

Business process automation, data analytics and sales performance: Basis for business operations improvement framework in merchandizing enterprise

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Abstract

This study aimed to determine to assess the business process automation, data analytics, and sales performance in merchandizing business enterprises to improve its operations. Specifically, it aimed to determine the business process automation in merchandizing enterprise in terms of customer boarding, order processing and invoice payments, assess the data analytics application in terms trends identification, customer behavior prediction, marketing campaign optimization; describe the enterprise sales performance in terms of sales volume, sales value and sales in pipeline; test the significant relationship of business process automation, data analytics and sales performance and to develop a framework to improve business operations in merchandizing enterprise. This study used the descriptive type of research and used 400 respondents to collect data. The finding showed that the respondents moderately agreed on the business process automation applied in merchandizing enterprise in terms of customer boarding, order processing and invoice payments. They moderately agreed on the application of data analytics in trends identification, customer behavior prediction, marketing campaign optimization. There is an average sales performance in merchandizing enterprises studied in terms of sales volume, sales value and sales in pipeline. There is highly significant relationship between business process automation, data analytics and sales performance. Business operations improvement framework for merchandizing enterprises was developed.

Keywords: business process automation, data analytics, sales performance, business operations improvement framework

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1. Introduction

With the rapid development of technology and the increasing diversification of consumer demand, Chinese retail business enterprises are facing unprecedented challenges. At present, the development status of China's retail business enterprises faces fierce market competition, serious homogenization competition and changeable consumer demand. These problems make enterprises seek effective means to improve their competitiveness and realize the optimization of business operation. In this context, business process automation (BPA) and data analysis, as an effective means of operational improvement, are gradually valued by enterprises.

Fan (2023) points out that in China, the development of retail business enterprises is restricted by many factors. First of all, the market competition is fierce, and enterprises need to constantly improve the quality of their products and services to meet the diversified needs of consumers. However, the traditional operation model often fails to meet this requirement, so enterprises are facing the risk of market share loss. Secondly, the homogenization competition is serious, and the price war and promotion war between enterprises are becoming more and more intense, leading to the compression of profit margins. In addition, consumer demand is changeable, and enterprises need to be more sensitive to capture market changes and adjust their strategies. To solve these problems, Zhang (2021), Bao (2023) and others proposed to use business process automation and data analysis to improve the sales performance of enterprises. Business process automation (BPA) uses the digital technology to automate the activities and services that complete a special function or workflow. It is a way for organizations to simplify their operations through technology. In the retail business enterprises, the operational efficiency can be effectively improved through the implementation of business process automation. For example, enterprises can use the automated system to carry out inventory management, order processing, after-sales service and other links to reduce labor costs and shorten business processing time (Cai, 2020).

At the same time, Li (2022) believes that the core competitiveness of retail business enterprises lies in supply chain management. Through business process automation, enterprises can realize the efficient coordination of all links of the supply chain, reduce the inventory cost, and improve the speed of logistics distribution. For example, enterprises can use automated systems to share information with suppliers, realize on-time procurement, forecast procurement and other functions, thus reducing the risk of inventory overstocking. In addition, Duan (2021) said that the customer experience is crucial in the retail business. Through business process automation, enterprises can provide customers with more convenient and personalized services. For example, enterprises can use automated systems to realize intelligent customer service, personalized recommendation and other functions to improve customer satisfaction and loyalty.

In Data analysis, it extracts valuable information through the mining, analysis and processing of massive data, and to provide a basis for enterprise decision-making (Fu, 2016). On the one hand, data analysis can help retail business enterprises to better understand consumer needs and market trends, so as to accurately achieve market positioning. Through mining and analyzing massive data, retail business enterprises can find potential market opportunities and formulate targeted market strategies. On the other hand, through data analysis, retail business enterprises can have a deep understanding of consumers' purchasing behavior and preference changes, so as to adjust commodity structure and pricing strategies. Retail business enterprises can make incremental procurement of hot goods according to sales data and promote unsalable goods to improve the turnover rate of goods. In addition, through data analysis, retail business enterprises can also achieve precision marketing and improve the marketing effect. enterprises can carry out personalized push and preferential activities according to consumers' shopping history and social media behaviors to improve the conversion rate.

