

The Effect of Business Intelligence on Innovation, Network Learning and Startup Performance (Case study: Snapfood)

El efecto de la inteligencia empresarial en la innovación, el aprendizaje en red y el rendimiento de inicio (Estudio de caso: Snapfood)

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ABSTRACT

The study aimed to determine the effect of business intelligence on innovation, network learning and startup performance. The research method is applied in terms of purpose, and in terms of collecting data, a descriptive correlational type is used. The statistical population of the study was 400 employees in the city of Tehran, which according to the Cochran formula, 196 people were selected as the sample and the data collection tool was a questionnaire. The collected data were analyzed using LISREL software. The research results indicate that among the research variables, business intelligence, network learning and innovation have the highest correlation coefficient with the startup function. Also, the results of structural equation model indicate that the direct effect of business intelligence on network learning is positive and significant.

Keywords: Business intelligence, Innovation, Network learning, Startup function

RESUMEN

El estudio tuvo como objetivo determinar el efecto de la inteligencia empresarial en la innovación, el aprendizaje en red y el rendimiento de inicio. El método de investigación se aplica en términos de propósito, y en términos de recopilación de datos, se utiliza un tipo de correlación descriptivo. La población estadística del estudio fue de 400 empleados en la ciudad de Teherán, que según la fórmula de Cochran, se seleccionaron 196 personas como muestra y la herramienta de recolección de datos fue un cuestionario. Los datos recopilados se analizaron utilizando el software LISREL. Los resultados de la investigación indican que entre las variables de investigación, la inteligencia empresarial, el aprendizaje en red y la innovación tienen el coeficiente de correlación más alto con la función de inicio. Además, los resultados del modelo de ecuaciones estructurales indican que el efecto directo de la inteligencia empresarial en el aprendizaje en red es positivo y significativo.

Palabras clave: inteligencia empresarial, innovación, aprendizaje en red, función de inicio

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1. INTRODUCTION

Increasing the speed of change over the last few decades has made the environment around the organizations increasingly dynamic and complex. In environments with high dynamics, there are characteristics such as rapid and discontinuous change in demand, competitors, technology or laws and regulations that result in inaccurate and timely access to information, so that most of the information is inaccurate and obsolete. As a result, organizations need to rapidly develop their responsive responses and expand the scope of data acquisition and gathering. Therefore, organizations are challenged by increasing the need for agility and agility. Measures that start with the scanning, selection, and processing of information and continue to be interpreted. Meanwhile, the increasing complexity of the environment requires organizations to consider heterogeneous factors and a wide range of actions, communications, and interactions beyond the existing boundaries in their strategic decision making (Dolly et al., 2018).

The suitability of business intelligence is considered as an organization's ability to produce intelligent business products and to use it in business decision making in an efficient and effective manner. As a result, business intelligence not only involves the use of technological systems and tools, which is construed as a technical competence, but also involves the acquisition of managerial and cultural competencies corresponding to managerial aspects and The process of business intelligence is also (Mortazai, 2018).

Business intelligence helps computer-based techniques that identify business data extraction and analysis and help secure better business decision-making. The greatest impact of business intelligence is on increasing the efficiency of decisions in organizations, including determining the business tendencies of the organization, predicting market conditions and enhancing the competitive ability of the organization in the market (Aarra, 2011). In fact, business intelligence involves a large spectrum of technologies, tools and processes for gathering information and making better use of them to make appropriate decision-making in an organization (Papotivich, 2012).

Business intelligence requires several infrastructures because of its purposeful nature and various models have been proposed and implemented to identify these infrastructures. According to the studies, a large part of these infrastructures returns to the structure of the data produced in the organization and how it is classified, maintained and communicated and updated. (Perimartine, 2011). One of the important issues in the implementation of business intelligence in organizations is to communicate closely the various parts of the organization with each other through a powerful system. If we look at the historical course of the information systems of organizations, we can observe that in three steps these systems lead to a smart trading system in the first step, there were only systems on the island. In the next step, integrated management systems emerged. Finally, the maturity of the information system of the organization and the integration of information can be observed in ERP systems planning. In the systems mentioned above Information Finally the integrity and communicate with each other (Sarvide, 2012). Business intelligence as a new approach in organizational architecture is based on the speed of information analysis in order to make accurate and intelligent business decisions in the shortest possible time, which includes a set of applications and analyzes and based on operational and analytical databases, it takes a low-level decision-making process for business intelligence (Lochin, 2012; Sauter, 2014). Business intelligence work framework consists of various processes, tools and technologies that are designed to move data from information to information and to create added value for the organization. Using the knowledge gained, managers of the organization can make better decisions and make business more efficient with the design of the program for the organization (Williams & Williams, 2004; Sharda et al., 2014).

