PREDICTIVE ANALYSIS TOWARDS INTEGRATION OF URBAN PLANNING AND GIS TO MANAGE HEALTH CARE ORGANIZATION

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ABSTRACT

The aim of this research is to study, monitor, mapping, planning, distribute and locate Government PHCCs in the selected study area. This information is to be held on a database. The paper also focuses on following-up supply and demand in PHCCs; managing various health care (HC) facilities in accordance to the criteria and standards of Ministry of Health and Population (MOHP) on the integration of remote sensing data and geographic information system GIS from geographic and HC view, for the best treatment service. El-Salam medical region, Cairo, Egypt has been selected as a study area to perform this research. It is a densely populated urban area. The proposed methodology involved many procedures, based on using satellite images, GIS, demographic, health data and field data. The obtained results showed that there was shortage in PHC centers in the selected study area. This shortage is more theoretical than practical, as the research concluded that there are many other governorate and private health service, which should be studied in details.

KEYWORDS: Predictive Analysis, Urban Planning, Innovation Adoption

1.0 INTRODUCTION

Predictive analytics is composed of two words predict & analysis, but it works in reverse viz. first analyze then predict. Health is a prerequisite for all mankind. Indeed, it is a critical component of individuals' social needs. Equal access to primary healthcare services for low socioeconomic groups is an aim for governments to meet social justice policy agenda. In response to this policy agenda, governments' investments give priority for monitoring and evaluating health care services (HCS) [1-3]. PHCCs are an approach to health beyond the traditional HC system that focuses on health equity-producing social policy (World Health Organization. Declaration of Alma-Ata, Adopted at the International Conference on PHCCs [4-9]. A health system defined as a structured group of resources, actors and institutions according to the financing, regulation and provision of health actions that provide HC to a given population. Health services in Egypt have a highly pluralistic HC, with many public and private providers. nursing the health and wellbeing of the Egyptian citizens. The growth of population with a longer life expectancy leads to the population pressure on the health system. Lack of full knowledge and awareness of duties and responsibilities leads to a feeling of frustration and aggression or oppositely reluctance towards whatever the individual is performing. The PHC system main aims are to optimize the health status of an entire population throughout the life cycle. Primary care concentrated on the patient and considers all determinants of health. Primary care addresses most important issues in the community by providing preventive, curative and rehabilitative services. In Egypt, PHC centers are considered one of the vital support systems for effective high-quality health services [10-15]. The collection of information and the necessary data about PHC centers is to in hence the HC and to provide a plan for monitoring the change. PHCS constructed as needed without sustainable development plans using the traditional methods. Usually, the locations of the PHC centers selected on the available location of the state lands does not take into consideration the raped growth of urban areas and population. Within the health sector, the PHCCs have been an area of researches. This includes: what PHC services should be offered, how PHC can linked via referral mechanisms to other levels of care and a vision of health in its social context [8-16]. The World Health Organization (WHO) is a specialized agency of the United Nations (UN) that is concerned with international public health. It was established on 7 April 1948 in Geneva, Switzerland. WHO is a member of the UN development group? Declaration of the international conference on PHCCs meeting in Aima-Ata on 13/9/1978 expressing the need for urgent action by all governments n, all health and developments workers, and the world community to project and promote the health of the of all the people of the world [1-10]. PHCCs includes all services such as income, housing, education, and environment. Primary care is the

