

FACTORS AFFECTING INNOVATION: A CONCEPTUAL FRAMEWORK

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ABSTRACT

This paper will examine the research on innovation and attempt to identify the factors that affect innovation. Three perspectives will be used to discuss the literature, and will be modified to include one more perspective, the environmental characteristic perspective [30]. Based on the literature review, innovation will be divided in three perspectives, namely, the individual characteristics perspective, the organizational characteristics perspective, and the environmental characteristics perspective. This paper will also conduct a literature review to investigate the relationship between organizational innovation and size. Further research directions in the field on innovation will be suggested.

INTRODUCTION

“The most consistent theme found in the organizational innovation literature is that its research results have been inconsistent” [41, p. 405]. The lack of agreement among researchers with respect to innovation and other organizational variables is obvious from the previous statement. The lack of clarity may be attributed to the various conceptual and methodological factors [41] such as different definitions of innovation, different measures of size of the organization [10], different stages in the innovation process [13], and types of organizations used in the studies. To avoid confusion regarding the definition, we will define innovation as “the adoption of an idea or behavior, whether a system, policy, program, device, process, product or service, that is new to the adopting organization” [10, p. 376]. This definition seems to encompass a broad range of activities associated with innovation. This study will utilize a broad definition of innovation which will allow us to investigate the literature with a broader outlook.

PURPOSE

The two main objectives of this study are:

1. to examine the different perspectives in the current literature on innovation and
2. to examine the innovation and size literature and the inconsistencies in the results.

The reason for studying these two areas (perspectives and innovation/size relationship) is due to the incompatibility in the results of studies in these areas. The following section of this paper will examine the different perspectives on innovation and propose a framework which will utilize the different perspectives. This discussion will allow the reader to discern the different approaches taken by authors in innovation research. The literature review on innovation perspectives will separate the studies reviewed based on one of the following perspectives: individual characteristics, organizational characteristics, and environmental characteristics. The section on perspectives on innovation will be followed by a review of the literature that examines the relationship between innovation and size. It is important to study the relationship between size and innovation due to the

emergence of small, technology-oriented organizations that contradict the traditional assumptions of size–innovation relationship.

PERSPECTIVES ON INNOVATION

In the early 90s three perspectives were developed to explain the diffusion and rejection of innovation [1]. The three perspectives were the forces-selection perspective, the fad perspective, and the fashion perspective. Before Abrahamson’s work the efficient-choice perspective was the dominant perspective which claimed that organizations rationally adopt technically efficient innovations. Abrahamson believed that claim to be insufficient in explaining the diffusion of technically inefficient innovations or the rejection of efficient innovations [1].

Slappendel discussed innovation in terms of three perspectives [35]. These perspectives, originally defined by Pierce and Delbecq [30], were the individualist perspective, the structuralist perspective, and the interactive process perspective. The individualist perspective suggests that innovations are caused by individuals and are simple linear progressions, whereas the structuralist perspective states that innovation is determined by the structural characteristics of an organization. The interactive perspective considers the interaction between individuals and structural characteristics as a cause of innovation. This study will focus on three perspectives, with an addition and deletion of one of the perspectives. This paper will focus on the environmental perspective, considered to be important by current researchers [20] [25] instead of the interactive process perspective. Pierce and Delbecq failed to mention externalities or external environmental characteristics as a determinant of innovation [30]. However, this paper will also include studies that discuss innovation due to environmental changes.

Individual Characteristics Perspective

Individual characteristic perspective posits that individuals in the organization cause innovation. Amabile et al. stated that “creativity by individuals and teams is a starting point for innovation” [4, p. 1155]. The authors also mention the importance of supervisory support, along with top management commitment, to create an environment of creativity. The literature on leadership offers ample proof that certain types of leaders (transformational) are more likely to take risks and innovate. Shin and McClomb found that leaders who portrayed a visionary leadership style were related to innovation frequency [34]. According to Shareef, neither transformational nor administrative leadership style is effective for innovative organizations [33]. Shareef suggested a new leadership theory known as ecovision theory, which views leadership as a merger between two distinct components: “the ecological perspective with emphasis on holistic relationship between the organization and the environment, and the ability to produce and renew realistic identities that enhance the environmental context in which organization functions” [33, p. 52]. Hence:

P₁: Innovation in organizations depends on leadership style.

