Applying a systematic grounded theory approach to presenting a CRM model with an emphasis on customer knowledge management and determining the validity of the model in structural equations

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Abstract

The study aims to present a customer relationship management (CRM) model focusing on customer knowledge management in the banking industry. It employs a qualitative, applied research approach using systematic grounded theory. Data was collected through semi-structured interviews with 18 experts from Pasargad Bank, utilizing snowball and purposeful sampling methods. The proposed model includes Causal factors, Contextual factors, and Intervening factors. Our strategies include: improving management structure, enhancing marketing strategies, human resource management, market orientation, and improving service delivery methods. Then 3 categories of factors "banking services marketing" in the three core codes of "greater and established presence in the market", "improving the bank structure for better service delivery" and "realizing internal marketing" were identified as consequences in the customer relationship management model with an emphasis on customer knowledge management in the banking industry. Moreover, the model's validation confirmed construct validity across all dimensions.

Keywords: customer relationship management, customer knowledge management, banking, grounded theory method
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1 Introduction

Implementing customer relationship management requires significant costs, and many organisations that have implemented customer relationship management as a strategy have failed to achieve their goals. This is because various factors such as innovation from the perspective of senior managers, organisation size, competitive advantage, knowledge management capabilities, and employee information capabilities, affect the success of implementing customer

relationship management in organisations [51]. Also, the main factors affecting the failure of customer relationship management (CRM) projects include executive factors in organizations, technological factors, cultural factors, managerial factors and cost factors, which are considered the main influential factors in the failure of customer relationship management projects [30]. One important factor in the continued success of organizations is their ability to retain existing and loyal customers to the organization's name, brand or services. Loyal customers contribute to the success of organizations through repurchase, increased spending, buying new products or services, paying higher prices, word-of-mouth advertising to others, etc. [19]. It can perhaps be boldly claimed that retaining old customers is more important for companies and institutions than attracting new customers. The reason for this is very simple [5]. However, customer relationship management software systems enable organizations to provide high-quality and low-cost products and services tailored to the needs of each customer, which is why it can be said that many customer-related activities are impossible without the use of proper technology [24]. The main objective of customer relationship management is to improve long-term growth and profitability by better understanding customer behaviour, providing effective feedback, and improving integration to better assess return on investment in these areas [10].

Proper customer relationship management will result in loyalty among customers. This will strengthen these relationships and make it easier for the organization to maintain, attract and create satisfaction among customers [18]. Customer relationship management is a business strategy that aims to create and expand value by building relationships with customers based on knowledge. By using information technology as an enabler, customer relationship management requires redesigning the organization and its processes to direct them towards the customer. Therefore, by customizing their products and services, companies will be able to optimally meet customer needs and thus generate long-term, mutually beneficial loyalty [21]. Bhat and Darzi identified four dimensions of customer relationship management: customer orientation, complaint resolution, empowerment and customer knowledge [7]. Customer relationship management is a term used to describe the highest strategic level and maintenance of relationships with customers. In fact, it manages all parts of the organization that are somehow related to customers and tries to adapt and control the external components that affect the customer. So that they can be considered as a set of activities and steps that are formed to create, develop, maintain and optimize long-term and valuable relationships between customers and the organization. Since organizations interact with customers in many of their daily activities, providing a system that can organize and strategies each of these tasks seems necessary for the success of the organization [20].

In the past, marketing, sales and service processes were considered separate activities; therefore, critical customer information was not shared between them. In some cases, information could be fully maintained for a specific customer across all departments, but there was no system or approach to combine all this information to create a unified view of the customer in the organization. With the emergence of customer relationship management systems, customer-related activities have been integrated, eliminating this problem, and customer information is collected from different sources and merged so that the organization can create an integrated image of the customer itself [44].

Since 1993, when the first email was sent in Iran, a lot has changed. Iranians have proven to be very keen on adopting the internet, and online information has become an inseparable part of every aspect of their lives. Therefore, knowledge including online knowledge bases is considered an important factor in improving and developing services, creating continuous innovation and gaining competitive advantage. Managing this intangible capital has attracted researchers' attention over the past decade, and libraries and information centers have also realized the role and importance of knowledge management in creating, innovating and improving information services as knowledge-based organizations [50]. Today's organizations, in order to survive in the new paradigm of competition between organizations, which is a completely competitive and knowledge-based space, must look at innovation as an essential strategy in the present era to be able to respond most appropriately to changes, because being innovative in an organization when dealing with turbulent external environment accompanied by complexity and change, helps [14]. Therefore, organizations need to make maximum use of their resources to achieve better performance in the current turbulent environment [29].

Knowledge as a major source of innovation and organizational productivity is extremely important, and success in present and future competition between organizations is largely based on knowledge management [9].

Customer knowledge management is a known process in which an organization produces, acquires, shares, transfers and utilizes knowledge to increase organizational productivity [36]. In other words, knowledge management is defined as awareness of the knowledge existing in the organization, creation, sharing and transfer of knowledge, use of existing knowledge, acquisition of new knowledge and its storage and accumulation, which are carried out in the knowledge process of the organization and with attention to the culture and strategy of the organization. By examining and analyzing knowledge and the importance of its characteristics in the field of organizational performance, it can be inferred that having up-to-date knowledge and information has become a necessity for the survival of organizations. In particular, if we evaluate the banking industry, this conclusion is reached that knowledge management in the banking industry is a necessity and the benefits of implementing knowledge management have led most organizations to make

efforts to implement this process [33]. The necessity and importance of implementing knowledge management in organizations is because it leads to three changes in perspectives:

1. It changes the core resources towards creativity.
2. It leads the limitation of resources through the abundance of knowledge.
3. It turns the static environment into changing conditions.

