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Research Article

PRODUCT INNOVATION AND THE MODERATING ROLE OF INNOVATION CULTURE (CASE STUDY: KHORASAN RAZAVI INDUSTRIAL BREAD PRODUCING FACTORIES)

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ABSTRACT
In an era with rapid change ofknowledge, developing innovations in technology context are essential to create and maintain the company'scompetitive advantage, and the product innovation has been widely known askey factorto the success of most companies. As the presence of innovation culture is a key factor in the movement of trade and business toward entrepreneurship and globalization, and innovation is deemed as one of the most important sustainable competitive resources; as a result, a company's innovation capability depends on the intellectual and organizational assets of the company and its ability to expand such assets. Thus, in this paper, in addition to examining the direct relationship between the human knowledge and technological assets and the product innovation, the moderating role of innovation culture in these relationships is discussed. To this end, using standardized questionnaires, the high-tech manufacturing companieswere assessed, and the datawere analyzed by SPSS software. After analyzing the relationship between human capital and product innovation in these firms, the results indicatedthe modulatory role ofinnovation culture in the knowledge-based model of product innovation.

Keywords: *Innovation Culture, Human Capital, Technological Knowledge Assets and Product Innovation*

INTRODUCTION
Human capitals and innovation are among the issues having special link with each other.They also have direct relationship with the organization's culture.The innovation culture is of great importance in creating and sustaining an innovative organization. Any organization needs at least three types of capital to achieve its objectives, which complement each other, and the development of the organization isalso subject to the presence of all three categories of namely minimum capitals, including social capital, human capital and economic capital. Capital in its general meaning implieson the set of assets, facilities and available resources, which represent in various forms and shapes (Etesami and Fazeli, 2010). Human capital is a concept that encompasses skills and capabilities such as specialized knowledge of the organization personnel (Peng, 2011). In fact, human capital includes the skills and abilities that people acquire them, skills in the field of education levels, verbal and communication skills, self-confidence, leadership power, etc. (Manzorand, 2009). Since organizational renewal, especially innovation in product is generally the main challenge for the prosperity and success of companies in today's economic environment, and given the role of knowledge in creating competitive advantage and innovational outcomes in organizations, thepresent study was performed in Khorasan Razavi manufacturing factories of industrial bread with the following purposes: Analysis of internal complexitieswhich are as featuresof innovation in technology in a company; to assess the direct relationship between human knowledge and technological assets and the product innovation, and to study the moderating role of innovation culture in these relationships.

Research Literature
Product Innovation
In the global market environment, an important element for business success in the long term is product innovation (Boso *et al.*, 2012). New products enhance the business growth of the company and increase

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the sales and profits, and are considered an important component in business planning (Dwyer and Mellor, 1993). Van *et al.*, argue that "organization creativity is a foundation for process innovation, and innovation is a part of a system that produces it (Yazdani, 2007). The major resources of creating organizational ideasare divided into two main categories:

- Extra-organizational resources such as goods or services available on the market, business activities and technologies available in the market, industrial research and development centers, trade fairs, scientific and industrial congresses and meetings, academic communications and activities
- Intra-organizational resources, including creative and innovative human resources, organization's strategic plan or in other words the organization's vision, using the techniques of generating ideas and research projects (Esmail, 2009).

According to Mclean (2005), innovation includes successful implementation of creative ideas within an organization (p.227). In today's turbulent world, theorganizations will not be able to survive without creativity and innovation. The employees'creativity can help the organization's survival. When the employees are creative in their work, they would able to provide and apply new and useful ideas about the products, performance and services. Thus, generating and taking advantage of new ideasenables the manufacturing organizations to adapt to the changing market conditions and respond to threats and opportunities as well as developing. Creating the appropriate culture and its context are as influencing factors on appearance of creativity in a society, which encourage new and noble thoughts. Culture of innovation and creativity as an input leads to continuous movementof development dynamic cycle, and increases the productivity through adjusting the organization with changes. Some have divided innovation into technological innovation, product innovation and process innovation. Process innovation is known as the fundamental innovation in production technology of the product (in the form of new equipments or managerial approaches or both of them), and it is believed that process innovation and product innovation are closely linked together, and as the rate of product innovation decreases, the growth rate of process innovation would increase. In another classification, other types of innovationnecessary to understand and identify the organization are divided into three types: Technical and administrative innovations, product and process innovations, and radical and incremental innovations (Liao and Wu, 2010). Innovation can be a new product or service, the technology of manufacturing process or new structures, administrative systems, or a new plan or project for members of the organization. Therefore, organizational innovation is measured by the rate of innovation acceptance (Damanpour, 1991).According to research conducted by Coombs and Bierly (2006), innovation is considered as one of the most sustainable competitive sources as it improvesthe product and increases the value of the portfolio.

