WAREHOUSE MANAGEMENT SYSTEM AND ITS USERS' PERFORMANCE IN SELECTED NUCLEAR ENERGY COMPANIES IN ABU DHABI, UNITED ARAB EMIRATES

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Research Article

Warehouse Management System and Its Users' Performance in Selected Nuclear Energy Companies in Abu Dhabi, United Arab Emirates

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Abstract

This study attempted to assess the effectiveness of the warehouse management system and its users' performance in selected nuclear energy companies in Abu Dhabi, United Arab Emirates. The respondents covered three (3) Nuclear Energy companies for privacy named in this study as X, Y, and Z, with a total of 1,000 population with a sample size of 146 respondents aged 30 to 55. Its effectiveness was assessed through the theory of Just-In-Time Production and its relationship to Human Resource Management and its impact on user performance. A descriptive method was utilized. To analyze and interpret the data, frequency distribution, mean, and independent sample t-tests were employed as statistical tools with a .05 significant level. The findings revealed that most respondents were bachelor's degree holders, officers, and 4 – 6 years in the company. Regarding the performance of duties, the warehousing processes were performed through the W.M.S. implementation. Furthermore, the process improvement, inventory management practices, and productivity and utilization capacity were influential in the W.M.S. implementation. Results also show no significant difference between the respondents' self-assessment performance and the respondents' assessment of W.M.S.'s effectiveness when grouped according to profile.

Keywords: Utilization, Productivity, Process Improvement, Warehouse Management System, User Performance, Nuclear Energy Companies, Inventory Management Practices

INTRODUCTION

Due to the rapid development of e-commerce and automation technologies over the past few decades, the Nuclear Industry has seen substantial changes in warehouse management systems (W.M.S.s) installation. These developments have increased the industry's speed and operational effectiveness. The W.M.S. value-added supply chain comprises many delicate parts that need time, money, and quality care to complete. With automation technology for handling bulky products and managing customer orders, the complexity of warehouse operations in this industry has increased. Modern warehousing techniques have been transformed by incorporating developing technologies, enabling speedier logistics and drastically lowering the margin for human error. As a result, this has increased warehouse productivity, decreased staff turnover and tiredness, raised customer satisfaction levels, and made it easier to build a skilled workforce that can quickly adjust to changing market conditions and company procedures. In this situation, organizational success depends on upholding a well-organized strategy that guarantees quantifiable results for the business. According to Jermsittiparsert et al. (2019), an effective warehouse is essential for rapidly satisfying client needs and enhances a company's overall success. However, obtaining this efficiency continues to be difficult and significantly depends on users' proficiency with the W.M.S.

Directors and logistics managers have different expectations and reasons while implementing W.M.S. at the Nuclear Energy Company. They all need an intuitive solution that makes their jobs easier, optimizes workflow, and eliminates wasteful warehouse procedures. Additionally, warehouse employees hope the new technology will simplify their tasks and reduce errors without endangering their employment (Pierce, 2020). A project risk is an unfortunate fact that many W.M.S. installation projects do not finish on time. This failure frequently happens as a result of poor planning and unforeseen difficulties. Additionally, choosing the correct group of individuals is essential for the smooth warehouse management system installation. Businesses have faced new obstacles due to recent technological developments that affect their operations and call for careful thought during implementation (Andiyappillai, 2019).

The target respondents for this survey were three sister companies. The researchers were interested in learning how these businesses used W.M.S. successfully in their different organizations. They sought to pinpoint significant demands through this investigation and discover suitable responses. The deployment of W.M.S. involves numerous teams and individuals who need to be skilled in various fields, including data administration, I.T., and system integration. Effective planning guarantees that the team completes work within time frames and deadlines.

Collaboration and communication among team members also need to be carefully considered. The businesses understand how crucial it is to give their staff members the tools and assistance they need to operate at the top of their game, expand the industry, and uphold the company's culture.

By examining the effectiveness of W.M.S. installation and its impact on accomplishing overall business goals connected to warehouse management operations, this study intends to close the existing gap. The ability of users to work together, support one another, and have the necessary skills is crucial to the successful execution of a warehouse management system project. As a result, employee performance is essential to the project's success and capacity to add value to the company. Training and development initiatives may be required if employees' performance exceeds acceptable requirements (Wainwright, 2018). To effectively satisfy the organization's performance objectives, this study underlines the significance of high-performing individuals with a solid understanding of warehouse procedures.

Statement of the Problem

The study's main objective is to assess the Warehouse Management System and its users' performance in selected nuclear energy companies in Abu Dhabi, U.A.E., as well as the expected outcome to be attained due to the change management business processes. Specifically, it sought to answer the following questions: What is the profile of the respondents in terms of the following: Educational Attainment, Current position, and length of experience in operations? What is the respondents' performance assessment in the next: Performance of Duties and Warehousing process? How do the respondents assess the effectiveness of the warehouse management system being implemented in terms of Process Improvement, Inventory Management Practices, and Productivity and Utilization Capacity? Is there any significant difference in assessing the respondents' performance when grouped according to their profile? Is there any significant difference in the estimated effectiveness of the warehouse management system when grouped according to profile? Based on the study's findings, what are the possible recommendations for improving the users' performance in implementing W.M.S.?

Literature Review

This section discusses the current study's uniqueness, similarities, or differences concerning past scientific studies that may guide the researcher on other related subject areas. This chapter explores the literature and studies relevant to assessing the users' performance in implementing W.M.S. in three (3) nuclear energy companies in Abu Dhabi-UAE.

