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The Creativity Stimulus, Creativity Capacity, and Creativity Performance: The LISEREL Model

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Abstract. This paper examines aspects of creativity management by modeling the creativity stimulus–creativity capacity relationship in determining creativity performance. The research framework developed in this study was tested amongst 204 managers of Iranian privative institutes. Three standard questionnaires for creativity stimulus, creativity capacity, and creativity performance were used. The validity of the instruments was confirmed by researcher-made questionnaire which was design base on Likert measurement system. The survey responses indicate that both the relationship between creativity stimulus and creativity capacity and between creativity capacity and creativity performance are significant and strong. However, creativity stimulus does not show any direct effect on creativity performance, suggesting that its effect is mediated through creativity capacity. The overall practical implication that can be drawn from the findings is that to achieve high creativity performance, organizations first need to develop the behavioral and cultural context and practices for creativity (i.e., stimulus), and only within such conducive environments is it possible for organizations to develop creativity capacity in research and development and technology so as to more effectively deliver creativity outcomes and performance.

Keywords: Creative Stimulus, Creativity Capacity, Creativity Performance

1. Introduction

1.1. Technology and creative

Technology features as an integral driver of creative. Theoretical and empirical studies show that technology not only plays a key role in creating new products or processes, but at key points of punctuation it changes the fundamentals of industry structure by radically redefining 'the rules of competition'.

1.2. R&D

R&D also plays an integral role in creative since it functions as the technological 'gatekeeper' in the organization (Jankowski, 1998). As is the case for technology, R&D's role in determining creative performance is not confined to manufacturing but applies equally to the service industry (Sirilli and Evangelista, 1998; Chiaromonte, 2002).

1.3. Human factors of creative management

Effort should be directed towards managing people for creative, and this effort should primarily be directed towards creating and maintaining an environment that supports creative so that people are not only 'willing' (i.e. motivated) to create but also 'can' (i.e. have opportunities) create (Kanter, 1983; Woodman et al., 1993; Claver et al., 1998).

Relationship between technological and human factors of creative management in determining creative performance

In the context of this study, based on the arguments made by Klein and Sorra (1996), we hold that technology and R&D management only effectively produce beneficial results, in terms of product and

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process creative, when complemented by an organizational culture and practices conducive to creative effort (i.e. stimulus).

As eluded earlier, the objectives of this study are, first, to examine the relationship between the technological and human factors of creative management in determining creative performance.

In this way, we argue that stimulus factor of creative plays a role not only in creating an organizational environment for developing creative capacity but also as the factor that, by itself, produces creative. In other words, creative capacity only partly mediates the impact of creative stimulus on creative performance.

In order to articulate the relationships captured in the research framework, three hypotheses were developed as follows:

Hypothesis 1: There is a significant relationship between stimulus factors and capacity factors of creative management.

Hypothesis 2: There is a significant relationship between capacity factors of creative management and creative performance.

Hypothesis 3: There is a significant relationship between stimulus factors of creative management and creative performance.

2. Source of empirical data

Empirical data were obtained through a random survey in 2010 of 204 managers, most of whom were senior managers who had knowledge of past and present organizational practices relating to quality and creative related aspects in the organization. The sample was selected randomly from the Iranian Organization database that encompasses various industry sectors, including both manufacturing and non-manufacturing sectors. The focus of this study was limited to one site (or plant) per organization. A total of 103 managers responded, while 150 questionnaires were returned to the researchers with return to sender (RTS) messages, indicating that the addresses were no longer valid. By discounting the number of RTS mails, the final response rate accounted for 22.8%..

2.1. Operationalization and reliability of constructs

2.2. Technology management

In the context of strategic creative, typical technology management practices include the following practices: systematically monitoring trends in existing technologies and identifying emerging technologies, assessing competitors' technological capabilities, building a core competence based on technological capabilities, and choosing sources of technologies, such as in-house R&D, licensing, partnering, and external alliances (Burgelman et al., 2004).

2.3. R&D

The R&D construct was developed by selecting several key elements in R&D practices identified in the study by Gupta et al. (2000), and also complemented by variables from the technical creative audit by Chiesa et al. (1996). Gupta et al. (2000) stress two major aspects of R&D management: capabilities and linkages. As such we define the scale to measure R&D practices within a firm by including the capacity to handle truly creative and leading-edge research

2.4. Leadership and people management

The scale used in the study for developing the constructs of leadership and people management in this study was one proposed by Samson and Terziovski (1999). Samson and Terziovski derived the content of their constructs from the criteria of Malcolm Baldrige National Quality Award (MBNQA) that is recognized as the best practice model of management of firms in Iran.

2.5. KM and creativity

The scale for KM was developed based on the key elements of KM practices as discussed in the literature review section. These practices can be summarized to include the following areas of systematically managing knowledge: facilitating knowledge-related activities such as creation or assimilation of knowledge,

transferring knowledge across the organization, maintaining the knowledge infrastructure, and leveraging knowledge assets to realize their value (Leonard-Barton, 1995).

