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Research Article

Analyzing Impact of Intellectual Capital on Business Performance Using Structural Models Based on Customer Knowledge Management

Seyedeh Maryam Ameli kalkhoran,¹ Kamran Rabiei,² Seyed Mehdi Seyed Alizadeh,³ Hakimeh Morabbi Heravi,⁴ and Yaser Rouzpeykar [©]

¹Business Management, School of Management and Accounting, Allameh Tabataba'i University, Tehran, Iran

Correspondence should be addressed to Yaser Rouzpeykar; y.rouzpeykar@iauqeshm.ac.ir

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In the modern era, intellectual capital encompasses all resources within an organization that enhance the value and competence of the organization. Consequently, this indicates that managing intellectual capital effectively will enhance the value and performance of an organization. This study aims to investigate the effects of intellectual capital on business performance through the use of customer knowledge management in the Bank Mellat branches of Iran. In this study, all managers and employees working for Bank Mellat in Tehran are included. Based on Morgan's table, the sample size was 220 people. Sampling was done by the simple random method. We used a descriptive correlation method to conduct this study and a questionnaire was used to collect data. The questionnaires were scored using a Likert scale. It was confirmed by a consensus of experts that the research instrument was valid, and the reliability of the research was 0.894%. Structural equation modeling was used to analyze the data. According to the results, the dimensions of intellectual capital (human, structural, and relational) have a significant impact on business performance. However, relational capital has been more influential on business performance than other factors.

1. Introduction

As knowledge-based societies continue to progress, the role and importance of intellectual capital returns is becoming increasingly important for companies' sustainable and continuous profitability [1]. The ability to manage and control intellectual capital requires that companies identify, measure, and report intellectual capital. On the other hand, companies have resources critical to strong financial performance and competitive advantage. The first type of these sources includes tangible assets such as property, machinery, and physical technologies that can be easily traded in open markets. The second type includes intangible, valuable,

scarce, non-substituted, and strategic assets that create a competitive advantage and superior financial performance [2].

In contrast, the rapid technological advancements of the last decade have had a significant effect on all aspects of human life and activity. It has led to a move towards a knowledge-based economy and a shift in the paradigm of industrial economics [3]. In today's knowledge-based economy, intellectual capital is a critical factor in the superiority and improvement of corporate performance. Intellectual capital includes all the organization's resources that increase the organization's value and the competence organization. Thus, it shows that the management of

²Faculty of Entrepreneurship, University of Tehran, Tehran, Iran

³Petroleum Engineering Department, Australian College of Kuwait, West Mishref, Kuwait

⁴Department of Statistics, University of Bojnord, Bojnord, Iran

⁵Department of Industrial Engineering, Islamic Azad University, Qeshm, Iran

intellectual capital effectively and efficiently will improve the value and financial performance of the organization (Ahmad Khan et al., 2012, [4]. Therefore, it can be concluded that the increasing success and productivity of the company or organization depends on attention to knowledge and intellectual capital. By recognizing the nature, model, and methods of measuring and valuing intellectual capital, the possibility of planning and optimization and continuous control and monitoring will be provided in companies and organizations [5]. However, in the last decade, with the advent of private banks in the Iranian banking system, the competition for monetary resources in the country's financial markets has intensified. However, the country's banks have faced many problems attracting and retaining customers. The attractiveness of their financial and monetary services to gain market share has diminished. Do many banks face how to get more customer satisfaction and better benefits? Is there a suitable solution to improve customer knowledge management performance? One of the reasons for the decrease in customers' willingness to invest in these banks is the negative relationship with their customers. Adverse conditions in the banking system are due to having only one technological view of customer relationship management [6]. Therefore, to achieve comprehensive development, intellectual capital seeks to be given more attention in organizations, intellectual assets, knowledge, experience, and organizational learning [7, 8].