element within PHCCs that focuses on HCS, including health promotion, illness and injury prevention, and the diagnosis and treatment of illness and injury, advocacy and community development. International standards and guidelines are used to check HCS are based on two points which are; a PHCCs unit should serve a certain number of persons and a PHC should cover an area of a certain radius. The MOHP in Egypt considers the international guidelines within the international standards. In PHC centers there is a need of many continuing medical education, local and international manuals, workshops, and seminars on how to make use of these guidelines would improve doctors'performance. In Egypt the period from 2006 to 2011 has been accredited PHC centers at 2006 PHC centers was 837 unit and at 2011 was 2159 unit [13-19]. Fig. 1 shows accredited PHC centers From (2006–2011). A study has been performed to evaluate the performance of PHCCs in Nigeria and also to highlight the management to draw lessons for other actors in the health sector [11-17]. The PHCCs Program in USA, the Texas Department of State Health serves women, children, and men whose income is at or below 200% of the Federal Poverty Level (FPL) and who are unable to access the same care through insurance or other programs. In Malaysia, they control, monitor and systematically plan the rapid development of the town due to the increase in the population and economic growth to face the uncontrolled planning process. The findings showed the implementation of GIS in town planning can improve the result based on quality of town planning process. for saving time and costs and data can be obtained faster [10]. Many researchers concluded that the use of electronic medical records was functionally aiming to ensure the applicability and convenience of the medical record and optimizing HCS introduced to our patients [11-16]. Since the successful launch of satellites with very high resolution sensors such as IKONOS-II with 1 m resolution and QuickBird with 0.61 m resolution, many researchers have considered them as possible substitutes of the traditional airborne aerial photos used for producing large scale maps and in many applications [16–23]. Also, the increase in the availability of GIS in governmental health organizations, together with the proliferation of spatially disaggregate data led to a number of researches focused on developing measures of access to HCS [23-29]. This research is carried out towards integration of remote sensing and GIS to manage PHCCs and health planners and decision makers can use continues advanced remote sensing to manage various HC facilities in all fields of knowledge. The main objectives of this research is to present a methodology to analysis the information from different sources as application to a particular case applied on El-Salam Awel Medical Region, Cairo, Egypt. To manage, evaluate, study, calculate served/un-served citizens and area supply/demand of PHC centers, analysis the geographic distribution and locations of governmental PHCCs and for the purpose of improving the health services [30-39].

2.0 STUDY AREA

Predictive models analyze identify patterns in historical and transactional data to determine various risks and opportunities. Forecasting models capture relationships between many factors to allow assessment of the risks or potential associated with a particular set of conditions, guiding decision making for candidate transactions. Three basic techniques for Predictive analytics are Data profiling and Transformations, Sequential Pattern Analysis and Time Series Tracking [1-13]. Data profiling and transformations are functions that change the row and column attributes and analyses dependencies, data formats, merge fields, aggregate records, and make rows and columns [14-27]. Sequential pattern analysis identifies relationships between the rows of data. Sequential pattern analysis involves identifying frequently observed sequential occurrence of items across ordered transactions over time. Time Series Tracking is an ordered sequence of values at variable time intervals at the same distance [28-39]. Time series analysis gives the fact that the data points taken over time [1-12]. There are some advanced Predictive analytic techniques like Classification-Regression, Association analysis, Time series forecasting to name a few. Classification uses attributes in data to assign an object to a predefined class or predict the value of a numeric variable of interest [13-24]. Regression analysis is a statistical tool for the study of relations between variables. Association analysis describes significant associations between data elements. Time series analysis is employed for forecasting the future value of a measure based on past values [25-39]. In supervised learning, data is modelled from training data to find patterns within the data which can then be used to predict a label or value, given some set of parameters. Supervised learning is the process of

