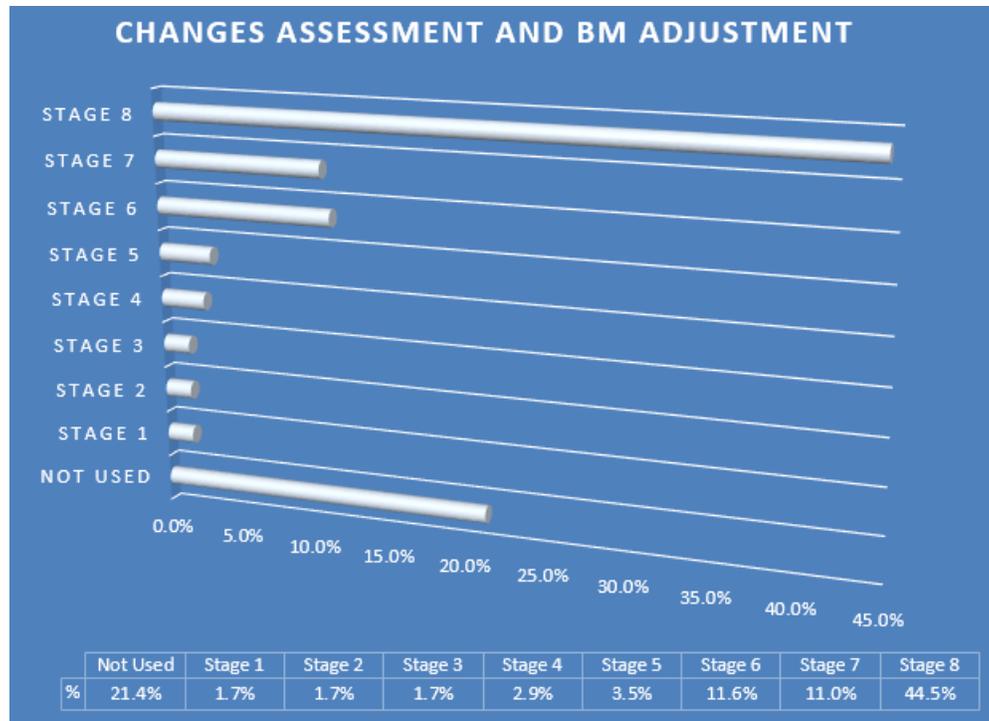
*Figure 56: Managing Change and New Operations Monitoring*

As in the six preceding stages, the sequencing is verified by the participants who would rank it as their seventh action in the business model change process.

### **Stage 8 – Assess**

The last stage of the methodology is the assessment of changes and BM adjustment, which was picked by 44.5% of the participants.

Stage 8 could be utilized by the hotel to evaluate the impact of changes and to determine if the new business model will be maintained or abolished. Following the integration of the ICTs, the transformed business model is evaluated against the original set objectives. The anticipated technological benefits are measured and the hotel decides if the promise for an enhanced business model is delivered.



*Figure 57: Changes Assessment and BM Adjustment*

Even if 21.4% of the respondents report that they would not incorporate this stage, the evaluation of the new business model is considered a conclusive part of the process, as it determines its longevity or its regression to its previous form.

This is a milestone in the suggested framework verification process, as all stages are verified by the participants. A summarized depiction is provided below (Figure 58).

What is evident by the presented results is unfolded on two levels. Firstly, the majority of hotels choose to implement each stage and secondly, they choose the suggested BMEF implementation sequence. This covers the second hypothesis (H2) formulated in the previous chapter of this thesis.

On the next part of the results analysis, the sub-elements of each stage are presented, based on the responses given by the participating hotels.

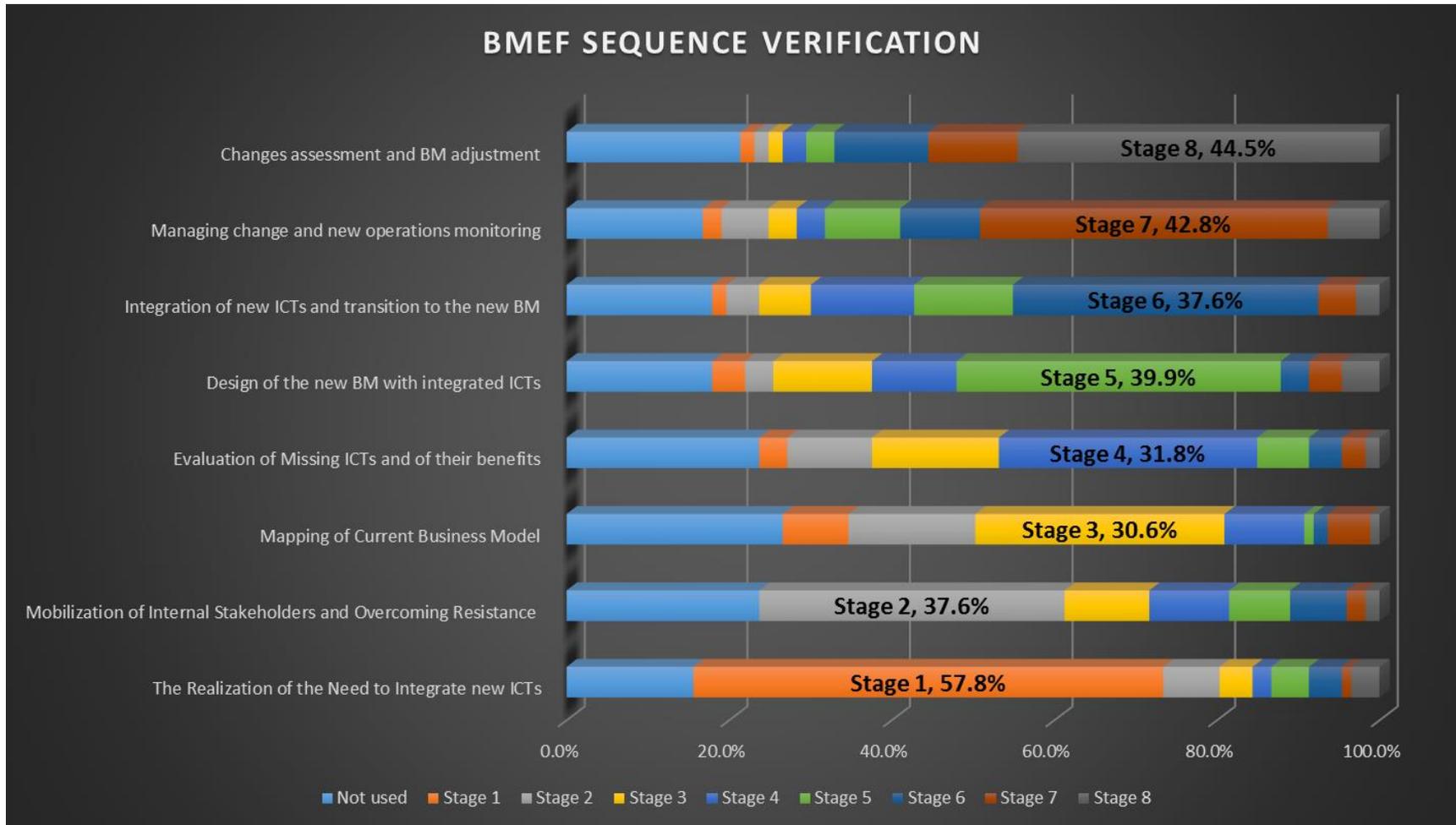


Figure 58: BMEF Sequence Verification

## **7.2 Sub-elements of the business model evolution framework**

Since the usage and the sequence of each stage of the framework are validated, further insights of the implementation elements are provided by the hotels and presented below.

### **7.2.1 Factors that would lead hotels to integrate new ICTs in their BM**

Technological advances would push most of the survey participants (69.9%) to integrate new ICTs, while at the top of the list are also changes in the economy (64.2%), as well as changes in the legislation (59%). The least motivating factors are the increasing employee turnover (8.7%) and the political (9.2%) and environmental (17.3%) changes.

Indisputably, the hotel sector is increasingly realizing the breadth of technological solutions affecting all facets of hotel operations and the interaction with the market. The research reflects this realization, as technology is the primary factor that would initiate a business model change.

Economic factors also rank high between the respondents, as the economic turmoil might drive a hotel to integrate new ICTs, expecting a more efficient and productive business model.

Employee turnover on the other hand, is not considered an important stimulus for ICT integration, as there is no clear linkage between this factor and the need to change the hotel's business model.

### Factors that would lead hotels to integrate new ICTs in their business models

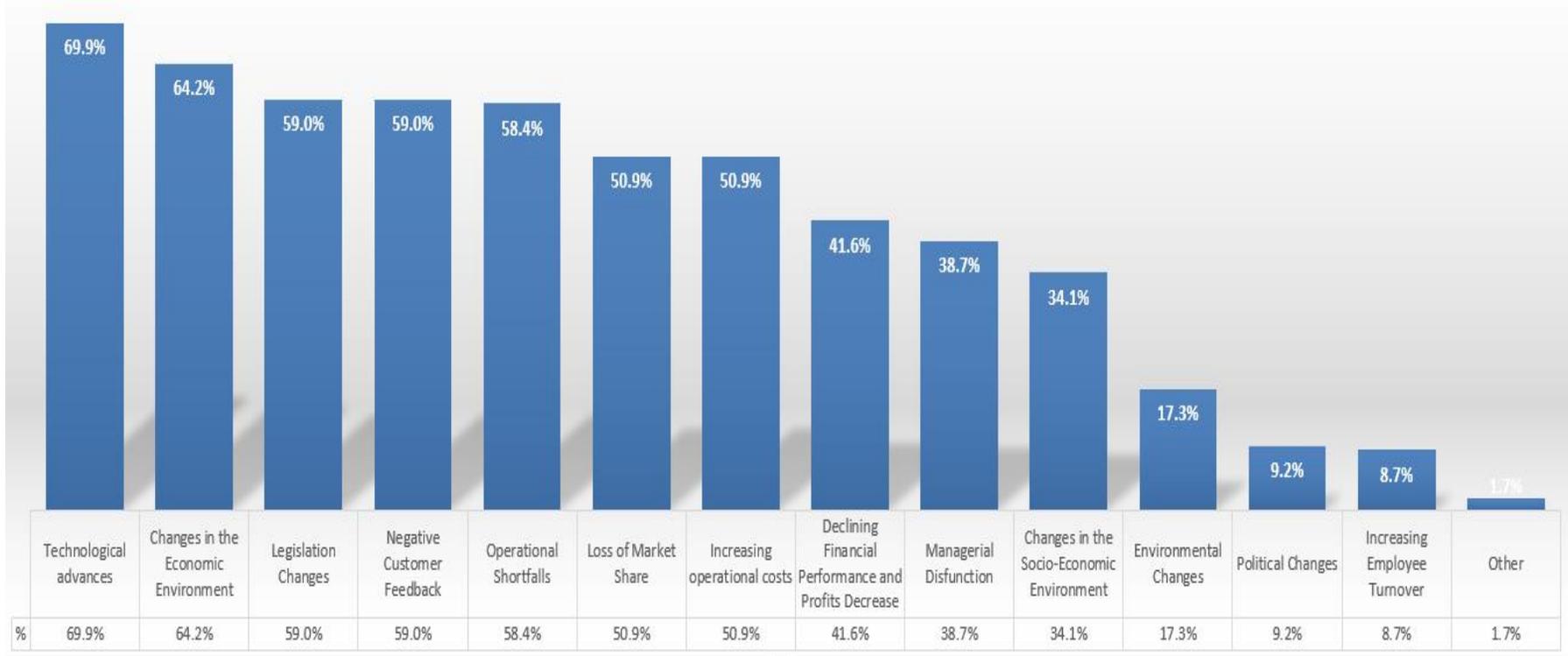
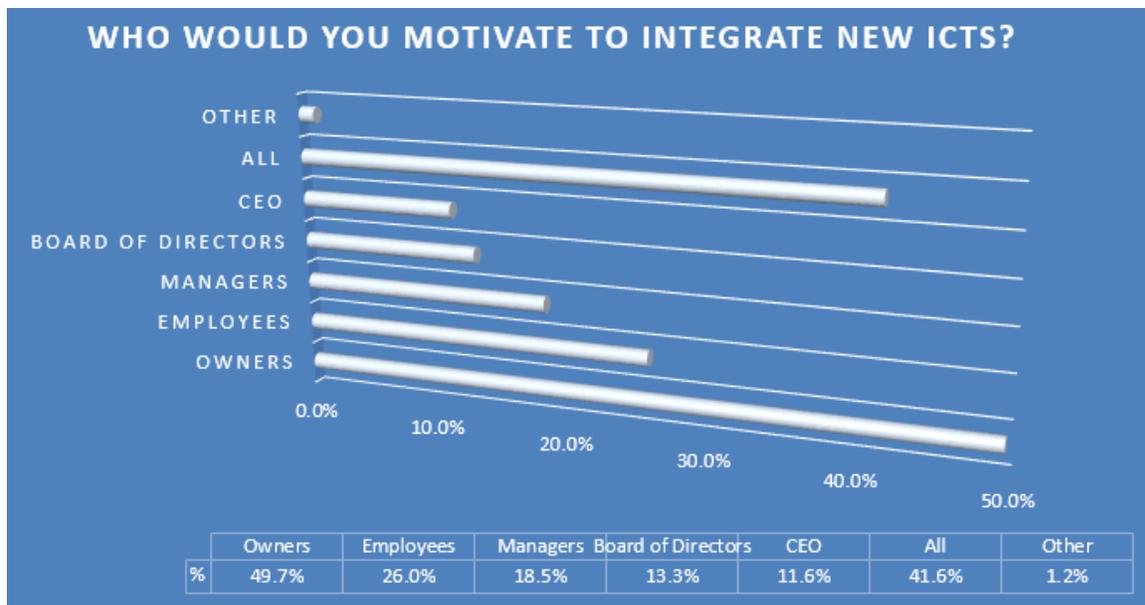


Figure 59: Factors that would lead hotels to integrate new ICTs in their business model

### 7.2.2 Motivating stakeholders

Respondents felt that they would need to mainly motivate the owners (49.7%) to proceed with ICTs integrations, while the second most popular reply is “all” (41.6%), representing all of the organization’s stakeholders.



*Figure 60: Motivating Stakeholders*

### 7.2.3 Business Model Mapping

Participants were asked to record the business model blocks they would map before moving to a new BM. The building blocks and their explanation were reproduced according to Osterwalder (2004) and as presented in Table 16.

Although mapping the Customer Segments appears as a priority for the majority of respondents (43.4%), a major part of the sample (41.6%) replied that they would map all of the organization’s building blocks. This is a healthy indication that hotels realize the necessity of a full structural mapping prior to any attempted change.