On the other hand, the effective development of innovative capabilities has been recognized in recent years as a way to create a sustainable competitive advantage and thus improve the organization's performance. Given the fierce competition in global markets and the explosion of technology in recent years, technological capital based on innovation and differentiation is necessary for any company. Therefore, to achieve success in the market and maintain the competitive advantage of the business, the need to take advantage of new opportunities and develop new market strategies or new services and markets becomes apparent [9]. Organizational literature shows that improving business performance requires a corporate structure, information systems, and management style that becomes a specific strategy [10]. Business performance is a model in decisions and activities that is the main feature. It is the organization's relationship with its environment and is a determining factor in achieving goals. It is also a way to improve sales volume, market share, cash flow, return on investment, dividends, and market value of companies by relying on strategic planning. With this case, researchers show that intellectual capital has more direct effects on the realization of the value of an organization and has increasingly become an essential factor in business. An organization with solid intellectual capital can create favorable conditions for the use and exploitation of human capital and allow human capital to use the potential of self-reliance. Therefore, it increases the organization's potential in attracting customers and presenting new products [2]. Thus, although the discussion of intellectual capital has a long history in the world, unfortunately, in our country, in science and organizational policy, this section has not been addressed. Looking at the

activities of organizations and service companies, we find that these institutions have not paid much attention to the processes of intellectual capital. In this regard, by examining the performance of Bank Mellat, we can see a volatile and controversial trend in this sector over the past few years [11].

The absence of required solutions to develop intellectual capital in Iran's specialized technical and service industries is a matter that merits special consideration, since this bank should focus on expanding and enhancing intellectual capital. In recent years, the successful creation of intellectual capital has been recognized as a means of creating a sustained competitive advantage and enhancing the performance of these organizations and businesses. Obviously, determining the function that intellectual capital can play takes a great deal of theoretical and experimental research, yet there have been surprisingly few studies conducted in this area. Therefore, we have endeavored to assess the effect of each capital component on Bank Mellat's commercial performance. In this study, it will be determined whether intellectual capital characteristics have a favorable influence on corporate performance via customer knowledge management.

2. Background of Theoretical Research

John Galbraith was the first to use intellectual capital. But in the mid-1980s, the shift from the industrial age to the information age began, creating a deep gap between the book value and the market value of companies. In the late 1980s, the first attempts were made to produce financial statements of accounts that measured intellectual capital. Also, books on the subject such as knowledge asset management were written by Amidon. In the early 1990s, intelligent capital management was first legitimized in the organization by allocating an official position, and Mr. Edinson was introduced as the director of the intellectual capital of Scandinavia. Fortune published articles in this field. But in the mid-1990s, Scandinavia published its first report on intellectual capital, and a conference on intellectual capital was held in 1996. Experts in intellectual capital agree that intellectual capital consists of three elements: human capital, structural capital, and relational capital. This section further explains these elements [12].

Human Capital. The researchers argue that employees generate intellectual capital through competence, attitude, and intellectual agility. The essential elements of the organization's human capital are the set of skills of the workforce and the depth and breadth of their experience. Human resources can be the soul and thought of the sources of intellectual capital. This capital leaves the company by the employees at the end of the business day, but the structural and relational money remains unchanged even after leaving the organization. Human capital includes

- (i) Skills and competencies of the workforce.
- (ii) Their knowledge in the important and necessary fields for the organization's success.
- (iii) Talents and their ethics and behavior.

According to Brooking, human resources include skills, expertise, problem-solving abilities, and leadership styles. An organization with a high employee turnover rate may have lost this critical component of intellectual capital. Relationship capital refers to all the relationships that exist between an organization and any other individual or organization. There is a wide range of individuals and organizations that can be involved. These include customers, intermediaries, employees, suppliers, legal authorities, communities, creditors, and investors, among others. These relationships can be divided into two general categories.

- (i) The first group includes relationships formalized through contracts and commitments with customers and suppliers or significant partners.
- (ii) The second group mainly includes informal relationships.

Customer capital is considered a bridge and organizer of intellectual capital operations and is a determining factor in converting intellectual capital to market value. This capital includes the strength and loyalty of customer relationships [10].

