

Uncertainty and Managers' skills in Industrial Innovation Processes

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Abstract. In the manufacturing industry, there is a strive for innovative processes. This study puts the focus on the successful implementation of innovation projects in the manufacturing industry. The study identifies the interrelationships between two dimensions: management skills and change management of innovation projects implemented in an industrial organization and technological uncertainty. Innovation can be achieved through small steps (incremental innovation), i.e., minor improvements to current products, services, processes, and business models. The necessary skills for successful organizational change and how managers can acquire them are provided. The literature review dedicated to this subject emphasizes the relationship between an innovation project's success and managers' skills within the industrial organization. In this study, we have narrowed this dimension to the manager's communication abilities. The data analysed were collected from Israel and Romania. We want to analyse the role human resources departments manage skills acquisition in the organisation, as well as the role of manager's communication skills in innovative cases. The data from 275 Israeli project managers, mainly from innovative projects, was collected using a validated questionnaire. Data from Romanian 48 industrial companies was collected using questionnaires distributed to 67 managers from all hierarchical levels. We found that management skills are correlated with innovation and its success; communication skills are acquired through non-formal learning methods. The skills of managers are highly correlated with success, especially under high levels of technological uncertainty.

1 Theoretical framework

"High-performance organizations have learned how to lead, motivate, and reward employees"[1]. There is a widespread acknowledgment that change initiatives strongly depend on people's skills and involvement as key factors in innovation processes. The concept of innovation synthetically defines the introduction of the new. This purpose's actions are part of man's life- finding and introducing the new representing the main factors that have determined humanity's evolution throughout its existence. The importance and volume of these activities have increased along with the development of society. Especially

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in recent decades, there has been a phenomenal increase in interest in innovation to achieve sustainable economic growth of organizations and society. Organizations can influence and develop individual abilities and behaviours and innovation-friendly skills through HRM activities. Their goal is finding, engaging, and stimulating talent for innovation, developing staff creativity and innovation skills, promoting entrepreneurship and rewarding performance, creating a culture favourable to innovation, etc.

The link between human resource management and organizations' innovation performance is a subject analysed by many publications, especially over the last decades. In the 1990s, many studies focused on "new practices in human resource management" - a global label on a series of changes relating to organizing working relationships (including teamwork, decentralization of leadership, and empowering employees), continuous learning, access to information, dissemination of internal knowledge, performance rewarding, etc. [2-4]. These practices have rapidly spread, becoming the distinctive elements of modern management, essential for the efficient use of human resources and adaptation to the requirements of a flexible organization in continuous learning [5]. According to Nielson, "employee-related issues the human dimension of innovation systems 113 is a part of the innovation system and, from this perspective, competence development and learning are important" [5, 6] found a set of personality traits that may lead to better success under innovative and technological uncertainty conditions.

In this article, innovation is considered a fundamental and indispensable element in organizational change. It has long been recognized that companies need to continually innovate to remain at the forefront when it comes to competitiveness. The continuing nature of contemporary change highlights several difficulties in managing the change process and, managers, in particular, need to develop skills in change management [7]. Specialized literature presents various outcomes that highlight communication as a critical factor in a successful organization's successful change.

There is no standard definition to explain change communication, but organizational change is perceived as a communication issue [8]. According to [9], the frequent failure of organizational change [10] results, in part, from inappropriate organizational communication strategies and tactics. [11] defines organizational communication as "The process by which information is changed and understood by two or more people, usually with the intent to motivate or influence behaviour." Communication is the process on which the initiation and maintenance of organizational changes depend. Finally, any change's success depends on how the strategy and substance of that change are communicated to those who are the target of that change. [12] says, "communication of the technological idea should not be a process of communication or information, but a mutual process of exchange of ideas, thoughts, and sharing of anxieties, fears, and reserves."

Change communication is the instrument used to build, deconstruct, and rebuild existing realities to make changes [8]. Today's managers' implications are that, to develop communication skills, they need to change the way they communicate rather than communicating change [9].