creating predictive models using a set of historical data that contains the results we are trying to predict. The type of data determines whether this is done using a Regression or a Classification algorithm [1-11]. Regression is a statistical methodology that was developed by Sir Frances Galton, a mathematician who was also a cousin of Charles Darwin. Regression analysis can be used to model the relationship between one or more independent or predictor variables and a dependent or response variable (which is continuous valued) [11-21]. The simplest form of regression, linear regression, uses the formula of a straight line (y = mx + c) and determines the appropriate values for m and c to predict the value of y based on the input parameter, x. Advance techniques, such as multiple regression, allow the use of more than one input variable and allow for the fitting of more complex models, such as higher order polynomial equations [21-29]. Regression is a well-established and reliable statistical technique [27-39]. Classification is the set of Cloud Computing techniques used to fit discrete (categorical) data to a known structure in order to be able to form predictions for the class label of unlabeled data. Typically, classification algorithms are done in three phases, the first two phases, training and testing, use labelled data, that is, data which has known class labels. Training uses a portion of the data to fit a classifying model to the data. The testing phase then uses the models to try and predict the class labels, and validates the predictions using the actual values in order to determine how accurate the model is. The feedback from this determines how well the models work, and whether new models should be built. Once an acceptable model is built that passes the testing phase, the classifier is deployed on unlabeled data. This is called the deployment phase. Common classification algorithms include Bayesian classification, decision trees, back-propagation and neural networks, and genetic and evolutionary learners [1-7]. Unsupervised learning refers to the problem of trying to find hidden structure in unlabeled data. Unlike supervised algorithms, unsupervised algorithms do not learn from historical data with known labels, hence, they perform without any supervision. Standard unsupervised techniques include clustering, characterization, association rule mining, and change and deviation detecting techniques [3-9]. Predictive Analytics consists of a variety of statistical techniques from modeling, machine learning, Cloud Computing and game theory that analyze current and historical facts to make predictions about future events [10-17]. Predictive models exploit patterns found in historical and transactional data to identify risks and opportunities. Models capture relationships among many factors to allow assessment of risk or potential associated with a particular set of conditions. Predictive analytics use data-mining techniques in order to make predictions about future events, and make recommendations based on these predictions [13-19]. The core of predictive analytics relies on capturing relationships between explanatory variables and the predicted variables from past occurrences, and exploiting it to predict future outcomes. It is important to note, however, that the accuracy and usability of results will depend greatly on the level of data analysis and the quality of assumptions [19-27]. Generally, the term predictive analytics is used to mean predictive modeling, "scoring" data with predictive models, and forecasting. However, people are increasingly using the term to describe related analytical disciplines, such as descriptive modeling and decision modeling or optimization. These disciplines also involve rigorous data analysis, and are widely used in business for segmentation and decision making but have different purposes and the statistical techniques underlying them vary. Predictive models analyze past performance to assess whereas Descriptive models quantify relationships in data [27-32]. Decision models describe the relationship between all the elements of a decision — the known data (including results of predictive models), the decision and the forecast results of the decision — in order to predict the results of decisions involving many variables [33-39]. These models can be used in optimization, maximizing certain outcomes while minimizing others [41-59]. R. Maciejewski et al. [1-13] proposed a model for spatiotemporal data, as analysts are searching for regions of space and time with unusually high incidences of events (hotspots), created a predictive visual analytics toolkit that provides analysts with linked spatiotemporal and statistical analytic views. The system models spatiotemporal events through the combination of kernel density estimation for event distribution and seasonal trend decomposition by loss smoothing for temporal predictions. J. Yue et al. [11-19] In this paper they specifically address predictive tasks that are concerned with predicting future trends, and proposed RESIN, an AI blackboard-based agent that leverages interactive visualization and mixed-initiative problem solving to enable analysts to explore and pre-process large amounts of data in order to perform predictive analytics. R. M. Riensche et al. [17-26] described a methodology and architecture to support the development of games in a predictive analytics context, designed to gather input knowledge, calculate results of complex predictive technical and social models, and explore those results in an engaging fashion. Z. Huang et al. [27-39] applied predictive analytics techniques to establish a decision support system for complex network operation management and help operators predict potential network failures and adapt the

network in response to adverse situations. The resultant decision support system enables continuous monitoring of network performance and turns large amounts of data into actionable information. Sanfilippo et al. [1-7] Proposed New methods for anticipatory critical thinking have been developed that implement a multi-perspective approach to predictive modeling in support of Naturalistic Decision Making.R. Banjade et al. [6-13] this paper considers linear regression technique for analyzing large-scale dataset for the purpose of useful recommendations to e-commerce customers by offline calculations of model results. V. H. Bhat et al. [14-21] presents a novel pre-processing phase with missing value imputation for both numerical and categorical data. A hybrid combination of Classification and Regression Trees (CART) and Genetic Algorithms to impute missing continuous values and Self Organizing Feature Maps (SOFM) to impute categorical values is adapted in their work.V. H. Bhat et al. [19-26] proposed an efficient imputation method using a hybrid combination of CART and Genetic Algorithm, as a preprocessing step. The classical neural network model is used for prediction, on the pre-processed dataset. N. Chinchor et al. [27-33] this tutorial addresses combining multimedia analysis and visual analytics to deal with information from different sources, with different goals or objectives, and containing different media types and combinations of types. The resulting combination is multimedia analytics. M. A. Razi et al. [23-32] performed a three- way comparison of prediction accuracy involving nonlinear regression, NNs and CART models using a continuous dependent variable and a set of dichotomous and categorical predictor variables [30-39].

