

# A model for examining the effects of communication on innovation performance: emphasis on the intermediary role of strategic decision-making speed

Strategic  
decision-  
making speed

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## Abstract

**Purpose** – In recent years, rapid changes in the economic situation and high levels of competition have increased the need for innovation in order to gain success. In such circumstances, organizational strategists are considered as critical in determining the success or failure of organizations. Using innovation in various aspects of organizational operations is the most important factor to achieve sustainable competitive advantages in industry. As a result, analyzing the effective factors involved in promoting the efficiency of innovative activities in the organization and ways of achieving it are of utmost importance. Thus, this paper examines the relationship between communication and innovation performance with respect to the intermediary role of strategic decision-making process speed.

**Design/methodology/approach** – The present study has used quantitative methodology and questionnaire to collect data from 450 managers and members who are involved in the decision-making process in 150 companies operating in the food-industry sector. Data analysis was done by using structural equation modeling and AMOS software.

**Findings** – The results of the data analysis suggest that communication and strategic decision-making speed possess a significant positive impact on innovation performance. Also, strategic decision-making speed has sufficiently played the intermediary role between communication and innovation performance.

**Originality/value** – This survey specifies the effects of communication on the success of making fast strategic decision and innovation performance which aid Iranian food companies to tackle one of the managerial challenges: postponing strategic decisions due to lack of efficient communication to get information. In addition, to the best of the authors' knowledge, this essay is a first in Iran.

**Keywords** Communication, Strategic decision-making, Innovation, Innovation performance, Decision speed, Strategic decision-making speed, Strategic management

**Paper type** Research paper

## Introduction

Firms seek to develop and maintain a competitive advantage, which empowers them to keep competitors at bay (Carlier *et al.*, 2017; Ibraimi, 2014). In recent decades, most competitive business environments reveal the characteristics of globalization, rapid technological transfer and competition that have radically changed (Mohsin *et al.*, 2013). To anticipate, adapt and satisfy the changing market needs of challenging competitive environments on a continual basis, firms must be innovative, flexible and creative (Zeng *et al.*, 2017; Bell and Burnham, 1989; Roszko-Wójtowicz and Białek, 2016; Peñalba *et al.*, 2015). The competitive forces have made today's organizations abandon their routine and fixed methods and procedures, which they had pursued for decades, and move forward by adopting new professional and working approaches (Zeng *et al.*, 2017). In this way, the organizational strategists are the ones who can take the responsibility for the success or failure of the organization by providing dynamic organizational climates which force firms to innovate and mitigate competition for survival (Lodh *et al.*, 2014). As a result, studying the effective factors involved in promoting the efficiency of innovative activities at the organizational level



and the ways of achieving it are of utmost importance. Based on previous studies (Bourgeois and Eisenhardt, 1988; Eisenhardt, 1989; Judge and Miller, 1991; Baum and Wally, 2003; Zehir and Ozsahin, 2008), the significant factor that can increase innovation in organizations is the speed of strategic decision-making, because decision-making dilemmas can arise owing to delaying decisions too long, resulting in lost opportunities to reap the benefits of new ideas (Eisenhardt, 1989, Payne *et al.*, 1996). In other words, decisions are intimately related to various aspects of time (e.g. Ariely and Zakay, 2001). Decisions take time to make, have consequences occurring at different moments in time and often change over the course of time. Much research has therefore been concerned with understanding how time affects people's decisions (Van de Calseyde *et al.*, 2014) and how availability of time could curb the negative side effect on upcoming outcome (e.g. Benson and Beach, 1996; Ordóñez and Benson, 1997; Zakay, 1993).

In addition, the fast pace of decision-making for facing rapid developments and changes in the environment has created circumstances which, in turn, have decreased the time required by the executives for thinking and reflection. Decision-making is no more a competitive advantage, but a necessity for survival. Thus, executives are looking for ways to speed their decision-making processes. The companies unable to make fast strategic decisions may face huge financial losses, project failures and so forth, and if the slowness in decision-making continues to exist, they will finally come to dissolution and bankruptcy. It is important to distinguish between two different facets in which time relates to choices. The first one concerns decisions about time. The classical question in this context concerns intertemporal choice. Extensive research suggests that, other things being equal, people have a tendency to prefer immediate rewards over larger, delayed ones, affecting their health and wealth (Van de Calseyde *et al.*, 2014). Two major theoretical approaches to time preferences are discounted utility theory (Loewenstein, 1992) and construal-level theory (Liberman and Trope, 1998). The second facet in which time and choices interact concerns decision time, the time available or needed for making a decision, which may strongly influence the manner by which a decision is reached and the corresponding outcome (e.g. Benson and Beach, 1996; Ordóñez and Benson, 1997; Zakay, 1993). For instance, there is evidence suggesting that under time constraint, decision-makers adjust by switching to simpler strategies when choosing between multiple choice options (e.g. Payne *et al.*, 1993; Weenig and Maarleveld, 2002). Another line of research in this context concerns retrospective evaluations of decisions made in haste or under time pressure, indicating that people regret their choices more when having a limited amount of time to choose between a set of options (e.g. Inbar *et al.*, 2011).

