Small Business Mobile App: An Analytical Approach for Car Spare Parts

Osman A.Nasr, Abd Almajeed Alajab, Khalid Mohiuddin, Faiz Bin Zafrah, Ahmed A.Ahmed

*Abstract***:** *The project entitled "Car Spare Parts Shopping Application" enables customer to buy car spare parts using mobile application. This application advertises a collection of branded and high-quality car spare parts available for shopping. For shopping, the intended customers must have an authentication. The customers with authentication will avail the entire benefits offer on the application. Customers who do not have the authentication credentials, such customers can access the application and view the products details and services for the customers. Necessary, a user must have an account to become a customer, meanwhile the intended customer can shop the items and place in the available shopping cart. Importantly, the application facilitates the users or customers with billing details and tracks the customers' orders with successful shipment acknowledgement.*

*Keywords***:** *Mobile App, Car Spare parts, Performance Evaluation, Small Business.*

I. INTRODUCTION

E-commerce is poised to become one of the most important channels in the automotive market and spare-parts industry. In fact, android-based online shopping applications are growing by double digits while brick and mortar channels are relatively flat. Generally, the vehicle owners keep their vehicle for longer duration depending upon their liking and preferences [1]. A study reports that the car owners maintain their car averagely more than 11 years. This encourages spare-parts business and opens several opportunities to all the stakeholders involve in the spare-part industries [2]. Precisely, with the growing of online shopping, all the stakeholders find an emerging technology-based platform to facilitate their spare-parts related activities. It enables an easy to access platform for both automotive parts owners and vehicle owners [3].

Osman A.Nasr*, Management Information Systems Department College of Business, King Khalid University, Abha, Saudi Arabia. Email: oanassr@kku.edu.sa

Abd Almajeed Alajab, Management Information Systems Department College of Business, King Khalid University, Abha, Saudi Arabia. Email: Email: alajab@kku.edu.sa

Khalid Mohiuddin, Management Information Systems Department College of Business, King Khalid University, Abha, Saudi Arabia. Email: kalden@kku.edu.sa

Faiz Bin Zafrah, Business Administration Department College of Business, King Khalid University, Abha, Saudi Arabia. Email: fzafrah@kku.edu.sa

Ahmed A.Ahmed, Management Information Systems Department College of Business, King Khalid University, Abha, Saudi Arabia. Email: aabdelmotlab@kku.edu.sa

With the rapid growth of e-commerce in the automotive industry and aftermarket, it experience a sizeable increase in customer shopping, behaviors and their preferences. Importantly, the business stakeholders get the customer particulars, behavior, preferences by monitoring shoppers' online navigational activities. The tracking of customers' activities help retailers to understand customers' preferences and priorities. Based on the customer navigation history, the business stakeholders make strategies to retain the customers and improve the business performance[4-6].

II. LITERATURE REVIEW

Car spare parts are omnipresent in the modern world. They contribute a major role in business, specifically vehicle maintenance and repairs. Car spare parts must provide frequently in after-sale services. The spare-parts' customers are optimistic in terms of availability and the quality of service. Among them, the most important are short-term orders realization and flexible services. The main aim of the paper is to consider two different distribution systems that occur at one entrepreneur's window. The reason of this consideration is to identify which of the distribution systems is more effective in context to the order completion time and which one is more effective regarding the level of customer service satisfaction. To achieve these objectives[7-9].

The study used the designed spare parts system management module, and proposed a development model based on B/S architecture. The system is based on MVC framework, used AJAX pages, business data, and a series of advanced tools available for the spare-parts management. The system design mainly uses high-performance UNIX system database server, a set of easy to maintain Windows Server2003 system as an application server, middleware using open source Tomcat, the Oracle database, ensure the system's high availability and high cost. The function module is based on B/S model include: procurement module, inventory management module, allocation management module, quota management module statistics query module, module-based information management, system maintenance module, and the message announcement system. The spare-parts management system and the advantages are analyzed to prove that the system is capable of successful application [10-12].

III. METHODOLOGY

In this section, the current study defines the methodology or the procedures that will apply in order to meet the main goals and to accomplish all the objectives. The study's approach considers the Agile Methodology for developing the proposed systems [13,14].