It also realizes how learning, is one of the indicators of the success of education systems. Therefore, to implement the knowledge management approach in educational organizations, the knowledge map as one of the knowledge management tools, serves as a guide to show the location of knowledge or the possibility of storing it. Knowledge maps are used to extract, share, create knowledge and guide learning [54].

In this regard, various researchers have also emphasized the gap and research vacuum in integrating customer relationship management and customer knowledge management models, especially in service organizations. For example, Zerbino et al. [56] believe that innovation in organizing customer information and knowledge in the form of big data analysis enables customer relationship management to create operational success, but there is still a gap between these two concepts in practice. Also, Nam et al. [42] believe that the ability to manage customer data improves the performance of customer relationship management, but banks and financial institutions are still not very familiar with this concept in practice. While the results of practical studies indicate the significant impact of customer experience and knowledge management programs in banks on their profitability and net income (some have experienced a 40% increase in revenue and an 80% decrease in controlling marketing costs that is achieved through medium and long term strategies focused on customer knowledge); in general, there is still a gap until the full implementation of the relationship between these two important concepts regarding customer orientation in banks [4]). One of the main reasons is perhaps the lack of comprehensive and in-depth studies to create models that present the relationship and interaction between these two constructs, namely customer relationship management and customer knowledge management, especially in banks and financial services institutions. In this regard, the focus of this study is on Pasargad Bank, a privately owned bank that started its activity in Iran in 2005. One of the two main strategies of this bank is the use of intelligent banking to create value and improve the customer experience. Pasargad Bank has also designed an extensive program to identify customer needs and provide satisfactory responses to identified and priority needs in line with achieving the goals of the bank's social responsibility and maximizing the benefits of all stakeholders, which focuses on increasing innovation in providing products and services with the highest possible quality and the best and most appropriate method, increasing customer satisfaction by ensuring effective and mutual communication and interaction and promoting the bank's brand. This program and major goal itself demonstrates the importance of establishing a profound connection between the two constructs of customer relationship management and knowledge by this bank to improve that core relationship, and the results and model presented in this study will help the bank to have a coherent framework for this important goal and program in order to better manage this issue. In this regard, the basic question of this research is what is the customer relationship management model with an emphasis on customer knowledge management in the banking industry (Pasargad Bank) and how much validity does it have?

2 Literature review

2.1 Customer relationship management

Customer relationship management focuses on creating, managing and expanding relationships between a company and its customers. One of the main assumptions of customer relationship management is that satisfying and establishing long-term relationships with profitable customers increases the success of the company's business [12]. Customer relationship management is not a new concept in marketing but is built on three aspects of marketing management, namely: customer orientation, relationship marketing, and database marketing. Customer relationship management is a strategy, not a solution, and can create many competitive advantages if implemented in a collaborative environment. Customer relationship management refers to activities that companies do to identify, attract, develop and retain profitable customers, and they do this by providing appropriate goods and services at the right time and the right cost [53]. With the intensification of competition in markets and recognizing the importance of retaining customers for organizations, and simultaneously with the rise of the customer-centric movement, organizations have gradually been pushed towards establishing long-term relationships with customers. Also, the emergence of new technologies such as information technology has had tremendous effects on various dimensions of the organization and led to the emergence of issues such as customer relationship management. Customer relationship management is a business strategy to select and manage customers to optimize and increase the value of the company as well as long-term sales. Customer relationship management is a comprehensive business and marketing strategy that integrates technology, processes and

all business activities around the customer. Customer relationship management is an integrated information system for planning, scheduling and controlling pre-sales and after-sales activities of an organization to enable customers to interact with the organization through various tools such as the website, telephone, etc. [26].

Customer relationship management is a tool that can be used to help organizations interact with and retain customers. Using electronic customer relationship management and utilizing its results can more effectively help improve the quality of services provided, and consequently, increase customer loyalty, trust and satisfaction [40].

Customer relationship management is one of the dynamic topics in the new millennium. Of course, customer relationship management is not a new concept and has always existed in organizations in some way. In fact, the proven principle of customer relationship management is the continuous attention and respect to customer needs over the years, and organizations of any size use some kind of customer-centric strategy to compete and survive in customer segmentation. In reality, the philosophical foundation of customer relationship management is relationship marketing, customer retention, profitability, lifetime value, and creating satisfaction through business management processes, and researchers believe that because customers differ in their preferences and purchasing habits, customer relationship management emerged, and if all customers were similar, there would be little need for customer relationship management. Therefore, understanding customer motivations and profitability helps companies improve specific offers to maximize the overall value of the customer portfolio [43].

In fact, changes in market demand and intense competition led to a shift from early transactional marketing to relationship marketing, which gave rise to customer relationship management in the 1950s, but it was in the 1990s that this concept became a term in business among consultants and users. Thus, in the late 1990s, theorists formally acknowledged customer relationship management. Accordingly, a gentle transformation took place from the company's single-channel and product-centric approach to a multi-channel and customer-centric approach, along with increased sales capability to loyal and profitable customers and integration of systems and processes. However, volunteers and pioneers soon realized that creating departments such as marketing, sales, and customer service, changing processes and information, and then connecting separate systems is easier said than done [32]. In recent years, the growth of customer relationship management has emerged as an important approach in business, and this is due to the return of the world to individual marketing. In this one-on-one approach, information about the customer (past and purchases made, needs and desires) is used as a framework for what the customer accepts. This approach progresses faster and more easily using information technology and is based on the principles of relationship marketing. In fact, management theories have expressed customer orientation in different decades, but in practice, they have ultimately remained product-centric. Although now a combination of factors simultaneously forces and enables companies to reorganize around customers; Extensive changes in business processes, service sector growth, and the availability of cost-effective software can address the challenges. Although these factors facilitate the shift from product management to customer focus, this change is not easily feasible [52].