The present research is related to the second facet, decision time, and investigates an aspect of time in choice that received surprisingly little research attention. Most decision-time research focused on the decision process from the decision-maker's point of view. Herein, we study decision-making speed as a key factor affecting communication and innovation performance.

Amid the last decades, the worldwide dynamics in food production and consumption have advanced quickly (Santeramo *et al.*, 2017). On the one hand, the increase in prices has prompted an over-supply; on the other hand, the unequal distribution of production and earnings has exacerbated the issues of access to food (Barrett, 2002; Caracciolo and Santeramo, 2013; Otsuka, 2013, Barrett, 2010; Leroy *et al.*, 2015; Santeramo, 2015a ,b; Muchenje and Mukumbo, 2015, Santeramo and Shabnam, 2015; Zhou and Yu, 2015). The food industry is an old industry; nonetheless, it has witnessed very little innovation historically. Compared with other industries, history, tradition and culture tend to have great value in the food industry, and these features of the food industry are also valuable insofar as branding current businesses is concerned. Therefore, the food industry has experienced fewer innovation activities historically. Much of the previous literature argues that innovation activities are not as active in the food manufacturing industry as in other industries (Kanama

and Nakazawa, 2017). Furthermore, owing to oil shortage, air pollution and climate change, energy savings and emission reductions are important issues with global attention. The food industry, which accounts for 30% of the global energy consumption and 20% of greenhouse gas emissions, has been increasingly recognized for its potential for energy savings (Monforti-ferrario *et al.*, 2015). From the production of crops and livestock, to the processing, packaging, distributing, storing, preparing, serving and disposing of food products, energy plays an important and necessary role for every stage of the food industry (Xu and Szmerekovsky, 2017) that causes million full- and part-time jobs to be related to agriculture (Glaser and Morrison, 2016). Moreover, the uncontrolled population growth and the increasing demand for food subject to reduction in the world's food resources are amongst the most important issues, which have drawn the attention of the authorities and researchers. Thus, there is a strategic position considered for the food industry because the important role played by the food industry and agriculture in economic development and job creation is very important. Thus, companies which are operating in the field of food industry, because of the type and nature of their activity, must accept the highest degrees of risk mainly because of the intense competition and low-profit margins that prevail in this field. Also, since food products are perishable by nature, the decision-making involved in their supplying and selling channels needs velocity and agility. This indicates that companies that apply low-speed decision-making cannot innovate to survive and will soon get out of the race.

In these days, effectively listening and responding to buyers can have a dramatic impact on a firm's ability to compete (Murphy and Sashi, 2018). Rezaeian's (2010) 40-years study on 1,000 companies revealed that there is a clear correlation at a confidence level of 25% between the effectiveness of decision-making and business performance. The organizational factors that affect the decision-making speed include many personal, organizational and even social problems that are, in turn, the sources of the lack of effective communications, as well as the inadequacy of the role of the communication system, causing misunderstandings and misinterpretations. Perhaps the fiercest criticism faced by the executives is their inability to create effective communication links. A study by Mintzberg (1973) showed that executives on average spend 80% of their time on communication.

This paper mainly focuses on the time needed for strategic decision-making, which is influenced by the speed of environmental changes. Hence, the intermediary role of strategic decision-making speed in the relationship between communications and innovation performance in the food industry companies of industrial towns of Razavi Khorasan province, has been studied. To this aim, the effects of communication on innovation performance have been studied. Also, how communication can lead to competitive advantage and innovation performance through strategic decision-making speed, and how can the strategic decision-making speed be related to innovation performance are the main research questions presented in this paper.

## Theoretical framework

### *Communications*

Information sharing is characterized as the formal as well as informal sharing of significant and timely information between companies (Anderson and Narus, 1990, p. 44). This definition focuses on the respective needs of both actors involved in a relationship to proactively give profitable data to the partners that may influence their activities (Heide and Miner, 1992). Such proactivity is relied upon to help align expectations and furthermore to avoid issues as well as to resolve disputes between partners (Morgan and Hunt, 1994). In that capacity, communication and particularly timely communication foster trust (Moorman *et al.*, 1992). Anderson and Narus (1990) contended that previous communication is a predecessor of trust, while such accumulated trust facilitates communication. The trust-commitment theory of

relationship marketing additionally bolsters this view (Morgan and Hunt, 1994). Communication not only attenuates the risks involved in making decisions within business relationships (Heide and Miner, 1992), it also impacts significantly by creating an impression that the partners are mutually supportive. It has been recognized that communication energizes commitment and loyalty through fostering participative decision-making (Anderson *et al.*, 1987). Communication has been recognized as a relevant dimension of the success of organizational decision, and it is considered important in building change readiness, reducing uncertainty and as a key factor in gaining commitment (Matos Marques Simoes and Esposito, 2014). Communication represents the total amount of interaction among organization members, regardless of the informality of the mode of interaction (Umans, 2008). The concept of communication as a relevant dimension to the success of organizational change is the basis of an executive's success; it is considered important in building change readiness, reducing uncertainty and as a key factor in gaining commitment (Marques Simoes and Esposito, 2014). In measuring frequency, one must bear in mind that interaction can occur in face-to-face meetings (whether in groups or one on one) or by telephone, mail, e-mail and other Internet-related media (Smith *et al.*, 1994). Many of the organizations' deficiencies are the result of misunderstandings due to miscommunications. However, regardless of who is actually at fault when communication breaks down or fails, the burden of ensuring effective communication will always rest with the managers. It is important for the organizations to deal with this, as effective decision-making is critically dependent on effective communication. Failure of the strategic decision-makers to realize and accept this fact will necessarily guarantee, at the very least, complications and potential disaster for the strategies of organizations. By understanding what hinders success, the managers can more effectively implement techniques that can help facilitate greater success in strategic decision-making (Cervone, 2014).

