

# DEMOGRAPHIC ANALYSIS OF THE KNOWLEDGE MANAGEMENT EFFECT ON BUSINESS INNOVATION

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## ABSTRACT

Knowledge supports that the talents of qualified employees and innovative products which increasing the competitiveness of the business. Innovation, which is an economics-based concept, gains functionality through technical, cognitive, explicit or implicit types of information. Employees are at the center of innovation process about radical, incremental, technological or social, with their knowledge, experience, talent and ideas. The aim of the research is to determine whether the influence of the management and sharing of information on firm innovation according to “age, education status, managerial tasks, number of employees of the business, sector and qualification” dimensions. As a result, no significant difference was found among “information management and demographic characteristics. “Contribution of this research is to determine the active role of information at innovative businesses.

Keywords: Knowledge, Knowledge Management, Business Innovation.

## INTRODUCTION

Innovative businesses in the 21st century, regard knowledge as an investment (Sucu, 2000). Controlling the flow of information, prevents the employee from combining and using different pieces of information. An innovative business invests knowledge because it facilitates the amount and distribution of open information (Stewart, 1997). For this purpose, links such as universities, competitors, suppliers and customers, have a function as information sources (Oslo Report, 1995). Knowledge is an input for innovative ideas and moderator in the arrangement of outputs. At this point it is necessary for a business to make at least one innovation or to be at the project stage in order to be innovative. The aim of this research is to examine whether there is a significant difference in terms of demographic situation of the employees (age, education level, sector, business quality) in the knowledge management and business innovation. The literature contribution of this research is that information management plays an important role in innovative businesses and sectors, so knowledge should be shared regardless of demographic dissociation.

As Schumpeter points out, improvements of knowledge and technology take place so rapidly that the life cycle of product is shortened, so the previous product is not satisfied the expectation. This result increases the need for innovative businesses in knowledge economies. At the same time employees are supposed as bridge in this relationship. Because, they are physically and mentally contributing to innovation. The prospect and contribution of this study to literature is to underline that sharing and management of information, as important as obtaining quality information for innovation (Tapscott and Hill, 1996). In this context, it is seen that the effectiveness of information depends on the demographic characteristics such as “age, professional experience, education” of the internal customer and next to these characteristics, “sector structure and number of employees” are important. The study shows that information and its’ education, attainment and communication sub-dimensions whether is different in regard to demographic factors. In the literature, the information and demographic characteristics relationships were considered as one dimension but different variables weren’t added to it, like a sector types. To show a route to innovative businesses in terms of competition and contribution to innovative behaviour for employees are principal expectations from this study. So primarily to find knowledge management and innovation relationship, change of knowledge management (acquisition, education and communication sub dimensions) according to “age, education, managerial position, on the other side number of employees and sector” factors was examined.

## LITERATURE REVIEW AND THEORETICAL FRAMEWORK

### Knowledge Management

Knowledge management brings an information to business as a productive factor (Beijerse, 2000). In this context, it is necessary to reveal, collect, organize, evaluate and share information. Businesses need knowledge management for the continuation of their assets. Knowledge management provides the transfer of information documents, information sharing with people in the information community, harmonization with environmental changes, continuous learning, online module system and interactive communication (Özmen, 2002).

Knowledge flow from operations point of view can be transaction-based. At this point, the information in the research activities is disseminated by the suppliers and innovative ideas are shared with other companies. In connection with the transaction, the information is spread to the company which sells the input from the supplier, the buyer, or the receiving company. As a mixed flow of information, information can be distributed among firms in the same sector (Karlsson and Johansson, 2004). In this context, knowledge management provides this process by demonstrating and improving the basic skills of employees and stimulating innovation behaviors (Beijerse, 2000). In this respect, knowledge management is supported by "information acquisition, education and communication dimensions". Where and how information is acquired, how it will be valued, monitored and protected (Barutçugil, 2002).