2.2 Customer knowledge management

Customer knowledge management is defined as: "Managing organizational processes that create, transfer, store, and replicate organizational knowledge" [31]. Lee and Chiu introduce knowledge management as a multifaceted and inter-functional phenomenon. Organizations can act effectively in knowledge management if their approach to organizational knowledge is a process approach [8]. The process of managing organizational knowledge includes acquiring, creating, documenting, transferring and applying knowledge, which is becoming a fully commercial task. The first step in knowledge management is acquiring knowledge. Knowledge can be produced by creating knowledge within the organizational boundaries, or obtained from an external source and brought into the organization [16].

Knowledge creation is the second aspect of knowledge management, which refers to how knowledge is created by individuals within the organization. Nonaka and Takeuchi believe that individuals are important components of knowledge creation within the organization [17]. According to Nonaka, knowledge is created through a series of continuous transformations between tacit and explicit knowledge through socialization, combination, internalization and externalization. Knowledge transfer refers to activities that disseminate knowledge outward [27]. Capabilities that can help organizations in this regard include the knowledge management approach. Knowledge management can collect, organize and dynamize existing knowledge and disseminate it throughout the organization [46]. Knowledge management is a process that helps organizations find important information, select, organize and disseminate it; It is also an expertise that is essential for problem-solving, dynamic learning, strategic planning and decision-making activities [49].

In other words, knowledge management is a tool for improving organizational performance and plays a role in achieving sustainable competitive advantage. The most important goal of using knowledge management in various

organizations is to adapt quickly to changes in the surrounding environment in order to increase efficiency and innovation. As a result, knowledge management refers to the process of how knowledge is created, disseminated and utilized in the organization; In other words, the ultimate goal of knowledge management includes sharing knowledge among employees to promote the added value of knowledge. In many organizations, it is a top investment priority [46]. Obviously, in the era called the knowledge-based society and knowledge-based economy, the proper implementation of knowledge management is not limited to economic organizations and enterprises, but educational organizations can also benefit greatly from it as one of the centers of knowledge exchange [47]. A knowledge-based organization that produces and consumes knowledge plays an important role in creating and transferring knowledge as one of the vital resources for social development and progress [48]. There is no general agreement on the definition of knowledge management, and there are at least over 70 definitions of knowledge management, each displaying aspects of it. Most definitions of knowledge management indicate a process stemming from the fluid nature of knowledge. The process of producing, storing and sharing valuable information as well as perspectives and experiences within and between human and organizational communities with similar interests and necessities is called knowledge management [15].

From a strategic point of view, the application of knowledge management throughout the organization requires a systematic perspective that properly understands the strategic role of knowledge and its relation to key decisions and processes, and helps promote the production, sharing and use of knowledge [45]. Knowledge management focuses more on the activities of identifying, acquiring, creating, storing, sharing, and applying knowledge with the help of individuals and groups in the organization [38]. Knowledge management is an attempt to discover the hidden assets in people's minds and turn these hidden treasures into organizational assets; in a way that a wide range of people involved in organizational decision-making have access to this wealth and can use it [37]. Management is increasingly turning into knowledge management; Meaning that we manage not the people themselves, but their knowledge [1]. When customer knowledge management is considered as a process and the effect of component integration in the organization is discussed, the number of observable variables representing knowledge management components may decrease. That is, with fewer inputs, we reach the same result that the components were considered individually. Efficient knowledge management patterns mean that the organization achieves the most results with fewer assets compared to when it has each knowledge component [45]. With the introduction of the element of knowledge and knowledge as the main resource and capital of organizations and the importance of knowledgeable employees, a new window has opened in the management and administration of organizations [25]. Therefore, the method of receiving and circulating information, organizing information, and the practical application of information in the daily activities of organizations and the training of knowledgeable employees are necessities that provide the ground for the production, storage and application of knowledge (knowledge management) [41].

In a classification, the processes of implementing knowledge management include five stages: production, collection, sharing, application, and internalization [34]. Becerra-Fernandez and Sabherwal, in complementing this classification, have considered four main processes for knowledge management, each of which has two subprocesses [6]. There are different perspectives on implementing knowledge management in an organization. The general perspective on knowledge management states that there is a single solution for all organizations in all circumstances. On the other hand, according to contingency theory, each organization needs its specific solution based on its situation and conditions [3].

If organizations want to engage in knowledge management as an organizational capital, they must provide appropriate infrastructural factors [35]. These factors, which affect the proper establishment of knowledge management, are known as knowledge management infrastructures. These infrastructures are the driving forces for establishing knowledge management in the organization, which not only encourages employees to create knowledge, but also provides a suitable context for facilitating the transfer of knowledge and experiences of organization members, and allows organizational knowledge to grow in an organized and coordinated manner throughout the organization. Knowledge management infrastructures are mechanisms that enable organizations to acquire, create, maintain, share and utilize knowledge within the organization. Knowledge management infrastructures are considered as the backbone of knowledge management and almost all organizations that have successfully implemented knowledge management are well aware of the need for and importance of having explicit and supportive infrastructural support for the knowledge management system. Therefore, the fact that the efficiency and effectiveness of applying knowledge management in an organization requires strong and appropriate infrastructures is confirmed [55]. To ensure success in establishing knowledge management in an organization, it is very important to ensure the existence of key knowledge management infrastructures in the organization so that in addition to the effective use of limited organizational resources, we can also reduce the use of human resources, materials and time and achieve the expected goals of the organization [35].