#### *Strategic decision-making speed*

We draw the influence of timing issues from scrutinizing literature (Bluedorn and Denhardt, 1988; Zaheer *et al.*, 1999; Ancona *et al.*, 2001a, b; Bluedorn, 2002). The issue of the strategic decision-making process and its speed has captured the attention of business managers and researchers. This is because the driving forces of globalization and technological developments have increased the intensity of competition and led to a more turbulent and more dynamic environment which has forced firms to speed up their decision-making and operating processes for survival and growth (Mwangi, 2012).

Scientific discussion on the speed of strategic planning began with the study conducted by Bourgeois and Eisenhardt (1988). They defined the speed of strategic planning as the speed at which any organization executes all aspects of the decision-making process. The decision speed implies how the most agile businesses apply strategies to response to external changes (Chen and Chang, 2012). Basically, decision-making speed refers to how quickly organizations execute all aspects of the strategic decision-making process (Eisenhardt, 1989; Mwangi, 2012). Strategic decision speed is an important aspect of strategic management to organizations. Academic discussion of decision speed emerged initially by Bourgeois and Eisenhardt (1988). Decision-making speed denotes how fast businesses adopt strategies in response to external changes (Chen and Chang, 2012). Strategic decision-making speed is defined as the time spent on the process of strategic decision-making (Ancona *et al.*, 2001a, b). The speed of strategic decision-making processes is constrained by the individual who is making the decision, the organization in which the decision is made and the environment in which organization operates (Zehir and Ozsahin, 2008). Firms that make strategic decisions faster in the market tend to gain from being the first in the market to make a move. It is therefore important to understand why some firms are able to make faster strategic decisions than others (Mwangi, 2012).

### *Innovation performance*

Since Schumpeter (1942) identified that the concept of innovation is substantial for long-term firm success, the topic of innovation has been the focus of notable research (Ramadani *et al.*, 2017; Audretsch, 1995; Blackburn, 2003; Castellani *et al.*, 2018; Damanpour, 1991; Lerner, 2012; Rosenbusch *et al.*, 2011; Teece, 1992). One of the key factors in the survival of knowledge-based organizations is the continuous improvement of their innovation performance. In such organizations, innovation performance maintains competitive advantage and improves the organizational development (Bontis, 1998; Sveiby, 1997; Edvinsson and Malone, 1997; Stewart, 1997; Marr and Schiuma, 2001; Lerro *et al.*, 2014; Inkinen *et al.*, 2014; Dehghanan and Harandi, 2014; Van de Ven, 1986; Cohen and Levinthal, 1990; Hamel, 1998).

Innovation performance refers to the evaluation of the knowledge application and technological innovation activities in an enterprise. There are two meanings associated with the concept of innovation performance. In the broad sense, innovation performance refers to the knowledge of technological, inventive and innovation operations (Hong *et al.*, 2019; Prajogo and Sohal, 2003; Gunday *et al.*, 2011; Kim *et al.*, 2012; Cao and Zhao, 2013; Hurley and Hult, 1998; Damanpour, 1991; Bahjat *et al.*, 2018). Similarly, organizational innovation performance is conceptualized in terms of both product innovation performance and process innovation performance. Product innovation involves the introduction of new or improved goods or services to the market, and it focuses on identifying new customer needs, managing product quality and developing an effective market strategy. Process innovation refers to the adoption of new or improved methods to produce goods and services (Tang *et al.*, 2013). Thus, innovation performance is a holistic construct that hints at the ways in which the organizational operations are conducted (Jafari Sangari *et al.*, 2014). Nowadays, with the emergence of a complex and highly competitive environment, only the organizations that have strengthened their performance in improving organizational capabilities, such as innovation, can maintain their operations (Farsijani and Neyestani, 2010). Carrying out innovative activities provides a rich source of competitive advantage (Azad and Arshadi, 2009). Innovation performance is the result of creating necessary knowledge for promoting product and new production processes or improving current production processes (Mirfakhrodini *et al.*, 2010). Also, innovation performance deals with the corporate capability to be the first user of ideas, tools, systems, policies, plans, processes, products and services (Latifian and Molavi, 2014).