Business intelligence helps companies improve their performance and enhance their competitive advantage in the marketplace. Business intelligence helps in making better decisions by assessing whether the activities actually lead companies to their goals or not. Nowadays, business executives need better tailor-made facts for their decision-makers, but most often there is a deep gap between the information needed by business executives and the enormous amount of data the business unit collects in its operations every day. There is. To fill this gap, business units are doing enough to develop and grow business intelligence systems to turn raw data into useful information. Decision making and analysis based on the reality of business intelligence is effective on all decisions and performance of the organization (Mohagher et al., 2008).

High levels of uncertainty and unpredictability in the organization's environment require continuous and continuous monitoring and processing. Under these conditions, the ultimate goals and paths to achieving those goals are unclear, so that the organization's readiness for change and selection and innovation is the best way to achieve its goals based on a steady basis. Hence, organizational backgrounds that are associated with increasing ambiguity and uncertainty will have important organizational and strategic challenges, especially with regard to organizational adaptation. In addition, the slow and raw response to sudden environmental changes will impose negative outcomes in terms of losses and costs to the organization (Ramirez et al., 2018). Innovation to the company's efforts to find new opportunities and solutions and gain competitive advantage through new products

2. THEORETICAL FOUNDATIONS OF RESEARCH

2.1 Research literature

2.1.1 Business intelligence

Business intelligence is a gigantic and umbrella term used to describe a set of concepts and methods for improving business decision making using computer support systems. Also, the first scientific definition of business intelligence by Kim and Ghasal (1986) states: "A management philosophy and a tool to help organizations manage and refine business information with the goal of making efficient decisions in the business environment. Business intelligence helps companies to systematically and automatize their analysis, strategy and forecasting tasks in order to make better decisions (Ishaia, 2012).

Intelligence is a set of abilities that are used to solve a problem and create new products that are considered valuable in a culture.

One of the most important types of intelligence that matters in the business environment and for top organizational managers is business intelligence. Business intelligence includes various processes, tools and technologies that are needed to transform data into information and information to knowledge. Business intelligence applications accelerate the process of business decision-making in relation to the quality of the data. Business intelligence systems can improve the business performance of organizations through the use of accurate and advanced information from competitors, customers, suppliers and internal business operations of organizations. Of course, at the outset, one should design an appropriate structure for business intelligence in the organization concerned, taking into account the analytical needs of that organization. Also, the organization's information technology infrastructure should have the ability to support the desired structure (Jajipour Shoshtari, 2014).

The term "business intelligence" was first introduced in 1958 in one of IBM's articles, The Business Intelligence System. Business intelligence is a package of decision support systems (Persoos, 2012). Business intelligence covers the collection, processing, and analysis of a large amount of data from the internal system and external resources, because business intelligence uses advanced analytical tools and predictions that allow a company to do this. It takes immediate and immediate decisions to achieve organizational goals. The first step in recognizing business intelligence is to become fully familiar with organizational intelligence. Organizational intelligence is a set of mental abilities of an organization. Therefore, organizational intelligence has two components, organizational intelligence as a process and organizational intelligence as a product. Business intelligence tools provide the views of the past, present, and future. By implementing business intelligence solutions, the gap between middle managers and senior executives will be lost from the point of view of information communication, and information will be provided to managers at different levels, in a moment and in high quality. Also, experts and analysts can improve their activities by using simple facilities (Hajipour Shoshtari, 2014).

2.1.2. Innovation

The invention of the term innovation in texts has been going on for more than half a century, but the type of conception of this concept has changed over time. To illustrate this path, the evolution of several well-known definitions will be presented: Innovation is the use of tools, systems, policies, programs, processes, products or new services that may have been created within the organization or purchased from an organization. For adaptation and adaptation of the organization (Chahal & Bacchi, 2015).