In reality, many enterprises have successfully used business process automation (BPA) to improve sales performance. As an effective means of operational improvement, business process automation is gradually attracting the attention of Chinese enterprises. For example, China Haier Zhijia Co., Ltd. has achieved significant sales performance improvement after the implementation of business process automation. Through business process automation, the enterprise realizes information sharing with suppliers and improves procurement efficiency. On the other hand, the company uses automated systems to provide intelligent customer service and personalized recommendation services, which improves customer satisfaction and loyalty.

Previous studies have shown that business process automation and data analysis have a positive impact on enterprise sales performance. On the one hand, through business process automation, enterprises can reduce operating costs, improve work efficiency, and thus improve profitability. On the other hand, data analysis helps companies better understand consumer needs, optimize products and services, and thus increase market share. In addition, business process automation and data analysis can also enhance the core competitiveness of enterprises, so that they are in an invincible position in the fierce market competition. As an emerging means of operation management, business process automation and data analysis are gradually attracting the attention of Chinese retail business enterprises. However, the theoretical research and practical application of these two fields are not yet mature. Most of the existing studies analyze a single enterprise from a qualitative perspective, and they lack of more comprehensive research on multiple enterprises through quantitative research methods, so there is a large research space. Secondly, with the development of technology and the diversification of consumer needs, retail business enterprises are facing unprecedented challenges.

Exploring the role of business process automation and data analysis in improving enterprise sales performance will help to provide effective operational improvement strategies for enterprises. Therefore, this study chooses Chinese retail business enterprises as the research object to carry out quantitative research on the impact of business process automation and data analysis on enterprise sales performance of retail business enterprises, which is helpful to promote the sustainable development of Chinese retail business enterprises. By analyzing the application of business process automation and data analysis in retail business enterprises, it can provide practical and feasible improvement strategies for Chinese retail business enterprises, improve sales performance, and then achieve sustainable development. Therefore, an in-depth study of this topic will help to improve the competitiveness of Chinese retail business enterprises, promote the overall level of the industry, and meet the growing needs of consumers.

Objectives of the Study - This study aimed to determine to assess the business process automation, data analytics, and sales performance in merchandizing business enterprises to improve its operations. Specifically, it aimed to: determine the business process automation in merchandizing enterprise in terms of customer boarding, order processing and invoice payments; assess the data analytics application in terms trends identification, customer behavior prediction, marketing campaign optimization; describe the enterprise sales performance in terms of sales volume, sales value and sales in pipeline; test the significant relationship of business process automation, data analytics and sales performance and develop a framework to improve business operations in merchandizing enterprise

2. Methods

Research Design - This study used descriptive quantitative study design to fully illustrate the findings. Quantitative research is a research method with quantitative and statistical analysis as the main research method. It emphasizes the quantitative processing of the research object, and through the statistics and analysis of the data. Quantitative research can accurately measure the research object and obtain specific data, which is conducive to the in-depth and comprehensive discussion of the research problems.

Participants of the Study - This study used five a famous Chinese retail business enterprise as the research object, respectively: Guangzhou Wide Hundred Co., LTD., Yong Hui Supermarket Co., LTD., Su Ningyi

Purchase Group Co., LTD., Sea Rings Home Group Co. and LTD., Jiangsu Yi Feng Big Pharmacy Chain Co., LTD. These five companies belong to different types of retail enterprises, their main sales products are different. This enables the data of this study to cover different enterprises and make the research more comprehensive and reliable. The questionnaires were distributed to the business executives, financial directors and middle and senior leaders of the five companies. The questionnaire mainly obtained the business and sales situation of retail business enterprises from three dimensions of business process automation, data analysis and sales performance, and explores the impact of business process automation and data analysis on sales performance.

Instruments of the Study - This study used self-structured questionnaire with three parts. Part 1 is about business process automation with three dimensions, customer on boarding, order processing and invoice payments. Part 2 is Data Analytics with three dimensions such as trends identification, customer behavior prediction and marketing campaign optimization. Part 3 pertains to Sales performance measured by sales volume, sales value and sales in pipeline. The questionnaire was validated and subjected to reliability testing to determine the consistency of the questionnaire. Below is the summary of the results of the reliability which is generally good having the Cronbach alfa value of .700 and above.