Several definitions of innovation can be found in organizational literature studies.In fact; innovation refers to the implementation of an idea generated from creativity that is providedas a new product or service. Holt used the term of innovation in a broad sense as a process to use the relevant knowledge or information in order to crate or introduce something new and useful.He explainsthat innovation is anything revised that has been designed or realized, which strengthen the organization position against competitors and makes a long-term competitive advantage possible (Hart, 1988). Urabe also suggests that innovation is the development and application of new ideas asa new product, process, or service that leads to dynamic growth of the national economy and increased employment for profit generation in the innovative company (Urabe *et al.*, 1988). Peter (1991) on Innovation says: Innovation is mainly concerned with what we can call it an organized withdrawal. Discussing product innovation, Adams according to Abernathy and Utterback (1987), defines the introduction of new or significantly modified products or services to meet the needs of a user or a market as product innovation, which effect of result is what the customer sees. The innovation related to the product can be defined in three forms of the development process of a new item, the new item itself and the following process of the new item (Zaltman *et al.*, 1973). From the viewpoint of Oslo Guidelines (2005), product innovation means"The introduction of a product or service that is new or accompanied with substantial improvement regarding its characteristicsor knowingly uses". This innovation includes significant improvements in components and ingredients, the software attached to it, the convenience of using it or its other functional properties.

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The ultimate goal of product innovation is that the company can achieve a competitive advantage by introducing a new product, which allows it to increase demand and the sales price (Oslo Guidelines, 2005). According to research by de Castro *et al.*, (2013), the process of innovation can be generally understood as a complex activity in which the new knowledge is used for business purposes.

Human Capital

In an era where knowledge is changing rapidly, and innovation, success and sustainability of the business is very important, human capital in the organization appears to be one of the issues with growing importance. Roberts (1988) also argued that the four dimensions of human resources, structure, strategy, and support system have been the success axis of innovation. According to Scarborough and Carter (2000), given that the organization has access to the knowledge, skill, and expertise of the staff, it requires appropriate capacity of knowledge management tools to ensure the effective use of human capital in developing the organizational expertise in order to create innovation. According to researchers, the economic wealth derived from knowledge assets, intellectual capitals and their applications can be an alternative, or perhaps a complementary to the ground, labor and the capital (de Castro *et al.*, 2013). Based on Edvinsson and Malone (1997) classification, intellectual capitals have two levels: Human capital (knowledge created and stored by human resources of a company and its employees) and structural capital (empowering and supportive infrastructure of human capital). According to Subramaniam and Youndt (2005), human capital refers to the knowledge of staff and their ability to produce it, which is useful for the company. According to conducted studies, both intellectual capitalscan be contributory to the companies' product innovation.

Several studies have been conducted regarding the relationship between human capital and innovation, including Beugelsdijk research, which in 2008examined the relationship between strategic performance of human resources and the ability of a company for product innovation. The results showed that performance-based education is positively associated with incremental innovation, but not with radical innovation (Beugelsdijk, 2008). Also, according to de Castro and colleagues (2013) studies, one can say that a company's ability to innovate has a close affiliation with intellectual capitals or its organization knowledge capitals and the company's ability to develop such capitals (2013).

