Artificial Intelligence based Business Process Automation for Enhanced Knowledge Management

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Abstract

A customer relationship management (CRM) system based on Artificial Intelligence (AI) is used to discover critical success factors (CSF) in order to improve the automated business process and deliver better knowledge management (KM). Moreover, different factors contribute towards achieving efficient knowledge management in CRM systems with AI schemes. Identifying the key elements may be accomplished in a variety of ways. For this purpose, Delphi technique, nominal group technique, and brainstorming approach are used. Using the interpretive structural modelling (ISM) approach, ten key variables, significance degree, and interaction are determined. CSFs such as funding, leadership, and support are the most important of the ten variables identified for integrating KM, CRM, and AI. This approach has the potential to significantly improve the business processes.

Keywords: Artificial Intelligence, business process automation, knowledge management, customer relationship management, interpretative structural modelling

1. Introduction

In terms of a new business process environment, the interaction between markets and organisations demands new approaches. In this perspective, it is critical for any organisation to implement and maintain a customer relationship management (CRM) system [1]. The CRM

system is primarily based on the effective strategy for leveraging long-term customer relationship retainment. Organizations must connect their knowledge management (KM) system with their CRM system in order to gain a competitive advantage [2]. The organization's business process will be enriched by this process. Sophisticated knowledge task is essential for identifying the customers, who are highly valued. The customers' long-ranging profile may be determined and preserved with this model. Since, the customer profile volume is increasing greatly; manual customer profile analysis is a tedious task. Artificial Intelligence (AI) techniques may be used for addressing this issue [3]. The KM architecture may be supplemented by the integration of CRM with AI models. The organizations' business process may be improved. The KM environment will be supported by a smart CRM system integrated with AI technology [4]. KM based curated data is restructured and the valued customer data is analyzed and filtered by the AI from the available voluminous customer data. The KM environment along with smart ARM system will help in improving the business of organizations eventually. Figure 1 represents the steps involved in the process of knowledge management automation.

Figure 1. Steps Involved in Automation of Knowledge Management

Several organisations utilize CRM systems to manage the tasks linked to business growth. Despite the implementation of CRM by more than 70% of businesses, noteworthy and effective improvements could not be identified [5]. In contrary, the business performance has faced a sad decline. The focus of organizations must be shifted to customer oriented view from product based perspective as suggested by several researchers in order to overcome the constraints. The organization may evaluate consumer data at a quicker rate with an innovative and efficient method [6-7]. In order to achieve overall growth in the business, the customer

data is analyzed and an innovative idea is proposed and implemented. CRM is essential for implementing the smart CRM application in KM environment for analyzing the voluminous data and developing innovative ideas [8]. In KM environment, the smart CRM process is used for the analysis of multifarious customer data. Integration of the KM and CRM system with AI aids the entire process of the business chain. This model helps in attaining the targets and success of the organization through modification in the business process environment. The critical success factors (CSFs) must be identified and the relationship between these factors must be studied to enhance the business organization performance using this model [9]. Thereby, business goals may be achieved by paying appropriate attention to specific CSFs of the organization. An interpretative structural modelling (ISM) scheme is used to identify the CSFs and the relationship among those factors in this paper. Identification of appropriate CSFs for improved knowledge management that can contribute towards enhancement of business processes, identification of relationship between the CSFs, development of an interpretative framework for the system implementation and classification of CSFs based on their importance are the factors addressed in this paper.

2. Literature Review

Knowledge management is performed in CRM systems by employing AI techniques at organizations in order to achieve various objectives [10]. Valued customer relationship may be improved using such models. The resistance when new processes are introduced is softened while the business processes are enhanced ensuring unhindered flow using these models. Change and new ideas is not accepted easily by employees in most organizations. For this purpose, the KM system with smart CRM technology integrated with AI framework is used to achieve success. The stakeholders resistance in the organization may be avoided by using this model [11]. Appropriate motivation helps in understanding the customer requirements better by the authorities of the organization with this new system. The intention, trust and customer loyalty will be improved with the integration of KM, CRM and AI in the organizational environment. In order to apply KM in CRM with AI framework, it is essential to enhance trust

[12]. This will increase employees' behavioral intentions to utilize the new system that has been implemented. For the successful implementation of KM based CRM with AI framework, trust enhancement is a crucial parameter [13]. This helps in increasing the overall organizational revenue.

