A Prototype of Job Distribution System for Community: A case study of a Corporate Social Responsibility using NFC

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***Abstract*—Corporate Social Responsibility (CSR) is one of the activities that help make society better. One of CSR's activities is to create jobs to support communities. To operate such activity, can be time and resource consuming for the organization. Also it might be hard for people to join due to different personal restrictions. A prototype of this Job Distribution System for Community was implemented to help increase income for people in community. The application has been tested in one organization with three communities. The result showed that the prototype application can help manage CSR project and help people in the community to be able to find jobs that suit their preferences.**

***Index Term*—Job Distribution System, Community Social Responsibility, Near Field Communication, Location Service**

I. Introduction

Thailand economy has moved to Thailand 4.0 which is to change economy structure to become value-based economy that is driven by innovation. The concept of Thailand 4.0 is to do less but gain more through innovation and technology. In order to accomplish the innovation driven economy, creativity of process and product is needed. Some examples of this would be traditional agriculture that used mostly manpower reformed to become innovative agriculture that uses innovation and technology such as internet of things to support agriculture. Another example would be service industry that has changed from low value service to high value service. The fields that Thailand 4.0 covers are, Healthcare & Medical Technology Industry, Food/ Agriculture and Biological Technology Industry, Digital Technology and Internet Industry, Creative and High-Value Service Industry, and Smart Robot and E-Control System Industry [1]. These five fields are aimed to take Thailand out of middle-income trap and become higher income country.

Currently in the society, many people are working to earn income to support individual or family. Full time job alone might not make enough income to suit individual needs or family needs. Many people have started to look for part time jobs to earn some extra income. However, due to various restrictions of individuals such as age, time, resource, education, location, and so forth, which has made it hard for them to be able to find part time jobs that suit their availability. For example some people might be over the age limit the job description demands, even if they are still capable of doing the work. Elderly people (age 60 and above) make up 14.9 percent of the population and that number is growing in Thailand according to data [2]. Due to the restrictions from job descriptions, they might not be able to find suitable job that suit their current life style. Another group that we need to pay attention to is the teenagers with no education which has made it hard for them to be able to find a job. Due to some restrictions, part time jobs might be another option that can help these people earn additional income.

However some of job offers or part time job offers might consume large resources; that one individual might not be able to accomplish. For example a hotel would like to hire people to make a thousand souvenir gifts. Many people might be interest in this job but due to the limitation of time and resources, they might not be able to complete the job. Reach of information for job offer is also crucial, the information might appear only on the company site so many people might not realize that there are part time jobs available until very late.

To solve these problems while focusing on Thailand 4.0 model, technology; such as application on smart phone can be considered useful due to its flexibility, range of reach and access. This research is done to implement a system for job distribution in the form of mobile application. Its aim is to help increase the reach of information, while dividing a large portion of job into smaller portions that meet the need and capability of an individual. This can help people to get the part time jobs that they are able to complete and earn income to suit their needed.

II. Literature review

Implementing mobile application alone to process the task might not be enough to support the whole operation. Other technologies need to be considered to improve application to be even better and suitable for the job. Near Field Communication (NFC) is one of the technologies that can be used in multiple ways to increase the performance of smart phone through application. NFC is a contactless short range communication between two devices for information exchange. These two devices do not need to be connected; this allows data exchange to be easier and faster [3]. There are three modes of NFC operations:

Card Emulation Mode: In this mode, the NFC device operates as a smart card that stores certain information to processing. When user brings the device to the NFC reader then the information from user device will be send to the reader for further processing. It can be used in various ways such as; identification card to identify the user, used as security card to grant access to security or personal area, used as credit card/ e-wallet for business transaction.

Reader / Writer Mode: In this mode the NFC device will read/write data from the NFC tag. When user brings the device to the NFC tag, the device will process the data and present the output to the users. This operation can be used in various ways; such as read data from the NFC tag at the bus stop and then the device shows the detail of bus service to the user, used to open a application or certain website; used to receive a electronic coupon.

Peer to Peer Mode: In this mode the NFC devices will exchange information between two devices. This operation can be used in various ways such as e-money transfer from one user to another by doing so the cost of credit card reader or point of sale machine can be reduced. Another use is transfer of contact information between others such as e-business card.

With these three types of operation modes, the NFC can be modified and applied in various ways to meet the need of users. Due to the simplicity feature, the devices can be processed without contract or connection between devices. This makes the data exchange and transfer become fast and easy. As a result, NFC is one of the technologies that can be useful in various ways.

