Innovative Model of Conference Attendance Process Reengineering at Saudi University

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Abstract—The repetition of procedures management and the complexity of the processes associated with the implementation of the procedures negatively affect the design and development of systems and reduce the quality of the produced programs. This paper presents considerations on the current running procedures of conference attendance system in Majmaah University. It tries to reengineer the running procedures in order to improve conference attendance process performance and minimize associated costs. Thereby, the contribution of this work appears by providing a link between business redesign processes and information systems development. This contribution is achieved by rebuilding a software model based on the concepts of reengineering procedures to solve problems associated with frequency of procedures, routine paper works, and processes complexity. The model developed three algorithms that address application guidance algorithm, applicant data retrieval algorithm, and conference information retrieval algorithm.

Keywords: *Process reengineering; Procedural reengineering; Algorithm; Modelling; Procedural requirements*

I. INTRODUCTION

With the advent of process automation, business operations have been transformed from manual operations into electronic communication and processing using information and communication technology (ICT). However, process design has long been confined to a centralized framework. Centralized operations involve a number of challenges associated with appropriate adoption of technologies, such as electronic data interchange (EDI), business intelligence (BI), big data assimilation, and repetition of procedures [1]. Business process reengineering (BPR) refers to the "rethinking and radical redesign of business processes to achieve dramatic improvements in critical

contemporary measures of performance, such as cost, quality, service, and speed" [2]. BPR is an important aspect to consider while implementing new technologies., cloud services, with significant changes in the way organizations execute routine operations [3]. However, it concluded that the repetition of procedures and the complexity of processes associated with the implementation of these procedures negatively affect the design and development of systems in which they reduce the quality of the produced programs.

In recent years, the business community has become increasingly aware that information technology should not be used merely to automate existing business processes, but should be used as a basis for reshaping these processes

to meet broader business objectives ([4]; [5]; [6]). In addition, time spent by customers at a service organization is found to be very critical in today's business environment. Service organization must be changed to provide services to customers within minimum time possible. After rethinking and redesign of management, core, and support process, implementing the reengineered business process in the organization is enabled by IT systems using applications and management software [7].

According to [8], the elements that impose the essential managerial changes that can be realized only through managerial reengineering, are, mainly, forms of manifestation of numerous malfunctions of the managements and its components. In this category, the most significant are insufficient or inexistent exertion of the planning function, lack of a system of objectives at the company level laid out by processual and structural components, the insufficient delimitation and dimensioning of some processual components (functions, activities, competences and tasks), extremely important in the realization of the objectives, existence of an

organizational structure insufficiently flexible, dynamical and efficient, that would permit and incite an "aggressive" behavior of the company toward the national, international environment, insufficient structuring of the authority and responsibility on hierarchical levels of the organization and lack of a clear concept, of a systematic vision concerning the conception and functionality of the informational system; [9]. Most of us assume that organizational survival in a challenging world requires a high level of adaptability. Consequently, anything that reduces flexibility must be a threat to survival [10].

The contribution of this paper is that it provides a link between the redesign of business processes and the development of information systems. This contribution is achieved by rebuilding a software model based on the concepts of reengineering procedures to solve problems associated with frequency of procedures, routine paper works, and processes complexity. The model is based on three algorithms, which address application guides, an applicant data retrieval algorithm, and a conference information retrieval algorithm.

II. RELATED WORK

In [11] the authors focus in their research on the impact of process re-engineering on patient throughput in emergency departments in the US.The main objective of their research is to increase the performance in health care sector in the United Kingdom. Re-engineering process has been applied to the whole system of the emergency department, and this led to more improvement in patient services, particularly it decreases the waiting time for the patient in the emergency department. The study proves that at the end of the year around 98% of the patient has been seen, treated, discharged, or admitted within four hours from the arrived time to the department of emergency.

There is a hug effort has been made to adapt automated software system in the case of modification in the technical issue which is one of the main motivated for [12]. The research proposed an approach that has ability to support re-engineering of open loop control system. The author presented a model that has ability to explain what the plan needs to do based on Unified Modelling Language (UML), and this is for manufactory explication work. Semantic ontology has been used to predict a model that defined manufactory system state space. In addition, to find an optimal solution for the operation to implement it.

