AN INFORMATION SYSTEM DEVELOPMENT AND TECHNOLOGY PLAN FOR CIMCAT TRUCKING CORPORATION

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ABSTRACT

   The company is the leading hauling services in Southern Mindanao and has been operating for eleven years. From ordering to billing process is the daily operation of the company and managing the human resource is in manual process. Based on the conducted study, company need to switch their business process from manual to automation to reduce cost and effort. The researchers proposed the Human Resource Management and Automated Intelligence Dispatch Assistant, and this system will use to support human resource process of the company. Also, it will help the manager and organization for better understand and how the HR technology is most effective in their organization. In addition, the system performs a paperless transaction. The automated system attains the digital process which can provide more flexibility to organization. The digitalization of the management and processing of data make sure that managers can get all kinds of essential data.

KEY WORDS: *Human Resource Management, Automation, Automated Intelligence Dispatch Assistant, HR technology, digitalization*

1. INTRODUCTION
1.1 Background of the Company
   CIMAFRANCA-CATOLICO Trucking Corporation is a domestic corporation setup under the Philippine Laws, with SEC Registry No. CS201128690 dated February 18, 2011. The corporation was formed as result of the one-vendor policies of Shell Shared Service Center – Manila (SSSC) wherein two independent trucking corporation who were existing hauling service under Shell joined forces to strengthen its service to Shell's customers. These two haulers namely: Cimafranca Trucking Corporation of Davao City which started its business on October 17, 1977, and Gensan JC Trucking Services, Inc. on January 1, 1966, whose prime movers are Mr. Damian L. Cimafranca and Engr. Edgar Wilfredo Catolico, respectively. The corporation has commenced its operation under its new name effective July 1, 2011, serving Shell retail stations in its assigned routes, itineraries, or areas.

1.2 Current Routines and Business Process
### 1.2.1 Current Routines
   Basically, CIMCAT is a petroleum hauling company in Southern Mindanao delivering on time, systematic, excellent, and safe transport services to all customers. The business has three (3) important roles namely: Safety Officer (SO), Dispatcher, and Road Transport Driver (RT Driver).
   The routines of the business are hauler dispatcher advice through short message service (SMS) the customer the availability of the lorries or tank trucks and their compartmentation. Then, customer will feedback to the hauler dispatcher for the lorry assignment and order breakdown. Hauler dispatcher request through email using standard form and once request is okay hauler dispatcher contact customer for the confirmation order. Once the order request is confirmed with the customer hauler dispatcher will advise the driver to proceed the loading of products and for delivery. Once the delivery is fully completed customer will issue cheque for the payment of the hauling service. Finally, driver will get back to garage and hauler dispatcher will collect the cheque and record it manually.

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1.2.2 Business Process

The order process is through email. Once the order breakdown is confirmed the hauler dispatcher will request order through email using standard form. Then, once the order request is processed the Shell customer service will email back with corresponding order number and breakdown. Lastly, hauler dispatcher will advise to the customer that their order request is already process and ready for loading and delivery. The manual ordering process of the company is shown in Figure 1.
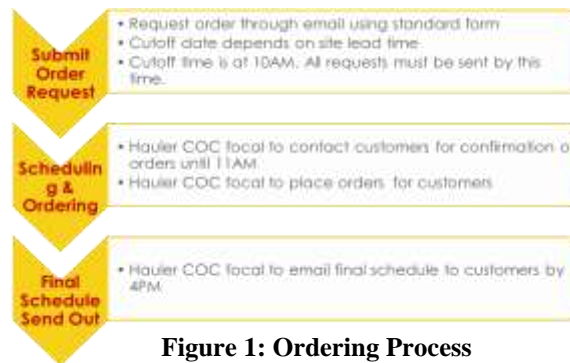
Figure 1: Ordering Process

Figure 2 shows the standard email form of Customer Own Collection (COC). This email request must be filled out by the hauler dispatcher completely. The email details as follows:

- Date and Time Request Sent
- Expected Delivery Date – the hauler dispatcher will give estimated time of arrival (ETA) for the information of the customer and to avoid advance billing.
- Ship-to – this is the customer identification number.
- Site Name – customer name
- Product – product name (ADO B2, FS DIESEL, VP DIESEL, REGULAR GAS, FS GASOLINE, PREMUIM GASOLINE, VP GASOLINE, and Kerosene).
- Volume in Liters – customer requested order quantity

Figure 2: Order Request From

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Table 1. List of Customer

Ship To	Site Name	Eta (Hrs.)	Eda
100235	SH PANABO DAVAO DOSS	0.45	1
100213	SH SASA DEPOT COSS	0.15	1
100365	SH TAGUM NAT HWAY COSS	1	1

The sample list of customers with corresponding details: SHIP TO (Customer Identification Number), Site (Customer Name), Lead Time (Estimated Time of Arrival (ETA) of the delivery to the customer site) and Expected Delivery Date is shown in Table 1.

Table 2. Final Delivery Schedule Format

Vehicle Plate No.	Trip No.	Site Name	Order Number	ETA	EDA

Final Delivery schedule format is shown in Table 2. Final delivery schedule is manually advice through SMS/viber to the customers.

1.3 Problem Found

Based on the interview the company has not yet invested in Information Technology. The company does the manual process on their operation. Discuss below problem found during the interview:

- **Application.** The company does the manual process for the data of all employees, data of tank truck, and manual dispatching and order process.
- **No IT Infrastructure.** The company has not yet invested in any IT infrastructure.
- **Customer.** The company does manual process for billing.

1.4 Goals and Objectives

1.4.1 General Objectives

This information system development and technology plan aims to address the process from manual to automation and to reduce the time for each task.

1.4.2 Specific Objectives

The following are the specific objectives of the information system development and technology plan:

- To propose Human Resource Management System for the data of the employee and tank truck to improve the business process.
- To integrate automated intelligence dispatch assistant, ordering and billing system that can be time and cost efficient to the business.
- To show the benefits of data management that will improve the efficiency of various activities, task management and administration.

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1.5 Organizational Structure

CIMCAT Trucking Corporation has an operations head who runs the operation followed by a safety on-ground operations manager who assists the operations head and manages the employees of the operation. As shown in Figure 3 is the organizational chart of the company.

Figure 3: Organizational chart of CIMCAT

1.6 Stakeholders

The following are the important part of the stakeholders of CIMCAT Trucking Corporation and shown in Figure 4.

- Owner
- Managers
- Employees
- Customers
- Supplier
- The Community

Figure 4: Stakeholder of CIMCAT Trucking Corporation

2. PROPOSED INFORMATION SYSTEM

2.1 Review of Related Study

2.1.1 Related Literature

Human Resource (HR) is the most important element in any organization. It was presented as a modern management method in the 1960s. Currently, human beings are considered assets rather than resources. HR consists of administrators, employees, users, and staff. It's difficult to deal with huge numbers of HRs in organizations especially large organizations, therefore, it's crucial to manage HR in an organized way. Innovative companies must predict the

environment changes and prepare for any domestic changes as strategic management. Therefore, Human resource management (HRM) is considered the most important managerial aspects in firms' life [1].

Information systems (IS) have long had a major influence on organizational functioning and overall organizational effectiveness. From the traditional transaction processing systems developed in the 1950s and 1960s to today's cloud-based enterprise-wide systems, organizations have used IS to support all business functions including marketing, accounting, production, and human resources management. As a result of implementing these systems, professional and academic fields such as accounting information systems (AIS) and supply chain management have emerged and transformed the way that accounting is practiced, and production and inventory are managed. One of the last functions in organizations to benefit from information systems was human resource management (HRM). But there is now a burgeoning interest in the practice and research surrounding HRM's use of technology [2].

Nowadays, many types of research make a point of managing Human Resources in companies because HR plays a vital role in achieving competitive advantages for organizations. Efficient HRM will increase productivity and enhance staffs' ability to respond to the organization's changes [1]. Currently, information system offers a range of benefits in data management such as cost-effective development process, accessible anywhere, accessible for a range of devices and higher user rates. Information system refers to a computerized system used for processing data to achieve certain functions. Referring to [1], information management system can be applied to improve the efficiency of various activities, task management and administration [3].

