



Business Model Innovation in Greece: Its Effect on Organizational Sustainability

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Abstract

The paper investigates business model innovation (BMI) and its effects on the organizational sustainability of a population of small- and medium-sized businesses with certain organizational characteristics. The research attempts to uncover how effectively BMI is applied, reveal its effects on organizational sustainability, and depict the latest BMI literature tendencies, as well as its elements, that may affect the organization. The applied methodology includes the usage of a structured questionnaire as the primary modeling tool, given to a number of businesses located in the Western Macedonia, Greece. Full statistical analysis is then applied, analyzing and correlating the research primary findings. Apart from presenting BMI latest literature trends, the research ulterior doubled goal is to display BMI effects on the businesses of a region that has been fully affected by a harsh financial crisis over the last decade.

Keywords Business modeling (BM) · Business model innovation (BMI) · Organizational sustainability · Sustainable Enterprise Excellence (SEE)

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Introduction

Technological advances have been recognized as being among the primary drivers of social, national, and financial development (Del Giudice and Maggioni 2014). Moreover, innovation processes constitute a critical factor for the adequate application of technology in general and knowledge-sharing in particular (Del Giudice et al. 2015) and technological knowledge embedded into innovations may be regarded as a production process shaped by radical indivisibility (Messeni Petruzzelli et al. 2010). The pattern of innovation is getting more complex, and hence requires more sophisticated models, with not only sequential, but also parallel and feedback processes to be involved within (Park and Kim 2005). As a result, innovation is considered a major characteristic, regarding any single aspect of economic development, which needs to be analyzed along with its effects on multiple elements such as sustainability or business modeling. Various researchers describe the concept of innovation as a difficult challenge for most firms and especially for the small- and medium-sized enterprises (Agarwala 2003; Alegre et al. 2011). As Carayannis and Provanca (2008) remark, *innovation* emerges from *propensity* as a reflection of processes, routines, and capabilities including the organization culture, *posture* which is the organizations position within a business ecosystem, and *performance* (3P). Except the profound financial impacts, the aforementioned characteristics may also refer to products, patents, and environmental impacts, while Bjorkdahl and Holmen (2013) consider *business model innovation* (BMI) as a new integrated logic of the way that a firm uses to create value for users and customers, to capture value. Regarding its relation with product or service innovation, BMI does not necessarily refer to a new service or product but it is used to apply new ways to build the existing product or create the existing service as well as uncover new ways to capture value from them. According to Zott and Amit (2012), BMI is actually changing the way of how doing business and it goes even further than just uncovering innovations in products, processes, or technologies.

Regarding *organizational sustainability*, it is considered a systematic concept directly related to the continuity of economic, social (including cultural), and environmental issues (Ribeiro et al. 2015). It actually defines an organization's ability to change, to provide, or to adapt a total of service delivery practices and opportunities which should be effective enough in order to help the organization become functional and developed (Kim 2015). In general, sustainability is considered a multidimensional aspect that should be supported by constant funding, which aims at creating knowledge and capacity and providing value-based services. The aforementioned attributes are considered critical to the organization's ongoing survival and further development (Scheirer 2005). Organizational sustainability is directly connected to *sustainable development* which according to Longoni et al. (2014) is defined as "the one that meets present needs without compromising the ability of future generations that meet their own needs". Other studies have indicated that enhanced organizational sustainability may come from advanced knowledge on sharing issues, storing knowledge in databases, looking for social interaction in order to allow knowledge exchange, aiming at innovation, and pursuing better performance (Carayannis et al. 2017). Faisal (2010) defines sustainability as an aspect of designing and performing in such a way, in order to accomplish the indefinite maintenance that can meet their demands. It can be also defined as an aspect of driving civilization in order, to the members of

the society (including organizations and firms), and preserve natural ecosystems and biodiversity.

As a result, the need for organizations to adopt a standardized and effective business model innovation (BMI) becomes evident. According to Zott and Amit (2010), business model innovation by definition is based on the acceptance that organizations innovate by leveraging their internal resources and capabilities. Furthermore, firms adopting and combining business models that are meant to distribute research-originated innovations to multiple market segments usually have a higher impact operating as technology transfer agents. As a result, they have a better potential to succeed and develop.

The types of enterprises that can find BMI particularly useful are those that mainly face commoditization, such as manufacturing or commercial firms (Velamuri et al. 2013). Limitations in differentiation, dangers of easy substitution, and increasing cost-pressure are the main obstacles that firms have to surpass, especially in the case of operating in developing countries or in developed economies that lack development particularly in innovation manners. That is so, due to their intention and culture to imitate precedence over innovation and sustainable development (Carayannis et al. 2014).

Business Model Theory and Business Model Innovation Towards Sustainability

Boons and Lüdeke-Freund (2013) consider a business model (BM) as a framework that describes how a firm can be profitable by selling products and services. In fact, a business model by definition mainly refers to value creation and delivery. According to Osterwalder and Yves (2010), a business model is the fundamental structure showing how companies create, deliver, and capture value. A BM consists of two essential elements, the value proposition and the operating model, each of which has three subelements (Lindgardt et al. 2009).

The value proposition actually describes the distinct choices along the three dimensions referred below:

- Target segment(s): The type of customers the organization chooses to serve—what needs are going to be addressed.
- Product or service offering: Offering for customer's satisfaction.
- Revenue model: Offering compensation.