Assessing Warehouse Management System

A feasibility study by Weink (2019), titled "Integrating Warehouse Management System," assessed multiple operational issues faced by Schmits' Company. The company's production and logistics departments needed to be fixed, primarily due to mismanagement of processes. Firstly, the allocation of raw materials in the warehouses was done manually, leading to inefficiencies. Secondly, the assigned locations for raw materials must be appropriately linked, resulting in a lack of a track-and-trace barcode system. This absence of a traceability system led to errors and difficulties in tracking materials, causing delays in production processes. The author emphasizes how the current inefficiencies in the warehouse management operations can negatively affect customer relations, causing manufacturing to be delayed and, as a result, customer deliveries to be delayed. It becomes clear that the current warehousing processes need more organized and automated procedures.

In a paper titled "Addressing the Key Challenges in Warehouse Management," written by Whiting (2019) noted that every warehouse organization has everyday difficulties and impediments. These difficulties include equipment failures, flawed procedures, order cancellations, and the discovery of lost or improperly packed goods that result in backorders. These prevalent worries are something that warehouse managers frequently deal with. However, many Warehouse Management System (W.M.S.) developers know these issues and work diligently to find solutions. The article discusses several significant obstacles and openings in the field of W.M.S. It explores the concerns with inventory that warehouses frequently deal with, the effects of layout and product counting on operations, the particular logistical difficulties that warehouses confront, and potential transportation problems and costs that warehouses might address and reduce.

The study by Hamdy et al. (2018) titled "Advancing Towards an Intelligent Warehouse Management System" highlighted the warehouse's critical function as a vital link in the supply chain connecting suppliers and customers. It was initially intended for the standard Warehouse Management System (W.M.S.) to keep an eye on, record, and regulate warehouse

operations. However, as networked market trends emerged, the old method lost efficiency and needed help to keep up with the most recent requirements and developments. The author tried to adopt new technologies to improve warehouse operations and give managers more control in response to this changing environment. They introduced the "Internet of Things" (IoT) as a potential technology for tracking and monitoring objects inside the warehouse. This study shows how IoT technology may significantly boost operational visibility and accuracy, resulting in faster processing times and fewer inventory shortages, among other advantages.

Users' Performance of Duties

"An Effective Leadership Skills for Warehouse Managers" (2022), published by ProLogistix, mentioned the concerns and looked into the kind of leadership practices in the modern workplace. One of these is effective communication, essential for maintaining warehouse productivity. This paper outlines a clear purpose for the employees and provides them with the necessary tools and materials to complete their work. Additionally, it is essential to communicate with employees one-on-one to ensure that they are satisfied in their respective positions and address any concerns they may have in the workplace by keeping an open-door policy and taking the time to listen to them because the company values them. This will motivate the team to work harder and stay with the company long-term. A warehousing position can sometimes be demanding, which is why the warehouse industry has a high turnover rate.

In a research project led by R. (2020) titled "Leadership Skills: Essential for Effective Organizational Functioning," it is stressed that leaders in all different kinds of organizations should prioritize the growth and improvement of their leadership skills because these abilities are crucial to the achievement of effective organizational functioning. The research paper aims to emphasize the value of leadership abilities. Leaders are aware that they must continually enhance their abilities throughout their careers to manage the business effectively. Kardos et al. (2014) researched how training and development affect work performance at E.S.C.O.N. The study shows that improving employee performance within the firm through training and development is a crucial goal. Competent teams can be built by enhancing employees' intellectual prowess and applicable knowledge. Conversely, inadequate training and development harm the business's productivity since having competent, motivated, and capable people is essential for accomplishing goals.

Warehousing Processes

Goodwin's (2022) paper "Enhancing Warehouse Efficiency: The Impact of Material Handling Equipment" underlines the expansion of the global warehousing market and the necessity of improved logistics and operational efficiency to stay competitive in the sector. Significant trends will shape future warehouses, including automation and enhanced technologies that will make packaging and shipping more effective. Technology-driven material-handling equipment is in high demand, and it is anticipated that the market will be penetrated by material-handling robots such as automated guided vehicles (A.G.V.s) and autonomous mobile robots, which would lessen the need for human labor. Warehouse managers may reduce expenses, and A.G.V. investments can reduce the number of employees while increasing the number of competent workers since firms can pay more competitive wages and improve the workplace environment. Increase safety and allow people to concentrate on other crucial activities by implementing these robots.

Zhen L. A. et al. (2021) thoroughly examined the operational difficulties smart warehouses face in the paper "A Literature Review of Smart Warehouse Operations Management." Information connectivity, machine automation, process integration, and environmental sustainability are characteristics of intelligent warehouses. Warehouses have had to adjust to the escalating demands and precise specifications due to the growth of e-commerce and new retail, increasing the efficiency and accuracy required for logistics services.

Ben (2020) emphasizes using appropriate material handling equipment to improve the material handling process in his paper titled "Warehouse Material Handling: A Complete Guide." It is necessary to evaluate variables like count per unit of time, weight, volume, and distance traveled while measuring material handling work. Efficiency can be achieved by streamlining warehouse work by eliminating, condensing, merging, or decreasing needless transfers. Injury prevention procedures should be in place when moving materials.

Custodio (2019) completed a study titled "Flexible Automated Warehouse: A Literature Review and an Innovative Framework." Increasing e-

commerce, mass customization, omnichannel distribution, and the Just-

In-Time (J.I.T.) philosophy was discussed as effects of the logistics market. Automation has been implemented in warehouses to adjust to these dynamic changes. However, the implementation of automation in warehouses needed more flexibility. So, a review was done to create a framework that includes both the past and the future. According to the study's conclusions, a flexible automated warehouse needs a mix of automated machinery, data collection systems, and management programs. The study put out an original paradigm for a flexible automated warehouse based on the studied literature. To meet the challenges of the changing logistics market, warehouse operations must be flexible and responsive. This framework tries to satisfy these needs.