[9] conclude that the development of "soft skills" remains of paramount importance in management development literature. Consequently, managers are urged to develop communication skills to minimize sabotage situations at work and develop skills in inspirational communication. Unfortunately, many managers do not understand it, and even fewer of them learn how to communicate effectively. The learning process of communication begins with the awareness that communication is a key element for implementing successful innovation.

Different authors describe the various skills needed for successful communication during the change:

- Proper use of language.

- Encouraging feedback.
- Active listening.
- Developing a climate of confidence.
- Influencing others.
- Understand communication channels.

2 Research methodology

The empirical study has been designed to identify the communication skills needed to implement innovation and to achieve organizational change successfully and find the most effective way to acquire them.

Four research hypotheses were formulated:

1. Communication skills correlate with the success of innovation.
2. Communication skills are acquired through non-formal learning.
3. Communication skills are correlated with the existence of a human resource management system.
4. The higher level of innovation leads to higher levels of communication of managers.

According to the proposed goal, the questionnaire was conducted in industrial companies in Alba County that implemented innovation processes. They were chosen by industry experts that could categories companies in the region according to their level of implementation of innovation processes. The survey was addressed to managers from all hierarchical levels and was distributed to 89 companies. Sixty-seven answers from 48 companies were received back. Data from 275 Israeli innovative projects regarding their success, the degree of technological uncertainty and communication extent of the managers was available for this study. The collected data were analysed using the SPSS software package. We want to analyse the role human resources departments manage skills acquisition in the organisation, as well as the role of manager's communication skills in innovative cases.

The questionnaire included four sections:

Identifying the skills needed for innovation and identifying significant communication skills for achieving change through innovation.

Identifying the role of human resources development programs in the process of learning abilities

Recognizing the link between communication skills and change management.

Since we want to address the four hypotheses, we separate the analysis of the Romanian data from the Israeli data. Consequently, we can be indifferent about questions regarding culture differences and communication.

3 Results

The Romanian companies included in the research are industrial SME's (92%), and the remaining 8% are large enterprises. The empirical distribution of the organizations in the study by their number of employees is: 8% of enterprises with less than ten employees, 25% of enterprises with a total number of employees ranging from 10 to 49, 59% of enterprises with 50-249 employees and 8% of large enterprises (over 250).

Respondents ranked as follows regarding management positions: 35% middle, 36% first-line and 19% top managers. Regarding the age group 12% are between 23 and 30 years old, 21% between 31 and 40 years and 66% over 40 years.

The 275 innovative Israeli projects are in the area of software (34.5%), Government (25.1%), Engineering (16%), Communication (13.5%) and others.

To explore the skills required for innovation in the company, and in particular the significance of communication skills, 25 abilities were listed in the questionnaire. Respondents assessed the importance of each skill and the results showed that communication skills were not recognized as essential for implementing innovation. The table below presents the classification of abilities as it results from the analysis of the questionnaires.

According to the study's findings, communication skills have been acquired through various learning methods: formal, non-formal and informal learning. The assessment of competency gained through informal learning was best assessed compared to non-formal and formal learning, although self-assessment of skills acquisition was very low. Communication skills acquired through informal learning have received 5.7 points out of 10, so they are considerably low. The results indicate that both the importance of communication skills during the innovation process and the degree of acquisition of these skills are weak in the organizations involved in the analysis.

Table 1. Necessary skills in the innovation process.

The first five significant abilities	The last five considerable abilities
1. Employee motivation.	1. Providing multiple channel information.
2. Operational decision-making	2. Active listening.
3. Development of the innovation strategy.	3. Communicating the change that accompanies the innovation process.
4. SWOT analysis.	4. Repeating relevant information.
5. Selection of key people in implementation	5. communicating information to everyone

The data show that the second hypothesis, which states that communication skills are acquired through non-formal learning, is rejected. Communication skills are acquired through formal, non-formal and informal education. Although the best level of skills acquisition is achieved through informal learning.