Technological Knowledge Assets

Innovation is the key competitive tool for many companies, especially in knowledge- and technology-based industries (de Castro *et al.*, 2013). Many companies have recently started to introduce their knowledge management initiatives to improve their performance. For most organizations, the knowledge assetsmanagement is a critical issue in achieving competitive advantage in the knowledge-based economy. Knowledge assets refer to firm-specific resources that are necessary to create value for the company (Tun *et al.*, 2010). One of the best ways for a company to achieve competitive advantage is directlyresultedfrom continuous technological innovations (de Castro *et al.*, 2013), and the ability of a company in products innovation and their knowledge assets as a dynamic capability is essential for their success in the future. Technologicalcapitals (technical knowledge assets) generally refer to the effort for research and development and the distribution of technical knowledge (Díaz *et al.*, 2008). According to de Castro *et al.*, (2013), in recent years, a number of researchers in the field of management focused on internal features of a company, which is influenced by technological innovations output. Specifically, the researchers had a special focus on Resource-Based View (RBV), Knowledge-Based View (KBV) andIntellectual Capital-Based View (ICBV) (P. 352). The RBV emphasizes thata company's resources and capabilities are the major factors to achieve competitive advantage and its technological achievements, such as organizational capabilities, culture, human capital, technical knowledge, and experience. Thus, RBV is an appropriate theory in which framework the researchers are working to review and analyze the role of capabilities and intangible resources to create competitive advantage through innovation. Recent developments such as KBV and ICBV are trying to focus in how the knowledge is created, its distribution, accumulation, storage, attracting and using the knowledge in the organization. According to Nonaka (1994), the new knowledge is developed by people, but organizations play an important role in its expression and distribution. Also, according to Nonaka and Takeuchi studies

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(1995), in examining the relationship between innovation and knowledge, the innovation was considered as the most important organization's commercial activity on knowledge management.ICBV is an approach that tries to overcome the problems of resource assessment and intangible capabilities and focuses on intellectual capitals management. The term "intellectual capitals" acts as a synonym for intangible assets and knowledge assets. Based on research by Dean and Kretschmer (2007), the term "intellectual capital" increasingly plays an important role asa strategic resource in business competition. Based on Subramaniam and Youndt (2005) definition, "intellectual capitals" refer to the sum of all knowledge assets that the company uses them for competitive advantage, which represents the distinct knowledge stocks accumulated and distributed through the individuals, relationships between the individuals and the organization itself. The results of Subramanian and Youndt studies on the impact of intellectual capital aspects on innovative capabilities in various organizations revealed that people, organizations, social capital and reciprocity relationships between theminfluence incremental and radical innovation capabilities (2005).

Innovation Culture

Researchers have done many efforts to discover and understand that how different organizational, personal and environmental factors can nurture innovation. In general, there are three sets of variables capable of creating innovation. They are related to the organizational structure, culture, and human resource capabilities. Over the past two decades, organizational culture has been known as an important component of organizational success (Irani *et al.*, 2004). To explain the influence of organizational culture on innovation, it should be noted that innovative organizations have similar cultures. They encourage to experience and reward both for successes and failures. They gain experience from errors. The organization controls the environment closely and quickly responds to changes as they happen. An innovation-oriented culture is primarily defined as the need to maximize the innovative ideas emerging in a given period. A more precise definition of innovation culture notes that innovation culture is one way of thinking and behavior, which creates, develops and establishes an organization's values and attitudes, and involves the acceptance and supporting of ideas and improving changes in performance and efficiency of the company. For innovation culture success in the company, four areas are necessary:

- The company management must tend to take risks
- It requires the participation of all members of the company
- The creativity should be stimulated
- The responsibility should be allocated

Organizational culture is a culture innovation in which continued development of production and application of new ideas in all areas of the organization is considered a norm. Having innovation culture should be a result of continuous efforts of motivated employees and their sufficient confidencein creation of something new. In another definition,the innovation culture is a common understanding of facts, values, social and cognitive environment and collective beliefsexisting in a consistent pattern of behavior in individuals (Ismail, 2005). By definition, innovation culture refers to the sharing of values, beliefs, and common assumptions of organizational members that can facilitate the product innovation process. When a corporate culture encourages its employees to innovate and risk tolerance and supports personal growth and development, that organizational culture may be called as an innovative culture (Menzel *et al*., 2007). According to research, the innovation process cannot be traditionally organized, planned, and conducted due to formal roles and procedures, but it should be nurtured through creating a culture of innovation.