2.6. Creative performance measures

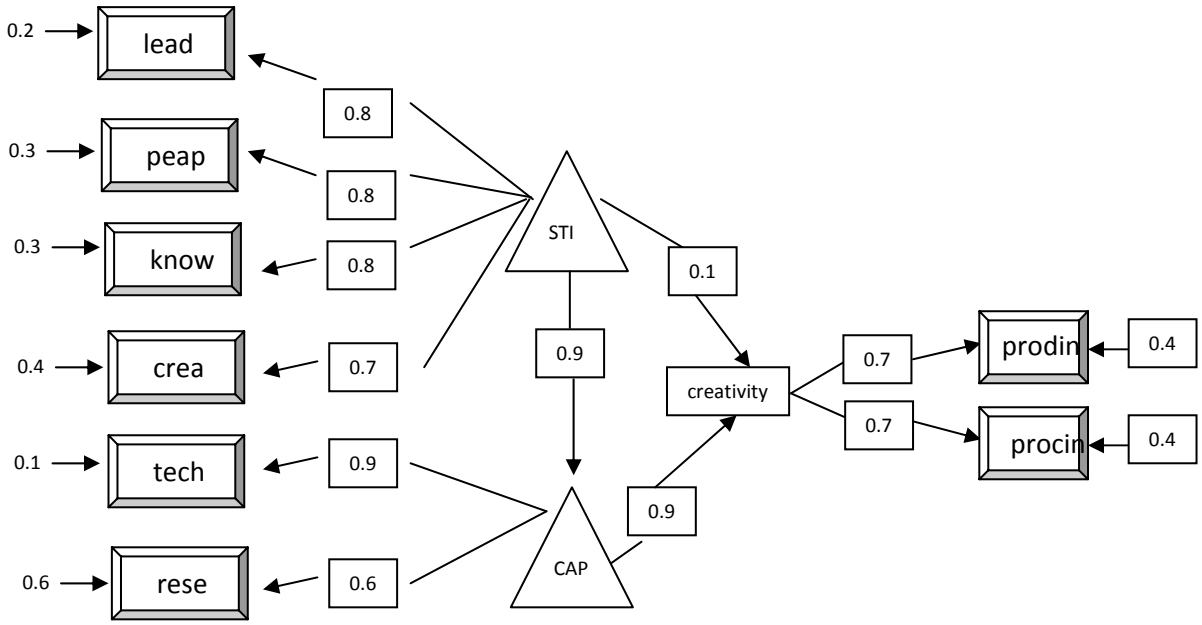
To comprehensively capture the varied aspects of creative performance, this study built the construct for measuring product and process creative on the basis of several criteria that were conceptualized and used in previous empirical studies of creative, such as Desponded et al. (1993) .

3. Data analysis

3.1. Data reduction

As a first step, data reduction was conducted to convert the items in each scale into a single composite score, following the method employed in the study by Flynn et al. (1994), Samson and Terziovski (1999), and Meyer and Collier (2001). The eight scales showed were subjected into principal component analysis to examine their unidimensionality. The result supports the validity of these eight scales as indicated by their variance explained which exceeds 50% and the loading factors of all items within each scale exceed 0.5 (Hair et al., 1998). The reliability analysis was conducted by calculating the Cronbach for each scale. The result shows that the Cronbach a measures for the eight constructs surpass the threshold point of 0.7, suggested by Nunnally (1978). During this process, none of the items were deleted from its latent variable.

Figure 1. Full structural equation modelling (SEM).



3.2. Relationship model testing and discussion

The SEM method was employed to examine the two stages of relationship between stimulus factors of creative management (labelled STIM), and the technological capacity for creative management (labelled CAPA), and creative performance (creative). The execution of the SEM showed that at the overall level, the model showed an acceptable fit as indicated by the goodness of fit indices. The values of Tucker–Lewis index (TLI), Comparative fit index (CFI) and Bollen's fit index (NFI) exceed the cut-off value of 0.95, and the value of root mean square residual (RMR) is below the cut-off values 0.08 suggested by Hu and Bentler (1999).As SEM estimates simultaneously both the measurement model and structural relationship of the research model, the results also validate the three latent variables of stimulus (STIM), capacity (CAPA), and creative performance (creative). This is confirmed by the values of their construct reliability which are above 0.5 (0.89, 0.75, and 0.71, respectively) as suggested by Hair et al. (1998). In terms of the structural relationship, the results indicate that the relationship between stimulus (STIM) and capacity (CAPA) is statistically significant (Po0.01) and strong (path coefficient¼0.70), and hence supports Hypothesis

