THE INTER-RELATIONSHIP BETWEEN KNOWLEDGE MANAGEMENT CULTURE AND KNOWLEDGE MANAGEMENT PROCESSES IN THE QUEST FOR ORGANIZATIONAL INNOVATIVENESS

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Abstract

In this study we examined the contribution of knowledge management (KM) processes and culture to the extent of organizational innovativeness. In order to examine the nature of the connections between the two variables and the extent of the organizational innovativeness, we first refined the elements of each variable and built a pattern of three components that generate the complete variable of KM Processes and four components that generate the complete variable of KM. Next, we examined the relationship between the variables on two levels. On the first level, we tested and examined the contribution of each variable, as a whole, to organizational innovativeness. On the second level, we tested, examined and compared the contribution of each component of each variable to organizational innovativeness.

The study's findings point to positive linear connections between organizational KM culture, KM processes and organizational innovativeness. It was also found that each of the components of organizational KM culture and processes has a significant effect on organizational innovativeness, although in terms of the contribution of each component, some of the components had a more significant contribution, while others' contributions were marginal only, as will be described in the article.

Introduction

Organizational innovativeness, in the form of constant applicable innovations and as an integral part of organizational culture and strategy, provides organizations with advantages over others [1]. Knowledge management (KM) is frequently considered to be essential to organizational innovativeness [2] and a means to achieving the competitive advantage [3]. KM has become increasingly important in today's competitive world due to the global and complex environments in which businesses today operate which demand great amounts of information and knowledge. Furthermore, by applying knowledge to products and services their value increases, once again increasing the demand for information and knowledge [4]. Many studies show that organizational culture affects employees in many aspects which are relevant to KM and is essential to KM processes ([3]; [5]).

But, how may organizational learning and organizational innovativeness be maximized, and what sort of interaction exists between organizational culture that supports KM ("knowledge management culture"), KM processes and organizational innovativeness?

We claim that, in order to exploit the competitive advantages of organizational innovativeness, processes which allow knowledge gathering, storage, sharing and distribution (knowledge management processes) must be used, alongside the existence of cultural aspects that support the learning organization (knowledge management culture). Each may have direct influence on the organizational innovativeness. Accordingly, this study focuses on three cycles – the culture of a learning organization, KM processes and organizational innovativeness, in the knowledge-rich, high tech organization sector.

The study is based on the theories of two leading theoreticians in the field of organizational learning and KM: the first – Peter Senge - outlined the comprehensive theoretical foundations relating to the learning organization, which is based on the assumption that, in this era, an organization's success and ability to survive for a length of time, depends on it being a learning organization, which is constantly looking for ways to create and change its' own reality [6]. According to Senge, this requires a multi-factor process (Personal mastery, mental models, Building shared vision, Team learning and System thinking,) and only a combination of all five dimensions constitutes a successful culture for a learning organization.

In this study, we reflected Senges' dimensions to the different elements of the research factors as follows: shared vision is reflected in employee's mutual trust, system thinking is reflected in knowledge sharing behaviors, mental models is reflected in flexible thinking, and team learning and personal mastery are reflected in the learning variable of the research. These factors will constitute the measurements of our first independent factor - a learning organization culture.

Whilst the learning organization emphasizes the improvement of learning processes, the world of KM puts the emphasis on the knowledge itself - its development, utilization and its reuse. From the standpoint of the KM process, we are talking about processes that include knowledge gathering, storage, sharing and distribution. These processes will constitute the measurements for the second independent variable – KM processes**.**

The second researcher, upon whose opinion this study is based, is the well-known Japanese theoretician and researcher – Nonaka - who presented a model for KM that focuses on processes that encourage the conversion of tacit knowledge into explicit knowledge [7]. Nonaka stresses that the aim of KM is organizational innovativeness. The establishment of KM processes in an organization allows the creation of new knowledge that eventually leads to the creation of new ideas within the organization, which translate into new products and services [8]. Various studies show that organizations of outstanding innovativeness are usually characterized by an effective KM system [9].

Our dependent variable is the organizational innovativeness. Organizational innovativeness is a result of an organizational strategy that allows and strives for innovativeness on both the individual level and the organizational level, and encourages the possession of knowledge, knowledge continuity, consistency and leadership, as will be described later on. These components constitute the measurements for our dependent variable - the organizational innovativeness.

Initially, in the literature review, we will discuss the components which compose each of the study's variables mentioned above (a learning organization culture, KM processes, and organizational innovativeness strategy), following that we will present the research model for the relations between these factors.

Literature Review

A. Knowledge Management Culture

The ability to create and maintain a learning organization, and the ability to manage knowledge effectively, are both inherently tied to people; thus, they entail cultural aspects. Millions may be spent on tools and technological solutions which allow the application of KM, designs for portals that allow knowledge sharing, advanced systems for data mining, document management and other functions, but without people, an organization's vision will not be fulfilled and its values that support KM will not be assimilated. An organizational culture which reflects trust between the people is essential also for creating a pleasant work atmosphere, which promotes learning and facilitates change on the individual level as well of the group [10]. Indeed, many studies prove that the organizational culture has a decisive effect on organizational learning, KM and the effectiveness of knowledge sharing ([11]; [12]; [13]). However, in most organizations the organizational culture does not include an understanding of KM and commonly used KM processes KM ([14]; [7]; [15] .

