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The role of intellectual capital in creating and establishing business value: A survey of a sample of workers at the Sonelgaz Foundation in Algeria

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ABSTRACT

This study seeks to highlight and clarify the level of intellectual capital in energy institutions in Algeria and to identify its role in creating value for the work of the institution in question, to address the problem of its content, and identify the reality of intellectual capital in the institution under study and its effectiveness in establishing and adding value to its work. A questionnaire was prepared and distributed amongst a target sample to gain their views and post-collection; the questionnaires were submitted to the SPSS program according to the fifth Likert scale. After descriptive analysis and testing the hypotheses of the study, a low level of awareness amongst the participants was found regarding the introduction of innovative technologies to improve their production processes and regarding the study's quest to achieve a good level of customer satisfaction with them. The reexamination of the improvement of the surveyed enterprise business level by focusing on the adoption of continuous improvement policy and change in the organizational culture is recommended as this may help it to own intellectual capital outstanding.

1. Introduction

Businesses are now working under a competitive knowledge-based economy characterized by rapid changes and large volumes of knowledge (Ben Hassen, 2021). This, accordingly, has become a real asset for the economy, where intellectual capital has occupied the position of a vital asset that passes on this knowledge in addition to being a source of competitive advantage via its capacity to introduce the latest innovations and add new business value. An assessment of the status quo of organizations in the Arab world reveals a lack of adequate awareness of the concepts of intellectual capital and its role in generating value for the organization (Serenko, 2023). According to several writers, the path to wealth and power commences by emphasizing the products of knowledge, scientific research, technical and continuous training of manpower, building and developing infrastructure, enhancing management systems, and adopting sophisticated technologies in handling administrative work (Wiig, 1997; Heitor et al., 2014; Sankaran et al., 2021). Both organization and utilization of knowledge give room for competitiveness and primacy. Promoting competitive advantages makes it imperative for these organizations to conceptualize their intellectual capital and to identify the appropriate methods and techniques to transform it into profits or into a competitive strategic position that yields benefits for the organization with respect to enhancing its performance.

Andriessen (2001) pointed out that the challenge facing organizations is the underlying hypothesis about the role of intellectual capital in creating value, as well as the importance of applying the theory of basic or pivotal competencies that clarified the concept and content of the component parts of intellectual capital, and the idea that he presented shows that this model is It doesn't take into account the fact that all types of intellectual capital should be grouped together under core competencies for business value. Many organizations still ignore their intangible assets, which are represented, according to Edvinsson and Malone (1997), in "the organization's ability to possess knowledge, applied

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experience, organizational techniques, customer market," and specialized skills that collectively provide the organization with the competitive edge of the market," not to mention that organizations reduce their economic value and their competitive precedence without noticing it and without monitoring it, and the confusing aspect of this is that most stakeholders and constituent bodies of business organizations have experienced some negative effects or repercussions and a decrease in their intangible value unwillingness to effectively protect and used on the need to invest them by likening him to the fact that intellectual capital is the knowledge that exists in the external environment to be applied and invested for the benefit of the organization by paying attention to their pivotal and intellectual abilities and their ability to create new creations and innovations and give new value to business organizations.

1.1. Problem statement

The basic system of value creation is based on the principle that value does not lie in the development of one model of intellectual capital but in the transfer of one form to another and thus in the relationship between them. This means that the focus should not be on managing individual models of intellectual capital but rather on the interrelationships among them. According to Uliana et al. (2005), the aspects that characterize intellectual capital are limited to developing a learning strategy for the organization, which is the cornerstone in order to increase the level of expertise, skills, and capabilities in a way that leads to achieving efficiency and effectiveness In accomplishing the internal operations of the organization while achieving customer value, and then reaching the financial goals represented in value-added and rates of return on investment, Thus, how should governments interact through their economic policies to pay attention to the new factors of wealth creation? In addition to the labor force participation rate, productivity is a key factor for economic growth, the future wealth of a nation, and its productivity. The economy is largely driven today by the share of its knowledge-based industries vis-à-vis other industries and by the size of their investment in education, information, intangible assets, and value-creating technologies, as well as in the activities of research and development. These areas represent the points that must be focused on in the areas of work and the construction of modern economic policies. The assessment of the reality of organizations in the Arab countries also shows a lack of sufficient awareness of the concepts of intellectual capital and its role in creating value for the organization for manpower, building and developing infrastructure, improving management systems, and relying on advanced technologies in carrying out administrative work. The organization of knowledge and its proper use give way to competition and excellence. The energy sector in Algeria is considered one of the most important sectors in creating a strong economy that meets the development needs of the state, and the sensitivity of this sector is related to the added value of the rest of the other sectors as energy institutions seek to reach the optimal use of material and immaterial resources. The tangible ones are difficult to control, given that their value is determined only after they are presented to the institutions when they need them. So, it's important to work on investing it in a way that fulfills its purpose and shows how important it is since energy institutions want to use this intangible resource to make their work more valuable.