1. The relationship between capacity (CAPA) and creative performance (creative) is statistically significant (Po0.01) and strong (path coefficient¼0.69), and hence supports Hypothesis 2. On the other hand, the direct relationship between stimulus (STIM) and creative performance (creative) was statistically insignificant. Hypothesis 3 therefore is not supported. These three findings suggest that the relationship between creative stimulus and creative performance is fully mediated by creative capacity. In order to confirm this result, a competing model was run where the direct path between STIM and creative was deleted. The assumption behind this test was that the second model would suffer a poor fit (larger w2 value) if STIM should have a direct effect on creative. The result, as shown by the nonstatistically significant difference of the w2 values (36.98 and 38.82) between the two competing models, suggests that deleting the STIM–creativity path does not make the model inferior, and hence confirms the full mediation of CAPA. These results provide clarification and understanding of the role of 'organizational or cultural context' as a fundamental enabling stimulus factor in determining creative performance. The findings do not mean that these 'soft' factors do not have a significant value in producing creative, but point to the fact that their effect on creative performance is realized through the 'hard' aspects. The LISREL output shows that the indirect effect of stimulus (STIM) on creative performance (creativity) is reasonably strong 0.45 at Po0.01. This two-staged link confirms Fiol's (1996) argument that only after sufficiently absorbing knowledge can firms 'squeeze' their resources to yield creative outcomes. At the same time, the strong relationship between stimulus and capacity as proposed in this study suggests that organizations that excel in creating an environment and developing behaviours and practices supportive to creative are also likely to excel in building capacity and competence to creative. Creative capacity is subsequently responsible for generating the highly desired performance outcomes. The overall practical implication that can be drawn from the findings is summarized in a sequential form as follows: to achieve high creative performance, organizations first need to develop the behavioural and cultural context and practices for creative (i.e. stimulus. As mentioned earlier, one group of creative studies has focused on examining Hypothesis 2 (i.e. the Relationship between technology/R&D and creative performance), and another group of researchers has examined Hypothesis 3 (i.e. the relationship between organizational context and creative performance In this study, Hypothesis 1 (i.e. STIM leads to CAPA) helps reveal an answer to this by indicating that an excellent creative stimulus is likely to be demonstrated in an excellent capacity. This proxy, therefore, provides evidence for managing the output of 'soft' organizational elements. Why is this issue so important? We argue that from a risk (and cost) point of view, managing the 'soft' area is actually much less risky and more likely to produce performance results in the long run than concentrating on the 'hard' area, even though a voluminous amount of literature maintains that managing cultural change is more difficult than bringing in new technologies. The logic for this argument stems from the finding that the stimulus (or soft) factors are determinant of hard factor effectiveness (i.e. creative capacity). Therefore, if firms continue to perceive soft factors as difficult or beyond the scope of managerial effort and dedicate their effort to building success purely through acquisition or development of technology and R&D they are not likely to reap full benefits from their investments. Yet, on the other hand, if they simply focus their energy on the soft aspects without a directed focus (stimulus) on the 'hard' aspect (i.e. creating a creative capacity) they may find few or no performance outcomes. This issue is reinforced by the findings of Hypothesis 3, in which stimulus does not directly produce creative. However, we believe that the relationship between STIM and creative would have been found to be significant had it been tested in isolation or exclusively (as found in previous studies that have examined the relationship in isolation). By linking Hypothesis 3 with Hypothesis 1, we can see that positive stimulus enhances creative capacity and through it creative performance. Therefore, by inclusively testing the impact of these parameters on creative a more rounded picture of practice in reality was appropriated. The evidence from this study suggests that in order to fully leverage creative outcomes requires effort that directs and integrates the creative stimulus with creative capacity. Put simply the human factors of the organization must be managed in a focused and directed way (creative stimulus) to produce the necessary creative capacity.

4. Conclusion

This study has examined a mediating model of the relationship between organizational stimulus and organizational capacity for creative and creative performance articulated in three hypotheses. Two hypotheses were supported by the empirical data in which there were significant relationships between stimulus and capacity, capacity and creative performance outcomes. The results did not support the direct relationship between stimulus and performance, suggesting that creative capacity fully mediates the relationship between creative stimulus and creative performance. Several limitations are acknowledged here. From a methodological point of view, this study is limited by self-report nature of the data that relies entirely on the perspective of one person. Several other limitations outlined below could be used to provide directions for further research on this topic. First, this study is focused at the organizational level, not at the individual level as the locus of creative, and therefore it only examines what managers can do in terms of creating conducive environment to accommodate and facilitate creative behaviour of the individuals in the organizations. Second, in relation to the previous point, the variables incorporated in the study were deliberately kept narrow to facilitate testing, and therefore further studies investigating the complexity of 'hard' and 'soft' aspects of creative management could incorporate more explanatory variables, including control and moderating variables such as business environment. Third, this study does not prescribe the 'how' issues in changing the managerial practices that lead to the organizational and cultural context described in this study although, as mentioned in the early parts of this paper, we believe that major changes are usually driven by top management.

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