Thus, the present study was performed in Khorasan Razavi manufacturing factories of industrial bread with the following purposes: Analysis of internal complexities which are as features of innovation in technology in a company; to assess the direct relationship between human knowledge and technological assets and the product innovation, and to study the moderating role of innovation culture in these relationships. To this end, based on the definitions provided of the research variables and their components,a conceptual model was designed to explain the correlation between the research variables and through testing the research hypotheses, the presence of relationship between the studied elements was investigated.The conceptual model is presented as follows:

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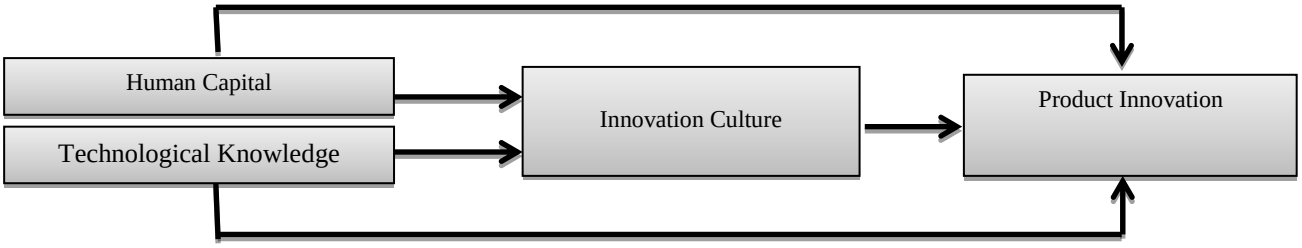

Figure 1: Conceptual Model

According to the model, the research hypotheses are as follows:
Hypothesis 1: Human capital has a direct and positive impact on product innovation.
Hypothesis 2: Technological knowledge assets have a direct and positive impact on product innovation.
Hypothesis 3: Human capital has a direct and positive impact on innovation culture.
Hypothesis 4: Technological knowledge assets have a direct and positive impact on innovation culture.
Hypothesis 5: Innovation culture has a direct and positive impact on product innovation.
Hypothesis 6: Innovation culture has a positive mediating role in the relationship betweenhuman capital and product innovation.
Hypothesis 7: Innovation culture has a positive mediating role in the relationship between technological knowledge assets and product innovation.

MATERIALS AND METHODS

Required data for this study was collected using a questionnaire that its reliability was tested. In the field study of the research, a questionnaire containing 26 questions, in which all questions were as five-option Likert scale, was used to collect data. The score given by the respondents to the questionnaire on Likert scale determined the state of innovation in the studied companies. The data were analyzed by SPSS software. Multiple linear regression analysis was used to examine the research model.In addition, to investigate the self-correlation between errors and the normalization of dependent variable, the Durbin-Watson (DW) test and Kolmogorov-Smirnov test were used, respectively. The people related to the research topic, including employees, experts, and authorities in a complex of high-tech industrial bread production companies in Khorasan Razavi Province, Iran were selected as the target population.In this research, the simple random sampling method was used, and using the Cochrane formula for sample size, the sample size was calculated as 180 subjects. The content validity and Cronbach's alpha coefficient were used to determine the questionnaire validity and reliability. The reliability coefficient was calculated as follows: Human capital: 0.709; Technological knowledge assets: 0.711; Innovation culture: 0.721 and Product innovation: 0.703.

Data Analysis

The multiple linear regression analysis we used to examine the research model. Assuming the presence of a causal linear relationship between the two quantitative variables, the regression equation is defined as $\psi = \alpha + \beta\chi + \varepsilon$; in fact, the dependent variable is estimated with the help of independent variables.

ψ : Represents the dependent variable matrix

α : Represents the intercept matrix of the regression line

β : Represents the matrix of regression coefficients, which shows that for a unit change in the independent variable, how much the dependent variable will change.

χ : Represents the independent variables matrix

Examining the Direct Effects Model

According to the model, human capital, innovation culture and knowledge assets should independently predict the product innovation. On the other hand, human capital and knowledge assets should independently predict the innovation culture. In order to test these two models,the use of innovation

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culture and product innovation are entered into the regression equation as predicting variables, and fit a regression line.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_k X_K + \varepsilon$$

Where:
Y: Dependent variable
α : Intercept
β_1 ، β_2 β_3 : The estimator of regression line slope
X_i : Independent variables

However, before doing the regression test, the establishmentof assumptionsnecessary to apply it should be ensured.