The operating model captures the organization's choices in the following three critical areas:

- Value chain: Organization's configuration in terms of interorganizational activities and outsourcing, in order to deliver on customer's demands.
- Cost model: Organization's configuration of assets and costs, in order to deliver with cost-efficiency.
- Organization: Deployment and development of organization's competitive advantage.

Bocken et al. (2014) define a BM, using three main elements: value proposition, value creation/delivery, and value capture. Value proposition basically involves the customer offerings that cause financial profit. Value creation and delivery involves the creation of value by getting into new markets and business areas and by creating new income streams. Value capture refers to the returns from selling products/services, or processes to customers.

According to Carayannis et al. (2014), the surrounding aspects of value creation, delivery, capture, and communication emerge from value proposition, which is relevant to a specific or several specific customer segments. Thus, it has to be communicated, selecting accurate content and proper channels. Furthermore, value creation includes the key resources, partnerships, and process required for business operation. Similarly, value delivery presents the customer segments and relationships along with the distribution channels, while value capture presents the means under which revenue is produced and the ways costs are kept at low levels too (Abdelkafi et al. 2013). Figure 1 presents the Abdelkafi business model framework.

In accordance with the above, value proposition can be considered the enabling foundation for the conceptualization and implementation of a business model or models as it encapsulates the unique, and challenging to expropriate and/or emulate as well superior value-adding in a socially, environmentally, and financially sustainable manner, creating sustainable entrepreneurship and robust competitiveness regimes (Carayannis et al. 2000, 2011; Carayannis and Campbell 2009; Carayannis and Korres 2013; Carayannis and Provance 2008; Carayannis and Wang 2012).

Osterwalder et al. (2005) state that the aforementioned three elements may be further divided into nine building blocks. Thus, value proposition consists of customer segments, product/service offerings, and customer relationships. Value creation/delivery consists of key partners, key activities, channels, and key resources. Value capture

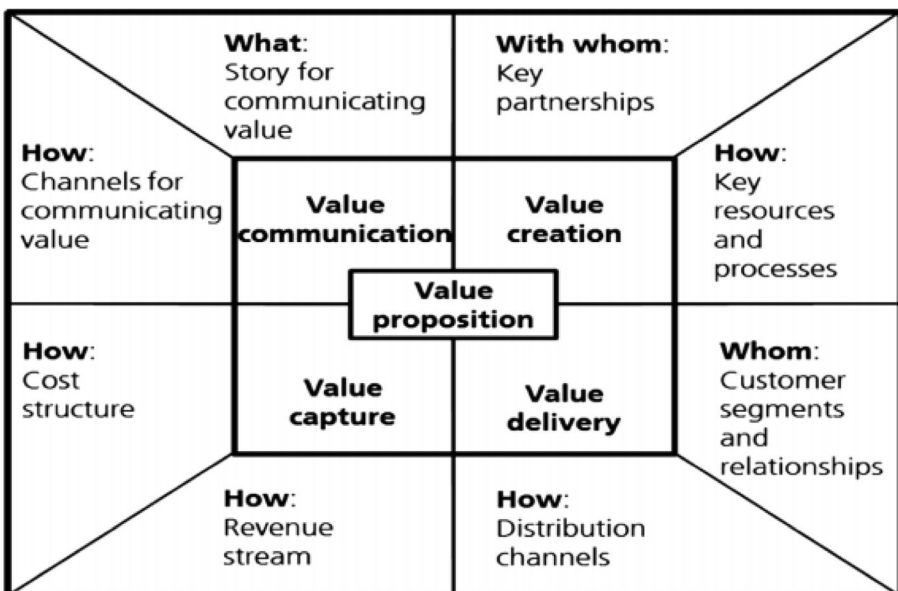


Fig. 1 Business model framework (source Abdelkafi et al. 2013)

consists of revenue streams and cost structures. Figure 2 depicts the relation between the nine building blocks and the three main elements of the business model (Kraaijenhagen et al. 2016.)

According to Amit and Zott (2012), BMI can be either used in multiple industrial patterns for new resource’s design or for the modification of current resources, even under no high R&D investments. Mitchell and Bruckner-Coles (2004) consider BMI as a process that deals with the change and development of a business model applying an event-driven approach that constitutes a new business model artifact/prototype. Relating to this, BMI can be safely presumed as a situation where change events are taking place in order. Poole et al. (2000) state that BMI presents a manifestation of change in an organization that can be comprehended by the investigation of the temporal sequence of events.

