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Research Article

Inventory and Monitoring System on Logistic Vehicles and Passengers Loading Plan for Office of the Presidential Adviser on the Peace Process (OPAPP)

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Abstract

Inventory and Monitoring system is the regular observation and recording of data over a period of time. Monitoring is very useful today because it helps to monitor daily transactions. This study adopted Waterfall model approach in order to create and design the software for monitoring system. Based on the analysis of the data the following results are yielded: it was found out that the respondents rated “highly effective” to the extent of the effectiveness of the system. As a significantly tool to improve tasking of employees especially in the fields, it reduces burden of work and user friendly. The system project helped the organization activities, especially in the normalization, under the Bangsamoro Peace Process. It was concluded that the system is very useful is the organization. It improve the data security and improve the integrity of the records of the passengers.

Keywords: Inventory, Loading Plan, Passengers Planning, Vehicle Inspection, Generating Reports, Short Message Notification

Introduction

The life that exists on earth is a lot of different than what it was before. Demand is just one of the many things that continuously change. Efficiency and productivity on other hand are some of the things that needs to be consider in meeting up the demands of the society. Luckily, our technology takes charge of these changes. Different kinds of systems can now be easily done with the use of different programming tools.

Inventory and monitoring system on logistic vehicles and passengers loading plan has a useful features like registration of staff, generating of passengers loading plan, receiving of items, and monitoring of vehicles, databases where the information will be stored. Inventory and monitoring system on logistic vehicles and passengers loading plan is great help for the organization, especially in monitoring operation and generating of passengers loading plan for the passenger’s activity. This is one of the most relevant elements for the competitiveness of organization especially in Independent Decommissioning Body (IDB). The researcher presents or initiate to invent a technology tool that one of the intelligent loading plan systems not only used to improve performance of the head driver and safety of passenger, but to improve the performance of the organization.

This monitoring program will find out the achievements, strength, weaknesses, and challenges of the project especially in field and will guide project personnel too easily and improve the quality of the work to achieve the goals in the planned timeline of the organization.

The conducted research is about the organization monitoring, inventory and passengers loading plan system. Keeping records of inventory and loading plan manually are the current method used by the organization. Due to this current method of inventory and generating of passengers loading plan, the organization has encountered several problems regarding the monitoring and time consuming when it comes to generating passenger loading plan.

The researcher fully gave his best to provide a monitoring and inventory system on logistic vehicles and passengers loading plan to solve the problems encountered by the Independent Decommissioning Body (IDB).

Research Questions

This study is conducted to determine the Inventory and Monitoring System on Logistic Vehicles and Passengers Loading Plan. Specifically, it sought to answer the following question:

1. To what extent are the effect of the Inventory and Monitoring System on Logistic Vehicles and Passengers Loading Plan in terms of:
1.1 usability;
1.2 functionality;
1.3 accuracy; and

1.4 services?

Literature Review

According to Yongqiu Zhu (2017) Passenger-oriented rescheduling problems receive increasing attention. However, the passenger assignment models used for evaluating the rescheduling solutions are usually simplified by many assumptions. To estimate passenger inconvenience more accurately, this paper establishes a dynamic passenger assignment model during disruptions, in which the time-dependent demand, disruption-induced service variations and vehicle capacities are all taken into account. Event-based simulation is adopted to implement the model of the dynamic loading and unloading procedures of passengers. Based on the model, individual travels can be tracked, thus making the estimation of individual passenger delay possible. By aggregating individual inconvenience, the performance of a given rescheduling solution/contingency plan can be evaluated. Furthermore, recommendations such as adding train units can also be proposed, as illustrated in the case study.

An inventory is basically a detailed list of all the items in stock. Inventory consists of raw materials, work-in-process and finished goods. In today's highly competitive market, businesses need to maintain an appropriate level of stock to meet the customer demands at any time. Inventory management is part of the supply chain management. Over the past years, the concept of supply chain management (SCM) has been given a considerable attention. This is an approach to view the supply chain as a whole rather than as a set of separate processes (Harry, 2005).