Agile methodology is one of the most practicing one that promotes continuous iteration of development and testing throughout the software development lifecycle on a project. Importantly, both activities, development and testing are concurrent unlike the Waterfall model [15].

For agile testing, extreme programming (XP) is used, since this technique is very helpful when there is constantly changing demands or requirements from the customers or when they are not sure about the functionality of the system. It advocates frequent releases of the product in short development cycles, which inherently improves the productivity of the system. It also introduces a checkpoint where any customer requirements can easily implemented. During the software design, the major focus was the customers' requirements, accessibility, and easy access to environment [16,17] .

Fig. 1. Extreme Programming (XP)

IV. ANALYSIS

This section identifies the problem and analyze the problem in context possible solution in context to the study's problem. Further, based on the problem analysis, the approach suggests possible solutions and suggests recommendations for the improvement of the overall system performance. The designing phase precisely considers the functional and non-functional requirements, which achieve the main purpose of the project. Such requirements push the developers to consider all the features and procedures to develop the proposed system.

A. Problem Analysis

Most of the practicing methods are manual and the other technology-based methods have many concerns for the improvements. The current system for shopping is to visit the shop manually and from the available product choose the item customer want and buying the item by payment of the price of the item. Some of the limitations are as follows:

- It is less user-friendly.
- User must go to shop and select products.
- It is difficult to identify the required product.
- Description of the product limited.
- It is a time-consuming process.
- Not in reach of distant users.

B. Analysis objectives

- To develop and design mobile application for brand car spare parts.
- To provide better services to customer.

- To helps customer to find different brands spare parts for their cars easily.
- To enable customer to view all the updates of the spare parts from any place through online.
- To provide quick and easy comparison of different products for the customers.
- To save customer time and money
- To reach the products to the customer's address with great care.

C. Analysis Diagrams

Use cases specify the expected behavior (what), and not the exact method of making it happen (how). The figure shows two types of users:

- System Administrator (who will manage all application data, products and orders from customers)
- System Customer (who will browse the application to order the available products).

The analysis phase further includes the static structure diagram that shows the various activities of the system by using the diagrams the system's classes, their attributes, operations (or methods), and the relationships among objects. Figures 2 and 3 illustrate the use-case diagram and class diagram, both the diagrams consider all the essential and non-essential requirements of the proposed system.
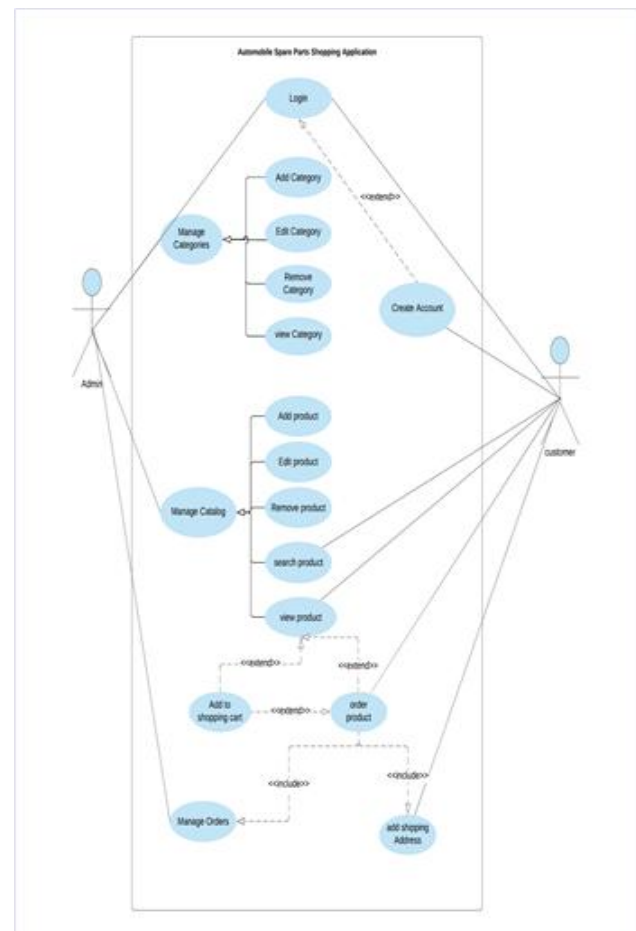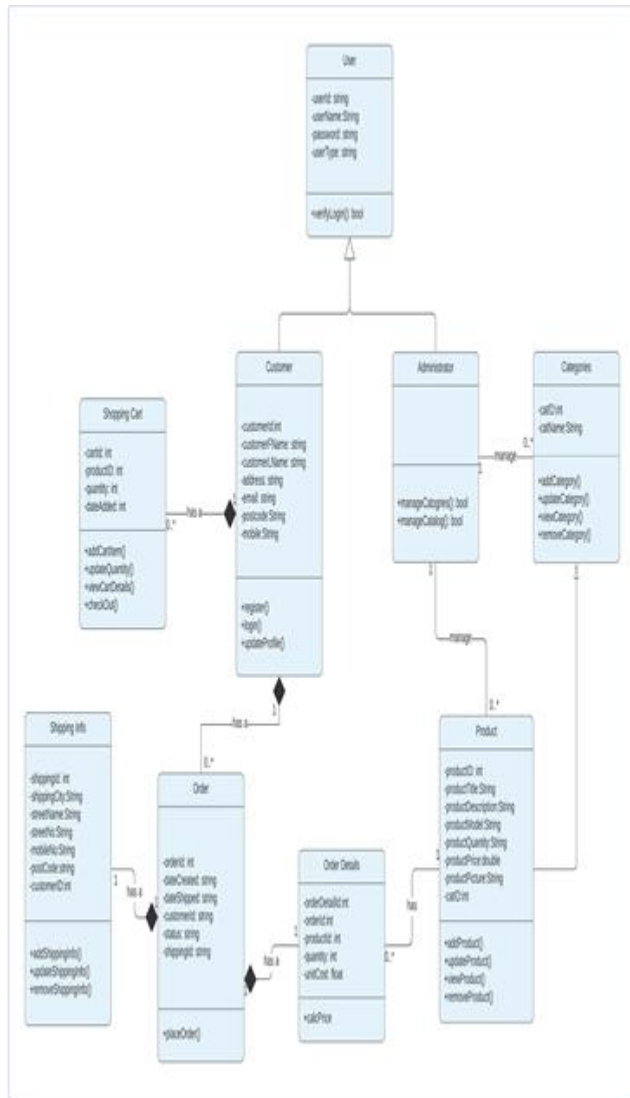