Along with the client value enhancement, marketing cost may also be reduced by using the business process automation [14]. The organizations business scenario value can be enhanced by the integration of KM, CRM and AI. In the integration of KM, CRM and AI, one of the key success factors that have to be considered is the value addition to business [15]. The overall perspective of the system may be narrowed down sometimes, when the hybrid system is considered as a mere technology by using information and communication technology (ICT) with the environments like KM, CRM and AI. Success may not be attained by the organizational authorities with such a narrow idea of the model [16]. This system is a software mechanism rather than a mere application. The organization's back and front office, concerned departments, people and business processes are involved in the KM environment integrated with CRM and AI framework [17]. According to various studies, the organizations' competitive advantages may be further enhanced with the integration of CRM systems with AI.

Training of employees and several other factors are essential for enhancing the system efficiency and its applications [18-19]. In order to incorporate this hybrid system in the existing environment, the employees must be trained adequately. In order to achieve success in the KM, CRM and AI implementation, it is crucial to ensure the training and readiness of employees. Scientific data analysis is considered as a significant parameter in this integration as it deals with the vulnerabilities of the system related to privacy and security [20]. The data privacy is safeguarded in a strict manner with appropriate privacy policy and then the data is protected from unauthorized utilization with the required attention from the authorities of the organization [21]. In different organizations, the new improved system is implemented

successfully by safeguarding data with the appropriate enforcement of privacy policy and adequate security mechanisms.

3. Research Design

Grounded theory is used for identifying the factors that contribute towards the successful application of the KM, CRM and AI based hybrid framework. Delphi technique, nominal group technique and brainstorming technique involving in-depth interview with the expert opinion has helped in the identification of success factors that have contributed towards the easy deployment of hybrid framework [22]. During the consultation stage, certain experts are approached to seek their input. These specialists have a thorough understanding of the organization's business processes. They have relevant expertise in the related subject and are employed in industries with a strong educational foundation. Ten experts are contacted for this purpose and out of which the eight experts have an experience of over five years in this domain [23]. The existing literature based knowledge and the in-depth interview based expert knowledge is used for the identification of the success factor of KM, CRM and AI integrated framework [24]. Table 1 represents some of the identified factors.

Table 1. Description of the Success Factors for the Integrated Framework

Sl. No.	Factor	Inference
1	Trust enhancement	Trust for utilization of the integrated hybrid framework must be possessed by all the stakeholders.
2	Leadership	Success cannot be achieved unless leaders provide assistance to users in order to utilize the system.
3	Support	For the success of the system, unhesitant support must be provided by the functional area lead.
4	Technical Personnel	In promoting the integrated framework, a technical personnel with high competence in the organization plays a major role.

5	Fund allocation	Fund paucity must not hinder the adoption of the system.
6	Training & Readiness	Training must be provided for the users to ensure easy use of the framework. In case of any unforeseen eventualities, they must be ready for reconciliation.
7	Privacy Policy	Confidentiality of sensitive information must be ensured.
8	Ease of use	Pulling of employees for using the system spontaneously with easy to use and simple elements.
9	Legal requirements	Legally bound data utilization and necessary actions in case of data breaches.
10	Value Addition	The worth perceived for implementation of the system.