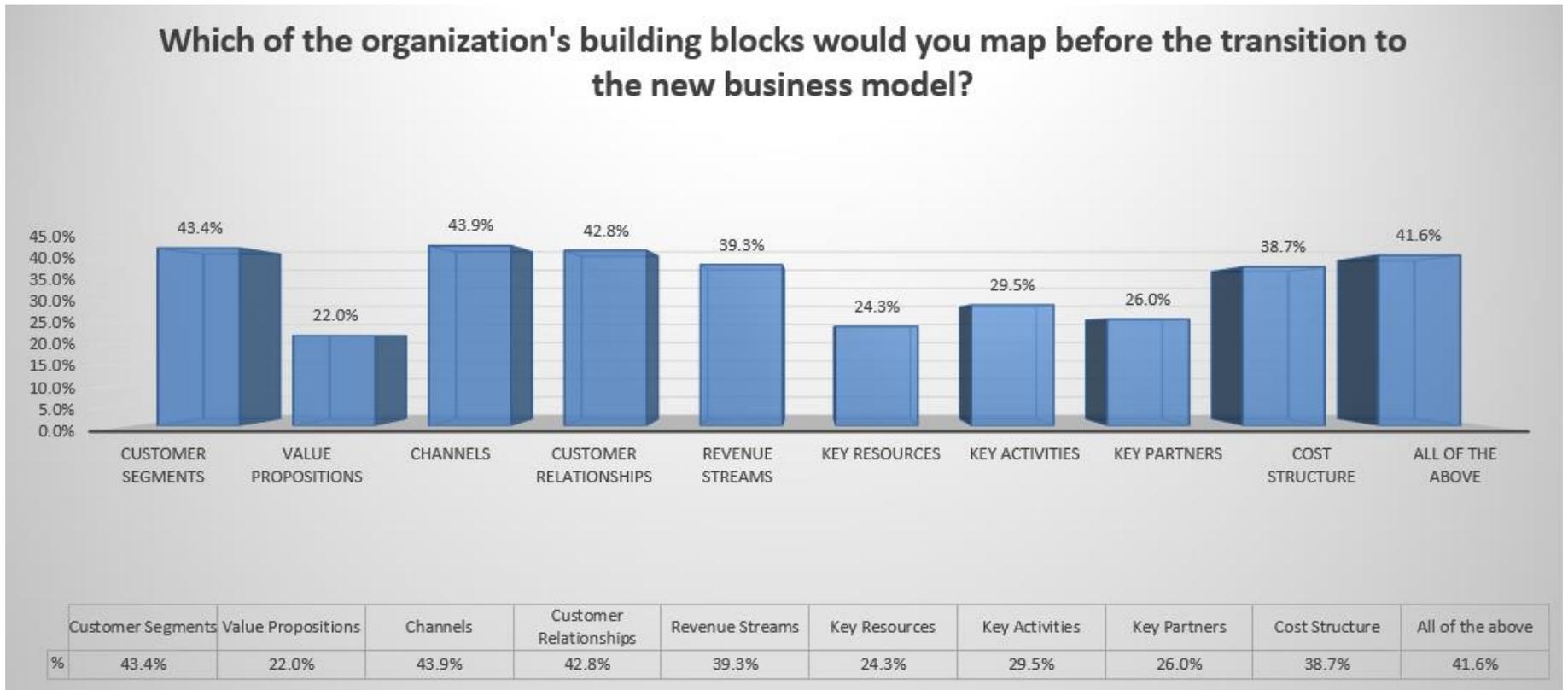
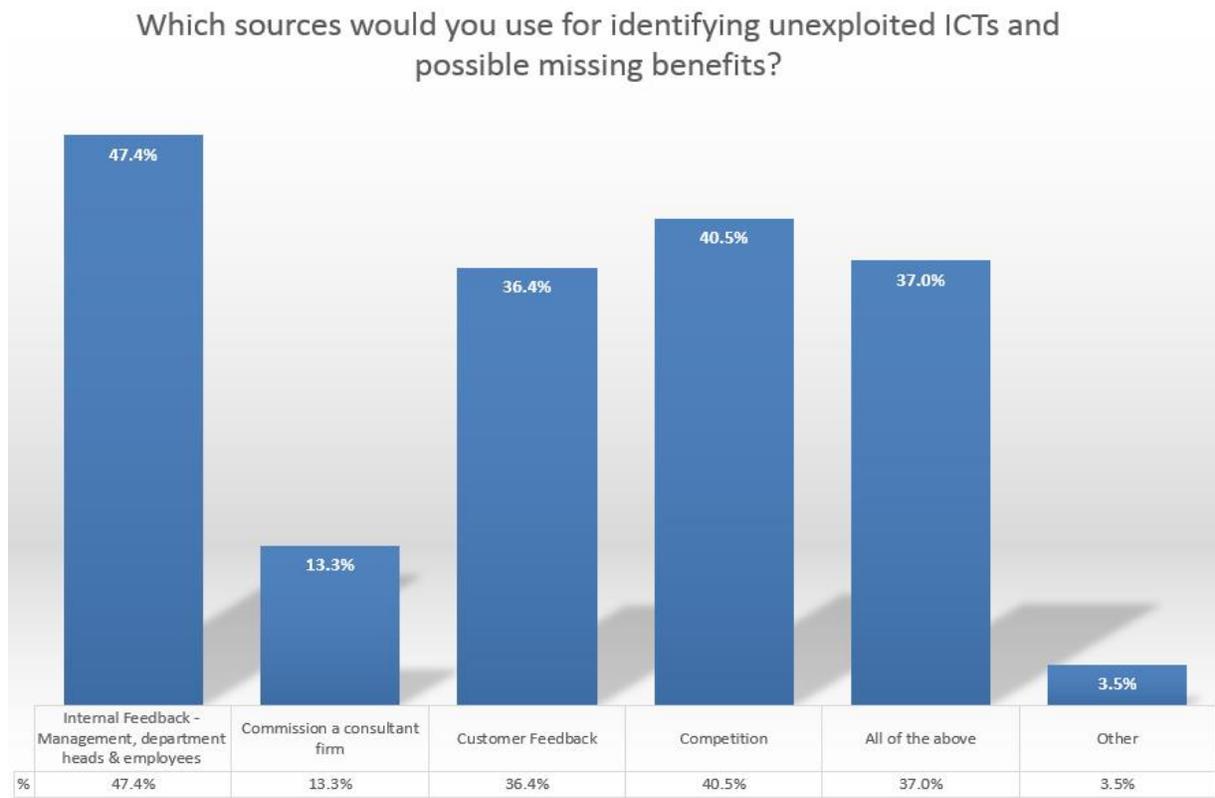


Figure 61: Mapping of the Business Model Blocks

### 7.2.4 Sources for identifying missing roles

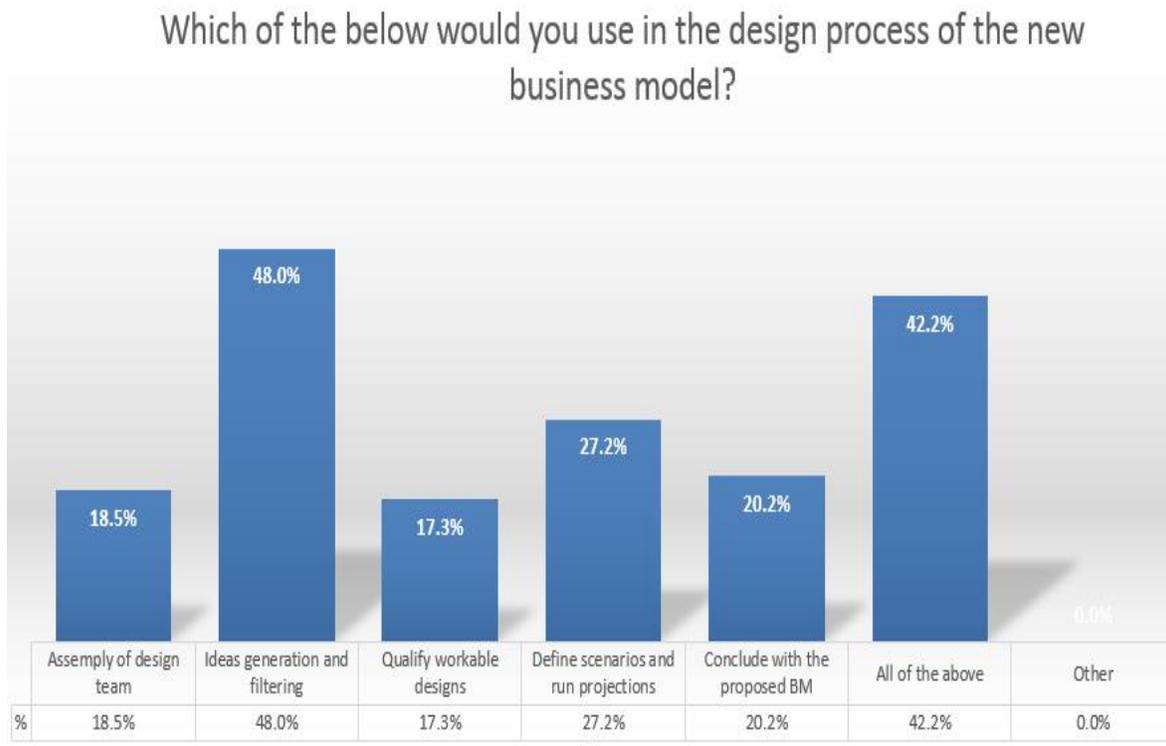
To identify unexploited ICTs and possible missing benefits, the majority of the respondents (47.4%) would look internally drawing information from the management and the employees. Others would look towards the competition (40.5%) while 37% would take into consideration all possible sources of information.



*Figure 62: Identifying Unexploited ICTs and Missing Benefits*

### 7.2.5 Elements of the new Business Model Design

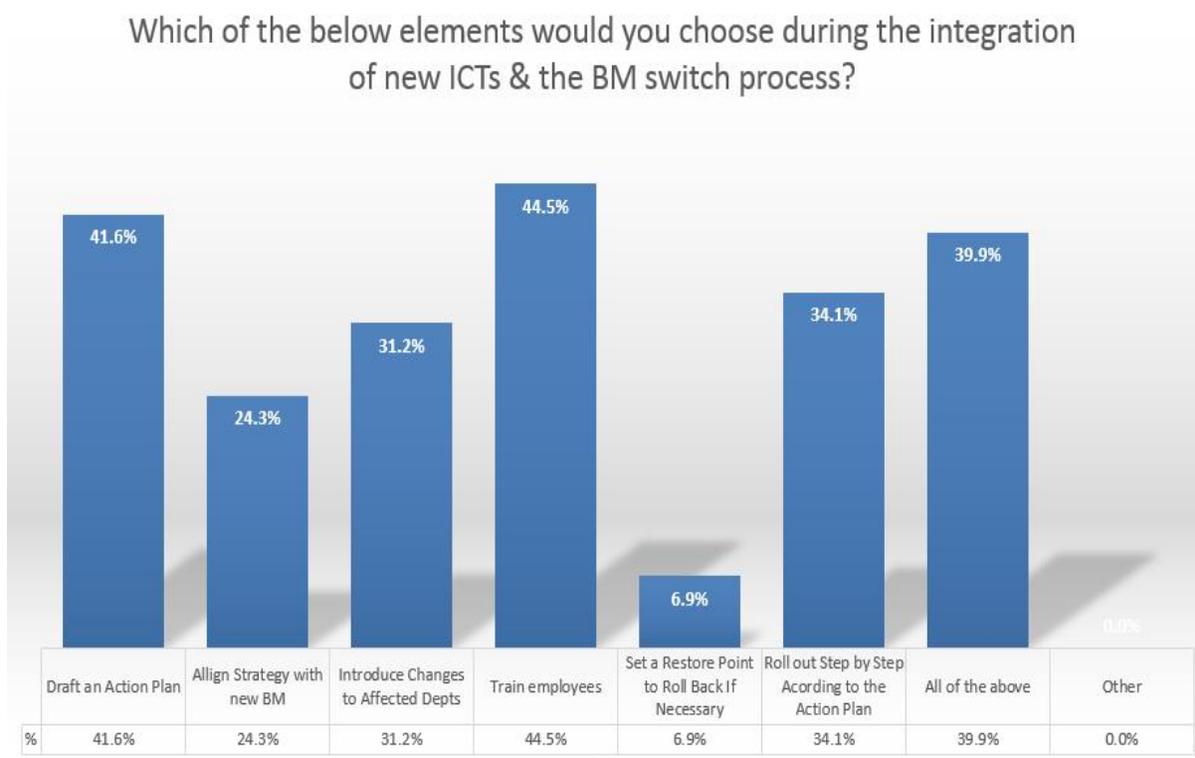
Emphasis is given in ideas generation and filtering, as 48% of the respondents would apply this element in the design process. However, the second most popular category of respondents 42.2% would incorporate all of the suggested elements during the BM design process.



*Figure 63: Elements of the New Business Model Design*

### 7.2.6 Integration of new ICTs & BM switch process

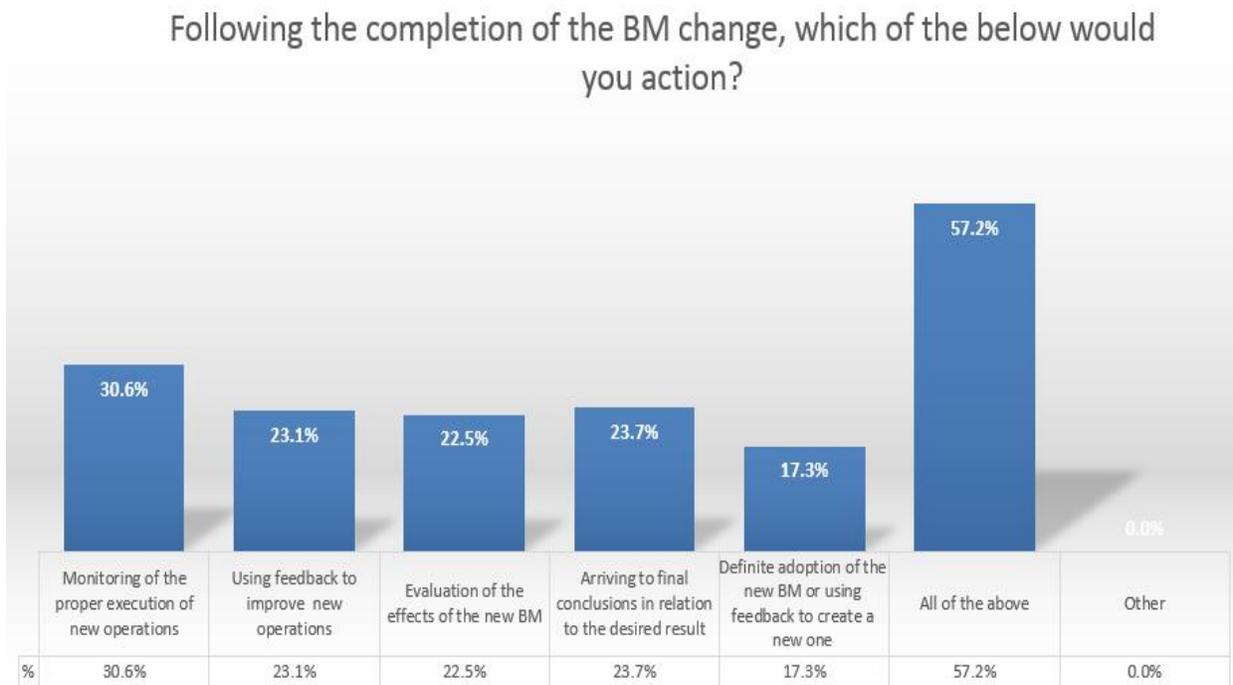
During the switch to the new business model, employee training ranks first among the respondents' options (44.5%), while “drafting an action plan” comes second in importance (41.6%). A significant number of the participants (39.9%) would choose to incorporate all of the presented elements in the switch process.



*Figure 64: Elements of ICTs Integration and Switch Process*

### 7.2.7 Managing and Assessing BM Change

Following the integration of new ICTs and the subsequent business model change, the majority of the respondents (57.2%) indicated they would action all of the suggested steps to manage and assess the BM reconfiguration.



*Figure 65: Managing and Assessing BM Change*

The research results suggest that the sub-elements of each stage of the framework would be utilized by the respondents, and in significant number of occasions to a full extent.

This completes the validation of the framework and adds to its effectiveness, as the multitude of the presented elements when implemented, contribute to risk minimization and performance maximization.

The research results conclude with an overview of the effects of ICTs integration to key performance indicators as perceived by the respondents.

### 7.3 Performance Effects of the Business Model Change due to ICTs integration

At the final part of the survey, the participants were required to determine the perceived effects of the BM change on selected key performance indicators:

- Profitability/Financial Results
- Market Share
- Effectiveness
- Functional Cost Saving
- Time Saving
- Employee Productivity

The last four key performance indicators (KPIs) can be grouped together as a first order factor since they summarize the operational performance of the hotel, while the first two are dominant elements of the organizational performance of the hotel.