Based on a field visit to the Sonalgaz Foundation, which is the focal point of this study, it was found there has been a growing interest in the foundation's material and financial resources. However, there is a weak interest in the foundation's intellectual resources and how to invest them to create intellectual capital on the one hand and in controlling and minimizing their costs along with attaining a continuous improvement in its organizational processes coupled with realizing a good level of customer satisfaction on the other. Accordingly, this has led to the following question:

- What role does intellectual capital play in creating and establishing value for the Sonalgaz Foundation business in Algeria?

The following sub-questions can be derived from the main question:

- What is the conceptual perspective of intellectual capital and creating value for businesses?
- What importance do the components of intellectual capital bear in the organization under study?
- To what extent does intellectual capital exist in the organization under study?
- What is the level of variation in creating value for Sonalgaz's business in Algeria?
- What is the level of the relationship between the presence of intellectual capital and the level of creation of value for Sonalgaz's business in Algeria?

What makes the field framework of this study significant is the fact that the energy sector constitutes one of the major sectors in the Algerian economy. This is coupled with the changes by modernity on the intellectual capital in the energy institutions and its role in creating and establishing business value for the organization under study. This field also requires a theoretical endeavor to fathom theoretical origins. This kind of study can be also viewed as a scientific addition in its practical aspect by projecting it to such a sensitive sector in the field of energy and its uses. This will, in turn, make significant contributions to the diversification of the past literature that addressed this field, in addition to identifying how much the organization under study relies upon intellectual capital in creating and establishing value to minimize costs, enhance its performance, and gain the satisfaction of dealing

with those considered sensitive variables impacted by the unstable business environment.

This study aims to achieve the following objectives:

- Identify the conceptual framework for intellectual capital, and identify the creation and establishment of business value.
- Realize the importance of Sonalgaz acquiring intellectual capital.
- Examine the possibility of the existence of intellectual capital, and examine the creation and establishment of value for the business in the researched institution.
- Propose a set of recommendations that could benefit senior management on how to utilize intellectual capital and business value in the future.

The hypotheses of this research are categorized as follows:

1. There exist no statistically significant differences in the sample's views with regard to the existence of intellectual capital in the researched organization due to the occupation variable, level of management, and work experience at a level less than 0.05.
2. There exist no statistically significant differences in the sample's views with regard to the creation and establishment of business value in the researched organization due to the occupation variable, level of management, and work experience at a level less than 0.05.
3. There exists no statistically significant relationship, according to the sample's views, between intellectual capital and the creation and establishment of business value in the researched organization at a level of less than 0.05.

2. Literature review

According to Moberly (2014), intellectual capital serves as a measure of value creation and is one of the key pillars in performance appraisal systems. In addition, Agndal and Nilsson (2006) asserted that a resource is fundamentally related to the knowledge that can lead to the creation of value. In the same vein, Stewart defines intellectual capital (IC) as the intellectual material that has been formalized, captured, and leveraged to create wealth by producing a higher-valued asset. Such material includes knowledge, information, intellectual property, and experience that can be leveraged to create wealth (Isaac et al., 2010). Thus, this intellectual material relies on the nature of the mental activity of the members of the organization. According to Vale et al. (2016), IC refers to accumulated and acquired knowledge that aims to realize the objectives of the organization and the personal goals of human resources since intellectual capital represents "the amount of accumulated knowledge and experiences acquired by workers and their mental capabilities, which can be leveraged for making the objectives of the organization come true through inventive thinking as well as attaining personal objectives." According to Roos (2017), intellectual capital is "a set of knowledge, information, and skills of economic value that can be applied to achieve economic growth and development."

Guthrie et al. (2012) defined intellectual capital as "the economic value of two intangible assets of organizational capital and entails ownership of software systems, distribution networks, supply chain, and human capital that rely on human resources" (Petty and Guthrie, 2000). The Economics Institute of Washington, DC, in its recent study on intellectual capital, concluded that intellectual capital refers to "employees' skills and knowledge and business problem-solving aptitude that could handle organizational problems efficiently." It also added that the nation's economic value depends heavily upon the employee imbued with skills and knowledge that can be instrumental in solving business problems and the market value of the organization outputs" (Nerdrum and Erikson, 2001). Most experts share the same perspective that the current era is built upon intellectual capital being the fundamental source of the information economy era.

It is common knowledge that intellectual capital comprises human capital, structural capital, and customer capital.

