



Study of Relation between Business Model and Sensemaking Decisions

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Abstract

Innovation of the business model is mainly proposed in an environment that is changing and undergoing some complexity. The function of sense-making has eliminated this ambiguity, and helps the organization direct the business model, which is identified by organizational senior decision makers. This research has studied the relationship between organizational sense-making capability and the business model innovation. The dynamic factors of the environment and the characteristics of the senior management team are described as moderating variables of this relationship. By conducting this survey in the ICT industry, on 287 sample organizations, the significant relationship between the sense-making and the business model innovation was confirmed by means of PLS-SEM. The dynamics of the business environment, the level of education of the senior management team and the comparative strategies of the organization have been identified as the moderating factors for this relationship.

Keywords: Business environment dynamism, Business Model Innovation, Strategic sensemaking, Strategy topology, Top management team

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1. Introduction

According to Michael Porter, the strategy means to be different. In the long run, companies are successful only when they can make sustainable competitive advantage (1). Therefore, the process of creating a value for a company must be distinct from its competitors. Product innovation does not have enough competitive advantage in differentiating successful companies (2). Rivals are able to copy innovations quickly. Product life cycles are shrinking, and rivals from low-wage countries offer significant cost and cost advantages. At the same time, ICTs have created unique opportunities to update the value-creating activities in new and different ways. Therefore, companies consider the business model innovation as an opportunity to create a sustainable competitive advantage (3) The scientific (Powell & Chapman, 2006) and academic researchers (Lambert & Davidson, 2012) has increasingly focused on the business model

innovation. So, it is not surprising that research in this field has grown steadily over the past few years. There are two reasons for this increase: 1. Business models are regarded as a new source for value-creation and capture and turn into a competitive advantage (4).

2. since the business model in most of the prominent cases has essentially arisen from the realm of action (5), the results are largely descriptive and narrative in nature.

Due to the rapid movement of organizations in the current business environment and the tremendous impact of IT and ICT technology, the competition and dynamics of this environment are seen more than the past, its senior management and organization constantly have to monitor their internal and external developments and changes. They should be ready to create innovation in their activities and business model in line with the conditions for more values. Concerning the changing conditions and dynamic nature of the

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environment, sense-making capability has been created in the organization and attempts have been done to reach a single understanding in accordance with the reality from the environment inside and outside the organization in order to facilitate decision making and change. The present research, with focus on the importance of organizational sense-making capability as well as a general view on the business model has tried to examine the relationship between this organizational capability and the business model innovation and moderating factors.

1.1 Theoretical background of the research

With the establishment of each organization, a business model, either systematically or mentally (6), is used to design the structure of its interactions. If the business model was considered as the strategic choice of the organization to create and share value within a value network (Lambert, 2008), the failure to recognize the proper business model would lead an organization not to achieve its goals. The performance of companies in turbulent and changing business environments is heavily depended on the marketing and creation of a new, consistent business model (7). The emergence of rapid changes in the environmental and internal conditions, on the one hand, makes it difficult for individuals and teams to properly understand and, on the other hand, forces them to take action with incomplete information (8). Therefore, it is necessary to search and interpret information in the form of sense-making processes. The sense of the need for change and the ability to adapt the organization to it involve different people in the process of changing. It has always been emphasized on the role of senior management of the organization in creating innovation, changing the business model and sense-making, and the senior management needs to understand correctly the industry and the external environment in order to formulate the necessary strategic change, and through the sense-making, the understanding and recognition of other members of the organization are formed in such a way to prepare the conditions for creation of changes in structures, the innovation and the transformation (9).

1.2 Concepts of the business model

The term, business model was first used in practical applications in the 90's, but was gradually accepted and studied by the scientific community (10). During the time, the concept of business model was gradually evolved from the logic of the company (11), or the way business was carried out into a conceptual tool that involves various building blocks (12). The essence and nature of the business are to create value for customers. A business model is a method by which a company makes a process of

creating and exchanging value in a profitable manner.

The business model is at the heart of the competitive response of each organization to the market and describes the delivered value, the activities, the necessary resources, the required partners, the knowledge compared to the customers, the costs and total operational costs (13). These can be summarized in four elements of value delivery, operational model, financial model, and customer relationships. In an inclusive definition that can capture different definitions, the business model is recognized as an explanation of the organization's complexity by reducing it to the main elements and relationships among them, which defines the main logic of the business.