Michael (2002) argued that the easiest way to manage inventory is with a computer inventory management system. The systems below help to reduce the time spent in managing inventory: Point-of-sale terminals: this system updates stock level automatically and provide a more error free sales transaction Barcodes and barcode readers which proved a way to effectively input inventory and stock takes faster into the system Job costing and inventory systems which are systems that also automatically update stock counts as orders are being made.

According to Kotler, (2003), he stated that most of these systems fail to render expected services and rather result in excess inventory. This is because software can only optimise the values it has and not what it could be and as a result, it neglects some important external influences like changes in the management process. He stated that World's best practice inventory management demands that the inventory management system is optimised not just the inventory.

According to Business Link (2006) an organization has an efficient inventory control only when they have the right amount of stock in the right place and at the right time. Inefficient Inventory control can leads slower sales and disappointed customers. Inventory control basically deals with reducing the total cost of inventory. Inventory control is very relevant for businesses, especially businesses dealing with a large variety of products. As site by Zenze (2004), Inventory management or control can be used to streamline warehouse processes in order to track orders and shipment.

Other important applications of inventory management systems are in manufacturing, shipping, and receiving. There are three main factors in inventory control decision making process (Arsham, 2006).

Presently, many businesses rely on modern inventory management systems to automate and integrate all aspects their business operations from order management, shipping management, billing systems, to inventory control all in one software package (Finchley, 2009). Inventory management systems must have ability to "track sales and availability, communicate with suppliers in near real-time and receive and incorporate other data like seasonal demand" (Finchley, 2009). This means that the system must tell the storeowner for example when its stock level is low so as to reorder and how much to purchase. Information technology provided a way to convert sales and purchasing into a strategic business operation. Businesses now are faced with the challenge of finding out how to use these technologies to gain value and competitive advantage. Inventory management system can deliver these advantages (Stylus Systems, 2008). Modern inventory management systems now depend on barcodes, and potentially RFID systems to enable automatic identification of objects. According to a case study at Wal-Mart, for products selling between 1 and 15 units a day, RFID was able to reduced out of stocks by up to 30% (Finchley, 2009). In order to record an inventory transaction accurately, the inventory management system uses a bar code scanner or RFID reader to identify products automatically, and then collects additional information on the specific product from the operators via fixed wireless terminals, or mobile

computers (Finchley, 2009). Mathieu defined RFID (Radio Frequency Identification) as a data collection technology that uses electronic tags also known as electronic label to store data and can be used to identify items just like bar codes.

According to Lysons (2001) Inventory management software is a computer-based system for tracking inventory levels, orders, sales and deliveries. It can also be used in the manufacturing industry to create a work order, bill of materials and other production-related documents. Companies use inventory management software to avoid product overstock and outages. It is a tool for organizing inventory data that before they will generally be stored in hard-copy form or in spreadsheets.

Industry 4.0 and mass customization sets high requirements on flexibility of inventory management. When these requirements are unfulfilled, material shortages can occur, which can result in production stoppages. By monitoring inventory levels, the risk of such shortages occurring can be reduced. The physical inventory must, however, correspond to the monitored, digital representation of the inventory. Existing solutions for avoiding inaccuracies of inventory levels are limited, and technologies for register inventory levels of boxes stored in flow racks were therefore explored in this thesis. Further, the aim was to integrate one, or several, of the explored concepts in a real-world system and visualize the data into a digital twin of the system to enable remote monitoring. The methodology was based on a theoretical framework and a mapping of technologies, followed by a concept creation phase and integration and visualization of the concepts in a digital twin. Throughout the project, a case study was used to identifying concept requirements and evaluating the concepts on a real-world system. Technologies found suitable for register inventory levels and enable remote monitoring are barcodes, Radio Frequency Identification (RFID), weight sensors, distance sensors, and contact sensors. The two concepts that fulfill the requirements from the case study are based on a weight sensor, respectively a distance sensor. In the concepts, data from the sensors are sent by WiFi to an Internet of Things (IoT) platform and then integrated and visualized in a digital twin with a low level of data integration. To conclude, there are ways to monitor inventory levels remotely in a flow rack. An ultrasonic distance sensor is proved to satisfyingly measure the correct number of boxes stored in a flow rack. However, the concept requires well-followed procedures to minimize the risk of human errors and thereby avoid inaccuracies.