An initial attempt was made to draw some conclusions by studying two basic groups of the sample that gave a different reply on what is considered the basic question of the questionnaire. Consequently, to compare the differences between the hotels that follow a specific methodology when integrating new ICTs and the hotels that do not, in regard to the above performance indicators, the Mann-Whitney U test was used.

As noted in chapter 6, this non-parametric test is appropriate when the dependent variable is an ordinal one (as each of the performance indicators is) and the independent variable consists of two categorical, independent groups, i.e. the hotels with a specific methodology (group 1) and the hotels without (group 2). The test results are summarized in Table 35.

Table 35: Mann-Whitney U test results

	<b>Employee Productivity</b>	<b>Time Saving</b>	<b>Functional Cost Saving</b>
Mean Rank (group 1)	92.84	90.26	92.13
Mean Rank (group 2)	85.92	84.09	83.99
Mann-Whitney U	3370.0	3279.5	3159.5
Sig. (2-tailed)	0.019	0.007	0.028
	<b>Effectiveness</b>	<b>Market Share</b>	<b>Profitability</b>
Mean Rank (group 1)	88.20	99.73	95.05
Mean Rank (group 2)	86.29	79.52	82.27
Mann-Whitney U	3411.0	2673.0	2972.5
Sig. (2-tailed)	0.792	0.006	0.049

Based on the Mann-Whitney U test results, it can be concluded that all the performance indicators, in the group of the hotels that follow a specific methodology when integrating new ICTs, are statistically significantly higher than the group of the hotels that do not follow a specific methodology.

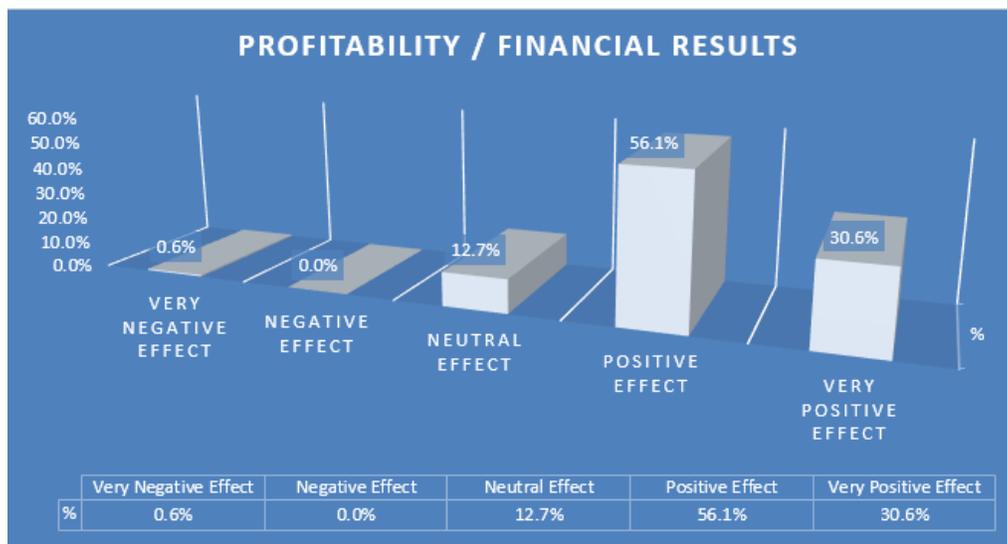
This is a strong indication that hotels following a specific methodology when integrating ICTs, anticipate a better performance throughout the set KPIs.

On a more generic level, including both groups (following and not following a methodology) the respondents' replies were overwhelming in terms of positive or very positive effects of the BM change due to ICTs integration, as depicted in the following paragraphs.

### 7.3.1 Effect on Profitability

An investment on a new technology often bears a considerable cost, and hotels involved in such a process have analogous expectations in terms of financial results and profitability.

This is reflected in this research, as participating hotels evaluate the business model change effects as positive by 56.1% or even very positive by 30.6%. It is an additional indication of the hotels' growing appreciation regarding new ICTs, and how a business model change can result in improved profitability.



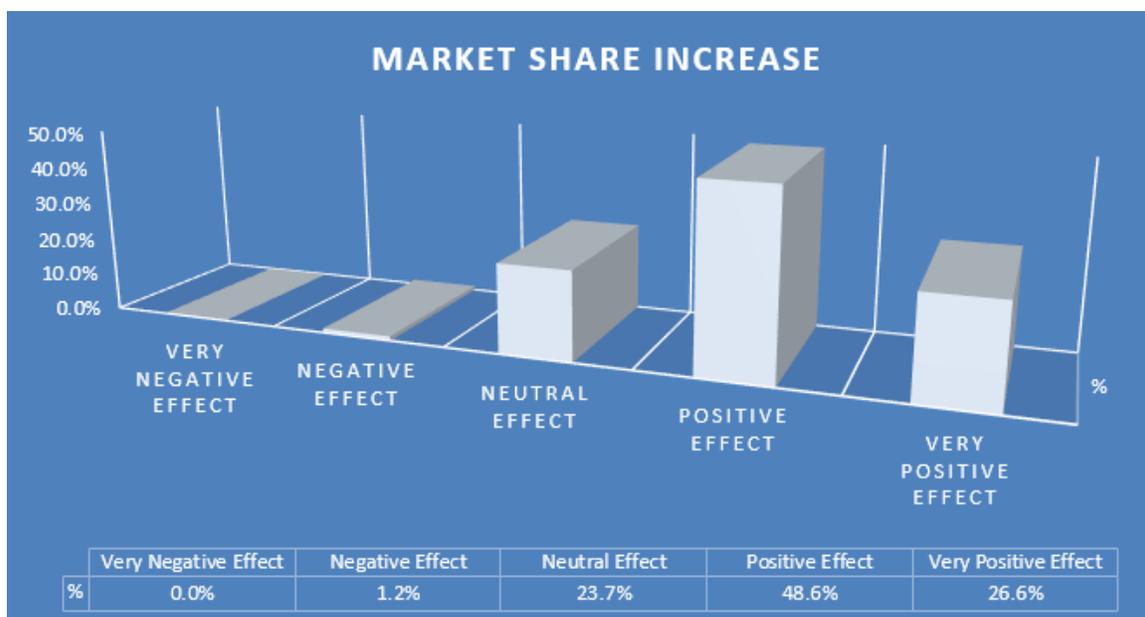
*Figure 66: Effect on Profitability/Financial Results*

### 7.3.2 Effect on Market Share Increase

Hotels operate in a highly competitive environment and the slightest gain in market share is hardly won. In growing markets, competition increases rapidly as hotels do not have to compete only with each other but essentially with anyone that offers accommodation. Low or non-existent entry barriers allow new players in the market and technology blurs the line between traditional accommodation providers (i.e. hotels) and newly emerged forms of competition (e.g. sharing economy).

At the same time, new technological solutions promise a competitive advance to any hotel that will integrate them in their operations.

Figure 67 depicts how hotels perceive the relationship between an ICT enabled business model and a much desired increase in the market share. An investment in technology and the resulting reconfiguration of the hotel's business model could have a positive effect on its market share. This is what is believed by 48.6% of respondents who anticipate a positive effect of BM change, or a significant more optimistic 26.6% who foresee a very positive effect in their quest for an increase in the market share.



*Figure 67: Effect on Market Share Increase*

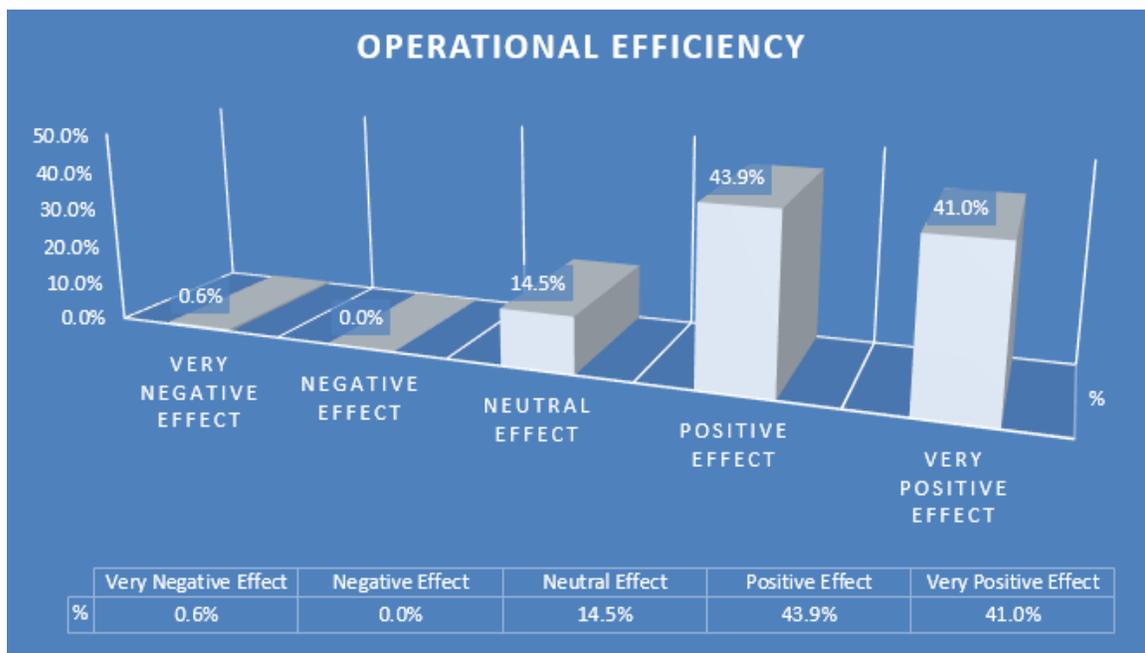
### 7.3.3 Effect on Operational Effectiveness

Operational efficiency/effectiveness for hotels is one the main hoped-for results of ICTs integration and BM change.

Growing hospitality organizations always look for ways to improve the way they operate, meticulously examining available options and their implications in the organization's operational efficiency.

The percentage of the research respondents who are enthusiastic with the very positive effects of an ICT enabled business model, reaches an impressive 41%, slightly less than those who believe that a BM change has just a positive effect (43.9%).

In the minds of hoteliers, there is a clear linkage between business model change and enhanced operational efficiency, a fact supported by the findings of this research as displayed in the below figure.

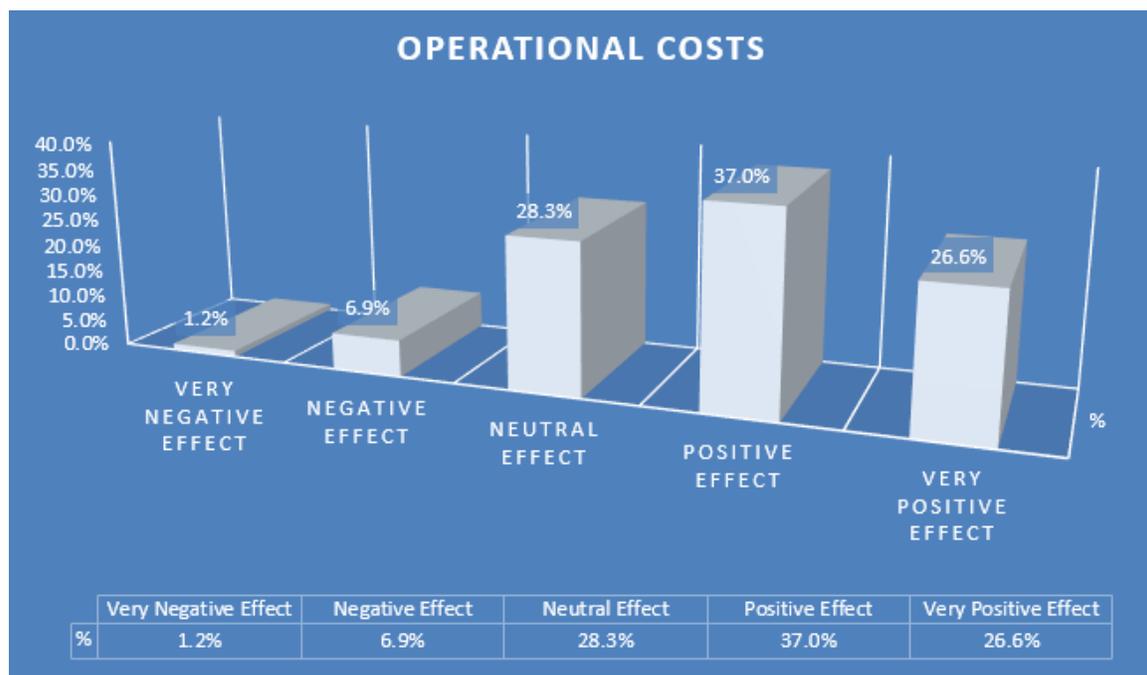


*Figure 68: Effect on Operational Efficiency*

### 7.3.4 Effect on Functional Cost Saving

As with every organization, the operational costs is one of the most important concerns for hotels. Operational costs include all the expenses incurred by the hotel in the process of delivering its value proposition to the customer. It is vital for the hotel to remain in control of its operational costs via effecting budgeting and constant improvement of processes. Any technological solutions towards that direction are popular among hoteliers as well as highly appreciated.

A new ICT enabled business model, can help in both reducing and controlling the hotel's operational costs. However, the cost of acquiring new ICT solutions might be high and it may take some time for the hotel's investment to pay off. This might explain the percentage (28.3%) of respondents who see a neutral effect of BM change on operational cost, and another 6.9% who believe it might even have a negative effect. Overall though, respondents believe that an enhanced BM has a positive (37%) or very positive effect (26.6%).



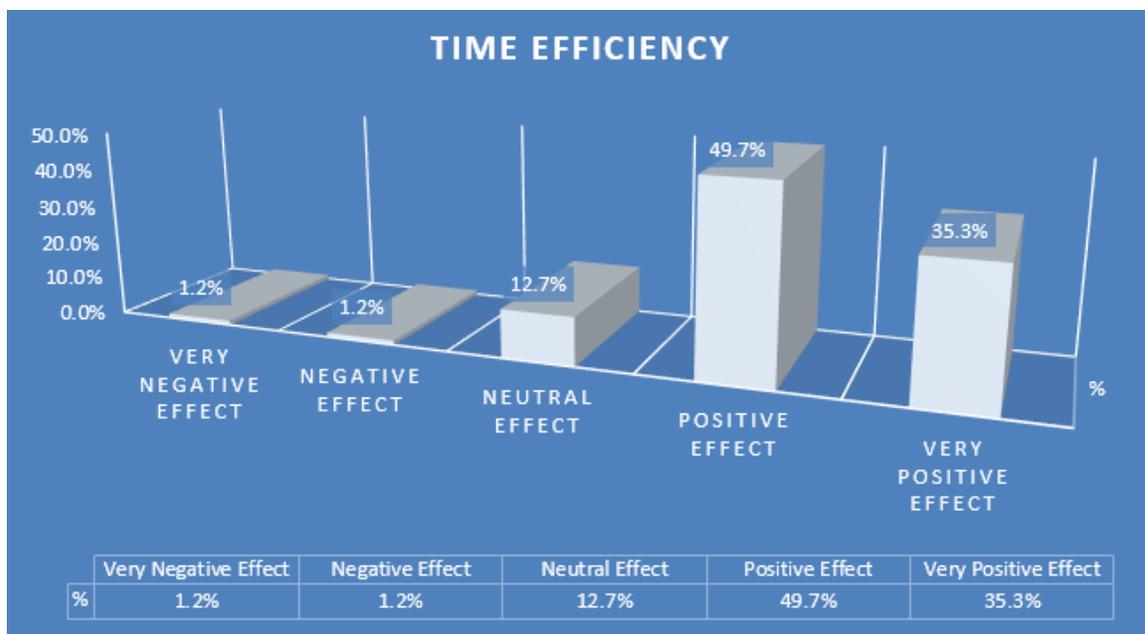
*Figure 69: Effect on Operational Costs*

### 7.3.5 Effect on Time Saving

Time saving/efficiency plays an increasingly important role in hotels. It affects the way they operates, the way they conducts business, and in a number of occasions, it might be the decisive factor for the guest’s experience.

