Development of "Virtual Office Model" Software for Entrepreneur and e-Management

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Abstract—Due to the low cost and environmental concern, virtual office is possibly the most promising alternative rather than in a physical office space. In this study, we proposed a framework named "Virtual Office Model" by using information and communication technologies (ICT) tools. In this virtual office model, in where people (designers, engineers, manager, and other employee) will be able to perform their task from their residence or any place using some modern technology like computers, mobile etc. So the industry based on our model doesn't require any big office space. We have attempted to define virtual office and examine major virtual office elements that link organizational systems. The application of virtual office in manufacturing, production and service operations is examined, and a new virtual office model is proposed. Finally, we summarize our findings and conclusions.

Index Terms—Virtual office, e-commerce, ICT, traditional industry.

I. INTRODUCTION

The new virtual office model proliferating through the business world means that company employees can work from wherever they can get an Internet connection and companies can dispense with the cost of maintaining physical offices through the power of cloud computing [1]-[3]. Through the Internet and the widespread digitization of the economy anyone can conduct almost any business activity virtually, in electronic space rather than in a physical facility. In 21st century, all the small to large sized business choose the virtual office. The main reason why most businesses choose virtual offices is because of their price. It is significantly cheaper to use a virtual office than rent a physical office space, especially if the primary purpose is to enhance corporate identity. However, there are also plenty of other reasons why they can be beneficial. Not only economical but also environmental aspect the virtual office model is effective. For example, using a virtual office instead of a traditional office space will reduce your CO_2 contribution. In addition, working virtually requires little paperwork, which creates less waste. Transportation is often a huge expense. Virtual offices significantly cut down transportation costs, which allow saving money and investing this money elsewhere scientific management evaluating day by day, now a days we can find lot of management technique and strategies that was unavailable before [4]-[7]. Hence our

work also a little bit evolution and mix-up management strategy to get better output in management aspects. Still strong tools available to manage and coordinate in industrial sector but some manual communication exists inside those modern systems, for example when any supreme want to assign any task to his subordinate he needs to send it manually using human resource like MLSS/peon. In Bangladesh 95% industry and other office operating such activities using human which cause higher lead time to complete task, not cost effective and difficult to record keeping. Another example, arranging official meeting or any discussion requires a physical space in current situation. It became difficult for an entrepreneur to initiate a new business/industry for high investment in physical assets. In this work we mentioned those ways to reduce some of operation and business communication related cost using modern technological support. If we think to start a new business idea we must have to invest for land, labor, infrastructure and management processing. We can make these elements of business more affordable according to monetary value and smart computerized processing that will make entrepreneur and running industries cost effective and faster in operation management. Considering low cost and fast business communication, avoiding physical space, connecting workers from faraway, time to time process monitoring and record keeping, we designed our system to make the existing management systems connected in a simple way. Another important need is human resource monitoring and evaluation, which is pretty difficult and lengthy in manual operation management. In our projected model we focused on HR evaluation according his task finishing time schedule. To make existing management flawless and more effective we developed a model named "Virtual industry model" with help of a virtual office software that could be used for production based industry or service based industry. When we will be able to connect the elements of an industry through our virtual office, which will result a strategic operations management in both service and manufacturing industries provide goods and services and synchronize through ensuring supply to make business operations efficient in terms of utilizing resources.

Over the past decade working from home has developed into an acceptable way to conduct business, especially among freelancers and new business owners [8]-[10]. Working from home is no longer seen as a business solution, but a lifestyle choice. There's a common misconception associated around home-based businesses that workers are detached from the real world. This misconception can drive clients away from conducting business with home-based company, as many of them would rather visit a well-known office address and contact an office phone number. Clients and leads see this as

security, which is exactly what virtual offices can provide. Small businesses and start-ups are often eager to expand, but don't have the capital to justify having an "official" office space. Regardless of the reason, moving to a prestigious address is often a priority. When this isn't possible a virtual office is perfect for the first stages of business development. Because a virtual office doesn't require workers to physically be at the office; relocation costs are saved. Therefore, the aim of this research is to develop and implement of virtual office model software for any small to large sized business or industry.

