Evaluation of Artificial Intelligence Models and Wireless Network Applications for Enterprise Sales Management Innovation under the New Retail Format

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Enterprise sales are distinct from other types of technology sales. It refers to the procurement of big contracts that involve long sales cycles, multiple decision-makers, and a higher level of risk when compared to traditional sales. It has its very own way of doing the decision-making process. In the current age of Internet technology, almost every field has adapted or upgraded to Artificial Intelligence (AI) technology. Likewise, enterprise sales also use this vibrant technology to enrich the sales representatives’ work. It does not mean that it affects the employees’ jobs, but it makes them much more manageable. The New Retail Format is the concept of selling products through the blending of contexts of online and offline modes. Also, enterprise sales management defines the management of product sales in business-to-business (B2B) transactions. In this research, Fuzzy Multicriteria Decision-Making is used by the customer to choose various products in an enterprise sales store. Additionally, Particle Swarm Optimization is utilised in this application to monitor the stock (product) availability and sales of the available products between two larger organizations. In this article, the proposed model incorporates AI and Wireless Sensor Networks (WSN) for enterprise sales under a new retail format. In this research, Fuzzy Multicriteria Decision-Making with a Particle Swarm Optimization Algorithm is implemented to analyze the process of enterprise sales. The proposed algorithm is compared with the existing fuzzy clustering method. From the result, it is observed that the proposed algorithm has achieved 99.78%, whereas the existing system has given only 93.46% of accuracy.

1. Introduction

In the field of artificial intelligence (AI), a wide range of disciplines are covered, and any of these fields might be regarded as a subdomain of artificial intelligence [1]. In addition, supervised, unsupervised, and semisupervised methods for training agents can be used to improve their performance. Advances in information processing techniques and artificial neural networks are used to analyze massive volumes of data [2]. With the use of cloud computing, the Internet of Things (IoT), big data, and general-purpose machine learning algorithms (GPML) can handle a variety of data sources, such as audio, video, and text, and improve product demand forecasting accuracy by analyzing customer behaviour [3]. The use of GPML technology and other components of digital platforms has assisted small businesses in raising their profile and expanding their operations globally [4]. The use of artificial intelligence can enhance the client experience. Because of the lack of access to a large amount of customer information, organizations’ ability to foresee customer behaviour and improve the customer experience has become increasingly difficult. The amount of information communicated via the Internet has reached previously unheard-of levels in the decade [5]. An organization that is able to analyze and make use of this data will acquire a competitive advantage over its competitors. According to BearingPoint research, emerging artificial intelligence technologies can improve the customer experience in two major ways [6, 7]. In recent years, messaging applications have increased the popularity of this technology. Customers’ shopping experiences are being improved by the use of chatbots, which merchants are increasingly
incorporating into their operations. H&M was the first retailer to launch a chatbot on the Canadian messaging service in 2016, allowing customers to browse, share, and purchase items from the H&M catalogue before any other retailer [8]. Customers' verbal orders are transformed into text and delivered to order-taking systems either automatically or via email to complete the transaction. McDonald’s has devised a multilingual, multiaccent operating system that is both automatic and incredibly difficult to operate on the part of the customer [9]. In visual recognition technology, a virtual assistant is a key component since it can recognise goods or people, track shipments, create accounts from a distance, and assess the preferences of Internet users for different brands of products [10]. If a company employs facial recognition technology, it may be able to identify clients who have a loyalty card even before they visit the store's premises. It is possible to use labels and shelf screens to draw attention to specific products or discounts that may be of interest to specific customers, although this is not recommended [11]. Customer experience can be significantly enhanced by implementing biometric and object recognition technology at the point of sale. Visual search is now available in the Amazon iOS app, allowing shoppers to take a snapshot of a product and have it appear in the Amazon catalogue within seconds. Autonomous robots are capable of adapting their behaviour to their surroundings and can perform a wide range of activities in a variety of environments [12]. Retail robots may be a fantastic marketing tool for raising brand awareness and customer satisfaction because of the eagerness of customers to watch them in action while they are working [13]. In large organizations, predictive analytics can assist them in making more informed strategic decisions by analyzing past or current patterns of customer behaviour. Predictive analytics can be used in a variety of ways to lower the turnover rate of a brand and identify potential threats [14, 15].