Presently, a new wave of awareness exists in people as it concerns the use of computers in administrative and qualitative information; it was also confirmed that organizations adopted the use of Management Information System (MIS) and Decision Support Systems (DSS) in their decision process, and this has advanced to a web-based human resource management system on the platform of Internet. This research outlines the benefits inherent in web-based human resource management system to streamline processes, outsource administrative activities, improve efficiencies, and reduce costs. With its user friendly and technologically advance solution [4].

2.1.2 Related System

The development of the technology continues to evolve. The used of internet as a medium of information providers which is better known as web has been utilized for various activities, such as sales, promotions, and other activities [4].

In the study of The Development of Web Based Management System: Emartech Computerized Management System to facilitate efficient handling of the employee management issues and provide instant access to the authorized users and based on the system specifications and requirements. The system can be used for maintenance, reporting of personnel information, using specialized input and maintenance programs, a generalized robust data management, reporting, and retrieval of the information. HRMS allows the personnel department to perform the tasks of storing, retrieving, and processing personnel data such as payroll and time reporting as well as generating managerial reports in a timely fashion [3].

Another study namely FGEHF: Authenticated Web Based Application for Human Resource Management System developed a system to assist HR in managing the employee record in easier, effective, and efficient manner. proposed system reduces the incurred cost and saves a lot of valuable time by avoiding any manual work. Additionally, it ensures all the data should be secure and should not be accessed by the unauthorized users. Each of the users could be assigned a particular role to access the different functionalities of the proposed system. The underlying aim of our solution is to reduce the manual workload of the administrative activities, such as maintenance and management of the file records, employee's payroll processing and other related tasks [5].

On the other hand, the company needs innovation for their ordering process and billing. Based on the study Automated Restaurant Ordering System Based on Embedded Technology achieves the ordering without use of paper. The automated system achieves the digital ordering which can provide more flexibility to customer. The digital processing and management of data makes sure that managers can get all kinds of data about sales etc. more efficiently. These features can provide more efficiency and systematization and reduce labor costs in small to medium sized restaurants [6]. E-Business is transforming corporations, markets, and the global economy. The Web is affecting the business transactions are performed: It makes it easy to find products and services as well as providers and suppliers, compare prices and qualities, and trade, buy, and get products and services quickly delivered to us. Customers are getting used to nice and friendly user interfaces, targeted advertisement, up-to-date product catalogues, and personalized stores [7].

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The IaaS Cloud Model for e-Ordering and e-Invoicing presented the design of an IaaS cloud e-Ordering and e-Invoicing model. Discussed the benefits of the IaaS cloud e-Ordering and e-Invoicing model which are elasticity and scalability, simplicity, cost-effectiveness, business agility and resiliency [8].

Another study namely Smart Shopping Cart with Automated Billing System this innovative project idea can be used places like shopping complexes, supermarkets & malls to purchase the products. RFID card is used to securely access every product in shopping places. If a product is scanned & put into the cart, all the required details of the product will be displayed on the LCD screen. Therefore, an RFID tag/card is used for accessing the products. hence this project will help in improving the security & also the shopping [9].

Point-of-Purchase Systems is another innovative for processing and billing. Technology at Point-of-Purchase - A Journey from Electronic Cash Registers to all Inclusive Point-of-Purchase Systems An effective POP / POS program can be of immense help in competing heads-on with other retailers. It can come to retailers' support in creating an edge over competitors by adding more intangible value to their service levels. Therefore, it can be stated that marketers who can manage systems and events more effectively at the point of purchase can gain competitive advantage. Moreover, an integrated POS system can make life at retail store easier for the store representatives and the management team. A POS system that rings sales, tracks inventory, and helps to grow business can be one of the biggest assets for a retailer. EPOS has transformed the entire supply chain systems by integration of the POS software with automated replenishment and re-ordering systems of the organization as well as with other suppliers. This has resulted in clarity and transparency at all the levels of the buying systems of any retail organization. EPOS can be duly credited to the significant reductions in lead and transit times and thus ensuring instant stock replenishment and subsequently greater customer satisfaction. The trend is moving towards more advanced EPOS solutions which can provide efficient 'Point of Purchase' experience to the customers and can help the retailers to add value. Potential scope for further automation aims to consider more interactive systems which require lesser human intervention, and which can lead the way towards a 'self-service environment' [10].