II. VIRTUAL OFFICE MODEL

In our model, it is the focal point and backbone to establish a virtual working environment [4], [5] for any business or industry. Virtual office is a business location that exists only in cyberspace. A virtual office setup allows business owners and employees to work from any location by using technology such as laptop computers, cell phones and internet access. A virtual office can provide significant savings and flexibility compared to renting a traditional office space. Meetings can be conducted via teleconferencing and video conferencing, and documents can be transmitted electronically. Some companies even provide virtual office services to give virtual offices the prestige associated with physical offices, such as an important-sounding address, a professional phone-answering service and even occasional rental of office space and conference rooms. Everybody in this model are free to work from any place but they have to complete their tasks as per given time and deadline. So we will ensure our goal and outputs from the human resource. The figure showing that all the officials are working at their home via connecting a common network and software system that we developed in our model. Virtual office needs only a single room to setup some technical equipment. Mangers and owner of the industry can monitor the whole working process from anywhere around the world. We can say that this industry will be a global working environment.

A. Elements of Virtual Office Model

In Fig. 1 we can see the model which has different types of user account, strong network connectivity and database. In our software model, there have several account types as required for organizational admin, employee account and client/buyer account. Internet will fulfill the communicational purpose. All type of user will get a user name and password to access their office. When any employee does login into system he will be able send message and share file to other co-worker. User can assign task with necessary file to other that will be shown in a task queue. Personal task schedule reminder, work process and performance evaluation report will be generating automatically after processing inputted data. Where all of this options need to done with physical contact with employees but our software will allow entrepreneur to perform all of this into a virtual world. In our proposed model of "Virtual Industry" software named "Virtual Office" is the backbone. From several study and feasibility test we selected web application platform for "Virtual Office". Fig. 2 shows the architecture of our software. We have 4 elements in our

software, they are
1) Database.
2) Web Application (Logical Programming).
3) Web Server.
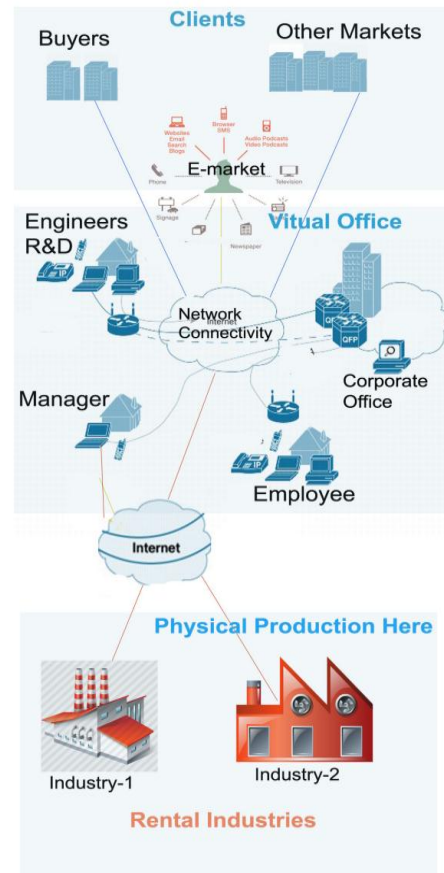4) Presentation (GUI)/User Interface.
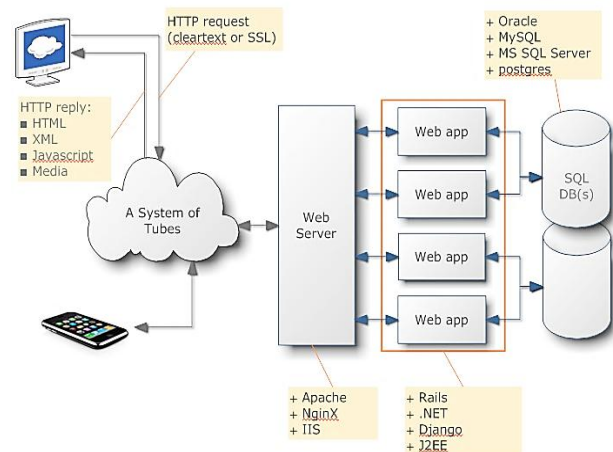

Fig. 1. Virtual office model.