### Business Innovation

According to the Oslo Report (1995), an innovative business is implementing at least one innovation. However, although the entity has not actually made an innovation, may have been involved in innovation during the review period. Therefore, all activities involved in the development or realization of innovations, including those planned to be realized in the future, are innovation activities. In this respect, during a certain period, innovation activities can be of three kinds as successful, surviving and abandoned. Successful innovation activity is the success of an innovation; the innovation activity, the work process has not yet been carried out and the innovation activity has been abandoned, is the abandonment of the activity before the innovation is realized. Innovative businesses at this point are fast, small unit, structure with teamwork; a culture that has an interrogator, a fault tolerant, a risk taker and a reward system; a non-bureaucratic process; knowledge and customer relationships (Sniukas, 2007).

### Knowledge Management, Business Innovation and Demographic Factors

The problem of this study is that analyze knowledge management and business innovation relationships according to employee's demographic characteristics. So knowledge sharing and innovative behavior is the main topic. Because firms need to be equipped with information to survive change (Barker, 2001). In this context, innovation creates added value and superiority when it is supported by knowledge (Drucker, 2003). Reige (2005) suggested that age is important factor for sharing of knowledge. Keyes (2008) found relationship between age and knowledge. But according to Bakhari (2009), demographic factor doesn't affect the knowledge sharing.

According to Carneiro (2000), the training, personality traits, and innovation of employees influence knowledge management. As the horizontal flow of knowledge is improved and human capital, change, adapts, the innovation of the company will increase. The sharing of knowledge between middle and senior managers within and between groups positively effects on innovation (Lengnick-Hall, 2004). Carneiro (2000) is claimed that managers better interpret effective information management and environmental change. Ardichvili, Maurer, Li, Wentling and Stuedemann (2006) was claimed that managers don't participate the ideas sharing. But according to Collin (2004), manager is a participant leader.

According to Li and Zeng (2014) sharing information increases the innovative behavior. Yu et al. (2013) has achieved the result that knowledge management has increased employee's innovation. Ojha (2005) and Keyes (2008) found negative relationship between knowledge management and employees number and task. But Irmer (2002) found a positive relationship.

Knowledge management provides a competitive advantage among business and customers; creating a customer-focused culture; expanding strategic options and activating innovation (Lengnick-Hall, 2004).

Afsan (2016) is the same result in the health sector; Wang et al. (2014) in the technology sector; Hu et al. (2009) achieved in the tourism sector (different sector like this study). The sharing of information between employees and firms affects innovation positively (Aulawi et al., 2009; Mura et al., 2013). Parjanen (2012) found that businesses increased information sharing and innovation. The hypotheses based on the literature are as follow:

- H<sub>1</sub>: The effect of knowledge management on firm innovation is different according to age.
- H<sub>2</sub>: The effect of knowledge management on firm innovation is different according to the level of education.
- H<sub>3</sub>: The effect of knowledge management on firm innovation is different according to the managerial task.
- H<sub>4</sub>: The effect of knowledge management on firm innovation is different according to number of employees.
- H<sub>5</sub>: The effect of knowledge management on firm innovation is different according to sector.
- H<sub>6</sub>: The effect of knowledge management on firm innovation is different according to the nature of the business.

## RESEARCH METHOD

### Sample and Data Collection

The research was conducted using face-to-face survey method with employees of six large and innovative businesses in Kocaeli. The selection of the sample was made by convenience sampling from the population. Questionnaires obtained from the survey were evaluated and data from 120 available questionnaires were evaluated after missing questionnaires and inappropriate surveys. In the research, the relational scanning method was used. Describe the purpose of the scanning models in the way they are; the purpose of the relational (comparative) screening model is to examine whether more than one variable differs according to each other and groups (Karasar, 2015).

### Analysis

SPSS 21.0 statistical software program was used to evaluate the data obtained in relation to the research. Confirmatory factor analysis, item total correlation and Cronbach Alpha test were used to test the reliability of the research scales. Then, the averages, standard deviations and normality distributions of the research variables were determined (Çokluk, Şekercioglu and Büyüköztürk, 2010). Correlation and regression analyzes were conducted to verify research hypotheses. Two independent t test and Anova tests were used to compare scale scores according to demographics. The level of significance in the analyzes was taken as 0.05.