- Human capital: It is the tacit knowledge lying in the worker's mind and includes skills, knowledge, employee directives, and human capital, which does not remain in the organization once employees leave it (Daniels and Noordhuis, 2002). Thus, it refers to individuals imbued with knowledge, skills, and experience in the organization.
- Structural capital: It entails "a set of systems, procedures, structures, and strategies through which the production system is realized and the methods of delivering products to customers are implemented on specified dates" (Arnheiter, 2005). According to Bontis (1998), structural capital refers to the firm's organizational capabilities to satisfy market requirements and involves the organization's routines and structures that support employees' quests for optimum intellectual performance.
- Customer capital: It refers to the value of the organization's relations with its customers. This is represented by customer satisfaction and loyalty, the retention level of customers through listening attentively to their suggestions and addressing the complaints they voice along with satisfying their desires and needs as soon as possible, in addition to making them part of the organization's business and deals and building bridges of cooperation with them (Ehret and Wirtz, 2019). It is the capability of the organization's internal customer to stay connected with the organization, in addition to his competence to utilize communication networks and create relations to quickly secure answers

about the organization's products, how resources are allocated, and how cooperation takes place inside and outside the organization (Sullivan, 2005).

Creating and establishing business value for the organization and its variables: According to Pitelis (2009), organizational value creation can be seen from a perspective where employees, customers, and financial values are viewed as interconnected and equally important for the long-term survival of the organization. In this way, the non-financial aspects of organizations are formally linked to the financial aspects of the value-creation process. On the other hand, business value comes from several sources; it may come from the products, services, processes, working people, physical resources, devices, and equipment that the organization owns, from the relationships it has with customers, and from distribution (Bergeron, 2004).

Falcon (1976) claimed that it is a function-oriented process aimed at improving the value of a product by finding relationships between its value elements and its cost elements to provide the desired function in the product at the lowest cost (Cannavale and Falcon, 1976). In the same vein, business value entails superior or outstanding performance (Goh, 2002).

A discrepancy does exist with respect to identifying the dimensions that represent the business value of the organization, as some pointed out that this value comes from commodities, products, services, material or human resources, etc., and some linked the business value of the organization to the level of customer satisfaction. The reduction of costs, the continuous improvement of processes and quality, the use of modern technologies, and the upgrading of intellectual assets are components of the global business value equation.

The research in this study relies on a questionnaire to measure the variables of creating and establishing business value for the organization by concentrating on the variable of cost reduction and continuous improvement and finally the customer satisfaction variable. It is implemented through presenting and providing questions directed to employees, assuming higher positions in the organization under study, to reveal their perspectives and responses about the extent to which their organization seeks to create and establish business value. Therefore, the majority of studies concentrate on the following dimensions for measuring the creation and establishment of business value, which can be listed as follows:

2.1. Cost reduction

The term "cost reduction" refers to "minimizing the cost to the lowest possible extent and it includes the costs of administrative, operational, and financial services and other services rendered to the customer" (Berk, 2010). It does not mean producing products or services at low costs but rather at a cost related to quality. It makes those goods and services attractive in the market and therefore, the organizations can obtain reasonable returns. Three types of cost advantage can be realized: First, achieving less variable cost in general, achieving a lower level of marketing expenses in particular, or achieving a lower level of operational and administrative expenses as well. Each of these types can give a competitive advantage to the organization by controlling the volume of its costs (Chen, 2019).

2.2. Continuous improvement

Evans (1997) demonstrated the concept of continuous improvement goes through some steps and is based on small and frequent improvements in the long run with the least investment of available resources and with the participation of those involved in the quality of the organization's outputs (Evans, 1997). Realizing continuous improvement, according to Slack et al. (2004), can be achieved through the:

- Generating a sense of understanding of the targeted improvement processes to be executed and implemented;
- Offering a wide range of products whose quality is unmatched when compared to those offered by other competitors; and
- Endorsing the zero-defect principle.

Finch (2006) argued that continuous improvement, as a term, refers to enhancing the business by reducing time, movement, inventory, and workplace to a minimum, and enforcing the improvement process in the organization in every department as it entails performing work better than the first time (Finch, 2006).

It is "the continuous pursuit after methods that enhance processes and in turn, involves a comparison with distinct applications and developing the feeling and awareness of individuals of their ownership of activities and processes" (Krajewski and Ritzman, 2002).

2.3. Customer satisfaction

Customer satisfaction constitutes a major and crucial indicator of the customer's level of demand for (the product) in light of his expectations (Gajewska et al., 2020). Kotler-Berkowitz (2006) defined customer satisfaction as a "person's feeling of pleasure or disappointment, which resulted from comparing a product's perceived performance or outcome against his/her expectations" (Kotler-Berkowitz, 2006). It is "a psychological state resulting from the purchase process" (Vinson et al., 1977). According to Özkan et al. (2020), it is defined as "the process of comparing the customer's expectations with the perceptions of the service provided to him." The origin of those expectations that the customer makes about the service or

product is the result of their evaluation of the various alternatives before making a purchase decision based on their prior experiences or information obtained from various sources. With respect to customer expectations, three levels of customer expectations have been identified by Hung et al. (2020) as follows:

- Required service: This reflects the level desired by the customer;
- Adequate service: The level that customers are willing to accept; and
- Predictable service: The level of service that the customer thinks will happen;

After purchasing and consuming the product, the customer compares their previous expectations with the actual perceived performance of the consumption process, and when the result is positive, it gives him a positive feeling of satisfaction; however, if it is negative, this results in dissatisfaction, and thus the customer opts for other alternatives.