Many researchers who examined the connection between organizational culture and KM, point to knowledge sharing, trust, intellectual flexibility and learning processes as the variables that are relevant to the measurement of organizational culture with relation to KM ([16]; [17]; [10]). As we noted previously, these variables are also appropriate for the areas which Senge [6] saw as the essential foundation for a learning organization. Therefore, this study will focus on these components in order to relate to the learning organization culture which supports KM. The following is a description of these components.

Collaboration – Samuel [18] claims that organizational activity is characterized by cooperation among employees and is manifested in the exchange of knowledge, decision making and activity coordination [18]. Sociologists and researchers view knowledge sharing and collaboration as a fundamental tool of the modern organization – knowledge creation and learning processes cannot exist without the sharing of knowledge among employees ([10]. Nonaka & Takeuchi [7] claimed that tacit knowledge, which is not concrete and is based on experience and intuition and therefore is harder to share in compare to the explicit knowledge, requires more cooperation between the knowledge holder and his fellow employees [7]. A large percentage of tacit knowledge transference takes place during personal and informal situations, and organizational culture is what mostly affects these situations [11]. Since the willingness to share knowledge among organizational members depends on the resources embedded in the organization's social relations and structures ([19]; [20], it is up to the organization, mainly its leaders, to encourage and reward information sharing and to create a relaxed atmosphere and free time, in order to encourage and allow employees to process the information that reaches them [21] .

Trust – In order to achieve ultimate effectiveness of creativity and knowledge sharing, organizations must implement and encourage an organizational culture which includes the value of trust among the employees [22]. Trust among co-workers is based on personal confidence, job security, credit for participants, forgiveness for those who err and openness for the hesitant [11] and is based on a joint and shared vision. The common vision is what helps the employees to feel

part of a large team with common interests and values [6] It is also easier for an organization with a joint vision to implement KM systems [23] .

Flexibility – A flexible organizational culture allows the individual to express his thoughts, motives and behaviors freely and honestly - in order to receive constructive feedback [17] Flexibility is manifested in the creation of an organizational culture which is open to change and provides employees freedom of action, and encourages innovativeness, openness and transparency. Senge calls this 'exposure of mental models' and claims that this ability, on the individual level and the organizational level as one, is essential to a learning organization [6].

Learning – The key to an organization's success lays in its ability to harness the intellectual capital that exists within the organization, and expose it for the purpose of organizational learning [7]. Organizational learning processes constitute effective mechanisms for minimizing uncertainty from the environment outside of the organization and effectively handle the knowledge resource all through its life cycle [24]. Senge refers to organizational learning on two levels – the development of personal skills and learning as a group. One without the other will not result in a learning organization. The development of an organizational culture which encourages employees to cooperate and learn from one another's successes and failures [25] raises the probability for efficient learning and knowledge flow within the organization [26].

One of the prominent empirical studies which examined the learning processes within knowledge organizations was carried out by [24]. They defined organizational learning as a process of development of common knowledge that is based on the analysis of data collected from many sources, including the employees themselves. These processes require KM. An organization which manages knowledge consistently, improves knowledge storage, management and utilization for the sake of organizational success, as will be described in the next section.

B. Knowledge Management Processes

We live in an era in which knowledge has become a strategic resource and human talent is the main resource of many organizations. Since knowledge is a unique organizational means, which increases in value when shared, the process of improving an organization's knowledge value by effective KM is perceived as being critical to the organization's success [27]. The aim of the KM discipline is to achieve a competitive edge for the organization by constructing an organizational memory, developing knowledge holders, maintaining processes that encourage constant knowledge acquirement, improvement of organizational

learning abilities, effective use of common expertise and organizational knowledge, and the assimilation of a suitable technological foundation. All these should operate simultaneously and ultimately bring about the development of new products [28] the creation of organizational innovativeness ([2]; [29]) and increase organizational effectiveness [30]. Orzano et. al [31] demonstrate how a successful KM system can improve performance even in the smallest of organizations with limited financial resources.

Nonaka and Takeuchi [7] emphasized that, the object and the essence of KM is organizational learning which enables organizational innovativeness. The transformation of the various types of knowledge demands the existence of supporting organizational processes, including interpersonal interactions and other tools that support the ability to spread knowledge and make new-use of it.

In order to support this effort and to increase the learning processes, many organizations develop or purchase advanced systems and invest a large amount of money in the effort of collecting information and knowledge, storing and distributing it and enhancing the awareness to the existing knowledge [32]. These steps and systems include LMS (learning management systems), decision support systems, data bases, EDM (electronic documents manager) emails management and social networks [33].

Over the years, different models for the KM cycle were developed. In general, it may be said that most of the models present a number of elementary steps which are necessary for the process of KM – knowledge collecting and capturing, knowledge storage and retrieval, and knowledge sharing and distribution ([34]; [35]; [36]; [37] ; [38]).
We will briefly refer to each of the components of the KM processes mentioned above.