Entering a business, making purchases, and exiting without having to wait in line for payment can all be accomplished with the use of an app. When it comes to intelligent stores, this is the way Amazon sees things from their perspective [16]. Customers must first download the Amazon Go app to their smartphones before they can shop [17]. Whenever a product is picked up or returned, shelf sensors automatically update the virtual carts of paying consumers. Reduced labour expenses in retail stores can also be achieved through the use of automated warehouses that are equipped with sensors, robots, and artificial intelligence (AI). According to the CEO of Plus One Robotics, a company that makes vision-guided robots for businesses, a typical item is touched by twenty-one people before it reaches its final destination [18]. The products you order are automatically picked up and packed by a robot from the shelf where they are located. Retailers have a variety of challenges when it comes to cost optimization [19]. Retailers may reduce inventory of perishable food items by defining the appropriate amount of produce at the appropriate locations as well as smartly synchronising downstream and upstream supply levels using predictive analytics. Increasing revenue, profitability, and operational effectiveness have all been reported by businesses in the retail sector as a result of enhanced artificial intelligence. The application of artificial intelligence to new retail activities is the subject of this study.

When discussing the integration of artificial intelligence and machine learning tools into the sales process, the research expert referred to this retail reorganization as a “sales renaissance.” According to the authors, artificial intelligence and machine learning can be applied in a variety of ways to increase sales [20]. An artificial intelligence (AI) system uses dashboard data from pricing factors, qualifying leads, IP addresses, and other customer data to enable sales professionals to calculate the appropriate price for different customer categories on the fly [21]. Through the utilisation of preexisting shop capabilities, the incorporation of artificial intelligence (AI) into retail operations can boost efficiency. The application of artificial intelligence-enhanced big data technology uncovers links between independent variables such as advertised pricing and display location and dependent variables such as retail sales or profit [22]. This study focused on evaluating the performance of enterprise sales management in the context of new retail.

2. Materials and Method

The manufacturing sector has always played a vital role in developing China’s economy. The current industrial structures of the manufacturing company and its improvement mode have undergone a critical transition. This study was aimed at investigating the problems that arise in the management of enterprises in the age of wireless sensor networks. Supply chain management appears to be the highest priority of production enterprise management. In terms of evaluating production enterprise performance, the Enterprise Sales Management Innovation under the new retail management data of large manufacturing groups is gathered through questionnaires. The Lagrangian multiplier method is used to analyze its performance evaluation establishment in manufacturing, and an enterprise management evaluation method is also established. According to the findings, the mean value of four enterprise sales management innovation indicators is under retail services marketing. This investigation provides not only a conceptual foundation for achieving management innovation in retail capability in enterprises but also a valuable reference for increasing production enterprises’ competitiveness in the sales market.

2.1. Proposed Model. There are two main types of sales: complex (or enterprise) and transactional (or small- and medium-sized business (SMB)) are represented in Figure 1. Transactional sales may occur in daily activity; they are the straightforward process of buying and selling of products and services to an individual or small group of individuals (like buying a washing machine). These are low risk, and the sales cycle is short. Enterprise sales represent months of communication between the sales team and the prospect, resulting in larger-scale corporate solutions. The complete data communication from the AI sales assistant to the end sales representatives is depicted in Figure 2. The complete data communication process works with the utilisation of
wireless sensor networks (WSN). The devices involved in this communication can be mobile phones, tablets, laptops, and others. Input for this WSN will be product details, customer requirements, and others.

The differences between the two are as follows: an enterprise sale is marked by high risk, many stakeholders, a long sales cycle, and high investment and complexity. In contrast, a transactional sale deals with the following:

(i) lower risk for a few stakeholders
(ii) short sales cycle
(iii) single product sales and services
(iv) marketing driven and sales driven rather than by relationships

With higher investment comes higher risk and greater complexity. But, when there is a profit, it is significant.