Kolmogorov–Smirnov (KS) Test

The corresponding statistical hypothesis with this test can be expressed as follows:
H_0: Variable Y has a normal distribution
H_1: Variable Y has not a normal distribution

Table 1: Kolmogorov–Smirnov (KS) test

Product Innovation	**Innovation Culture**	**Indices**
180	180	Count
3.3000	3.1704	Mean
0.51072	0.52081	SD
0.168	0.145	Absolute maximum of SD
0.168	0.106	Maximum positive deviation
-0.148	-0.145	Maximum negative deviation
0.108	0.115	Kolmogorov-Smirnov
0.063[c]	0.056[c]	Significance level

Based on the table output (P- value> 0.05), the hypothesis H0 is not rejected, and the H1 hypothesis indicating the absence of normal data will be accepted.

Durbin-Watson (DW) Test

One of the assumptions considered in the regression is the independence of errors (the difference between the actual values and the predicted values by the regression equation). Ifthe independence of errors hypothesis is rejected and the errors are correlated with each other, the regression cannot be used. Then, the Durbin-Watson (DW) test will be used to investigate the independence of errors.The test statistic value is in the range of 0 and 4, and if the statistic occurs in the range of 1.5 or 2.5, thetest of non-correlation between the errors will be accepted, and otherwise, thereis a correlation between errors. Ascan be seen in Table 3, the value of this statistic for these test occurred in the above range, and we accept that the data are uncorrelated with each other. After testing the assumptions necessary for using regression, the researcher's claimsare tested using linear regression analysis. In regression technique, first, the significance of the whole regression model is tested, which is done by ANOVA table. Then, the significance of the independent variable coefficient must be examined, which is done using a table of coefficients. The test results include four outputs as follows.

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Table 2: Independent variables entered into regression testing

Model	Entered Variable	Eliminated Variable	Method
Dependent: Product innovation (Direct impacts)	Human capital, knowledge assets and innovation culture		Input
Dependent: Innovation culture (Direct impacts)	Human capital and knowledge assets		Input
Dependent: Product innovation (Modifying impact)	Human capital, knowledge assets and interaction between innovation culture and human capital		Input
Dependent: Product innovation (Modifying impact)	Human capital, knowledge assets and interaction between innovation culture and knowledge assets		Input

Table 2 shows entered and deleted independent variables and method used in the regression. Table 3 respectively estimates the multiple correlation coefficient, determination coefficient, adjusted coefficient of determination and standard error.According to coefficient of determination obtained from the test output; one can say what percentage of the dependent variable changes is justified by the independent variables included in the model.

Table 3: Results of regression correlation coefficients

Model	Multiple correlation coefficient	Determination coefficient	Adjusted determination coefficient	Standard error	Durbin-Watson
Dependent: Innovation Culture (direct impacts)	0.633[a0]	0.4000	0.3930	0.405670	1.893
Dependent: Product innovation (direct impacts)	0.888[a0]	0.7880	0.7840	0.237210	1.877
Dependent: Product innovation (interaction of innovation culture and knowledge assets)	0.878[a0]	0.7700	0.7660	0.246950	1.968
Dependent: Product innovation (interaction of innovation culture and human capital)	0.8310	0.6910	0.6850	0.286450	1.675

Table 4 contains the regression analysis of variance to investigate the certainty of a linear relationship between the two variables. The statistical hypotheses of test significance of the whole regression model are as follows:

H0: There is no linear relationship between the variables.

H1: There is a linear relationship between the variables.

In fact, the null hypothesis states that all regression coefficients are equal to zero, i.e.:

$$H_0 : \beta_1 = \beta_2 = 0$$

H1:At least, the coefficient of one independent variable is non-zero.

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Table 4: The results of regression variance analysis

Sig	F statistic	Mean Square	Df	Sum of Square	Model
Dependent: Product innovation (direct effects)					
0.000	196.531	11.985	3	35.956	Variability rate of dependent variable through independent variable
		0.061	176	10.733	Variability rate of dependent variable through random factors
			179	46.689	Sum
Dependent: Innovation culture (direct effects)					
0.000	59.019	9.712	2	19.425	Variability rate of dependent variable through independent variable
		0.165	177	29.128	Variability rate of dependent variable through random factors
			179	48.553	Sum
Interaction of knowledge assets and innovation culture					
0.000	196.531	11.985	3	35.956	Variability rate of dependent variable through independent variable
		0.061	176	10.733	Variability rate of dependent variable through random factors
			179	46.689	Sum
Interaction of human capital and innovation culture					
0.000	130.997	10.749	3	32.247	Variability rate of dependent variable through independent variable
		0.082	176	14.442	Variability rate of dependent variable through random factors
				46.689	Sum

In the above table, Sig = 0.0 and less than 5% (P- value< 0.05). Then, the hypothesis of a linear relationship between the dependent variable and independent variables is confirmed.