The purpose of knowledge management is to uncover the hidden assets in the minds of employees and turn them into an organizational asset so that employees can better access these assets [28]. We achieve this goal when we

value the members of the organization and increase their abilities to produce, collect and exchange knowledge [22]. Knowledge management can be defined as the discovery, organization, summarization and presentation of information in a way that improves employee information [2].

3 Research methodology

This study was conducted based on two quantitative and qualitative approaches. Therefore, in the qualitative part of this study, it is exploratory in terms of nature, in the quantitative section it is developmental-applied in terms of purpose and descriptive survey in terms of data collection method. To achieve the goals ahead in the present study, first, by conducting a comprehensive library study and evaluating previous studies, factors and components of green marketing were identified and extracted. In the next step, by using the grounded theory method among professors and experts in the field of customer relationship management and customer knowledge management in the banking industry, the factors were identified. In the final step in the quantitative section, confirmatory factor analysis and structural equation modelling were used to validate the model, determine the relationship between factors, and fitness and test the model. The statistical population of the present study in the qualitative part includes experts and professors in the field of customer relationship management and customer knowledge management in the banking industry.

In the qualitative part of this study, the purposive snowball sampling method was used, meaning that sampling is done until the saturation point is reached. Finally, 25 people were selected for the expert panel and in the quantitative section, Pasargad Bank customers will benefit from an unlimited population. The sampling method is cluster random sampling, meaning that 5 customers are selected from each branch, and a total of 310 customers are selected from 62 branches as the sample size of the qualitative section to survey the extracted questionnaire from the qualitative part of the research for model validation. To analyze the hypotheses and collected data, the structural equation modelling method was used with the partial least squares approach. In this, in the qualitative part, the interview tool was used for measurement and quantification, and in the quantitative part, a researcher-made questionnaire was used. There are various methods for assessing the validity of the questionnaire, the most important of which are: face validity, concurrent validity, predictive validity, and construct validity. In the present study, face or content validity and construct (convergent) validity were used to investigate the validity of the questionnaire. To investigate the face validity of the research questionnaire, the questions were presented to several management professors, concerning valid research and relevant sources, to comment on the validity of the questionnaire. After reviewing and evaluating the questionnaires by professors and experts and making minor corrections, the face validity of the questionnaires was confirmed. In this study, factor load was used to investigate construct validity. In factor analysis, it must first be ensured that the available data can be used for analysis. In other words, are the number of data suitable for factor analysis? For this purpose, the KMO index and Bartlett's test are used.

4 Findings

Axial and selective coding are carried out in an iterative process. Therefore, the steps of selective coding are not clearly separated from each other and are performed through an interactive process, along with open and axial coding. In summary, the data analysis procedure that leads to the creation of a theoretical model includes causal conditions, context, intervening factors, strategies, and consequences that describe the main phenomenon of "customer relationship management with an emphasis on customer knowledge management". The theoretical model of the "customer relationship management model with an emphasis on customer knowledge management" is observable in Figure 1 according to the dimensions of the paradigmatic model. Given that the interview questions with experts in the interview stage were developed based on the paradigmatic model, the interviewees expressed their opinions on the components of the model specifically based on the 1 model dimension. However, with the analyses and back and forth, some adjustments were made to these individuals' initial responses. Therefore, the storyline and criteria for selecting concepts in each of the model dimensions are as follows according to the explanations below.

In this model, the causal conditions are the motivating or compelling factors for the "customer relationship management model with an emphasis on customer knowledge management" in Pasargad Bank, factors that may currently be faded or eliminated but at the time compelled organizations to adopt this phenomenon. Therefore, with this approach, factors have been considered in this section that have a causal effect on the main phenomenon in terms of temporal precedence and imperative conditions.

Contextual conditions are the internal and external organizational characteristics of organizations for "customer relationship management with an emphasis on customer knowledge management" of employees, conditions that should

be considered for better success in implementing these processes. Unlike contextual conditions, intervening conditions are conditions that affect the selection of different mechanisms of "customer relationship management with an emphasis on customer knowledge management" and can facilitate and accelerate the implementation of mechanisms. In the main phenomenon dimension, value creation and its dimensions, which were the main and questioned subject of this study, are placed and analyzed with related explanations and details in this section. In the strategies section, the main actions and activities that can help implement the "customer relationship management model with an emphasis on customer knowledge management" in Pasargad Bank of Iran have been considered. The difference between this dimension and the main phenomenon is that the concepts and categories of this dimension are not procedural but executive and help implement the processes. Finally, in the consequences dimension, the expected results and consequences of "customer relationship management with an emphasis on customer knowledge management" in Pasargad Bank have been considered. The expected consequences that can result from the implementation of processes and "customer relationship management with an emphasis on customer knowledge management" for the organization. This model is shown in Figure 1.
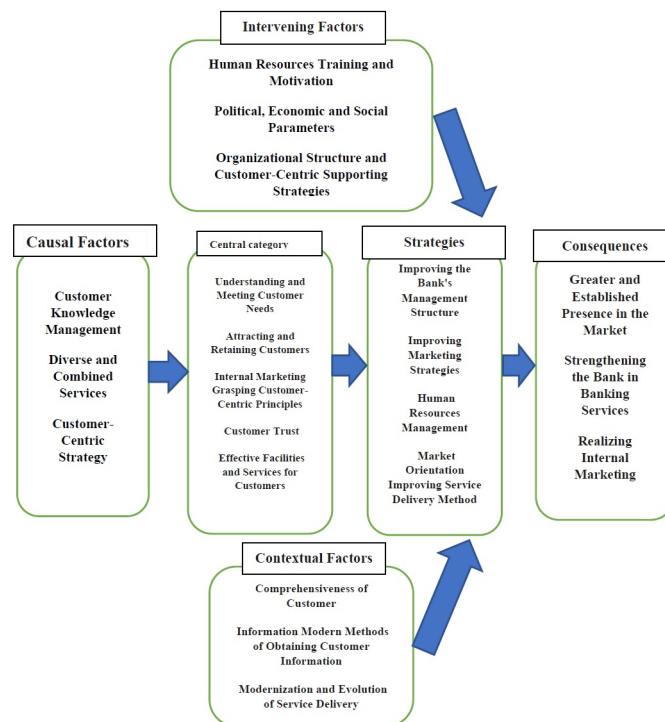