Table 1

Reliability Test Results

Variable	Cronbach's Alpha	Remarks
1A. Customer on-boarding	0.892	Good
1B. Order Processing	0.911	Excellent
1C. Invoice Payments	0.828	Good
2A. Trends Identification	0.926	Excellent
2B. Customer Behavior Prediction	0.844	Good
2C. Marketing Campaign Optimization	0.898	Good
3A. Sales Volume	0.865	Good
3B. Sales Value	0.950	Excellent
3C. Sales in Pipeline	0.849	Good

Data Gathering Procedure - The research underwent a process in coming up with this study which started with literature build up and after which raising research questions through literature review was conducted. The research method was established and a questionnaire was designed. This was distributed to the target participants using an online survey the data collected was summarized and submitted to the statistician for data processing. The results were analyzed and interpreted.

Ethical Considerations - In conducting the research work, the investigator considered ethical consideration to ensure that all information collected is used for research purposes only and maintains the quality and integrity of the study. To ensure the ethical compliance of the study, the following measures were taken: Respect the wishes of the respondents: During the study, the investigator fully respected the wishes of the respondents, ensured that they voluntarily participate in the questionnaire, and are free from any form of stress when answering the questions. Protect the privacy and confidentiality of respondents: Investigator strictly protected the privacy and confidentiality of respondents during the collection and processing of data. The questionnaire did not require any information that may reveal personal identity, ensuring that respondents' personal information is fully protected. Clear notification of the study purpose and process: Before starting the questionnaire, the investigator specified the study purpose, background, process and required information to the respondents to ensure that they fully understand and agree to participate in the study. Ensure transparency and impartiality of the research: The investigator disclosed the process, methods and results of the research to ensure transparency and impartiality of the research. Meanwhile, this study assured to correct any errors or misconduct during the study to maintain the credibility and validity of the study. Compliance with relevant laws, regulations and academic norms: During the course of the study, the investigator strictly complied with the relevant laws, regulations and academic norms to ensure the compliance and legality of the study. Through the above measures, the investigator tried her best to ensure the ethical compliance of the study process to protect the rights and interests of the respondents and ensure the quality and effectiveness of the study. When collecting, processing

and using the data, the investigator only focused on ethical issues to ensure that the ethical principles of the study are fully represented.

Data Analysis - Weighted mean and rank were used to determine the business process automation in merchandizing enterprise in terms of customer boarding, order processing and invoice payments; to assess the data analytics application in terms trends identification, customer behavior prediction, marketing campaign optimization; and to determine the enterprise sales performance in terms of sales volume, sales value and sales in pipeline. The result of Shapiro-Wilk Test showed that p-values of all variables were less than 0.05 which means that the data set was not normally distributed. Therefore, Spearman rho was used as part of the non-parametric tests to determine the significant relationship. All analyses were performed using SPSS version 28

3. Results and discussions

Table 2

Summary Table on Business Process Automation in Merchandizing Enterprise

Key Result Areas	Composite Mean	VI	Rank
Customer Boarding	3.20	Agree	1.5
Order Processing	3.18	Agree	3
Invoice Payments	3.20	Agree	1.5
Grand Composite Mean	3.19	Agree	

Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree

The summary table on business process automation in a merchandising enterprise reveals positive perceptions across key result areas, including Customer Boarding, Order Processing, and Invoice Payments. Both Customer Boarding and Invoice Payments received a composite mean score of 3.20, categorized within the "Agree" range, indicating that respondents generally view the automation in these areas as effective and beneficial. This aligns with research that highlights how business process automation (BPA) enhances customer onboarding by reducing manual errors and improving efficiency (Bertelsmann, 2022) and how it streamlines invoice management, leading to lower processing costs and fewer mistakes (Lee et al., 2020). On the other hand, order Processing scored slightly lower at 3.18 but still within the "Agree" range, suggesting it is perceived as slightly less effective than Customer Boarding and Invoice Payments. This is consistent with findings that BPA can indeed improve order processing efficiency but may encounter challenges in integration or execution that could affect overall perception (Smith et. al., 2021). The Grand Composite Mean of 3.19 confirms an overall positive view of BPA across the enterprise, reflecting a consensus that automation is advantageous in enhancing operational efficiency and accuracy.