Imbentaryo App an intelligent inventory system and decision support system (DSS) equipped with forecasting algorithm and Short Messaging Service (SMS) technology. The system performs business intelligent solutions through predictive data analysis from the inventory historical data needed for decision making on planning, monitoring, and management of supplies and equipment in the Supply Management Office (SMO) of Tanauan, Leyte, Philippines. The study is designed to advance the current inventory system by integrating innovative technologies and intelligent algorithms comparable to artificial intelligence. The system development utilized an agile model in building software prototypes to meet user and business requirements. The application is equipped with a secured database server and accessible on secured network architecture through web and mobile technology. The application was confirmed by SMO personnel to be an effective and efficient inventory system using ISO 25010 with a significant rating of 4.32 interpreted as Extremely Efficient.

Marisa Ferry Terminal is a port that serves the Marisa - Dolong - Supply - Ampana route. The existence of the Marisa Ferry Port has a very important role in supporting economic activity and equitable development in Pohuwato Regency. However, at this time many people and unauthorized vehicles can easily enter the port area, causing the port to become less regulated, such as traders who sell their merchandise at port area, delivery / pick-up enters the port dock area. This is due to the absence of a zoning system in accordance with the Regulation of the Minister of Transportation Number: 29 of 2016 concerning the Sterilization of Ferry Ports. So that in the activity of getting on and off passengers and loading and unloading vehicles, there are several obstacles, among others, the irregularity of the traffic flow pattern, the absence of zoning in the port which causes unauthorized people to enter restricted areas. This research aims to; 1) To Know Sterilization Passengers and Vehicles at the Ferry Port. 2) To analyze the existing conditions of passenger and vehicle sterilization at the Marisa Ferry Terminal, Pohuwato Regency, Gorontalo Province in 2020. 3) And to evaluate the sterilization of passengers and vehicles and any supporting facilities needed. The research methodology used is direct observation in the field (field research) with measurement studies and literature (literature). Then to analyze this based on the Decree of the Director General of Land Transportation Number SK, 242 / HK.104 / DRJD / 2010 concerning Technical Guidelines for Ferry Traffic Management and PM Number 29 of 2016 regarding ferry port sterilization. The analysis used is the zone system

analysis, analysis of vehicle and passenger traffic patterns and the equipment needed to support the zone system. As for the results of this study are 1) That the sterilization of passengers and vehicles is a zone arrangement system at the crossing port from the accumulation of passengers and vehicles. 2) Whereas the existing conditions of the Marisa Ferry Port, pohuwato district, Gorontalo province are not in accordance with the Minister of Transportation Regulation Number 29 of 2016 concerning the Sterilization of Ferry Ports. 3) And that the evaluation in this research states that there are no supporting facilities such as weigh bridges and portals at the Marisa Ferry Terminal which results in an accumulation of the number of passengers and vehicles while operating.

The difference of gathered related system to system project is that the system project generates Loading plan records of the passengers and will send SMS notification from the system to the drivers.

Methodology

System Overview

Inventory and monitoring system on logistics vehicles and passengers loading plan is developed to solve the problem occurs in the manual-based system on the organization. Each item received by the organization do not have a proper place to store it effectively and generating of a passenger's loading plan, for the passenger's activity. This method is not too effective to apply without the combination with computerize database. The features of Inventory and monitoring system on logistics vehicles and passengers loading plan, like receiving of item, generating of passengers loading plan, to generate vehicle report, inventory report, and to generate passengers loading plan history, and will send short message notification from the system to the drivers.