From the aforementioned success factors, the CSFs are identified based on the respondent feedback to certain questions. The questionnaire provided a quantitative evaluation of the parameters on a scale of 1 to 5. Respondents holding various posts from various Indian cities were randomly selected for research. Certain respondents are from metropolitan cities and scholars from various Universities. An organized approach using scale development architecture is followed for the preparation of questionnaire. Pretest [25], expert opinion and several other factors are employed in this approach. Controversial and leading questions are avoided with utmost importance. The readability constraints and defects are avoided while framing the questions. The questionnaire quality is enhanced using the pretest factor. Identification of gaps and redundancy of the items prepared during evaluation to ensure the content validity and scrutinization of the scale is performed by certain researchers.
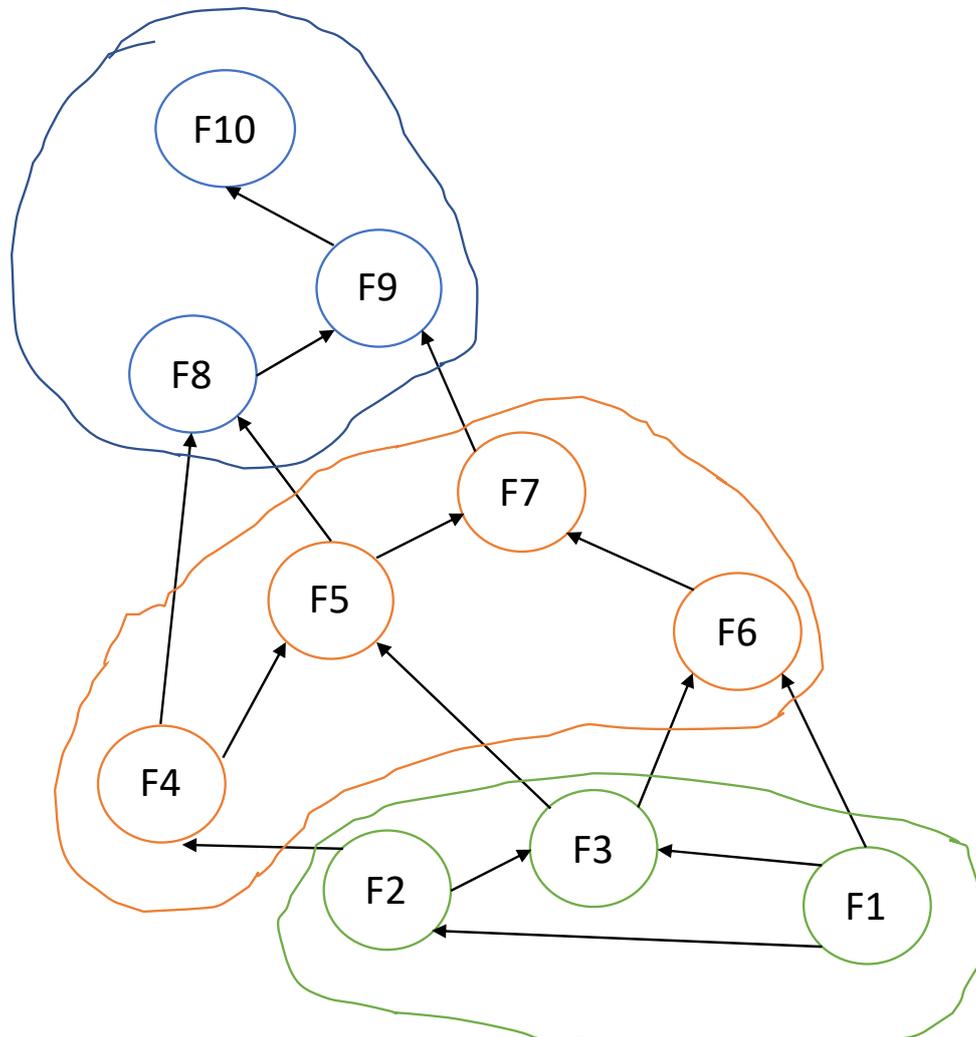
Figure 2. Clustering the CSFs

The items face validity, readability, and clarity enhancement is done using a pilot study on completion of the pretest. The question structure and indistinctness is ascertained by filtering the set of questions and provided to the employees of appropriate organizations during the pilot study. Five experts verified the content and suggested the addition of certain effective and laudable content while dropping certain items eventually. This process helped in fine-tuning and enhancing the efficiency of the quantification feedback. Figure 2 provides the categorization of CSFs into clusters where the driver cluster is represented in green,

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autonomous cluster is represented in orange and dependent cluster is represented in blue. The 10 factors are represented as F1- F10. Limited impact is obtained by the autonomous driver factors. The dependent driver provides the factors that are weakest. These factors are strongly dependent on the other factors. The leading factors are found in the driver cluster represented in green. These are the most significant and crucial factors of the study.

4. Research Methodology

Classification of CSF and identification of the relationship between the factors has been performed. In several organizations, AI based knowledge management systems are unsuccessful as these factors are not appropriately identified along with the inter-relationship between them. Identification of the direct and indirect association between the parameters in an accurate and specific manner contributes towards the successful implementation of the system [26]. When each of these factors is considered independently, the performance of the model is very efficient. The complex relationship between these parameters must be understood in a collective manner. For this purpose, the ISM technique called interpretive method is used. The complex variables are analyzed for their inter-relationship and also the overall structure is estimated. The hierarchical arrangement and digraph modelling techniques are used for presenting the overall structure. ISM application simplifies the complexity of relationship between certain variables. For small and medium enterprises, strategic decision analysis and linking competitive factors are caused by the successful application of ISM technique.