When enterprise sales management is concerned, the role of sales representatives is more critical. AI sales assistants are introduced to enrich the sales representative’s performance and the sales lead. These AI assistants play a vital role in enterprise sales nowadays. The significant roles played by AI sales assistants are as follows:

(1) Communication between the leads and sales representatives: The AI sales assistant engages the leads by conversing with them and qualifies leads before talking to a sales representative. In sales language, a leader refers to contact with a potential customer. The AI sales assistant also emails, chats, sends sales-related videos to the leads, and communicates the process to sales representatives

(2) Prioritize leads for sales reps: The AI sales assistant follows every lead and selects qualified leads. These follow-ups save the sales representatives a lot of time from the unwanted conversation. This type of AI provides numerous benefits. By this process of AI sales assistant, the sales representatives can sell to genuine potential buyers rather than wasting time talking with people who are not qualified

(3) Evaluation and closing the deal: The AI sales assistant evaluates the sales process carried out on leads and prepares a detailed report for the sales representatives. It also closes the deal after the evaluation process. These processes constitute a significant part played by AI in enterprise sales

(4) Empowers sales: It empowers the sales process itself on the whole. The traditional method without AI sales assistant is tedious for the sales representatives and sales team. AI technology has reduced the burden for sales representatives by empowering the sales process

(5) Track competitors move: The AI sales assistant powered by competitive intelligence tracks many related sources online and reports sales representatives on the competitor’s next move with the aid of wireless sensor networks (WSN).

(6) Autoupdates sales strategy: This type of information about a competitor’s move can help the sales team to update sales methods to tackle the competition. Moreover, the AI autoupdates itself and forms new sales strategies. These autoupdates are performed with the utilisation of intelligent wireless networks.

Thus, artificial intelligence plays a crucial role in new age enterprise sales under the new retail format.

2.2 Fuzzy Multicriteria Decision-Making with Particle Swarm Optimization. In this research, it is assumed there is a retail business that offers a single product to customers over a finite time surface. In other expressions, the retailer offers goods at n various supply prices at same time. The following is Equation (1):

\[
S = \left(\sum_{p=1}^{n} \sqrt{\frac{2 \times M \times U_i}{Q_j \times h} + \sqrt{\frac{2 \times M \times U_i}{Q_p}}} \right)
\]

In practice, different retail profits are frequent. Users generally discover that such a product is being sold at different retail prices at the same time, whether online, as part of a retailer’s sales promotion. The abbreviation S stands for target (optimal) order quantity. The notification U represents the annual demand for optimised inventories. \(i\) represents the cost of stock creation, and \(U_j\) represents the inventory upkeep operating costs. \(Q_i\) is the percentage rate during which inventory protection production costs have been calculated. The proportion of resources maintained is attributed to the fact that the costs of retaining cash reserves now have increased in proportion to the amount of reserves in enterprise. Its proportion appears to be the sum of Equation (2) resources: alternative, stockpiling, transportation, domestic transportation inside of financial stability factory, worker compensation, and degradation.

\[
MK = \sum_{i=1}^{j} \frac{S}{E} \times U_i + \left(\frac{E}{2} + K_i\right) \times h \times Q_i
\]
Retailers now use various retail pricing structures to encourage purchase behaviour, which involves selling products at different prices at about the same time, as represented more by Equation (3). $MK$ stands for the term of providing costs, $E$ stands for the amplitude of a delivery component, and $K_j$ stands for the execution of safety system.

\[
S = \sum_{i=1}^{j} \sqrt{\frac{2 \times (1 - C) \times U_i \times M}{h \times \sum (u + Q \times (1 - C))}}.
\]  

(3)

The Lagrangian multiplier method is used to solve the problem, but an algorithm for determining the estimated optimal total transaction quantity is also planned. It demonstrates that when the number of orders is limited, the retailer must limit the number of retail costs. The letter $v$ represents an innovative cost. $S$ represents the optimal amplitude of a small transaction in terms of increasing enterprise value. $Q$ represents the effective rate of stock manufacturing costs, which is represented by Equation (4).

\[
MK = \sum_{i=1}^{j} \frac{M}{E} \times U_i + \sum_{j=1}^{h} \left( \frac{E}{2} + K_j \right) \times h \times Q.
\]  

(4)

As in the apparent lack of a reorganized constraint, the frequency restriction; analysis results indicate that the discount coefficient, but it is not the volatility equation, influences various retail costs as given in Equation (5).