Table 3

Summary Table on Data Analytics Application

Key Result Areas	Composite Mean	VI	Rank
Trends Identification	3.22	Agree	3
Customer Behavior Prediction	3.25	Agree	1.5
Marketing Campaign Optimization	3.25	Agree	1.5
Grand Composite Mean	3.24	Agree	

Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree

Table 3 presents the Data Analytics Application Summary. This reveals insights into the application of data analytics across three key areas: Trends Identification, Customer Behavior Prediction, and Marketing Campaign Optimization. The grand composite mean of 3.24 reflects a solid agreement among respondents on the usefulness of data analytics for various applications. This score signifies that while data analytics is valued, there is room for further enhancement and application to fully leverage its potential in these key areas. The highest-ranked areas, with a composite mean score of 3.25, are Customer Behavior Prediction and Marketing Campaign Optimization. This shared rank shows that both areas are seen as equally important and effective in applying data

analytics. Customer Behavior Prediction involves using data to forecast future customer actions, which is critical for personalized marketing and strategic planning (Chen et al.,2012). Marketing Campaign Optimization focuses on improving campaign performance through data-driven insights, which is essential for maximizing marketing effectiveness (Eisenberg et al.,2017). On the other hand, trends Identification, with a composite mean score of 3.22, is ranked slightly lower but still within the "Agree" range. This area involves using data to recognize and anticipate market trends, which supports strategic decision-making and responsiveness to market changes (Kotler et. al.,2016). Although slightly less emphasized compared to the other areas, identifying trends remains a valuable application of data analytics.

Table 4*Summary Table on Enterprise Sales Performance*

Key Result Areas	Composite Mean	VI	Rank
Sales Volume	3.18	Agree	3
Sales Value	3.27	Agree	1
Sales in Pipeline	3.25	Agree	2
Grand Composite Mean	3.23	Agree	

Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree

Table 4 provides a summary of the enterprise sales performance across three key result areas: Sales Volume, Sales Value, and Sales in Pipeline. The grand composite mean score of 3.23 shows that respondents have a favorable assessment of the sales performance metrics in overall. This positive perception implies that the enterprise's sales strategies are perceived as effective. The composite mean highlights that while performance is satisfactory, there is potential for optimization and improvement (Kotler et al., 2016). The highest-ranked key result area is Sales Value, with a composite mean of 3.27. This indicates that respondents perceive the sales value metrics as the most significant contributor to overall sales performance. Higher sales value reflects improved profitability and financial health, suggesting that the enterprise is effective in maximizing revenue from its sales efforts. Effective management of sales value is crucial for achieving financial targets and ensuring business sustainability (Kotler et al., 2016). Ranked 2 with a composite mean of 3.25, Sales in Pipeline is also viewed positively. This metric assesses the effectiveness of managing potential sales opportunities and leads. A strong sales pipeline is essential for sustaining future sales and ensuring long-term business growth. The positive view on sales pipeline performance suggests confidence in the strategies used to manage and convert leads into actual sales (Kotler et al., 2016). Sales Volume is ranked 3 with a composite mean of 3.18. While still in the "Agree" range, this metric is seen as slightly less impactful compared to Sales Value and Sales in Pipeline. Sales volume measures the quantity of products or services sold but may not fully capture the profitability or quality of sales. Effective sales volume management is important, but it should be complemented by strategies that focus on value and conversion rates to enhance overall performance.

Table 5*Relationship Between Business Process Automation and Data Analytics Application*

Variables	rho	p-value	Interpretation
Customer Boarding			
Trends Identification	0.335**	< .001	Highly Significant
Customer Behavior Prediction	0.392**	< .001	Highly Significant
Marketing Campaign Optimization	0.352**	< .001	Highly Significant
Order Processing			
Trends Identification	0.345**	< .001	Highly Significant
Customer Behavior Prediction	0.349**	< .001	Highly Significant
Marketing Campaign Optimization	0.429**	< .001	Highly Significant
Invoice Payments			
Trends Identification	0.346**	< .001	Highly Significant
Customer Behavior Prediction	0.435**	< .001	Highly Significant
Marketing Campaign Optimization	0.367**	< .001	Highly Significant