Figure 1: Paradigmatic model of "customer relationship management with an emphasis on customer knowledge management"

The Kappa coefficient was used to validate the extracted model. For this purpose, 4 experts in the field of banking marketing were asked to score each of the dimensions and their components on a three-point scale (weak, moderate, and good) in terms of the presented model and its various dimensions in the areas of intervening, contextual and infrastructural, causal, consequences and strategies, as well as the central category, and state their opinion on the validity of these items. Finally, these responses were tested using Cohen's kappa coefficient as shown in Table 1:

Cohen's kappa coefficient (κ, lowercase Greek kappa) is a statistic that is used to measure inter-rater reliability (and also intra-rater reliability) for qualitative (categorical) items. It is generally thought to be a more robust measure than simple percent agreement calculation, as κ takes into account the possibility of the agreement occurring by chance. There is controversy surrounding Cohen's kappa due to the difficulty in interpreting indices of agreement. Some researchers have suggested that it is conceptually simpler to evaluate disagreement between items.

Cohen's kappa measures the agreement between two raters who each classify N items into C mutually exclusive categories. The definition of κ is:

$$\kappa = \frac{p_o - p_e}{1 - p_e} = 1 - \frac{1 - p_o}{1 - p_e}, \tag{4.1}$$

where p_o is the relative observed agreement among raters, and pe is the hypothetical probability of chance agreement, using the observed data to calculate the probabilities of each observer randomly seeing each category. If the raters are in complete agreement then $\kappa = 1$. If there is no agreement among the raters other than what would be expected

by chance (as given by pe), $\kappa = 0$. It is possible for the statistic to be negative, which can occur by chance if there is no relationship between the ratings of the two raters, or it may reflect a real tendency of the raters to give differing ratings.

Table 1: Cohen's kappa coefficient for validating the developed model from the experts' perspective

Kappa Coefficient	Value	Standard Error	t-value	Significance Level
	0.86	0.031	2.33	0.000

Therefore, since the significance level is below 0.05 and the Kappa statistic is above 0.8, the validity of the model has also been confirmed. Although the Kappa value above 0.6 is also acceptable and approved, in the present study, the high level of 0.8, which is a very desirable level, has been approved.

In this study, to test the conceptual model of the research, the Smart PLS software was used in two general stages including "evaluating model fit" and "testing hypotheses". Before performing confirmatory factor analysis, the KMO test should be performed to ensure sampling adequacy. This test is performed to ensure sufficient sample size. The KMO index should be above 0.7. In this study, the KMO value is 0.701, indicating that the sample size is sufficient for factor analysis and the significance level of the Bartlett test is less than 0.05:

$$KMO = \frac{\sum_{i \neq j}^{n} \sum^{n} r_{ij}^2}{\sum_{i \neq j}^{n} \sum^{n} r_{ij}^2 + \sum_{i \neq j}^{n} \sum^{n} a_{ij}^2}. \tag{4.2}$$

As can be seen in the formula above, in the denominator of the sum of the non-diagonal correlations of the reagents, the sum of the non-diagonal correlations of the reagents plus the sum of the partial non-diagonal correlations of the reagents are included in the denominator. Therefore, the smaller the current correlations are, the larger the KMO index will be and vice versa. The closer the KMO index is to 1, the better "sampling adequacy" there has been in selecting the predictors (manifest variables). The cut-off point of the KMO index for "sampling adequacy" is 0.6, which means that if the KMO index is higher than 0.6, the criterion of "sampling adequacy" has been estimated, and if it is lower than 0.6, it means that the criterion of "sampling adequacy" has not been estimated

Table 2: Measuring sampling adequacy

test	Value	
(Kaiser-Meyer-Olkin (KMO))	Measuring sample adequacy	0.701
Bartlett's sphericity test	Chi-square approximation	457.086
	Degrees of freedom	3
	Significance	0.000

After ensuring the appropriateness of the sample size, the shared values of the items were examined, and items whose values were less than 0.3 were excluded from the analysis because they were not consistent with other items and were not suitable indicators for that dimension.

4.1 Evaluating the measurement model

Factor loadings: First, the research model is tested based on factor loadings. Factor loading between 0.3 to 0.6 is acceptable and if greater than 0.6 is very desirable. The structural equation modeling model of the research model is plotted in the standard factor loading estimation state in Figure 2. The results of the test showed that all factor loads of the indicators are above 0.4 and the factor load of the indicators is desirable.

Composite reliability: As can be seen in the table, all variables have a composite reliability above 0.7 and therefore the model is also approved in terms of composite reliability.