\[
S = \sum_{i=1}^{h} \sqrt{\frac{2 \times \sum [(1 - C) \times U_i^T + U_i^S] \times M}{h \times \sum (u + Q^T + Q^S \times (1 - C))}}.
\]  

(5)

To investigate its problems that arise in manufacturing enterprise management in the era of wireless sensor networks. The highest priority of manufacturing enterprise management appears to also be supplier management. Where $U_i^T$ represents the income cost of producing levels of inventory, $U_i^S$ represents the semicosts of emerging inventories, but also $O^T$ represents the likelihood of income ready and willingness to operate costs of maintaining inventories. The efficient technique of semi-inventory-maintenance operating costs is denoted by $Q^*$ which is given in Equation (6).

\[
MK = \sum_{i=1}^{j} \frac{M}{E} \times U_i^T + \frac{M}{E} \times U_i^S + \left( \frac{E}{2} + K_j \right) \times h \times Q^*.
\]  

(6)

Variations in delivery times have a significant impact on the various stages of protection systems required by distributors who follow Equation (7).

\[
K_j = \sum_{i=1}^{j} \sqrt{2 \times M^2 \times \frac{U \times E \times M \times h \times \sqrt{2\pi \sigma}}{M \times U_{ij}}}. \]  

(7)

To clarify Equation (8), $A$ denotes the confidence interval of exchange utilisation and $U_{ij}$ denotes the cost of not having inventory assets.

\[
S_{ij} = \sum_{i=1}^{j} M_i \times (K_i + K)^2.
\]  

(8)

Questionnaire items are used to accumulate information from large quality management practices for the enterprise sales management innovation, which is part of the new retail management. To analyze the performance evaluation establishment of manufacturing enterprises, the analytical network (AI and WSN) process is used, and also an enterprise management evaluation method is developed in Equation (9).

\[
M_{ij} = \sum_{i=0}^{j} \sqrt{P} = \sqrt{\sum_{i=1}^{j} M_i \times (K_i + K)^2}.
\]  

(9)

From the research results, the mean value of five different enterprise sales management technology indicators is under the retail marketing. The $M_{ij}$ represents the approximate probability of occurring of the particular
incident based on statistics. The difference coefficient is determined in responding to data about what possible advantages may be made in its decision to incorporate by Equation (10) supplying funding to such a marketing decision.

\[
U = \sum_{i=1}^{j} \frac{M}{K} + \sum_{i=1}^{j} (K_i + K)^2. \quad (10)
\]

In Equation (11), to establish a link between economic and its benefits of buying from a specific supplier and the economic advantages of purchasing from other distributors, correlation testing is frequently used to evaluate such a correlation.

\[
Q_{ij} = \frac{\sum_{i=1}^{j} M_i(K_{1i} + K_1) \times (K_{2i} + K_2)}{M_1 \times M_2}. \quad (11)
\]

The regression coefficient formula of the economic benefit of purchasing products from two suppliers is expressed as \(Q_{ij}\). \(K_1\) is the acceptable price of economic benefit from purchasing with the first supplier; \(K_2\) is the appropriate level of economic benefit from purchasing from the second supplier; and \(M_1\) is the reliability coefficient for the first supplier. \(M_2\) represents the statistical power of the second provider. \(K_{1i}\) appears to be the ability to obtain a retail price of economic benefits from goods purchased with the first supplier; \(K_{2i}\) appears to be the probability of achieving a price of economic advantages from items purchased also with the second supplier; and \(i\) seems to be the probability of potential rates of financial advantages from suppliers as from second wireless provider as in Equation (12).

\[
S_M = \sqrt{\sum_{i=1}^{K} S_U^2} + \sum_{i=1}^{K} S_{K}^2 + 2 \times S_U \times S_{K} \times Q_{U\&K}. \quad (12)
\]

where \(S_M\) is the total spread measure, \(S_U\) is the small difference of the first solution, \(S_K\) is the dispersed measure of a second suggestion, and \(U\&K\) are the coefficient vectors during the first and second multidimensional data. The permitted Equation (13) will be defined again in order to implement measures for that development and enhancement of an integral approach a restricted and compensated set of factor representation

\[
S_i = \sum_{i=1}^{K} \sqrt{U} = \sum_{i=1}^{n} \{U_i\}, i = 1, 2, \cdots .n. \quad (13)
\]