Location service is the function in the smart phone that can identify the position of the smart phone for user or device to process information as needed. There are two different methods to get the location of users though the smart phone. One method is to use global positioning system (GPS) which used satellites to identify the location. The other method is quite similar but instead of using the satellites, the cell towers are used to identify the location [4]. The location service system can be applied and used in many ways including navigation on the map, information alert when user is close to certain area, identifying location for reservation, etc.

In the developing world, mobile applications have been applied to help society in many ways to enhance service and performance. One of the usages is applied to mobile phone to improve health in developing world [5]. This uses mobile phone as a means of communicating the health issue. A study showed that with communication through mobile phone helps people to get necessary information regarding health information, widely across the location. Another example of mobile application usage is Mobile Applications for Agriculture and Rural Development which focus on improving agriculture supply chain and provide necessary information [6]. The users are including farmers, buyers, suppliers, content providers, etc. The benefits of using mobile application in agricultural and rural development are better access to information, better access to extension services, better market links and distribution networks, and better access to finance. These show that mobile use and application can be applied widely to enhance the process, service, performance, and many more.

III. Methodology

The system is implemented in the form of mobile application which can operate on smart phone. Technology such as Near Field Communication (NFC) and Location Service are also considered in the development system. NFC can grant quicker access to jobs and also confirm identity for payments when submitting jobs. Location Service can increase the reach of information for users when they are near by the organizations offering the job. There are two users to focus on in the development process; one is organization or anyone that has a job to offer and the other is the people that are looking for jobs.

NFC Technology can be applied to the system with two purposes. The first one is for the quick access to the job information. When users bring the smart phone close to NFC Tag, the system will launch the application and open the job offer page for user to accept the job offering. In this task, NFC is use as reader mode which read the data from NFC tag and process. Then the result will be presented to the user the information of the job. The second one is to identify the users that submit the job task when they completed. They can bring the smart phone close to NFC reader of the organization or the smart phone of the one that offer the job. The system will show the detail of user, quantity of the job to be submitted and amount of money or points that they have earned from the organization. In this task, NFC is used as peer to peer mode which exchanges the information between users. NFC can help enhance speed of the information access and exchange while ensuring accuracy and collection of data for the task. The flow of the NFC functions is presented in figure 1.

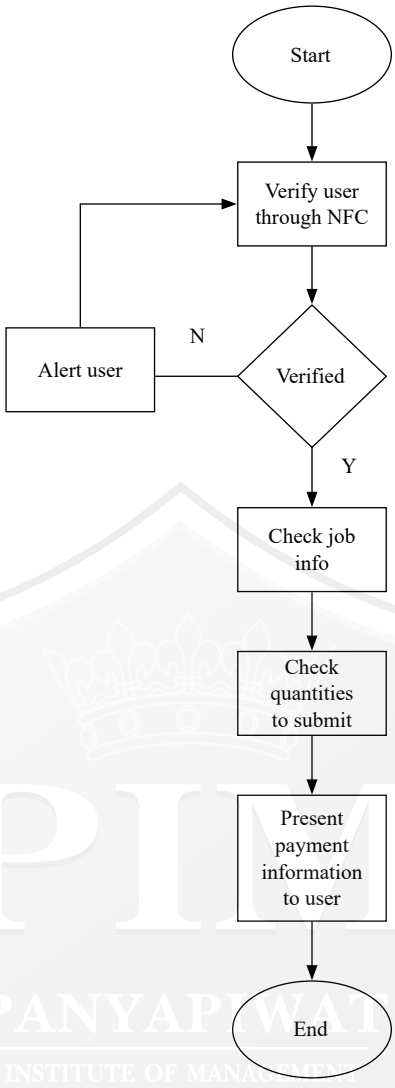

Fig. I. Identity verification and job submission through NFC

Location Service System is used to present the information of the job when the users are in the range of the pinpoint location. With Location Service System, users will be able to gain information of the job that is nearby their location. This can help alert the users of the job offer which increases the reach of information for users.

The alert system is for alerting users when the deadline of the job offer that they participated is getting close. This function is to ensure users who are able to complete the job on time and for organization or individuals that offer the job, will receive the products or merchandises on time. The alert function can be set up multiple times; 15 days prior to deadline, 10 days prior to deadline, 5 days prior to deadline. In case those users are unable to complete the job, they can inform the system and job owner so the system will alert other users that are interested in the job and redirect the job to them.

As for organizations or people that have jobs to offer, they can post the job information and necessary information such as quantity and deadline of the job. Once they are open the application and login to the system they can post job offer including job description, quantity, price, deadline, contact information, etc. As for individual that looking for part time job, once they open the application and login to the system they can browse for the job that suit their best interest. Once they accepted the job they can choose the quantity that they are able to complete, after that the system will reduce the total quantity for others that are interested to join the job. The process of the system is shown in figure II.

