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Using Intelligent Information Systems to Enhance Customers' Knowledge

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ABSTRACT

A collection of software and hardware known as an intelligent information system (IIS) is claimed to have included qualified employees in the organization's decision-making and communication operations. Customer Knowledge Enhancement (CKE) is key in creating a high-quality software solution. The CKE in creating Enterprise Software (ES) is still in its immaturity, raising concerns on how CKE enablers may be leveraged to enhance ES development businesses while enhancing the quality of their software. A set of software and hardware that knows a specific area, has intelligent decision-making procedures, and the capability to rationalize its activities is stated as an Intelligent Information System (IIS). The most significant element of an IIS is its flexibility to operate properly with individuals to finish activities or make decisions in response to the environment, user input, and knowledge. In this research, a novel approach is proposed to enhance the customer's knowledge using IIS that may be beneficial while improving the software quality.

1. INTRODUCTION

Customer Knowledge (CK) is becoming crucial element for a growth of any business. As a result, focusing on Customer Knowledge Management (CKM) is quickly expanding. CKM helps the businesses in using their particular CK to increase performance, enhance customer service quality, and save expenditures (Naeem and Naeem, 2022). Companies who want to build a well-functioning CKM, on the other hand, encounter uncertainties. There has been a dearth of study, in notably, on how the organisations could employ Human, Institutional, and Technological conditions to control CK while also becoming more adaptable to consumer expectations (Khosravi et al., 2018).

Businesses are overwhelmed with client data in the big data (BD) age, which is important for enhancing services, generating new products, and discovering new markets. The use of big data in new product development creates important challenges. Although the fact that the significance of CKM in product innovation has been generally acknowledged, the topic has not been thoroughly studied, and the utilization of consumer information to product creation has received little attention and consideration. Second, modern data-driven methodologies are necessary to enable active consumer sharing of knowledge throughout product creation. The advantages of using data-driven approaches in knowledge management processes include a greater possibility to incorporate cutting-edge innovation, improved market share, more profit, and more accurate projections of customer requirements. While the studies have provided high-level confirmation of these benefits, they have neglected to study the particular mechanisms behind how organisations might enjoy these advantages (Zhan et al., 2019).

Consumers are among the most crucial stakeholders in every company endeavor. There is no uncertainty that effective communication and engagement with consumers at various stages of the ES development process are essential that can contribute to increase customer loyalty and the ultimate improvement of a business CKM that might be used to improve the receiving of consumer feedback as well as the collecting and use of consumer data. Because CK inclusion in ES advancement is still in its early stages, there is a lack of a conceptual perspective to completely capture the usage of CKM to advance the production process in ES.

Today, information systems (IS) play an essential role in making informed business choices about consumer buying behavior. IS is a comprehensive gathering of elements used to collect, store, and investigate data as well as to deliver information, learning, and digital properties. Businesses and management trust on technology to carry out activities, and to engage with consumers and vendors, and participate in the business world (Setyowati et al., 2021). Many Knowledge Management research have looked at the major aspects that impact CKM. One of the least researched and explored issues in IS is studies on the characteristics that boost CKM in team and project creation to enhance process performance.

The advancement of ICT has a significant impact on many aspects of modern life, notably in the corporate sector. One of the unique ideas offered is e-business, or online marketplaces. Every organisation and professional is attempting to implement Intelligent Information Systems (IIS). Intelligent Information Systems (IIS) looks to be a comment section of Artificial Intelligence (AI) incorporating components of Information Systems based on its most popular versions (IS). IIS is a combination of software and hardware and it entails trained personnel for decision-making and organisational coordination IIS are the next generation of information systems that incorporate AI and database technology, and intelligent behaviour is knowledge based. The information system (IS) is often used to store and display data. In addition, the IIS provides various levels of intelligent assistance for its intended function. The system should provide intelligent support capabilities, the information necessary for intelligent assistance, and a mechanism to manage the ability in an integrated fashion (Abualoush et al., 2018).

2. LITERATURE REVIEW

Several academics focused on Smart Information Systems to improve the corporate sector and consumer pleasure. Using CK, include the authors, is a "stumbling obstacle" for many businesses. Unfortunately, the rate of CKM intake and use in ES is poor; for example, only 27% of the ES research businesses who submitted goods at ELECOMP 2014 had a CKM strategy to boost production effectiveness and the delivery improved service (Khosravi et al., 2018).