Nohria and Gulati discussed the degree of internal control and stated that it was related to the organizational culture and leadership styles of the leaders in the organization [29]. Hitt et al. conducted a study to propose that there is a trade-off between growth through acquisition and managerial commitment to innovation [19] [20]. The authors suggest that the need to innovate decreases when an organization acquires or is planning to acquire in order to grow. It was found that

acquisitions are used as substitutes for innovation because of the risk involved in pursuing innovation and the trade-offs concerning resource allocation. Managers are also likely to exert tremendous amounts of energy during the acquisition process, which results in a lower likelihood of pursuing risky innovative projects that require top management approval. Hence:

P₂: Innovation in organizations is inversely related to integration and diversification strategies.

Organizational Characteristics Perspective

Organizational characteristics perspective states that innovation is caused by one or more organizational variables, such as size. A study by Kimberly and Evanisko had concluded that organizational variables are better predictors than environmental or leadership variables [24]. Nohria and Gulati conducted a study to examine the relationship between slack, which is considered to be an organizational characteristic, and innovation in multinational firms [29]. Nohria and Gulati stated that the relationship between slack and innovation is inverse U-shaped [29]. The authors believed that an intermediate level of slack is optimal for innovation, anything more than that or less than that level of slack will be detrimental to innovativeness of organizations. Their results supported their hypothesis, which stated the inverse U-shaped relationship between slack and innovation. Starpoli discussed the emergence of network organizations and their impact on organizational innovation [37]. The development of biotechnologies was responsible for the emergence of network organizations in the pharmaceutical industry. It is interesting to note that innovations in biotechnology caused the structural change in organizations from traditional hierarchical organizations to networks organizations. Conversely, Millar et al. believed that information and communication technologies caused the evolution of innovation based on the “technology fusion” [28, p. 399]. Hence:

P₃: Innovation in organizations is related to its structure.

Another organizational variable that affects innovation is the organizational culture. According to Harrison, market-oriented organizations are more likely to innovate as opposed to the clan oriented cultures [18]. Bureaucratic cultures are the least innovative [18] and tend to be risk averse. Hence:

P₄: Innovation in organizations is related to its culture.

Environmental Characteristics Perspective

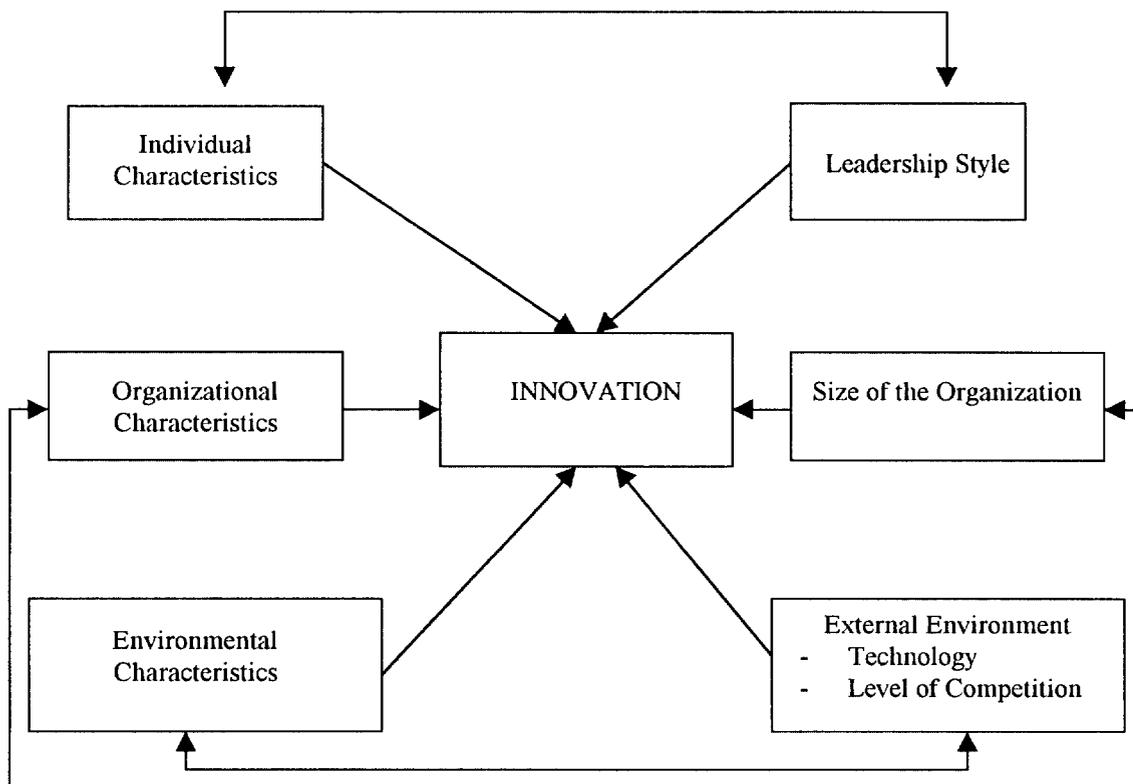
This perspective claims that innovation is caused by shifts in the external environment. Hitt et al. proposed that acquisition had a negative effect on R&D at the corporate level [20]. The authors stated that maybe firms choosing the acquisition method of growth tend to acquire firms that operate in less-intensive R&D environments, thus proving the original point that managerial commitment for innovation is reduced for such firms. However, Lawless and Anderson stated that organizations that lagged in creating innovative products or services do not necessarily experience a decrease in performance because of their ability to compete on a price in a niche characterized by an earlier technology generation [25]. According to Marcus, organizations innovate when they face threats from the external environment [27]. Marcus suggested that this approach be known as the