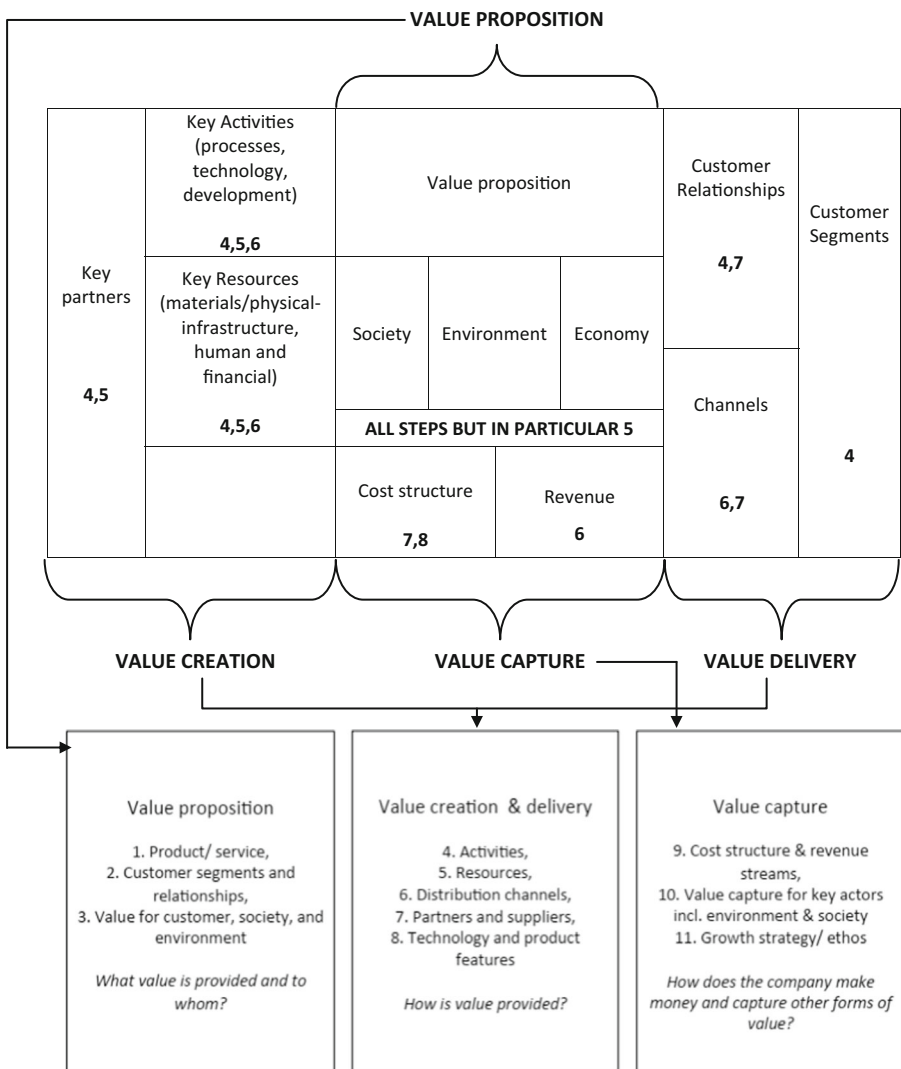


Fig. 2 Conceptual sustainable business model framework (source Kraaijenhagen et al. 2016)

Regarding the interconnection between BMI and sustainability, a business model (BM) can be considered as a new unit of analysis and discussion for sustainability initiatives (Lee and Casalegno 2010). This definition is further extended by Schaltegger et al. (2012) who states that in order to support a systematic creation of business cases for sustainability, it is mandatory to include business model innovation that goes far beyond traditional BM designs.

On the opposite side, Kiron et al. (2013) present BMI as the main lever for total organizational sustainability while Osterwalder and Pigneur (2011) consider that integrating sustainability strategy is not just feasible, but it is required for firms in order to be competitive. In spite of the aforementioned situation, Upward and Jones (2016) underpin the fact that BMI and BM design, in general, fail to effectively embrace the dimension of sustainability. Similarly, the ability to bring people together creating systematic ventures to the direction of sustainable business is typically substantially low (Rohrbeck et al. 2013). As a result, the opportunity for embedding and advancing sustainability during business-value creation procedures where sustainable BMs are used is lost.

The external aspects affecting organizational sustainability are equally important. A business model should be transformed in order to be effective, embodying environmental, economic, and social aspects for organizational sustainability (Stubbs and Cocklin 2008; Savitz 2006). The Quintuple Helix introduced by Carayannis et al. (2012), operating as an evolved form of the Triple and Quadruple Helix, characteristically depicts the interaction between innovation and the other distinct aspects of the natural environment such as ecology, society, and democracy. By that way, it successfully underlines the interconnection between organizational sustainability and the aforementioned environmental aspects. Overall, Hansen et al. (2009) point out that the economic, environmental, and capital aspect of an organization can be further increased by sustainability innovations, comprising the culture and ethics as primary characteristics of the operating framework.

Furthermore, the exploitative and explorative BMI gaining organizational sustainability should also be underlined, as well as the differences between the two models. Benner and Tushman (2003) consider that exploitative innovation is mainly based on developing existing knowledge in order to conserve and enhance firm's competitive advantage, while explorative innovation is mostly targeted at building new cognitive capabilities over company's organizational capability and performance. However, both BMIs are equally significant over organizational sustainability and they should be equally exercised and developed. As Aspara et al. (2009) point out a firm should pay attention in order to elaborate and make proper choices between exploration and exploitation tensions that eventually constraint the choices of organization design and actions, especially in the case of BMI choices. Sustainable Enterprise Excellence (SEE) is also a similarly important factor achieving BMI and affecting organizational sustainability, as innovation is critical to SEE correspondingly. That is so, as it balances the supplementary and adversary interests of critical stakeholder segments and increases the possibility of superior and sustainable competitive positioning resulting at a long-term organization's success that is determined by steadily responsible and relevant governance, actions, strategy, and a performance that is consistent with high-level organizational resplendence, robustness, and resilience (Carayannis et al. 2017). SEE actually balances complementary and adversary interests of critical stakeholder segments such as society and the natural environment, and empowers the capability of a