According to many researchers, the framework provided by Storovalder and Pegner (2002) for the business model is one of the most complete definitions of the business model. Because this definition includes a description of the structure and different components of the business model, as well as a description of the logic of creating value and identifying profitable goals. Tys (2010) defined the concept of business, which has widely been accepted in literature: a business model encourages a customer to pay money by presenting value to him and changes the payment into the profit. In essence, a business model is a small representation of financial and organizational architecture of a business (14).

1.3 Business Model Innovation

In today changing world, innovation and importance are indisputable. Nowadays, in almost all countries of the world, the development of creativity and innovation in order to increase productivity and improve the economic situation is considered as one of the main factors in the survival of companies (15). Many companies have always created innovation in products, services, markets, and operations to achieve success. But despite the many innovations in these four areas, there is still the risk of reducing market share, undermining key business distinctions, insufficient growth, non-responsiveness to the needs of key customers, and lack of identification of opportunities and no optimal utilization of resources, all of which were out of the ability of absolute focus on these types of innovations (16). But extensive studies on the business in recent years have shown the increasing importance of the business model innovation against other types of innovation.

Since the business model is a framework to determine the type of activity, the manner and time of its implementation with respect to the company's resources and capabilities, success can be achieved by changing this model in a way different from the current models of the company and the industry

(17). The research done on the business model also argues that "the business model innovation is the key to the success of the company." In 2006, research was carried out by IBM Research Team, which reported an increase in awareness of the importance of business model innovation. This study showed that companies that were successful in implementing their innovative business model had better performance. Based on this research, many of the innovations of business models have been known as a new strategic distinction.

1.4 Sense-making

Sense-making is the process by which the organization gains, interprets, and acts on its own environment (18). An effective strategic plan needs to understand the forces shaping the situation, by engaging in collective effort and the ability to interpret events. Organizations are seen as sense-making units within which the managers and employees interpret the events and their mental models and their past experiences can influence the way the program is interpreted (sense-making) and transfer of their understanding to others (sense-giving) (18).

Meytelis and Christianson (2014) consider the sense-making as a process that involves focusing and classifying information and clues in the environment, and by creating meaning in different minds through the interpretation cycle and establishing a more systematic environment, from which one can acquire the next information. Therefore, organizational sense-making is a multidimensional process based on the interaction of sense-giving and the action for new, vague and sometimes contradictory events with expectations (19). Organizations that enhance their sense-making capability can better communicate (through the exchange of strategic information), interpret (simulating different dimensions of the complex environment), and analyze information (through consideration of different perspectives) and make better responses to environmental changes (20).

In different literatures, sense-making is composed of different dimensions. In research of Neil et al. (2007), sense-making has three aspects of communication, interpretation and analysis. They believe that sense-making as a strategic capability is a process by which an organization acquires, interprets its own environment information and acts based on it. In the communication dimension, we refer to strategic information exchange. In the interpretative aspect, information analysis is pointed out, and in the dimension of analysis, the views and opinions of influential people on the analysis process are taken into account. Also, the factors affecting the sense-making capability are

the perceived environmental turbulence, readiness to accept new ideas and the functional diversity of the team (21).

The concept of strategic sense-making was first introduced as a process of monitoring, interpreting, and acting (22), and then these three stages of sense-making were related to the organization's performance. Therefore, at this level, three stages of the environmental searching to gather information about the actual or potential changes in the environment, the interpretation of the collected information, and action based on this interpretation and analysis are determined. Each of these tasks of sense-making process is considered to be related to organizational performance (21). Sense-making does not occur alone and separate from the environment, but technology, cognitive frameworks and dominant policies will influence the stages of the sense-making process (22).

2. Conceptual Model Development

2.1 The role of sense-making capabilities in the innovation of the business model

In today's unstable environment, many organizations need ongoing organizational change (23). The change involves the transformation of organizing resources within an activity system into a series of new activities. This re-arrangement of individuals and resources takes place within the framework of the business model, which requires complex relationships between control and attention in order to encourage searchable and adaptive behavior (24).