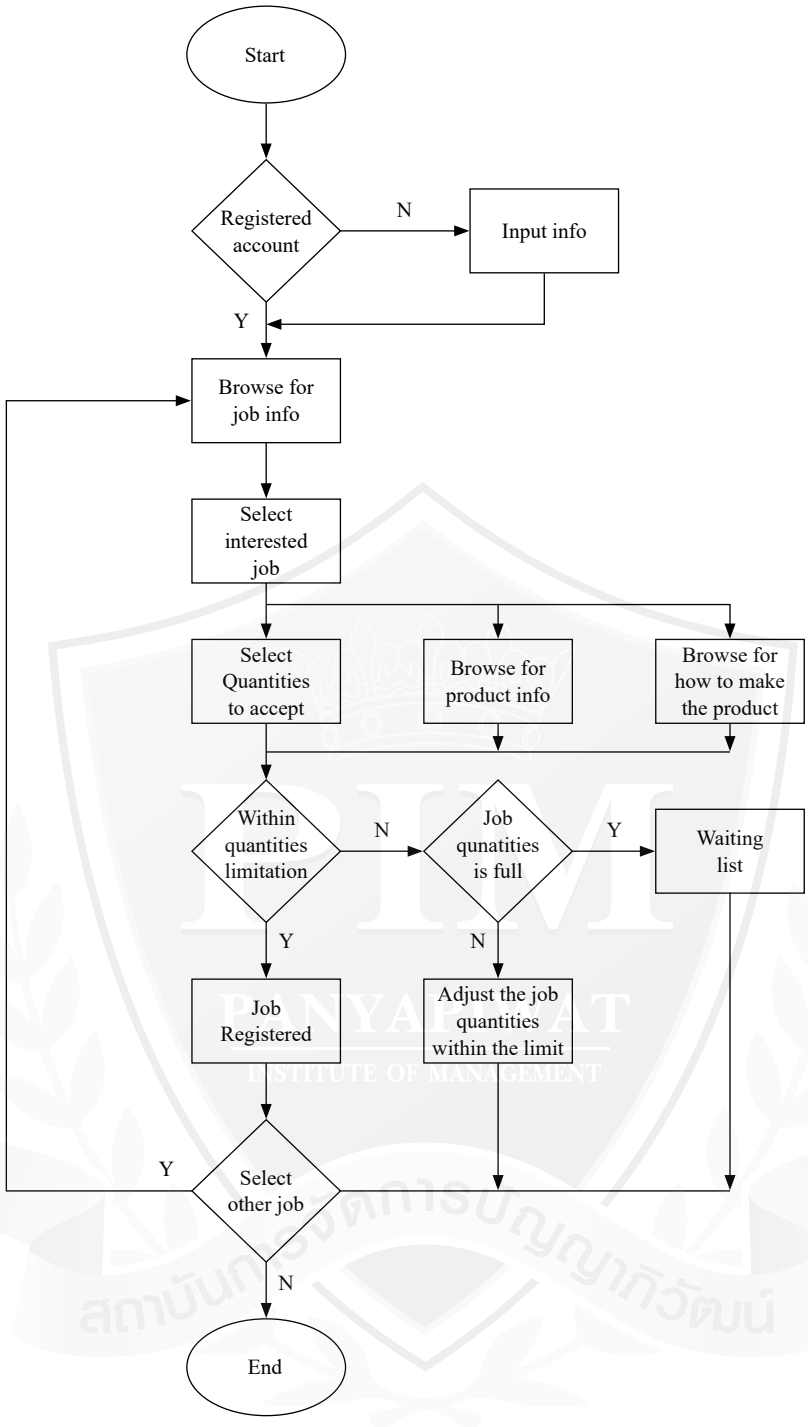

Fig. II. Flow of the prototype system

IV. Experiment: A Case Study of Corporate Social Responsibility

Corporate Social Responsibility (CSR) is the activities that benefit the society. It is a concept that companies or organizations to voluntarily contribute to a society and environment [7]. In society there are various groups of people that need to be concerned such as elder people or people with no education. Due to age range in job description, elder people who are still able to work might not be able to get the job they want. Some elder people are staying home to take care of home or their grand children. They are still have spare time where they would like to work to earn some income to support family as well. The second group that needs to be addressed is teenagers with no education. It is harder for these people to get a decent job and will likely end up as a taxi driver, motorcycle taxi driver, or daily wage worker.