The relationship between communication skills and the success of innovation was not significant. According to the results of the survey, communication skills do not influence the success of organizational innovation. The variable of a successful change in the organization is correlated with the existence of the human resource development system, with the acquisition of knowledge through informal learning, the manager's experience and the application of acquired knowledge (Table 2).

Table 2. The correlation between the success of innovation and other variables.

	The presence of a Human Resource Development system	Acquiring skills through informal learning	Application of knowledge acquired through informal learning
The success of innovation	0.330 P=0.018	0.369 P=0.019	0.367 P=0.008

According to the data, the first hypothesis, according to which communication skills correlate with the success of organizational change, is rejected. There was no direct relationship between the success of the innovation process and communication skills. However, further analysis of the survey data showed that the existence of the human resources development system within the organization is related to the level of communication skills acquisition through non-formal learning (Table 3).

Table 3. The correlation between the human resource development system and other variables.

	Innovation processes have been successful	The level of communication skills acquired through non-formal learning
The presence of the Human Resource Development system	0.328 P=0.019	0.374 P=0.024

The analysis of the collected data also shows that a human resources development system correlates with successful changes in the organizations. According to the results, the third hypothesis confirms that communication skills are correlated with the human resources development system's existence.

The extent of the communication level of managers and the level of technological uncertainty is provided in Table 4.

Table 4. The frequency of technological uncertainty concerning extent of communication level of managers in 275 innovative projects in Israel.

	Extent communication level of managers					
		2	3	4	5	Total
Technological Uncertainty	1	7	12	23	8	80
	2	6	17	29	20	72
	3	5	11	29	28	73
	4	1	11	22	16	50
	5	2	4	14	10	30
Total		21	55	117	82	275

The p level of the Chi-Square is 0.09.

It seems from Table 4 that more communication is used as more technological uncertainty exists. In turn, it highlights the success of such projects. The disadvantage of having uncertainty can be switched to an advantage as better communication skills are exercised. This finding also depends on other factors in the management of innovative projects. This advantage supports the acceptance of research hypothesis 4

Table 5. The frequency of extent of communication level of managers concerning customers' satisfaction in 275 innovative projects in Israel.

	Extent communication level of managers					
		2	3	4	5	Total
Customer Satisfaction	4	1	0	1	0	2
	5	3	3	2	2	10
	6	3	2	7	0	12
	7	2	9	17	6	34
	8	9	17	47	32	105
	9	1	20	33	31	85
	10	2	4	10	11	27
Total		21	55	117	82	275

The p level of the Chi-Square is less than 0.001.

A success measure of customers' satisfaction is used to evaluate the performance of innovative projects. It seems (Table 5) that the higher the extent level of communication of managers, the higher is the success. This phenomenon is a by-product result of assigning the more skill managers in terms of communication, leading to better success.

4 Conclusions

The study examined the significance of communication skills during a change and their forms of acquisition and the relationship with innovations' success in industrial organizations. It is assumed that communication skills play a crucial role in the innovation process and that it is, therefore, necessary to strengthen these skills among managers.

Research findings reveal that Research results have shown that managers do not consider communication skills as having a significant role during the implementation of the innovation process and are, therefore, contradictory to previous research. Managers' attitudes towards communication during a change may not coincide with low-level employees' opinions and may also be one reason why most of the changes fail. According to the results, the most useful skills during the change that takes place with innovation are related to human resource management and conceptual knowledge.

The results showed that communication skills were acquired through all forms of learning: formal, informal, and non-formal. However, the findings suggest that managers feel they have a low level of communication skills, although their development is more effective through informal learning. The study's limitations are that the skill acquisition assessment was done by the managers and may not reflect the real situation.

The more attention is being put on the technological uncertainty; the more appropriate manager is assigned concerning communication skills. This attention, in turn, increases the chances of success.

Human resources development programs or systems within organizations have a positive impact on the success of organizational change and on the level of acquiring communication skills through informal learning. The study has shown a contradiction in the role of communication skills in the innovation process. The study results also suggest other implications for further research: exploring the relationship between resilience to change, the success of innovation, and change of abilities, exploring the relationship between leadership style and the success of invention.

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