Structural Capital. Bass and his colleagues believe that structural capital includes all non-human reserves of knowledge in the organization, including databases, organizational charts, process execution instructions, strategies, executive plans, and generally anything of higher value to the organization. Structural capital covers a wide range of essential elements.

Rossi et al. [13] looked at the influence of company characteristics on economic decisions made by small and medium businesses, with an emphasis on agro-food microbusinesses. In comparison to huge corporations, access to financing is critical for company start-up, progress, and expansion. Small businesses have quite different demands and face significant financial issues. Rossi et al. [14] investigated the impact that business ethics in general and corporate social responsibility in particular can have on the voluntary disclosure of innovation for the world's most ethically engaged enterprises. Festa et al. [15] studied India's top five pharmaceutical businesses to see if their financial structures are solid and if they are in danger of going bankrupt, underlining the importance of intellectual capital in financial stability. The financial structure of the selected firms appears to be steady based on the findings. Limijaya et al. [16] looked at how corporate governance might help to control the link between intellectual capital and business performance. Furthermore, Caputo et al. [17] investigated the function and contribution of voluntary corporate transparency and intellectual capital in improving the "quality" of company-market connections. A conceptual method was taken to discover prospective breakthroughs in the management of voluntary corporate disclosure and intellectual capital, based on the conceptual framework provided by signaling theory and legitimacy theory. Bhasin and Shaikh [18] described the manner of IC disclosures used by Indian and Australian IT companies. The study's findings indicated that IC disclosure by enterprises in these nations is

modest, largely provided in narrative form, and that IC disclosure does not receive any favor from the firms' supervisors. An investment or business may lose money if it is exposed to financial risk. There are several common and distinctive financial concerns, including operational risk, credit risk, and liquidity risk [19]. Stakeholders may suffer financial losses as a result of this type of risk. The cost of starting a business from scratch is high. A business may, at some point in its development, require outside funding [20]. There is still a pressing need to address credit discrimination in the financial system and in the transformation of the digital business environment. There is a correlation between consumer behavior during the epidemic and customer-company identification and social responsibility involvement, according to [21, 22].

2.1. Business Performance. Business performance is a multidimensional concept that has administrative indicators such as financial index, marketing, and product suitability; it also has good growth and profit and can be measured by objective or subjective indicators. "Organizational performance is achieving organizational and social goals or going beyond it and fulfilling the responsibilities assigned to individuals." In other words, the analysis of different methods of payment performance refers to the process and activities within the organization that are directly involved with employees. The scope refers to the organization's boundaries that improve employees' organizational processes to create and share knowledge [23]. Furthermore, persistence of the sustainability assessment completed by an external agency is required to support the sustainability strategy and the sustainability committee, therefore legitimizing an organization within its institutional environment [24]. Zhang et al. [25] investigated the correlation between the working-fromhome environment and the performance of small businesses during the pandemic. They developed a theoretical framework centered on maximizing corporate profits. The study indicated that working from home might be a "creative destruction" force that accelerates the adoption of technologically ready working from home and has long-lasting effects on industrial structure and people's work lives.

2.2. Customer Knowledge Management. At first glance, customer knowledge management may seem like just another name for customer relationship management or knowledge management. But customer knowledge managers, in some respects, need a different approach from the usual way of managing customer relationships or knowledge management. As a characteristic of customer relationship management, customer relationship managers focus primarily on customer knowledge [26]. In other words, intelligent organizations have found that their customers are more aware of the employee who seeks knowledge through direct interaction with the customer and inquiring about customer knowledge from sales representatives. Knowledge managers also focus on transforming employees from knowledge collectors to knowledge shareholders, usually

accomplished by intranet-based knowledge sharing maps [3]. It is essential for companies to know what their customer knows, what their customer thinks about that company and competing companies, and what will make them more competitive. Today, it is no longer the good and the bad separated, but the good and the good. It is also crucial for all organizations and companies not to lose even one customer because if we lose him, he will undoubtedly be a competitor to embrace him. In this regard, the flow of knowledge processes customer relationship management is divided into the following three categories [27].