Knowledge collecting and capturing - Knowledge gathering is a process of learning from external sources, such as other organizations' experiences, academic and professional literature and clients' wisdom, and transferring this knowledge from the external environment to the internal environment [24] Knowledge is collected internally as well, from associates and fellow employees by exposing hidden knowledge. Pasha and Pasha [39] divide knowledge gathering into three groups: (i) capturing knowledge through work processes, licensing, etc. [40] ; (ii) capturing knowledge through training programs, apprenticeships, lessons learned, environmental scans, etc. ([40]; and (iii) capturing knowledge through discussion, interaction between individuals, networking, etc. [41].

Knowledge Storage and Retrieval – One of the most fundamental and important tasks of KM in every organiza-

tion is the development of structured processes for the storage of the knowledge in the organization's memory, and to enable its retrieval in the future [42]. In order to achieve these goals, organizations must first recognize which knowledge is important for the organization. Knowledge storage includes technical procedures (documentation, construction of a data base and document formats), as well as human processes that encourage the externalization of tacit knowledge. The storage solution must be tailored to the specific organization in order to allow effective and accurate retrieval.

Knowledge Sharing and Distribution – Knowledge sharing and distribution include the (passive) flow and the (active) transfer of knowledge through the formal technological system (memos, reports, educational software) and on the informal interpersonal level (position rotation, storytelling, team assignments, informal networks). The establishment of structured processes for sharing and distributing organizational knowledge improves the employees' abilities, expertise and effectiveness and result in a competitive advantage which may be maintained for a long time [33].

C. Organizational Innovativeness

The dependent variable in this study is organizational innovativeness. Innovativeness is considered a management tool and a springboard to success. Creativity is considered the road to business excellence.

In the literature there are various definitions for what organizational innovativeness is and how to measure it. Gopalakrishnan and Damanpour [43] claim that organizational innovativeness is having new ideas and products. Others perceive innovativeness as the organization's intention to seek new ideas and products [44], and a condition of organizational culture which indicates a tendency to innovativeness [45]. Indeed, Forbes Magazine and the Insead School of Business Management, listing the top 100 innovative companies in the world, pointed out that, innovative strategies are part of these companies D.N.A. This strategy is manifested in creative thinking techniques and freedom of action, which encourages the employees innovativeness and thinking "out of the box", in order to develop new and fresh processes and ideas that may be applied quickly and successfully.

Based on these conceptions, organizational innovativeness will be measured in this study by the way the employees perceive the organizational strategies, culture and support of innovativeness. The measurement of the innovativeness will be based on the scale developed by Siegel (Siegal Scale of Support for Innovation -SSSI) [46]. Following is a short

description of the components for the organizational innovativeness:

L (Leadership) - This component describes the measure of support provided by the management for the creation and development of new ideas by the employees.

O (Ownership)- This component describes the employees feeling of proprietary of the ideas and projects that were developed as a result of them being involved ([46]; [47]).

D (Diversity and Development Continuity) - This component describes innovativeness by the maintenance of research that integrates alternative approaches to problems and tasks, and a constant search for solutions.

C (Consistency) - This component describes the measure of consistency that exists between the processes advocated by the organization and what is actually carried out.

Research Hypothesis

A. Hypothesis 1 (H1)

H1a. The greater the KM Culture - as one variable composed of all of its components together, the greater the Innovativeness - as one variable composed of all of its components together.
Q1. In addition, we ask the following question: how much influence does KM Culture, as a whole, have on organizational innovativeness, as a whole?

H1b. The greater each of the components comprising the KM Culture, the greater the Organization's Innovativeness - as one variable composed of all of its components together. Thus:

H1b.1. The greater the Trust, the greater the organizational innovativeness.

H1b.2. The greater the Sharing, the greater the organizational innovativeness.

H1b.3. The greater the Flexibility, the greater the organizational innovativeness.

H1b.4. The greater the Learning, the greater the organizational innovativeness.

H1c. The greater each of the components comprising KM Culture, the greater each of the components comprising innovativeness. Thus:

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H1c.1. The greater the Trust, the greater each of the following: Leadership; Ownership; Diversity and Development Continuity; and Consistency.

H1c.2. The greater the Sharing, the greater each of the following: Leadership; Ownership; Diversity and Development Continuity; and Consistency.

H1c.3. The greater the Flexibility, the greater each of the following: Leadership; Ownership, Diversity and Development Continuity; and Consistency.

H1c.4. The greater the Learning, the greater each of the following: Leadership; Ownership, Diversity and Development Continuity; and Consistency.

Q2. In addition, we strive to understand how much weight each component of KM Culture carries with regard to its effect on organizational innovativeness.

B. Hypothesis 2 (H2)

H2a. The greater the KM Processes variable - as one variable composed of all of its components together, the greater the Innovativeness - as one variable composed of all of its components together.

Q3.We also ask the following question: how much influence do KM Processes, as a whole, have on organizational innovativeness?

H2b. The greater each of the components comprising the KM Processes, the greater the organizational innovativeness - as one variable composed of all of its components together. Thus:

H2b.1. The greater the Knowledge Collecting and Capturing, the greater the Innovativeness.

H2b.2. The greater the Knowledge Storage and Retrieval, the greater the Innovativeness.

H2b.3. The greater the Knowledge Sharing and Distribution, the greater the Innovativeness.

H2c. The greater each of the components comprising KM Processes, the greater each of the components comprising organizational innovativeness. Thus:

H2c.1. The greater the Knowledge Collecting and Capturing, the greater each of the following: Leadership; Ownership; Diversity and Development Continuity; and Consistency.