- Standard expectation: This expectation refers to the ideal level at which a product or service should perform;
- Predictive expectation: It refers to the beliefs about a particular level of performance that is expected to exist in a product or service;
- Comparative expectation: It refers to the expectations that the customer makes about the product or service when comparing products that are expected to be at the same level.

In a nutshell, it can be said that satisfaction expresses a psychological state or emotional feeling that the customer has as a result of the comparison between the performance of the product or service and their expectations, which means that satisfaction is related to the level of the perceived quality of service and that the degree of satisfaction determines the level of satisfaction, which in turn is determined by comparing it to the level of expectations with the actual output.

3. Data and methods

The research population is composed of all individuals working in the energy and mining sector in Algeria. The employees of the Sonalgaz Foundation in Adrar Province were selected as a sample, and a questionnaire was intentionally distributed in this organization. The sampling unit comprises individuals who occupy high positions (director, deputy manager, department director, employee, and worker).

A three-axis questionnaire was designed for the study; the three axes were as follows: The first axis is related to intellectual capital and was divided into three partial variables (human capital, structural capital, and customer capital). Also, the literature related to this topic was used.

The second axis is related to the creation and establishment of business value, which was divided into sub-variables (cost reduction, continuous improvement, and customer satisfaction); also, past literature, both theoretical and applied, was used. For recording the sample's responses, a 5-point Likert scale was employed.

An intentional sample composed of 60 individuals out of all the employees of Sonalgaz Foundation was selected for whom 60 questionnaires were distributed. Only 53 questionnaires were retrieved and were subjected to analysis. Cronbach's alpha coefficient of the questionnaire scored 96%, indicating that the study tool has strong reliability along with proving the quality of measuring the impact of intellectual capital on creating and establishing business value for the organization under study, as illustrated in Table 1.

Table 1: Reliability coefficient of the study tool

Number of items	Axis	Cronbach's alpha	Sig
10	Human capital	0.816	0.000
10	Structural capital	0.867	0.000
09	Customer capital	0.885	0.000
29	Intellectual capital	0.941	0.000
07	Cost reduction	0.845	0.000
06	Constant improvement	0.805	0.000
07	Customer satisfaction	0.782	0.000
20	Creating and establishing value for the organization's business	0.917	0.000
Impact of intellectual capital on creating and establishing business value for the organization		0.960	0.000

4. Results and discussion

The intellectual capital axis: It is crystal clear from Table 1 that the coefficient of stability of the study tool for the components of intellectual capital was high, where the value of the Cronbach's alpha coefficient for the human capital variable reached 0.816, for the structural capital variable 0.867, and finally for the customer capital variable 0.885. This proves the strong stability of the study tool and its quality in measuring the level of intellectual capital in the organization under study. This verifies the reliability of the study tool and its good measurement of the sample members' responses.

Business value creation and establishment axis: Based on Table 1, the reliability coefficient, Cronbach's alpha, for the study tool for the sub-variables to establish and create business value scored a total of 91.7%. So, it was high as the value of Cronbach's alpha coefficient for its sub-variables in relation to the cost reduction variable scored 0.845, whereas the coefficient of the continuous improvement variable scored 0.805. As for the coefficient of the customer satisfaction variable, it scored 0.782. Such scores verify the strong stability of the study tool and its quality in measuring the level of creation and establishing business value for the organization under study. This also proves the quality of the study tool and its good measurement of the sample members' responses.

4.1. Descriptive analysis of the study variables

4.1.1. Descriptive analysis of personality variables

- Descriptive analysis of the gender variable: It can be observed that the majority of the respondents were males with a percentage of 56.6% compared to 43.4% of females. This depicts the convergence of gender with regard to the demand for professions and the pursuit after establishing intellectual capital in the organization under study.
- Descriptive analysis of the job variable: In accordance with Table 2, it is crystal clear that in the "occupation" variable, the majority of the sample surveyed holds the post of "department director" with a percentage of 43.4% followed by 34% serving as employees and finally 5.7% serving as workers, the lowest of them all.
- Descriptive analysis of the "level of management" variable: Based on Table 2, it can be observed that the majority of respondents serve at the senior management level with a percentage of 43.4% followed by those serving at the middle management level with a percentage of 39.6% of the total sample. Finally, those serving at the lower management level are 17%, the lowest of them all.
- Descriptive analysis of the work experience variable: It can be seen that the majority of the respondents belong to the category of "experience of fewer than 5 years" with a percentage of 52.8%, followed by the category of "experience ranging from 5 to 10 years" by 22.6%. The category "experience ranging between 10 years and less than 15 years" was the lowest with a percentage of 7.5%.