Process Improvement

According to Fergal (2022) in his article titled "How to Manage and Improve Warehouse Operations?", two critical factors contribute to a warehouse's success: efficiency and cost-effectiveness, strong leadership, and continuous improvement of warehouse operations. A capable warehouse manager enables the company to handle current demands while remaining attentive to changes that can optimize warehouse processes in the short or long term. In an article by Sunol (2021) titled "The 6 Primary Warehouse Processes and How to Optimize Them," the author delves into the six fundamental warehouse processes to comprehend and efficiently optimize warehouse operations. The six processes are receiving, put-away, storage, picking, packing, and shipping. By optimizing these processes, warehouse operations can be streamlined, costs and errors reduced, and the perfect order rate improved.

Koon's (2020) paper titled "Key Performance Indicators (KPIs) in Warehousing Performance" discussed the significance of adopting Key Performance Indicators (KPIs) as a tool to evaluate the efficacy and efficiency of warehouse management. The KPI system uses gathered data as a benchmark against additional data to assess the level of success attained in different operational domains. The warehouse performance KPIs must be impartial and aligned with the overarching corporate goals. Warehouse KPIs measure the company's established goals and the accomplishment of warehouse management. Past assessments of warehouse performance are taken into account while setting these targets. When creating plans using KPIs, comparing internal operations with warehouse management perspectives can be used to optimize inter-organizational achievement. It can also concentrate on operational planning and control or strategic evaluation. The S.M.A.R.T. criterion, which stands for Specific, Measurable, Attainable, Relevant, and Timely, is a commonly used method for establishing KPI performance targets. This approach gives the goals and objectives structure and tracking, directing the warehouse operations toward the desired goals.

Inventory Management Practices

Argent et al. (2022) wrote an article about "Warehouse Management Inventory System to Adapt New Challenges and Automate Warehouse Inventory Processes." The authors define a *warehouse inventory management system* as software created to handle activities connected to inventory tracking, storage, and movement within warehouses. This system assists business owners and warehouse managers in keeping order and coordinate various tasks, including acquiring inventory, ensuring stock quality, managing inventory, completing orders, and replenishing supplies as necessary. In her article titled "Best Practice Managing Warehouse Inventory," Ng Li Hsia (2019) highlighted that many businesses have opportunities for improvement, particularly in their warehouses. Effective inventory control techniques are essential for well-managed warehouses, starting with maintaining an organized and well-maintained site. Warehouse managers should conduct regular inspections to ensure that stocks are stored to enable easy and safe access for the staff.

According to Scharwz's article in a report published in 2020 titled "Warehouse Inventory Management Guide: Best Practices, Case Studies, and Expert Advice," warehouse inventory management is referred to as the procedure used by companies to arrange, monitor, and manage items inside their warehouses. These products could be in the form of raw materials, finished things, or works in progress. Various organizations, including manufacturers, wholesalers, distributors, retailers, and online sellers, rely on efficient warehouse inventory management to meet client expectations and spur growth.

Productivity and Utilization Capacity

According to Bilan (2021), employee productivity relates to how successfully and efficiently workers complete their tasks. Some people work more quickly than others, while others work more slowly. Low productivity must be addressed to prevent subpar customer service and ensure personnel can effectively manage their workloads. The productivity of underproductive employees can be increased by good

supervision and training. Productivity may be increased by providing staff members with knowledge of best practices and giving them the proper supervisor feedback and coaching. More workers will fulfill productivity goals as a result, keeping the department's overall productivity at a standard rate.

Lai (2015) conducted a study titled "Capacity Utilization and Productivity Analysis in the Canadian Food Manufacturing Industry." Around 65% of Canadian processed food was exported to the U.S. market in 2012, according to Statistics Canada, making the state of international trade and the value of the Canadian dollar critical for the expansion of the Canadian food processing industry's economy. The Canadian dollar's comparatively low value can make Canadian food processors more competitive in terms of pricing on international markets, and higher efficiency levels can further strengthen this competitiveness. The study found several significant factors influencing provincial-level productivity development in the Canadian food processing sector. These included expanding the scope of operations, improving pure technical efficiency, and implementing cutting-edge technology.

Additionally, it was shown that maintaining higher capacity utilization was essential for productivity growth, particularly in the Atlantic and Prairie regions. Diversifying into markets besides the U.S., Canada's leading trading partner, may increase demand for Canadian processed food and improve capacity utilization and productivity. The study's findings showed that technological advancement was a critical factor in the growth of total productivity in the Canadian food processing sector, and they provided evidence that more significant private and public sector investment in R&D could boost manufacturing productivity and advance technology. Food processors are anticipated to gain from such R&D expenditure.

Research Methodology

Participants

The sample size is 146 respondents, of whom 66 are from X, 45 are from Y, and 35 are from Z, three (3) selected nuclear energy companies in Abu Dhabi, United Arab Emirates. The population is 1,000 respondents. The sample size is always smaller than the population as a whole. Respondents were chosen randomly as a subset of the people using a random sample technique, giving every member of the population an equal chance of being selected.

Instruments of the Study

The survey questionnaire is the primary tool the researcher used to collect data. The questionnaire's objective was to gather data and information from a large population to identify the points of view of some respondents or participants on a phenomenon or a specific topic or interest (Mathers et al., 2007). The primary goal of this study is to assess how the adoption of W.M.S. has affected employee performance at nuclear energy enterprises in Abu Dhabi. A specially created questionnaire was used as the primary approach for gathering information from the respondents. In making the survey questionnaire, the researcher obtained the information required to produce reliable estimations and statistics on W.M.S. Three sections comprise the questionnaire. The respondents' profiles were acquired in the first section. The users' performance in terms of their tasks and warehousing procedures was evaluated in the second section. The final team investigated the respondents' perceptions of the W.M.S. implementation's effectiveness. Three professionals validated the survey before it was made available to ensure reliability and accuracy.