The authors of this study are interested to examine some CKM outcomes, such as boosting the effectiveness of the firm's operations and improving the quality of its goods as well as services. This relates to increasing the capabilities of the corporate entity to identify customer necessities in addition to commercial and operational success. According to the KBV, CKM can provide a long-term, durable comparative benefit for the corporate entity because CK-based capabilities are socially complex and difficult to mimic. A study stated that the Laboratory for Intelligent Information Systems (IISLAB) is part of the directory and information techniques division (ADIT) (Zou, 2020). IISLAB conducts sophisticated management and data research that is targeted to current and future software development. The current initiatives are concerned with data protection, extraction and screening of information, organisation, and processing of information in networked contexts such as the web. According to them, IIS is a clever data processing (Zou, 2020).

The use of information management and web-based technologies by businesses has assumed rise to e-business. E-business, according to Mohan Sawhney in Setyowati et al. (2001), is "the use of digital networks and related technologies to enable, develop, enhance, transform, or create a company's process or system to deliver higher value to present or future customers". In principle, this notion highlights how digital and electronic technology may be utilized to develop commercial systems and

processes (product and service exchange) that are significantly over traditional procedures, especially in regard to the benefits that can be obtained by interested individuals (stakeholders).

Defined customer management incorporates organizational practices and dynamic abilities connected to the generation, storage, and exchange of customer information in order to create a durable dominant market position and increase company efficiency through particular growth methods (Castagna et al., 2020).

The customer is the decisive element in building the reputation of the organizations, as it is considered the capital of the institution, and therefore the success of the institution depends on building a strong and long-term interactive relationship with the customer, and on gaining his satisfaction and knowledge. Intelligent information systems are based on the continuous and renewed collection of data about the environment in which they operate, analyzing and formulating them in a meaningful and useful way, in order to access the required information accurately and at the required speed, and send it to decision-making centers to benefit from it in planning and monitoring business activities and operations (Alzoubi et al., 2021). In addition, intelligent information systems are an installation that includes a group of individuals interacting with each other and with equipment equipped to store data, where individuals collect data on the marketing environment, target market, distribution channels, competitors, audience and environmental forces, and store, analyze and organize this information in the information system (Mirzaee & Ghaffari, 2018).

3. PROBLEM STATEMENT AND RESEARCH CONTRIBUTION

One of the key principles of the organization's strategy for knowledge management is the importance of customer knowledge (Alshurideh & Sukkari, 2024). It belongs to the customer relationship management domain that is significant as it raises the possibility that the company's products and services would satisfy the customers' expectations and needs by determining customer data and information (Irshaidat et al., 2024). Customer focus is one of the most crucial problems for businesses in detecting customer requirements and offering appropriate products and services to their clients. Customer focus emphasizes knowledge about, for, as well as from customers (Aburub et al., 2024). This system creates a knowledge base depending on the process of resolving client issues. The customer service platform can also handle process control inside the business. The ultimate objective is to use the knowledge base to identify customer needs and produce products based on customers data (Al-Quran et al., 2023).

Customer needs are the underlying reason for customers making the purchase process, or as it is called the purchasing motives, and no matter how good the service or product is, no one will buy it unless they want it or feel they need it (Nuseir et al., 2023; Al Kurdi et al., 2024). The sales department will not be able to convince anyone to buy it without a clear understanding of the customers' needs. Today's research is dedicated to all entrepreneurs, marketers and salesmen who are looking for an optimal way to know what their customers want. Knowing the needs of customers is a great success, especially in world today, which is marred by a lot of confusion, and a lot of products and competitors (Zhan et al., 2019). Determining the desires of customers has become a goal that companies and salesmen seek to achieve. It has been found that companies that focus on customer knowledge have higher profits than companies that do not.

4. PROPOSED RECOMMENDATIONS

A proposed method based on consumer purchasing behaviour may assess product data, research customer interests, item matching, and offer alternatives or complimentary products to consumers. By combining inputs from all individuals, the recommendation engines assist individuals in identifying items that may be of concern to them from a big gathering of objects. These algorithms often provide suggestions based on a combination of previous purchase or browser history, features of the goods being investigated, and shoppers' demographic and personal preference information (Ghimire et al., 2020). They stated that product suggestions from other Internet users influenced consumer buying behavior. E-commerce recommendation systems may assist customers in choosing favourite goods,

which can then be applied in real networks such as Amazon, Google, and other websites to increase sales (Liu and Ichise, 2017). Figure (1) depicts the structure of the suggested proposal, which includes both positive and negative criteria while using big data to improve the customer's understanding.