Fig. 2. Web application system architecture.

B. Existing Similar System and Their Limitations

There have loot of tools for modern industrial management [3]-[8], a concept of virtual office already exists which works based on some different software, hardware and technology. Which needs to accumulate several technologies, the key difference between the existing system and our developed virtual office is integration of several tools. We integrated several features that are not available in a same platform in

existing systems. Our virtual office model software has some functionality that jointly serves the purpose of different tools in same software. It also generalized for all type of industry which also a unique concept in modern industrial management tools. The existing virtual office works as given bellow.

1) Email communication

Email remains an essential virtual office tool for professional communication and it doesn't look like it will be replaced anytime soon. Your email client should be set up to automatically filter your mail, it should make it easy for you to tag and sort mails, and you should be able to access your mail online in case something happens to your computer. Gmail, YAHOO, Hotmail is the most used email tools.

2) Organizing and planning

No virtual office is complete without a calendar to remind you of deadlines, events, and appointments. Due to its seamless integration with Gmail [5] I use Google Calendar. Many people use their smart phone's organizer and planning tools as an element of virtual office.

3) Direct communication

It's important to connect with people. Direct communication via IM, voice, phone, or video calls also helps to relay information more efficiently than through an email. Either way, you will need to communicate directly with colleagues or customers. Skype covers the entire direct communication bandwidth. You can use it to instant message, voice or video chat, and call a phone number.

4) Online file storage & sharing

If your office is not only virtual, but also in The Cloud, you need a reliable online file storage tool. You might also need a tool to exchange or collaboratively work on documents with your partners. Dropbox can do all that and more. One drive, Google drive also a famous tool for online file storage and sharing.

So we can get a clear knowledge that existing virtualization of industrial management is a combination of several software and tools. From the mentioned elements of existing "Virtual Office" we can identify that it become difficult for any non tech person who is not expert in technology to use them as a package. When one of them became down the system loss it's functionality, also those couldn't be owned by any industry. To prevent this problem sometimes industries use their own mail server, file sharing server and customized software which is costly that small industries can't afford that. After studying on this problem we thought why not all of this facility in same software in low cost? As a answer of this question we developed our model "Virtual Industry Model" which has a strong software that can solve the needs of 5 different elements in existing "virtual office".

From a study on 10 popular and most used project management software, we can find that those are not applicable homogeneously for all kind of industries and task. These tools are one type of commercial software which has a good price. So people from third world countries can't use those, or they are not interested due to limited budget. Which results that companies using those project management tools perform better than our industries, so if we can develop a generalized industrial management, project managing and industrial communication tools which can replace the needs of mentioned high cost software, that will be an additional opportunity for entrepreneur.

C. Tools and Technology for Implementation

As it is a package of software and network working environment, we used web programming language and online database that's why it doesn't requires any extra networking related hardware [6]. Only internet connection is enough to access the software from around the world. The software will be hosted at an online space that it could be useable any time. The database structure of virtual industry system software is shown in Fig. 3. This software is an online application what is able to perform a complete official and industrial working process through it. It takes some inputs from its users and processing that it gives desired outputs. The system is flexible that multiple entrepreneurs can use the system. The architecture of web application is shown in Fig. 3. Actually this model is a package of software and communication tools that will make an environment of an industry like traditional industry in virtual/cyber world. Our developed database based software where all types of processing and input will be taken. Using technical tools like wireless or wired internet, IP camera, computers, laptop, and modem in this software we will make the environment that we are calling "Virtual Office software Model". So our main goal to develop a software system named "Virtual Office". We are using very familiar tools and technology that people can use the system frankly. And it will be a user-friendly feasible model. All user will use a graphical user interface and user login option for perform their task, the system will count how long they are working, what is the status of all tasks, progress of production, production status and statistics. This software has some sophisticated and expandable feature like we can sell, show our products via online marketing or e-commerce system. It will be a whole solution to operate the operation of an industry. Once it will be able to replace the typical industrial working system that the current era needs. In presentation layer we used HTML, CSS, JavaScript [7]. For database we used MySQL. For core logical programming we used the "PHP" [4], [5] programming language.