more effective and competitive positioning of a firm (i.e., Carayannis and Campbell 2009; Carayannis et al. 2014). As a result, SEE amplifies the possibility a firm's long-term success, which is defined by significant organizational flexibility and effectiveness, by constantly responsible governance, effective marketing strategy, and organizational actions that might produce superior results. SEE integrates *ethical, efficient, and effective* (E3) governance with the Triple Top Line Strategy (*equity, ecology, economy*) (3E) throughout enterprise culture to achieve Triple Bottom Line (3P) results (*people, planet, profit*) that are effective and pragmatic at the same time and might predict the next best practices on achieving competitive advantage (Carayannis et al. 2014).

Methodology

The research was conducted as a qualitative case study, affected by appropriate grounded theory. According to Strauss and Corbin (1998), grounded theory allows the acquisition of new perspectives on specific scientific subjects and topics and helps creating empirical scientific knowledge that can give new findings and conclusions regarding the scientific area of interest. As a result, the qualitative case study was chosen in order to use the appropriate academic literature regarding BMI and organizational sustainability, along with the academic findings of previous related work (i.e., Carayannis and Campbell 2009; Carayannis et al. 2012; Carayannis et al. 2015).

The main chosen methodology tool for this research was the interview based on a semi-structured questionnaire that included all necessary aspects of the suitable grounded theory along with the findings of previous work (i.e., Hansen et al. 2009; Lindgardt et al. 2009; Abdelkafi et al. 2013; Carayannis and Campbell 2009; Carayannis et al. 2011; Carayannis et al. 2012; Carayannis et al. 2015). The questionnaire comprised the necessary literature credibility along with the demanded flexibility in order to allow discrete and spontaneous questions.

The questionnaire was electronically sent and answered by email, through telephone communication, and physically delivered to a number of small- and middle-sized businesses mainly located in the Greek region of Western Macedonia. The businesses participated in the research belonged to the retail, services, and industrial sector. The questionnaire was sent to 63 firms and 21 of them fully answered the questionnaire, which allowed the appropriate processing of the received data.

The Questionnaire

The questionnaire included 37 questions in total, separated into three main categories representing the three main aspects of the research topic. Thus, the first part of the questionnaire included business model innovation-related questions, the second part referred to organizational design, and the third part included enterprise excellence-related questions. The questionnaire was mixed, including both Likert Scale answers as well as qualitative answers.

The BMI part included crucial elements according to the relevant grounded theory and literature such as the firm's value proposition, firm's communication methods, company's key resources and processes, selling methods and marketing strategies, cost

structure, and firm's revenue streams. More specifically, the main questions referred to value proposition examined whether the company's value proposition referred to services, products or combined offers, and how the firm communicates and explains its value proposition to potential customers. Regarding key resources and processes, the questionnaire examined what type of resources and processes the companies use, how do they use the combination of the above, in order to create organizational sustainability, and so on. The questionnaire also included significantly important questions examining how the company's selling methods are applied to different market segments, what is the form of company's cost structure and whether the company's revenue streams are internal, external, or investment.

The organizational design part of the questionnaire focused and analyzed organizational sustainability. The main organizational sustainability aspects included in the questions were:

- Firm's value creation (Amit and Zott 2012).
- Organizational strategy (Agarwala 2003).
- Organizational policies, procedures, and practices (Boons and Lüdeke-Freund 2013).
- Current and future organizational changes (Boons and Lüdeke-Freund 2013).

In more detail, it was examined how well value creation has been comprehended by the firm's owners and stakeholders, how effectively value creation is enhanced and promoted, which internal parts of the organization (firm) are used for that purpose, and which procedures are used, in order to amplify value creation. Regarding organizational strategies, policies, and procedures, the magnitude of how well organizational procedures are comprehended and promoted was examined, along with the magnitude of the subjective success and effectiveness according to the organization's CEO's, owners, and administrators. The way organizational policies are applied was also examined, along with the internal environment acts and procedures that are used to promote and enhance organizational sustainability. Finally, the collaborating organization's departments that are used to empower organizational sustainability were also tested, in order to uncover the tools that each organization uses in order to promote effective organizational sustainability.

Sustainable Enterprise Excellence (SEE) was introduced in the third major part of the questionnaire, investigating the main aspects that affect BMI and organizational sustainability. More specifically, it is primarily examined whether the organization applies SEE or not and on what extent, in order to achieve its organizational objectives. Furthermore, the effects of lack of organizational performance are examined, related to the survival, well-being, and growth of the organization. The effectiveness of the company's organizational structure as an element of the enterprise excellence is also investigated. In detail, the magnitude of cost reductions accrued from effective organizational structure is examined, as well as the extent of value creation due effective organizational structure. Similarly, other important aspects of organizational structure are put to question, such as the extent of growth and innovation predictions, supported by the proper organizational structure. Finally, the aspects of organizational and technological learning as elements of SEE and the actual difference between them are also examined. The questionnaire concludes with the investigation of the purpose and the significance of organizational learning, as a crucial element of SEE.