Figure (1) Proposed recommendations

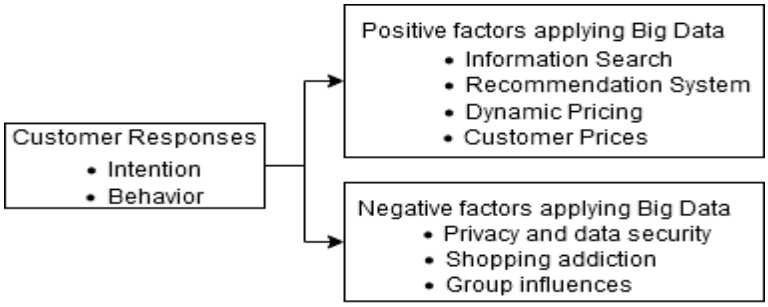

Table (1) positive and negative factors

Positive Factors	
Offering information search, personalized recommendation, recurring billing, and service and support to communicate with key stakeholders is a beneficial aspect of using Big Data analytics (Al Kurdi, 2024; Sukkari, 2024). E-commerce merchants hired ICT to deliver personalized services to clients as well as remodel their websites to provide improved products (Sadok et al., 2022). According to (Lo and Campos, 2018), e-vendors use BDA to make individualised offers, set flexible prices, and give the appropriate conduit to provide customer satisfaction. Using BDA to deliver a real shopping experience, a more real life experience of tailored products, will upsurge the desire of people to purchase things (Pei et al., 2020). All four of the above beneficial uses of the positive factor will aid in capturing consumers' intentions, bringing excellent customer behaviour, and lastly leading to sale and take act to purchase a creation or service from e-sellers.	
Negative Factors	
Privacy and Data Security	The Security of Big Data as another major worry is confidentiality and safety due to its specific properties. Because of the huge number and intensity of data (Alshurideh, 2024; Ozturk, 2024). It is more likely that the data files include fundamentally important and sensitive information. As a result, big data is a potential goldmine for fraudsters (Rukanova et al., 2019). Recent research has found that consumers are increasingly concerned about their privacy when it comes to real-time advertisements and monitoring technology like cookies (Lo and Campos, 2018). Because of the complexity of Big Data information, companies lack the capacity to manage and handle these data, and special interests have access to data. They might not follow laws regarding data protection.
Shopping Addiction	Shopping behaviour is a common inadequately form of cognitive addiction. Situational addiction is defined as a person's inability to comprehend the intensity of post-addiction desires and an inability to manage desire (Joshi et al., 2018). Shopping junkies not only purchase items they require, but they will also spend money on something that represents a wonderful opportunity. Utilizing Big Data analytics software, the website may propose alternatives or complementary products to consumers. These applications inform consumers to spend money and their time on related items (Boone et al., 2019).
Group Influences	Consumers are affected by groups they engage in modifying their intentions by analysing group thought. Consumers may avoid brands that they feel will categorise them. Consumers leave comments on the internet after acquiring items or services, which cannot be called falsified creating an opportunity (Lee and Chen, 2022). It possesses an inhuman intellect with a great awareness for forceful and social interaction. Privacy and security issues, shopping addiction, and group effects are all negative group influence aspects. Consumers feel uneasy and shamed when they believe e-vendors know more about them than they do. According to authors, examining Big Data has a detrimental influence on customers' desire. Bad aspects reduce customers' intents and encourage undesirable behaviour, eventually leading to a refusal to purchase a product or service.

5. CRITICAL ANALYSIS AND DISCUSSION

An intelligent information system is defined as the collection of software and hardware that involves competent individuals in the decision-making and coordinating processes of the company. An intelligent information system may also precisely estimate process time and resource requirements. As a consequence, it performs as anticipated, preparing and storing the results before the retrieve request occurs, ready for speedy access. With all of this, lots of data may be converged, diverged, retrieved, and processed to yield probability and greater prediction accuracy. Managing consumer knowledge during New Product Development (NPD) can help businesses to overcome issues related to customer engagement with novel products. The likelihood of a new product prospering could be increased by strategies that improve a company's knowledge management process as well as its knowledge of customer decision motives.