A questionnaire consisting of three parts was used as data collection tool in the research. In the first part of the data collection tool, there is information form consisting of participants' age, education level, managerial status, number of employees in operation, sector and quality information. In the second part of the questionnaire, Information Management Scale developed by Özcan (2007) is included. The scale consists of 12 items and 3 dimensions (acquisition of information, education and training, communication). The choices on the scale are in the form of a 5-point likert (1-not implemented, 2-I do not know, planned to be implemented in 3-a year, 4-a year is applied shortly, 5-a year is applied long) size and scale scores are obtained. High scores indicate that knowledge management activities are applied at a high level. In this study, the Cronbach Alpha coefficient of the scale was 0.86; the Cronbach Alpha coefficients of the subscales were 0.70 - 0.71 and 0.70, respectively. Its' found by Özcan as 0,895. Bakhari (2009) used similar method and result.

In the third part of the questionnaire, Hult et al. (2004) developed by the Firm Innovation Scale. The scale consists of 6 items and one dimension. The choices in the scale are in the form of a 5-point Likert (1-strictly disagree, 5-strictly agree) scale score is obtained by dividing the item score total by the number of items. A high score indicates that the company's innovation is high. In this study, the Cronbach Alpha coefficient of the scale was 0.74. This method is supported by Özcan's (2007) and Karavardar's (2012) studies.

## Findings

8.3% of the 120 employees participating in the survey are in the age range of 35-40 years, 31.7% are in the age range of 41-45 years. 40.8% of the participants were undergraduates and 59.2% were trained at the graduate level. 75.8% of the participants have a managerial duty. 11,7% of the participants have 50-100 persons, 101,150 people in the 54,2% of the enterprises, 151-200 people in the 20,8% of the enterprises and more than 200 people in the 13,3% of the people. 25% of participants are in food, 15% in chemistry, 16,7% in health, 13,3% in durable goods, 15% in informatics and 15% in other sectors. 29.2% of respondents are international, 70.8% are only national. The comparison of scale and subscale scores according to age groups are given at Table 1:

**Table 1. T Test Results According to Age Groups of Scale Scores**

Sub-Dimensions	Age Groups	n	$\bar{X}$	SS	t	p
Acquisition of Information	35-40	82	3,71	0,71	-0,52	0,606
	41-45	38	3,80	0,59		
Education and Training	35-40	82	3,95	0,74	-0,20	0,844
	41-45	38	4,08	0,46		
Communication	35-40	82	3,95	0,78	-0,14	0,888
	41-45	38	4,01	0,58		
Information Management	35-40	82	3,85	0,66	-0,58	0,562
	41-45	38	3,95	0,45		
Business Innovation	35-40	82	4,06	0,52	-1,59	0,115
	41-45	38	4,14	0,59		

Knowledge management scale and subscale scores do not show any significant difference according to age groups ( $p > 0,05$ ):

**Table 2. Test Results According to Level of Education Scores**

Sub-Dimensions	Education Level	n	$\bar{X}$	SS	t	p
Acquisition of Information	Graduate	49	3,68	0,72	-0,62	0,540
	Master	71	3,78	0,63		
Education and Training	Graduate	49	3,96	0,79	0,09	0,925
	Master	71	4,02	0,57		
Communication	Graduate	49	3,88	0,87	-0,58	0,560
	Master	71	4,03	0,61		
Information Management	Graduate	49	3,82	0,70	-0,72	0,474
	Master	71	3,92	0,52		
Business Innovation	Graduate	49	4,05	0,62	-0,29	0,775
	Master	71	4,10	0,48		

Information management did not show any significant difference according to the level of education and subscale scores ( $p > 0,05$ ).