externally induced innovation approach [27]. Marcus proposed that organizations which respond with rule-bound behavior perpetuate their poor performance, whereas organizations which retain their autonomy reinforce their strong performance [27]. Marcus stated that there are two types of organizations, those that wait until the actual change is required or where the change is based on the rules of the external body are likely to have poor performance and those that organizations that customize what the external body requires or implements the change before it is necessary are likely to perform better [27]. Organizational cultures that are more open to innovations are usually more autonomous (proactive), whereas cultures that are risk averse are generally more rule-bound (reactive). Hence:

P₅: Innovation in organizations is positively related to the volatility of the external environment.

Spender and Kessler stated that innovation is caused due to uncertainties in the external environment [See Figure 1], however, the innovation process is an internal phenomenon [36]. Wade suggested that government policies with respect to entry into the market could play an important role in the level of technological diversity in the industry [39]. The author stated that industries in which entry is restricted by government might experience drops in the rate of innovation.

Figure 1
Factors Affecting Innovation



A few of the studies discussed above investigated the relationship between innovation and other organizational variables [See Fig. 1 above]. One such important relationship is the one between innovation and size. With respect to organizational variables, researchers have considered the relationship between size and other variables to be important [5] [14]. The following section will examine the literature on innovation and size.

INNOVATION AND SIZE

Innovation literature is not only diverse with respect to the four perspectives in the previous section, it is also diverse and contradictory when it comes to the relationship between innovation and size. The reason for the differences in results might be the effect of moderators in that relationship. In 1992 Damanpour conducted a meta-analysis to review the relationship between innovation and size [10]. In this study moderators in the relationship between innovation and size were identified. The results of Damanpour's study indicated that there was a positive relationship between innovation and size in manufacturing and profit making organizations [10]. The study also indicated, however, that the relationship was weak in service and non-profit making organizations. Damanpour used the following criteria for the study [10]:

- The dependent variable was the rate of adoption of innovations
- The level of analysis was the organization

Damanpour identified 20 empirical studies (18 articles and 2 books) that conformed to the criteria mentioned above. The moderators for the study were type of organization, measure of size, scope of innovation, type of innovation, and stage of innovation. There are several studies that found a non-significant relationship between size and innovation [3] [22] and others that found a negative relationship between size and innovation [16]. Researchers have argued that size facilitates the adoption of innovation in organizations due to a presence of slack [29], research capabilities, and marketing skills. Slack allows large organizations to experiment and lose money during the innovation process and yet continue the research. Large organizations also have the resources, financial and physical, necessary to conduct experiments necessary for innovation. Kimberly and Evanisko stated that administrative innovation, which is related to the administrative component of the organization, is affected by size because the larger the size the larger the administrative component of an organization [24].

Brynjolfsson et al. conducted a study to investigate the role of information technology on organization size [6]. The authors considered information technology (IT) as a form of innovation, because with the implementation of information technology, organizations involve themselves in adoption of new processes, methods, or techniques. The authors hypothesized that investment in IT will significantly reduce size of the organization and found that investment in IT is significantly associated with subsequent decreases in the average size of the firm. The study also concluded that the decreases in the size were typical after 2 or 3 years since the IT investment. This study contradicts a number of studies which state that size should increase with innovation [10]. Fiol, however, agreed with Damanpour and other researchers that large organizations prove to be better innovators [12]. Fiol stated that there has to be contradiction among researchers in organizations in order to be creative [12]. Large organizations, according to Fiol, provide a productive environment needed for the development of creative thought and action [12].

Hitt et al.'s study also had an interesting commentary on the relationship between size and innovation [19]. The authors discussed Schumpeter's hypothesis that large firms tend to be more

innovative than small firms [32]. Other researchers have suggested that large size does not necessarily provide the incentive to be more innovative [26].