The mean value of multiple enterprise sales management technology indicators is underneath the retail services marketing, according to the findings. It entails ensuring its policy’s effectiveness by assuming that its col-

![Figure 3: The statistical results of the gender ratio and manufacturing industries were included in the questionnaire.](image)

lection is a very well-defined sequences relationship as described by Equation (14).

\[
U_1 < U_2 < \cdots , < U_n, \quad (14)
\]

in which \(U_1\) occurs within a week of \(U_2\) occurs before \(U_3\), and so on. The purchase responsibility in a set \(U\) becomes a quantitative sequence of strength time to prepare \(M\) of factor measures \(U_i\) in such a way that the estimation is represented in Equation (15).

\[
M = \sum_{i=1}^{n} (M_i), i = 1, 2, 3, \cdots .n. \quad (15)
\]

This study provides an initial framework for successful organization to create retail abilities in manufacturing enterprises and also a useful comparison for increasing production enterprises’ global level of competitiveness. Wherein \(M_i\) is a relevant manufacturing that satisfies the systemic divisions described by Equation (16).

\[
\sum_{i=1}^{n} M_i < M_2 < \cdots , < M_n. \quad (16)
\]

The accumulated scheme effectiveness measurement might be represented mathematically as a difficult and complex effectiveness measure, according to Equation (17).

\[
K = \sum_{i=0}^{n} M_i U_1 + M_2 U_2 + \cdots + M_n U_n = \sum_{i=1}^{n} M_i U_i. \quad (17)
\]
This research will not only provide a conceptual basis for improving manufacturing enterprises’ management performance but will also serve as a valuable regard for increasing the production enterprises’ competitiveness in the market. The efficiency of a policy is simply a function $K$ that includes $n$ efficiency different factors that are linear to its performance indicators $U_i$.

3. Experimental Results and Discussion

For this study, the analysis of test qualities was carried out. Figure 3 depicts the gender ratio statistical data, which show that men have 57.16% of the data set and women account for 85.33%. The research topic represents the domestic conventional manufacturing industry’s management innovation capability.

Methods and techniques are consolidated to communicate the theoretical background of enterprise retail innovation management, which has practical parameters for improving the WSN online management innovation ability of manufacturing enterprises. Initially, a comprehensive evaluation framework of manufacturing enterprise management innovativeness is designed on the basis of these conceptual incorporation, and also manufacturing enterprise qualities.

Methodologies are consolidated to express the theoretical underpinning of enterprise retail innovation management, which has practical dimensions for increasing manufacturing businesses’ WSN online management innovation ability. On the basis of these conceptual incorporations, a thorough evaluation framework of manufacturing enterprise management innovativeness, as well as manufacturing enterprise attributes, is initially established. The items expected to be brought are classified into three groups using the ABC classifier: A, B, and C. The three stages are used to evaluate the single most important factor that has a significant impact on the desired outcome, as well as the supplementary factors that have a lesser impact on the desired outcome. The statistical data is summarized in Table 1. In that table, the value “1” also indicates that the factor was chosen as a measurement (weight), and “0” indicates that it was not chosen. Various models are used to quantify and calculate a quality assessment index.
There are five investigations underway. The importance of their distributors is also ranked based on the establishments’ process design status.

Figure 4 depicts the quantitative results of the survey question statistics for various manufacturing sectors. The notations used in the figure are as follows: equipment innovative manufacturing is specified by EM, MM is an abbreviation for material retail manufacturing, EP is an abbreviation for electrical products, AP stands for agricultural products, chemical process industry is abbreviated as CI, and BM is an abbreviation for biological medicine. The WSN online retail manufacturing enterprises account for 22.36% of all enterprises, biomedical enterprises for 19.67%, chemical organizations for 16.54%, material manufacturing enterprises for 16.37%, and electrical and electronic enterprises for 22.47%, but agricultural but also blindside product lines enterprises account for 17.62%.