Fig. 2. Use case Diagram

Fig. 3. Class Diagram

V. GUI DESIGN

Create Account Screen this screen allows both vendors and customer to create their own account on the system. Users must input unique email address and password, then the system redirect user to profile page based on user account type.
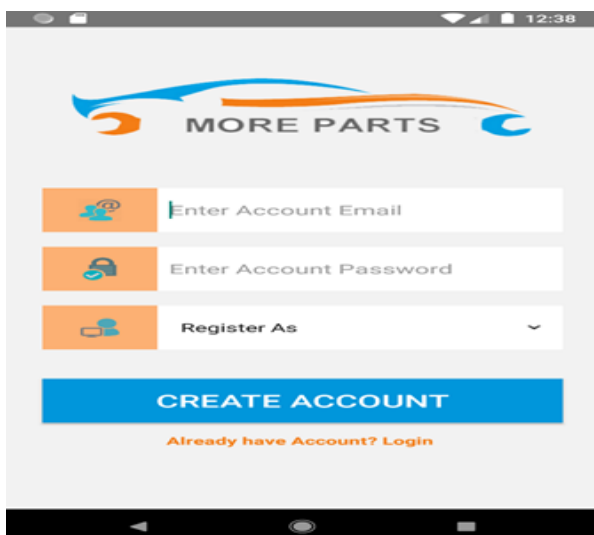