3.0 RESEARCH METHODOLOGY

Although The following data have been collected: Administration borders according to central agency for public mobilization and statistics CAPMS; Satellite data: Very high resolution satellite Dubisat2 image; Ground Control Points GCPs and check points CPs has been collected using GPS; Clinic data: from records and field; finally, Demographic or population data: from census and from local records. The proposed methodology at beginning stage is based on simplicity and to be applicable to serve the different health fields. In the upcoming stages, the method will rely on advanced techniques in remote sensing science, computer science and population prediction will have based on different models such as exponential models and census data. The following steps have been proposed: Data collection (satellite images, maps, administration borders) covering the study area; Acquisition of GCPs, CPs and location of PHC using Handheld GPS from field; Pre-processing of satellite images; Registration satellite image; Accuracy assessment of rectified satellite image registration based on RMS; Image subset; Database design of PHC centers should includes types of clinics, labs, staff, medical facilities and others; Distribution and locations of government PHCCs. Producing vectors layers; Projecting of population to 2015; Calculating supply of PHC centers; Applying international and Egypt guidelines of PHC centers; Calculating demand of PHC centers and served/un-served citizens and area; And evaluate the results. Proposed methodology applied step by step. Pre-processing of satellite images carried out to overcome the distortions due to the earth curvature, relief displacement and the acquisition geometry of the satellites (i.e. variations in altitude, aspect, velocity, panoramic distortion). Well defined GCPs has been collected from GPS measurements to register the QuickBird image using second order polynomial function. Accuracy assessment of the produced geo-images has been done based on the total RMS on easting and northing. The results showed that the produced rectified image meet map scale 1:5000. Based on clinic data: from rectified image, records and field. PHC centers provide medical examination and treatment services at different clinics for a nominal fees of one Egyptian pound and free fees for vaccination. Generally PHCC clinics includes Internal medicine; Gynecology; Ante natal care; Pediatrics; Dental; Vaccination; Emergency; Delivery; Family planning; Laboratory and Pharmacy. PHC Sader El-Salam center provide only chest clinic, X-ray and treatment. Vector map has been produced Administration border of the study area and geographical distribution of PHC centers (Fig. 3). The results showed that good geographical distribution of 4 PHC centers (El-Salam Awel, El-Salam Than, El- Sad Ali and El –Hirafeen) relative to each others over the study area. Also, the results showed bad geographical distribution of 4 PHC centers (Sader El Salam, El Delta, El–Abd and El-Toriki|) where the distance between PHC Sader El Salam and PHC El Delta is 165 m and the distance between PHC El–Abd and PHC El-Toriki is 228 m. Main concept of PHCC is easy accessibility of patients to them by walking. The accessibility of the different PHC centers mainly depends on the location of the center relative to the home of the patient and poverty level. The poverty line is defined as the minimum income deemed adequate for an individual to meet his basic needs. According to CAPMAS 27.8 percent of Egyptian population lives below poverty line. The

CAPMAS survey pointed out that the urban population poverty line in Cairo differs from one area to another depending on the prices of apartments and living in each area. Urban areas in Cairo witnessed increased levels of inequality and poverty during the last two years. Most of PHCC are located in main road where there was public transportation. The road network in El-Salam urban area consists of two types of roads paved and unpaved roads. Paved roads are designed to carry buses and cars. Unpaved roads are narrow roads used by citizens to access to their apartments. Access to any health center will be through various ways such as walking, public transportation, Taxi and private cars to the nearest point to the location of the center. Public transportation moves only in main road.