**Table 3. T Test Results According to Managerial Position of Scale Scores**

Sub-Dimensions	Management Task	n	$\bar{X}$	SS	t	p
Acquisition of Information	Yes	91	3,80	0,64	1,71	0,091
	No	29	3,56	0,75		
Education and Training	Yes	91	4,02	0,60	0,50	0,615
	No	29	3,91	0,85		
Communication	Yes	91	4,02	0,66	0,80	0,423
	No	29	3,80	0,89		
Information Management	Yes	91	3,93	0,54	1,56	0,122
	No	29	3,74	0,75		
Business Innovation	Yes	91	4,13	0,42	1,24	0,219
	No	29	3,94	0,80		

Knowledge management does not show any significant difference between scale and subscale scores according to managerial task ( $p > 0,05$ ).

**Table 4. Anova Test Results According to Number of Employees in Scale Scores**

Sub-Dimensions	Number of Employees	n	$\bar{X}$	SS	F	p
Acquisition of Information	51-100	14	3,80	0,45	1,03	0,383
	101-150	65	3,74	0,70		
	151-200	25	3,58	0,69		
	201 and over	16	3,91	0,67		
Education and Training	51-100	14	4,11	0,35	0,43	0,733
	101-150	65	3,94	0,67		
	151-200	25	4,00	0,79		
	201 and over	16	4,09	0,64		
Communication	51-100	14	4,17	0,43	1,11	0,349
	101-150	65	3,94	0,75		
	151-200	25	3,84	0,79		
	201 and over	16	4,08	0,69		
Information Management	51-100	14	3,99	0,27	1,06	0,371
	101-150	65	3,86	0,61		
	151-200	25	3,79	0,71		
	201 and over	16	4,02	0,59		
Business Innovation	51-100	14	4,24	0,23	1,10	0,350
	101-150	65	4,12	0,46		
	151-200	25	3,94	0,74		
	201 and over	16	4,02	0,65		

Knowledge management does not show any significant difference between the scale and sub dimension scores according to the number of employees in operation ( $p > 0,05$ ).

**Tablo 5. Anova Test Results According to Sector Scale Score**

Sub-Dimensions	Sector	n	$\bar{X}$	SS	F	p
Acquisition Information	Food	30	3,87	0,47	1,25	0,291
	Chemistry	18	3,68	0,70		
	Health	20	3,96	0,51		
	Durable Consumer Goods	16	3,65	0,87		
	IT	18	3,50	0,76		
	Others	18	3,66	0,76		
Education Training	Food	30	4,08	0,43	1,42	0,222
	Chemistry	18	4,17	0,64		
	Health	20	4,14	0,40		
	Durable Consumer Goods	16	3,92	0,88		
	IT	18	3,75	0,88		
	Others	18	3,83	0,76		
Communication	Food	30	4,17	0,39	0,70	0,625
	Chemistry	18	3,98	0,64		
	Health	20	4,13	0,38		
	Durable Consumer Goods	16	3,67	1,10		
	IT	18	3,83	0,89		
	Others	18	3,83	0,86		
Information Management	Food	30	4,01	0,29	1,17	0,326
	Chemistry	18	3,92	0,54		
	Health	20	4,06	0,20		
	Durable Consumer Goods	16	3,74	0,89		
	IT	18	3,67	0,80		
	Others	18	3,76	0,73		
Business Innovation	Food	30	4,17	0,21	0,31	0,907
	Chemistry	18	4,04	0,64		
	Health	20	4,21	0,25		
	Durable Consumer Goods	16	4,06	0,47		
	IT	18	3,94	0,84		
	Others	18	4,01	0,72		

Knowledge management scale and subscale scores do not differ significantly according to the sector ( $p > 0,05$ ).