1) Reason to develop "Virtual Office Software" in web platform

The popularity of the Web and its advantages as a client-server platform led to countless Web applications. Web applications are global environments for delivering all kinds of applications. One reason for the popularity of Web applications is the facility to access an application from all over the world on any platform. Furthermore the maintenance of Web applications is arranged in a centralized way at minimal costs. We base the necessity of developing Web applications in a rapid and high quality way on the following statements:

1) Web Applications are becoming the first choice for most business application development.
2) Designing and maintaining Web applications is one of the major challenges for the software industry.
3) The maintenance of a Web application is getting difficult due to the inherent complexity of the system.

D. Required Network Connectivity

Network connectivity means physical (wired or wireless) and logical (protocol) connection of a computer network or an individual device to a network, such as the Internet or a LAN.

In web hosting this can be referring to how the company receives its bandwidth and how it is connected to the provider. In our proposed model it is first needs to have a fast network connectivity to connect all the functional blocks. We can use internet, mobile networks and other fast internet service for connecting remote human resources to login our software and work. To communicate with rental industry we can use internet, if the industry locate near our virtual office network area we can use LAN. Because it needs very high speed fulltime network [10] to observe, communicate and monitor that industry's working progress due to virtual industry's order. In Fig. 1 we can see the functional blocks are connected through various network and network tools, technologies which are very important in our model.

E. Inputs of Software

There could be several users to input data but the types of input will be production plan, market analysis data, research and development data, product order, statistical data of production or anything in any file format like ".xls, .doc, .pdf". As it requires employee information to make an user account that it will be able to calculate wages of employees, monitoring and evaluating them the software needs employee information and his log data of working hours, performance statistics and frequency to complete task successfully. As it is a computerized system, so it will be able to calculate and evaluate them. Sometime it may needs to input some video from IP cam to observe from remote place the rental factory if it satisfies the contracting policy. Then the manager or owner of industry will be able to watch product status, progress and also will be able to show that to his buyers/clients.

F. Database

It is an important part of this online software system. All inputs will be accumulated and stored in this online database for further needs and processing. Every single working process, single change will be stored in this database. This database is able to make a paperless office which is applied in some big companies like Google [5] or Amazon.com [4]. As our target to reduce industry setup cost and operation cost that makes it affordable for all entrepreneur to touch their dream. Thus, this tool will help us robustly. In Fig. 1 we can see a database which has table to store data of company managers, employees, client as user account. Also the task queue, task status, company meeting, personal organizer and supporting table exist in our developed database model.

G. Outputs of software

Output of this software not the desired product but the status of production, operation status, several job done by employee and lots of report which are customizable. It will provide a transparent view of the employs in a single click which is impossible at a traditional industry. It will produce all type of report, analytical data, and payments of employees, company revenue, production order, and production queue status. From the production plan of and industry, production