Convergent validity: The mean of extracted variance is used to measure convergent validity, whose critical value is 0.5; this means that the mean extracted variance above 0.5 indicates acceptable convergent validity. The values of this criterion for the research model are as shown in Table 3. As can be seen, the mean extracted variance of all variables is more than 0.5, which means confirming the convergent validity of the model.

Average Variance Extracted (AVE), composite reliability (cp), and alpha indicators were used to test the measurement model as presented in Table 3. The results indicate that all the variables have the criterion limit:

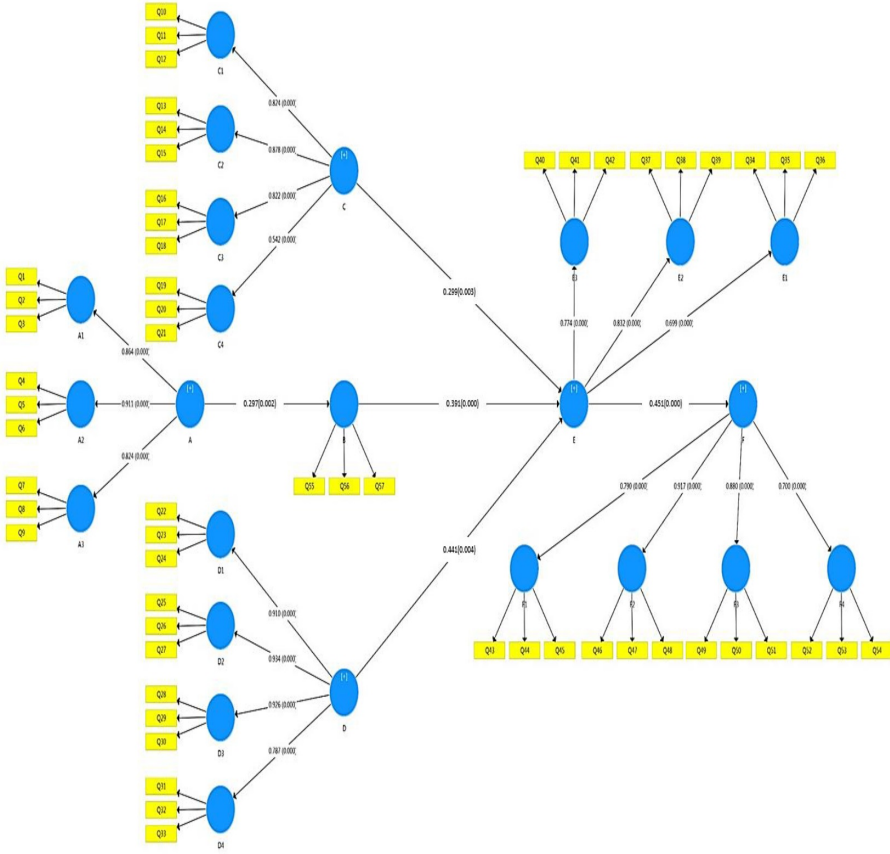$$AVE = \frac{\sum \lambda_i^2}{n}. \tag{4.3}$$

Figure 2: Structural equation modeling model of research model in standard factor loading estimation mode

As you can see, the null hypothesis implies the homogeneity and homogeneity of all societies in terms of variance, while the opposite hypothesis rejects this hypothesis. In this way, if out of K population samples of size n_i and S_i^2 indicates the variance of the ith community, then Bartlett's statistic is written as follows:

$$\chi^2 = \frac{(N-k)\ln(S_p^2) - \sum_{i=1}^{k}(n_i - 1)\ln(S_i^2)}{1 + \frac{1}{3(k-1)}\left(\sum_{i=1}^{k}\left(\frac{1}{n_i-1}\right) - \frac{1}{N-k}\right)}. \tag{4.4}$$

Note that the following limitation should be considered in this regard:

$$N = \sum_{i=1}^{k} n_i. \tag{4.5}$$

It is clear that the mixed variance is also calculated as follows:

$$S_p^2 = \frac{1}{N-k}\sum_i (n_i - 1)S_i^2). \tag{4.6}$$

According to this form of Bartlett's test statistic, which is defined as the square ratio of two standard normal distributions, asymptotically, the distribution of χ^2 or χ^2 with $k-1$ degrees of freedom will be zero. In this way, if the value of the statistic is greater than the αth percentile of such a distribution, we assume zero:

$$\chi^2 > \chi_{k-1,\alpha}^2. \tag{4.7}$$

Divergent validity: Fornell and Larcker criterion was used to examine the divergent validity of the model. This criterion determines the relationship of a variable with its indicators in comparison with the relationship of that variable with other variables; So that acceptable divergent validity indicates that a variable has more interaction with

Table 3: Composite reliability and Cronbach's alpha as indicator reliability tests and mean extracted variance (Ave) as convergent validity test