Hotels strive to complete tasks better and faster, as time is of the essence in the hospitality industry, especially when it comes to guest satisfaction. Take for example the importance of a quick check-in and checkout process, or the expectation for a fast service when visiting one of the hotel’s food and beverage outlets. Beyond the guest’s experience, the hotel might win or lose reservations depending on its time management ability, as well as avoiding overbookings or other difficult situations.

The research results concur with the above, as respondents anticipate a positive (49.7%) or very positive (35.3%) effect of utilizing ICT solutions, through an improved business model that adds to the time efficiency of the hotel.



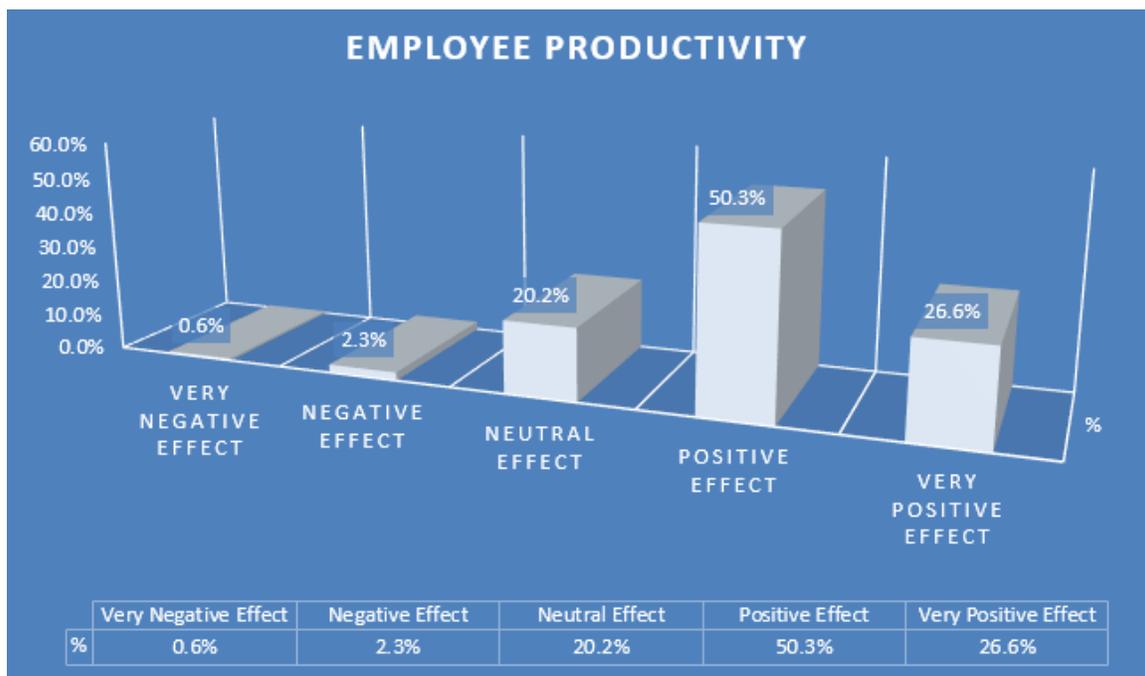
*Figure 70: Effect on Time Efficiency*

### 7.3.6 Effect on Employee Productivity

The last key performance indicator set to the research participants is employee productivity. This has been thoroughly analyzed in chapter 2, where the productivity paradox was discussed, leading to the realization that it has no effect, especially in the hospitality industry.

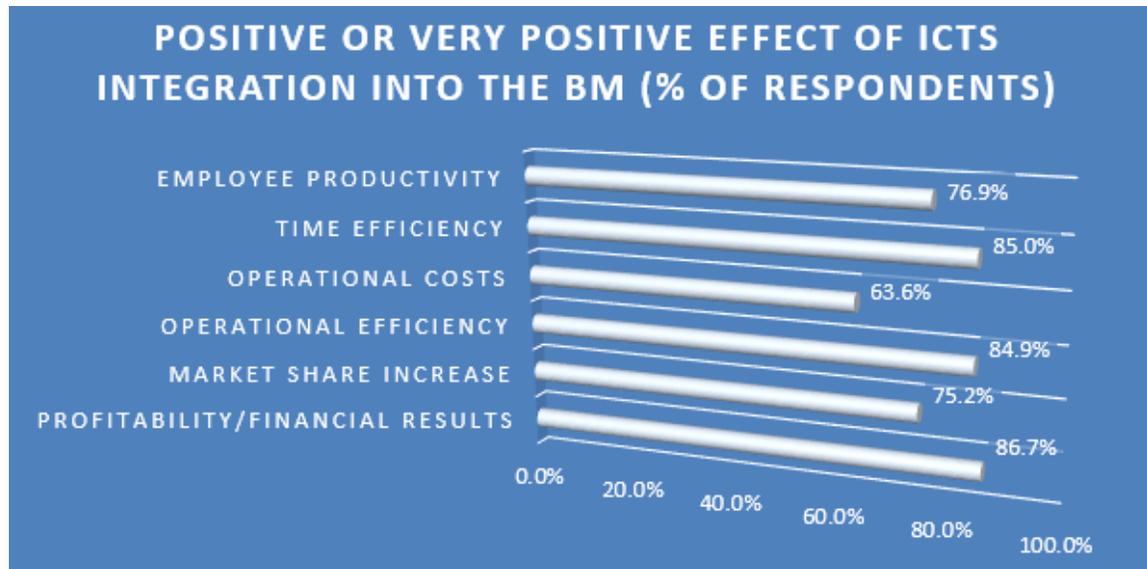
Employee productivity is a major issue for hotels as the quality of employees alone, does not guarantee an increased hotel productivity. ICT tools and an effective business model maximize the capacity of the staff, leading to a more productive workforce, hence better results for the hotel. Examples include ICT solutions that can be used throughout the hotel, from the back-office to the housekeeping department and of course the front desk with its numerous technological applications.

This is appreciated by the participants of the research, who find a positive (50.3%) or very positive effect (26.6%) of a business model change in employee productivity, as depicted in the below figure.



*Figure 71: Effect on Employee Productivity*

Collectively, the participants' responses indicated that integrating ICTs into their BM, resulted in positive or very positive effects for essential key performance indicators, i.e. employee productivity (76.9%), time (85%) and operational efficiency (84.9%), operational costs (63.6%), market share increase (75.2%) and profitability/financial results (86.7%).



*Figure 72: BM change due to ICTs integration and performance effects*

Overall, the effects of the business model change due to ICTs integration are reported to be more than positive, which at a large extend might explain the pace of technological assimilation in the hotels sector within the last decade.

### **7.3.7 Effects of ICT Integration on Operational and Organizational Performance**

It is evident by this point that hoteliers acknowledge the benefits of BM change due to the integration of ICTs in their operation.

Furthermore, it would be of great interest to elaborate deeper and investigate the causal relationships between the level of ICTs integration with the operational and organizational performance of the hotel.

To facilitate the above, structural equation modeling was used to impute relationships between observed and latent variables.

The first step was to create groups of ICTs popularity among the sample. From the sum of twenty-eight ICT elements included in the questionnaire, three major bands emerged, based on the number of ICT elements adopted by hotels (Table 36).

The first band, labeled “low”, includes ICT elements that are widely employed within the hospitality industry. The threshold was set to 50% sample adoption, resulting to six basic ICT elements that most hotels reported to adopt.

The second band, labeled “medium”, includes ICT elements with an adoption percentage between 20% and 50%, resulting to a band of twelve elements. This medium band is not exclusive, as the respondents who employ one of the ICT elements of this band, have a high probability of employing one or more of the ICT elements of the low band as well.

The third and less popular set of ICTs, belong in the band labelled “advanced” and are adopted by less than 20% of the sample, including nine ICT elements and the “other” category which was selected by 1% of the respondents.

Table 36: Bands of ICT Use

ICT HOTEL ELEMENTS	ADOPTION %	BANDS
Website/Email	100%	BASIC ICT ADOPTERS (LOW BAND) BAND 1 - up to 6 Elements Selected by >50% of the sample
Third Party E-sales Online Travel Agencies	99%	
Wi-Fi / Internet Access	64%	
Brand.com reservation/sales Engine	58%	
Customer Database System	57%	
Central Reservation System (CRS)	52%	
Check in & Check out System	47%	PROGRESSIVE ICT ADOPTERS (MEDIUM BAND) BAND 2 - up to 18 Elements
Automatic Wake up Service	46%	
Electronic Lock System	42%	
Property Management System	38%	
Front Office Reports and Statistics System	36%	
Housekeeping Management System	35%	
Food and Beverage Point of Sales System	34%	
Inventory Control System	26%	
Customer Security System	25%	
Room Energy Control System	23%	
Food and Beverage Ordering System	21%	
Brand.com mobile application (ios/android)	21%	
Yield management system	17%	ADVANCED ICT ADOPTERS (ADVANCED BAND) BAND 3 > than 18 Elements - Condition - Used by < 20% of the sample
Sales and Procurement Management System	16%	
Conference and Banquet Management System	13%	
Business Centre	13%	
Global Distribution System (GDS)	13%	
Customer Relationship Management System	13%	
In-room Entertainment	12%	
Restaurant Reservations System	11%	
Human Resources Management System	8%	
Other	1%	

For investigating the benefits of BM change due to the integration of ICTs in their operation, we used the operational model presented in figure 73. The hypotheses H7, H8, and H9 developed previously are also shown in this operational model.

In particular, the variables of effectiveness, functional cost saving, time saving and employee productivity constitute operational performance construct.

Profitability and market share (increase of), as two essential key metrics in the hospitality industry, constitute organizational performance construct. Profitability is an intrinsic metric, as it is measured by the hotel internally year over year, recording the organization's financial gain.

The market share (or market penetration index), measures how a hotel's occupancy compares to a competitive set. It can be considered as an extrinsic metric as it positions the performance of the hotel in room nights (or revenue in some cases), among the competition.

Both metrics were selected as they consist an adequate representation of the hotel's performance and the recorded data reflected the sample's feedback as provided by the hotels' owners or by managerial staff.

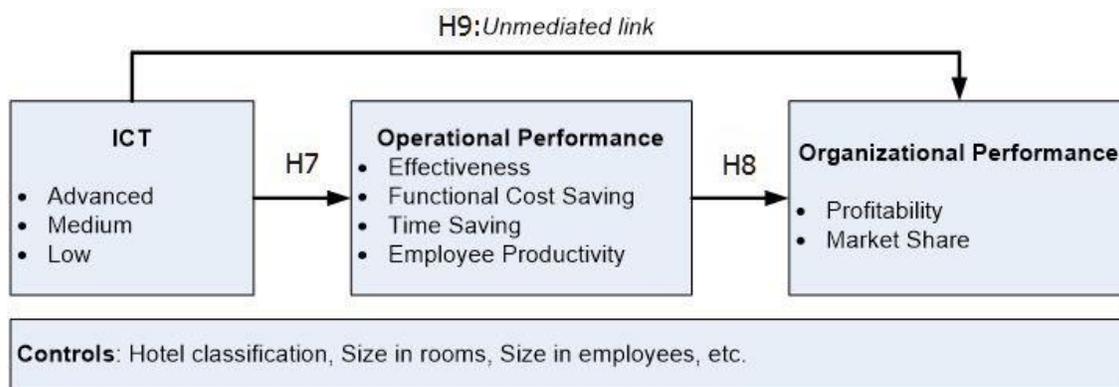


Figure 73: The operational model

Demographic controls on an individual and organizational level (age, gender, level of education, hotel classification, size in rooms, number of employees, location etc.) are also included in the operational model to avoid erroneous results. Each of the controls was treated in estimation as a single latent variable.

For estimating and testing the operational model, we worked as follows:

### **7.3.7.1 The survey instrument**

#### **Consistency and validity**

Construct internal consistency was investigated by evaluating the computed Cronbach alphas. The figures in Table 37 indicate that the survey instrument is reliable for testing the model presented in Figure 73, as all Cronbach alphas are higher than 0.70. Construct validity was examined by evaluating the percentage of the total variance explained for each dimension, obtained by applying confirmatory factor analysis (CFA) with Varimax rotation and the selection criterion that the eigenvalue should be greater than one. The percentage of total variance explained values reported in Table 37, are higher than 50.0 percent indicating acceptable survey instrument construct validity (Hair, Anderson, Tatham, & Black 2008). The correlation coefficients reported in Table 37 are significantly smaller than one, providing thus evidence for separate constructs (Hair et al., 2008).

#### **Common method bias**

To reduce the common method bias threat in the survey design, we asked multiple respondents from each organization to answer the questions of the questionnaire (Lindell and Whiney, 2001). However, taking into consideration that some correlation coefficients were rather high, Harman's (1967) single factor test was also used to examine the likelihood of common method bias threat. According to this test the simultaneous loading of all items in a factor analysis, revealed two factors, and not just one, with the first factor

covering 34.934 percent of total variance explained, indicating thus that there is some common method bias in the data.

*Table 37: Means, Standard deviations, Consistency indices, and Correlation coefficients of the constructs used in the study*

Constructs	Means (standard deviations)	Consistency indices		Correlation Coefficients		
		Cronbach Alpha	Percent of variance explained	ICT	Operational performance	Organizational performance
ICT	3.143 (1.886)	0.795	78.812	1		
Operational performance	4.056 (0.641)	0.792	62.238	0.232**	1	
Organizational performance	4.084 (0.636)	0.746	79.831	0.110	0.516**	1

### 7.3.7.2 Statistical analysis

To test the hypotheses developed for the proposed framework, the methodology of structural equation models (SEM) was used via AMOS. SEM is effective when testing models that are path analytic with mediating variables, and include latent constructs that are being measured with multiple items.

We used maximum likelihood estimation because tests of departure from normality, skewness and kurtosis for all variables used were (except for some controls) within acceptable statistical limits (Byrne, 2010).

We assessed the overall model fit following Bollen's (1989) recommendation to examine multiple indices, since it is possible for a model to be adequate on one fit index but inadequate on many others.

We used the chi-square test (with critical significant level  $p > 0.05$ ) and the normed-chi-square ratio (with critical level 1-3, 3-5, and 5-7 for very large samples and high correlations, to indicate excellent, good, or mediocre fit respectively), the goodness of fit index - GFI (with critical level not lower than 0.80, or 0.70 for complex models), the normed fit index - NFI (with critical level not lower than 0.90), the comparative fit index - CFI (with critical level not lower than 0.90), and the root mean squared error of approximation - RMSEA (with critical level not more than 0.05, 0.08, or 0.10 to indicate excellent, good, or mediocre fit respectively) (for details see Hair et al., 2008).

### **7.3.7.3 Results**

#### **The measurement model**

Before testing the hypotheses a series of CFAs were performed to ensure construct validity. First, the hypothesised model was tested, referring to the three constructs.

Analyses showed acceptable fit for the hypothesised structure (see figure 74). However, taking into consideration that correlations between some factors were high, we compared the fit of the proposed measurement model to an alternative, less restrictive, model with all items loading on a single factor. This model was found to fit worse than the hypothesized model (see figure 75).

We further compared the proposed measurement model with alternative models with restrictions ranging between the proposed three factor model and the single factor model. The fit values of these alternative models were ranging between the two extreme models, supporting the proposed factor structure of the constructs used in this study as well as their discriminant validity.