In Table 5, in column B, respectively, the constant value and the coefficient of the independent variable are presented.The coefficients Table include two sets of standardized beta coefficients and non-

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standardized beta coefficients. In non-standardized beta coefficients, the variables scales are not the same, while in beta standardized coefficients, the variables scales are homogenized and the variables can be compared. Therefore, the standardized coefficients are used to compare the effect of independent variable on the dependent variable.

Table 5: Regression equation coefficients and significance levels

Sig	(t) Statistic	Standardized coefficients	Non-standardized coefficients		Model
			Std.Error	B	
Adjusting model: Interaction of human capital and innovation culture					
0.001	3.534		0.290	1.025	Constant value
0.000	4.516	0.415	0.090	0.407	Innovation culture
0.042	2.049	0.199	0.083	0.169	Human capital
0.047	1.998	0.294	0.021	0.043	: Interaction of human capital and innovation culture
Adjusting model: Interaction of knowledge assets and innovation culture					
0.276	1.092		0.483	0.527	Constant value
0.011	2.554	0.415	0.159	0.407	Innovation culture
0.007	2.752	0.476	0.146	0.402	Knowledge assets
0.773	0.288	0.084	0.046	0.013	: Interaction of knowledge assets and innovation culture
Direct effects model: Dependent: Innovation culture					
0.000	6.252		0.187	1.169	Constant value
0.000	4.008	0.297	0.064	0.257	Human capital
0.000	5.467	0.405	0.064	0.349	Knowledge assets
Direct effects model: Dependent: Product innovation					
0.021	2.333		0.121	0.282	Constant value
0.000	3.852	0.178	0.039	0.151	Human capital
0.000	9.300	0.444	0.040	0.375	Knowledge assets
0.000	9.154	0.410	0.044	0.402	Innovation culture

Now, if α and β are respectively the constant value and the regression line slope of the population, the hypotheses testing for these two can be written as follows:
H0: $\beta = 0$
H0: $\alpha = 0$
H1: $\alpha \neq 0$
H1: $\beta \neq 0$
For each independent variable in the model, a regression coefficient and a significance level are calculated.The regression coefficient shows the size and the equation direction, but regarding the significance, it is judged by the significance level.If the significance level is greater than 0.05, the regression coefficient is assumed equal to zero.
As a result, the independent variable becomes ineffective and can be removed from the model. If the significance level is smaller than 0.05, the presence of independent variable in the model is significant, and its regression coefficient will be investigated.

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Results

Hypothesis 1

1. Human Capital has a direct and positive impact on product innovation.

Table 6: Results summary of regression equation coefficients and significant levels

Significance level	(t) Statistic	Standardized coefficients	Non-standardized coefficients Std.Error	B	Model
0.000	3.852	0.178	0.039	0.151	Human Capital

According to the table above, the impact of human capital variable on product innovation with regression coefficient of 0.151 and significance level of 0.05> 0.000 is statistically significant, and due to the positive regression coefficient, the direct impact is accepted.Thus, the researcher's claim is confirmed, and we can say with 95% confidence level that the human capital has a direct, positive, and significant effect on product innovation. Therefore, in accordance with the research conducted, it can be concluded that having motivated, talented and experienced human capital should be the basis of all innovation processes in the companies, and this type of intellectual capitals provides the main source of development of new ideas and knowledge.

Hypothesis 2

2. Knowledge assets have a direct and positive impact on product innovation.

Table 7: Results summary of regression equation coefficients and significant levels

Significance level	(t) Statistic	Standardized coefficients	Non-standardized coefficients Std.Error	B	Model
0.000	9.300	0.444	0.040	0.375	Knowledge assets

According to the table above, the impact of Knowledge assets variable on product innovation with regression coefficient of 0.375 and significance level of 0.05 > 0.000 is statistically significant, and due to the positive regression coefficient, the direct impact is accepted. Thus, the researcher's claim is confirmed, and we can say with 95% confidence level that the knowledge assets have a direct, positive, and significant effect on product innovation. The results obtained in this hypothesis are consistent with the results of Subramaniam and Youndt (2005) that demonstrated technical knowledge has a positive effect on product innovation. Thus, beyond human capital, an important part of technical knows how the capabilities and experience required for the successful development of new products and services are embedded across the organization.