According to Tys (2010), three meta-competences of sense-making (meaning recognition of external opportunities), the acquisition of new opportunities (the ability to understand and change new opportunities) and the ability to reshape resources (physical and human assets) are the essential capabilities to adjust and innovate the business model. These meta-competences lead to an ever-expanding range of products and processes or the organization's structures, which are considered as the response to specific market requirements (25). Thus, the new organizational arrangement is carried out through a sense-making of the structures and strategies, which is a logical response to environmental changes, and it is also done by sense-making of decision makers that make others aware of new changes and how they are implemented (26).

The first hypothesis: There is a positive relationship between sense-making capability of the organization and the business model innovation.

Environmental dynamics

Environmental dynamics includes the perceived change in the industry, unpredictable behavior of customers and competitors, and changes in the

technical conditions of the industry, technological change, customer preferences and competitive acts. Dynamic environments are a rich source of ideas for the emergence of new opportunities (27). According to Ducker, changes in the social, political, technical, and economic environment create new opportunities, and innovative strategies are often a response to environmental dynamism to remain as a competitive company (28).

Environmental dynamics is considered as one of the important factors in innovation management, because it is identified as a moderating variable for the relationship between independent and dependent variables.

Some have considered the positive relationship between the use of technology and the degree of environmental uncertainty in the business (29) and perceived environmental dynamics as one of the factors of the adapted innovation of the business models in organizations (30). High environmental dynamics requires effective reaction to rapidly changing business conditions, hence the importance of the variables under study is intensified. Shilak (2013) has pointed to the moderating effect of the environmental dynamics in relation to the dynamic capabilities for competitive advantage. In a relatively stable industrial environment for innovation and the rapid identification of problems or opportunities, finding technology and other resources for innovation, time and energy are less required for innovation management (31).

The second hypothesis: Business environment dynamics modifies the relationship between organizational sense-making capability and business model innovation.

2.2 Senior Management Team

The senior management team refers to the chief executives and senior managers of the organization, who play a key role in the strategic and practical direction of the company (Carmeli and Halvi, 2009). The organization reflects the characteristics of the senior management team. The existence of ambiguity and contradiction in empirical results led to the researchers' conclusion that senior management team mismatches can be a two-edge blade in the performance of the organization (32). According to Mason & Humberig's results (1984), researchers have suggested that senior managers play an important role in strategic change because they define the strategic level of the interpretations of the organization (33) and identify strategic responses. A lot of types of research has been done about why senior management teams cannot adapt to their environment and how they can improve their adaptation. Linking the characteristics of these teams (mostly in the form of sociological features such as the length of leadership or age) to

output variables, the research on senior management teams (for example, Tullung and Ramadani, 2015 and Journali, Nakart and Erickson, 2016), has answered these questions (such as strategic change and company performance). In any case, the innovation of the business model is one of the variables that depends on the decision makers meaning senior managers of the organization, which should be investigated.

The third hypothesis: The characteristics of the senior management team modify the relationship between organizational sense-making capability and the innovation of the business model.

Table 1: Division of businesses based on the orientation of innovation strategy

Strategic orientation	The main focus	Characteristics
Pioneering	Entrepreneurship, New Opportunities, Innovation	External orientation, research and environmental discovery, increasing new opportunities, innovating to meet market needs, welcoming change, and the environment is considered to be uncertain.
Defensive	Defending the current market, it targets a limited part of the market.	Focusing on the limited range of products and services, internal orientation, the use of approved theories and methods and the prevention of unnecessary risk.
Analytic	Prospective and defensive	It works well in stable and dynamic markets. It innovates on the efficiency and increase of production in dynamic markets.
Passive	It responds to change.	Short-term planning, it responds to the actions of others.

Source: Hach & Schultz (1997)

2.3 Strategy typology

Many organizations consider innovation as a competitive advantage and one of the principles of the organization's orientation, and its management

is an inevitable issue and the key of the organization survival (Michelle, Barwan and Gallan, 2008). Studying the companies, Milles and Snow, two researchers in management science, have found that organizations use a kind of adaptive strategy to reduce the negative impact of the environment and increase the opportunities (35). They classified the organizations into four defensive, pioneering, analytic and passive classes according to the type of adaptive strategy (36) (Table 1).