- (i) Knowledge for the customer: in customer relationship management processes, we need to meet the knowledge needs of customers, for example, knowledge of products, markets, and suppliers.
- (ii) Knowledge about the customer: this knowledge is collected to understand the customer's motivations.
- (iii) Customer knowledge: it is the customer's knowledge of products, suppliers, and markets. To interact with the customer, this knowledge can be gathered to stabilize continuous improvement. For example, improving services or developing new products are among these improvements [28].

This is while customer knowledge is divided into the following two parts by Zhu et al. Customer knowledge, which includes learning about potential customers and customer groups and its top people, the corporate brand, are a set of values that represent the organization and the positive image of the company brand not only increases competitiveness; Rather, it encourages customers to repurchase [29]. An organization's brand should convey its fundamental values, capabilities, values, and skills which constitute the organization's competitive advantage and cannot easily be duplicated or imitated [30]. Furthermore, innovation quality mediates the connection between customer knowledge management and business performance. In addition, the outcome indicates the moderating influence of competitive intensity on the link between customer knowledge management and innovation quality [31]. Literature findings indicated that among the components of knowledge for the customer, knowledge from the customer, and knowledge about the customer, the components of knowledge for the customer and knowledge about the customer had the greatest and least significant impact on creating value in electronic retail business environments, respectively [32].

2.3. Background of Experimental Research. Heidari et al. [6], in examining the relationship between cultural intelligence with social capital and intellectual capital, found no significant relationship between cultural intelligence with social capital and intellectual capital and their dimensions. However, a significant relationship was observed between social and intellectual capital (r=0.75) and its dimensions. Hamdi [33], in his master's thesis entitled the study of multiple relationships between cultural capital, organizational intelligence, and organizational innovation among

faculty members of Urmia University, found a positive and significant relationship between cultural capital, organizational intelligence, and organizational intelligence innovation. Dehghan Jazani (2013), in his master's thesis entitled study of the relationship between organizational culture and intellectual capital in the Ministry of Foreign Affairs of the Islamic Republic of Iran, found the following. (1) There is a significant relationship between the nature of involvement and intellectual capital in the Ministry of Foreign Affairs. (2) There is a significant relationship between adaptability and intellectual capital in the Ministry of Foreign Affairs of the Islamic Republic of Iran. (3) There is a significant relationship between mission and intellectual capital in the Ministry of Foreign Affairs of the Islamic Republic of Iran. (4) Between adaptability and capital, there is a significant relationship in the Ministry of Foreign Affairs of the Islamic Republic of Iran. (5) There is a significant relationship between organizational culture and intellectual capital in the Ministry of Foreign Affairs of the Islamic Republic of Iran. Amrizah and Rashidah [2] found in their research that there is a significant relationship between the components of intellectual capital (human capital, structural capital, and communication capital) with organizational performance. According to the theoretical foundations, the central hypothesis of the study has been formulated as follows:

- (i) Human capital has a positive effect on the financial performance of Tejarat Bank.
- (ii) Structural capital has a positive impact on the financial performance of Tejarat Bank.
- (iii) Communication money has a positive effect on the financial performance of Tejarat Bank.
- (iv) Customer knowledge management modulates the impact of intellectual capital on business performance.

3. Research Methodology

The present study was conducted because of the nature of the subject and the expertise of the authors. These findings will assist managers and marketers in improving the performance of the relevant organizations, as well as describe the method of data collection that will be used by Mellat Bank executives in making future decisions. The research population includes all managers and employees with 550 employees. The appropriate statistical sample for the study was calculated based on the sampling formula of a limited population and based on the Morgan table at an error level of 0.05% of 220 people. The research questionnaire was measured through a five-point Likert scale (strongly disagree = 1, disagree = 2, have no opinion = 3, agree = 4, and strongly agree = 5). The reliability of the questionnaires was examined using Cronbach's alpha coefficient in order to test the research hypothesis. The correlation coefficient was greater than 0.7 for all variables of the conceptual model of the study; Figure 1 illustrates the appropriate internal validity and compatibility of research structures (Table 1).