process, marketing, delivery status. As a results manger or administration will be able to control easily everything which is tough in typical industry due to various limitation like CBA association, political hazard etc.
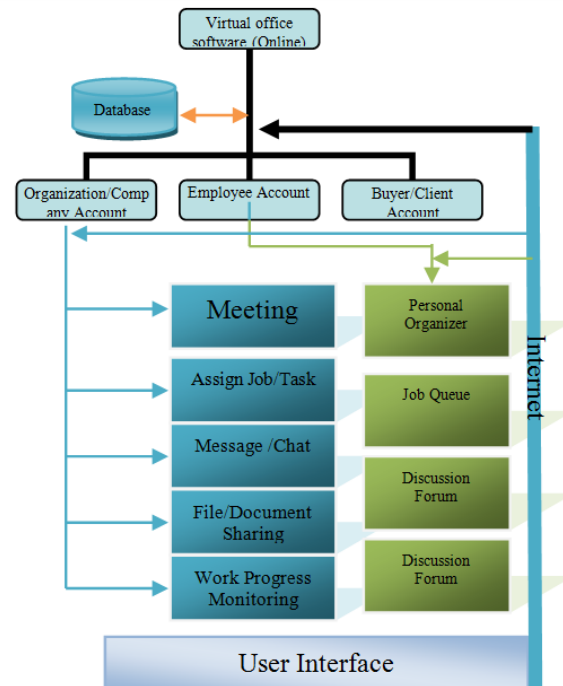

Fig. 3. Web application internal architecture.

III. ROLE OF DIFFERENT USER ACCOUNT IN MANAGEMENT

Mangers are key person for an industry to manage the man, machine material in an industry. As our model skipped physical industry but also manager will play key role in our model. He will organize and synchronized among all part. We made it very easy for manger as he is going to perform any task, monitor the progress using software and other tools. In this model we proposed part time such expertise who will perform research and development, making new product ideas anytime that could be shared with others. And due to part time work our industry will pay less than a fulltime such employee. As it will reduce cost also gives chance to hire several experts as entrepreneur wish. Employee An industry needs different employees for different purpose as example accounts, marketing, advertising etc. All of such employee will also work through a network accessing the virtual industry software system and complete their job as they given. Interesting fact is that in this system, there has no opportunity to claiming wages without working exactly because of the software system.

IV. KEY DIFFERENCE THAN TRADITIONAL e-MANAGEMENT SOFTWARE

Now a day, we can find a lot of e-business, e-marketing [6], [7] and many more electronics based business [1]-[3]. Most common and known system is freelancing. A person who works as a writer, designer, performer, or the like, selling work or services by the hour, day, job, etc., rather than working on a regular salary basis for one employer is called freelancer. In IT based industry it is most used employment

method all over the world. In fact various industries now hiring people basis on freelancing. It is one of most progressive way where IT professional earning [8] in Bangladesh. All of this has its own small customized management system but not a common model. We are developing a common model for all of this e-business, e-markets, IT based freelancing. Our model proposes that any business can be performed using a common model. This model will be an integrated system where a single freelancer to a complete manufacturing system could be implemented, usable for any types of business operation or any entrepreneur. By connecting several part of a manufacturing system from various remote places we can structure any business even a heavy industry, for what we are calling our model "Virtual Office Software Model". Where the existing systems have no ideal model and one is not applicable for another. Rather our "Virtual Office Software Model" is ideal model that will be applicable for any electronics based business system.

V. Conclusions

In this paper we proposed a framework named "Virtual Office" [9]. We developed a structure of all working process of an industry trough internet and others ICT tolls in where total system is operated using online software that is communicate, synchronize among all segment of production process. Thus, entrepreneurs can fulfill their dream by establish an industry in very low cost, less paper works as well as they can make their product more versatile compare to the other traditional industry. Additionally, those industries which have less production and marketing opportunity, they can be profited when they will conduct production and operation related task in virtual world with this "Virtual Office Software Model". The world around us is rapidly changing. The above-mentioned issues must be addressed, as must others that exists, or will arise. The Internet and other ICT related developments have the potential to radically change the ways in which we communicate, interact, receive information and entertainment, and acquire goods and services. For businesses to survive and prosper in the 21st century and beyond, they must develop business models that give virtual office the prominence it deserves as a key ingredient in business success [4], [5].

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