** . Correlation is significant at the 0.01 level

Table 5 presents the correlation coefficients (rho) and p-values illustrating the relationships between business process automation (Customer Boarding, Order Processing, and Invoice Payments) and data analytics applications (Trends Identification, Customer Behavior Prediction, and Marketing Campaign Optimization). The correlation coefficients are significant at the 0.01 level, denoted by **, indicating high significance. As to Customer Boarding and Data Analytics Application, Trends Identification (rho = 0.335, p < .001): The correlation is highly significant, suggesting a moderate positive relationship between Customer Boarding and Trends Identification. This indicates that as trends identification improves, so does the effectiveness of customer boarding processes. In view of Customer Behavior Prediction (rho = 0.392, p < .001): The correlation is highly significant, indicating a moderate to strong positive relationship. Enhanced customer behavior prediction positively impacts the customer boarding process. As to Marketing Campaign Optimization (rho = 0.352, p < .001): This highly significant correlation reflects a moderate positive relationship, implying that improvements in marketing campaign optimization are associated with more efficient customer boarding.

When Order Processing and Data Analytics Application is analyzed, Trends Identification (rho = 0.345, p < .001): The significant correlation suggests a moderate positive relationship, indicating that better trends identification enhances order processing efficiency. In Customer Behavior Prediction (rho = 0.349, p < .001): This correlation is highly significant, showing a moderate positive relationship. Effective customer behavior prediction contributes positively to the order processing function. While Marketing Campaign Optimization (rho = 0.429, p < .001): The high significance and relatively stronger correlation indicate that improved marketing campaign optimization significantly enhances order processing. As to Invoice Payments and Data Analytics Application, Trends Identification is (rho = 0.346, p < .001): This highly significant correlation indicates a moderate positive relationship, suggesting that better trends identification can improve the management of invoice payments. The Customer Behavior Prediction (rho = 0.435, p < .001) correlation is highly significant and strongest among the metrics, reflecting a strong positive relationship. Effective customer behavior prediction has a notable impact on managing invoice payments.

The Marketing Campaign Optimization (rho = 0.367, p < .001) shows the highly significant correlation with a moderate positive relationship, indicating that optimizing marketing campaigns contributes positively to invoice payment processes. The results shows that there are strong and consistent positive relationships between various aspects of business process automation and data analytics applications. High significance across all correlations indicates that improvements in data analytics applications, such as trends identification, customer behavior prediction, and marketing campaign optimization, have a notable impact on different business process automation areas (Customer Boarding, Order Processing, and Invoice Payments). This highlights the importance of integrating data analytics into business processes to enhance efficiency and effectiveness.

Table 6

Relationship Between Business Process Automation and Sales Performance

Variables	rho	p-value	Interpretation
Customer Boarding			
Sales Volume	0.408**	< .001	Highly Significant
Sales Value	0.371**	< .001	Highly Significant
Sales in Pipeline	0.350**	< .001	Highly Significant
Order Processing			
Sales Volume	0.317**	< .001	Highly Significant
Sales Value	0.371**	< .001	Highly Significant
Sales in Pipeline	0.342**	< .001	Highly Significant
Invoice Payments			
Sales Volume	0.336**	< .001	Highly Significant
Sales Value	0.448**	< .001	Highly Significant
Sales in Pipeline	0.408**	< .001	Highly Significant

** Correlation is significant at the 0.01 level

Table 6 illustrates the correlation coefficients (rho) and p-values that depict the relationships between

business process automation variables (Customer Boarding, Order Processing, and Invoice Payments) and various sales performance metrics (Sales Volume, Sales Value, and Sales in Pipeline). All correlations are highly significant at the 0.01 level, denoted by **. As to Customer Boarding and Sales Performance, Sales Volume ($\rho = 0.408$, $p < .001$), the correlation is highly significant, indicating a moderate to strong positive relationship between Customer Boarding and Sales Volume. Effective customer boarding processes contribute to higher sales volume. As to Sales Value is ($\rho = 0.371$, $p < .001$), this highly significant correlation reflects a moderate to strong positive relationship, suggesting that improvements in customer boarding positively impact the sales value. While Sales in Pipeline is ($\rho = 0.350$, $p < .001$), the correlation is highly significant, showing a moderate positive relationship. Enhanced customer boarding processes contribute to a stronger sales pipeline.