Therefore, it can be said that innovation is a special type of change that implements a new idea for the first time for the construction or improvement of goods, services or freedoms. So all innovations lead to change, but any change is not necessarily an innovation. The innovation axis has traditionally been the development of product technology, but as the speed of change and the course of events are completely unpredictable, it is better to create a general incentive instead of dealing with products and create and produce them throughout the organization for Creativity and innovation. Innovation is a broader concept that involves the use of method, system, process, policy, program, product, and service that is considered for the new company and may have been acquired within the company or from outside the company (Juergattam, 2017)

One complicated phenomenon can hardly be divided into completely separate parts; innovation is not the exception as a complex phenomenon. Organizations follow different innovations in order to achieve competitive advantage. Innovation in goods and services, innovation in Strategy and structure, innovation in culture and technology. These innovations are evident in a variety of ways and have special advantages. Table 1 illustrates the role and importance of the strategic advantage of innovation in the organization.

Table 1: The Role and Importance of the Strategic Advantage of Types of Innovation in Organizations (Wang et al., 2013)

The form of innovation	Strategic Advantage
Freshness	Provide a product or service that nobody has
Improvement of Competency	Rewriting the rules of the competitive game
Complexity	Difficulty in imitating and impeding newcomers
Strong design	A basic version of the product or service that can reduce cost or extend life cycle.
Innovative and gradual innovation	Continuous promotion of performance boundaries

John (1999) identifies three types of innovation: product innovation, process innovation, and market innovation. Productive innovation provides a tool for production and is the most obvious tool for generating revenue. Innovation provides a tool for maintaining and improving quality and saving costs. Market innovation also addresses the advancement and integration of target markets, and how to target the target markets to the best of service, aimed at identifying new markets with higher potential, or identifying new and better ways to serve target markets (Ojimalu, 2008).

Innovations can be categorized according to their type. Schumpeter distinguishes between the five different types of innovation. New products, new methods, new sources of production, exploitation of new markets, new markets for business organization. However, in economics, the focus is on two first was the case.

Most scholars and scholars of this subject have considered four groups for types of innovation:

1. Administrative innovation (change in organizational structure and administrative processes)
2. Innovative Production (Replacing Products in Production, Developing Product Type)
3. Process innovation (improving product flexibility, reducing production costs, improving working conditions and reducing environmental damage)
4. Technological innovation (a combination of process innovation and production innovation) (Ojarsalo, 2008).

One of the classifications that has become more widely accepted in the literature is the classification given by Damanpour (1991). He distinguishes between two types of innovation:

- Technical innovation
- Administrative innovation (executive) (Chang et al., 2010).

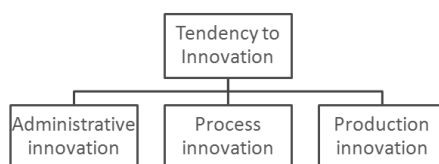


Figure 1: The components of organizational innovation (Chang et al., 2010)

2.1.3 In the learning of the network or the

Learning occurs when people share their knowledge and knowledge. Knowledge can be understood as meaningful information gained through understanding, awareness and familiarity through study, research, observation, or experience over time (Kasiero, 2017).

Learning in non-routine conditions requires special attention. Network learning contributes to management in these circumstances. For network learning purposes, learning is a set of organizations as a group. Network learning is something more than summing up the learning of individuals, groups, and organizations that make the network. Network learning processes change network properties, such as processes and interaction structures and common narratives. The purpose of the learning network is the organizational groups that interact with each other to learn, interact, and interact. Therefore, its main focus, rather than collective learning of the group of organizations, is on group dynamics and the learning of individual members of the group. The thinkers of this field consider the network not as a learning entity, but as a platform for learning (Soltanieh, 2013).

Function

In necessity, the description and definition of the concept of the word of performance, it should be noted that the place of this term is important from the point of view only by defining and describing the function that can be evaluated or managed. Holton and Bates have noted that performance is a multi-dimensional structure whose evaluation varies depending on the type. He also points out that the goal of evaluation is performance results or behavior. There are different attitudes about performance. So that performance can only be considered as a record of the results obtained. Individually, performance is a success story of a person. Kane believed that performance was something that a person left apart from the goal. Bernadine and colleagues argue that performance should be defined as the results of the work. Because the results have the strongest relationship with the organization's strategic goals, customer satisfaction, and economic roles. The Oxford Dictionary defines the function as the execution, execution, completion, performance of an order or commitment, specifies the function. This definition refers to outputs or results, while the title of performance is also the result of doing the work (Kamukova et al., 2017).