Fig. 4. Create Account

Figure 5 shows admin dashboard screen that allow admin to control the application data and manage all its operation.
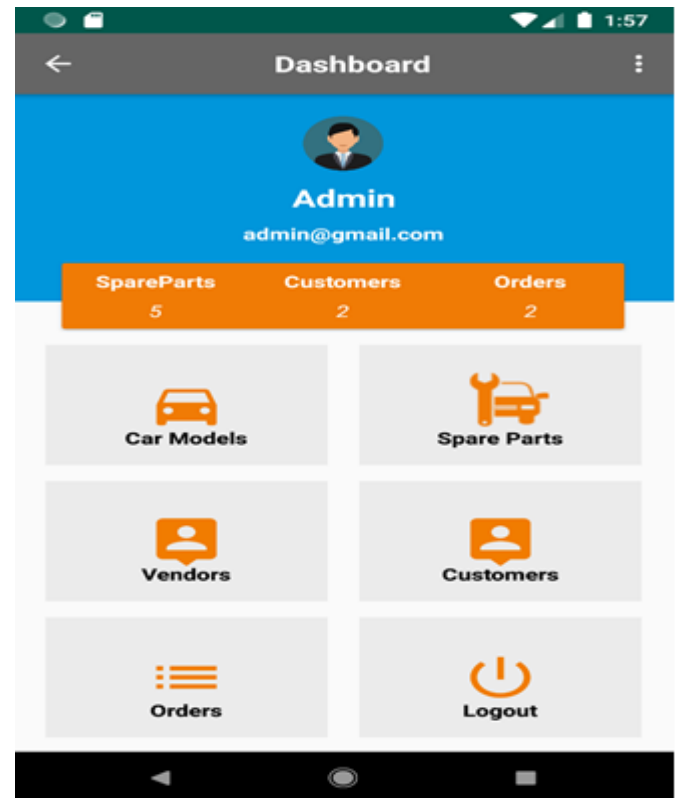

Fig. 5. Admin Dashboard

Figure 6 show Manage Car models Screen: that allow admin to manage car models include add model, edit and remove model.
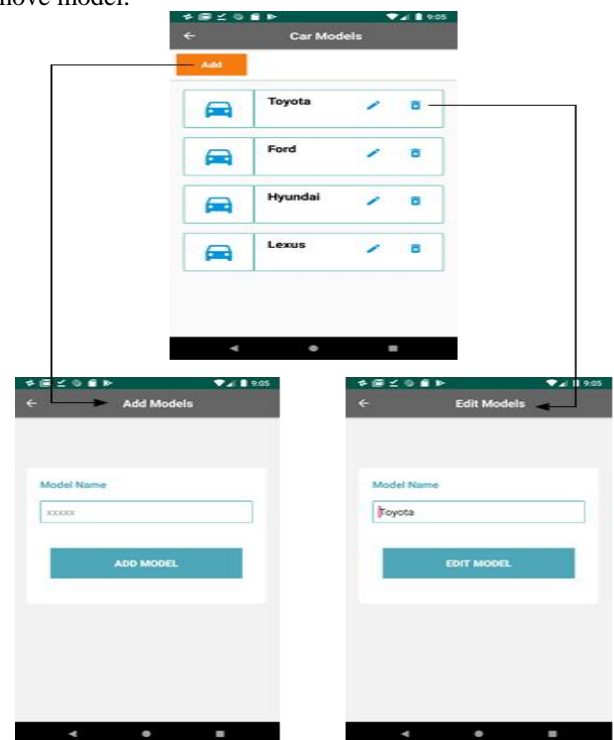

Fig. 6. Manage Cars

Figure 7 shows screen to manage Spare Parts Screen: that allow admin to manage view the list of spare part being sold on the app.
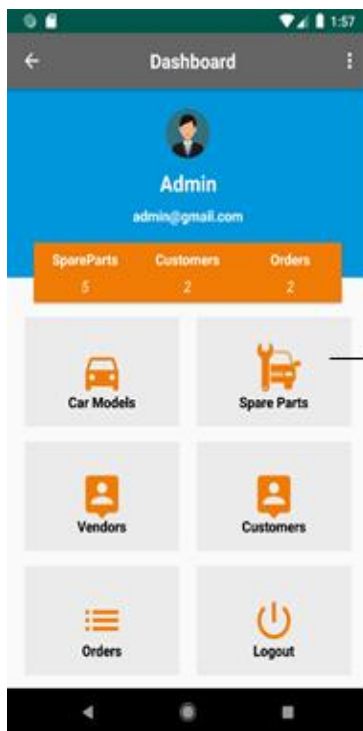