H2c.2. The greater the Knowledge Storage and Retrieval, the greater each of the following: Leadership; Ownership; Diversity and Development Continuity; and Consistency.

H2c.3. The greater the Knowledge Sharing and Distribution, the greater each of the following: Leadership; Ownership; Diversity and Development Continuity; and Consistency.

Q4. We also strive to understand how much weight each component of KM Processes carries with regard to its effect on organizational innovativeness.

The research hypotheses and questions can be more clearly seen as follows:

H1a= KMC → OI
H1b= KMC (1,2,3,4) → OI
H1c= KMC (1,2,3,4) → OI (1,2,3,4)
H2a= KMP → OI
H2b= KMP (1,2,3) → OI
H2c= KMP (1,2,3) → OI (1,2,3,4)

Q1 KMC → OI
Q2 KMC (1,2,3,4) → OI
Q3 KMP → OI
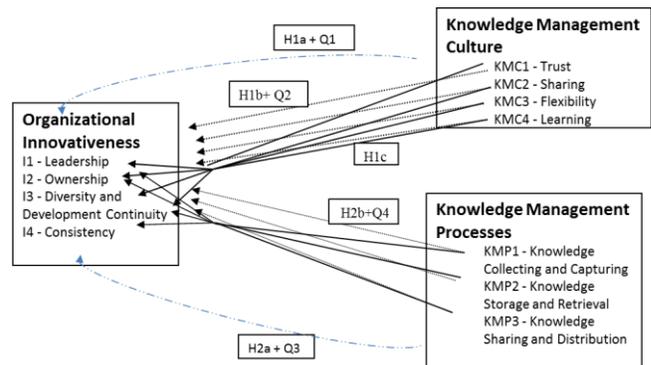Q4 KMP (1,2,3) → OI

Diagram 1 describes the research model.

Diagram 1. Research Model.

Explanation of diagram arrows:

a. Independent variable as a whole with regard to dependent variable as a whole

b. Independent component variable with regard to dependent variable as a whole

c. Independent component variable with regard to dependent component variable ◄

Research Methods

A. Research Population & Research Procedures

Field research was carried out among high tech organizations. These organizations have many resources at hand, including various knowledge resources. Some of the organizations manage knowledge in a systematic manner and have implemented KM tools, such as organizational portals, knowledge mining tools and lessons learned systems.

We approached 11 companies – 5 software companies, 2 IT companies, 2 verification companies and 2 testing companies – 6 of which agreed to participate in our study, as depicted in Table 1. The approached companies were chosen randomly, as we wished to represent various types of high-tech companies (verification, software, IT, testing).

The study included knowledge workers only, i.e. developers, engineers, and project managers; it did not include overhead personnel such as maintenance workers, cleaning personnel, etc. 225 questionnaires were distributed. 208 questionnaires were returned, 198 questionnaires were completed properly and were used in this research. Table 1 presents the companies participating in the study.

Table 1. Companies participating in the study

Company No.	Type	No. of Employees	Distributed Questionnaires	Completed Questionnaires
1	Software	120	50	49
2	Verification	80	40	33
3	Testing	70	30	28
4	Software	100	50	41
5	Software	50	25	22
6	IT	60	30	25
			225	198

B. Measurement Tools

The research data was collected using questionnaires: a questionnaire for each independent variable (organizational culture and KM process) and for the dependent variable (organizational innovativeness), covering all the components as discussed in the literature review.

The theoretical basis for the questionnaire was as following: [24], [17], [46], [48], [49].

Every component of the questionnaire was measured by an ordinal Likert scale (1 – 5). The subjects were asked to rank the statements from "strongly disagree" (1) to "strongly agree" (5). In order to validate the questionnaire, it was first distributed among 22 employees and following a statistical analysis, was corrected and validated accordingly. The structure of the questionnaire is set forth below.

Independent Variables

Knowledge Management Culture

This part of the questionnaire examined the level of the organizational culture components that are necessary to support the learning organization and the organizational KM (KMC). This was examined by a group of statements relating to the following components: 1 – trust; 2 – sharing; 3 – flexibility; and 4 – learning. Following are sample statements for each of the components:

KMC1 – Trust: "In your organization employees are not afraid to ask associates for help."
KMC2 – Sharing: "In your organization associates are willing to help one another and share personal knowledge."
KMC3 – Flexibility: "In your organization every employee may initiate and express criticism."
KMC4 – Learning: "In your organization a procedure exists for the inquiry of events whose results are distributed among the employees."

Knowledge Management Processes

This part of the questionnaire examined the KM processes existing in the organization (KMP). These processes include 1 – knowledge collecting and capturing; 2 – knowledge storage and retrieval; and 3 – knowledge sharing and distribution. This also was measured by various statements. For example:

KMP1 - Knowledge collecting and capturing: "In your organization there exists a program for acquiring external knowledge."
KMP2 – Knowledge storage and retrieval: "In your organization it is simple to obtain knowledge relevant to your position and which supports the implementation process."
KMP3 - Knowledge sharing and distribution: "In your organization knowledge sharing is a routine process and is a natural employee habit."