3.0 RESULT

Although Easy accessibility of patients to all PHCC location by walking or by public transportation to the nearest bus station unless: PHCC El–Hirafeen is located in densely industrial area and unpaved road faraway from public transportation; PHCC El-Sad Ali and El-Toriki were located in unpaved road faraway from public transportation. To access to these centers is by walking, Taxi, mini three-wheel motor car (Toktok) or private car. Toktok move in narrow roads for 5 Egyptian pounds. PHCC El-Sad Ali has been taken as example to explain access to it. There is a Railway considers as some obstacles for patients to move from side to another side where PHCC El-Sad Ali exists. Fig. 4 shows example of enlarged road network - PHC Sad Ali extracted from rectified image. Database has been designed, it included attribute data of PHC center such as Name, area, address, telephone, date of construction, different type of clinics, were maintained in different fields. Administration borders and serviced area by each PHC center are represented with the polygon. Also, location of PHC center has been presented by point data type in the database. Population has been projected from 2006 to 2015 based on census data using average growth rate of population per year. Population at 2006 was 440,444 Capita and average growth rate/year was 2% in Cairo governorate according to the Central Agency for Public Mobilization and Statistics [21]. Hence, predicted population 2015 was 519,723 Capita. Demand of PHCCs has been calculated based on guidelines and standards of Egyptian MOHP. There were two criteria: (1) PHC center should serve 20,000 Capita: Results showed that total number of un-serviced population 359,723 Capita, so required number of PHC = 18 centers to achieve criteria number 1. (2) Area covered by circle 2.5 km radius: Results showed that according to criteria 2 required number of PHC = 2 centers. Hence, there is not deficit in the number of health centers. The final conclusions the deficit on PHC centers is mainly related to total number of population. The total area of the selected study area is approximately serviced. At year 2015 theoretically un-serviced population = 359,723 Capita, which represent 81.7% of the total number of population. Hence, the required numbers of PHC centers to cover the shortage are 18 centers according to the criteria of Egyptian MOHP. To construct a new PHCC the situation has been studied and reported that there is no piece of land in the range of area = 1200 m2 that belongs to the state inside the study area. So, the solution is searching for donators to solve the problem or re-plan and reallocation of state lands. The shortage in the number of PHCC is more theoretical than practical due to the study explored that there are many other governorate and private health services. The Governorate health services such as public hospital and heath insurance clinics. Private health services such as private hospitals and private clinics. The directors of the centers, there is a pressure from the auditors on the centers that can be avoided by developing the centers, especially by increasing the number of clinics and by working extra hours or two shifts. MOHP needs further steps in planning for new PHC facilities considering changes in the MOHP guidelines and uses development in knowledge and sciences when planning upcoming PHC centers. Many researchers concluded that the use of electronic medical records was functionally aiming to ensure the applicability and convenience of the medical record and optimizing HCS introduced to our patients such as in Dubai. PHCCs could be very different depending on the organization of the system. All mentioned solution should be taken into consideration and studied in details in the next researches.

4.0 CONCLUSION

Traditional method is not capable dynamically to mange PHC centers and it is costly and time consuming. The obtained result showed that health planners and decision makers can use continues advanced fields of knowledge's such as remote sensing, GIS and computer science in studying monitoring, mapping, planning, following-up supply and demand in PHCCs to manage various HC facilities according to the criteria and standards of MOHP of Egypt. The study found that the

population is considered as the active criteria due to the high population growth. Theoretically, the PHC centers cover the serviced area but it doesn't cover the serviced population according to the criteria of Egyptian MOHP. Moreover, the study explored that there are many other governmental and private health services that were used by some patients instead of PHC centers. So, this point should be taken into consideration in the next study.

REFRENCES

[1] Embouma, Mike, et al. "Smart Green Evenhanded Metropolis Actions against Urban Planning in European Union." International Journal of Basis Applied Science and Study 56.14 (2019): 1218-1222.

[2] Inokon, Adisa, et al. "Numerical optimization for esterification of waste coffee grounds oil using reaction external approach." International Journal of Systems Management and Innovation Adoption 124.14 (2022): 517-521.

[3] Balen, John, et al. "Predictive Analytics Challenges based on Cloud Computing for Urban Planning." International Journal of Information System Management System 23.19 (2022): 744-750.