Results

Basic Statistical Analysis

The initial data of the BMI part indicated that the majority of the businesses' (52.4%) value proposition is based on a mixed solution, offered both products and services. 33.3% of the firms offer a value proposition based exclusively on services and only 14.3% offer a product value proposition. This element indicates that the private small- and middle-sized economy in the region is mostly based on the services' sector, with the corresponding value proposition. Regarding company's key resources, the vast majority of the companies asked (57.2%), consider the human factor as the most vital company's resource for maximization of value creation. 23.8% of the firms consider the technology factor most important, while only 9.5% of the companies consider the financial or natural key resources as the most crucial ones. In relation to that element, it is worth pointing that while the Greek financial crisis continues to negatively affect Greek economy for the seventh consecutive year, Greek businesses do not appear to consider financial resources as a key element for value creation—in comparison to the human or technology factor which are considered the most crucial ones. Similarly, the research showed that human resources and expertise are the key processes of the company regarding added value proposal (47.6%), while the production processes indicated as the second most important pointed by 33.3% of the companies asked. At this case, financial services were only pointed by 4.8% of the companies as the key processes. Another important element of the processed data was the process under which the company promotes its products/services to different customer segments. The vast majority (71.4%) promotes its products via sales, while only 28.6% promotes its products through strategic partnerships with other companies. This element indicates the lack of partnership and collaboration strategy for Greek businesses, a crucial element for BMI (Aspara et al. 2009).

The initial data received regarding organizational design indicate that a large majority of businesses seem to comprehend very well or sufficiently well the way value is created in their organizations (76.2%), while only 23.8% of the companies asked consider that they do not understand well enough the way value is created in their organizations. This element indicated that a relatively small but considerable amount of operating businesses owners has not quite understood the meanings of value creation. Similarly, 66.6% of the firm's owners consider their strategy and business model is articulated very well or sufficiently well. On the other hand, a significant amount of business owners (33.4%) do not consider they have a clear strategy or business model. This indicates a lack of effective organizational design in a large amount of businesses in the region of interest. A crucial research finding had been the extent on which, the organization is prepared for potential shifts and disruptions. This question aimed to investigate how ready an organization is, to accept and apply organizational changes. The vast majority answered that their organization is sufficiently well or very well prepared for potential organizational shifts and disruptions (76.1%), while only 9.6% answered is not. This element proved that the Greek firms are ready to accept organizational changes in order to increase their survivability and growth potential—especially during the financial crisis. Regarding the internal company department that could empower value creation, the majority of the businesses answered that the market

research department could mostly strengthen value creation (42.8%), while only 9.6% of company owners consider research and sales departments as value creators. This proves that businesses consider the market research as the most efficient way to create value creation, rather than internal organizational changes or efforts. A similarly important question indicates how value is actually created in the organization. Value creation could be reinforced by strategic partnerships (47.6%), according to the received answers. 38.1% of company's owners believe that targeting new market segments could strengthen value creation and only 14.3% consider innovation as a main amplifier of value creation.

The answers related to SEE mainly aimed to investigate whether SEE is comprehended by the organization's administrators, and applied properly to the company's organizational planning. More specifically, the received data indicated how well understood is the proper organizational learning and whether the company's owners understand the differences with the technological learning. 61.9% of the company's administrators answered that they understand the differences well enough while 38.1% comprehend the differences very well. These data indicated a sufficient comprehension of organizational learning by the businesses of the region. Regarding the proper application of the SEE principles, 61.9% of the organizations answered that they apply proper SEE principles sufficiently well while 38.1% apply those principles very well. The aforementioned data indicate that SEE is applied by the companies and considered a main lever of proper BMI.

The non-parametric statistical analysis conducted for this study aimed to compare the answers, in order to reveal whether there is a correlation between the main variables or not.

Spearman Test

The statistical correlation between specific variables was examined, in order to reveal the association between major aspects that constitute to BMI, organizational sustainability, and SEE. The hypotheses shown below were conducted under Spearman test.

- Hypothesis 1: There is (or not) correlation between the level of understanding of the *firm's BM* by the employees and the actual *organizational part* that mostly contributes to *firm's value creation*.
- Hypothesis 2: There is (or not) relation between how well understood *company's BM is* and how each employee personally comprehends *how value is created*.
- Hypothesis 3: There is (or not) correlation between the level of understanding of *firm's BM* and *SEE application*.
- Hypothesis 6: There is (or not) correlation between the level of *BM's comprehension* and understanding of *value creation*.

By considering the aforementioned hypotheses, employees show whether they have understood the actual role of the BM in company's value creation and SEE's achievement. That is so, as the crucial organizational parts (organizational policy, top management, HRM strategy, etc), the help the firm create value is directly related to the organization's adequacy on applying an effective BM strategy (Lee and Casalegno 2010). Likewise, BMI can be a great source of value creation in businesses (Makhmoor

and Rajesh 2017) and BMs create value for all firm's parties involved (Amit and Zott 2012), while a BM can provide an inclusive framework that explains how companies create and capture value, and clarify how firms capitalize their innovations (Carayannis et al. 2014).

The next hypotheses conducted intend to uncover the level of organizational readiness to accept changes (through effective BMI procedures) in relation to the degree of organizational adequacy in the organization itself and how cost-effective these procedures are.