Dependent Variable

In order to evaluate organizational innovativeness, data was collected by a questionnaire based on Siegal & Kaemmerer's study [46]. This Questionnaire examined the following components- 1- leadership; 2 – ownership; 3 – development diversity and continuity; and 4 – consistency. These components were examined through statements such as:

I1 – Leadership: "In your organization, the management initiates various activities in order to encourage creativity among the employees."

I2 – Ownership: "In your organization, every employee has the opportunity to examine his/hers personal ideas."

I3 – Development diversity and continuity: "In your organization, employees try new approaches for problem solving."

I4 – Consistency: "In your organization, the way the employees carry out their tasks seems appropriate for what is actually trying to be achieved."

Questionnaire Consistency

Table 2 presents the internal consistency analysis.

Table 2: internal consistency of the questionnaire components using Cronbach's alpha

Variable	Component	Cronbach's Alpha
Knowledge Management Culture	C1	0.69
	C2	0.63
	C3	0.74
	C4	0.66
	General	0.87
Knowledge Management Processes	KM1	0.71
	KM2	0.81
	KM3	0.80
	General	0.88
Organizational Innovativeness	I1	0.89
	I2	0.64
	I3	0.89
	I4	0.75
	General	0.99

The findings presented in table 2 show that most of the questionnaire components are consistent. The Internal consistency was retested using Cronbach's alpha and found to be $\alpha = 0.63 - 0.89$,

Findings Analysis

Hypothesis 1: In order to examine the relationship between the KM culture and the organizational innovativeness, Pearson's coefficients were calculated for the relationships within the group of dependent variables and the group of independent variables.

As portrayed above, our first hypothesis (H1) was threefold: (A) First, that the greater the KM culture (as a whole) is, the greater the organizational innovativeness (as a whole) is (H1a); (B) Second, that the greater the knowledge management culture components are, the greater the organiza-

tional innovativeness as a whole is (H1b); and (C) Third, that the greater each knowledge management culture component is, the greater each of the organizational innovativeness components are (H1c). Table 3 demonstrates these correlations and their respective significances.

Table 3 – Correlations and Significances between Knowledge Management Culture (and its Components) and Organizational Innovativeness (and its Components)

Knowledge Management Culture \ Organizational Innovativeness	I1	I2	I3	I4	General
KMC1	0.43***	0.41***	0.40***	0.33***	0.49***
KMC2	0.46***	0.30***	0.38***	0.16**	0.43**
KMC3	0.39***	0.25***	0.34***	0.19**	0.38***
KMC4	0.53***	0.38***	0.57***	0.35***	0.58***
General	0.54***	0.40***	0.50***	0.30***	0.56***

N=198   ***p<.001   **p<.01

Table 3 shows that a significant positive correlation exists between: (i) KM culture (as a whole) and the organizational innovativeness (as a whole) ($r=0.56$; $p<0.001$), as we assumed in hypothesis H1a; (ii) each of the KM culture components and organizational innovativeness as a whole, as we assumed in hypothesis H1b; and (iii) each component of the KM culture and each component of organizational innovativeness, as we assumed in hypothesis H1c.

Up to now, we have seen that the KM culture is significantly connected to organizational innovativeness as a whole (H1a) and by its components (H1b, c). In order to facilitate a model, one of the main purposes of this study was to examine how all of components of KM culture contribute together to organizational innovativeness (Q1) and how much weight each component carries with regard to its effect on the dependent variable (Q2). To accomplish this, we conducted a hierarchical regression analyses in which the independent variables were trust, sharing, flexibility and learning, and the dependent variable was organizational innovativeness. The results are presented in table 4.

Table 4 - multiple regressions for the prediction of organizational innovativeness using knowledge management culture components

	B	Std. Errors	Beta	T
KMC1	0.24	0.07	0.27	3.57***
KMC2	0.03	0.08	0.03	0.346
KMC3	-0.06	0.06	-0.09	-1.08
KMC4	0.42	0.07	0.47	5.60***
F(4,193)	29.99***			
R2 Adj	0.38			
				***p<.001

The results of the multiple regression analysis show that the learning component, as a culture component, is the best predictive element for organizational innovativeness. The trust component is also a significant predictive element for organizational innovativeness. The other components did not contribute significantly to the prediction of organizational innovativeness. With regard to Q1, we can see that all the KM culture components together explain 29.9% of the organizational innovativeness variance.

We conclude that hypothesis 1 has been proven also with relation to the overall effect of a KM culture on organizational innovativeness (H1a), but – with regard to Q2 - the most significant effect is derived from two cultural components - trust and learning only, whereas the two other components flexibility and sharing were not found to be significant contributors to organizational innovativeness.

Hypothesis 2: Our second hypothesis was also threefold: (A) First, that the greater the KM processes (as a whole) is, the greater the organization's innovativeness (as a whole) is (H2a); (B) Second, that the greater the KM processes components are, the greater the organizational innovativeness (as a whole) is (H2b); and (C) Third, that the greater each component of KM processes is, the greater each of the components of organizational innovativeness are (H2c). In order to examine the relationship between KM processes and organizational innovativeness, Pearson's coefficients were calculated with regard to the relationships within the group of dependent variables and the group of independent variables. Table 5 demonstrates these correlations and their respective significances.

Table 5 – correlation and significance between knowledge management procedures components and organizational innovativeness components.