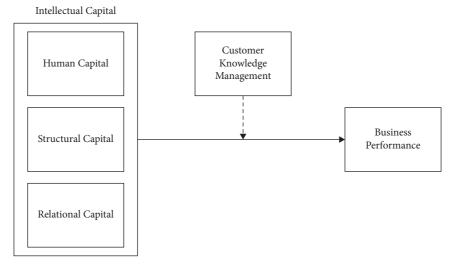


FIGURE 1: Conceptual model of research.

TABLE 1: Cronbach's alpha variables.

Variable	Cronbach's alpha
Human capital	%777
Structural capital	%812
Relational capital	%852
Business performance	%782
Customer knowledge management	%802

3.1. Examination of Research Hypotheses. To test the hypothesis, first the distribution of research data is examined. In order to determine whether to use parametric or non-parametric tests, we examine the normality of the data using the Kolmogorov–Smirnov test. The results of the Kolmogorov–Smirnov test are shown in Table 2.

According to the test results, the null hypothesis, the normality of the variables is confirmed.

3.2. Data Analysis Method. Structural equation modeling has been used to test the research hypotheses and fit the conceptual model in this research. There are different approaches to structural equation modeling. This means that structural equation modeling can be done based on various statistical methods appropriate to the research sample's variables and characteristics. One of the statistical methods in this field is the partial least squares method. Software that uses structural equation modeling based on this statistical method is compatible with conditions such as the alignment of independent variables, the normality of the data, and the small size of the sample. In the present study, SmartPLS software has been used, a widely used and helpful software in structural equation modeling based on the partial least squares method.

As a result, we track the response rate since it directly affects the quality of the data. If the rate of unit non-response is large, the final survey estimates are more likely to be

biased. If the characteristics of non-responding units differ from the characteristics of responding units, estimates may be biased.

4. Research Findings

To test the conceptual model and the research hypotheses, structural equation modeling based on the least squares method has been used. SmartPLS software was used for this purpose. After testing the conceptual research model, the software output is shown in Figures 2 and 3.

Figure 3 shows the obvious and hidden variables and the path coefficients and factor loads. The numbers you see between the hidden variables of the model (variables shown in an oval shape) and the explicit variables (the variables in a rectangle that are hidden under the components of the variable) represent the factor loads. The relationships defined between the latent variables are the same as the research hypotheses, and the numbers shown on these relationships are path coefficients. Table 3 shows the results of the causal analysis of the structural equation model to test the research hypotheses.

4.1. Quality Test of the Measurement Model. The model's ability to predict observable variables through their corresponding hidden variables is measured by this index. Positive values of the CV Com index indicate that the reflective measurement model is of good quality. The appropriate value for this index is as follows (see Tables 4 and 5).

According to the five quality test results, the measurement model shows that all variables have been correctly predicted by the pertinent questions.

4.2. Structural Model Quality Test. Cohen (2009) introduced this criterion to determine the intensity of the relationship between the latent variables of the model. This index measures the model's ability to predict observable variables through the values of their corresponding latent variables.

TABLE 2: The result of Kolmogorov statistics.

Variable	Probability level error (s)	Kolmogorov statistics	Sig.	Test result	
Human capital	0.05	1.263	0.418	The distribution of the variable is normal	
Structural capital	0.05	1.472	1.012	The distribution of the variable is normal	
Relational capital	0.05	0.379	1.023	The distribution of the variable is normal	
Business performance	0.05	1.147	1.015	The distribution of the variable is normal	
Customer knowledge management	0.05	1.028	1.12	The distribution of the variable is normal	

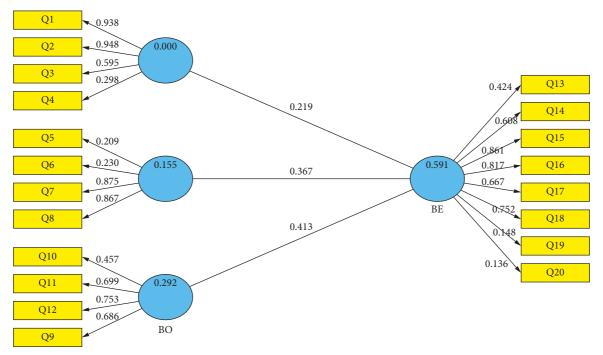


FIGURE 2: General model of standard research.