Defenders and attackers are at the two ends of the spectrum of possible strategies. Analysts place somewhere between defenders and attackers and displays some of the characteristics of each of these two types of organization. But reactive organizations seem to be unable to follow only one type of strategy and inevitably respond to it after any passive event.

The fourth hypothesis: The organization's comparative strategies modify the relationship between organizational sense-making capability and business model innovation.

2.4 The conceptual model of research

The business model is the result of a conceptual modelling process. A conceptualization is a model of reality and logic of the business that describes a meta-model or reference model in a particular industry and allows for the description of an unlimited number of business models (38).

Innovation in the business model can be divided into its components, and with a value-based approach, it can be sought in three dimensions: creating, presenting and acquiring value. Sense-making capability is an essential element to understand the existing conditions and to develop a business model and create innovation in it. This capability covers the various dimensions of internal communication, external communication, information collection, information categorization, and the emergence of a common mentality that predisposes innovation. For the relationship between sense-making and the business model innovation, the business environment dynamics moderators, the organization's strategic type, and the characteristics of the senior management team of the organization have been identified, which should be investigated.

3. Research method

The present research is a descriptive research and is an applied research in terms of results and outcomes. Given the fact that the data of this research are collected by the subjects in a short time interval, they are presented in a cross sectional form. The nature of the data has been considered quantitative and statistical and mathematical analyses have been used to describe and analyze the

subject of research. The research was conducted in a field form and data collection has been carried out through survey with questionnaire.

In the information and communications technology industry, the importance of innovation and the high influence of rapid technological change are clearly evident. The statistical population of the research is senior and executive managers of information technology (IT) and information & communication technology (ICT).

For this study, information was gathered from 287 organizations in this area. Stratified random sampling was used in which the sample has been selected in such a way that the subgroups in the sample are as much as possible the same size as the community.

Data collection was done in two forms: online and face-to-face questionnaires completed by individuals at ICT-based organizations.

Internal or content validity means a precise examination of the concept in the light of its meaning by observing the criteria of theoretical studies, the opinion of the professors, the use of previous tested questions and the correction of the questionnaire and its items in the pre-test stage (Table 2).

Table 2: designing the measuring tool

Variable	Symbol	Source
Technological turbulence	techTurb	Javerski & Kooheili (1993)
Market turbulence	markTurb	
Competition intensity	compInt	
Internal communication	intCom	Neil, Mc Key, Roz (2007)
External communication	extCom	
Information gathering	infGath	
Information classification	infClas	
Shared mental model	sharedMod	
Value creation	valCre	Waldner, Poetz, Grimp and Uring (2015)
Value delivery	valDel	
Value capture	valCap	
Experience in industry	TMTinTen	Dalenbach, Mc Karty, Shanker (1999)
Experience in organization	TMTcoTen	
Education	TMTedu	
Functional diversity	TMTfnDiv	
Technical orientation	TMTtechOr	

4. Results

In addition to descriptive statistics methods for determination and expression of the characteristics of the evidence and the inferential statistics through using the data collected from the sample group, the PLS-SEM method and Smart PLS version 3.2.7. Structural equation test has been used to measure the relationship among the variables and to study the appropriateness of the conceptual model and its significance.

The construct validity of the questionnaire has been evaluated using confirmatory factor analysis. In order to perform confirmatory factor analysis and model the structural equations, the standard factor load and t statistic have been calculated. The intensity of the relationship between the hidden variable and the observed variable is shown by the factor load, with an acceptable limit of 0.4 and a favourable limit of 0.7. After determining the correlation between the variables, a significance test was performed. To test the significance of the relationship between the variables, t test is used. Considering the significance at the error level of 0.05, if the t-value was out of the range of -1.96 and 1.96, then there would be a significant relationship. Internal consistency (convergent validity and composite reliability)

Convergent validity means that each question in the questionnaire measures only its own index, and their composition is in such a way that all the variables are well-differentiated. For this purpose, the average variance extracted is used. The average variance extracted for a hidden variable is the sum of the squares of factor loads divided by their number. For convergent validity, the AVE calculated for each variable must be greater than 0.5. In order to evaluate the reliability of the questionnaire, composite reliability is used. According to Fernell and Larker (39-42), values above 0.7 show acceptable reliability (Table 3).