Organizational Innovativeness / Knowledge Management Processes	I1	I2	I3	I4	General
KMP1	0.47***	0.36***	0.48***	0.29***	0.52***
KMP2	0.40***	0.27***	0.49***	0.29***	0.46***
KMP3	0.30***	0.22**	0.20**	0.17**	0.29**
General	0.54***	0.40***	0.50***	0.31***	0.56***

N=198   ***p<.001   **p<.01

Table 5 shows that all the correlations between all of the KM process components and organizational innovativeness are positive and significant. We also see a connection between the variables as a whole (r=0.56), as assumed - thus proving H2a, H2b and H2c.

With regard to the second research hypothesis, we examined to what degree all the components of KM processes together affect the dependent variable - organizational innovativeness (Q3) - and how much weight each component carries with regard to its effect on the dependent variable (Q4). In order to do so, a multiple regression analysis was carried out, the results of which are presented in table 6.

Table 6 - multiple regressions for the prediction of organizational innovativeness using knowledge management processes

	B	Std. Errors	Beta	T
KMP1	0.40	0.28	0.45	5.39***
KMP2	0.20	0.06	0.26	3.58***
KMP3	-0.12	0.07	-0.12	-1.63
F(4,193)	30.58***			
R2 Adj	0.31			
				*** p<.001

The results of the multiple regression analysis show that all the components comprising KM processes, together, explain 30.58% of the organizational innovativeness variance. We can see that the knowledge collection component is the best predictive element for organizational innovativeness. The storage and retrieval component is a significant predictive element, as well. However, sharing and distribution have not been found to contribute significantly to organizational innovativeness. We can conclude that hypothesis 2 has been proven with regard to the overall effect of KM process on organizational innovativeness. However, in regard to Q4, the significant effect derived only from two out of the three components of KM.

Discussion

Successful organizational innovativeness, even if not protected by patents, has always been excellent protection against extortion of the profit margin ([50]; [51]. Many organizations realize that they are dependent on knowledge as a resource for organizational innovativeness. Knowledge resources, like equipment, require investment and maintenance in order to reap their benefits; hence the need for a strong foundation for KM [52]. Therefore, organizations that are focused on innovativeness dedicate much time and capital to activities such as research and development, professional conferences, job rotation, etc., the main purpose of which is to improve knowledge in order to create organizational innovativeness. Thus, in this study we elected to examine the relation between the elements that serve the organization in the effort of development and improvement of knowledge and its organizational innovativeness. Next we will discuss the results of the study.

A. Correlation between Knowledge Management Culture and Organizational Innovativeness

According to hypothesis 1a, the stronger the KM Culture is, the greater the organizational innovativeness is. From the analysis of the results, we saw that the correlation between the general variable KM Culture, and Organizational Innovativeness, was found to be high and significant (r=.56).

According to hypothesis 1b, the greater the KM Culture components are, the greater the organizational innovativeness is (H1b). We found that all four components – trust, sharing, flexibility and learning – showed significant correlations to organizational innovativeness (0.38 <r<0.53). However, as to the second research question - the multiple regression analysis shows that the learning and trust components showed the most significant effect, whereas flexibility and sharing yielded only a minimal contribution, as will be discussed here.

Learning and Organizational Innovativeness

Learning was found to be the component that contributes most to organizational innovativeness (r=.42). This finding is supported by Senge's theory [6] which points to the development of individuals' skills and group learning abilities as significant elements in the structure of the learning organization culture, which, in turn, leads to organizational innovativeness.

The high-tech organizations are based on up-to-date knowledge, which is constantly changing and being updated. The need to maintain up-to-date knowledge requires constant learning within the organization ([21]; [6]). Therefore, it is not surprising that the learning element was found to be the most significant with regard to organizational innovativeness.

Trust and Organizational Innovativeness

The correlation between the trust element and organizational innovativeness is significant and high (r=.49), and the contribution of the trust element to organizational innovativeness is also high and significant (r=.24). In other words, the greater trust is amongst the employees, the greater the organizational innovativeness of the organization. As mentioned in the literature review, trust among employees is based on a common vision that unites all the workers and the management of the organization [6]. The common vision allows the employees to freely ask for help from one another and to openly discuss professional problems, as they view themselves as a single unit with common interests, values and objectives. Organizations that do not succeed in creating an atmosphere of trust among the co-workers fail to establish an organizational culture which supports KM processes [22]

These types of processes are necessary in order to allow innovativeness [6].

Sharing and Organizational Innovativeness

The correlation between the sharing component and organizational innovativeness is significant (r=.43). This finding supports other empirical studies, which also found the sharing element to be a significant component of the culture of the learning organization ([53]; [54]) and necessary for the motivation of organizational innovativeness [55].

Alongside the high and significant correlation, the regression analysis indicated that this element is not significant to the prediction of organizational innovativeness. That said, the sharing element is the most significant challenge when attempting to assimilate KM in an organization ([56]; [57]). In order for knowledge sharing to exist, technological elements and work processes must be planned to allow a natural flow of knowledge as an integral part of the existing work processes. Furthermore, a positive atmosphere is necessary in order to enable sharing of knowledge. If the atmosphere is competitive or stressful, the motivation to share knowledge will diminish.