There are notable researches on evaluating innovation performance (Prajogo and Sohal, 2003). Their findings of different studies revealed that companies that pay special attention to innovation will considerably increase their market and profit shares (Prajogo and Sohal, 2003). Innovation performance is determined by checking the number of tangible achievements, recorded reports and new projects. Also, comparison with competitor's quality, function of new products and new processes shows how innovatively the organization performs. Reputation and presence on the market are other determining factors in this regard (Mobaraki *et al.*, 2013).

### *Research literature*

According to our survey, it seems that there has not been any study conducted in the area of "strategic decision-making speed" inside Iran. The present study highlights the most relevant domestic and international researches in the fields of innovation performance and communications. Montiel Campos *et al.* (2015) draw upon strategic decision-making and organization theories to propose that strategic decision-making speed mediates the relation between personal, organizational and environmental factors and performance. Hypotheses were theoretically developed and tested with data from an empirical investigation of Mexican new technology-based firms. Measures of individual characteristics, organization structure,

business environment, strategic decision speed and performance were collected from 103 technology founder managers at the end of 2012. The results confirmed that strategic decision-making speed influences the performance of new technology-based firms and mediates the relation of uncertainty, CEO model, dynamism and quality with firm performance. Zehir and Özşahin (2008) have studied well the relation between strategic decision-making speed and innovation performance. The study population included executives of companies working in different industries. Using convenience sampling, 73 large companies of different industries were chosen as samples. A strong correlation was drawn between the strategic decision-making speed on the one hand, and innovation performance and contribution, independence and technological complexity on the other hand. According to regression analysis, industrial competitiveness did not have any significant relation with any of the factors except for the technological complexity and the relation between technological complexity and industrial competitiveness (significant at the “ $p$ ” value  $< 0.05$ ).

In the research conducted by Hsu and Huang (2011), two questionnaires were designed: one for the leader and one for the followers. In their study, structural equation modeling (SEM) was used, and 198 samples were taken by using convenience sampling. The findings showed that the characteristics of the top management team (TMT), such as risk-taking, innovative character and the ability to communicate effectively, which affect the strategic decision-making styles (as well as the speed and quality of decision-making), have an impact on the performance of each company. Also, the innovative character had a significant and positive relation with the speed and the quality of decision-making, while willingness to take risk showed no significant relation. Mwangi (2012) studied the relationship between strategic decision-making speed and performance of two photography companies using non-probability sampling techniques (purposive sampling method). The results of correlation and regression analysis suggested that the industries’ competitiveness affected strategic decision-making speed. Also, the company’s performance was not much affected by strategic decision-making speed, but in order to attain strategic advantage, especially in industries with high technological complexity, companies must take “speed” into serious consideration while conducting decision-making.

Chen and Chang (2012) have studied 260 entrepreneurs who were chosen by convenience sampling method and SEM. The subjects showed a higher degree of organizational formalization leading to higher degrees of organizational innovation and slower decision speed. However, a higher degree of centralization weakened the organizational innovation, but no significant relation was found with decision-making speed.

## Conceptual model and research hypotheses

### *Communication and strategic decision-making speed*

Gu *et al.* (2012) studied the effects of six variables on the speed of decision-making; one of them was the ability to communicate effectively. Their findings state communication to be an effective variable in determining the speed of decision-making. Effective communication among the firm’s members is a must. If members reduce their communications to less than the necessary limits for saving time, they will probably risk the performance by operating on the basis of incorrect information, and this, in turn, might lead to weak strategic decisions. If members facilitate communication more than the optimum levels, they will probably make wiser decisions. This is not just because they spend more time and resources, but also because they sacrifice effectiveness and timeliness (Hsu and Huang, 2011). Therefore, we hypothesize that communication positively affects firms making faster strategic decisions.

- H1. Communication has a positive and significant impact on strategic decision-making speed.



*Strategic decision-making speed and innovation performance*

Bourgeois and Eisenhardt (1988) observed a positive relationship between strategic decision-making speed and innovation performance. Eisenhardt (1989) and Judge and Miller (1991) proved that in unstable environments, fast decision-making is associated with high performance. In addition, Baum and Wally (2003) confirmed this claim that the fast strategic decision-making improves the growth and profitability of the company.

H2. Strategic decision-making speed has a positive and significant impact on innovation performance.

*Communication and innovation performance*

Communication between a team's members is of paramount importance owing to performance. If managers place emphasis on communication as a way of sharing their perspective as well as obtaining credit, employers would have stronger enthusiasm, motivation and commitment toward gaining goals (Hsu and Huang, 2011). Consequently, these internal feelings help them to share their brainwaves (sudden clever ideas according to Longman dictionary), attitudes, thoughts, even the bad ideas due to the fact that the effective communication offers a friendlier work climate, resulting in more new articles and events. In addition, in the presence of a trustworthy atmosphere and a source of information stemming from effective communication, time and resources would be consumed proficiently, otherwise misunderstanding might cause employers to spend more time to perceive other's meaning and interrupt it which sometimes brings people to make hasty or bad decisions, leading to poor performances especially detrimental to innovation.

H3. Communication has a positive and significant impact on innovation performance.