2.2 Proposed Information Systems (CIMCAT Human Resource Management and Automated Intelligence Dispatch Assistant)
2.2.1 Functionality
- A computer server dedicated to managing HRM System and database.
- QR/Bar code Scanner for checking employee's and tank truck data.
- A network router connected to the network and serves as first-line network security.
- HR staff computer is connected to the router for secured updates and security. The company used Microsoft Excel for recording and updating the data.
- Dispatch computer is connected to the network and database and used for checking data. This computer will be dedicated for easy to use by the drivers.

2.2.2 System Architecture
Learning the structures and elements of the system, interaction of the system and the proper way in which functionality is to be implemented. As shown in Figure 5 is the proposed system architecture of the company.
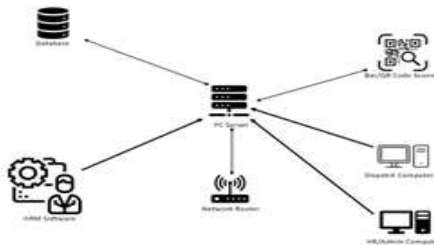

Figure 5: System Architecture

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- Use of Human Resource Management System for recording and updating the data of employees as well as the data of the tank truck.
- This system also has database use to store all data and information.
- The PC server serves as the central location of database, HRM and Ordering and Billing software
- Automation of searching and dispatching using the Bar/QR code Scanner.
- The network router will serve to connect the network and network security purposes.
- HR/Admin Computer gets the information updates from the pc server through network router. Also, it will check the if HR/Admin computer and Dispatch computer have the same information and checking the tank trucks expired documents.
- Dispatch Computer used to check information of the employee as well as tank truck information

2.2.3 Economic Feasibility

Table 3. Economic Feasibility of CIMCAT Trucking

Cost Description	Cost
Operational Cost	P 70,000.00
Development Cost	P 45,000.00
Maintenance Cost	P 32,000.00
Total Cost	P147,000.00

   Table 3 shows the cost of the of the proposed IT infrastructure and peopleware with its corresponding prices and session fees, respectively.

3. PROPOSED INFRASTRUCTURE
3.1 Proposed Computer Hardware
   Since the company have already 4 sets of computers and 2 printers, we proposed to upgrade the following:
- Memory – 8 GB RAM as the bare minimum for WINDOWS 10 and fine for workday productivity task and minimal multitasking.
- Upgrade of SDD – 500 GB is required for the business and sufficient working with huge amount of data, and file transfer and access time is faster.

Table 3. Proposed Computer Hardware

Computer Hardware	Specification	Unit Cost	QTY
Memory	RAM (8G DDR3 1600mhz)	P1,224.00	4
Storage	Seagate Fast SSD STCM500401 2.5 USB3.1 Type-C 500gb External SSD	P4,395.00	4
	Total Cost	P22,476. 00	

Table 4. Proposed Peripheral Hardware

Peripheral Hardware	Specification	Unit Cost	QTY
QR/Bar Code Scanner	Honeywell Granit 1280i Industrial, Full-Range Scanner	P4,500.00	1
Printer	Brother DCP-T710W	P0.00	
	Total Cost	P4,500.00	

QR/Bar Code Scanner

QR/Bar Code Scanner are optical devices that can read printed barcodes, decode the data, and send the information to a server. Honeywell QR Code Scanner is suggested since its versatile and flexible to use, cheaper price and widely use in retail, marketing communications, advertising, and other industries.

3.2 Proposed Operating System

Windows 10 Operating System is already installed in the 4 set of computers. This OS supports the human resource management software and order processing and billing software [11].

Table 5. Proposed Operating System

Operating System	Specification	Unit Cost
Windows 10	Application Ready	P 0.00
Total Cost		P 0.00

Table 5 shows the cost description of the proposed operating system platforms which are needed to implement the proposed information system.