- Hypothesis 4: There is (or not) correlation between the readiness of the organization to *accept (BMI) changes* and the effective alignment of *the organizational procedures to the best practices* are.
- Hypothesis 5: There is (or not) correlation between the adequate alignment of the *organizational procedures to best practices* and the *organizational cost effectiveness*.

The necessity for an organization to adapt changes adequately according to a systemic organizational framework that is based on implementing the best practices should be a top managerial priority (Alsamydai et al. 2013). Furthermore, according to Johnson et al. (2008), a successful BM that consists of effective organizational procedures shall operate under an effective cost structure formula that includes cost of key assets, direct and indirect costs, organizational economies of scale, etc.

Finally, it was essentially important to detect whether the employee's response on the organizational part that delivers the most to the firm's organizational strategy is correlated to the chosen organizational part that help the company comply with industry standards. That is so, as the organizational tools that help the company deliver on an effective BM application, should follow the external environment standards (Voiculet et al. 2010).

- Hypothesis 7: There is (or not) a correlation between the organizational part that mostly contributes to *strategy implementation* and the *organizational procedures* that are in accordance to the *government standards*.

Spearman test comparisons are depicted in detail on Appendix Table 3.

Table 1 shows the results obtained with MINITAB software for the aforementioned Spearman test hypotheses:

Table 1 Results obtained for Spearman test hypotheses

	Spearman coefficient	<i>P</i> value
Hypothesis 1	0.110	0.634
Hypothesis 2	−0.362	0.107
Hypothesis 3	0.583	<i>0.006</i>
Hypothesis 4	0.340	0.131
Hypothesis 5	−0.133	0.566
Hypothesis 6	0.646	<i>0.002</i>
H1 accepted are in italic presentation	Hypothesis 7	0.679
		<i>0.001</i>

As depicted on Table 1, only three (3) hypothesis cases appear to show statistical significance and correlation between the two variables tested. More specifically, Test 3 on Table 1 reveals that H_0 is rejected as P value = $0.006 < 0.05$, meaning that the H_1 Hypothesis is accepted and there is statistical correlation between “how clearly articulated the organization’s BM is” and “how thoroughly the administration applies SEE in order to obtain organization’s objectives.” Furthermore, Spearman coefficient is positive ($0.583 > 0$), pointing out that the more organization’s BM becomes clearly articulated, the more thoroughly the administration applies SEE—revealing the interconnection between the two. Similarly, Test 6 led to a P value = $0.002 < 0.05$, pointing a statistical correlation between “how well comprehended the way value created in the organization is” and “how clearly articulated the organization’s business model is.” That result proves the literature relation between value creation and BM. A positive Spearman coefficient appears at the test also ($0.646 > 0$), showing that the increase of value creation’s comprehension leads to a correspondent increase of BM understanding and its main principles. Correspondingly, Test 7 calculations showed that since P value = $0.001 < 0.05$, H_1 hypothesis should be accepted and there is actual correlation between which part of the company contributes the most to the realization of its strategy” and “where organizational policies and procedures comply with industry or government standards.” The available answers on this question both included the organization’s departments (research, development, design, market research, sales department, other) and the statistical analysis showed a direct correlation, meaning that the organization’s department that contributes the most to the realization of its strategy is the one that policies and procedures comply with the industry or government standards.

The statistical disadvantage of the study is the relatively small sample of 21 organizations that took part in the research, providing fully answered questionnaires that could be further processed. Thus, out of the four (4) remaining tests which did not show statistical correlation for the 5% interval since their P values > 0.05 , the two of them (Test 2: P value = 0.107 , Test 4: P value = 0.131) showed a P value slightly above 0.1. This could be considered an indication that if the sample was larger, a statistical correlation could accrue at least of for the 90% interval (P value < 0.1).

Kruskal-Wallis Test

A Kruskal-Wallis test was also conducted in order to uncover whether independent samples representing answers on specific questions (populations) give statistically different answers (statistical data) on certain questionnaire aspects or not. The Kruskal-Wallis test comparisons are presented in detail on Appendix Table 4.

The first hypothesis conducted investigates if there is a significant difference of the employees who consider firm’s key resources each of the four categories (financial, natural, human and technology), regarding the level of organizational readiness for changes. Actually, this statistical test aims at comparing if there is any correlation of those who consider, e.g., the financial resources as key organizational resources, to consider at the same time if the organization is ready for changes or not. By that way, we may compare organizational key resources and acceptances of change, as changes in organizational actions affect organizational resources and the firm’s capability to enact schemas with those resources (Feldman 2004).

Similarly, in Hypothesis 2, we investigate if there is a significant difference of the employees who consider firm's key resources each of the four categories (financial, natural, human, and technology) regarding the actual way that the organization creates value (through innovation, strategic partnerships, and aiming at new niche markets). Specifically, we check, e.g., whether those who consider financial resources as key ones, also believe that value is created through innovation, or strategic partnerships. Such a way, we investigate whether there is statistical correlation between those elements, as there is a significant relationship between organizational resources and competitive advantage in the form of value creation (Alimin et al. 2012), while in Hypothesis 3, the same populations of CEOs decide on the differences between technological and organization learning. This test aims at correlating company's key resources with the technological and organizational learning. It is an effective indicator to check on whether those who consider technological and organizational resources as key factors for the firm also comprehend the differences between them and their actual meaning.