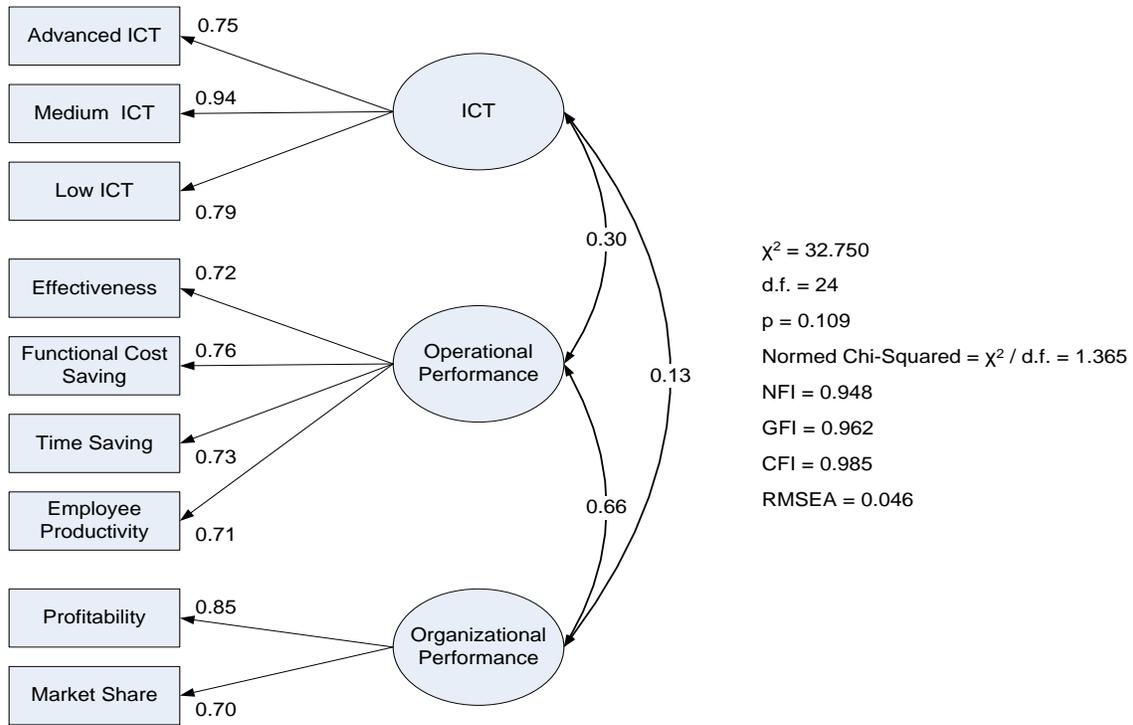


Figure 74: CFA results of hypothesized factor structure

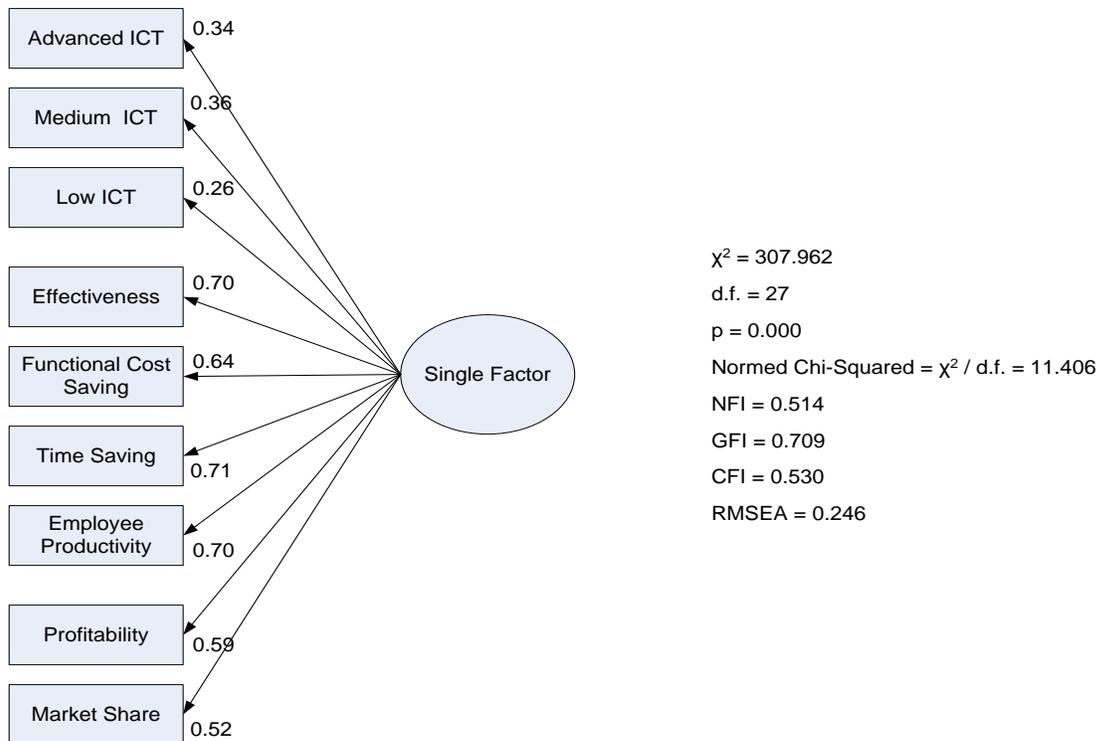


Figure 75: CFA results of single factor structure

### **Structural model**

Table 37 displays the means, standard deviations, consistency indices, and correlation coefficients of the constructs used in the study.

We observe strong, positive and significant correlations between all structural constructs, supporting the hypotheses of the study.

However, results based on correlations, although interesting, may be misleading due to the interactions between several variables. Therefore, in order to isolate the possible links between the variables involved in the operational model presented in Figure 73, the estimated path diagram for this proposed framework is presented in Figure 76.

The circles represent the related latent variables and the bold arrows indicate the structural relationships between the corresponding variables.

The numbers that are assigned to each arrow show the estimated standardized coefficients, and the goodness-of-fit indexes are as follows:  $\chi^2 = 43.319$  d.f. = 33,  $p = 0.108$ , Normed Chi-Squared =  $\chi^2 / \text{d.f.} = 1.313$ , NFI = 0.942, GFI = 0.953, CFI = 0.985, RMSEA = 0.043. All factor loadings were statistically significant.

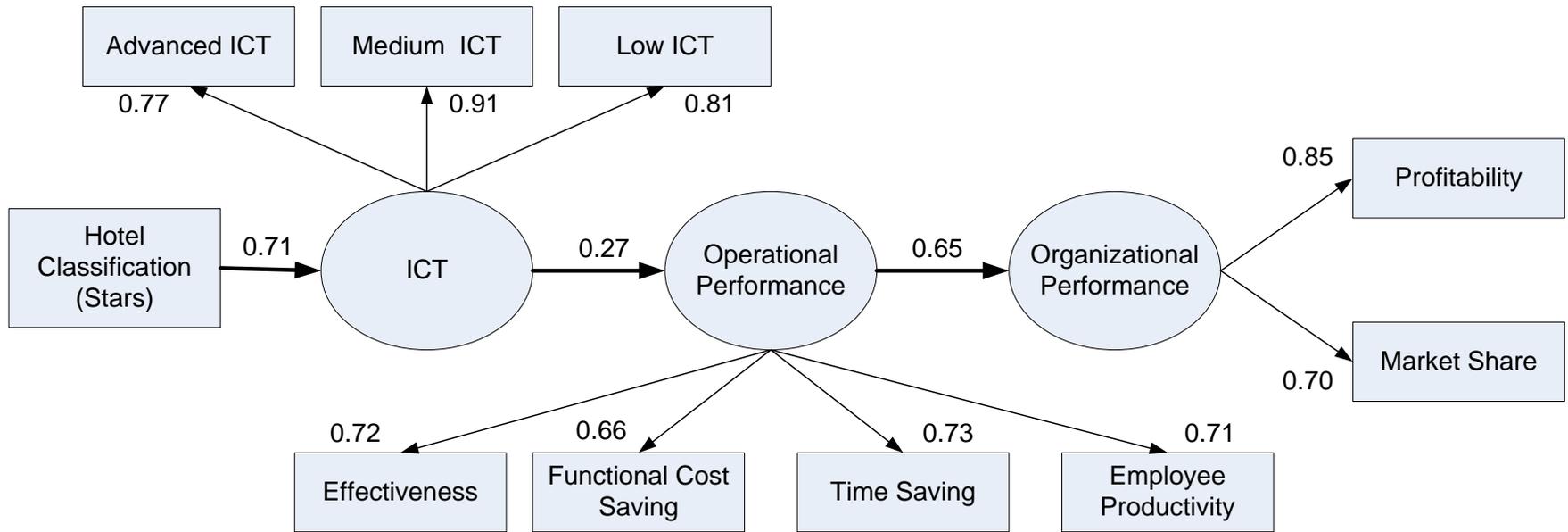


Figure 76: The estimated operational model. All relations are significant

## Testing the hypotheses

From the results presented in Figure 76 we see that ICT directly predicts operational performance ( $\beta = 0.27$ ), supporting hypothesis H7. The loading of 0.27 is anticipated, since a hotel's operational performance is also dependent by a number of factors outside ICTs.

From the presented standardised loadings we see that the contribution of medium ICT (0.91) is greater than the contribution of low ICT (0.81), indicating possibly increasing returns, and smaller than the contribution of advanced ICT (0.77), indicating possibly a turning point.

It is worth mentioning that the key ICT elements involved in a lower band are considered a prerequisite for the operation of hotels adopting higher bands of ICTs. For example, a hotel using a property management system (belonging in the medium band) is bound to have an email address (low band).

From the results presented in Figure 76 we see that operational performance directly predicts organizational performance ( $\beta = 0.65$ ), supporting hypothesis H8.

According to the standardized loadings, we see that the dimensions of time saving (0.73), effectiveness (0.72) and employee productivity (0.71) are greater than that of functional cost saving (0.66), indicating that their impact on organizational performance is much greater than that of cost saving. This is expected as the increased use of ICTs bear an additional cost, limiting the beneficiary effects of the ICTs adoption in terms of cost saving.

Additionally, profitability (0.85), compared to market share (0.70), is the dominant dimension of organizational performance. This can be explained as gaining market share depends on a variety of internal and external factors (e.g. changes in the socio-economic environment, the strategic choices of the hotel, etc.), other than the implementation of ICTs.

Similarly, from the results presented in Figure 76 we see that the direct influence of ICT on organizational performance is not significant, rejecting hypothesis H9.

Taking into consideration that hypotheses H7 and H8 are accepted whilst hypothesis H9 is rejected, we conclude that operational performance “fully mediates” the relationship between ICT and organizational performance (Barron and Kenny, 1986).

Thus, the level of adoption of ICTs explains the improvement in the hotel’s organizational performance through their direct and positive effect on its operational performance.

Finally, in terms of the controls used in the study, the only significant results derived are those presented in Figure 76. These results indicate that from all the controls used, only hotel classification in stars (0.71) significantly influences the adoption of ICT by hotels and accordingly influences performance.

This suggests that the higher the hotel’s classification, the higher the likelihood to adopt the second band of ICTs. This flexible IT core involves different level of technologies and represents the main tendency of the latent variable ICT.

## **Findings**

From the above it can be concluded that there is a clear relation between the classification of the hotel, the adoption of ICT elements, the operational performance and eventually the organizational performance.

To set it descriptively, hotels of a higher classification are most likely to adopt up to eighteen ICTs, affecting positively the operational performance, resulting to a higher organizational performance through better profitability and growth in market share. The higher the stars, the more the ICTs, the better the hotel’s performance.

The model is consistent with the existing literature presented in chapter 2 of this thesis. The validation of hypothesis seven (H7) is coherent with the existing literature, as published by a number of scholars (Olsen & Connolly 2000, Greger & Peterson 2000; Sigala et al. 2004, Law & Jogaratnam 2005, Sirirak et al 2011, Salim et al. 2013, Bethapudi 2013, Omanyo 2014 etc). Tables six to twelve, demonstrate the perceived benefits of ICT integration, through the work of academics during the last thirty years (1996-2016).

As per previous research, the modelled data displayed in figure 76 verify the direct and positive correlation of ICTs with operational performance, specifically in the hotels' industry context.

Existing literature also relates operational performance to organizational performance (Hitt & Brynjolfsson 1996, Siguaw & Enz 1999, Anderson et al. 1999, Melville et al. 2004). This is further strengthened by the implications of improved operations due to enhanced business models, as outlined in the work of academics presented in chapter four. This is in line with the hypothesis validation H8, as the model directly and positively links the latent variables of operational performance and organizational performance.

The full mediation effect validated through the rejection of hypothesis nine (H9), is also consistent with existing literature, as in Mihalic & Buhalis (2013) work, with their CAF model showing that "... ICT has indirect and strong positive potential for firm performance".

This thesis concludes with chapter 8, which presents a research overview, its implications and contribution to theory and practice, as well as its limitations and areas of future research.

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**Chapter 8.****Conclusions**

This chapter presents a summary of the research findings and main conclusions. First, the set objectives are matched against the obtained knowledge, supported by an overview of the respective accomplishments. Subsequently, the research contributions and implications to theory and practice are discussed, followed by the identification of the research limitations and areas of future research.

**8.1 Research Overview and Findings**

Business practice has proved that there is a positive relation between ICT integration and BM effectiveness, therefore there is great interest on how new technologies contribute to BM transformation.

This research aimed in investigating the transformational effects of ICTs integration in the business model of hotels, and to provide a comprehensive BM change framework that can be utilized by hotel organizations during the integration of new ICTs. The accomplishment of this aim is regarded to have an important value for hotels that wish to evolve their business model by incorporating ICTs, following a stepwise process that adds to risk minimization and efficiency maximization.

The thesis is organized in eight chapters and at this point it would be useful to have a short overview of the previous seven, along with their main findings.

Chapter 1 is the introductory chapter of this thesis. It is a first approach to link the topics of ICTs integration, the business model concept and the hospitality industry. It explains the research motivation and context, by highlighting the significance of the trend of ICTs diffusion, the importance of the hospitality industry on a global and national level, and

the perceived theoretical gap of BM change frameworks designed for the hospitality industry and more specifically for hotels.

The main research goal is defined, that is the composition of the Business Model Evolution Framework, a comprehensive tool that will address the aforementioned theoretical gap and act a powerful practical tool for hotels integrating new ICTs in their operations. This is accomplished through six objectives as presented in the below table along with an explanation of how they were achieved within the thesis.

*Table 38. Accomplishments of the Research Objectives*

Research Objectives	Accomplishments
<b>Objective 1:</b> Investigate the performance implications and the perceived benefits of ICTs integration at the firm level and the hotel	Objective 1 is accomplished in chapter 2, where the productivity paradox is discussed and argued against, followed by an explanation of why firm-level analysis is more appropriate than conclusions drawn from industry-level data. The impact of ICTs in at the firm level were discussed, proving the positive relation between the use of ICTs and productivity. This is further extended on a hotel level, as the use of ICTs have a positive effect on productivity followed by a number of benefits, such as cost related benefits, operational benefits, product or service Improvements and capabilities benefits, suppliers interaction benefits, customer relationship benefits, marketing benefits, and research and development benefits.
<b>Objective 2:</b> Analyze the concept of the business model in terms of context and definitions and review the developed theory on contemporary business model frameworks	Objective 2 is achieved in chapter 3, where the concept of business model is thoroughly discussed and the need for a definitional consensus is highlighted, leading to the identification and justification of the most comprehensive definition of the concept. The second part of the objective is also met, as all contemporary business model frameworks are presented and reviewed, providing the necessary knowledge of the topic for the development of the suggested framework.
<b>Objective 3:</b> Record the existing BM change methodologies and discuss their typology and limitations	Objective 3 is accomplished in chapter 4, where the discussion on the value of business model innovation follows a complete review of the existing business model change frameworks. Each theoretical construct is presented, analyzed and compared to others, to identify the critical change elements that are later employed in the composition of the Business Model Evolution Framework.