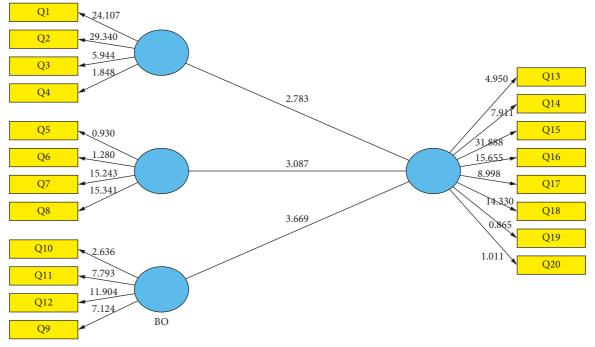


Figure 3: General model of research in a meaningful state.

TABLE 3: Conclusion of research hypotheses.

Hypothesis title	Test statistics	Beta coefficient	Result
The impact of human capital on business performance	2.873	0.219	H0 reject
The impact of structural capital on business performance	3.087	0.367	H0 reject
The impact of relationship capital on business performance	3.369	0.413	H0 reject

TABLE 4: A quality test of the measurement model.

Variables	Quality index
Human capital	0.342
Structural capital	0.349
Relational capital	0.465
Business performance	0.356

TABLE 5: Appropriate index of CV Com [6].

Strong	Medium	Poor
0.35	0.15	0.02

The positive values of the CV Red index indicate the appropriate quality of the structural model. According to Cohen, the appropriate weight for this index is as follows (see Tables 6 and 7).

Therefore, according to Table 7, the structural model quality test results show that the relevant questions correctly predict all variables.

4.3. PLS General Model Test (GOF). This model fit index has been proposed to evaluate the fit of models of internal equations and external measurements of data simultaneously. This index is the square of the product of the average values of the shared values and the average of the coefficients of determination. According to China (1998), this index should be at least 0.2, but ideally higher than 0.3, so Tables 8 and 9 state that the endogenous (dependent) variable has achieved the ideal value.

$$GOF = \sqrt{\overline{\text{(communality)} \times (R \text{ square})}}.$$
 (2)

Therefore, the calculated value (GOF) is 1.41, indicating the model's good fit for the data. Hypothesis 4: customer knowledge management as a moderating variable has a moderating effect on the relationship between intellectual capital and business performance.

According to Table 10, since the total beta value in all variables is more than 0.3, the mediator hypothesis has been confirmed and can be inferred as follows. Hypothesis 4: the research indicates that the variable of customer knowledge management has an adjusting effect on the relationship between intellectual capital and business performance. Given that the value of the total impact obtained for this relation was more significant than 0.6, this correlation is desirable, and this hypothesis is confirmed.

5. Discussion

All the factors influencing knowledge management, especially in service-financial companies, should be considered

TABLE 6: Structural model test.

Research variable	CV Red
Human capital	0.357
Structural capital	0.342
Relational capital	0.356
Business performance	0.349

TABLE 7: Appropriate index of CV Red (Cohen, 2009).

Strong	Medium	Poor
0.67	0.33	0.19

TABLE 8: The variance described for the dependent variables.

The dependent variable	R^2
Business performance	0.97

TABLE 9: Average of common values.

Research variable	Communality
Human capital	0.361
Structural capital	0.448
Relational capital	0.390
Business performance	0.514

in light of the knowledge management framework in order to effectively utilize intellectual capital. Also, design and implement an IT performance evaluation system to evaluate employee participation to apply knowledge and use knowledge assets. This issue can be considered one of the job requirements of people in foster care. It is also suggested that the motivational system of the developer encourages them to learn more about organizational learning, and help their colleagues apply what they have learned in the workplace. By examining successful organizations using intellectual capital, new strategies for acquiring knowledge should be taught to managers and employees. Customer knowledge is to design new systems and methods for acquiring customer knowledge, and senior managers have effective communication and partnership with organizations that have been successful in this field. Strengthening employee commitment to the organization and improving take place by supporting group activities, positive thinking, and trusting employees. It is suggested that Bank Mellat show their continuous support and responsibility to initiate and maintain efforts to implement customer knowledge management.