Table 2: Descriptive characteristics of the researched sample

Variable	Description	Frequency	Percentage
Gender	Male	30	56.6
	Female	23	43.4
	Total	53	100
Occupation	Deputy manager	9	17
	Department Director	23	43.4
	Employee (administrative)	18	34
	Worker	3	5.7
	Total	53	100
Level of management	Senior management	23	43.4
	Middle management	21	39.6
	Lower management	9	17
	Total	53	100
Work experience	Less than 5 years	28	52.8
	5 years to 10 years	12	22.6
	From 10 years to 15 years	4	7.5
	More than 15 years	9	17
	Total	53	100

4.1.2. Results of the descriptive analysis of the study variables

Table 3 shows the descriptive analysis of the axes of the study variables by showing the arithmetic mean, standard deviation, and coefficient of variation, as illustrated in Table 3.

Table 3: The arithmetic means and standard deviations of the respondents' views of the study variables

Axis	Variables	Arithmetic means	Standard deviation	Coefficient of variation
--	Human capital	3.750	0.705	18.8
--	Structural capital	3.364	0.889	26.42
--	Customer capital	3.310	0.914	27.61
First	Intellectual capital	3.475	0.768	22.10
--	Cost reduction	3.471	0.975	28.08
--	Continuous improvement	3.198	0.940	29.39
--	Customer satisfaction	3.950	0.835	21.13
Second	Creating and establishing business value for the organization	3.431	0.818	23.84
Impact of intellectual capital on creating and establishing business value for the organization		3.453	0.748	21.66

4.2. Respondents' perceptions about the intellectual capital variable

Based on Table 3, the arithmetic mean of the dimensions of intellectual capital can be described as a relative consensus among the members of the research sample with a percentage of 3.475 and a standard deviation of 0.768. This reflects that the sample members are well aware of the fact that they represent intellectual capital for the organizations they work for. This is confirmed by the value of the variation coefficient, which scored 22.10%, showing a percentage of variation in the views and perspectives of the sample members as a whole.

Through analyzing the partial dimensions of the intellectual capital variable, it can be seen that the human capital variable came first with an arithmetic mean of 3.750 and a deviation of 0.705, reflecting a state of semi-consensus. This is followed by the structural capital variable with an arithmetic mean of 3.364 and a standard deviation of 0.889. The customer capital variable came last with an arithmetic mean of 3.310 and a standard deviation of 0.914. This proves that there is a relative consensus among the sample members that they possess skills and competencies that help them provide the best services to their organization. Additionally, they possess the technological and organizational competencies that assist them in executing the services assigned to them. This is of much assistance to them in their pursuit to satisfy the customer's desire and satisfaction.

4.3. Respondents' perceptions of the business value creation and establishment variable

Based on Table 3, the general arithmetic mean of the dimensions of the creation and establishment of business value shows a relative consensus among the surveyed sample with a percentage of 3,431 and a standard deviation of 0.818. This proves that the sample members are uncertain about their organization's attempt to reduce costs and seek continuous improvement of services. They are also less confident about their pursuit after satisfying their customers. This is confirmed by the value of the variation coefficient, which scored 23.84%, showing the percentage of variation in the views and perspectives of the sample members as a whole.

Analyzing the partial dimensions of the business value creation and establishment variable, it was found that the customer satisfaction variable came first with an arithmetic mean, showing a sense of consensus with a percentage of 3.95 and a standard deviation of 0.835. This is followed by the variable cost reduction with an arithmetic mean of 3.471 and a standard deviation of 0.975. The continuous improvement variable came last with an arithmetic mean of 3.198 and a standard deviation of 0.940. This reflects a relative consensus among the sample members on their organization's pursuit after enhancing their services to promote the value of their work through reducing costs along with achieving what the customers look for.

5. Testing study hypotheses

In this part of the study, the researchers dealt with verifying and testing the study hypotheses by carrying out tests to either accept or reject the study hypotheses.

5.1. Testing the first hypothesis

It states there exist no statistically significant differences in the sample's views with regard to the existence of intellectual capital in the researched organization due to the job variable, management level, and work experience at a level less than 0.05

Before carrying out a test for the first hypothesis, the researchers employ a test to check the level of homogeneity of variance of intellectual capital variable as a whole in accordance with the variables of "occupation, level of management, and work experience" using the Levene Statistic, whose value is greater than the significance level adopted in this study ($\propto \leq 0.05$), according to Table 4. Therefore, the variance hypothesis test can be completed.

Table 4: Homogeneity of variance test of intellectual capital according to the adopted variables in the study

Elements	Levene statistic	Sig.
Intellectual capital according to the "occupation" variable	4.729	0.076
Intellectual capital according to the "level of management" variable	1.327	0.275
Intellectual capital according to the "work experience" variable	1.194	0.900

To test this hypothesis, the ANOVA test of intellectual capital was employed, taking into consideration the variables of occupation, level of management, and work experience, whose results are illustrated in the following Table 5.