<p><b>Objective 4:</b> Formulate the hypothesis based on the research questions derived from the literature review</p>	<p>Objective 4 is achieved in the early stages of chapter 6, where the research methodology is presented in terms of the selected research method, followed by the description of the research identity and the presentation of the descriptive characteristics of the sample units and respondents.</p>
<p><b>Objective 5:</b> Develop a theoretical framework for ICT induced business model change in hotels, synthesizing essential change elements and sequencing the process</p>	<p>Objective 5 is realized in chapter 5, where the Business Model Evolution Framework is synthesized and presented analytically, justifying the necessity of inclusion of each of the framework's stages and their usefulness to hotels when integrating new ICTs.</p>
<p><b>Objective 6:</b> Elaborate on the research findings and establish if the theoretical framework is validated</p>	<p>Objective 6 is accomplished in chapter 7, where the research hypotheses are tested, along with the validation of the Business Model Evolution Framework. As per the research findings, although the majority of hotels do not use a specific methodology when integrating new ICTs, they have a methodological approach and they would implement every stage of the suggested framework in the exact same sequence of stages. Furthermore, interesting conclusions also arise from the discussion around the usage of the sub-elements of the framework. The findings conclude with the realization that hotels do appreciate the positive effects of an ICT enabled BM to basic hotel KPIs, and that hotels that follow a methodology during ICTs integration anticipate a greater positive impact.</p>

Chapter 2 investigates the performance implications of the integration of ICTs into the organization. The first paragraph examines the productivity paradox as expressed by Solow (1987), to arrive to the conclusion that there might not be a paradox after all. This is further supported by other studies (Sigala et al., 2004), a realization that allows the continuation of the discussion around the performance implication of ICTs. What follows is an explanation why firm-level analysis is more appropriate than industry-level analysis to draw conclusions in productivity, which paves the way for the exploration of the impact of ICTs at the firm level and more specifically at hotels. Productivity is positively correlated with the use of ICTs and the anticipated benefits for hotels are matched to respective favorable studies. These include cost related benefits, operational benefits, product or service Improvements and capabilities benefits, suppliers interaction benefits, customer relationship benefits, marketing benefits, and research and development benefits.

Chapter 3 introduces the concept of the business model, describing its evolution from its first appearance in an academic article in 1957 (Bellman et al.). The first paragraph of the chapter focuses on the lack of definitional consistency, which represents a potential source of confusion, promoting dispersion rather than convergence of perspectives, and obstructing cumulative research progress on business models (Zott et al., 2010). In an attempt to overcome this, a typology of definitions is provided, leading to the presentation of the most cited ones, and the selection of the most comprehensive one, as delivered by Al-Debei et al. in 2008. The next big section of the chapter concentrates on contemporary business model frameworks, as they are critical for the substantial understanding of the concept. Among different theoretical models, Ostewalder's nine blocks BM conceptualization was selected as the most qualified representation of the organization's business logic, expressed through its value proposition, customer relationship, customer segments, channels of distribution, key resources, key activities, key partners, cost structure and revenue streams. The chapter closes by presenting some of the basic forms of business models that are outlined along with a short description and relevant examples.

Chapter 4 investigates the topic of business model innovation and goes deeper into the current knowledge with regard to the BM change process. In the early lines of the chapter, the limitation of the BM construct as a static representation is identified, emphasizing on the dynamic nature of the concept, especially in a turbulent and dynamic technological environment. Subsequently, the necessity of business model innovation is thoroughly discussed, concluding that it is not only vital for the survival of the organization but it can also lead to superior business performance. This is where the subject of business model change frameworks becomes more relevant, as they can serve as a transformational 'vehicle', transferring the organization from the current state to a new ICT enabled business model. Based on literature review, a review of fifteen BM change frameworks is provided, along with the identification of the essential components of change that will be later employed in the composition of the suggested theoretical framework.

Chapter 5 introduces the Business Model Evolution Framework and the logic behind its design. Detailed attention is given to each of the implementation stages, i.e. the stimulus,

mobilization, mapping, evaluation of missing roles, BM design, switch, manage and assessment. Each step is supported by related theories and a conclusive explanation is provided for their inclusion in the framework. Significant sub-elements are also weaved in every stage, contributing to the completeness of the theoretical framework. The sequence of the stages is also discussed along with the necessity for a feedback loop. To conclude, the theoretical suitability of each stage is established and the rationale of the Business Model Evolution Framework design is thoroughly explained.

Chapter 6 elaborates on the selection of the research methodology that was employed to reach the set objectives. First the research questions and resulting hypotheses are outlined to be tested later via the forthcoming research. Quantitative research is selected over quality research and the methodology selection is defended through a respective justification. Random sampling is employed among other options and online questionnaire is selected as the most appropriate way to collect the required primary data. Furthermore, research design issues are discussed regarding the size of the sample and its characteristics, leading to the description of the research identity. Finally, this chapter also includes the presentation of the descriptive characteristics of participating hotels and respondents.

Chapter 7 presents and examines the research results in three main sections; the verification of the Business Model Evolution Framework, the delivery of hotel insights with regard to the BMFE's sub-elements, and the presentation of the effects of ICTs integration as perceived by the respondents. The hypotheses set in chapter 6 are tested, confirming that the majority of hotels do not use a specific methodology when integrating new ICTs, although they would use the suggested sequential stages if they would do so. Through their responses, the participating hotels verify the Business Model Evolution Framework and provide interesting insights on the employment of the stages sub-elements. Furthermore, the research findings validate the hypothesized positive relation between the effects of ICT induced BM change and key performance indicators of hotels, also revealing the anticipated superiority in performance of those who implement a specific methodology. Finally, using SEM, a statistical model is employed to relate the

classification of hotels in stars, the level of ICTs adoption, the operational performance of the hotel and its organizational performance, opening the way for new discussions of a theoretical and practical nature.

The goal of the presented research was to provide useful insights into the trending concept of ICTs integration and business model change. The hotels industry was selected as a fertile ground for the application of a new comprehensive BM change framework, which could be tested and verified by the participating hotels. Throughout the eight chapters of this thesis, the research goals are successfully met and further knowledge is obtained on the ever-evolving topic of ICTs integration and BM change, leading to significant theoretical and practical contributions.

## **8.2 Research Contributions**

The contribution of this research is the introduction of the Business Model Evolution Framework, intended for hotels that go through a BM transformation due to the integration of ICTs. The suggested framework extends the preceding theoretical literature and contributes towards the systematization of the BM change management.

The research has a twofold contribution, both to theory and practice. As a study, it adds to the clarity of the concept of business model, arriving to a definitional consensus and providing a complete review of contemporary BM change frameworks.

It also enriches the discussion of the integration of ICTs and the emerging performance implications for the organization.

The BMEF provides a new ground for a deeper theoretical elaboration on the ICT induced BM change process, but also constitutes a powerful tool for the management of organizations and more specifically hotels. This section analyzes the contribution to both theory and practice.

### 8.2.1 Contribution to Theory

Although the main contribution to theory is the introduction and verification of the Business Model Evolution Framework, there is also a number of side theoretical contributions accomplished throughout this thesis.

- The study enforces the theoretical argument against the productivity paradox, as the research results indicate a positive or very positive relationship between ICTs and a range of hotels' selected key performance indicators. The research findings indicate that hotels that use a methodology when integrating ICTs, anticipate a superior performance compared to those that do not. This is an important addition to the discussion around the topic, as the productivity paradox if superficially approached may lead to false hypotheses and discourage future research. The study favors the discussion against the existence of the paradox, and through its findings proves there is a positive relation between ICTs integration and superior productivity among other significant hotel KPIs.
- The lack of the business model definitional consensus has been disturbing the development of the concept, as there is no widely accepted common definitional ground, allowing the misinterpretation of the concept and the dispersion of theoretical approaches. The study provides a thorough list of BM definitions along with an analysis of the issue, justifying the selection of a comprehensive definition that meets certain criteria and can be potentially be acknowledged as the most accurate representation of the term.
- Adding to the comprehension of the business model concept, the study summarizes the predominant BM theoretical conceptualizations, focusing on a shortlist of contemporary and qualified representations of the organization's business model. Through their presentation, the study concludes to Osterwalder and Pigneur's

proposal, as the most complete representation of the BM concept, strengthening its position as the most appropriate tool to use when mapping the organization's BM.

- Transcending the BM frameworks as static representations of the organization, the study highlights the dynamic nature of business model innovation, putting in frame the BM change frameworks. Filling the gap in the existing literature, this is a first attempt to provide a complete list of BM change frameworks, identify their unique elements, review and compare against each other for their comprehensiveness.
- On a theoretical level and for the first time, the issue of employing a methodology when integrating ICTs is addressed to hotels. Although anticipated, the fact that ICT integration and BM change is not pursued through a methodology for the majority of respondents, draws attention to the necessity for an effective BM change framework. As reviewed in the study, the developed theoretical constructs are not designed specifically for hotels and lack in comprehensiveness of change elements and sophistication. This perceived theoretical gap is covered by the presentation and thorough explanation of the Business Model Evolution Framework, which entails all essential change components, organized in a stepwise risk-minimizing process. The verification of this framework shows that hotels would employ each of the suggested stages of implementation, proving the necessity of their inclusion. Furthermore, the research results validate the suggested sequential process in the specific ranking of actions. Essentially, the BMEF extends the theoretical literature on business model change frameworks, as it is verified through the conducted research based on an adequate sample of hotels, establishing a comprehensive and methodical approach to the integration of new ICTs and the consequent business model change. It adds to the current theoretical knowledge by combining existing and innovative essential change elements, in a sequential configuration that allows a safe and efficient transition to an ICT enabled business model.
- Another interesting theoretical implication emerging from the research results, is with regard to the utilization of theory-supported sub elements of each of the

implementation stages. Based on respective theoretical approaches, each stage of the BMEF contains a series of sub-elements for hotels to consider upon the implementation process. Established theoretical constructs are embedded in the implementation stages of the framework, adding to its theoretical solidity and overall theoretical value. The results provide useful findings that contribute to the validation of the framework and may be further explored on a theoretical or practical level.

- Through the validation process of the research hypotheses, an estimated operational model (figure 76) displays the relation between the hotels classification in stars, the level of ICTs adoption and their operational and organizational performance. The full mediation of operational performance enables the correlation between ICTs and organizational performance measured in profitability and growth of market share.
- Among other results, a plenitude of data regarding the questionnaire's respondents and hotel characteristics, may be of particular interest to future researchers to draw their own conclusions on different facets of the business model change domain.

### **8.2.2 Contribution to Practice**

The contribution to practice of this research is equally important and is not limited to the application of the Business Model Evolution Framework to practice.

- The research results can act as a benchmark for comparison with the competition. On a national level, the research results could be employed by hotels to draw conclusions on how they compare against their competition. Demographic data of the sample units and respondents could be indicative to that direction, and hotels might consider it beneficial to compare for example their level of ICT sophistication with that of their competitors.

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- Hotels might also benefit from the listing of available ICT solutions and their preference among competitors. Especially hotels of limited technological interaction, might find appealing the idea of further research of one of the presented ICT hotel solutions.
  - ICT practitioners might also find it useful to study the results of the ICTs diffusion among the sample, as it could provide them with exploitable market insights. Furthermore, the depiction of the existing situation regarding the level of ICTs adoption by hotels, reflects the room left for the growing opportunities within the hotel industry.
  - The research proves the relationship between the classification of hotels in stars, the level of ICTs adoption and the subsequent effects on the operational and organizational performance. This can prove to be valuable to hotels of various classifications when defining the ICT elements integrated in their operations. According to the research data, a low star hotel will be less benefited by an investment in ICTs, as opposed to a five star hotel that wishes to enhance its operational and organizational performance. This direct and positive relation can assist the management of hotels with regard to their ICTs investment decisions and planning.
  - The Business Model Evolution Framework could be of a great practical use for the hotelier. It can act as a change facilitator, enabling the hotel to integrate any new ICT methodically and safely, until it is seamlessly incorporated in the enhanced business model. The BMEF allows the hotel to:
    - Identify possible stimulus to change, looking internally or externally in the hotel's operational and competitive environment.
    - Consider mobilizing the right stakeholder at the right moment and to avoid possible internal resistance to change.

- Improve the understanding of the organization and prepare for the forthcoming change by mapping its current BM, employing Osterwalder and Pigneur's (2010), business model canvas.
- Evaluate the missing roles of unexploited ICTs
- Design a new BM and utilize scenario planning to minimize risk
- Safely implement the switch to the new business model
- Manage the change effectively and adjust if necessary, and
- Assess the impact of changes and the effectiveness of the new BM

In other words, the BMEF constitutes an implementation roadmap, which guides the hotel through a detailed sequence of actions, from the moment of the idea conception to the delivery of the ICT enabled business model, and the continuous flow of information via the feedback loop.

- The BMEF could also be used at any time by the hotel, irrespectively of an ICT induced BM change process. For example, a hotel might want to explore the reconfiguration of its BM to gain on efficiency, thus considering specific elements and sub-elements of the framework.
- The research results prove the established perception of an effective ICT induced BM change among hotels, as they agree on the positive effect on their key performance indicators, creating a standard for the market. Furthermore, it is evident from the results that hotels that use a methodology when integrating new ICTs anticipate a higher impact on performance factors, compared to those who do not. This could be indicative for hotels that remain uncertain on the usefulness of adopting a methodology when incorporating ICTs in their operations.
- Although verified locally, the Business Model Evolution Framework might find practical applications in hotels located in other countries.

- Finally, the Business Model Evolution Framework could be potentially applied in other forms of accommodation within the hospitality industry, like self-catering apartments, villas, holiday homes, etc.

### **8.3 Limitations and Future Research**

Following the aforementioned contributions of the study, the acknowledgment of its limitations also shows the directions for further research.

- Although the sample is representative of the total population, it is restricted to a specific geographical area in northern Greece. Future research carried out in other geographical areas nationally and internationally, could produce additional market insights and add to the verification of the BMEF.
- The research is conducted via the selected quantitative method of online questionnaires, as in this occasion it is the most suitable method of primary data collection. Future attempts could consider a mixed method, combining quantitative and qualitative methods (e.g. interviews), that could add further depth in the research analysis.
- The research is limited with regard to focusing on the effects of ICTs integration to the BM, while future studies could include and test the behavior of the organization to other BM change stimuli.
- Since the Business Model Evolution Framework is verified within the boundaries of the hotels industry, it would be of great interest to establish if it could be applied to other forms of accommodation or hospitality businesses via a future research. Moreover, the framework could also be tested in different organizational environments outside the hospitality industry, widening its range of possible applications.

- Finally, the research is limited to the theoretical verification of the BMEF. Future research could practically test its application to hotels adopting the framework when integrating ICTs in their BM, monitoring its implementation up until the final BM reconfiguration. The effects of such an application could provide significant conclusions on the practical value of the theoretical construct for hotels. Another challenge would be to conduct further research between hotels adopting the suggested methodology, hotels using another methodology and hotels that do not use a methodology at all.

Business model change, ICTs and hotels, represent trending subjects for both academics and practitioners. Their inevitable growing association provides a rich ground for future research that may produce considerable results both on a theoretical and practical level.

This research is a step towards that direction and an open invitation for further development.

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## APPENDICES

### APENDIX I – DEFINING THE ECONOMIC CONTRIBUTION OF TRAVEL & TOURISM



Source: WTTC – Travel & Tourism Economic Impact 2015 Greece, 2015

## APENDIX II

Author(s)  Year	Definition
Porter, 1985	“The business model outlines how a company generates revenue with reference to the structure of its value chain and its interaction with the industry value system”
Brandenburger and Stuart, 1996	A business model is “an organization’s approach to generating revenue at a reasonable cost, and incorporates assumptions about how it will both create and capture value”
Slywotsky, 1996	A business model is “the totality of how a company selects its customers, defines and differentiates its offerings, defines the tasks it will perform itself and those it will outsource, configures its resources, goes to market, creates utility for customers and captures profits.”
Timmers, 1998	The business model is “an architecture of the product, service and information flows, including a description of the various business actors and their roles; a description of the potential benefits for the various business actors; a description of the sources of revenues”
Venkatraman and Henderson, 1998	“The business model is a coordinated plan to design strategy along the customer interaction, asset configuration and knowledge leverage vectors”
Maître and Aladjidi, 1999	“The business model consists of three elements: a value proposition, appropriate time management and a typology of the ecosystem then of the company’s specific positioning. A company’s business model is essentially its supply structure, the way income is generated, its organization and the structure of the resulting costs, the way appropriate alliances are established and the resulting position in the value chain”
Mayo and Brown, 1999	A business model refers to “the design of key interdependent systems that create and sustain a competitive business.”