Table 3: evaluation of internal consistency (convergent validity and composite reliability)

Variable	AVE	Composite reliability	Result
Environmental conditions of the industry	0.527	0.844	Confirmed
Sense-making capability	0.505	0.905	Confirmed
Business model innovation	0.593	0.935	Confirmed

Modelling the equations of the research model

Due to the fact that the constructs of the sense-making capability and the business model innovation are considered to be the second order and they are obtained reflectively at the first order from observers and at the next class, they are a combination of variables of the first order, the

model of this study is reflexive- formative. One of the methods of modelling the second order models is the two-stage PLS-SEM method, in which the second order constructs are not considered in the first stage, and relations among the first-order variables are established and the factor coefficients for each dimension of the second order constructs are calculated. In the second stage, the amount of hidden variables (dimensions of the constructs of sense-making capability and the business model innovation) is placed and the model is summarized to the simplified first order state. Figure 1 shows the model in the standardized correlation coefficient and t statistics.

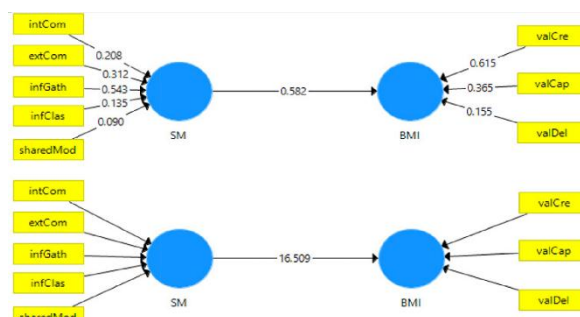


Figure 1: The final research model- the second stage- standardized correlation coefficient and t statistic.

In general, and regardless of the effect of the moderating variable, according to the following table, the organizational sense-making capability is positively correlated with the business model innovation with a standardized value of 0.439 and a significance level of 16.509.

4.1 Model fit indices

The fit indices of the model can be grouped into three general categories of absolute fit indices, such as chi square, adaptive fit indices including normalized fit index (NFI), and parsimony fit indexes such as SRMR or normalized chi square. These indices are presented in table 4, and in addition to the acceptable range of fit, its amount has also been mentioned.

Table 4: fit indices of the research model

Index	Value	Acceptance limit
SRMR	0.016	< 0.08
Chi-Square/df	1.907	> 3
NFI	0.986	> 0.90

Evaluation of the status of moderating variables

To investigate the effect of the variables specified as moderators, each one has been examined separately and the significance of its effect is measured in t statistics and multi-group analysis

(MGA). Table 5 shows the high and low states of each of the moderators of the characteristics of the senior management team and the dynamics of the business environment, the path coefficients and the p- and t-values in the relationship between the sense-making and the business model innovation. The t-statistics in both high and low cases in each moderating variable are shown in table 6.

Table 5: The effect of moderating variables in high and low states

Relationship moderator SM->BMI	Path coefficient (low-high)	t-value (high vs low)	p-value (high vs low)
Dynamic environment of business	0.255	2.051	0.035
Length of activity in industry	0.036	0.601	0.548
Length of activity in organization	0.034	0.544	0.587
Education	0.294	1.971	0.049
Functional diversity	0.012	0.195	0.846
Technical orientation	0.119	1.287	0.174

Table 6: Path coefficient and significance values of strategic types of the organization

Strategy moderator in relation to SM -> BMI	Path coefficient (analytic)	Path coefficient (defensive)	Path coefficient (pioneering)	Path coefficient (passive)
	0.580	0.312	0.682	- 0.171
	t-value (analytic)	t-value (defensive)	t-value (pioneering)	t-value (passive)
	4.862	1.022	6.827	0.736

Summary results of testing research hypotheses
The results of research hypotheses have been summarized in table 7.

5. Conclusion

In the face of the turbulent competition and the profound changes in technology, attention to the business environment (internal and external) in order to create an understanding proportional to the reality and to adapt it with the organization's understanding of the conditions helps greatly senior management of the organization make appropriate decisions on the strategic orientation of the organization and the revision of the business model (43). The research conducted with this view tried to discover the relationship between the two areas of monitoring and decision making in the organization.