Table 5: ANOVA results to identify differences in the researched sample's views with regard to intellectual capital attributed to the variables of occupation, level of management, and work experience

Variable	Source of variance	Sum of squares (SS)	df	Mean squares (MS)	F Value	significance level	Significance
Intellectual capital according to the "occupation" variable	Between groups	5.227	3	1.742	3.353	0.026	Significant (differences do exist)
	Outside groups	25.463	49	0.520			
	Total	30.960	52				
Intellectual capital according to the "level of management" variable	Between groups	0.531	3	0.265	0.440	0.647	Insignificant (differences do not exist)
	Outside groups	30.160	49	0.603			
	Total	30.960	52				
Intellectual capital according to the "work experience" variable	Between groups	0.196	3	0.065	0.105	0.957	Insignificant (differences do not exist)
	Outside groups	30.945	49	0.622			
	Total	30.960	52				

According to Table 5, F calculated value of the intellectual capital variable is F=3.353 with a degree of freedom of 3.49. Also, the corresponding probability value calculated is Sig=0.026, which is less than the level of significance at ($\propto \leq 0.05$). This shows its significance (the null hypothesis is accepted) and entails there exist no statistically significant differences in the views of the researched sample with respect to the intellectual capital due to the occupation variable.

With respect to the result of the analysis of variance of the variable of intellectual capital according to the administrative level, it is evident from Table 5 that the value of calculated F for the variable of intellectual capital is F=0.440 with a degree of freedom equals 3, 49. The corresponding

probability value calculated is Sig=0.674, which is greater than the level of significance at $\propto \leq 0.05$. This shows its insignificance (the alternative hypothesis is accepted). In other words, there exist statistically significant differences in the views of the researched sample with respect to the intellectual capital due to the variable of "level of management."

Based on Table 5, the analysis of variance of the intellectual capital variable according to the work experience variable, the value of F calculated for the intellectual capital variable is F=0.105 with a degree of freedom of 3, 49. The corresponding probability value calculated is Sig=0.957, which is greater than the level of significance at $\propto \leq 0.05$. This shows its insignificance (the alternative hypothesis is accepted). In other words, there exist statistically significant differences in the views of the researched sample with respect to intellectual capital due to the variable of work experience.

5.2. Testing the second hypothesis

It states there exist no statistically significant differences in the sample's views with regard to the creation and establishment of business value in the researched organization due to the occupation variable, level of management, and work experience at a level less than 0.05.

Before carrying out a test for the first hypothesis, the researchers employ a test to check the level of homogeneity of variance of creating and establishing business value as a whole in accordance with the variables of occupation, level of management, and work experience using the Levene Statistic whose value is greater than the significance level adopted in this study $\propto \leq 0.05$, according to Table 6. Therefore, the variance hypothesis test can be completed.

Table 6: Homogeneity of variance test of creating and establishing business value according to the adopted variables in the study

Elements	Levene statistic	Sig
Creating and establishing business value according to the "occupation" variable	3.039	0.068
Creating and establishing business value according to the "level of management" variable	0.421	0.659
Creating and establishing business value according to the "work experience" variable	0.118	0.949

To test this hypothesis, the ANOVA test of creating and establishing business value attributed to the variables of occupation, level of management, and work experience was employed. The test results are illustrated in Table 7.

Table 7: ANOVA results to identify differences in the researched sample's views with regard to creating and establishing business value attributed to the variables of occupation, level of management, and work experience

Variable	Source of variance	Sum of squares	DF	Mean squares (MS)	F Value	Significance level	Significance
Creating and establishing business value according to the "occupation" variable	Between groups	4.168	3	1.396	2.232	0.096	Significant (differences do exist)
	Outside groups	30.643	49	0.625			
	Total	34.831	52				
Creating and establishing business value according to the "level of management" variable	Between groups	1.621	2	0.811	1.221	0.304	Insignificant (differences do not exist)
	Outside groups	33.210	50	0.664			
	Total	34.831	52				
Creating and establishing business value according to the "work experience" variable	Between groups	1.960	3	0.653	0.974	0.413	Insignificant (differences do not exist)
	Outside groups	32.872	49	0.671			
	Total	34.831	52				

According to Table 7, F calculated value of the creating and establishing business value variable is F=2.232 with a degree of freedom of 3, 49. Also, the corresponding probability value calculated is Sig=0.096, which is greater than the level of significance of $\propto \leq 0.05$. This shows its insignificance (the alternative hypothesis is accepted) and entails that there exist no statistically significant differences in the views of the researched sample with respect to creating and establishing business value attributed to the occupation variable.

With respect to the result of the analysis of variance of the variable of creating and establishing business value according to the administrative level, it is crystal clear from Table 7 that the value of calculated F for the variable of intellectual capital is F=1.221 with a degree of freedom equals 2, 50. The corresponding probability value calculated is Sig=0.304, which is greater than the level of significance of $\propto \leq 0.05$. This shows its insignificance (the alternative hypothesis is accepted). In other words, there exist statistically significant differences in the views of the researched sample with respect to creating and establishing business value attributed to the variable of "level of management."