Developing a competency framework for employees and managers, which includes knowledge and skills,

Hypothesis		Standard beta value				Result
The relationship between intellectual capital and business performance	β3	β 2		0.82		Approved
The role of customer knowledge management concerning intellectual capital and business performance	Customer knowledge management and intellectual capital	Customer knowledge management and business performance	Total effect	Indirect effect	Direct effect	
	0.42	0.68	0.87	0.42	0.59	

TABLE 10: Test of mediating hypotheses.

abilities, and a plan for their development. Continual assessment of employee competency levels and succession planning at various organizational levels. Evaluate business performance continuously and analyze the results of employee performance measurement, comparing the results of these measurements. Hold meetings, public hearings, and discussions on the use of new information technology and other knowledge-related topics for all employees in organizations and companies. Create a customer knowledge electronic database in the bank so that people can share their tacit knowledge without the need for face-to-face encounters with tools such as e-mail, chat groups, chat rooms, and audio and video conferencing. Carry out strategic planning to identify opportunities and threats to the external environment and internal strengths and weaknesses when drafting contracts and agreements. Use advanced structures such as team and project structures in different parts of the organization. Identify those key processes that are most valuable to the client (customer), document these processes, and identify and apply the experiences of domestic and foreign competitors. The following suggestions are made based on the findings of this study and its limitations. Due to the importance and the unique position of intellectual capital in various fields, research such as this study should be expanded and conducted at various levels. Investigate the obstacles and problems in implementing customer knowledge management following the performance characteristics of the organization. Other researchers are suggested to increase the generalizability of the results of this research by researching other organizations, other statistical communities, and different levels of education by comparing their results with each other.

Limitations are considered an integral part of the research. These constraints provide the conditions for future research. This study was no exception to this rule. One of the problems of the present study is the limitation of access to resources related to intellectual capital and its components in libraries, universities, and other organizations in the country. Due to time constraints, the questionnaire was distributed only in Tehran, which should have been included in other cities for more accuracy.

6. Conclusion

The three dimensions of intellectual capital have been studied using structural equations, namely, human capital, structural capital, and communication capital, through

structural equations, showing the positive effect and the relationship between these dimensions and business performance. According to numerous studies, it is accepted that organizations with high levels of knowledge management and intellectual capital development are likely to be more successful than their competitors. Therefore, the issues of organizational knowledge and intellectual capital are considered the central part of the discussions of organizations and service companies. According to customer knowledge management, successful managers are deemed to be able to produce and develop more money in this regard. Our findings show that corporate executives need to recognize the key role of developing customer knowledge management in current employees and, in doing so, consider developing human capital, structural capital, and communication capital to deliver what it has promised. According to the research results, the following are suggested.

To effectively utilize intellectual capital in organizations, especially service-financial companies, all knowledge management influencing factors must be considered within the framework. New strategies for acquiring knowledge should be taught to managers and employees by analyzing successful organizations that utilize intellectual capital. It is recommended that Bank Mellat demonstrate ongoing support and responsibility for initiating and sustaining efforts to implement customer knowledge management.

Design a competency framework for employees and managers, which includes knowledge and skills, and plan their development based on their competencies. Using tools such as e-mail, chat groups, chat rooms, and audio and video conferencing, people can share tacit knowledge without the need for face-to-face interactions by utilizing a customer knowledge electronic database in the bank. When drafting contracts and agreements, conduct strategic planning to identify opportunities and threats in the external environment as well as internal strengths and weaknesses. Other researchers are encouraged to broaden the applicability of this study's findings by investigating additional organizations, statistical communities, and educational levels.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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