Data-Gathering Procedure

The researcher adhered to particular data collection techniques during the data collection process. The researcher first requested permission from the department head to conduct the poll in a letter. Once approval was obtained, Google Forms was used as the distribution tool for the survey, which was mainly carried out online. Information can be gathered using Google Forms' user-friendly online form. The questionnaire was created online and distributed to different informants via email. It had a list of survey questions. The informants were asked to complete the questionnaire within a given timeframe and submit their responses. The survey's objective was explained in a cover letter attached to the questionnaire, and participants were encouraged to help collect data.

The answers to the survey were treated with confidentiality. The anonymity of the respondents and organizations participating in the research was given paramount importance. After gathering all the data, the researcher tallied the scores, summarized, analyzed, and interpreted the data.

Statistical Treatment of Data

After gathering the data, the researcher formulated and used statistical tools to examine them. The frequency count, percentage, weighted averages,

and t-test for independent samples statistical tests and methodologies were employed to ensure an objective data presentation, analysis, and interpretation.

Ethical Considerations

The respondents in the study have participated based on informed consent, which makes them also aware of the reason for which the research is being undertaken and the purpose that the research expects to serve. They were provided with sufficient information about the objectives of this research and assurances on the implications of taking part in the survey. The voluntary participation of the respondents is essential. Hence, they were freely given the decision to join without pressure or coercion. In addition, participants were informed of their rights to withdraw from the study at any stage if they wished to do so. The researcher has considered that adequate confidentiality of each respondent's identity must be ensured and maintained while analyzing their feedback for making the final interpretations. Likewise, the anonymity of the respondents and organizations participating in the research was given of paramount importance.

RESULTS AND DISCUSSION

Profile of the Respondents

This part of the study deals with the profile of the respondents in terms of educational attainment, current position, and length of experience in W.M.S. operations. Table 3 presents the respondents' frequency and percentage distribution regarding educational attainment. As the table above shows, most respondents were bachelor's degree holders, with the highest frequency of 68 or 46.6 percent. This was followed by 52 or 35.6% of the respondents who got diplomas, 18 or 12.3% with master's degrees, and 8 or 5.5% were high school graduates. This suggests that most nuclear energy company employees' college degrees were highly helpful in assisting them in finding employment possibilities or in assisting them in developing knowledge and skills that they could utilize at work.

Table 3: Distribution of the Respondents in Terms of Educational Attainment

	Frequency	Percentage
High School Graduate	8	5.5
Diploma	52	35.6
Bachelor's Degree	68	46.6
Master's Degree	18	12.3
TOTAL	146	100

Table 4 shows the respondents' frequency and percentage distribution regarding their current position. It can be seen that the majority of the respondents were officers who got the highest frequency of 77 or 52.7%. This was followed by senior specialists with a frequency of 51 or 34.9%. Lastly, managers got the lowest frequency of 18, or 12.3%. This suggests they felt more trusted and needed by their employer or senior management team to complete the task without checking their W.M.S. progress.

Table 4: Distribution of the Respondents in Terms of Current Position

	Frequency	Percentage
Officers	77	52.7
Senior Specialist	51	34.9
Managers	18	12.3
TOTAL	146	100

Table 5 exhibits the frequency and percentage distribution of the respondents in terms of length of experience. It can be gleaned from the table that most respondents were in their 4–6 years in the company, which got the highest frequency of 73 or 50%. This was followed by 47 or 32.2% with 7–9 years, 24 or 16.4% with 10 years and above, and 2 or 1.4% with 1–3 years. This implies that staying with an organization for many years indicates a consistent and reliable work environment, improving morale.

Table 5: Distribution of Respondents in Terms of Length of Experience in W.M.S. Operations

	Frequency	Percentage
10 years and above	24	16.4
7 – 9 years	47	32.2
4 – 6 years	73	50
1 – 3 years	2	1.4
TOTAL	146	100

Self-Assessment of the Respondents' Performance

The following tables present the assessment of the respondents' performance towards warehouse management systems and their users in terms of performance of duties and warehousing processes. Table 6 displays the respondents' self-assessment of the effectiveness of the warehouse management system in terms of their performance of duties.

It can be observed from the table that most of the respondents are performing cooperative relationships to have a better performance, which got the highest weighted mean of 3.014. In addition, most respondents communicate a vision focused on warehouse process improvement, which got the second highest weighted mean of 2.959 and was interpreted as performed. Moreover, the respondents worked with everyone to achieve common goals rather than encourage competition, which got the third-highest weighted mean of 2.842. This implies that there has been a harmonious relationship between the leaders and workers, which makes work easy, effective, and productive. Meanwhile, most respondents were willing to put in the extra hours to complete an assignment so that the other workers would see the commitment and follow this example, getting the lowest weighted mean of 2.534. Moreover, the respondents were available to discuss issues and concerns about W.M.S. implementation with other members/employees, who got the second lowest weighted mean of 2.562. Lastly, the respondents need to be flexible, accepting whatever changes during W.M.S. implementation that come their way got the third lowest weighted mean of 2.651. This implies that the respondents were committed to their work because they were willing to exert efforts and gave time when needed. Even though the following statements got a low average response, they were still interpreted as performed. Workers' duties were generally performed in implementing W.M.S., which obtained a composite mean of 2.76. This was supported by the study of Kapur (2020), which revealed that the up-gradation of their skills was fundamental in leading to the effective functioning of the organizations. Communication, inspiration, creativity, optimism, feedback, delegation, trustworthiness, work ethics, conscientiousness, and dispute resolution are among the various sorts of skills.