Based on the analysis of the variance of creating and establishing business value according to the work experience variable, the value of F calculated for the intellectual capital variable is F=0.975 with a degree of freedom of 3, 49. The corresponding

probability value calculated is Sig=0.413, which is greater than the level of significance of $\propto \leq 0.05$. This shows its insignificance (the alternative hypothesis is accepted). In other words, there exist statistically significant differences in the views of the researched sample with respect to creating and establishing business value attributed to the variable of work experience.

5.3. Testing the third hypothesis

It states no statistically significant impact relationship exists, according to the sample's views, between intellectual capital and the creation and establishment of business value in the researched organization at a level of significance less than 0.05.

The results of the simple linear regression between intellectual capital and creating and establishing business value, based on SPSS, are illustrated in Table 8.

According to Table 8, there exists a positive, statistically significant impactful relationship between intellectual capital and the creation and establishment of business value during the study period. The regression coefficient was found to be 0.833.

Table 8: Results of simple linear regression between intellectual capital and creating and establishing business value

Variables	Creating and establishing business value								
	Reliability coefficient	Regression coefficient	T-test		Coefficient of determination R^2	Correlation coefficient R	F-test		Standard error
			T value	Sig			F value	Sig	
Intellectual capital	0.536	0.833	8.959	0.000	0.611	0.782	80.268	0.000	0.515

This confirms that intellectual capital contributes 83.3% of the efforts exerted by the researched organization with regard to paying attention to human resources potential and utilizing the structural energies to promote the level of customer satisfaction and reduce costs on the one hand and contribute to enhancing business performance in general on the other hand, assuming the stability of other factors. This impact is significant at 5% or less. The other 0.536 represents the percentage of the contribution made by the other factors altogether in creating and establishing business value.

The explanatory nature of this model is represented by the coefficient of determination R^2, which reached 0.611. This means that 61.1% of the modifications made to the dependent variable-creating and establishing business value during the study period can be ascribed to intellectual capital. This is emphasized by the value of the correlation coefficient between the two variables, which scored 78.2% and reflects the strong positive relationship between the two variables.

From the statistical perspective, the simple regression model can be considered statistically acceptable because the calculated f-test value of 80.268 is significant at the level of significance at 0.05 or less with a degree of confidence of 95% or more.

Based on these results, we reject the third hypothesis, which states there exists no significant, positive, or direct impact between intellectual capital and creating and establishing business value on the organization under study at the significance level of 0.05.

We shall replace this with an alternative hypothesis that states there exists a statistically significant impact between intellectual capital and the creation and establishment of business value in the researched organization at a level of significance of 0.05.

To depict the degree of impact of each dimension of intellectual capital and creating and establishing business value in the researched organization, multiple linear regressions were employed, as illustrated in Table 9.

Table 9: Results of multiple linear regression between "intellectual capital components" and creating and establishing business value

Components	Creating and Establishing Business Value									
	Reliability coefficient	Regression coefficient	T-test			Coefficient of determination R^2	Correlation coefficient R	F-Test		Standard error
			T value	Sig	Significance			F value	Sig	
Human capital	0.100	0.639	3.879	0.000	Significant					
Structural capital		0.077	0.541	0.591	Insignificant					
Customer capital		0.205	1.599	0.116	Insignificant					
Intellectual capital						0.648	0.805	30.052	0.000	0.500

Based on Table 9, approximately 63.9% of the modifications that contributed to creating and establishing business value in the organization under study can be ascribed to human capital-assuming the stability of other factors-and this impact is of insignificance because the calculated value of T is 3.879, which is significant at 0.05, taking into account the calculated significance value is 0.000, which is lesser than the adopted level of significance. Moreover, around 7.7% of the

modifications made to the intellectual capital in the organization under study can be attributed to the structural capital-assuming the stability of other factors-and this impact is insignificant because the calculated value of T is 0.541. This is insignificant at 0.05, considering the calculated value of significance is 0.591, which is greater than the adopted level of significance.

Approximately 64.8% of the improvements attained in creating and establishing business value in the organization under study during the study period can be ascribed to the components of the intellectual capital as a whole in the organization under study. This is evidenced by the value of the strong correlation coefficient of around 80.5%, showing a sense of harmony among them and leaving their impact on the dependent variable. From the statistical perspective, this analysis is considered acceptable with a degree of confidence greater than 95% because the calculated F-test value, which scored 30,520, is significant at the level of 0.05 because the calculated value of significance is 0.000.

Based on these results, it can be decided to reject the null hypothesis and accept the alternative hypothesis, which states that there is a statistically significant impactful relationship, according to the sample's views, between intellectual capital and the creation and establishment of business value for the organization under study at a level of significance less than 0.05.