In view of Order Processing and Sales Performance, Sales Volume ($\rho = 0.317$, $p < .001$): This highly significant correlation indicates a moderate positive relationship, suggesting that efficient order processing is associated with higher sales volume. The Sales Value ($\rho = 0.371$, $p < .001$), the correlation is highly significant and moderate to strong, implying that effective order processing contributes positively to sales value. While Sales in Pipeline ($\rho = 0.342$, $p < .001$): This highly significant correlation reflects a moderate positive relationship, suggesting that efficient order processing enhances the sales pipeline. In terms of Invoice Payments and Sales Performance: Sales Volume ($\rho = 0.336$, $p < .001$): The highly significant correlation indicates a moderate positive relationship between invoice payments and sales volume, suggesting that better management of invoice payments is associated with higher sales volume, the Sales Value ($\rho = 0.448$, $p < .001$) correlation is highly significant and the strongest among the metrics, reflecting a strong positive relationship. Effective invoice payments management significantly enhances sales value. While Sales in Pipeline ($\rho = 0.408$, $p < .001$), the correlation is highly significant and strong, indicating that efficient management of invoice payments positively affects the sales pipeline. The results indicate that effective business process automation in Customer Boarding, Order Processing, and Invoice Payments has a significant positive impact on various aspects of sales performance. All correlations being highly significant suggest that improvements in these automation areas are strongly associated with enhancements in sales volume, sales value, and the sales pipeline. This underscores the importance of integrating efficient business process automation to boost overall sales performance.

Table 7

Relationship Between Data Analytics Application and Sales Performance

Variables	ρ	p-value	Interpretation
Trends Identification			
Sales Volume	0.397**	< .001	Highly Significant
Sales Value	0.371**	< .001	Highly Significant
Sales in Pipeline	0.381**	< .001	Highly Significant
Customer Behavior Prediction			
Sales Volume	0.398**	< .001	Highly Significant
Sales Value	0.384**	< .001	Highly Significant
Sales in Pipeline	0.392**	< .001	Highly Significant
Marketing Campaign Optimization			
Sales Volume	0.363**	< .001	Highly Significant
Sales Value	0.352**	< .001	Highly Significant
Sales in Pipeline	0.344**	< .001	Highly Significant

** : Correlation is significant at the 0.01 level

Table 7 displays the correlation coefficients (ρ) and p-values that reflect the relationships between data analytics application metrics (Trends Identification, Customer Behavior Prediction, and Marketing Campaign Optimization) and sales performance metrics (Sales Volume, Sales Value, and Sales in Pipeline). All correlations are significant at the 0.01 level, denoted by **, indicating a high degree of statistical significance. In terms of Trends Identification and Sales Performance, the Sales Volume ($\rho = 0.397$, $p < .001$) is highly significant correlation indicates a moderate to strong positive relationship between Trends Identification and Sales Volume. Effective identification of trends is associated with higher sales volume. The Sales Value ($\rho = 0.371$, $p < .001$): which implies that the correlation is highly significant, suggesting a moderate to strong positive relationship.

Improved trend identification positively impacts the sales value. In Sales in Pipeline ($\rho = 0.381, p < .001$), there is significant correlation which reflects a moderate positive relationship, implying that better trend identification contributes to a stronger sales pipeline.

The Customer Behavior Prediction and Sales Performance showed that Sales Volume ($\rho = 0.398, p < .001$) is highly significant correlation shows a moderate to strong positive relationship, suggesting that accurate customer behavior prediction enhances sales volume. Sales Value ($\rho = 0.384, p < .001$) correlation is highly significant, reflecting a moderate to strong positive relationship between customer behavior prediction and sales value. Sales in Pipeline ($\rho = 0.392, p < .001$) correlation indicates a moderate positive relationship, implying that effective prediction of customer behavior positively influences the sales pipeline.