Indicator	Weighted mean (μ)	Verbal Interpretation
2.1.1 I make myself regularly available to discuss issues and concerns about Warehouse operations with other members/employees.	2.562	Performed
2.1.2. I communicate a vision focused on warehouse process improvement.	2.959	Performed
2.1.3. I made an effort to get all team member's opinions and ideas before making a decision.	2.829	Performed
2.1.4. I am for cooperative relationships that will lead to better performance.	3.014	Performed
2.1.5. I work with everyone to achieve common goals rather than encourage competition.	2.842	Performed
2.1.6. I help improve warehouse processes	2.733	Performed
2.1.7. I consistently monitor work-in-process to identify constraints in the warehouse operations being implemented.	2.740	Performed
2.1.8. I have to accept mistakes and failures during W.M.S. implementation and devise clear solutions for improvement.	2.774	Performed
2.1.9. I am willing to work extra hours to complete an assignment so that other workers will see this commitment and follow this example.	2.534	Performed
2.1.10. I am flexible, accepting whatever changes or responsibilities during W.M.S. implementation that come my way.	2.651	Performed
Average Weight Mean (μ)	2.76	Performed

Table 6: Respondents' Self-Assessment on their Performance of Duties

Table 7 presents the respondents' self-assessment of the effectiveness of the warehouse management system in warehousing processes through material handling equipment, storage, and automation. The table reveals that most respondents arrange the shop floor throughout the warehousing process so that the processes and machines are close to one another, yielding the highest weighted mean of 3.048. Furthermore, they chose the proper handling equipment for W.M.S. deployment because its use will influence the design of the warehouse layout and the required staffing level at the facility, with the second highest weighted mean (3.027). Additionally, most respondents placed all operations adjacent to one another to reduce the need for part storage and material handling, earning them the third-highest weighted mean of 2.993. This suggests that the respondents are more aware of their duties at work.

Meanwhile, most respondents assessed when a task proves to cause frequent or repetitive stress injuries and it is time to look for the right material handling equipment for the warehouse, which got the lowest weighted mean of 2.747. Mainly, they have to ensure that W.M.S. implementation will continue to carry its floor design based on anticipated loads from all forms of equipment, and other loads should be considered for future possible uses of the floor, which obtained the second lowest weighted mean of 2.753. Lastly, the respondents who make sure that the material commonly stored on this type of equipment is waiting to enter the

production cycle or be transported got the third lowest weighted mean of 2.788. All tools and supplies used on the job site must be stored appropriately. While awaiting transit, materials in layers must be stacked, racked, blocked, interlocked, or otherwise secured to avoid sliding, falling, or collapsing.

Most respondents rated the warehouse processing as conducted, as indicated by the composite mean of 2.87. The article by Ben (2020), which claimed that using the right material handling equipment can accelerate the process of work improvement, provided evidence for this. There are some considerations to remember when improving the warehouse material handling process. It is advisable to be aware of the service level and ensure that it will maintain productivity to reduce the number of material handling tasks.

Table 7: Respondents Self-Assessment on the Warehousing Processes

Indicator	Weighted mean (μ)	Verbal Interpretation
2.2.1 I select the appropriate handling equipment in W.M.S. operations because its use will condition the warehouse layout design and the number of operators needed in the facility	3.027	Performed
2.2.2 I lay out the shop floor so the processes and machines are close to each other.	3.048	Performed
2.2.3 I have to find suitable material handling equipment during W.M.S. implementation to transport, load, and unload the goods from their locations.	2.801	Performed
2.2.4 I operate automated material handling equipment employing a warehouse control system (W.C.S.) that manages all machine movements.	2.801	Performed
2.2.5 I make sure that the overall design of the warehouse, specifically the storage area, should focus on improving how to tackle materials and designing a space that maximizes how much equipment can fit in and place that equipment in that space to eliminate waste.	2.849	Performed
2.2.6 I have to ensure that W.M.S. implementation will continue to carry its floor design based on anticipated loads from all forms of equipment, and other loads should be considered for future possible uses of the floor.	2.753	Performed
2.2.7 I ensure that the material commonly stored on this type of equipment is waiting to enter the production cycle or be transported.	2.788	Performed
2.2.8 I need to check that the products are stored safely and appropriately	2.890	Performed
2.2.9 I have located all processes close together so that material handling and part storage are minimized.	2.993	Performed
2.2.10 When a task proves to cause frequent injuries or repetitive stress injuries, then it is time for me to look for the right material handling equipment for the warehouse.	2.747	Performed
Average Weight Mean (μ)	2.87	Performed

Assessing the Effectiveness of the Warehouse Management System being Implemented

Table 8 presents the respondents' assessment of the warehouse management system's effectiveness in process improvement.

The table shows that most respondents who use technologies and automate the application in the warehouse got the highest weighted mean of 3.00, verbally interpreted as 'Effective.' Similarly, most of the respondents take all process improvement seriously to reduce human error and got the second highest weighted mean of 2.966 and interpreted as 'Effective.' In addition, most respondents regularly undergo training and development in workplace skills, getting the third highest weighted average of 2.884 and interpreted as effective. This suggests that professionals must adapt their knowledge and skills to keep up with workplace techniques and technology changes. Training is one of the best strategies to improve knowledge and abilities. Giving staff members continuous, pertinent training can boost productivity and performance at work.

Meanwhile, most respondents assessed properly aware of picking or order preparation as slightly practical and got the lowest weighted average of 2.486. In addition, most respondents followed rules and procedures to reduce labor and operational costs and got the second lowest weighted mean of 2.521, interpreted as 'Effective.' Lastly, most respondents observe safety protocol to reduce injury caused by manual or automated handling, obtaining the third lowest weighted mean of 2.630 and verbally interpreted as 'Effective.' This implies that preventing injuries is essential to workers' productivity and operational safety.

With a composite mean of 2.75, most respondents rated the warehouse management system as effective in improving the process. Fergal (2022) agreed with this. Strong leadership and ongoing warehouse operations improvement are two significant variables that come into play when operating a profitable, efficient, and cost-effective warehouse. Hiring a capable warehouse manager knowledgeable about existing operational procedures and emerging technological trends enables the business to comfortably meet customer expectations while keeping an eye out for developments that could further streamline operations.