Tapscott et al., 2000	A business model is “a system of suppliers, distributors, commerce service providers, infrastructure providers, and customers”, labeling this system the business web or “b-web”
Benavent and Verstraete, 2000	The business model represents a large unit “which includes relations with suppliers, partnerships, interactions between several markets and can result in decisions which define the conditions and the reality in which the company is operating”
Boulton et al., 2000	“The business model determines whether a company destroys or creates value and in what ways”
Gordijn et al., 2000	“The main goal of a business model is to answer the question: “who is offering what to whom and expects what in return”. Therefore, the central notion in any business model should be the concept of value”
Hamel, 2000	“ A Business Concept is a radical innovation that can lead to new customer value and change the rules of the industry” [...] The business concept is directly related to the business model since the latter is “nothing else than the business concept implemented in practice”
Miles et al., 2000	“A business model represents a clearly stated plan for adding economic value by applying know-how to a set of resources in order to create a marketable product or service”
Stewart and Zhao, 2000	A business model is “a statement of how a firm will make money and sustain its profit stream over time”
Kraemer et al., 2000	They identify the four blocks that make up the business model: “direct sales, direct customer relationships, customer segmentation for sales and service and build-to-order production
Linder and Cantrell, 2000	“The business model is the organization’s core logic for creating value. The business model for a profit-orientated enterprise explains how it makes money”
Eriksson and Penker, 2000	“The business model is the focal point around which business is conducted or around which business operations are improved”

Rappa, 2000	“A business model is the method of doing business by which a company can sustain itself, that is, generate revenue. The business model spells out how a company makes money by specifying where it is positioned in the value chain”
Mahadevan, 2000	“A business model is a unique blend of three streams that are critical to the business. These include the value stream for the business partners and the buyers, the revenue stream and the logistical stream. The value stream identifies the value proposition for the buyers, sellers, and the market makers and portals in an Internet context. The revenue stream is a plan for assuring revenue generation for the business. The logistical stream addresses various issues related to the design of the supply chain for the business”
Applegate, 2001	“A business model is a description of a complex business that enables study of its structure, the relationship among structural elements, and how it will respond in the real world”
Feng et al., 2001	The business model is “a concept focused on management, plans for cost recovery and sources of funding, including the capital market”
Colvin, 2001	The business model is “the way we make money”
Petrovic et al., 2001	“Business model describes the logic of a business system for creating value that lies behind the actual processes”
Afuah and Tucci, 2001	“Business model is a method by which the firm builds and uses its resources...” “...It consists of components, linkages between such components and the dynamics between them.”
Alt and Zimmermann, 2001	“We will distinguish six generic elements of a business model: mission, structure, processes, revenues, legal issues and technology. (...) We propose the presented six generic elements as a comprehensive framework in order to develop sustainable business models in the new economy. When designing a business model, all six generic elements and the dynamics of the respective elements have to be considered”
Tapscott, 2001	“Business model refers to the core architecture of a firm, specially how it deploys all relevant resources”

Amit and Zott, 2001	The business model depicts “the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities”
Weill and Vitale, 2001	A business model is “a description of the roles and relationships among a firm’s consumers, customers, allies, and suppliers that identifies the major flows of product, information, and money, and the major benefits for participants”
Bienstock et al., 2001	“A business model describes the way an organization makes money”
Porter, 2001	“A business model is a loose conception of how a company does business and generates revenue”
Winter and Szulanski, 2001	“The formula or business model, far from being a quantum of information that is revealed in a flash, is typically a complex set of interdependent routines that is discovered, adjusted, and fine-tuned by ‘doing’”
Chesbrough & Rosenbloom, 2002	“A business model is a description of how your company intends to create value in the marketplace. It includes that unique combination of products, services, image and distribution that your company carries forward. It also includes the underlying organization of people and the operational infrastructure that they use to accomplish their work”
Auer and Follack 2002	A business model “is simply a model of the logic behind a business. It describes how to make money”
Dubosson – Torbay et al., 2002	“A business model is nothing else than the architecture of a firm and its network of partners for creating, marketing and delivering value and relationship capital to one or several segments of customers in order to generate profitable and sustainable revenue streams”
Betz, 2002	“A business model is an abstraction of a business identifying how that business profitably makes money. Business models are abstracts about how inputs to an organization are transformed to value-adding outputs”
Bowman, 2002	A business model is “a description of roles and relationships of a company, its customers, partners and suppliers, as well as the flows

	of goods, information and money between these parties and the main benefits for those involved, in particular, but not exclusively for their consumers”
Chesbrough and Rosenbloom, 2002	“In the most basic sense, a business model is a model of doing business by which a company can sustain itself – that is, generate revenue. The essence of the idea is ‘how you get paid’ or ‘how you make money’ with a taxonomy of alternative mechanisms”
Magretta, 2002	Business models are “stories that explain how enterprises work. A good business model answers Peter Drucker’s age old questions: Who is the customer? And what does the customer value? It also answers the fundamental questions every manager must ask: How do we make money in this business? What is the underlying economic logic that explains how we can deliver value to the customers at an appropriate cost?”
Stahler, 2002	The business model is “a model of an existing business or a planned future business. A model is always a simplification of the complex reality. It helps to understand the fundamentals of a business or to plan how a future business should look like”
Fisken and Rutherford, 2002	“The business model outlines how a company generates revenues with reference to the structure of its value chain and its interaction with the industry value system”
Elliot, 2002	“A business model specifies the relationships between different participants in a commercial venture, the benefits and costs to each and the flows of revenue. Business strategy specify how a business model can be applied to a market to differentiate the firm from its competitors”
Joo, 2002	“The business model is a framework for successful business practices ranging from business ideas to sources of revenue and the distribution structure for partners”
Camponovo and Pigneur, 2003	The business model is “a detailed conceptualization of an enterprise’s strategy at an abstract level, which serves as a base for implementation of business processes”

Chesbrough, 2003	“Value proposition, market segment, value chain structure, cost structure, the position of the firm on the value network, the competitive strategy”
Faber et al., 2003	A business model is “the way a network of companies intends to create and capture value from the employment of technological opportunities”
Hawkins, 2003	“A business model is a description of a company’s intention to create and capture value by linking new technological environments to business strategies”
Hedman and Kalling, 2003	“A generic business model includes the following causally related components, starting at the product market level: (1) customers, (2) competitors, (3) offering, (4) activities and organization, (5) resources, and (6) supply of factor and production inputs. These components are all cross-sectional and can be studied at a given point in time. To make this model complete,  we also include a longitudinal process component (7), to cover the dynamics of the business model over time and the cognitive and cultural constraints that managers have to cope with”
Casadesus-Masanell, 2004	A business model is “a collection of assets and activities, and the governance structure of the assets”
Mansfield and Fourie, 2004	“A model is an abstract representation of reality that defines a set of entities and their relationships. A business model most commonly describes the linkage between a firm’s resources and functions and its environment. It is a contingency model that finds an optimal mode of operation for a specific situation in a specific market”
Engelhardt, 2004	The business model “denotes the organization, production and financing strategies implemented by the typical young, radically innovative, fast-growing and publicly listed company that came to dominate the information technology sectors in the USA”
Haaker et al., 2004	The business model is “a blueprint collaborative effort of multiple companies to offer joint proposition to their consumers”
Mitchell and Coles, 2004	“A business model is a combination of “who”, “what”, “when”, “where”, “why”, “how”, and “how much” an organization uses to provide its goods and services and develop resources to continue its

	efforts”
Leem et al., 2004	The business model is “a set of strategies for corporate establishment and management including a revenue model, high-level business processes and alliances”
Seddon et al., 2004	“A business model outlines the essential details of a firm’s value proposition for its various stakeholders and the activity system the firm uses to create and deliver value to its customers. If Porter (1996, 2001) is used to define strategy, a business model may be defined as an abstract representation of some aspect of the firm’s strategy. However, unlike strategy, business models do not consider a firm’s competitive positioning”
Warnier et al., 2004	“We define a business model as the choices that a firm makes in order to generate revenue. The business model emerges as all the choices operating on a certain number of variables influencing the operational implementation of a strategy”
Yip, 2004	“A business model can be broadly defined as the composition of these elements: Value proposition; Nature of inputs; How to transform inputs (including technology; Nature of outputs; Vertical scope; Horizontal scope; Geographic scope; Nature of customers; How to organize”
Bely, 2005	“Positioning an offer in the market, outlining the processes that will ensure both the value of the offer and the economic performance of the firm, and lastly, choosing the control and management system, all this is building the business mode. These three links in the business model must all be brought into line for it to be successful”
Ghaziani and Ventresca, 2005	The business model is “a description of a company’s logic of value creation”
Osterwalder et al., 2005	“A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture if the firm and its network of partners for creating, marketing, and delivering this value relationship capital, to generate profitable and sustainable revenue streams”

Morris et al., 2005	A business model is a “concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets” [...] It has six fundamental components: Value proposition, Customer, Internal processes/competencies, External positioning, Economic model, Personal/Investor factors.
Pateli and Giaglis, 2005	“A business model must explicitly account for the need for partnership and provide the best possible answers to the questions regarding the type of value that each partner will contribute based on its core competence, the distribution of revenues and profits between them, the type of service offerings and the business structures that will be required to implement the changes”
Rajala and Westerlund, 2005	A business model is “the ways of creating value for customers and the way business turns market opportunities into profit through set of actors, activities and collaborations”
Shafer et al., 2005	A business model is a “representation of the underlying core logic and strategic choices for creating and capturing value within a value network”
Schweizer, 2005	“The expression ‘business’ refers to the fact that a company does business with the purpose of making profit, while the term ‘model’ is a simplified description or representation of a system that is composed of different elements and the relationships between them. Thus, a business model tries to give an integrated and consistent picture of a company and the way it aims to generate revenues”
Tikkanen et al., 2005	“We define the business model of a firm as a system manifested in the components and related material and cognitive aspects. Key components of the business model include the company’s network of relationship, operations embodied in the company’s business processes and resource base, and the finance and accounting concepts of the company”
Voelpel et al., 2005	“The particular business concept (or way of doing business) as reflected by the business’s core value proposition(s) for customers; its configured value network to provide that value, consisting of

	own strategic capabilities as well as other (e.g. outsourced, allied) value networks; and its continued sustainability to reinvent itself and satisfy the multiple objectives of its various stakeholders”
Anderson et al., 2006	“Business models are created in order to make clear who the business actors are in a business case and how to make their relations explicit. Relations in a business model are formulated in terms of values exchanged between the actors”
Chesbrough, 2006	“A business model defines a series of activities that will yield a new product or service in such a way that there is net value created throughout the various activities. Second it captures value from a portion of those activities for the firm developing the model”
Kallio et al., 2006	A business model is “ the means by which a firm is able to create value by coordinating the flow of information, goods and services among the various industry participants it comes in contract with including customers, partners within the value chain, competitors, and the government”
Lecocq et al., 2006	“We define the business model as the decisions that a firm takes to generate revenue. These decisions are based on three main dimensions: the resources and skills mobilized (enabling them to make an offer), the offer made to the clients (in the broadest sense), and the internal organization of the firm (value chain) and its transactions with external partners (value network).
Malone et al., 2006	A business model is defined “by two dimensions: types of assets involved in the business (physical, financial, intangible, and human) and types of rights sold by the business (creator, distributor, broker, and landlord)”
Hamel, 2007	“A business model is simply a business concept that is put into practice and acted upon”
Rajala and Westerlund, 2007	“We identified three elements in all of the studies we reviewed. These elements, expressed in different words, are: (1) value propositions and offerings; (2) various assets and capabilities as resources needed to develop and implement a business model; (3) the revenue logic (including sources of revenue, price-quotation principles and cost structures) that is characteristic of a particular

	business”
Seelos and Mair, 2007	A business model is “a set of capabilities that is configured to enable value creation consistent with either economic or social strategic objectives”
Tavlaki and Loukis, 2007	“...a business model can be defined as a blueprint, or a story, of how an interrelated set of enterprise variables, in the areas of strategy, operations architecture and economics are addressed and fit as a working system. In this sense business model represents the framework for conceptualizing a value-based innovative idea”
Al Debei et al., 2008	“The business model is an abstract representation of an organization, be it conceptual, textual, and/or graphical, of all core interrelated architectural, co-operational, and financial arrangements designed and developed by an organization presently and in the future, as well as all core products and/or services the organization offers or will offer, based on these arrangements that are needed to achieve its strategic goals and objectives”
Baden-Fuller et al., 2008	Business model is «the logic of the firm, the way it operates and how it creates value for its stakeholders”
Fiet and Patel, 2008	“A business model explains how a venture is expected to create a profit”
Mason and Leek, 2008	“... two cornerstones of business models (...): (1) structure: how firms perceive the structure of their firm, their business network and their position within it; and (2) routines: how firms develop effective operational routines to exploit the potential value of their network”
Johnson et al., 2008	Business models “consist of four interlocking elements that, taken together, create and deliver value”. These are: Customer value proposition, Profit formula, Key resources, and Key processes.
Zott and Amit, 2008	Business model is “the structural pattern, describing how the negotiations between a corporation’s headquarters and all the external agents in the product and process markets are organized”
Patzelt et al., 2008	“Business models define how firms manage their transactions with other organizations such as customers, partners, investors and suppliers and therefore constitute the organizations’ architecture for

	the product, service and information flows”
Teece, 2009	A business model is a reflection of “the management’s hypothesis about what customers want, how they want it, and how an enterprise can best meet those needs, and get paid for doing so”
Gunzel and Wilker, 2009	“The business model depicts the design of transaction content, structure, and governance so as to create value through the exploitation of business opportunities”
De Reuver, 2009	“Business models are an abstraction of how organizations create value”
Santos et al., 2009	“A business model is a configuration of activities and of the organizational units that perform those activities both within and outside the firm designed to create value in the production (and delivery) of a specific product/market set”
Casadessus and Ricart, 2010	“The logic of the firm, the way it operates and how it creates value for its stakeholder”
Doz and Kosonen, 2010	“Business models can be defined both objectively and subjectively. Objectively they are sets of structured and interdependent operational relationships between a firm and its customers, suppliers, complementors, partners and other stakeholders, and among its internal units and departments (functions, staff, operating units, etc). These ‘actual’ relationships are articulated in procedures or contracts and embedded in (often) tacit action routines. But, for the firm’s management, business models also function as a subjective representation of these mechanisms, delineating how it believes the firm relates to its environment”
Humel et al., 2010	“A business model describes the logic and principles that a firm uses to generate revenues”
McGrath, 2010	“...two core components constitute a business model ... the basic ‘unit of business’, which is what customers pay for [and] ‘key metrics’ of process or operational advantages for delivering superior performance”
Moingeon and	“A firm’s business model is the description of the mechanisms

Lehmann, 2010	<p>enabling it to create value through:</p> <ul style="list-style-type: none"> <li>• the value proposition made to the clients,</li> <li>• its value architecture,</li> </ul> <p>and to harness this value in order to transform it into profits (profit equation)”</p>
Osterwalder et al., 2010	“A business model describes the rationale of how an organization creates, delivers, and captures value”
Jovarauskiene and Pilinkiene, 2015	“Business model defines the method of business organization, which ensures the company’s profit, specifies the corporation’s difference from its rivals also the principles of declaration of goods and services in the market”

## ΑΡΕΝΔΙΧ ΙΙΙ – RESEARCH QUESTIONNAIRE

11/10/2015

Ερωτηματολόγιο για την χρήση τεχνολογιών πληροφορικής και επικοινωνιών

### Ερωτηματολόγιο για την χρήση τεχνολογιών πληροφορικής και επικοινωνιών

Η παρούσα έρευνα αποσκοπεί στην καταγραφή του βαθμού και της μεθόδου ενσωμάτωσης των τεχνολογιών πληροφοριών και επικοινωνίας σε ξενοδοχειακές μονάδες. Η έρευνα πραγματοποιείται μέσα στα πλαίσια διδακτορικής διατριβής την οποία εκπονώ στο Τμήμα Εφαρμοσμένης Πληροφορικής του Πανεπιστημίου Μακεδονίας. Για οποιαδήποτε απορία ή διευκρίνιση μην διστάσετε να επικοινωνήσετε μαζί μου στο 2310922493 και σας ευχαριστώ προκαταβολικά για την πολύτιμη συμβολή σας.