**Table 6. Test Results of Scale Scores According to Operational Qualifications**

Sub- Dimensions	Qualification	n	$\bar{X}$	SS	t	p
Acquisition of Information	International	35	3,75	0,75	0,48	0,635
	National	85	3,73	0,64		
Education and Training	International	35	3,98	0,79	0,35	0,729
	National	85	4,00	0,61		
Communication	International	35	3,96	0,80	0,22	0,825
	National	85	3,97	0,70		
Information Management	International	35	3,88	0,71	0,68	0,499
	National	85	3,88	0,55		
Business Innovation	International	35	4,00	0,69	-1,16	0,249
	National	85	4,12	0,47		

Knowledge management does not show any significant difference between scale and subscale scores according to the nature of the operator ( $p > 0,05$ ). According to the results of the research, the hypothesis of  $H_1$ ,  $H_2$ ,  $H_3$ ,  $H_4$ ,  $H_5$  and  $H_6$  was rejected and no significant difference was found in demographic characteristics in the effect of information sharing and management innovation on the sample consisting mostly of innovative firms. The reason for this is that employees already internalize innovation, as there is already a culture of innovation in these enterprises. Senior management supports innovation. For the sector, businesses adopt a pioneering strategy, often turning to radical or incremental innovation and earning a significant profit share and cost advantage. Sharing sectoral knowledge with competitors and suppliers does not seem dangerous but rather it improves the process. In most cases, seniority and experienced managers encourage employees to create new ideas and participate.

## CONCLUSIONS AND DISCUSSION

The starting point of the research is the need to innovate in a changing cultural, economic and technological environment and the strategic importance of knowledge at this point. The development of innovation in a business depends on its knowledge capacity and its widespread using (Kermally, 2004). In this context, as well as the analysis of the types of knowledge, it has strategic priorities as to which sectors of this information are used. A business may resist to share information which perceive innovation as a non-productive time and does not allocate resources among employees. The uncertainties in business life, bring about the issue of sectorial trust of employees and managers. This leads to knowledge becoming implicit and decreasing organizational propensity for innovation.

The research sample was consisted by employees in six innovative businesses from Turkey's largest 500 list that operating in Kocaeli. Convenience sampling method was used. According to the results, it is seen that "knowledge management is important in international and national innovative businesses" because of the different sectoral distributions and qualities. This result is supported by various researches (Jorgenson and Stiroh, 2000; Pelenk, 2016). The difference of this research from others is consisting of large scale businesses from different sectors. So whether there is a significant difference as using information for innovation, is main problematic of this study. At this point, how information is perceived by employees is important in this study. So is there a meaningful difference in the acquisition, learning and transmission of knowledge among employees? As results;

Most of the participants were trained at the graduate level (59.2%).

Most of the participants have a managerial duty (75.8%).

Different sectors were examined according to use information for innovation: 25% of participants are in food, 15% in chemistry, 16,7% in health, 13,3% in durable goods, 15% in informatics and 15% in other sectors.

70.8% of businesses is national.

Sub dimensions of knowledge management does not show any significant difference according to demographic factors (age, education, national/international, sector, number of employees)

Results of this research is important. Because it is being stressed that for innovation, primarily businesses must have innovation culture. So this innovative culture is assimilated by employees. Hereby innovative goal is adapted by employees and managers. Innovation must be supported by top management. In businesses which have innovative culture and capability, “education, training and communication of knowledge” can’t show any significant difference. This is supported by various studies: Mc Lean (2005), Martins and Terblanche (2003), Kanter (1983). Because all employees are coordinated around the same goal. If sharing of information is significant among employees and employer (leader of team), crisis that source of communication error can occur. The difference in knowledge wasn’t not significant in this study because they were already highly specialized and highly educated in the field of all employees.

Bakhari (2009) was found the similar results. As this study that demographic variables aren’t significant predictors government personel knowledge management. This result is supported by Carneiros’ study (2000) that knowledge management has an important role in terms of employees’ development, information technologies, values, attitudes and beliefs, for employees and managers. Most of the innovative businesses couldn’t be reached because of the time and cost constraints. But in innovative business, different and new ideas always occur. Because trust and respect employees' abilities are important factors in these businesses. So is it a problem? Or does it bring success in different sectors? Like these questions, this research could be improved as intra-sectoral allocation or cultural factors of country. And finally it is original study because the sample of this study is obtained from the biggest 500 enterprises around Kocaeli / Turkey. But sampling could be expanded as a country-based.

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