*The mediating effect of strategic decision-making speed between communication and innovation performance*

Innovation is a fundamental mainstay of present firm improvement and competitiveness, and much research has been committed to multiple facets of it, particularly to the connection among innovation and performance (Damijan *et al.*, 2012). Current evidence with respect to time pressure illustrates that expanding communications is the antecedent to making people decide quickly (Everett *et al.*, 2017; Rand, 2016; Rand *et al.*, 2014; Evans and Rand, 2018). Although management consultants have repeatedly specified fast decision-making as a source of competitive advantage (Jones and Quinn, 1993), and professionals claim they make strategic decisions in less and less time (Ancona *et al.*, 2001a, b; Kepner-Tregoe, 2001; Baum and Wally, 2003). Communication, speed of strategic decision-making and innovation performance determine the effectiveness of an organization in engaging important events.

H4. Communication has a positive and significant impact on innovation performance through strategic decision-making speed.

**Research methodology**

Since executives and their deputy officers are considered to be the most knowledgeable source for the mentioned concepts with respect to their functions and impacts on their organizations, the population of this research includes the executives and their deputy officers in the food industry companies, which are located and based in the industrial towns of Razavi Khorasan Province, Iran. This study has used the random sampling method. The ratio of multivariate regression analysis of the samples (or observations) to the independent variables should not be less than 5 (otherwise the results of the regression equation cannot be generalized) (Knofczynski and Mundfrom, 2008). The more conservative ratio of ten

observations for each independent variable has been suggested by [Pedhazur and Schmelkin \(1991\)](#) and [Miller and Kance \(1973\)](#). According to them, even considering 15 observations for each predictor variable in multiple regression analysis by using the method of least squares can be a good rule of thumb ([Knofczynski and Mundfrom, 2008](#)). Thus, in SEM methodology, sample size can be determined between 5 and 15 observations for each measured variable or question. Based on this rule, the researchers considered the highest observations (15 times of question numbers) in order to acquire more participation. The number of observations is kept to less than 5 times of 11 questions, that is, 55). The maximum sample size is calculated by multiplying 15 by 11 (i.e. 165), and as a result, any number of questionnaires between 55 and 165 is acceptable; the researcher distributed 150 questionnaires in order to select 150 companies using random sampling method. Since the organization is the level of analysis for the research, 2 to 5 questionnaires were provided to each organization and a total of 450 questionnaires from 150 companies were collected.

In descriptive statistics analysis, the information of 450 executives and decision-makers was reviewed. For inferential statistics, each company's questionnaires were averaged and considered as one, that is, the questionnaires were distributed according to each company's size and their managerial positions. Thus, in large companies, 3 to 5 questionnaires, and in small and medium companies, 1 to 3 questionnaires were distributed in accordance with the managerial positions and the number of persons who were involved in the process of decision-making. For descriptive statistical analysis, all of the questionnaires were calculated, and for inferential statistics, encoded questionnaires of the companies were averaged separately. The outcome was 150 average questionnaires for 150 companies.

The geographical extent of the research has been Toos Industrial Town in Mashhad, Northeastern Biotechnology and Food Industry Technology Town (located in 12th kilometer of Asian Highway [i.e. Mashhad-Quchan Highway], road to Toos Industrial Town), Kavian Industrial Town (located in 40th kilometer of Fariman-Mashhad road), Binalood Industrial Town (located in 50th kilometer of Neishabour-Mashhad road) and Kalat Industrial Town.

The questionnaires (see [Appendix 1](#)) used for the present study include two sections: general questions and specific questions, which, in turn, include three parts: communications, strategic decision-making speed and innovation performance. The general information questions contain subjects' descriptive statistics such as sex, age, educational degree, work experience and job status. The second set of questions covers specific questions about main variables, with a total number of 11 questions with a 5-level Likert scale, in which [Hsu and Huang's \(2011\)](#) questionnaire has been used to measure communications under three items, [Mwangi's \(2012\)](#) questionnaire has been used to measure strategic decision-making speed under five items and [Zehir and Özşahin's \(2008\)](#) study has been used to measure innovation performance.

### Research findings

[Table 1](#) shows the correlation, mean and standard deviation matrix of variables. Result of this table indicates that the calculated mean for each of three variables of communication, strategic decision-making speed and innovative performance is greater than 3. In addition, the correlation between these three variables is positive and statistically significant at confidence level of 0.99.

Before evaluating the fitted structural model, we have to ensure the significance of factor loadings for all the model indicators as well as the model goodness of fit ([Hoyle, 1995](#); [Rigdon, 1998](#); [MacCallum and Austin, 2000](#); [Kline, 1998](#); [Roth et al., 1989](#); [Duncan and McAuley, 1993](#); [Duncan et al., 1994](#)). This was accomplished by conducting confirmatory factor analysis in AMOS software. As the result shows, factor loadings are from 0.54 to 0.78 for the variable of communication; 0.69–0.85 for strategic decision-making speed and 0.36–0.48 for innovative performance. The average variance extracted (AVE) is a measure of the amount of variance