Conducting a step-wise multiple regression analysis to identify the significance of each of the components of intellectual capital individually, separately, to define how much they contribute to creating and establishing business value for the organization under study is illustrated in Table 10.

Table 10: Results of stepwise regression for predicting the value of the researched organization business through intellectual capital components

Order of inserting independent variables into the forecasting equation	Regression coefficient	standard error	Coefficient of determination R^2	T Value	Sig	Significance
Constants	1.003	0.184		0.230	0.000	Significant
Human capital	0.908	0.074	0.613	8.985	0.000	Significant
Customer capital	0.681	0.058	0.646	2.155	0.036	Significant
Structural capital	0.267	0.496	0.423	0.541	0.591	Insignificant
Model tests			R^2=0.646 Standard error of the model = 0.496 F Calculated = 45.577 Level of significance = 0.000			

Accordingly, the stepwise regression analysis yields three models: The first model contains human capital alone with the constants only; the second model gives the constants of the two variables of human capital and customer capital and does not include the other variables; and the third model contains all the variables of intellectual capital in a regression model with the components of the intellectual capital and their impact on the business value of the organization under study.

Table 10 shows the order of inserting the dimensions of the independent variable into the regression equation, with the human capital ranked first and thus interpreted as a percentage of 61.3% of the variance in the variable of creating and establishing business value in the organization under study. This is followed by customer capital, which was interpreted to be about 64.6% together with the variable of human capital. Finally, the structural capital component, together with the above-mentioned two components was interpreted to be about 26.7%. Interpretation of the components of intellectual capital as a whole comes above average, and this reflects the existence of a significant impact of each of the components on creating and establishing business value for the organization under study.

6. Conclusion

According to the results obtained from the field study, the following conclusions can be reached:

1. The members of the study sample are well aware that their organization possesses human capital imbued with unique and outstanding skills and competencies; however, they are not fully confident whether they possess procedures and techniques that could assist them with creating and establishing business value for their organization.
2. The researched organization has customer capital that seeks to satisfy and meet their needed services in line with both price and quality.
3. Poor awareness is detected among the study sample with regard to their organization's endeavor to minimize cost. However, a poor desire toward activating continuous improvement in their jobs is found. On the other hand, great efforts are exerted toward realizing a high level of satisfaction for the researched organization's external customers.
4. The organization under study seeks to introduce modifications to the technologies used in the production and distribution of electricity to improve its internal operations with a focus on the quality of the replaced technologies to achieve a good level of customer satisfaction.
5. Apparently, the organization under study has no clear strategy to create and establish business value; also, its sector does not keep pace with the modern technologies available in the global markets.
6. The first hypothesis test proved that there are statistically significant differences in the views of the surveyed sample with regard to the intellectual

capital attributed to the variable of work experience. However, the results also revealed that differences and discrepancies do exist among the sample views with regard to the existence of intellectual capital due to the variables of the level of management and work experience at a level of significance less than 0.05.

7. The second hypothesis test proved that statistically significant differences do exist in the views of the surveyed sample with regard to creating and establishing business value according to the variable of work experience. No stark differences according to the variables of the level of management level and work experience were identified at a level of significance less than 0.05.
8. The third hypothesis test proved that a positive, direct, and significant impact does exist between intellectual capital and creating and establishing business value in the organization under study in its general form. However, no positive significance of the impact of human capital on creating and establishing business value for the organization was identified. Furthermore, no impact of both structural and customer capital on creating and establishing business value for the organization under study was observed.

In pursuance of the findings of the applied study, the following recommendations can be proposed:

1. Workers in senior management should focus on creating and establishing a good structural capital to ensure good management of their resources and to ensure the availability of organizational capabilities that qualify them to add value to their businesses;
2. Sonalgaz leaders should work on utilizing scientific methods to forecast potential costs and focus on minimizing them and strive to adopt quality principles to impart continuous improvement in the provision of their services;
3. Efforts to improve the mental image of the organization and its services should be exerted by focusing on analyzing the behavioral pattern of customers and the components of the markets to create customer capital that guarantees its continuity and survival in the market;
4. The leadership of the organization under study must adopt a comprehensive quality management approach and enforce continuous improvement and activate it to reduce costs on the one hand and promote the level of satisfaction of those dealing with it on the other.
5. A necessity arises for the organization to compare the cost it bears for providing its services and the level of satisfaction it seeks to attain through focusing on improving institutional performance and paying attention to the quality of the energy service provided to meet customers' expectations.
6. The members of the senior management must pay attention to following up on what is being developed in the field of modern administrative concepts and their endeavors to adopt them and incorporate them within the organization's culture to initiate improvements in its business and services and add real customer value to the organization.
7. There is a necessity to look for good ways to provide electricity and gas transmission and distribution services in line with the safety of its customers and the requirements of the market and competitiveness, with a focus on achieving quality and speed in service delivery.
8. Interest in all scientific research activities should be promoted so as to assist the organization in setting its future estimates to better utilize its potential and its unlimited market.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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