Variable/Indicator	cr	AVE	α
Understanding and Meeting Customer Needs	0.893	0.585	0.865
Retaining and Attracting Customers	0.894	0.738	0.820
Customer-Oriented Marketing	0.812	0.591	0.755
Building Customer Trust	0.829	0.620	0.792
Effective Facilities and Services	0.925	0.804	0.878
Customer Knowledge Management	0.901	0.743	0.879
Diverse and Combined Services	0.891	0.732	0.816
Customer-Centric Strategy Making	0.867	0.687	0.762
Comprehensiveness of Customer Information	0.904	0.759	0.839
Modern Methods of Obtaining Customer Information	0.896	0.742	0.826
Modernization and Evolution of Service Delivery	0.949	0.611	0.939
Political, Economic and Social Parameters	0.936	0.829	0.897
Organizational Structure and Customer-Centric Supporting Strategies	0.939	0.837	0.902
Improving Marketing Strategy Styles	0.885	0.720	0.804
Improving Service Delivery Method	0.821	0.578	0.764
Improving Management Structure	0.811	0.588	0.778
Human Resources Management	0.789	0.601	0.798
Market Orientation (Customer and Competitor Orientation)	0.713	0.599	0.812
Strengthening the Bank in Banking Service Delivery	0.785	0.537	0.751
Greater and Established Presence in the Market	0.871	0.693	0.779
Realizing Internal Marketing	0.933	0.824	0.893

its indicators than with other variables. Fornell and Larcker state that divergent validity is acceptable when the mean extracted variance for each variable is greater than the shared variance between that variable and other variables. In Smart PLS software, this is done through a matrix whose cells contain correlation coefficient values between variables and the root of mean extracted variance values for each variable. The model has acceptable divergent validity if the numbers in the main diagonal of the matrix are greater than the numbers below it. All numbers in the main diagonal are greater than the numbers in their below column, which means acceptable divergent (differential) validity of the model.

4.2 Evaluating the structural model

The structural model or outer model shows the relationships between the latent (hidden) variables of the model. In fact, in this section, the questions (indicators) are not considered and only the latent variables along with the relationships between them are examined. Several criteria are used to evaluate the structural model, each of which is discussed below.

T-values: The foremost criterion for measuring the relationship between variables in the model is t-values. If the value of these numbers is greater than 1.96, it indicates the correctness of the relationship between the variables and thus confirms that relationship or relationships at the 95% confidence level. Figure 3 depicts the results of testing the research conceptual model in terms of the significance of t coefficients. The values calculated on the arrows indicate the t-value. The reported T-value results in the figure above are all greater than 1.96, so it can be concluded that at the 95% significance level, all questions are considered for the intended structural equation model and there is no need to exclude any of the questions from the model.

In this section, the structural model is examined and the overall research model is fitted. The coefficient of determination is a number between zero and one. R^2 values close to 0.67 are desirable, close to 0.33 are normal, and values close to 0.19 are considered weak.

Table 4: Coefficients of determination of the research model

structures	coefficient of determination (R^2)
central category	0.409
strategies	0.551
consequences	0.403

As can be seen in Table 4, the values of the coefficients of determination for the latent variables of the model indicate the extent to which the dependent variables are affected by the independent variable. In fact, the above table values imply that 40.9% of the changes in the central category; 55.1% of the changes in the strategies construct; and 40.3% of the changes in the consequences construct are explained by the entering constructs, namely causal factors,
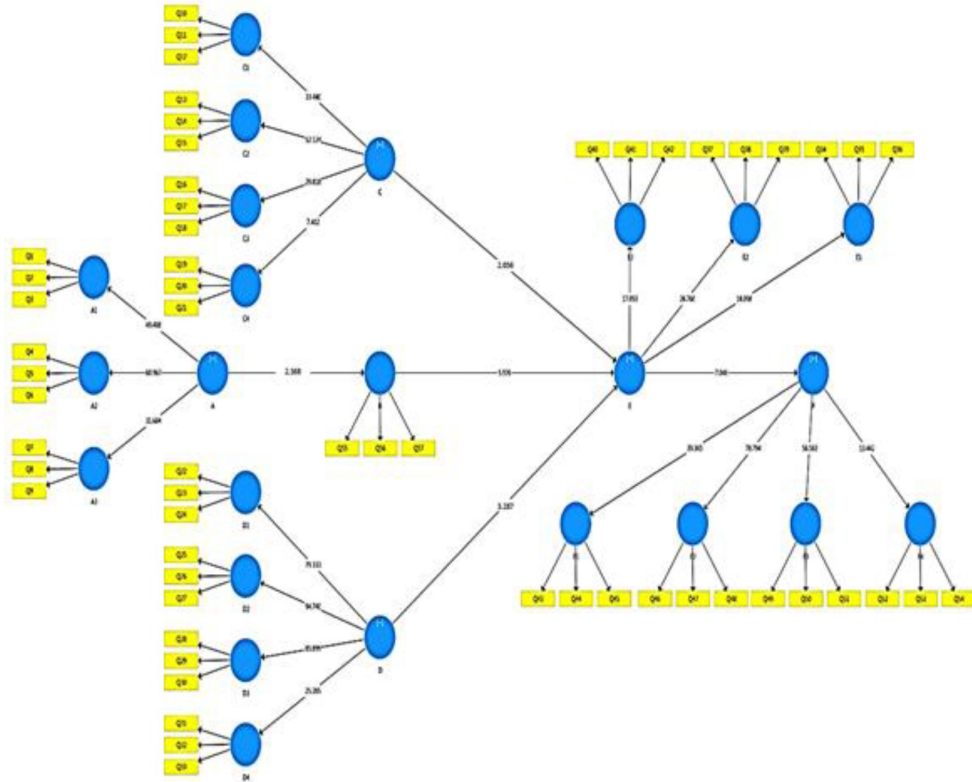
Figure 3: Structural equation model of the research model in terms of t-value significance statistics

contextual factors and intervening factors. The overall fit of the model with the GOF index, which should be greater than 0.3, indicates that this index is appropriate:

$$GOF = \sqrt{\overline{Communalities} \times \overline{R^2}} = 0.441 \tag{4.8}$$

4.3 Testing hypotheses in the conceptual model of research

Based on the findings in Table 5:

The t-value presented for the first path is greater than 1.96 and the significance level of the test is less than 0.05, so with 95% confidence, the causal factors affect the central category by 0.297.