In addition, Inventory and monitoring system on logistics vehicles and passengers loading plan is developed using C# programming language that is faster development time. C# has several features that allow developers to code faster than with other languages.

Results and Discussion

Table 1. *Mean rating on the extent of the effect of Inventory and Monitoring System on Logistic Vehicles and Passengers Loading Plan in terms of Usability*

Usability of the inventory and monitoring system on logistic vehicles and passengers loading plan:	*Mean*	*Descriptive Interpretation*
1. It reduces the burden of work.	4.95	Highly Effective
2. It provides an efficient the manual system.	4.90	Highly Effective
3. It assesses contents, usefulness and language styles.	4.95	Highly Effective
4. user friendly.	4.95	Highly Effective
5. design and develops evaluation system through identified requirements.	4.90	Highly Effective
Grand Mean	4.93	Highly Effective

As seen in the table 1 above, these five items are discussed in the order of their ratings. Items such as, it reduces of burden of work; it assesses contents; usefulness and language styles; and user friendly. have same ranked with a mean of 4.95 with the description of "highly effective". The other two items such as, it provides an efficient manual system; it designs and develops evaluation system through identified requirements. have same ranked with a mean of 4.90 with the description of "highly effective". It denotes that the Inventory and Monitoring System on Logistic Vehicle and Passengers Loading Plan is highly effective in terms of usability. The respondents rated highly effective the extent of the effect of Inventory and Monitoring System on Logistic Vehicles and Passengers Loading Plan in terms of usability with a grand mean of 4.93.

Table 2. *Mean rating on the extent of the effect of Inventory and Monitoring System on Logistic Vehicles and Passengers Loading Plan in terms of Functionality*

Functionality of the inventory and monitoring system on logistic vehicles and passengers loading plan:	*Mean*	*Descriptive Interpretation*
1. It allows for a faster and accurate data processing.	4.90	Highly Effective
2. It provides good has results based on the tasks assigned to it.	4.70	Highly Effective
3. It assesses the quality of the developed system.	4.80	Highly Effective
4. It ensures that the standardized software quality specifications are achieved.	4.80	Highly Effective
5. It undertakes data processing, and all target outputs are achieved.	4.80	Highly Effective
6. maintained its security.	4.95	Highly Effective
Grand Mean	4.83	Highly Effective

As seen in the table 2 above. Item such as, it

maintained its security; have ranked with a mean of 4.95 with the description of "highly effective". However, it assesses the quality of the developed system; it ensures that the standardized software quality specifications are achieved; it undertakes data processing, and all target outputs are achieved, have ranked with a mean of 4.80 and described as "highly effective". Whereas, it provides good has results based on the tasks assigned to it, have ranked with a mean of 4.70 with the description of "highly effective". This denotes that the Inventory and Monitoring System on Logistic Vehicle and Passengers Loading Plan is highly effective in terms of functionality. The respondents rated highly effective the extent of the effect of Inventory and Monitoring System on Logistic Vehicles and Passengers Loading Plan in terms of functionality with a grand mean of 4.83.

Table 3. *Mean rating on the extent of the effect of Inventory and Monitoring System on Logistic Vehicles and Passengers Loading Plan in terms of Accuracy*

Accuracy of the inventory and monitoring system on logistic vehicles and passengers loading plan:	*Mean*	*Descriptive Interpretation*
1. It uses a very-well defined functions and features.	4.85	Highly Effective
2. It generates a reliable result.	4.85	Strongly Agree
3. It is capable in handling errors and recoverability.	4.80	Highly Effective
4. It provides an accurate report.	4.90	Highly Effective
5. It provides safety of the passenger.	5.00	Highly Effective
Grand Mean	4.88	Highly Effective