Fig. 7. Manage Spare Parts

Figure 8 shows screen to view a spare Part Detailed Information Screen: that interface displayed detailed information related to selected spare part.
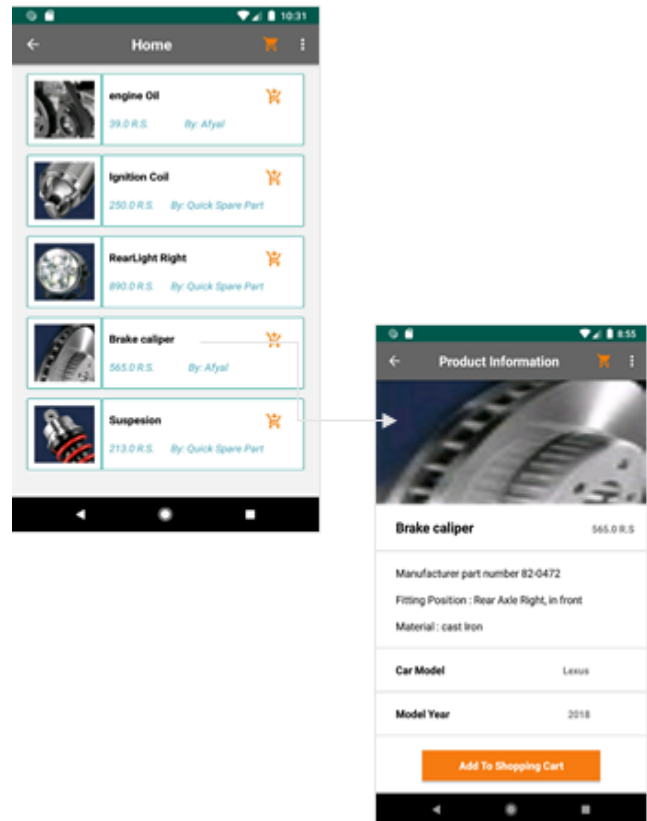

Fig. 8. Spare Part Detailed Information Screen

Figure 9 shows screenshot to shopping cart that interface displayed items added by the customer into his shopping cart.
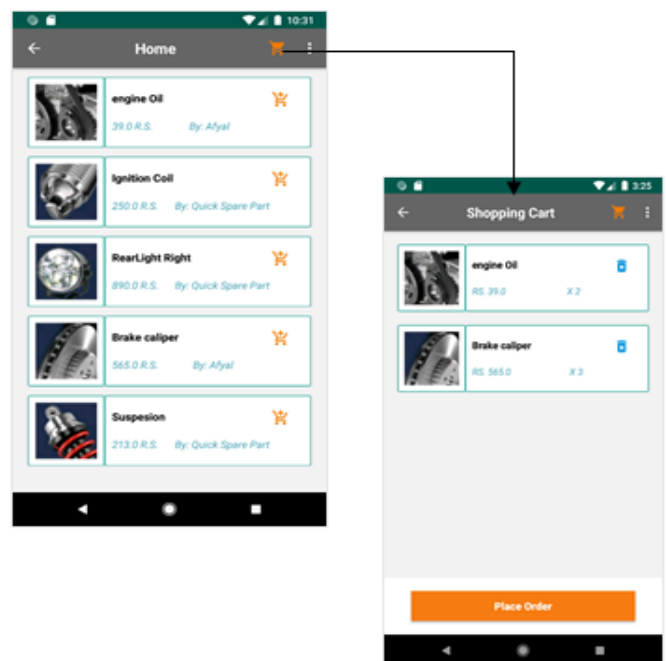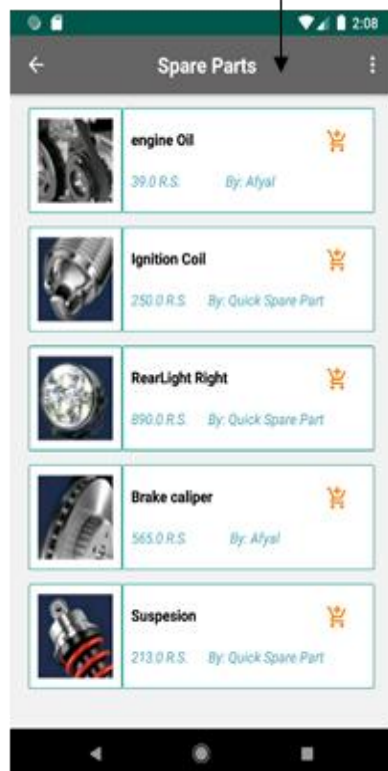