\*Required

### Δημογραφικά Στοιχεία

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1. Φύλο \*

Mark only one oval.

- Άντρας  
 Γυναίκα

2. Ηλικία \*

Mark only one oval.

- <18  
 18-24  
 25-35  
 36-49  
 50-67  
 >67

3. Επίπεδο εκπαίδευσης \*

Mark only one oval.

- Πρωτοβάθμια εκπαίδευση (Δημοτικό)  
 Δευτεροβάθμια εκπαίδευση (Γυμνάσιο - Λύκειο)  
 Μεταλυκειακή Εκπαίδευση (IEK - Τεχνικές Σχολές)  
 Τριτοβάθμια Εκπαίδευση (ΑΕΙ - ΤΕΙ)  
 Μεταπτυχιακές - Διδακτορικές σπουδές

4. Επίπεδο εξοικείωσης με την τεχνολογία \*

Mark only one oval.

1 2 3 4 5

Καθόλου εξοικωμένος/η      Απόλυτα εξοικωμένος/η

**5. Ιδιότητα \****Mark only one oval.*

- Ιδιοκτήτης
- Γενικός Διευθυντής/Διευθύνων σύμβουλος
- Μέλος του διοικητικού συμβουλίου
- Στέλεχος
- Other: .....

## Στοιχεία Ξενοδοχείου

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**6. Ονομασία ξενοδοχείου \***

Ζητείται για την ορθή καταγραφή των απαντήσεων και δεν θα χρησιμοποιηθεί σε οποιοδήποτε σημείο της έρευνας

.....

**7. Αστέρια \****Mark only one oval.*

- 5
- 4
- 3
- 2
- 1

**8. Αριθμός δωματίων \****Mark only one oval.*

- 1-20
- 21-50
- 51-100
- 101-

**9. Αριθμός εργαζομένων \****Mark only one oval.*

- 1-10
- 11-50
- 51-250
- 251-

**10. Έτη λειτουργίας \****Mark only one oval.*

- 1-20  
 21-40  
 41-60  
 61-80  
 >80

**11. Εποχική λειτουργία \****Mark only one oval.*

- Ναι  
 Όχι

**12. Τοποθεσία \****Mark only one oval.*

- Αστικό κέντρο  
 Περίχωρα πόλης  
 Επαρχία

**13. Βαθμός κεντρικής διοίκησης \***

Παρακαλώ διευκρινίστε σε ποιο βαθμό οι αποφάσεις λαμβάνονται κεντρικά (π.χ. αν ανήκετε σε όμιλο επιχειρήσεων) ή ανεξάρτητα από το ξενοδοχείο

*Mark only one oval.*

	1	2	3	4	5	
Κεντρική Λήψη Αποφάσεων	<input type="radio"/>	Αποκεντρωμένη Λήψη Αποφάσεων				

**14. Τμήματα ξενοδοχείου \***

Παρακαλώ επιλέξτε τα τμήματα που λειτουργούν στο ξενοδοχείο σας

*Tick all that apply.*

- Διεύθυνση
- Τμήμα Δωματίων (Rooms Division)
- Τμήμα Υπηρεσίας Ορόφων
- Τμήμα Επισιτιστικών
- Τμήμα Πωλήσεων
- Τμήμα Μάρκετινγκ
- Τμήμα Προσωπικού
- Τμήμα Προμηθειών
- Οικονομικό Τμήμα
- Τμήμα Συντήρησης
- Τμήμα Ασφαλείας
- Τμήμα Άθλησης και Ψυχαγωγίας
- Νομικό τμήμα
- Καταστήματα
- Other: .....

**15. Στοιχεία τεχνολογιών πληροφορικής και επικοινωνιών (ΤΠΕ) \***

Παρακαλώ επιλέξτε ποια από τα παρακάτω στοιχεία ΤΠΕ έχετε ενσωματώσει στην λειτουργία σας

*Tick all that apply.*

- Ιστοσελίδα και ηλεκτρονικό ταχυδρομείο
- Εταιρική εφαρμογή για κινητές συσκευές (ios ή/και android)
- Κεντρικό σύστημα διαχείρισης ξενοδοχείου (PMS)
- Συστήματα υποδοχής και αναχώρησης/Check in & Check out systems
- Κεντρικό Σύστημα Κρατήσεων / Central Reservation System (CRS)
- Παγκόσμιο σύστημα Διανομής/ Global Distribution System
- Σύστημα διαδικτυακών πωλήσεων μέσω της εταιρικής ιστοσελίδας
- Συστήματα διαδικτυακών πωλήσεων μέσω τρίτων/ OTAs e-sales extranets
- Συστήματα κατάστασης δωματίων και συστήματα διαχείρισης υπηρεσίας υποδοχής
- Σύστημα βάσης δεδομένων πελατών
- Σύστημα διαχείρισης σχέσεων πελατών (CRM)
- Σύστημα στατιστικής και αναφορών υποδοχής
- Σύστημα διαχείρισης απόδοσης/Yield management system
- Σύστημα κράτησης εστιατορίου
- Σύστημα παραγγελιοληψίας
- Σύστημα Ηλεκτρονικού σημείου πώλησης (POS)
- Συστήματα οργάνωσης συνεδρίων και δεξιώσεων
- Σύστημα πωλήσεων και τροφοδοσίας
- Σύστημα διαχείρισης αποθεμάτων και αποθήκης
- Σύστημα παροχής γραμμής διαδικτύου/ασύρματη πρόσβαση
- Σύστημα διαχείρισης ενέργειας δωματίου
- Σύστημα αυτόματης αφύπνισης
- Συστήματα αναψυχής δωματίου
- Σύστημα ηλεκτρονικής κλειδαριάς
- Σύστημα ασφαλείας πελατών
- Επιχειρηματικό κέντρο
- Σύστημα διαχείρισης ανθρώπινου δυναμικού
- Other: .....

## **Ενσωμάτωση νέων Τεχνολογιών Πληροφορικής και Επικοινωνιών και αλλαγή του επιχειρηματικού μοντέλου**

Το επιχειρηματικό μοντέλο περιγράφει τη λογική με την οποία μια επιχείρηση δημιουργεί, παρέχει και συλλαμβάνει αξία και αναλύεται σε 9 επιμέρους δομικά στοιχεία. Σε αυτό το σκέλος του ερωτηματολογίου σας προσκαλούμε να αποτυπώσετε την σχέση των δομικών στοιχείων του ξενοδοχείου με την ενσωμάτωση νέων ΤΠΕ, κατά την διαδικασία μετάβασης στο νέο επιχειρηματικό μοντέλο.

## 16. Ακολουθείτε συγκεκριμένη μεθοδολογία κατά την διαδικασία ενσωμάτωσης νέων ΤΠΕ; \*

Mark only one oval.

 Ναι Όχι

## 17. Επιλέξτε κατά σειρά εφαρμογής τα στάδια που ακολουθείτε κατά την διαδικασία ενσωμάτωσης νέων ΤΠΕ \*

Mark only one oval per row.

	Στάδιο 1	Στάδιο 2	Στάδιο 3	Στάδιο 4	Στάδιο 5	Στάδιο 6	Στάδιο 7	Στάδιο 8	Μη χρήση
Ερέθισμα για αλλαγή (Η συνειδητοποίηση της ανάγκης ενσωμάτωσης νέων ΤΠΕ)	<input type="radio"/>								
Παρακίνηση εσωτερικών δομών και υπερπήδηση αντιστάσεων στην αλλαγή	<input type="radio"/>								
Αποτύπωση του υπάρχοντος επιχειρηματικού μοντέλου	<input type="radio"/>								
Καθορισμός των αναξιοποίητων ΤΠΕ και προσδιορισμός των πιθανών ωφελειών τους	<input type="radio"/>								
Σχεδιασμός νέου επιχειρηματικού μοντέλου με ενσωματωμένες νέες ΤΠΕ	<input type="radio"/>								
Ενσωμάτωση νέων ΤΠΕ και μετάβαση στο νέο οργανωτικό μοντέλο	<input type="radio"/>								
Διαχείριση αλλαγής και παρακολούθηση νέων λειτουργιών	<input type="radio"/>								
Αξιολόγηση των αλλαγών και προσαρμογή επιχειρηματικού μοντέλου	<input type="radio"/>								

**18. Ποιοι από τους παρακάτω παράγοντες θα σας οδηγήσει στην ενσωμάτωση νέων ΤΠΕ στο επιχειρηματικό σας μοντέλο; \****Tick all that apply.*

- Αλλαγές στην νομοθεσία
- Αλλαγές στο πολιτικό πλαίσιο
- Αλλαγές στο οικονομικό περιβάλλον
- Αλλαγές στο σοσιο-κοινωνικό περιβάλλον
- Περιβαλλοντικές αλλαγές
- Τεχνολογικές αλλαγές
- Επιδεινούμενη οικονομική απόδοση και μείωση κερδών
- Απώλεια μεριδίου αγοράς σε ανταγωνιστές
- Λειτουργικές ελλείψεις
- Αυξανόμενα λειτουργικά κόστη
- Αυξανόμενος ρυθμός αποχωρήσεως προσωπικού
- Ανησυχητικά μηνύματα από έρευνες ικανοποίησης πελατών
- Διοικητική δυσλειτουργία
- Other: .....

**19. Επιλέξτε ποιους από τους παρακάτω θα παρακινούσατε για την χρήση νέων ΤΠΕ; \****Tick all that apply.*

- Ιδιοκτήτες
- Διευθύνων σύμβουλο
- Διοικητικό συμβούλιο
- Μάνατζερ
- Εργαζόμενους
- Όλους τους παραπάνω
- Other: .....

20. **Ποια από τα παρακάτω δομικά στοιχεία της επιχείρησης θα χαρτογραφούσατε πριν την μετάβαση στο νέο επιχειρηματικό μοντέλο; \***

Επιλέξτε τα στοιχεία του υπάρχοντος επιχειρηματικού μοντέλου που θα αποτυπώνατε πριν την εφαρμογή νέων ΤΠΕ

*Tick all that apply.*

- Κατηγορίες Πελατών: Τα άτομα ή οι οργανισμοί για τους οποίους η επιχείρηση δημιουργεί αξία
- Προτεινόμενη Αξία για κάθε κατηγορία πελατών: η ομάδα προϊόντων ή υπηρεσιών που δημιουργούν αξία για τους πελάτες
- Κανάλια Επικοινωνίας με τους πελάτες: οι τρόποι με τους οποίους η επιχείρηση επικοινωνεί και προσεγγίζει κάθε κατηγορία πελατών για να παρέχει την προτεινόμενη αξία. Κανάλια επικοινωνίας, διανομής και πωλήσεων
- Σχέσεις με Πελάτες: το είδος των σχέσεων που έχει η επιχείρηση με κάθε κατηγορία πελατών. Αναζήτηση πελατών, διατήρηση πελατών, ώθηση πωλήσεων
- Ροές εσόδων: οι τρόποι και μηχανισμοί τιμολόγησης με τους οποίους η επιχείρηση συλλαμβάνει αξία. τα χρήματα που η επιχείρηση αντλεί από κάθε κατηγορία πελατών
- Κύριοι Πόροι: οι σημαντικότεροι πόροι που απαιτούνται για να λειτουργήσει το επιχειρηματικό μοντέλο. Φυσικοί, οικονομικοί, διανοητικοί, ή ανθρωπίνοι
- Κύριες Δραστηριότητες: οι σημαντικότερες ενέργειες που πρέπει να κάνει η επιχείρηση για να λειτουργήσει το επιχειρηματικό της μοντέλο. Οι σημαντικότερες δράσεις που πρέπει να αναλάβει η επιχείρηση για την επιτυχημένη λειτουργία της
- Κύριοι Συνεργάτες: το δίκτυο των προμηθευτών και συνεργατών που υποστηρίζουν τη λειτουργία του επιχειρηματικού μοντέλου
- Δομή Κόστους: όλες οι δαπάνες που επιβαρύνουν τη λειτουργία του επιχειρηματικού μοντέλου
- Όλα τα παραπάνω

21. **Ποιες πηγές θα χρησιμοποιούσατε για τον καθορισμό των αναξιοποίητων ΤΠΕ και τον προσδιορισμό των πιθανών ωφελειών τους; \***

*Tick all that apply.*

- Εσωτερικές - Πληροφόρηση από την διοίκηση, διευθυντές τμημάτων και εργαζόμενους
- Ανάθεση σε εταιρεία συμβούλων
- Πληροφόρηση από πελάτες
- Κινήσεις ανταγωνιστών
- Όλα τα παραπάνω
- Other: .....

22. **Τι από τα παρακάτω θα χρησιμοποιούσατε στο στάδιο σχεδιασμού του νέου επιχειρηματικού μοντέλου; \***

*Tick all that apply.*

- Σύνθεση ομάδας σχεδιασμού της αλλαγής
- Κατάθεση προτάσεων και φιλτράρισμα ιδεών
- Πρόκριση λειτουργικών προτεινόμενων μοντέλων
- Ορισμός πιθανών σεναρίων και προβολές εφαρμογής
- Κατάληξη στο τελικό προτεινόμενο μοντέλο
- Όλα τα παραπάνω
- Other: .....

23. **Ποια από τα παρακάτω στοιχεία θα επιλέγατε στην διαδικασία ενσωμάτωσης των νέων ΤΠΕ; \***

*Tick all that apply.*

- Κατάστρωση πλάνου δράσης
- Ευθυγράμμιση στρατηγικής με το νέο επιχειρηματικό μοντέλο
- Παρουσίαση αλλαγών σε όλα τα επηρεαζόμενα τμήματα
- Εκπαίδευση εργαζομένων στις νέες λειτουργίες
- Θέσπιση σημείου υπαναχώρησης σε περίπτωση αποτυχίας εφαρμογής
- Σταδιακή εκτέλεση αλλαγής σύμφωνα με το πλάνο δράσης
- Όλα τα παραπάνω
- Other: .....

24. **Σε συνέχεια της αλλαγής του οργανωτικού μοντέλου, ποια από τα παρακάτω θα εκτελούσατε; \***

*Tick all that apply.*

- Παρακολούθηση ομαλής εκτέλεσης νέων λειτουργιών
- Χρησιμοποίηση συμπερασμάτων για την βελτίωση των διαδικασιών
- Αξιολόγηση των επιπτώσεων του νέου επιχειρηματικού μοντέλου
- Διαμόρφωση τελικών συμπερασμάτων σε σχέση με το επιθυμητό αποτέλεσμα
- Οριστική υιοθέτηση μοντέλου ή επανατροφοδότηση πληροφοριών για την δημιουργία νέου
- Όλα τα παραπάνω
- Other: .....

## Αποτελέσματα αλλαγής επιχειρηματικού μοντέλου λόγω ενσωμάτωσης νέων ΤΠΕ

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25. Επιλέξτε τον βαθμό επίδρασης της αλλαγής του επιχειρηματικού μοντέλου στους βασικούς τομείς απόδοσης του ξενοδοχείου \*

Mark only one oval per row.

	Πολύ αρνητική επίδραση	Αρνητική επίδραση	Ουδέτερη επίδραση	Θετική επίδραση	Πολύ θετική επίδραση
Κερδοφορία/ Οικονομικά αποτελέσματα	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Αύξηση μεριδίου αγοράς	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Οργανωτική αποτελεσματικότητα	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Λειτουργικά κόστη	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Εξοικονόμηση χρόνου	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Παραγωγικότητα εργαζομένων	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Σας ευχαριστούμε για την συμμετοχή σας στην έρευνα**

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