that is captured by a construct in relation to the amount of variance due to measurement error (Fornell and Lacker, 1981). The criterion was utilized in order to investigate the convergent validity. This index represents the amount of variance for each latent variable extracted from its indicators (Curran *et al.*, 1996; Curran *et al.*, 1997; Duncan *et al.*, 1997; Roth *et al.*, 1989). Fornell and Lacker (1981) suggested that the values greater than 0.5 are satisfactory since they ensure that at least 50% of a construct variance is predicted by its indicators. The AVE of greater than 0.5 for all the three variables is shown in Table 1. In order to evaluate the discriminant validity, it should be investigated that whether or not the extracted AVE for each construct is greater than the square of the correlation between that construct and the other constructs. This indicates that a construct is different from the other model constructs (Fornell and Lacker, 1981; Hu and Bentler, 1999; Schumacker and Lomax, 1996). To do this evaluation, conversely, we calculated the AVE square for the model constructs indicated in Table 1. The values on this table should be greater than the correlation of the other constructs; diagonal values represent the AVE squares and the other values are the correlations. As it can be seen, this applies for all constructs, and the questionnaire's discriminant validity is reached. Results for CFA along with the two criteria of AVE and CR are provided in Table 2. Furthermore, fit indices for CFA model shows the goodness of fit for all the measurement models ( $\chi^2 = 83.3$ ,  $df = 41$ ,  $GFI = 0.901$ ,  $AGFI = 0.840$ ,  $NFI = 0.900$ ,  $CFI = 0.945$  and  $RMR = 0.061$ ).

### Testing the hypotheses

Figure 1 shows the output structural model indicating the intensity of relationships between variables. All the final fit indices were greater than the critical values which indicate the model satisfactory fitness ( $\chi^2 = 83.397$ ,  $\chi^2/df = 2.034$ ,  $GFI = 0.945$ ,  $NFI = 0.900$ ,  $CFI = 0.901$ ,  $RMR = 0.061$ ,  $RMSEA = 0.083$ ).

Variables	1	2	3	Standard deviation	Average
Communication	756/0			69/0	911/3
Strategic decision-making speed	570/0**	718/0		74/0	770/3
Innovative performance	613/0**	**667/0	759/0	84/0	697/3

**Note(s):** \*The explanation of the above table: \* Correlation [one sequence] at a significant level ( $p < 0.05$ )

\*\*Correlation at a significant level of  $p < 0.01$

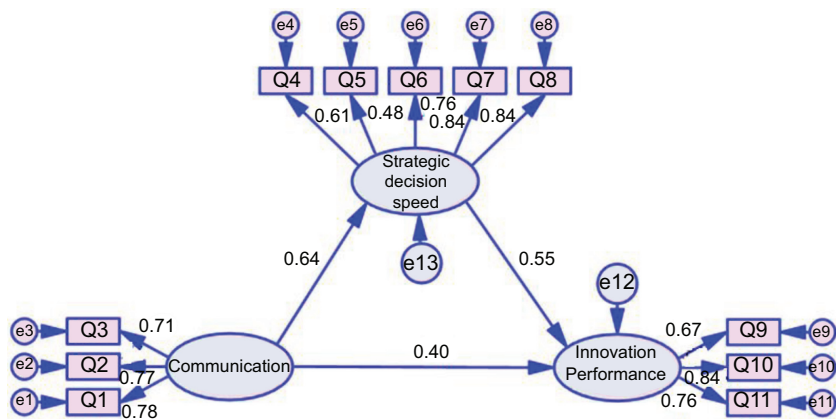
\*The values presented in the original matrix diagonal are AVE

**Table 1.**  
Average, standard  
deviation, reliability  
and correlation of  
variables

	Item	Factor loading	Significance level	Cronbach's alpha	CR	AVE
Communications	Q1	782/0	000/	797/0	696/0	572/0
	Q2	775/0	000/			
	Q3	710/0	000/			
Strategic decision-making speed	Q4	610/0	000/	828/0	734/0	516/0
	Q5	478/0	000/			
	Q6	757/0	000/			
	Q7	843/0	000/			
	Q8	836/0	000/			
Innovation performance	Q9	666/0	000/	797/0	702/0	577/0
	Q10	840/0	000/			
	Q11	763/0	000/			

**Table 2.**  
The results of  
confirmatory factor  
analysis for  
questionnaire items

**Figure 1.**  
Structural  
equation model



In this model, all the direct effects of variables are positive and significant at a confidence level of 0.95. The coefficient effect of communication on decision-making speed is equal to 0.64, which is statistically significant ( $p$ -value = 0.000;  $t$ -value = 5.430), and, consequently, the first hypothesis is confirmed. In addition, the effects of communication and decision-making on innovation performance were 0.40 ( $p$ -value = 0.000;  $t$ -value = 3.645) and 0.55, respectively ( $p$ -value = 0.000;  $t$ -value = 4.454), and the second and third hypotheses were also confirmed. The hypothesis number was related to indirect effect of communication on innovation performance. Indirect effect of independent variable is calculated through the following formula in which ( $a$ ) is the effect of independent on mediator variable, and ( $b$ ) is the effect of mediator on the dependent variable.