Table 7: Summary of research results

Hypothesis	Description	Result
The relationship between sense-making and BMI	There is a significant relationship between sense-making and BMI	Confirmed
Moderating dynamic environment of business	Dynamic environment of business moderates the relationship between sense-making and BMI	Confirmed
Moderating experience in industry	The experienced presence of senior management team in the industry moderates the relationship between sense-making and BMI	Rejected
Moderating experience in the organization	The experience of senior management team in the organization moderates the relationship between sense-making and BMI	Rejected
Moderating education	The education of senior management team moderates the relationship between sense-making and BMI	Confirmed
Moderating functional diversity	Functional diversity of senior management team moderates the relationship between sense-making and BMI	Rejected
Moderating technical orientation	Technical orientation in senior management team moderates the relationship between sense-making and BMI	Rejected

The results indicate that there is a positive and significant relationship between organizational sense-making capability and organizational business model innovation. An organization that is aware of its own environment, and the information transfer and communication within the organization are properly present, it makes more appropriate decision on innovation and adapts to the conditions more properly (44-48). When there is a difference between the perception of an organization and the reality, the sense-making becomes more important in environmental changes. In such a situation, it is necessary to make changes in the performance and business model as a way of adapting to new conditions and taking advantage of opportunities and protecting against the threats. The present research depicts the effect of the business environment dynamics on the relationship between the sense-making and the business model

innovation. It is evident that the environmental dynamics moderates this relationship, and in the turbulent environment, the relationship between the organizational sense-making and the rate of the business model innovation is significantly strengthened. But in a stable environment, the necessity of creating innovation in the organization is less felt.

One of the other variables considered as a moderating variable was the type of adaptive strategy of the organization based on Milles and Snow's classification. Pioneering organizations have more innovations in their business model, with regular environmental monitoring and attention to industry trends. In contrast, reactive organizations, regardless of the environmental conditions, less undergo changes and innovations, and a change in their business model occurs when the governed new conditions impose a change on them. As expected, the type of strategy implemented by the organization has an impact on the strengthening or weakening of the relationship between the sense-making and the business model innovation and positively reinforces the moderating role of this relationship in pioneering and analytic organizations.

Among the characteristics of the senior team that were considered as moderators, the results indicate that education plays an important role in the relationship between organizational sense-making and business model innovation, and this relationship is enhanced when the education of the senior management team members is higher. It means that the need for a monitoring-based change in the environment and conditions is more important for higher-educated decision makers (Zhou and Yin, 2015), and they direct their organizations towards innovation in the business model. However, the effect of characteristics of the length of the leadership and the duties of the senior management team on the relationship between the organizational sense-making and the business model innovation was not significant.

5.1 Research suggestions

In a turbulent environment with high uncertainty, the organization must evaluate itself through monitoring of the environment and the strategic orientation and, if necessary, modify or correct its business model. The study shows that organizations that do not have an organized sense-making of meaning make less changes in their own way of thinking, which means less attention to threats and opportunities ahead. Therefore, the sense-making in the organization should be developed through inter-departmental meetings, continuous monitoring of customer satisfaction, creation of a codified mechanism for the exchange

of information, review of competitive advantage, customer orientation.

The research has been limited to the ICT industry. The reason for this choice is the new and dynamic nature of this industry due to the advancements in technology. Among the features of the senior management team, only education was identified as a moderator. This issue can also be studied in various industries to re-examine the impact of moderators, such as the experience of a senior management team, and the intensity of this industry-driven relationship. Also, at the behavioural level, leadership styles in sense-making capability and the degree of innovation of the organization can be studied as a moderating factor. Learning and knowledge management can be considered as a mediator in this regard. Because learning is one of the achievements of the sense-making, learning and knowledge play a key role in generating business model innovation. The business model innovation is seen throughout the organization life cycle and refers to changing the business model over time, influenced by the internal and external conditions of the organization. Performing such a study as a case study in the innovative organizations and comparing the performance of the organization, will give a deeper look and identification of the full dimensions of the subject under study.

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