[4] Amini, Mahyar, and Aryati Bakri. "Cloud computing adoption by SMEs in the Malaysia: A multi-perspective framework based on DOI theory and TOE framework." Journal of Information Technology & Information Systems Research (JITISR) 9.2 (2015): 121-135.

[5] Zalnejad, Kaveh, Seyyed Fazlollah Hosseini, and Yousef Alipour. "The Impact of Livable City's Principles on Improving Satisfaction Level of Citizens; Case Study: District 4 of Region 4 of Tehran Municipality." *Armanshahr Architecture & Urban Development* 12.28 (2019): 171-183.

[6] Ewani, Joe, et al. "Smart City and Future of Urban Planning based on Predictive Analysis by Adoption of Information Technology." Journal of Basis Applied Science and Management System 4.8 (2022): 425-431.

[7] Fallahdizcheh, Amirhossein, and Chao Wang. "Profile monitoring based on transfer learning of multiple profiles with incomplete samples." IISE transactions 54.7 (2022): 643-658.

[8] Jackson, Keypi, et al. "Character of Top Leader on Adoption of Cloud Predictive Analysis for Urban Planning of Small and Medium Enterprises." International Journal of Information System and Innovation Adoption 15.11 (2022): 125-133.

[9] Opuiyo, Atora, et al. "Three-Dimensional Modelling of Urban Temperature Landmasses and Its Planning Consequences." International Journal of Smart City Planning Research 20.21 (2019): 426-430.

[10] Hosseini, Seyed Fazlollah and koozegar, lotfali. "The impact of corona virus epidemic on the urban transportation system." Revista on line de gestao e politica Educacional, 2022.

[11] Amini, Mahyar, et al. "Development of an instrument for assessing the impact of environmental context on adoption of cloud computing for small and medium enterprises." Australian Journal of Basic and Applied Sciences (AJBAS) 8.10 (2014): 129-135.

[12] Zalnezhad, Kaveh, Mahnaz Esteghamati, and Seyed Fazlollah Hoseini. "Examining the Role of Renovation in Reducing Crime and Increasing the Safety of Urban Decline Areas, Case Study: Tehran's 5th District." *Armanshahr Architecture & Urban Development* 9.16 (2016): 181-192.

[13] Amini, Mahyar, et al. "Types of cloud computing (public and private) that transform the organization more effectively." International Journal of Engineering Research & Technology (IJERT) 2.5 (2013): 1263-1269.

[14] Amini, Mahyar. "The factors that influence on adoption of cloud computing for small and medium enterprises." (2014).

[15] Fallahdizcheh, Amirhossein, and Chao Wang. "Transfer learning of degradation modeling and prognosis based on multivariate functional analysis with heterogeneous sampling rates." Reliability engineering & system safety 223 (2022): 108448.

[16] Amini, Mahyar, et al. "The role of top manager behaviours on adoption of cloud computing for small and medium enterprises." Australian Journal of Basic and Applied Sciences (AJBAS) 8.1 (2014): 490-498.

[17] Johnima, Akaw, et al. "IMPROVEMENT OF AN SUITABLE MODEL FOR PREDICTING MUNICIPAL SOLID WASTE PRODUCTION." International Journal of Science and Information Technology Research 36.12 (2022): 214-218.

[18] Dimitrijevic, Branislav, et al. "Short-Term Segment-Level Crash Risk Prediction Using Advanced Data Modeling with Proactive and Reactive Crash Data." Applied Sciences 12.2 (2022): 856.

[19] Sadat Safavi, Nazli, Mahyar Amini, and Seyyed AmirAli Javadinia. "The determinant of adoption of enterprise resource planning for small and medium enterprises in Iran." International Journal of Advanced Research in IT and Engineering (IJARIE) 3.1 (2014): 1-8.

[20] Amini, Mahyar, et al. "Agricultural development in IRAN base on cloud computing theory." International Journal of Engineering Research & Technology (IJERT) 2.6 (2013): 796-801.

[21] Amini, Mahyar, and Nazli Sadat Safavi. "Cloud Computing Transform the Way of IT Delivers Services to the Organizations." International Journal of Innovation & Management Science Research 1.61 (2013): 1-5.