$$B_{\text{indirect}} = a \times b$$

After calculating the indirect effect, its significance was investigated by calculating the Sobel  $p$ -value. The Sobel formula is as follows in which ( $a$ ) is the effect of independent on mediator variable, ( $sa$ ) is the standard error of independent on mediator variable, ( $b$ ) is the effect of mediator on dependent variable and ( $sb$ ) is the standard error of mediator on dependent variable.

$$t\text{-value} = \frac{a*b}{\sqrt{b^2*sa^2 + a^2*sb^2}}$$

Based on the above-mentioned formula, in the following, mediating hypotheses are tested. As it can be seen in Figure 1, the effect of communication on decision-making speed is 0.64, and the effect of decision-making speed on innovation performance is 0.55. Thus, indirect effect of communication on innovation performance is 0.352. By replacing the calculated values in the formula, the amount of  $t$ -value is 3.368, which is greater than 1.96, and, consequently, indirect effect of communication on innovation performance is statistically significant. In other words, communication may improve the innovation performance by increasing the speed of strategic decision-making. Table 3 provides the summary results for testing the four hypotheses of the research.

**Robust test**

In order to do manipulation checks on data, we calculated the mean differences between the manipulated conditions using ANOVA by reporting the mean scores and  $F$ -statistics, one-

sample *T*-test and chi-square. According to the statistical results (Tables 4–6), all the statistics are at a significant level and the hypotheses are confirmed.

Our chi-square test statistic means that the observed data fit the expected data extremely well. In other words, there is a relationship.

The one-way analysis of variance (ANOVA) is used to determine whether there are any statistically significant differences between the means of three or more independent (unrelated) groups. An *F* statistic of at least 3.95 is needed to reject the null hypothesis at an alpha level of 0.1. As the data revealed, because the *p*-value is less than the significance level (0.05), the null hypothesis is rejected and not all of population means are equal. Therefore, all hypotheses are confirmed.

The one-sample *T*-test was performed on the data as an extra check. Using the significance level of 0.05, we reject the null hypothesis because *z* is greater than 1.96 or less than  $-1.96$ .

## Discussion and conclusion

With regard to the main goal of study to evaluate the effect of communication on innovation performance with respect to strategic decision-making speed, we can claim that the results of

**Table 3.**  
Summary of test  
results of research  
hypotheses

Result- hypothesis	Sig level	Meaningful number	Standard error	Standard factor	Test result
Communication/speed of strategic decision-making	000/0	430/5	085/0	64/0	Confirmed
Communication/innovative performance	000/0	645/3	093/0	40/0	Confirmed
Speed of strategic decision-making/ innovative performance	000/0	454/4	146/0	55/0	Confirmed
Communication/speed of strategic decision-making/innovation performance	000/0	368/3	104/0	35/0	Confirmed

**Table 4.**  
Chi-square test  
statistics

	Communication	SDP	Performance
Chi-square	20.545	47.273	41.879
df	5	13	9
Asymp. Sig.	0.001	0.000	0.000

**Table 5.**  
ANOVA test

			Sum of squares	df	Mean square	<i>F</i>	Sig
Performance	Between groups	(Combined)	1.506	5	0.301	5.36	0.000
		Linear	0.172	1	0.172	8.95	0.019
		term	1.333	4	0.333	6.05	0.027
	Within groups		23.412	60	0.390		
	Total		24.918	65			
SDP	Between groups	(Combined)	1.438	5	0.288	4.77	0.001
		Linear	1.100	1	1.100	27.48	0.036
		term	0.337	4	0.084	14.17	0.004
	Within groups		18.013	60	0.300		
	Total		19.450	65			

our study are compatible with the vast majority of studies. For example, the Gu *et al.* study (2012) was in line with the results of the statistical analysis performed to prove the first hypothesis. The results showed that strategic decision-making speed has a positive relationship with communication ( $r = 0.486$  and  $p < 0.01$ ). The results of the study support the view that effective communication is the key to organizational performance and proper functioning. Therefore, communication should be placed in the strategic planning process. Many managers recognized that organizations can achieve success over a shorter period of time through effective communication. Hence, when the organizations provide communication bases or communicate effectively, communication finds a special identity, which is interpreted as corporate communications. Corporate communication is referred to as the transmission of information, concepts and meanings among organizational factors in order to achieve the goals. The main objective of corporate communication is that the appropriate and qualified people send and receive the right information at the right time and with the appropriate means of communication. Effective communication within the organization is defined as a set of procedures about how to deliver, access, share and use the information correctly. Therefore, with the presence of communication process and the correct application of information, strategic decision-making accelerates, thus confirming the first hypothesis.