Hypothesis 4 compares the four populations of employees who consider organization's key resources each of the four categories, with the level of thoroughness that SEE is applied in the organization. The aim is to correlate the types of organizational resources with SEE principles as SEE consists of high-level organizational resilience and robustness (Carayannis et al. 2014). Similarly, the next test investigates the correlation between the level of comprehension of the differences of organizational and technological learning, and the level of SEE thoroughness. With that comparison, the researchers aim to investigate whether those who understand the differences between technological and organizational learning do believe that SEE applied in the organization. Finally at Test 6, value creation with organization's BM was compared as a prerequisite for a sustainable BM is that there is a way for the organization to appropriate a large enough share of the created value (Roos 2011).

According to the results of the six (6) tests conducted (Appendix Table 4), only Test 6 appeared to show statistically significant difference of the organization's owners and administrators who understand value creation more or less distinctly (Factor) on the view of how clearly segmented the organization's BM is (Response). The Kruskal-Wallis analysis was conducted under MINITAB software and the results for Test 6 are shown in Table 2:

Table 2 Descriptive statistics and the Kruskal-Wallis for Test 6

Descriptive statistics for Test 6					Kruskal-Wallis for Test 6			
Value creation understanding	<i>N</i>	Median	Mean rank	Z-value	Null hypothesis	H_0 : All medians are equal		
					Alternative hypothesis	H_1 : At least one median is different		
					Method	DF	H-value	<i>P</i> value
3	5	3.0	5.7	-2.19	Not adjusted for ties	2	6.18	0.045
4	14	4.0	12.0	1.01	Adjusted for ties	2	8.34	0.015
5	2	4.5	17.5	1.56				
Overall	21		11.0					

H1 accepted are in italic presentation

As seen in Table 2, the P value = $0.015 < 0.05$, so the Null Hypothesis is rejected and H1 case is accepted, meaning that the median of the magnitude of how clearly articulated organization's BM is of the 5 grades of value creation understanding is different. It is worth mentioning that the Kruskal-Wallis test for case 6 is aligned with the comparison of the same questions conducted for Spearman Test 6. At this case, it was proven that there is statistically significant correlation between "how well comprehended value creation in the organization is" and "how clearly articulated the organization's BM is". Furthermore, the Kruskal-Wallis test proves that the 5 grades of comprehension of value creation give different answers of how clearly articulated the organization's BM is—meaning that those who do not have clear view of value creation to not have clearly articulated BM, those who have sufficiently clear view of value creation, to have correspondingly sufficiently articulated BM, and so on. This result statistically proves the theoretical interconnection between value creation and BM as well as their principles.

For the rest of the Kruskal-Wallis tests conducted, only Test 5 showed a P value = 0.078 which is slightly higher than 0.05 but smaller than 0.1 . Thus, it can be supported that there is statistically significant difference (for the 10% internal) of those organization's owners who have a clear (or less clear) understanding of the differences of technological and organizational learning on the view of how thoroughly SEE principles applied in order to achieve organization's objectives.

Discussion and Conclusion

The main purpose of this study was to present BMI and its effect on organizational sustainability for a set of Greek businesses, taking into consideration the main aspects that constitute BMI and organizational sustainability. The literature research initially uncovered the theoretical correlation between the aspects of BMI and organizational sustainability, pointing out that BMI is a dominant element on the organizational performance of any organization, which needs to be processed and developed accordingly. Actually, the literature research showed that a properly developed BMI affects most of organizational characteristics that might lead to its economic survival and growth, exceeding the limits of organizational sustainability itself. These characteristics mainly deal with the organization's value proposition, affecting its value creation, delivery, capture, and communication and all the internal components that constitute those four aspects.

The research then examined all components that constitute the study's main subjects, in order to construct and apply a questionnaire that fits the purpose of the research and be adjusted to the characteristics of the businesses located in the region of interest. The principle research aim has been to investigate, whether the firms apply BMI through effective organizational sustainability and SEE. This implies that the researchers had to ascertain whether CEOs are able to "comprehend" research's core meanings, acknowledge their differences with similar factors, and decide on the actual level that those elements are applied in their organization. Thus, the questionnaire was primarily focused on investigating the aforementioned three aspects.

The research findings indicated that BMI is properly applied to the businesses of the region (Western Macedonia, Greece) at most cases. Furthermore, its main principles, along with the principles of organizational sustainability and SEE, are sufficiently comprehended by the company's owners and CEOs. A crucial research finding was that the financial resources and their availability were not considered primarily important (regarding value creation, added value and BMI) for the businesses of the region. This has been a surprising element, considering the differentiated literature findings (Boons and Lüdeke-Freund 2013; Carayannis et al. 2014; Carayannis et al. 2015) as well as the Greek financial crisis over the last 8 years that has also hardly affected the region of interest. The human, innovation, and technology factors—along with SEE—were considered primarily important instead, pointing out their significance, an element that the literature research also previously underlined. Furthermore, the findings point out that the majority of the businesses do not see a correlation between the aspects organization's readiness to accept potential shifts and the alignment of organizational procedures and policies or value creation in the organization. Also, the research uncovered a statistical correlation of organization's value creation and the segmentation of organization's BMI, confirming the relevant findings of literature research.