[13] present Service Engineering Methodology (SEM) that contains some methods that has ability to design the concept of services and process that leads to make balance the evaluation between the customer and company. In some companies, with some cases can be cooperation between leading power and automation system. The main aim of this research is to present the effectiveness of this methodology application, in order to re-engineer the current services between the companies. The cases show that applying Service Engineering Methodology is time consuming; therefore, re-engineering has been applied to the current productions, to speed up the process.

Business process reengineering has been used in two emergency hospitals in Greek hospitals and has been analyzed by simulation framework. All the important information has been gathered based on observation application. In more details, starting and finishing time for each patient in emergency department has been recorded. All the simulation model which focus on follow up patient, are analysis based on specific features in the emergency department. The main aims of this research is to determine the main issue in these process, in addition, to obtains recommendations which can be applied to improve healthcare services quality from two concepts, waiting time and the provision of services , and then to develop a stratagem plan that aim to increase the efficiency without increase the cost.

The authors in [14] presents the probability of impact blockchain technology from the perceptive of business process reengineering. The study focusses on the feasibility of applying supply chain process. The research proposes a blockchain model with its attachment such as smart contracts, this is for obtaining the benefits from designing supply chain process through clear design of integrate operations. A case study is used for business operation in sharing information ledger. The proposal does not focus on tracking information, but it also covers supporting multilateral cooperation network among member of supply chain.

The objective of [15] is to study and apply business process reengineering, focusing on its Impact on healthcare sector connected with healthcare information system. The research also focusses on the success factors in healthcare origination in case of implementing business process reengineering on its operations. The conclusion of the research says that business process reengineering is an important and very helpful to improve the effectives of healthcare information system. In additional, it is very supportive mulita operations connection and operations automation.

III. RESEARCH METHODOLOGY

The proposed reengineering modeling utilized a customized methodology that intended to implement conference attendance process by reengineering the current running procedures at Majmaah University. Figure 1 below shows the proposed methodology.
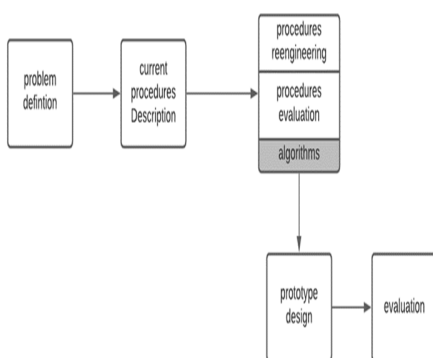

Fig 1. Procedural reengineering methodology

A. Problem definition

as several institutions may suffer from iterative, complex task execution procedures, and bureaucratic procedures, in which it believed that such running routines could waste both time and efforts, especially if immediate decisions need to be made. As information technology represents a key factor to promote the procedures reengineering, we proposed the reengineering of conference attendance process at Majmaah University to overcome all snags that meet faulty members in applying and participating in conferences worldwide.

B. Current procedures description

To attending conferences there are a number of procedures and conditions to follow. The sequence of these procedures start by submit an application form to the head of the department and discussed and approved within the department council, Then send it to the College Board for approval After that it is approved by the Graduate Studies Council and the University Council. In the case of external conferences must be approved by the Minister of Education. Figure 2 shows the flow chart of conference procedures.

C. Current Conference Application Form

The conference application form consists of the applicant's data which includes the full name of the faculty member, national ID number, job number, college, department, academic qualification, Academic Rank and Employment date (Professor/ Associate Professor/ Assistant Professor), Brief Curriculum Vitae, Email, office phone and mobile number. The application form also contains information about the conference to be attended, which includes the address of the conference, the country and city where the conference will be held, Conference Venue, Conference Period, Conference Organizer, and a brief overview of the conference. Data needed for application form is shown in Table 1.

Table1

Application data form	Data Name		
1	full name of the faculty member	9	Email
2	national ID number	10	office phone and mobile number
3	job number	11	Conference address
4	college	12	Conference
5	department	13	Conference country and city

| 6	academic qualification	14	Conference Venue
7	Academic Rank	15	Conference Period
8	Brief Curriculum Vitae	16	Conference Organizer
		17	brief overview of the conference

Fig 2. Conference attendance procedures algorithm

Figure 2 illustrates the algorithm of the procedures and table 1 demonstrates the data required to attend the conference. Its noted that repetition and complexity of the procedures are clearly seen in this procedure. Additionally, there are many data required.