Statistical analysis is required to further assess the validity and reliability of the measurement items. Initially, an element analysis is performed with the first index of a process by evaluating the ability of manufacturing organizations’ transformation leaders. The ultimate evaluation system is evaluated and analyzed once more (refer Table 2). The survey’s quantitative findings include figures from numerous manufacturing sectors. In the figure, the notations are as follows: EM stands for equipment innovative manufacturing, MM represents for material retail manufacturing, EP stands for electrical goods, AP stands for agricultural products, CI is for chemical process industry, and BM refers to biological medicine. WSN online retail manufacturing firms account for 22.36% of all enterprises, whereas biomedical companies account for 21.36% of all enterprises.

Figure 5 shows training sessions conducted in an online questionnaire utilising WSN with AI, as well as statistical results analysis. According to data analysis of an education stage for the online (WSN with AI) questionnaire, there appear to be 60 people with a college degree, properly accounting for 12.3 percent; 160 people with such an associate’s studies, properly accounting for 75 percent; 40 people with postgraduate degrees, properly accounting for 18.7 percent; and 2 individuals with such a doctorate, properly accounting for 2%. Individually gathered data includes the participants’ years of experience in the manufacturing industry as well as the positions they hold. To further assess the validity and reliability of the measurement items,
statistical analysis is required. Initially, an element analysis is performed with the first index of a process of evaluating the ability of transformation leaders in manufacturing organizations. The ultimate evaluation system is reevaluated and analyzed.

Figure 6 depicts the analysis’s reliability findings. The corresponding represents the significance value, and also the ordinate represents the sales of assistance for organizational management. The qualities of items 1, 2, and 3 are 0.91, 0.85, and 0.99, respectively. B represents the level of creativity of organizational retail management, with reliability and validity of items 1 and 2, but also 3 of 0.81, 0.97, and 0.88, including both; C represents its indicated results of organizational retail management, with validity and reliability of items 1 and 2, and 3 of 0.93, 0.95, and 0.67, including both.

Figure 7 depicts the outcome of the enterprise retail sales management ability analysis using the Management Capabilities. The entrepreneurial organization’s retail sales management value is less than 4.8438, implying that the retail management effectiveness of large manufacturing enterprises is more substantial. Still, organizational management innovation is relatively low. There appears to be a lot of room for innovation in entrepreneurship sales and distribution. The projected value of multiple enterprise retail sales management, entrepreneurship retail encourage, retail organization performance achieve group, and enterprise retail production technology indicators is more significant than 4.841, indicating that large manufacturing enterprises support retail marketing and product innovation. According to the results of the statistical analysis of the questionnaire, the average age of the person in charge of a business appears to be older; the educational qualification is primarily undergraduate; and the organization is unable to provide retail managerial skills.

The main strength of existing works is that they concentrate on researching entrepreneurship production management solutions, enterprise organization and cooperation abilities, and information innovation and technology level from the perspective of enterprise business ability. Due to such high failure rates, there are still gaps in research on manufacturing performance and management innovation.
ability, particularly in the following two areas: First, the descriptive and analytical metrics of the attribute system are insufficient and should be improved later. Second, the amount of data that can be collected is limited. Compared to many retail manufacturing enterprises, the manufacturing retail enterprise data can be included in the research for comparative evaluation. The existing method provides the exact result for the 60 questionnaire WSN-based accuracy (93.46%) and the same 60 questionnaire WSN-based overall accuracy (99.78%), whereas our proposed Fuzzy Multicriteria Decision-Making with Particle Swarm Optimization Algorithm has provided an accuracy of 99.78% (refer Table 3).

4. Conclusions

Supply chain management appears to be the most important aspect of manufacturing company management. According to enterprise sales management innovation, large manufacturing groups are gathered through questionnaires for data on production enterprise performance. Data shows that the average values of four enterprise sales management innovation indicators are relevant to retail services marketing. The study proposed a Fuzzy Multicriteria Decision-Making with Particle Swarm Optimization algorithm for evaluating the performance of enterprise sales management. The results proved that our proposed model works well in increasing the competitiveness of manufacturing companies in sales markets.

Data Availability

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

Conflicts of Interest

The author declares no conflicts of interest.

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