Table 8: Respondents' Assessment of the Effectiveness of Warehouse Management System in Terms of Process Improvement

Indicator	Weighted mean (μ)	Verbal Interpretation
3.1.1 I take all process improvement seriously to reduce human error	2.966	Effective
3.1.2 I encourage each one to make suggestions for improvement of workers' performance at this plant.	2.829	Effective
3.1.3 I tell them why teamwork is essential to get things done or get into healthy communication with the workers more often	2.644	Effective
3.1.4 I manage the work assigned to me.	2.699	Effective
3.1.5 I use technologies and automate the application in the Warehouse	3.000	Effective
3.1.6 I observe safety protocol to reduce injury caused by manual or automated handling.	2.630	Effective
3.1.7 I follow the rules and procedures to reduce labor and operational costs	2.521	Effective
3.1.8 I am properly aware of picking or order preparation	2.486	Slightly Effective
3.1.9 I am a competent warehouse manager/specialist or worker at this plant.	2.849	Effective
3.1.10 I undergo training and development in workplace skills regularly.	2.884	Effective
Average Weight Mean (μ)	2.75	Effective

Table 9 shows the respondent's assessment of the warehouse management system's effectiveness in inventory management practices. The table displays that most respondents often keep track of the real-time data to capture and find other ways of optimization to enhance data accuracy and analysis, which obtained the highest weighted mean of 3.007. In addition, most respondents often kept track of all the daily transactions, which got the second-highest weighted mean of 2.986. Moreover, most respondents conducted regular audits in areas with high need, such as safety concerns, which got the third highest weighted mean of 2.945 and was interpreted as 'Effective.' This implies using the audit to identify and resolve company issues and improve W.M.S. processes.

Meanwhile, most of the respondents provided "I am in charge of greater Inventory control or counts the physical inventory regularly" with the lowest weighted mean of 2.637, verbally interpreted as 'Effective.' In addition, most respondents analyzed inventory data to validate transactions, check wastage, and measure customer satisfaction, which obtained the second lowest weighted mean of 2.644. Lastly, most of the respondents observe operations and how things are currently working to be more aware of challenges and develop actions that can properly address issues, getting the third lowest weighted mean of 2.712. This implies that understanding how to organize inventory control is a great way to fit the highest number of products into the warehouse to avoid wastage.

Generally, warehouse management systems in terms of inventory management practices were effective, with a composite mean of 2.82. This was supported by Ng Li Hsia (2019) as she mentioned that most businesses have plenty of areas to improve, especially in their warehouses. The foundation of effective inventory control strategies for warehouse management is a clean, well-kept environment. Workers should be able to access stock conveniently and safely. Thus, managers should periodically review warehouse operations. Make a stock inventory as needed; use A.B.C. analysis of inventory to keep working capital costs low; plan the usage of each space in the warehouse; use fixed and movable tracking options to allow the workers to see where the product was placed and is prepared for shipment, among other best practice inventory control techniques. If warehouses have the appropriate software, they can manage their inventories properly.

Table 9: Respondents' Assessment of the Effectiveness of Warehouse Management System in Terms of Inventory Management Practices

Indicator	Weighted mean (μ)	Verbal Interpretation
3.2.1 I Check that equipment is in good condition and regularly used to avoid expensive maintenance	2.726	Effective
3.2.2 I am in charge of greater Inventory control or counting the physical inventory regularly	2.637	Effective
3.2.3 I handle the daily forecasts of stock profiles and access requirements	2.890	Effective
3.2.4 I Keep track of the real-time data to capture and find other ways of optimization to enhance data accuracy and analysis	3.007	Effective
3.2.5 I execute all the cycle counting operations to enhance inventory accuracy.	2.795	Effective
3.2.6 I analyze inventory data to validate transactions, check wastage, and measure customer satisfaction.	2.644	Effective

3.2.7 I observe operations and how things are currently working to be more aware of challenges and develop actions that adequately address issues.	2.712	Effective
3.2.8 I conduct regular audits of areas where the need is high, such as safety concerns	2.945	Effective
3.2.9 I Keep track of all of the daily transactions.	2.986	Effective
3.2.10 I count on getting backup machines or equipment to use during the busy period and meet the sudden change demands.	2.890	Effective
Average Weight Mean (μ)	2.82	Effective

Table 10 exhibits the assessment of the respondents on the effectiveness of the warehouse management system in terms of productivity and utilization capacity.

It can be seen from Table 10 that the majority of respondents regulate the degree of utilization and timing of order release by considering the process's ability to finish on time, which received the highest weighted mean of 3.014, verbally assessed as 'Effective.' The statement, "I am knowledgeable about prescribed best practices and provide manager feedback and appropriate coaching when they are not," was verbally interpreted as 'Effective.' This indicates that more employees will rise to meet productivity expectations, keeping the department's overall productivity at an average pace, which obtained a weighted mean of 2.884.

Additionally, a sizable portion of respondents who received instruction to do several tasks received the third-highest weighted mean of 2.863, indicating an efficient level of performance. This implies that a warehouse with more efficiency will be more productive and able to complete more jobs during the workday. The lowest weighted mean, 2.685, was obtained by the majority of respondents who evaluated their effectiveness in making every effort to reduce or eliminate idle time. The next group, reporting that they built time into their daily routine to account for unexpected stops and machine problems, attained the second-lowest weighted mean of 2.747, likewise considered 'Effective.' The final group of responders, who agreed with the statement, "I am a cross-trained worker at this plant, so I can fill in for others, if necessary," received the third lowest weighted mean of 2.795, verbally assessed as 'Effective.' These results suggest that good warehouse management trains employees to participate in all facets of warehouse operations, enhancing productivity and controlling expenses.