Hypothesis 3

3. Human Capital has a positive impact on innovation culture.

Table 8: Results summary of regression equation coefficients and significant levels

Significance level	(t) Statistic	Standardized coefficients	Non-standardized coefficients Std.Error	B	Model
0.000	4.008	0.297	0.064	0.257	Human Capital

According to the table above, the impact of human capital variable on innovation culture with regression coefficient of 0.297 and significance level of 0.05 > 0.000 is statistically significant, and due to the positive regression coefficient, the direct impact is accepted. Thus, the researcher's claim is confirmed.

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Hypothesis 4

4. Knowledge assets have a positive impact on innovation culture.

Table 9: Results summary of regression equation coefficients and significant levels

Significance level	(t) Statistic	Standardized coefficients	Non-standardized coefficients Std.Error	B	Model
0.000	5.467	0.405	0.064	0.349	Knowledge assets

According to the table above, the impact of knowledge assets variable on innovation culture with regression coefficient of 0.349 and significance level of 0.05 > 0.000 is statistically significant, and due to the positive regression coefficient, the direct impact is accepted. Thus, the researcher's claim is confirmed. In this regard, Beugelsdijk research can be mentioned, which in 2008 examined the relationship between strategic performance of human resources and the ability of a company for product innovation. The results showed that performance-based education is positively associated with incremental innovation. Also, according to de Castro *et al.*, (2013) studies, one can say that a company's ability to innovate has a close affiliation with intellectual capitals or its organization knowledge capitals and the company's ability to develop such capitals.

Hypothesis 5

5. Innovation culture has a positive impact on product innovation.

Table 10: Results summary of regression equation coefficients and significant levels

Significance level	(t) Statistic	Standardized coefficients	Non-standardized coefficients Std.Error	B	Model
0.000	9.154	0.410	0.044	0.402	Innovation culture

According to the table above, the impact of innovation culture variable on product innovation with regression coefficient of 0.402 and significance level of 0.05 > 0.000 is statistically significant, and due to the positive regression coefficient, the direct impact is accepted. Thus, the researcher's claim is confirmed.According to de Castro *et al.*, (2013), focusing on innovation culture has a positive effect on the performance of knowledge management according to the company's innovation and performance from both source-based and knowledge-based views. Therefore, the organizations need to develop more effective methods that ensure that the culture will lead to knowledge sharing.

Table 11: Results summary of regression equation coefficients and significant levels

Significance level	(t) Statistic	Standardized coefficients	Non-standardized coefficients Std.Error	B	Model
Adjusting model: Interaction of human capital and innovation culture					
0.001	3.534		0.290	1.025	Constant value
0.000	4.516	0.415	0.090	0.407	Innovation culture
0.042	2.049	0.199	0.083	0.169	Human capital
0.047	1.998	0.294	0.021	0.043	: Interaction of human capital and innovation culture

Hypothesis 6

6. Innovation culture has a positive mediating role in the relationship between human capital and product innovation.

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In order to evaluate the modifying model, the direct effects of human capital and innovation culture variables as well as the interactions of these two on product innovation are studied. If the effect of interaction of innovation culture and human capital on product innovation is statistically significant, due to their significant direct effects and based on the above results, the moderating model can be confirmed.
According to the table above, the impact of innovation culture variable on product innovation with regression coefficient of 0.402 and significance level of 0.05 > 0.000 is statistically significant, and due to the positive regression coefficient, the direct impact is accepted. Thus, the researcher's claim is confirmed.
The equation of interaction effect of innovation culture and human capital variables on product innovation after insertion the regression coefficients will be as follows.

$$\hat{y} = 1.025 + 0.407X_1 + 0.169X_2 + 0.043(X_1 * X_2)$$

We already see from the above table that the innovation culture regression coefficient in the above regression equation is as $\beta_1 = 0.407$, and thiscoefficient for the human capital variable is $\beta_1 = 0.169$, and as the test Sigrelated to both variables (0.000<0.05, 0.000<0.05) is less than 5%, as a result, the direct impact between them on product innovation was accepted.
According to Table 11, the regression coefficient for the interaction of innovation culture and human capital is equal to $\beta_1 = 0.043$, and as the relevant test Sig (sig = 0.047) is less than 5%, thus, the interaction effect of innovation culture and human capital on product innovationwill be accepted.Given the significance of the direct effects and interactions of innovation culture and human capital on product innovation, the adjustment role of the innovation culture regarding the relationship between human capital and product innovation is supported. Due to the positivity of this coefficient, the impact would be positive.