The t-value presented for the second path is greater than 1.96 and the significance level of the test is less than 0.05, so with 95% confidence, the central category affects the strategies by 0.291.

The t-value presented for the third path is greater than 1.96 and the significance level of the test is less than 0.05, so with 95% confidence, the intervening factors affect the strategies by 0.451.

The t-value presented for the fourth path is greater than 1.96 and the significance level of the test is less than 0.05, so with 95% confidence, the contextual factors affect the strategies by 0.299.

The t-value presented for the fifth path is greater than 1.96 and the significance level of the test is less than 0.05, so with 95% confidence, the strategies affect the consequences by 0.441.

A t-test is a type of statistical analysis used to compare the averages of two groups and determine if the differences between them are more likely to arise from random chance. It is any statistical hypothesis test in which the test statistic follows a Student's t-distribution under the null hypothesis. It is most commonly applied when the test statistic would follow a normal distribution if the value of a scaling term in the test statistic were known (typically, the scaling term is unknown and therefore a nuisance parameter).

As an example, in the one-sample t-test:

$$t = \frac{Z}{s} = \frac{\bar{X} - \mu}{\hat{\sigma}/\sqrt{n}}, \tag{4.9}$$

where X is the sample mean from a sample $X1, X2, ..., Xn$, of size n, s is the standard error of the mean, σ is the estimate of the standard deviation of the population, and μ is the population mean.

Table 5: Path coefficients and t-test for the effects of variables in the paths of the structural model of research

path number	Route description	t-value	Path coefficient	significance level	result
1	Causal factors to central category	2.368	0.297	0.002	confirmation
2	central category to strategies	5.926	0.291	0.000	confirmation
3	Intervening factors to strategies	7.046	0.451	0.000	confirmation
4	contextual factors to strategies	2.056	0.299	0.003	confirmation
5	Strategies to consequences	3.287	0.441	0.004	confirmation

5 Discussion and conclusion

This study sought to develop a "customer relationship management model with an emphasis on customer knowledge management in the banking industry." To achieve this goal, a qualitative systematic grounded theory research method and a quantitative survey method using structural equations were used. Due to the importance of paying attention to customer relationship management with an emphasis on customer knowledge management in the banking industry, which was explained in Chapter 2, first of all, the dimensions of a customer relationship management model with an emphasis on customer knowledge management in the banking industry, which was the subject of this study, had to be presented for better management of this issue. Therefore, using the systematic grounded theory method and semi-structured interviews and questionnaires, ultimately after reaching theoretical saturation, by extracting, categorizing and classifying codes, and the researcher's innovation with the help of supervisors and advisors, qualitative and survey research sections, the paradigmatic model of "customer relationship management model with an emphasis on customer knowledge management in the banking industry?" including the central category, contextual factors, intervening factors, background factors, strategies and consequences were presented, and then these dimensions were tested in the survey section and the specified paths in the model were monitored and confirmed. Based on the validity conducted, the model is valid and with 95 percent confidence, the causal factors affect the central category by 0.297; the central category affects the strategies by 0.291; the intervening factors affect the strategies by 0.451; the contextual factors affect the strategies by 0.299; and finally the strategies affect the consequences by 0.441.

The results obtained from this study are consistent with the results of the following domestic and foreign research: Darvishi Solukolaei and Ghadimi Jojadeh [11] in a study entitled Identifying and prioritizing the factors affecting the implementation of the customer relationship management system using fuzzy TOPSIS approach found that organizational factors are the most important from the managers' point of view and rank first. After that, in order, the factors of customer-oriented organizational culture, knowledge management and organizational structure are located. Technological factors are also the least important. Gopalsamy et al. [23] in a study entitled "Does Optimum Customer Relationship Management in Banking Industry Lead to Customer Retention and Trust?" found that customer relationship management through customer knowledge management, customer satisfaction and customer experience positively affects loyalty, trust, and retention. Migdadi et al. [39] in a study entitled "Knowledge Management, Customer Relationship Management and Innovation Capabilities" found that knowledge management affects the success of customer relationship management, which in turn affects innovation capabilities, and knowledge management affects innovation capabilities through the success of customer relationship management. Easa et al. [13] in a study entitled "Customer Knowledge Management in Banking Industry and Its Outcomes" found that banks' awareness of the importance of customer knowledge management and how to implement customer knowledge management impacts innovation, customer relationship management and risk management.

Based on the research findings, it is recommended that marketing experts, decision-makers and managers of banks pay more attention to sustainability in customer communications and focus on the target market by properly presenting and distributing user-friendly services to customers. Be sure to think about branding and brand building to improve your relational marketing. Pay more attention to providing solutions to customers, not just services to customers. Pay more attention by considering the language and interactive facilities and building communication communities for more two-way interaction with customers. Consider the timing of launching services to the market to attract the most customers for their services. Always keep in mind the novelty and having new and creative service solutions. To prevent customer confusion, pay special attention to understanding customers' needs for services tailored to the lifestyle and behavioural changes of audiences. Engage customers in content production and sharing through interactive tools. Be very careful about trust-building and commitment to their brand in terms of quality, quantity and quality of content provided. Periodically monitor and train their employees' awareness of and acquaintance with the brand and

services. Awareness of market issues, brands and services offered by other banks should be one of the most important activities of managers and employees. Increasing the quality and quantity of dynamic social and digital interactions with customers should be one of the most important activities of bank managers and marketers. Having the desired criteria for reviewing and measuring the impact of services on customers and the market should be one of the most important activities of relational managers and marketers.

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