3.3 Proposed Enterprise Software Application

Every business adapted the integration of enterprise software applications and important part of smart automation transformation. The best advantage of the enterprise software is that it improves efficiency of the business, better data workflow, data storage and simpler IT infrastructure.

Human Resource Management System

This system function as centralized employee records which provides database where all employee information is stored, updated, and maintained. Also, will generate reports and time efficient. The researcher suggested to avail the monthly subscription of HRMS which cost ₱ 1311.49.

Table 6. Proposed Enterprise Software Application

Enterprise Software	Specification	Unit Cost
Human Resource Management System	Centralized employee records, Track HR information, Generate complete reporting Employee scheduling and absence management User-friendly interface	P1,311.49/month
	Total Cost	P1,311.49/month

3.4 Proposed Data Management

Data management is a process such as storing, maintaining, organizing, and securing the information obtained in the business from the different sources and securely with utmost efficiency. The data management is included in the Human Resource Management System.

Table 7. Proposed Data Management

Data Management	Specification	Unit Cost
Human Resource Management System	Centralized employee records Track HR information, Generate complete compliance reporting Employee scheduling and absence management User-friendly interface	Included in the software bundle
Total Cost		P 0.00

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Table 7 shows the specification and cost for the proposed data management for the proposed CIMCAT Human Resource Management and Automated Intelligence Dispatch Assistant.

3.5 Proposed Network and Telecommunication

Network and Telecommunication plays vital role in a business. For businesses strong telecommunication infrastructure is important for business survival. Fast and reliable communication within organization and with customer is a critical part success of the business [12].

Internet connection has been installed and the business subscribed already the PLDT HOME 2499 plan as well as router and switch has been installed in the company. The researchers proposed for an additional unshielded twisted paired (UTP Cable) and will be used at the kiosk computer.

Table 8. Network and Telecommunication

Network and Telecommunication	Specification	Unit Cost
Unshielded twisted paired (UTP Cable)	Cat 6 Ethernet Cable 100 ft White [13]	P 987.48
Total Cost		P 987.48

3.6 Internet Platform

Internet platforms provides business with a range of benefits and opportunities. Business can maintain connections and support networks and access more information. With the advancement of technology, we have now the web-based application [14]. As advised by the company Operation heads for now, they will use the desktop application for human resource management and sales Order management for data security purposes.

3.7 IT Manpower

Table 9. IT Manpower

IT Manpower	Specification	Unit Cost
Software Developer	Build the desktop application and collaborate with data analyst.	P 45,000.00/month [14]
Data Analyst	Gather and interpret data to solve a specific problem and collaborate with the software developer.	P 39,700.00/month [14]
Information Technology (IT) Support	Provide the technical assistance and computer-related support in the business. To train the staff of the company using the desktop application and other IT related stuff.	P 18,000.00/month [14]
Total Cost		P 67,000.00/month

Table 10 shows the proposed IT workforce CIMCAT Trucking and its salary.

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3.8 Prototype

Figure 6: Prototype for CIMCAT Trucking

CIMCAT Automated Intelligence Dispatch Assistant

   This protype is the automated in searching and checking the information of the employee and tank trucks. It is connected to a network to operate, simply scan the QR code or enter manually the company ID and automatically reads and searches information and display it on the monitor.

4. CONCLUSION AND RECOMMENDATION

4.1 Conclusion

   CIMCAT Trucking Corporation is a petroleum hauling company in Southern Mindanao. The company operates almost eleven (11) years already. As the business grows, they must invest in Information Technology infrastructure so that the company will belong to the technology era.

   Based on the conducted study, company need to switch their business process from manual to automation to reduce cost and effort. The proposed system will improve the company in terms of human resource management and dispatching. This study also helps the operations head and organization understand the deployment of Human Resource technology is cost effective and efficient. This study had completed successful with the collaborative effort from the company.

4.2 Recommendation

This study is proposing recommendations below:

- With the advance of technology, the company must invest in Information Technology Infrastructure.
- Implementation of the proposed Information System Development and Technology Plan for the improvement of the business process.
- Must replace the traditional process to automatization to their operation
- Also consider the implementation of web-based technology and cloud computing.

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