Background

Several theoretical studies and research on the use of business intelligence in various institutions and organizations have been carried out, some of the studies conducted in Table 2 and the results have been summarized.

Table 2: Studies conducted

Researchers	Year	Results
Alter	2004	Organizations and their decision makers should implement the business intelligence system in the organization based on the organization's specific philosophy and methodology.
Hobule	2010	Business intelligence is a set of abilities, and business intelligence applications accelerate the process of business decision-making in relation to data quality.

Hussar et al	2010	Business intelligence has the advantages of easy and quick access to information, organizational satisfaction, organizational maintenance in competitive conditions, the use of in-house and outsourcing information for decision making for the organization.
Papavaitch et al	2012	The quality of information content and the culture of analytical decision-making affect the use of information in the business (BI) process.
Hoo	2012	Ease of perceived use, perceived usefulness and adaptation have a positive and significant effect on the attitude of using the business intelligence system.
Park and colleagues	2017	Business intelligence has a significant effect on organizational agility. Also, the use of information and communication technology has a positive and significant effect on organizational agility.

3. RESEARCH MODEL

In this research, after studying these researches, the conceptual model of the research has been developed (Fig. 2). As you can see, in this model, business intelligence is considered as an independent variable that affects the function of startups through two intermediate variables of innovation and network learning. The hypotheses presented in this study are also included on the conceptual model of research with respect to the relevant paths.

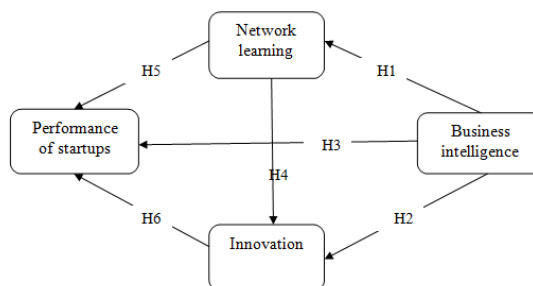


Figure 2. Conceptual Model

3.1. The hypotheses

Hypothesis 1: Business intelligence has an impact on network learning.

Hypothesis 2: Business intelligence has an impact on innovation.

Hypothesis 3: Business intelligence affects the performance of startups.

Hypothesis 4: Network learning has an impact on innovation.

Hypothesis 5: Network learning has an impact on the performance of startups.

Hypothesis 6: Innovation influences startup performance.

Hypothesis 7: Network innovation and learning have a role to play between the business intelligence and the startup function.

3.2. Research variables

In this research, business intelligence was considered as an independent variable, network learning and innovation as the intermediate variable and the function of startup as an associated variable.

3.3. RESEARCH METHOD

This research is a descriptive survey in terms of the nature and method of data collection. In this research, information and data are used in two ways through the use of resources in libraries (books, journals, dissertations, reports, articles, Scientific documents, etc.), and the preparation of a questionnaire has been collected. For information analysis and ranking of effective factors, correlation and confirmatory factor analysis and structural equation modeling have been performed using LISREL software. The statistical population of the study consisted of all managers and experts and food service staff (snapfood) in Tehran. Sampling method is purposeful sampling. The size of the community is approximately 400 people and the number of 196 people is determined using the Cochran formula. The results of the confirmatory factor analysis indicate that the items related to the variables of business intelligence, network learning, innovation, and startup function Uploads have acceptable factor loads.

Also, the results show that each of the business intelligence, network learning, innovation, and startup functions have acceptable fit indices.

4. RESULTS

The results of the demographic variables of the research are presented in Table 3.

Table 3: Demographic Results

Variables	Frequency	Frequency percentage
Sex		
Man	137	89/69
Female	59	10/30
Age		
25 to 31 years old	80	8/40
31 to 35 years old	65	1/33
36 to 40 years	35	8/17
41 years up	16	1/8

After calculating the descriptive indexes of the research variables, structural equation modeling was used to study the causal relationships between variables. Considering that the basis for analysis of causal patterns is a correlation matrix. The correlation matrix, mean and standard deviation of the variables studied are presented in Table 4.