As reflected in the table 3 above, the following are the response of the respondent. For statement like, it provides safety of the passenger has the highest ranked with a mean of 5.00 with the description of "highly effective". However, it provides an accurate report, with a mean of 4.90 with the description of "highly effective". Whereas, it uses a very-well defined functions and features; it generates a reliable result. have the same ranked with a mean of 4.85 with the description of "highly effective" Lastly, it is capable in handling errors and recoverability with a mean of 4.80 with the description of "highly effective". This denotes that the Inventory and Monitoring System on Logistic Vehicle and Passengers Loading Plan is highly effective in terms of accuracy. The respondents rated highly effective the extent of the effect of Inventory and Monitoring System on Logistic Vehicles and Passengers Loading Plan in terms of accuracy with a grand mean of 4.88.

Table 4. *Mean rating on the extent of the effect of Inventory and Monitoring System on Logistic Vehicles and Passengers Loading Plan in terms of Services*

Services of the inventory and monitoring system on logistic vehicles and passengers loading plan:	*Mean*	*Descriptive Interpretation*
1. quicker (timesaving).	4.90	Highly Effective
2. reliable (on-time arrival of notifications).	4.90	Highly Effective
3. flexible (can cancel anytime).	4.90	Highly Effective
4. available.	4.90	Highly Effective
5. safer.	4.95	Highly Effective
Grand Mean	4.91	Highly Effective

As seen in the table 4 reveals that items such as, safer, has the highest ranked with a mean of 4.95 with the description of "highly effective". While the four of the items such as, quicker (timesaving); reliable (on-time arrival of notifications); flexible (can cancel anytime); and available, have same ranked with a mean of 4.90 with the description of "highly effective". This denotes that the Inventory and Monitoring System on Logistic Vehicle and Passengers Loading Plan is highly effective in terms of services. The respondents rated highly effective the extent of the effect of Inventory and Monitoring System on Logistic Vehicles and Passengers Loading Plan in terms of services with a grand mean of 4.91.

What are the benefits that you face in using this system?

Participant	*Benefits*
P1	Easily track data, generate loading plan, retrieved data
P2	Access anytime, easy to learn
P3	Easy to access data
P4	Generate passengers planning
P5	Easier than manual system
P6	Less burden on job
P7	Reload anytime, generate report anytime, no hassle
P8	More efficient than the manual
P9	Helpful in motor pool
P10	Faster transaction, easy to filter data
P11	Faster and easier
P12	Useful and reliable
P13	Log transaction, user friendly

What are the issues and challenges that you face in using this system?

Participant	*Issues and Challenges*
P1	Can of remember the flow of the system
P2	System works slowly because of low performanc of PC
P3	System not yet familiar
P4	Printer problem
P5	Multiple apps are open
P6	Low PC performance, bugs
P7	Not friendly for the first time because of unfamilia process
P8	Force shutting down of the computer
P9	Opening multiple application can cause lov performance of the PC
P10	Not familiar

Observation

Inventory and monitoring system on logistic vehicles and passengers loading plan has very useful in the organization, it improves tasking of employees, especially in the fields, manual transaction involves human error resulting in delays, improper time, and resource management, with the used of this system we observe the speed up of tasking and improvements of the logistics section.

Conclusion

Technology is very wide concept which is developing day by day and making life simpler and easier. It solves the real worldwide problems in an easier and efficient manner.

After conducting system project, the researcher observed that using Inventory and monitoring system on logistics vehicle and passengers loading plan, is very useful in IDB daily transaction, just like issuing of computerized Passengers loading plan and SMS notification for the drivers that serves as reminders.

The researchers recommended that the manager would use the Inventory and Monitoring System on Logistics Vehicle and Passengers Loading Plan to improve the manual transaction of the IDB and to have secured transactions.

For other security purposes, the manager must have a backup copy of the database for every transaction. He/she may assign trusted personnel to operate the system.

The system operator needs to have training on how to use the said system to protect data from being lost and to take good care of the important files within the system. There should be regular maintenance of the system and hardware to maintain its performance.

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