With a composite mean of 2.83, productivity and utilization capacity were generally 'Effective.' Lai (2015) agreed with this and found that increased operational scale, improved pure technical efficiency, and sophisticated technology were significant variables influencing productivity growth at the province level in the Canadian food processing industry. For productivity to increase, capacity utilization must be maintained at a greater level. The findings showed that the aggregate productivity growth of the Canadian food processing industry was primarily driven by technological advancement, which suggests that both private and public institutions could increase their investment in R&D to boost manufacturing productivity and quicken technological advancement. Research and development (R&D) spending is anticipated to assist food processors.

Table 10: Respondents' Assessment of the Effectiveness of Warehouse Management System in Terms of Productivity and Utilization Capacity

Indicator mean (μ)	Weighted	Verbal Interpretation
3.3.1 I make every effort to minimize or eliminate idle time.	2.685	Effective
3.3.2 I control the level of utilization and timing of the order release by considering the process's capacity to finish on the deadline.	3.014	Effective
3.3.3 I use a repetitive master schedule from day to day.	2.808	Effective
3.3.4 I finish my assigned job as planned or scheduled.	2.795	Effective
3.3.5 I build time into my daily schedule to allow for machine breakdowns and unexpected stoppages.	2.747	Effective
3.3.6 I complete certain hours of doing W.M.S. operations in an hour per week, making them productive. It 2.842 means the amount of time I am available to be used for work.		Effective
3.3.7 I am knowledgeable on prescribed best methods and provide manager feedback and appropriate coaching when they are not, which means that more workers will rise to meet productivity expectations, keeping the department's overall productivity at an average pace.	2.884	Effective
3.3.8 I meet the warehouse operations schedule daily to complete my work on time.	2.849	Effective

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3.3.9 I am a trained worker at this plant, so they can fill in for others if necessary.	2.795	Effective
3.3.10 I receive training to perform multiple tasks.	2.863	Effective
Average Weight Mean (μ)	2.83	Effective

Significant Difference in the Respondents on Their Self-Assessment Performance When They Are Grouped According to Profile

Table 11 demonstrates the summary of computations when testing was done on the significant differences between the workers' performance levels when grouped according to educational attainment.

The researcher's testing yielded an F value of 0.323 and a p-value of 0.809, more significant than the 5% significance level. The researcher concluded that there was no significant difference in the performance of the workers' self-assessment when they were categorized according to educational attainment but did not reject the null hypothesis due to the data. Assis, Rafael, and Sagawa's (2018) research showed that staff involved in the transformation reported decreased conflicts. However, a noticeably increased level of client trust and credibility, both internally and externally, confirmed this. These elements have shown an increase in effectiveness and quality of service. Concrete advantages were attained with the system's installation.

On the other hand, other gains, like the potential for increased competitiveness, were intangible and more difficult to quantify. According to reports and personal observation, some consumers have reportedly already commended the company's new deadline policy and made fresh purchases. Most employees expressed high levels of satisfaction with logistic operations performance, and after implementation, the average grade for logistic operations quality was also extremely satisfactory.

Table 11: Significant Difference in the Assessment of the Respondents' Performance When Grouped According to Their Educational Attainment

	Sum of Squares	df	Mean Square	F	Sig.	Decision	Interpretation
Between Groups	27.941	3	9.314	.323	.809	Do Not Reject Ho	No Significant Difference
Within Groups	4096.614	142	28.849				
Total	4124.555	145					

The summary of calculations made during testing on the performance levels of the workers when categorized according to their current position is shown in Table 12. The researcher's testing produced an F value of 370 and a p-value of 691, which are greater than a 5% significance level. The researcher concluded that there was no significant difference in the performance of the workers' self-assessment when they were grouped according to their current position but did not reject the null hypothesis due to the data.

Table 12: Significant Difference in the Assessment of the Respondents' Performance

When Grouped According to Their Position

	Sum of Squares	df	Mean Square	F	Sig.	Decision	Interpretation
Between Groups	21.240	2	10.620	.370	.691	Do Not Reject Ho	No Significant Difference
Within Groups	4103.315	143	28.695				
Total	4124.555	145					

Table 13 shows the summary of computations when testing was done on the significant differences between the workers' level of performance when they were grouped according to the length of service. When testing was done, the researcher generated an F value of .678 and a p-value of .567, more significant than the 5% significance level. Due to the results, the researcher did not reject the null hypothesis and concluded that there was no significant difference in the workers' self-assessment performance when grouped according to the length of service.

Table 13: Significant Difference in the Assessment of the Respondents' Performance when Grouped According to Their Length of Service

	Sum of Squares	df	Mean Square	F	Sig.	Decision	Interpretation
Between Groups	58.226	3	19.409	.678	.567	Do Not Reject Ho	No Significant Difference
Within Groups	4066.328	142	28.636				
Total	4124.555	145					

Table 14 exhibits the summary of computations when testing was done on the significant difference between the respondents' performance when they were grouped according to their profile.

When testing was done, the researcher generated p-values of .809, .691, and .567, greater than the 5% significance level. Due to the results, the researcher did not reject the null hypothesis and concluded that there was no significant difference in the workers' self-assessment performance when grouped according to profile.

Table 14: Summary of Computations in Testing the Significant Difference in the Assessment of the Respondents' Performance When Grouped According to Their Profile

	p-value	Decision	Interpretation
Educational Attainment	.323	.809	Do Not Reject H_o	No Significant Difference
Position	.370	.691	Do Not Reject H_o	No Significant Difference
Length of Experience	.678	.567	Do Not Reject H_o	No Significant Difference

Significant Difference in the Respondents' Assessed Effectiveness of the Warehouse Management System When They are Grouped According to Profile

Table 15 presents the summary of computations when testing was done on the significant differences between the assessed effectiveness of the warehouse management system when they were grouped according to educational attainment.