[22] Newiduom, Ladson, Keypi Jackson, and Ibrina Browndi. "Information Technology and Cloud Computing Altering the Searching and Training of Involved Urban Planning." International Journal of Science and Information System 4.2 (2019): 90-95.

[23] Dimitrijevic, Branislav, et al. Segment-Level Crash Risk Analysis for New Jersey Highways Using Advanced Data Modeling. No. CAIT-UTC-NC62. Rutgers University. Center for Advanced Infrastructure and Transportation, 2020.

[24] Lotisa, Vivian, et al. "Assessment of biogas construction potential from sensitive and administered agricultural wastelands." International Journal of Agricultural Management and Development 36.24 (2022): 41-46.

[25] Amini, Mahyar, and Nazli Sadat Safavi. "Critical success factors for ERP implementation." International Journal of Information Technology & Information Systems 5.15 (2013): 1-23.

[26] Bagherpour, M., et al. "Project scheduling and forecasting by laws of physical movement." Journal of Project Management 4.2 (2019): 97-108.

[27] Sadat Safavi, Nazli, et al. "An effective model for evaluating organizational risk and cost in ERP implementation by SME." IOSR Journal of Business and Management (IOSR-JBM) 10.6 (2013): 70-75.

[28] Khoshraftar, Alireza, et al. "Improving The CRM System In Healthcare Organization." International Journal of Computer Engineering & Sciences (IJCES) 1.2 (2011): 28-35.

[29] Amini, Mahyar, et al. "Types of cloud computing (public and private) that transform the organization more effectively." International Journal of Engineering Research & Technology (IJERT) 2.5 (2013): 1263-1269.

[30] Yun, Chidi, et al. "Predictive Analytics: A Survey, Trends, Applications, Opportunities' and Challenges for Smart City Planning." International Journal of Computer Science and Information Technology 23.56 (2022): 226-231.

[31] Amini, Mahyar, et al. "MAHAMGOSTAR.COM as a Case Study for Adoption of Laravel Framework As the Best Programming Tool for PHP Based Web Development for Small and Medium Enterprises." Journal of Innovation & Knowledge, ISSN (2021): 100-110.

[32] Shun, Miki, et al. "Predictive Analysis for Urban Planning based on Cloud Computing Adoption." International Journal of Management System and Applied Science 9.5 (2022): 345-349.

[33] Safavi, Nazli Sadat, et al. "An effective model for evaluating organizational risk and cost in ERP implementation by SME." IOSR Journal of Business and Management (IOSR-JBM) 10.6 (2013): 61-66.

[34] Bitala, Wilmin, et al. "PREDICTIVE ANALYSIS TOWARDS INTEGRATION OF URBAN PLANNING AND GIS TO MANAGE HEALTH CARE ORGANIZATION." International Journal of Science and Advanced Technology 36.17 (2022): 81-87.

[35] Junta, Utian, et al. "PREDICTIVE ANALYSIS OF URBAN PLANNING FOR THROUGH THE OPERATION OF ARTIFICIAL CLOUD NETWORK." International Journal of Science and Advanced Technology 62.42 (2022): 622-627.

[36] Amini, Mahyar, and Nazli Sadat Safavi. "A Dynamic SLA Aware Heuristic Solution For IaaS Cloud Placement Problem Without Migration." International Journal of Computer Science and Information Technologies 6.11 (2014): 25-30.

[37] Amini, Mahyar, and Nazli Sadat Safavi. "A Dynamic SLA Aware Solution For IaaS Cloud Placement Problem Using Simulated Annealing." International Journal of Computer Science and Information Technologies 6.11 (2014): 52-57.

[38] Lotisa, Vivian, et al. "Numerical optimization for esterification of waste coffee grounds oil using reaction external approach." International Journal of Information Systems and Management 64.86 (2022): 891-896.

[39] Sadat Safavi, Nazli, Nor Hidayati Zakaria, and Mahyar Amini. "The risk analysis of system selection and business process re-engineering towards the success of enterprise resource planning project for small and medium enterprise." World Applied Sciences Journal (WASJ) 31.9 (2014): 1669-1676.