Fig. 9. Shopping Cart

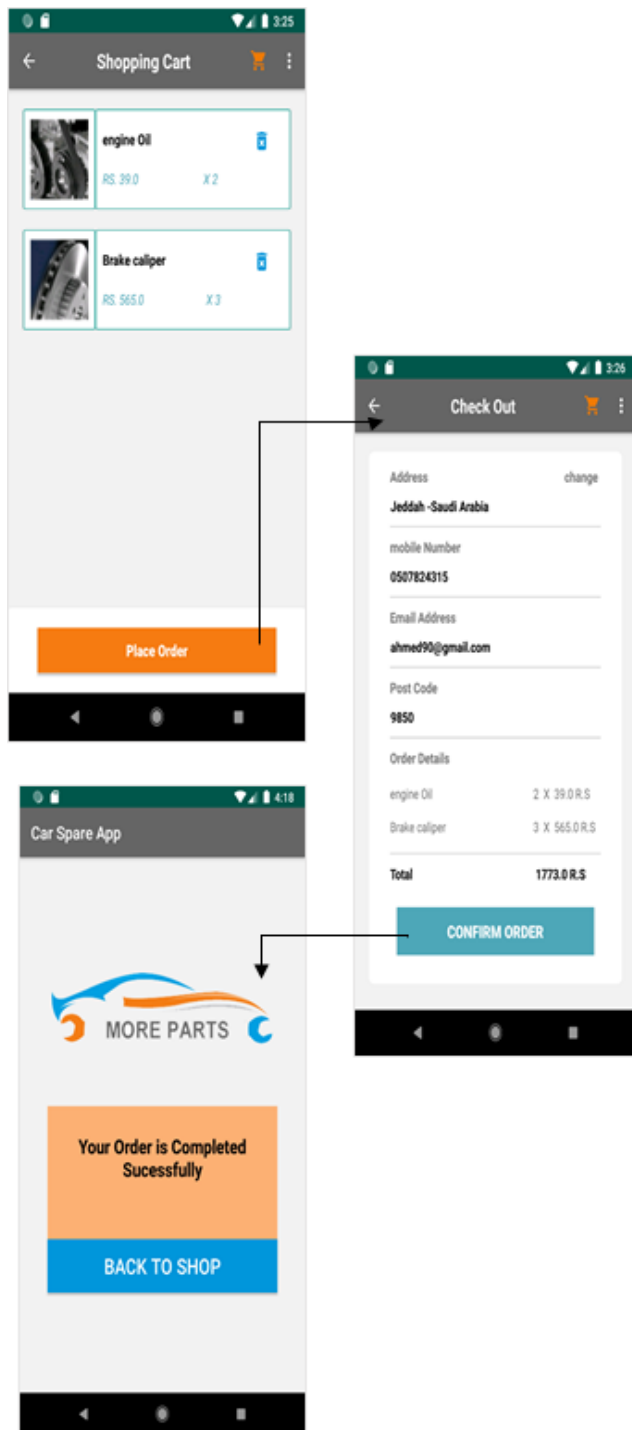Figure 10 shows screen to place order that interface displayed items ordered by customer and shipping address details.

64

Fig.10. Place Order

VI. CONCLUSION

The proposed small Business Mobile App is an efficient tool that assures quality, efficiency, accuracy, and most importantly ease of use. We have developed this app considering every aspect of Application to Car Spare Parts Shopping. We received feedback from customers and dealers that has been used this app and their responses were very encouraging as this app overcomes most of their concerns with accuracy.