Large firms tend to spend twice as much on R&D patents than small firms, whereas small firms utilize greater proportions of their patents than do large firms [31]. Thus the assumptions made by Schumpeter in 1961 may not hold true for all large organizations. Collier, who stated that there is an inverted U-shaped relationship between firm size and innovation, provided another argument against Schumpeter's assumption [9]. Collier mentioned that as maturity of organizations increase due to increase in size, the rate of technological change slows due to high levels of formalization [degree of control discussed in 29] [9].

Hannah and Freeman stated that increase in an organization's size causes innovation to increase only to a certain point beyond which passivity sets in and the organization becomes unresponsive to change [17]. Dougherty and Hardy believed that the inability of the innovators to solve the innovation-to-organization problems caused the passivity [11]. Williamson argued that large organizations are better at manufacturing and marketing new products to the marketplace, whereas small firms are more efficient at developing innovations rather than manufacturing and marketing them [40]. Child posited that larger organizations are more bureaucratic and formalized [8]. Bureaucracies develop a less hospitable environment for innovation, according to Kamien and Schwartz [23].

Despite the assertion by many researchers that innovation and size are not positively related, Damanpour's meta-analysis indicated a positive and statistically significant relationship between organizational size and innovation [10]. Damanpour concluded that types of organizations moderate the relationship between size and innovation. Stage of adoption was also statistically significant, suggesting that it acts as a moderator between the size-innovation relationship. Types of innovation did not display significant differences and therefore was not considered to be a moderator. The measure of size and scope of innovation also displayed statistically significant differences and were considered to be moderators. Overall, Damanpour stated that other than types of innovation, all other moderators were effective in distinguishing between subgroups. In conclusion, Damanpour warned readers that some of the studies used in the meta-analysis are based on few correlations and a small sample size. Damanpour also suggests that researchers should conduct more meta-analytical studies on innovation in order to incorporate new literature and increase the pool of knowledge in this area [10].

There were a number of studies not included in the meta-analysis by Damanpour and not discussed in management journals that discussed the issue of innovation and size. Chandrashekar and Sinha conducted a study which studied two dimensions of innovation: timing of adoption and volume of adoption [7]. Firm size did not affect the timing of adoption, however, firm size did matter when timing and volume were used together in the model. This study confirmed Schumpeter's theory that large and bureaucratic organizations adopt more innovations, but take a longer time to do so. Large firms tend to be more innovative than small ones based on resource availability, which usually favors large firms. Tannenbaum and Dupuree-Bruno also found that large firms are more likely to innovate in their human resources (HR) practices [38]. The authors suggest that large organizations need efficient and effective HR practices and hence the higher level of innovation. Gifford found that innovation in small, young firms is higher than in large, old firms [15]. Acs and Audretsch took a unique stance on innovation and size [2]. They stated that in a given industry, small firms have to be more innovative than the large ones in order to remain competitive in the market. The authors state that "the greater extent to which an industry is composed of large

firms, the greater will be the innovative activity, but that increased innovative activity will tend to emanate more from the small firms than from the large firms” [2, p. 687]. Hence:

P₆: Innovation in organizations is positively related to its size.

CONCLUSION AND FUTURE RESEARCH DIRECTIONS

Due to increase in competition and trade, organizations found it necessary to innovate in order to be successful. The emergence of small, technology-oriented firms also makes it important to understand the relationship between innovation and size. The current trend in organizations is to get lean and mean in order to be more efficient and effective in the utilization of their resources. Future research needs to focus on the smaller organizations as well as large organizations that have downsized, restructured, and/or reengineered in order to improve performance. Another important area of research is in international or global organizations. Despite the absence of international studies on innovation in this paper, it is imperative that researchers focus on innovativeness of organizations in the global arena [10] [21]. The author of this study also felt the need to conduct more international research based on the lack of articles that examined the relationship between innovation and size internationally.

Damanpour also suggested that more meta-analyses need to be conducted with innovation and size [10]. The innovation process can be better understood and studied with the help of longitudinal studies. The effect of innovation on size or vice-versa can be measured with longitudinal studies. Despite the difficulties in conducting a longitudinal study researchers may need to conduct them with the help of corporate sponsors, if necessary. Developing a standardized measure of size will go a long way in reducing the confusion in the results. Standardization will allow meaningful comparison of results among studies.

The field of management is extremely situational and discovering perfectly “universal” theories is nearly impossible in management. The field of innovation is so broad and complex that consistency is next to impossible in this field. Maybe consistency will dampen the debate that has kept the research and dialogue current. Fiol stated the importance of contradictions for creative action in the innovation process [12]. Maybe the same logic applies to research in this field. Contradictions among researchers will enhance the quality of the research and increase the scope of innovation research.

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