Company A foresees such issue in the community in rural area of Nakornnayok, Thailand. Instead of

hiring a sub-company to produce handmade merchandise such as water lily, soap, shampoo, incense, etc to distribute to hotel or other company to be use as gift for guest and other purposes. Company A together with the community discussed the purposes of CSR project to help create jobs to support society by hiring elders and teenagers with no education for part time jobs.

At first the company used public relations to provide information to the community through the headman or person that in charge of the community. However the information was not spread to all people that were interested due to distance and time. Still people that were interested could get a part time job from making the merchandise but the manpower needed to make the merchandise was still not enough to meet the quantity of order. Another problem was that the quantities that people were able to accept was not guarantee due to some personal problems that occurred later which make them unable to complete the job or meet the quantity. Without centralized information and access of information, CSR Project of creating job to support society might be hard to accomplish because it is difficult to manage people in different location.

The prototype of Job Distribution System for Community was implemented for Company A to run CSR Project effectively and efficiency. The system was developed in the form of mobile application that operates on the smart phone. This is because the information can reach to the people in community equally with less cost. After implementing, the application was tested in 3 communities nearby Company A. There were 53 participants from 3 communities consisting of 32 elderly people and 21 teenagers with no education. The job offers were to produce 1000 small bottles of water lily and 300 sets of incense for company gifts. Both of job offers were given the time one month to complete.

When the company released the information of job offer, people in the community were able to receive information immediately as it is published as shown in figure 3. Also people in remote area or rural area are able to receive the information without having to travel into the organization or headman/ person that in charge of the community. The location service function also helps people in the area to see available job that offered in the closed by area. As a result people in the community will be able to get the job notice without traveling which will save cost for people in the community. After information was released, both job offers was accepted in less than two hours by 17 people to produce 1000 small bottles of water lily and 10 other people were waiting for job cancelation. Also 13 people accepted offer to produce 300 sets of incense and 5 other people waiting for job cancelation.

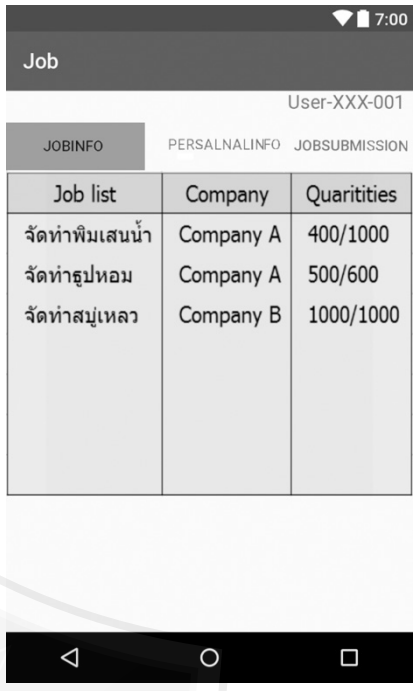

Fig. III. Job offering screen

People in the community could access the information of the job. The information of how to make the merchandise was also available in the system to be used as a guideline for people to follow as shown in figure 4. People that registered to the system could accepted the job with the quantity that they were able to accomplish. The detail of quantities of merchandise that individual accepted is present in table 1.

Fig. IV. Job Information Screen

TABLE I
QUANTITIES OF JOB THAT DISTRIBUTED TO INDIVIDUAL

TABLE I QUANTITIES OF JOB THAT DISTRIBUTED TO INDIVIDUAL		Incense	
TABLE I QUANTITIES OF JOB THAT DISTRIBUTED TO INDIVIDUAL	Quantity	People	Quantity
Number. 01	100	Number. 01	30
Number. 02	200	Number. 02	30
Number. 03	50	Number. 03	20
Number. 04	50	Number. 04	30
Number. 05	50	Number. 05	20
Number. 06	50	Number. 06	30
Number. 07	100	Number. 07	20
Number. 08	50	Number. 08	20
Number. 09	50	Number. 09	20
Number. 10	50	Number. 10	30
Number. 11	50	Number. 11	20
Number. 12	50	Number. 12	20
Number. 13	30	Number. 13	10
Number. 14	30	Spare Number. 01	15
Number. 15	30		
Number. 16	30		
Number. 17	30		

When they had completed producing the merchandise they notified Company A for date and time to bring the product to Company A for submission. Alert function also is of key important to keep users informed about the deadline of job submission. Both jobs offer were completed at least 10 days before deadline. In the Incense merchandise case, people number. 04 was unable to complete the job due to the limitation of resource so the user informs the system by request readjustment of quantity. Then the system informed other people who were waiting for cancellation, that there is job available to produce 15 sets of incense.