Supply chain management system is largely benefited by this framework. Using this paradigm, users may overcome challenges in whole quality management as well as barriers in interaction analysis. Based on these findings, it is obvious that the ISM approach provides a better understanding of the variables and their interconnections. Delphi technique, nominal group technique and brainstorming technique are used for the identification of 10 CSF parameters that contribute towards the successful implementation of KM, CRM and AI integrated framework in organizations. Relationship is established between the critical factors

by using ISM technique. The hierarchical arrangement and digraph modelling schemes are used for representation of the overall structure for enabling simplification in the complexity and challenges.

For the successful implementation of KM, CRM and AI integrated framework in organizations, CSF identification plays a major role. Further, the interrelationship between these factors is established by using the ISM model. The KM, CRM and AI integrated framework is adopted and managed by the practitioners and policy makers in the organization. During this process, it is possible to ensure reduction of complications and to impose directions using the ISM technique. The framework adoption rate is improved by this technique while efficient resource utilization is ensured by the policy makers. The organizational benefits are further enhanced and it is directly reflected by the overall business process enhancement. For the integration of KM, CRM and AI, CSFs like funding, leadership and support factor analysis is highlighted and successful adoption of the framework is also ensured. Figure 3 represents the comparison of the results obtained from the quantitative questionnaire for categorizing the CSFs based on their significance.
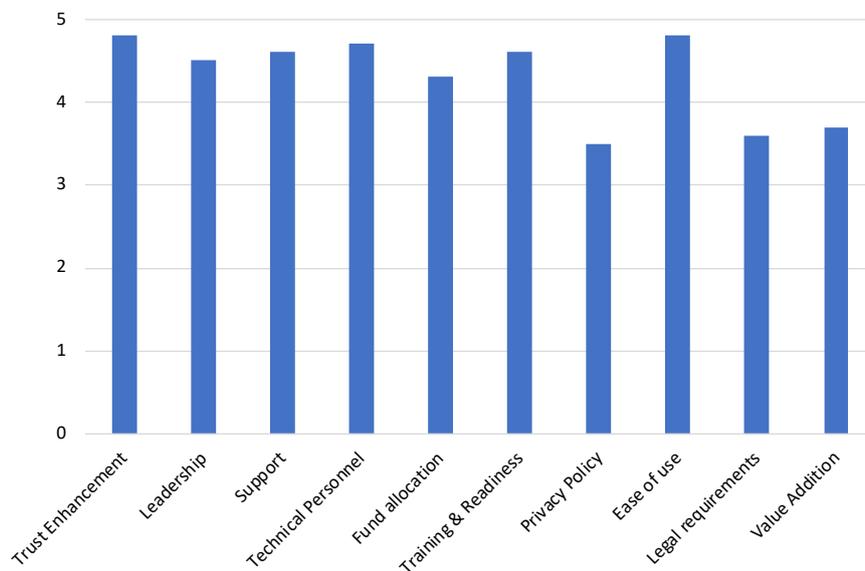

Figure 3. CSF Evaluation Results

5. Conclusion

The KM, CRM and AI integrated framework is adopted in different organizations based on certain CSFs that are identified. Delphi technique, nominal group technique and brainstorming technique helps in channelizing these success factors based on various parameters. This paper presents ten factors that influence the adoption of integrated framework in different organizations. The factors are further categorized. ISM technology is used for identifying the inter relationship between the identified factors. For the adoption of hybrid integrated framework, key factors like funding, leadership and support are highlighted. The exact areas are identified for helping the concerned managers in this regard. This helps in increasing the rate of adoption of the hybrid integrated framework by enabling automated knowledge management in the business process management systems. Understanding various CSFs is critical for businesses that have been mandated by relevant authorities to use the hybrid integrated framework in order to ensure effective system deployment and improved business health. A systematic and comprehensive approach is essential as the identification process of CSFs and the relationship between them is complex. In order to attain the success, special attention is demanded by certain critical constructs that are explicitly defined by ISM with the help of hierarchy orientation.

For effective policy formulation at different organizations and making strategic decisions, the hybrid integrated model for knowledge management plays a pivotal role. The KM, CRM and AI integrated framework performance is improved by the applications with the comprehensive guideline provided by the ISM model. The analysis of massive customer data, which is extremely difficult to accomplish manually, is done efficiently with the help of AI in the KM context with CRM system management. The combined framework of KM, CRM, and AI enables an effective customer data analysis. Efficient adoption of this model is made possible in different organizations with the appropriate identification of CSFs and the relationship between them. For business process enhancement, and successful implementation

of the hybrid framework, the CSF based comprehensive structural model is used and the classification of CSFs is made possible.

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