As to Marketing Campaign Optimization and Sales Performance, Sales Volume ($\rho = 0.363, p < .001$), the correlation is highly significant, showing a moderate positive relationship. Optimizing marketing campaigns is associated with increased sales volume. In Sales Value ($\rho = 0.352, p < .001$), there is highly significant correlation reflects a moderate positive relationship, suggesting that better marketing campaign optimization contributes positively to sales value. In Sales in Pipeline ($\rho = 0.344, p < .001$) There significant correlation indicates a moderate positive relationship, implying that effective optimization of marketing campaigns strengthens the sales pipeline. The results indicate that each data analytics application—Trends Identification, Customer Behavior Prediction, and Marketing Campaign Optimization—has a strong positive impact on various aspects of sales performance. The high significance of all correlations suggests that enhancements in these analytics areas are strongly associated with improvements in sales volume, sales value, and the sales pipeline. This emphasizes the critical role of data analytics in optimizing sales performance.

Research Output

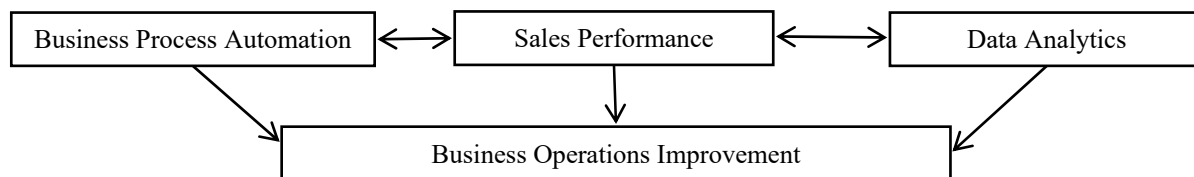


Fig 1. Business Operations Improvement Framework in Merchandizing Enterprise

The figure presents the Business Operations Improvement Framework. This offers a promising approach for merchandising enterprises to streamline operations, gain valuable insights, and drive sales growth. Automating tasks can free up employee time for more strategic work, leading to faster turnaround times and improved productivity. For instance, automating repetitive tasks like order processing and inventory management can significantly reduce the time and effort required to complete these tasks. This can free up employees to focus on more value-added activities, such as developing new marketing campaigns or providing customer service. Automation can minimize human error in data entry and other processes, leading to more accurate results and improved decision-making. Manual data entry is a common source of errors in merchandising businesses. By automating this process, businesses can ensure that their data is more accurate and reliable. This can lead to better decision-making in areas such as pricing, inventory management, and marketing. Also Data analytics can provide valuable insights into customer behavior, buying patterns, and product trends. This information can be used to optimize marketing campaigns, personalize product recommendations, and improve sales forecasting. For example, data analytics can be used to identify which products are selling well together and which products are not selling well. This information can then be used to create targeted marketing campaigns and promotions. Faster turnaround times, fewer errors, and a more personalized shopping experience can all contribute to increased customer satisfaction. By streamlining operations and improving data accuracy, businesses can provide their customers with a faster and more efficient shopping experience. Additionally, data analytics can be used to personalize the shopping experience for each customer. This can be done by recommending products that are likely to interest the customer or by providing them with special offers and discounts.

4. Conclusions and recommendations

The respondents moderately agreed on the business process automation applied in merchandizing enterprise in terms of customer boarding, order processing and invoice payments. The respondents moderately agreed on the application of data analytics in trends identification, customer behavior prediction, marketing campaign optimization. There is an average sales performance in merchandizing enterprises studied in terms of sales volume, sales value and sales in pipeline. There is highly significant relationship between business process automation, data analytics and sales performance. Business operations improvement framework for merchandizing enterprises was developed. The merchandising companies may deepen usage of different automation technologies and explore more options like Robotic Process Automation (RPA), workflow management systems (WfMS), and artificial intelligence (AI)-powered tools. The merchandizing companies may consider process optimization techniques by identifying bottlenecks and opportunities for improvement beyond simple automation. The merchandizing companies may develop data-driven decision making by analyzing process performance data to measure the impact of automation and identify areas for further improvement. The Business Operations Improvement Framework developed may be presented to merchandizing enterprises to use for their continuous business operations improvement. Future researchers may enhance the current study by including organizational factors like company culture, leadership support for innovation, investment in training and development.

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