ACKNOWLEDGEMENTS

REFERENCES

1. Charan, P. (2012), "Supply chain performance issues in an automobile company: a SAP-LAP analysis", Measuring Business Excellence, Vol. 16 No. 1, pp. 67-86. https://doi.org/10.1108/13683041211204680
2. Kapoor, V. and Ellinger, A.E. (2004), ''Transforming supply chain operations in response to economic reform: the case of a motorcycle manufacturer in India'', Supply Chain Management: An International Journal, Vol. 9 No. 1, pp. 16-22.
3. Buyukkaramikli, N. C., Van Ooijen, H. P., & Bertrand, J. W. M. (2015). Integrating inventory control and capacity management at a maintenance service provider. Annals of Operations Research, 231(1), 185-206.
4. Mohammaditabar, D., Ghodsypour, S. H., & O'Brien, C. (2012). Inventory control system design by integrating inventory classification and policy selection. International Journal of Production Economics, 140(2), 655-659.
5. Persson, F., & Saccani, N. (2007). Managing the After Sales Logistic Network–A Simulation Study of a Spare Parts Supply Chain. Advances in Production Management Systems, Springer.
6. Pourakbar, M., Frenk, J. B. G., & Dekker, R. (2012). End-of-Life Inventory Decisions for Consumer Electronics Service Parts. Production and Operations Management, 21(5), 889-906.
7. Oumaima Bounou, Abdellah El Barkany, Ahmed El Biyaali, "Performance Indicators for Spare Parts and Maintenance Management: An Analytical Study", Journal of Engineering, vol. 2020, Article ID 2950789, 22 pages, 2020. https://doi.org/10.1155/2020/2950789
8. P. J. Siddique, H. T. Luong, and M. Shafiq, "An optimal joint maintenance and spare parts inventory model," International Journal of Industrial and Systems Engineering, vol. 29, no. 2, pp. 177–192, 2018.
9. O. Bounou, A. El Barkany, and A. El Biyaali, "Inventory models for spare parts management: a review," International Journal of Engineering Research in Africa, vol. 28, pp. 182–198, 2017.
10. N. MohdNoor, N. Z. Zaibidi, and Z. Hanafi, "An integration model of planned maintenance and spare parts inventory for periodic order policy," International Journal of Supply Chain Management, vol. 7, no. 1, pp. 144–148, 2018.
11. Achetoui, Z., Mabrouki, C., & Mousrij, A. (2019). Performance Measurement System for Automotive Spare Parts Supply Chain: A Categorization Approach. Journal of Transportation and Logistics, 4(1), 31-50. doi: 10.26650/JTL.2018.04.01.03
12. Yi L, Li H T, Peng J. Longyuan Spare Parts Management System Development[C]//Applied Mechanics and Materials. 2014, V529: 686-
13. Dennis WR. Systems analysis & design. 5th edn. John Wiley & Sons: United States of America. 2012; 592. https://dl.acm.org/doi/book/10.5555/2544011.
14. Object oriented analysis & design. O'Reilly Media: United States of America. https://www.tutorialspoint.com/object_oriented_analysis_design/index.htm. Date accessed: 2007.
15. Shelly GB, Rosenblatt HJ. Systems analysis and design. 8th edn. Course Technology: Boston. United States of America. 27. Atlanta, GA, USA, ACM Press. 2010; 115–122. https://epdf.pub/systems-analysis-and-design-shelly-cashman-series.html.
16. Mohammed Alghobiri, Osman A.Nasr, An Assistive Examination Processing System Based on Course Objectives Using a Binary Approach Algorithm, Indian Journal of Science and Technology, 13(10):1135-1147, DOI: https://doi.org/10.17485/ijst/2020/v13i10/149653 , 2020
17. Osman A.Nasr, mohammed A, Ahmed A, Fath Alrahamn T, Design and Implementation an Online System for Course Files Management by using WEBML Methodology: A Higher Education Perspective (King Khalid University), International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-8 Issue-6, 1969-1972, DOI: https://doi.org/10.35940/ijrte.F8051.038620 , 2020.

AUTHORS PROFILE

Osman A.Nasr, currently working as an Assistant Professor at the College of Business, King Khalid University in the Kingdom of Saudi Arabia. His research interests includes Data mining, System analysis and design, web based systems.

Abd Almajeed Alajab, currently working as an Assistant Professor at the College of Business, King Khalid University in the Kingdom of Saudi Arabia. His research interests includes accounting information systems.

Khalid Mohiuddin, currently working as an associate Professor at the College of Business, King Khalid University in the Kingdom of Saudi Arabia. His research interests includes Data Mining, Data Analysis, cloud computing.

Faiz Bin Zafrah, currently working as an Assistant Professor at the College of Business, King Khalid University in the Kingdom of Saudi Arabia. His research interests includes Human Recourses Management, Quality Management.

Ahmed Abd elmotlab Ahmed, received Ph.D. degree in 2010. He is currently working as an Assistant Professor at the College of Business, King Khalid University in the Kingdom of Saudi Arabia. His research interests includes Data Mining, Data Analysis.

66