However, in many statistical comparisons, there was no statistical significance found, between the main aspects that the literature review indicated, mainly due to the limited sample of the study. Thus, the main limitation of the current study can be considered the relatively small sample of organizations that fully participated in the research. Despite having clear statistical significances in many occasions or statistical tendencies in others, a significantly larger sample of organizations could statistically verify all BMI aspects and their interfaces with each other, that the literature review has already pointed out. A future research that would include a wider region of businesses (from Central and Eastern Macedonia or the whole country) could give clear statistical significances to more statistical assumptions and strengthen the total statistical validity.

Furthermore, most of the organizations that participated in the research do not comprise district marketing departments and most of the firm's organizational policy is mainly applied through the CEOs and the top managers. Since the four major elements of a BM are the customer value proposition, the key resources, key processes, and the profit formula (Johnson et al. 2008), it is obvious that BMI may not exclusively applied by the organization's management and more organizational elements have to participate. Thus, an enhanced questionnaire that will include questions directed to employees from other organizational departments would further strengthen the validity of the research, as it would analyze BMI elements regarding lower organizational segments.

In total, this study can be considered an innovative tool testing BMI for the businesses of a region that were hardly hit by the Greek financial crisis. Its results show that the operational businesses of the region still consider BMI and its core aspects as their main tool and lever applied on organizational sustainability, which can secure their survival and bring economic growth. All these were deduced, despite that intense lack of financial resources and market reduction that the businesses have suffered over the last eight (8) years.

Appendix

Table 3. Hypotheses conducted under Spearman test

	H0	H1
Test 1	No correlation between “how clearly articulated the organization’s business model is” and “which part of the company contributes the most to organization’s value creation”.	Correlation between “how clearly articulated the organization’s business model is” and “which part of the company contributes the most to organization’s value creation”.
Test 2	No correlation between “how clearly articulated the organization’s business model is” and “how do you enhance how value is created in the organization”.	Correlation between “how clearly articulated the organization’s business model is” and “how do you enhance how value is created in the organization”.
Test 3	No correlation between “how clearly articulated the organization’s business model is” and “how thoroughly the administration applies SEE in order to obtain organization’s objectives”.	Correlation between “how clearly articulated the organization’s business model is” and “how thoroughly the administration applies SEE in order to obtain organization’s objectives”.
Test 4	No correlation between “how well prepared the organization is, in order to accept potential shifts and disruptions” and “how well aligned with the best practices the organizational policies and procedures are”.	Correlation between “how well prepared the organization is, in order to accept potential shifts and disruptions” and “how well aligned with the best practices the organizational policies and procedures are”.
Test 5	No correlation between “how well aligned with the best practices the organizational policies and procedures are” and “to what extent the organizational structure minimizes costs”.	Correlation between “how well aligned with the best practices the organizational policies and procedures are” and “to what extent the organizational structure minimizes costs”.
Test 6	No correlation between “how well comprehended value creation in the organization is” and “how clearly articulated the organization’s BM is”.	Correlation between “how well comprehended value creation in the organization is” and “how clearly articulated the organization’s BM is”.
Test 7	No correlation between “which part of the company contributes the most to the realization of its strategy” and “where organizational policies and procedures comply with industry or government standards”.	Correlation between “which part of the company contributes the most to the realization of its strategy” and “where organizational policies and procedures comply with industry or government standards”.

Appendix

Table 4 Hypotheses conducted under the Kruskal-Wallis test

	H0	H1
Test 1	The median rating of “how well prepared the organization is for potential shifts and disruptions” of those who consider organization’s key resources each of the four categories (financial, natural, human, technology) is the same.	The median rating of “how well prepared the organization is for potential shifts and disruptions” of those who consider organization’s key resources each of the four categories (financial, natural, human, technology) is different.
Test 2	The median rating of “how does the organization enhances how value is created (innovation, strategic partnerships, targeting new market niches)” of those who consider organization’s	The median rating of “how does the organization enhances how value is created (innovation, strategic partnerships, targeting new market niches)” of those who consider organization’s

Table 4 (continued)

	H0	H1
	key resources each of the four categories (financial, natural, human, technology) is the same.	key resources each of the four categories (financial, natural, human, technology) is different.
Test 3	The median rating of “how well understood the differences between technological and organization learning in the organization are” of those who consider organization’s key resources each of the four categories (financial, natural, human, technology) is the same.	The median rating of “how well understood the differences between technological and organization learning in the organization are” of those who consider organization’s key resources each of the four categories (financial, natural, human, technology) is different.
Test 4	The median rating of “how thoroughly SEE principles applied in order to achieve organization’s objectives” of those who consider organization’s key resources each of the four categories (financial, natural, human, technology) is the same.	The median rating of “how thoroughly SEE principles applied in order to achieve organization’s objectives” of those who consider organization’s key resources each of the four categories (financial, natural, human, technology) is different.
Test 5	The median rating of “how thoroughly SEE principles applied in order to achieve organization’s objectives” of those who consider “the differences between technological and organization learning in the organization are more or less well understood” is the same.	The median rating of “how thoroughly SEE principles applied in order to achieve organization’s objectives” of those who consider “the differences between technological and organization learning in the organization are more or less well understood” is different.
Test 6	The median rating of “how clearly articulated organization’s BM is” of those who “comprehend value creation in the organization more or less clearly” is the same.	The median rating of “how clearly articulated organization’s BM is” of those who “comprehend value creation in the organization more or less clearly” is different.

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