All this leads us to the conclusion that the organization must invest appropriate resources in the development of a structural and social system that allows knowledge sharing ([19]; [20]). The ability and the will of the various individuals in the organization to share is a function of the social capital of the company which is an important element of the organizational intellectual capital [58], and is realized in the workers' faith in the organization and is affected by the workers' sense of belonging to the organization [59]. The workers' perception of similarities among themselves is also important, since identification intensifies the sense of oneness [60].

Flexibility and Organizational Innovativeness

The correlation between flexibility and organizational innovativeness was found to be significant, yet relatively weak when compared to the other components (r=.38).

These results indicate that organizations that are characterized by their flexibility towards the employees, and in which the workers may initiate ideas and express criticism freely, reach higher levels of organizational innovativeness. This finding is consistent with basic theories that indicate that flexible organizations, which allow the individuals to honestly express their thoughts, intentions and actions in order to receive constructive feedback, achieve organizational innovativeness ([6]; [7]; [17]). On the other hand organizations with inflexible managements do not implement new ideas and cling to illogical status quos, which do not support organizational innovativeness [46].

Therefore, we argue that the design of a culture that supports KM is crucial for organizational innovativeness and to its success [61].

B. Correlations between Knowledge Management Processes and Organizational Innovativeness

Our second hypothesis was that the stronger the KM processes are, the greater the organizational innovativeness is (H2a). This argument is based on the understanding that beyond a KM culture, there is great importance to KM processes and activities which support continuous learning and utilization of the knowledge which exists within the organization, both on the individual level and the organizational level.

The research results reinforce these hypotheses. We found the correlation between the general variable of KM processes and organizational innovativeness to be high and significant (r=.56). Hence, we conclude that H2a is proven and KM processes support innovativeness. This finding corresponds with many studies that claim that organizational abilities which support KM increase innovativeness [62].

Furthermore, the correlation found between the various elements of KM processes and organizational innovativeness (H2b) is also high and significant (r=.56), as will be discussed below.

Knowledge Gathering and Organizational Innovativeness

The correlation found between the knowledge gathering component and organizational innovativeness was high and significant (r=.52). This result supports the argument that the learning abilities related to the data and knowledge supply within the organization are based on the ability of the organization to gather knowledge and transfer it to structured forms. These processes include the assembly of educational software, reports collection, and the wide use of intra-organizational systems, such as intranet, email and other organizational forms of communication [63]. Knowledge gathering also includes the process of learning from the experience of other organizations, the assimilation of external knowledge [24], the existence of routine staff meetings in the organization, and various other means of collecting employees' wisdom (such as tagging tools).

The multiple regression analysis results indicate the gathering components' unique contribution to the variance of the organizational innovativeness (r= .40). In other words, a good KM process must first be based on efficient, systematic, and operative knowledge gathering activities, which con-

stitute the foundation for learning, change and organizational innovativeness. In order to efficiently gather knowledge the organization may utilize automated mechanisms, inert-organization social networks and wisdom of the crowd strategies.

Knowledge Storage and Retrieval and Organizational Innovativeness

The correlation between the storage and retrieval components as part of KM, and organizational innovativeness, is significant (r=.46). The importance of storing organizational knowledge on computerized systems is clear, since these systems allow all employees to retrieve knowledge anytime and anywhere, and to learn from the personal knowledge of experts in various fields in the organization. Therefore, organizations must plan these systems so as to allow efficient and easy retrieval of the organizational knowledge [64], independent of the system on which it is stored among the various organizational systems.

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Nonetheless, the multiple regression analysis indicates that the contribution of this component is secondary to knowledge gathering. This may be explained by the storage and retrieval systems that cannot keep up with the pace of the collection of knowledge and are not sufficiently efficient. Many organizations are at a critical point where they must find the most efficient way to handle the knowledge that they have accumulated, so that when needed, it may be retrieved accurately, efficiently and quickly. When choosing or up-grading the knowledge retrieval software of the organization, the CKO or the IT people should look for a software that can adapt itself to the user, learn the user and keep improving ("self learning"), so it can retrieve exactly what is relevant to each user specifically. It is also important that when building the search algorithm for the organization, the organizations' taxonomy will be taken into account, with the view towards tailoring the algorithm to the nature of the organization's knowledge needs and its organizational language. Design and implementation must be contextualized in relation to knowledge needs, which will differ between organizations and even within a single organization [65].

Knowledge Sharing and Distribution and Organizational innovativeness

Although other studies indicate a foreseen connection between knowledge sharing and innovativeness [66], and despite the significant correlation that we found between the sharing and distribution component and organizational innovativeness, the correlation was weak in comparison to the other components of KM (r=.29). With regard to the KM variable, the sharing and distribution component relates to organizational activities and processes which support sharing and distribution of knowledge, while the sharing and

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distribution component of the KM culture variable relates to employee activities. Accordingly, a possible explanation of the relatively low correlation may be that in many organizations, sufficient means for sharing and distributing knowledge do not yet exist. This result is also supported by the low significant that was found in the multiple regression analysis and also in other studies, which indicate that suitable technology mediates between sharing and organizational innovativeness [66]. The establishment of knowledge sharing and distribution systems is critical for KM and organizational innovativeness, since these systems allow the employees to expand their personal knowledge, contribute to continuous increase of the employees' professionalism and enable the identification of knowledge gaps among the workers, thus allowing speedy and efficient closure of these gaps [67].