Hypothesis 7

7. Innovation culture has a positive mediating role in the relationship between knowledge assets and product innovation.

In order to evaluate the modifying model, the direct effects of knowledge assets and innovation culture variables as well as the interactions of these two on product innovation are studied. If the effect of interaction of innovation culture and knowledge assets on product innovation is statistically significant, due to their significant direct effects and based on the above results, the moderating model can be confirmed.

Table 12: Results summary of regression equation coefficients and significant levels

Significance level	(t) Statistic	Standardized coefficients	Non-standardized coefficients		Model
			Std.Error	B	
Adjusting model: Interaction of knowledge assets and innovation culture					
0.276	1.092		0.483	0.527	Constant value
0.011	2.554	0.415	0.159	0.407	Innovation culture
0.007	2.752	0.476	0.146	0.402	knowledge assets
0.773	0.2880	0.084	0.046	0.013	Interaction of knowledge assets and innovation culture

The equation of interaction effect of innovation culture and knowledge assets variables on product innovation after insertion the regression coefficients will be as follows.

$$\hat{y} = 0.407X_1 + 0.402X_2 + 0.013(X_1 * X_2)$$

We already see from the above table that the innovation culture regression coefficient in the above regression equation is as $\beta_1 = 0.407$, and this coefficient for the knowledge assets variable is $\beta_1 = 0.402$, and as the testSig related to both variables (0.011<0.05, 0.007<0.05) is less than 5%, as a result, the direct impact between them on product innovation was accepted.

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According to Table 12, the regression coefficient for the interaction of innovation culture and knowledge assets is equal to β_1 = 0.013, and as the relevant test Sig (sig = 0.773) is less than 5%, thus, the interaction effect of innovation culture and knowledge assets on product innovation will not be accepted. Given the insignificance of interactions of innovation culture and knowledge assets on product innovation, the adjustment role of the innovation culture regarding the relationship between knowledge assets and product innovation is not supported. Thus, the researcher's claim cannot be accepted at the 95% confidence level. In this regard, de Castro *et al.*, (2013) studies can be mentioned, in which they showed that innovation culture has an intermediary role in the knowledge-based product innovation model; for, the strategies for usingtechnological assets are as important elements of decision-making to make the best use of resources and organizational capabilities.

RESULTS AND DISCUSSION

Given that one of the survival conditions in a highly competitive and complex environment is the presence of innovation culture and the creation and maintaining an innovative organization, thus, to develop the culture of innovation, creativity, innovation and development of new ideas should be encouraged as cultural values in manufacturing companies, and a shared system of values, beliefs and goals towards innovation needs to be established in the companies.

According to de Castro *et al.*, (2013) findings, the innovation capability of a company closely depends on the intellectual capitals or its organizational knowledge capitalsand the company's ability to develop these assets. They also went beyond the direct relationships between humans and technologicalknowledge assets and the product innovation and studied the role of innovation culture in these relationships.The research results indicatedthe modulatory role ofinnovation culture in the knowledge-based product innovation model. Therefore, to improve the work processes, experiencing and innovation need to be encouraged. To do this, better planning should be done for use of science and technology in the production, preparing and distributing processes of the products of Companies producing bread toreduce the wastes.

Reasonable flexibility to changes and technological progresseshas led to up-to- dated organizations so that they set their policies, procedures, and decisions based on the facts. Measures need to be taken to promotethe technology level to reduce the waste of products include establishing research and development units, technology and technical knowledge management, optimization and expansion of product lines, diversification and innovation in products portfolio, and reviewing the administrative and operational procedures for more agilenessand increasing labor productivity in performing the issues .Also, in the field of human resources, to improve the skill levels of employees, the studied companies must allocate sufficient time and funds for staff training and activelyencourage the learning and development of its staff as up-to-date standards; since, the companies with the best human capital would be able to create maximum rate of ideas and producing new products.

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