The intelligent information system seeks to maximize the use of information available via the Internet, and to develop and create new information services based on the electronic participation environment (i.e e-government, e-commerce). In today's digital world, customer retention is as essential as customer acquisition, and the organizations are working on this path. Accordingly, the majority of customers feel that customer experience is the main differentiating factor when choosing one brand over another. As customer expectations grow daily, the companies realize the important to focus on improving customer experience.

Companies nowadays compete how to be more adaptable to changing customer demands. As a result, relationship marketing is necessary for businesses to ensure that they deliver adequate information to their consumers. In the recent years, the customer knowledge has been defined as a dynamic blend of expert values, expertise, or insight developed when customers and companies engage. It is critical for businesses to understand their consumers' interests and utilise them when developing new products and services. Intelligent agents, on the other hand, have been seen as a strategic instrument for information management systems in order to acquire, exchange, and distribute knowledge across the system's numerous customers. One is able to make data-based decisions with the aid of decision knowledge. Machine learning and enhanced intelligence may be used to analyze this data to produce better reports and analysis. One may make better decisions and get better outcomes owing to this decision intelligence.

Intelligent systems automation is not only responsible for improving customer experience, but there is a list of things that positively impact any organization. Whether it is fast decision-making, high accuracy, or quick resolution of customer problems, IA is extremely beneficial to any organization that wants to deliver an excellent customer service experience. Quick responses is an element in this system which as being a customer, getting quick and high quality responses is the best thing need in terms of support from any organization. By incorporating AI-powered IT service desk, the organizations can reduce mean time to resolution so that professionals can deliver fast, high-quality responses. This is a long term solution for any organization to deliver an excellent customer knowledge.

Eliminate manual or repetitive tasks by integrating intelligence into the business process with the unified and certified platforms. With intelligent systems automation, the virtual agent/self-service, service desk automation, and management information systems, end-to-end IT service management solution gives the organizations all the ingredients to deliver a great customer knowledge and experience. So, integrate today's company platform and provide exceptional support to company end users.

6. CONCLUSION, LIMITATIONS AND FUTURE DIRECTIONS

In order to enhance businesses' decision-making operations, the discipline of decision intelligence combines Business Intelligence (BI) with Artificial Intelligence (AI). To make business decisions more quickly, easily, precisely, and reliably, decision intelligence makes use of data and prediction frameworks. An intelligent information system is a continuous process of gathering and analyzing consumer interaction data in order to obtain important insights into customer behaviour. Customers are regarded as a great source of information for businesses, since they acquire skills and knowledge when purchasing and using items or services. Customer knowledge management is a relatively new stage in the management of relationships between enterprises and their consumers. The majority of the models discussed in the literature are focused on human capital in order to establish a framework for exchanging information with consumers. The usefulness of agent-based technologies to manage customer knowledge was studied in this research.

Today, customer knowledge is considered one of the most important differentiating factors between competing organizations and companies, as the effective customer knowledge plays an essential role in today's business world when it comes to customer satisfaction and loyalty. It is necessary to have the ability to deal with any problem facing customers and make every effort to ensure their satisfaction at all times to provide service that exceeds expectations. However, the sustainability and management of automated customer service in the global market has become a challenge for most organizations. Customers today are more curious, searching, and demanding, and they do not necessarily come from the same background. From this perspective, the concept of artificial intelligence in the field of customer management was born.

An information system is described as a network of coordinated components that collaborate to produce, distribute, and process information. Precision is an important feature of computer-based information management data that may not apply to other sorts. Thus, the objective of an information system is to convert raw data into useful data that can be used for organisational decision making. Some limitations are listed in the section below:

New skills: There is a need for a more, differentiated set of skills in the process of developing information systems. New types of skills are needed. Systems analysts and programmers are no longer a sufficient partitioning of “workers” in a development project.

Methods and techniques: The majority of method research is focused on the development (or re-creation) of formal describing techniques with high expressive power for describing objects that may be formally described.

Informality: Many IT development initiatives nowadays are focused with the architecture or re-engineering of business processes, as well as the provision of adequate IT support for the processes.

Maintenance: The provision of raw input data and the preservation of up-to-date information is a major issue for management information systems. The organisation currently produces data on sales, revenue, costs, payments, and other core business information.

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