The research results of this study generally confirm our second hypothesis and indicate that a relation exists between actual processes of KM and the organization's ability to create innovation and initiate knowledge that leads to innovation. Unlike other studies that supported our hypothesis [68] ; [45]) but did not differentiate among the potency of the different components, our research indicates that the magnitude of the contribution of the different components of knowledge processes varies. In regard to our third research question, the results of the multiple regression analysis also indicate that the processes of KM have a unique contribution beyond organizational culture. All the elements together contribute 30.58% to the variance of the organizational innovativeness ($R2= .31$).

Final Research Model

As we see it, the findings of this research lead to a multiplication equation (π) for organizational innovativeness, rather than an addition equation ($\sum$). In other words, without a culture which supports a learning organization (KM Culture) and without KM processes, organizational innovativeness cannot exist. The strong existence of both will bring the organization to effective results with regard to organizational innovativeness; weakness in either one of the components of these variables will negatively affect the total result. That said, each component may compensate for the weakness of another, thus aiding to achieve the desirable result.

According to this, the organizational innovation equation is as follows:

$$\text{Organizational Innovativeness} = \pi(\text{KMC , KMP})$$

KM Culture= $\sum$(Trust, Collaboration, Flexibility, Learning)

KM Processes= $\sum$(Collection, Storage and Retrieval, Distribution)

Conclusion

This study opens a window of opportunity to broaden our understanding of organizational development and its implications on organizational innovativeness.

In order to test the relationships between the culture of the learning organization, organizations foundations for KM processes and organizational innovativeness, a comprehensive, analysis was carried out on two levels: On the First level we conducted an examination related to the contribution of KM Culture as a whole to organizational innovativeness and an examination of the contribution of each of the four components of the KM Culture to organizational innovativeness. On the second level, an analysis of the contribution of the KM Process variable as a whole and an examination of the contribution of each of the three components of the KM Processes to organizational innovativeness. Although other studies indicate that the critical link in organizational KM is found in the culture of knowledge sharing and processes [69] , this study found that, knowledge sharing is actually the weakest link and has the least effect on organizational innovativeness. That may be explained by other studies that note the challenge of knowledge sharing. Kramer, Brewer & Hanna [60] claim, that emotional connections among the employees creates identification with the organization's goals and the closer the members feel to the organization the more they will have the necessary trust in order to share their knowledge [10]. Jo & Joo [5] claim that, social elements constitute stronger incentives for knowledge sharing than external benefits, This leads us to maintain that perhaps the social connections in the organization were not strong enough for establishing the desired knowledge sharing.

That said, our study indicates that the relationships between the various parameters are complicated and is not a simple process which may be explained as a systematic procedure. Therefore, the model that we presented introduces a new perception of the process, as it presents a multidimensional product of a number of elements.

As presented in the model above, the most appropriate equation for representing the connections between the various components is a ¶ equation. In order to maximize the potential for organizational innovativeness, an organization should relate to all of the various components of each variable, as presented above. However, a situation may arise where certain components compensate for others, and one operating element that is especially efficient may have the ability to pull the whole organizational innovativeness upward.

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Recommendations for Organizations

Following the study's findings, it is important that organization managers understand the essential connection and the positive influence that exists among the various components of organizational culture, which support the learning organization, the application and assimilation of KM processes and organizational innovativeness. The managers should especially take care to cultivate an organization culture which nurtures complete trust among the employees, first by setting a personal example and by continuing with organizational values, both explicit and implicit [70] .

Employees should be encouraged to take responsibility for gathering information relevant to their jobs from outside sources, as well as internal sources, and to consider who else within the organization may profit from their knowledge ([21], thus causing the organizational learning to be a meaningful continuous process of personal responsibility, as Peter Senge advised [6].

Managers aspiring to organizational innovativeness should cultivate processes of gathering, retrieval and distribution of knowledge, using technology adapted for the specific organization, its unique environment and terminology. They should consider knowledge systems solutions that provide the necessary knowledge to the employee automatically, and not only by active searching and retrieving at the employee's initiative, so the process of retrieval of knowledge will be an optimized, natural and integral part of the work process. Still, and as we saw in our research, it is not enough to maintain KM processes; it is important for the organizations to develop the community and trust among the employees, as well. Therefore, we recommend that work processes will include holding structured routine meetings among teams, maintaining digital social networks and workers' profiles, establishing communities of practice, and so on. In these environments, employees connect and learn, a community is created, and trust is built.

In light of the relationships found in this study among the various variables, it is our opinion that the research conducted in the context of this study should be broadened, in an effort to understand the potency of the influence of each of the variables examined in this study. Such potency should be gauged when said variables are combined with each other, as well as when they are combined with other variables that were not examined in our study. Having a thorough understanding of the potency of each variable would presumably be invaluable to any organization striving to assimilate innovation and other changes among its employees.

We also see a need to expand the research with regard to the architecture of information systems which are suitable for and support knowledge sharing among employees, since knowledge sharing was found to be the most challenging part of the KM process. In that respect, we recommend that future research will focus on the connection between the different kinds of communities in the organization, including digital social networks, and the sharing aspect of KM. This relatively new perspective might improve our understanding of the mystery of knowledge sharing in organizations, thereby assisting organizations in advancing their business goals, such as increasing revenues - as a result of effective the KM processes.

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