The main focus of this work is to develop a methodology that utilizes IT resources to facilitate business procedures, which represents the main component of functional requirements Information Technology is a major way to enhance reliable procedure redesign and it plays a key role in procedure re-engineering as it provides computerization, provides flexibility in, supports rapid and paperless transactions, allows the business to be conducted in different locations and enhances quick delivery to customers. To achieve the objectives of the procedures Re-engineering, three algorithms were built, an algorithm Applicant Algorithm to achieve the requirements of the application, retrieve faculty member data Algorithm and Conference data selection Algorithm to retrieve conference data required from the conference page.

D.   Applicant Algorithm:

This algorithm begins by defining terms which used as variables, it works to achieve the requirements of the application, begins with the definition of basic data, which includes the staff member's job number and conference address, the algorithm also works to verify the presence of the basic conditions for conferences. Applicant algorithm parameters are listed below, while applicant's requirements algorithm is shown in figure 3.

PL : approval Letter from conference organizer

FM_N: faculty member name

 FM_ID: faculty member number

CO_URL : Conference URL

Web_s: Web Data Extraction Systems

CN_N: conference name

CN_data: Conference Title, The state, City, Place of the conference, The duration of the Conference, Organization of the Conference

CN_S: conference subject

FM_sp: faculty member specialization

FM_cb: faculty member current business
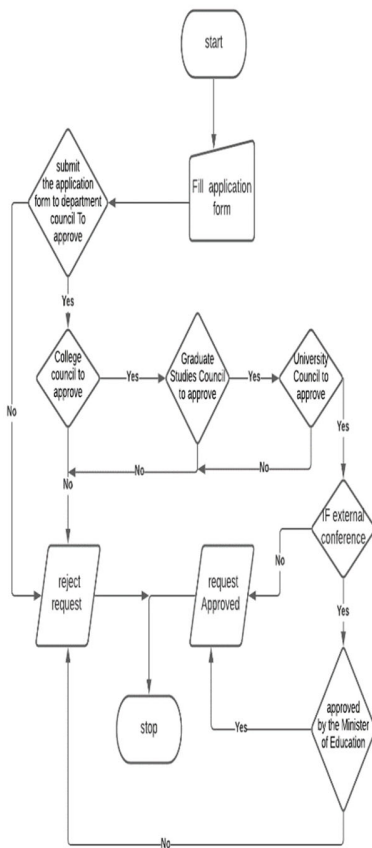
FM_lr: Member lectures

S_org: scientific organization

CN_org: conference organizer

FM_lang: faculty member language

CN_lang: conference language

L_org : Universities, colleges and scientific departments within, scientific research centers or scientific societies.

Algorithm 1 Applicant requirements

1. Input FM_N, FM_ID, PL
2. Go to Retrieve FM data Algorithm
3. Input CO_URL
4. Using Web_s
5. Go to Conference data selection Algorithm
6. If ((FM_sp ≠ CN_S) OR (FM_cb ≠ CN_S)) then
7. Go to step 15
8. Else
9. If ((CN_org ≠ S_org) AND (S_org ≠ L_org)) then
10. Go to step 15
11. Else
12. If FM_lang = CN_lang then
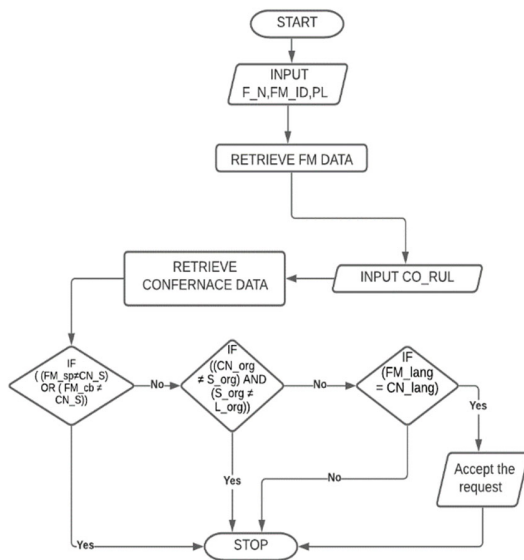13. Return(demand)
14. Else
15. Exit

The above algorithm sketch can be explained in more details as follow:

- As stating point, a staff need to inter their name, their ID number, and the approval letter from conferences organizer.
- The next step is that the algorithm has ability to retrieve the faculty data from university database, this will make it easy for the faculty to process the request.
- After that the system will ask the faculty to inter the URL of the conference
- Next stage is that the algorithm will have ability to gather the conference data from the conference web page automatically with any interaction from the faculty.
- A condition has been set her to examine that whether the faculty specialization does not consist with conference subject, or not consist with the faculty current business. If the result of this condition is yes m then the algorithm will stop, otherwise the process must go to the next condition.
- The second condition is to examine that whether the conference organizer is a scientific organization or not, in addition the scientific organization must be one of the following entity: university, scientific research center, if the result of this condition is yes, then the algorithm will stop the process, otherwise the algorithm must go to the next condition.
- The third condition of the algorithm is to examine the language of the faculty that must consist with the language of the conference, if the result is yes, then the system will accept this application and notify the faculty for the acceptance, otherwise the system must stop the process.

E. Algorithm 2 works to retrieve the required faculty member data to attend conferences from the university database

Fig 3. Applicant's requirements algorithm

Algorithm 2 Retrieve faculty member data from university data base

```
1.      Def Fm_dlist{ }={ identity number , Functional number, college , department}
2.      i = 1
3.      found = False
4.      while (i>0)
5.      {if i=fm_id
6.      { found = true
7.      For (j=1; j<=4;++j)
8.      Print Fm_dlist.j
9.      break}
10.     else
11.     i=i+1
12.     return found }
```

This algorithm has ability to gather faculty data from the university database, where the faculty need to insert either ID number, faculty number or the full name, after that the algorithm can search in the university database until the faculty data can be found. Faculty member data retrieval algorithm is explained in figure 4 below.
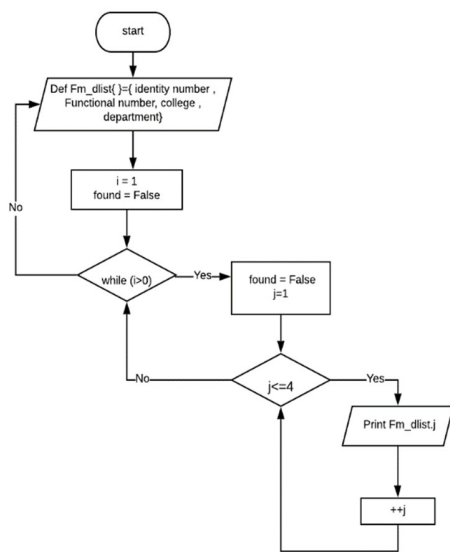

Fig 4. Faculty member data retrieval algorithm

F. Conference data selection

This algorithm retrieves conference data required from the conference page

Algorithm 3 Conference data selection

```
1.      Def CN_data{ } ={ Conference Title, The state, City, Place of the conference, The duration of the Conference, Organization of the Conference}
2.      Item=0
3.      While (item<=6)
4.      { Print CN_data.item
5.      Item=item+1}
```

IV. PROTOTYPING

Based on the previous algorithms, a web-based system was designed. It will be branched out from the university's portal to handle any data and procedures related to conference attendance system, and it consists of three pages organized as follow: a page related to data retrieval from the database of faculty members; a page related to the university's scientific councils and committees; and a page for retrieving the required data from the conference site. The proposed prototype is shown in figure 5 below:
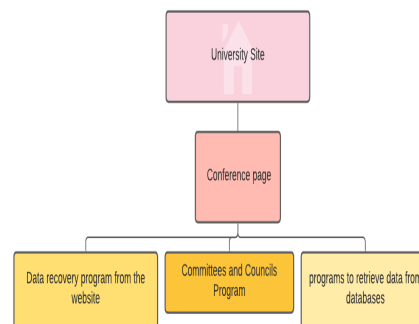

Fig 5. Conference prototype homepage

V. CONCLUSIONS

The study provided a model for the treatment of procedures repetition as they may arise in applying for conference attendance and participating. it relies on the use of re-engineering and the use of information

technology available resources to address the procedures of attending conferences at Majmaah University in special and at Saudi universities in general. The used algorithms tried to re-engineer procedures for attending conferences in Saudi universities, then to be utilized for model development that integrates procedures into one technical template. Future work aims to build and develop models based on the integration of processes re-engineering methodologies with the development of computerized systems concepts that overcome routine paper works and redundant procedures.

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