When testing was done, the researcher generated an F value of .989 and a p-value of .400, greater than a 5% significance level. Due to the results given, the researcher did not reject the null hypothesis and concluded that there was no significant difference in the assessed effectiveness of the warehouse management system when they were grouped according to educational attainment.

Table 15: Significant Difference in the Assessed Effectiveness of the Warehouse Management System When Grouped According to Educational Attainment

	Sum of Squares	df	Mean Square	F	Sig.	Decision	Interpretation
Between Groups	237.610	3	79.203				
Within Groups	10646.068	133	80.046	.989	.400	Do Not Reject H_o	No Significant Difference
Total	10883.679	136					

Table 16 presents the summary of computations when testing was done on the significant differences between the assessed effectiveness of the warehouse management system when they were grouped according to the current position.

When testing was done, the researcher generated an F value of .645 and a p-value of .526, greater than a 5% significance level. Due to the result given, the researcher did not reject the null hypothesis and concluded that there was no significant difference in the assessed effectiveness of the warehouse management system when they were grouped according to the current position.

Table 16: Significant Difference in the Assessed Effectiveness of the Warehouse Management System when Grouped According to Current Position

	Sum of Squares	df	Mean Square	F	Sig.	Decision	Interpretation
Between Groups	113.585	2	56.793				
Within Groups	12599.922	143	88.111	.645	.526	Do Not Reject H_o	No Significant Difference
Total	12713.507	145					

Table 17 displays the summary of computations when testing was done on the significant differences between the assessed effectiveness of the warehouse management system when they were grouped according to length of service.

When testing was done, the researcher generated an F value of 1.599 and a p-value of .193, greater than a 5% significance level. Due to the results given, the researcher did not reject the null hypothesis and concluded that there was no significant difference in the assessed effectiveness of the warehouse management system when they were grouped according to the length of service.

Table 17: Significant Difference in the Assessed Effectiveness of the Warehouse Management System when Grouped According to Length of Service

	Sum of Squares	df	Mean Square	F	Sig.	Decision	Interpretation
Between Groups	378.972	3	126.324				
Within Groups	10504.707	133	78.983	1.599	.193	Do Not Reject H_o	No Significant Difference
Total	10883.679	136					

Table 18 exhibits the summary of computations when testing was done on the significant differences between the warehouse management system's assessed effectiveness when grouped according to the profile.

When testing was done, the researcher generated p-values of .400, .526, and .193, greater than a 5% significance level. Due to the results, the researcher did not reject the null hypothesis and concluded that there was no significant difference in the warehouse management system's assessed effectiveness when grouped according to profile.

Table 18: Summary of Computations in Testing the Significant Difference in the Assessed Effectiveness of the Warehouse Management System When Grouped According to Profile

	F value	p-value	Decision	Interpretation
Educational Attainment	.989	.400	Do Not Reject H_o	No Significant Difference
Position	.645	.526	Do Not Reject H_o	No Significant Difference
Length of Experience	1.599	.193	Do Not Reject H_o	No Significant Difference

Summary of Discussion

After a careful evaluation and analysis of all the data gathered, the researcher laid the following findings:

Profile of the Respondents

Regarding educational attainment, most respondents were bachelor's degree holders, with the highest frequency of 68 or 46.6%, and 8 or 5.5% were high school graduates. Regarding the current position, the officers with the highest frequency of 77 or 52.7 percent and 18 or 12.3% were managers. Regarding length of experience, 73, or 50%, were in their 4–6 years in the company, and 2, or 1.4%, were in their 1–3 years.

Self-assessment of Respondents on Their Performance

In terms of performance of duties, most of the respondents are performing cooperative relationships to have a better performance, which got the highest weighted mean of 3.014. Workers' performance of duties was performed in the implementation of W.M.S., which obtained a composite mean of 2.76. Regarding warehousing processes, most respondents lay out the shop floor so the processes and machines are close to each other, obtaining the highest weighted mean of 3.048. The majority of the respondents performed with a composite mean of 2.87.

Assessment of the Effectiveness of Warehouse Management

Regarding process improvement, most respondents use technologies and automate the application in the warehouse, which got the highest weighted mean of 3.00. Process improvement was effective in the warehouse management system, with a composite mean of 2.75. Regarding inventory management practices, most respondents often keep track of the real-time data to capture and find other ways of optimization to enhance data accuracy and analysis, which obtained the highest weighted mean of 3.007. The respondents assessed W.M.S. as 'Effective' with a composite mean 2.82. In terms of productivity and utilization capacity, most respondents control the level of utilization and timing of the order release by considering the capacity of the process to finish on deadline, got the highest weighted mean of 3.014, verbally interpreted as 'Effective.' Productivity and utilization capacity were 'Effective' with a composite mean of 2.83.

Significant Difference Between the Respondents' Assessment of the Workers' Level of Performance When Grouped According to Position

The researcher generated p-values of .809, .691, and .567, greater than a 5% significance level. There is no significant difference between the respondents' assessment of the workers' level of performance when they were grouped according to the profile. Significant Difference Between the Respondents' Assessed Effectiveness of Warehouse Management System When They are Grouped According to Profile The researcher generated p-values greater than a 5% significance level. There was no significant difference between the respondents' assessment of the effectiveness of the warehouse management system when they were grouped according to their profile.

CONCLUSION

The researcher has drawn the following conclusions in light of the present study's findings:

Most respondents were bachelor's degree holders' officers and had been in the company for 4–6 years. Performance of duties and warehousing processes were performed in the W.M.S. implementation. Process improvement, inventory management practices, and productivity and utilization capacity were effective in the W.M.S. implementation. There was no significant difference between the respondents' self-assessment performance when grouped according to profile. There was no significant difference between the respondents' assessment of the effectiveness of the warehouse management system when they were grouped according to profile.

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