The statistical analysis regarding the second hypothesis exhibited parallelism with the findings of the study conducted by Judge and Miller (1991). The research, based on a sample size of 32 companies, showed that the executives, who can accelerate their cognitive process and group activities in homogenization processes, act with self-confidence to make faster decisions. In such a high-speed environment, decision-makers who make faster strategic decisions also show better performance. Zehir and Ozsahin (2008) also showed that the strategic decision-making speed is strongly associated with innovation performance. Bourgeois and Eisenhardt (1988) observed a positive relationship between strategic decision-making speed and innovation performance. Eisenhardt (1989) and Judge and Miller (1991) proved that in unstable environments, fast decision-making is associated with high performance. In addition, Baum and Wally (2003) confirmed this claim that the fast strategic decision-making improves the growth and profitability of the company. According to this study, it was assumed that the fastest decisions improved competitive performance through the environments. The rationale for this assumption was that the fastest decisions led to the immediate successful adoption of new products or improvement of the models that provided competitive advantages. Quick selection of these effective technologies is even beneficial for achieving organizational success in the case of established industries. Innovation performance reflects the company's ability to become a leader in the industry. Finally, strategic decision-making speed and innovation performance are related in most organizational situations. It should be noted that performance has many factors among which innovation performance has been evaluated in this study. In total, researchers have achieved identical results related to the role of decision-making speed in innovation performance, which is also consistent with the results of this study.

Table 6.  
One-sample T-test

	<i>t</i>	df	Sig. (2-Tailed)	Std. deviation	Std. error mean	95% Confidence interval of the difference	
						Lower	Upper
Communication	74.165	65	0.010	0.43318	0.05332	3.8481	4.0610
SDP	51.800	65	0.000	0.54702	0.06733	3.3534	3.6224
Performance	46.190	65	0.002	0.61915	0.07621	3.3680	3.6724

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According to the results of the study that indicate communication has a positive effect on the strategic decision-making speed, it is recommended that executives strive to properly communicate their own expectations and intentions to their employees to ensure that further possible coordination of organizational performance will be more likely, which will allow for the alignment of individual goals with that of organizational goals.

Hence, research that has characterized the elaboration of food purchase decisions reveals established customer requirements for low prices, product variety and expanded choice (Costa and Jongen, 2006). In turn, the food-manufacturing necessity for the application of innovations is regularly driven by both consumers (shoppers, retailers, food service providers) and regulatory pressure. Consequently, the capacity to empower innovation in the food sector has become limited by a reduction in research investment and diminished accessibility of competencies in the food industry (UK Cabinet Office Strategy Unit, 2008a, b). As a result, organizations need to manage business relationships effectively in order to stay competitive (Zaefarian *et al.*, 2016). Business connections have positive performance impacts on critical administrative aspects such as innovativeness (Muller and Zenker, 2001; Rindfleisch and Moorman, 2001), the reduction of operating costs (Cannon and Homburg, 2001; Selnes and Sallis, 2003) and ultimately on company profitability (Fang *et al.*, 2008; Palmatier *et al.*, 2007). An effective future food system must create activities that defeat these obstructions to empower food science-led innovations (Martindale and Swainson, 2008). It implies that innovation and making strategic decision play a pivotal role in the food industry. Furthermore, making strategic decisions have been discussed as a means of creating competitive advantages and upgrading mid-term firm innovation performance (Ashton *et al.*, 1994; Rohrbeck and Kum, 2018) that to recharge or create a competitive advantage, many firms create ideas by survey and acquire strategic resources independently or through collaboration and communication (Makadok and Barney, 2001; Schwarz *et al.*, 2019).

Time preferences drive choices in numerous economic contexts. In order to understand the fundamental decision procedure, it is vital to distinguish what influences these preferences in various circumstances (Lindner and Rose, 2017). A few investigations locate a critical impact of time pressure on the decision-making process in different experimental settings (Karagözoglu and Kocher, 2018; Kocher and Sutter, 2006; Rand *et al.*, 2012; Sutter *et al.*, 2003; Tinghög *et al.*, 2013; Tinghög *et al.*, 2016; Spiliopoulos and Ortmann, 2016; Mahmoud-Jouini *et al.*, 2004).

Finally, about communication in the food industry, a management team with an effective communication acquires a better understanding of the customers and employees' needs and clearer lines of communication with management. The outcome may be both a better portfolio of services and improved morale. Since the relationship between strategic decision-making speed and innovation performance has been confirmed, it is suggested that in order to improve innovation performance, quick decisions should be made. For achieving this, it is proposed that information systems in the organization should be optimized and strengthened, and the executives should try to cultivate a culture in an organization, which inhibits the transmission of rumors and misinformation. In another words, this study makes the way for further studies to conduct a research in the field of culture and making fast decisions or boosting innovation performance; their possible direct or indirect relationships we do not know yet owing to lack of any scientific researches or evidence; hence, further studies should examine the role of culture in communicating effectively to be more innovative. For example, future research can study the practice of communications in organizations or countries with different cultures. In addition, they should pay attention to four types of organizational culture, namely, clan, adhocracy, market and hierarchy, and then should classify four types of culture in every company to get better results. The results of the study proved that communication has a positive effect

on innovation performance. In this regard, it is suggested that communications must occur in a fashion that provides a framework for the exchange of information and ideas, so that innovation and innovation performance in organization may be improved. Finally, with regard to the verification of the hypothesis that communication has a positive impact on innovation performance through strategic decision-making speed, it is recommended that the process of effective communication in organization should be practiced on a widespread basis, even within the business processes. Establishing appropriate expectations of employees and communicating correctly with them would further lead to speeding up their decisions and improving their innovation and performance.

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