Table 4: Correlation matrix of research variables

Variables	Business Intelligence	Network learning	Innovation	Startup performance
1. Business intelligence	1			
2. Network learning	** 68/0	1		
3. Innovation	** 51/0	** 62/0	1	
4. Startup function	** 55/0	** 48/0	** 45/0	1
Average	22/3	51/3	65/3	40/3
Standard deviation	89/0	10/1	09/1	02/1

P < 05/0, ** P < 0.001

As shown in Table 4, among business variables, business intelligence ($r = 0.55$), network learning ($r = 0.48$) and innovation ($r = 0.45$) have the highest correlation coefficient with competitive advantage, respectively. And the correlation coefficient between variables is positive and significant at the level ($P < 0.01$).

Since the purpose of this study is to investigate the effect of business intelligence on innovation, network learning and startup function using structural equation modeling, in table 5, the coefficients of direct effect and the significance level between the variables of the research are presented.

Table 5: Estimation of standardized coefficients of direct, indirect and total model

Path	Direct effect	Indirect effect	Explained variance
On network learning from Business Intelligence	** 38/0	-	** 14/0
On innovation Business Intelligence Network learning	** 41/0 ** 36/0	- -	** 29/0
On startup Business Intelligence Network learning Innovation	** 48/0 ** 36/0 ** 31/0	** 16/0 * 11/0 -	** 46/0

* P < 0.05, ** P < 0.001

As shown in Table 5, the direct effect of business intelligence ($\beta = 0.38$) on network learning ($P < 0.01$) is positive and significant. The direct effect of business intelligence ($\beta = 0.41$) and network learning ($\beta = 0.36$) on innovation is positive and significant at level ($P < 0.01$). The direct effect of business intelligence ($\beta = 0.48$), network learning ($Z = 0.61$) and innovation ($Z = 0.1$) on the performance of startups at the level ($P < 0.01$) was positive and significant. Also, the indirect effect of business intelligence and network learning on startup performance is significant.

Table 6: Fitness Characteristics of the Path Analysis Model

df / χ^2	RMSEA	GFI	AGFI	CFI	NNFI
91/1	0.68/0	95/0	97/0	1	99/0

According to Table 6, the ratio of two to two degrees of freedom (1.21 $df = 1.91$) was a nicely fit index (GFI = 0.95), a moderate adjustment index (AGFI = 0.97) and the root mean square error (approx. 0.68/0 = (RMSEA are at the appropriate level), therefore fitting the fitted pattern of research is at an appropriate level.

5. CONCLUSION

The study aimed to determine the effect of business intelligence on innovation, network learning and startup function using path analysis. The path analysis results showed that the proposed model with fitting data is fairly good.

The results showed that business intelligence has a significant effect on network learning and innovation. In explaining these results, it can be said that managers with high business intelligence can, by recognizing and proper understanding of their organizational processes, induce the need to change and create dynamism more effectively and more efficiently and in order to enhance the performance of different parts of their organization. The most important need of a manager is having accurate information to make the right decision. Companies have turned to using intelligence tools such as business intelligence to extract information quickly from resources. This system, while creating new opportunities for the growth of the organization, not only eliminates problems, but also changes the working conditions by saving time and money. Business intelligence, through decision-making support at all levels of the organization, will increase the efficiency and effectiveness of the organization and lead to sustainable development. Innovation is a way of making progressive changes based on creativity and is an important process in industrial and commercial organizations. Innovation is a multi-dimensional approach that all members of the board are involved in, from management to employee. Regarding the effects of decision making by business and service center managers on organizational processes and the impact of their decision making style on their thinking and business intelligence, their policies and approaches have a high impact on the process and innovation system of entrepreneurial organization. Park et al. (2017) concluded that business intelligence had an impact on technological performance and agility of the organization.

The results of this study showed that the direct effect of business intelligence, network learning and innovation on the performance of startups was positive and significant at the level ($P < 0.01$). Business intelligence is a powerful tool that managers of organizations by creating creativity and innovation in their decisions will be more efficient and effective and will bring more profit to organizations. Also, business intelligence can help reduce costs by speeding things up and reducing redundancies in the organization and can increase the organization's revenue by innovating products and services. If the managers and staff of the organization, by making innovations and creativity in it, will remove this system from being traditional, processing large volumes of information with its high accuracy and speed will be a factor in reducing costs. Managers need timely and accurate decision making in different conditions, including confidence, conflicting, non-risky (risk), etc., predicting customer behavior and recognizing market demand, useful and relevant facts and data. In this regard, business intelligence can help the organization achieve its goals by analyzing and processing input data. The results of this study are consistent with the findings of Chahal and Bakhtiy (2015) and Wang (2013).

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