After completion of merchandise, they brought the merchandise to Company A. When they arrived to the Company A, people could identify themselves through NFC feature which showed personal information, the merchandise to submit, and total income that they were to receive if all products pass Quality control as shown in figure 5 and 6.

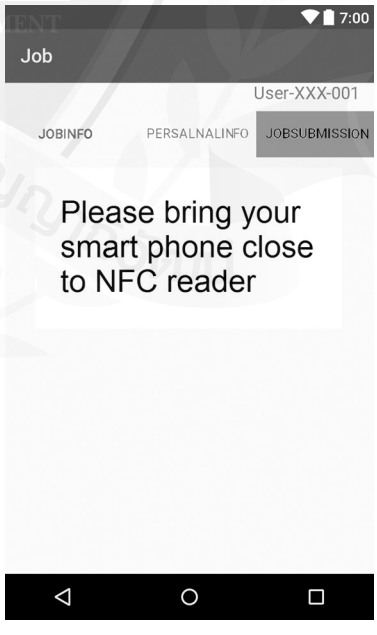

Fig. V. Job submission through NFC

Fig. VI. Details of job submission

V. Evaluation

The evaluation of the prototype system covered three parts: information access, system performance and benefit of the application to society. In the information access part, Information Quality Framework is considered to evaluate the system. The evaluation covers how application enhances the reach of information for people that are far away were able to receive information equally. Information access focused on how application is able to help people to access to information that they looking for. Information is up to date focused on information that people received is the most updated information. Information relevancy focused on information from the application that is related to the tasked that they need to complete. The second part covers how the system performs including: ease of use which means the application is easy to use, speed of the system that is focused on the speed of system to perform the task, correctness of the system that is focused the correction of data that is submitted into the system such as quantities number that users would like to accept for the job.

The third part covers how the application impacts the users and society. In this part participants were asked how application could benefit them including whether the application was helping them to get the job that suited their preferences. This part also concerned whether the application help promoted CSR project in the community and helped improve it to be a better society. The result of evaluation is presented in table 2.

TABLE II
Evalution of phototype system

Information Access		
Question	Average	Range
User is able to receive information from anywhere	4.11	Agree
User is able to access information as preferred	4.04	Agree
Information that provided in the application is up to date	3.92	Agree
Information that provided in the application is relevant to the task	4.25	Very Agree
Information that provided in the application is sufficient for user to complete the task	4.23	Agree
System Performance		
Question	Average	Range
The application is easy to use	3.98	Agree
The application is fast and allows user to complete his task quickly	4.15	Agree
The process of the system is flexible	3.92	Agree
The data that user input into application is correct as it should be	3.96	Agree
Impact of System		
Question	Average	Range
The application is benefit to the society to help people in community to get a job that suit them	4.06	Agree
The application is essential for CSR Project to help create job to support society	3.85	Agree

The ranges are:

Very Agree : 4.25 - 5.00
Agree : 3.75 - 4.24
Neutral : 3.00 - 3.74
Disagree : 2.00 - 2.99
Very Disagree : 1.00 - 1.99

From the result of evaluation, most of participants are agree that the application helped with information access of CSR project to help create job to support society. They were able to receive and access the information of job offering from anywhere at any time to get the most up to date information. The participants were very much in agreement that the application provided relevant information to the job offering such as time, place, location, and detail of product. Lastly the participants agreed that the application provided was able to help user to be able to complete the merchandise/ product to complete their task. The participants also agreed with all aspects in System Performance. The application was somewhat easy to use due to less number of processes to receive information and accept job offer which helped the user to complete the process quicker. Nonetheless the application was also flexible with quantities adjustment function that users were to readjust the quantities of product to produce then the system would distribute the job to other users. The application also ensured correctness of data in the application. Even after job quantities readjustment the system would keep monitoring and controlling data to prevent error from occurring. Finally the participants all agreed that the application was helping promote and support CSR activities such as creating job to support community. They also agreed that the application helped provide necessary information for users that have limitation to be able to get the job that suit their preference.

VI. Conclusion

The prototype of Job Distribution System was developed to be able to divide a large quantity of jobs that could be difficult to accomplish by a single person to a smaller part in which they could choose the quantities that they are able to accomplish. This helps reduce the limitation of manpower, time, cost, and other resources to the level that they could afford to complete the job. Through application that operates on the smart phone this helps enhance the reach and access of information to those people in different locations. People were able to received and access to information at any place and any time. So they can start working at home immediately without having to travel to the company or information center to get the information of the job which will help reduced the cost and time of traveling. Once the users got used to the application, they found that the application had ease of use and flexibility. Furthermore from the experiment, the result showed that the application was able to help distribute the work load to those that needed the jobs. It was also shown that the application is giving the benefit to the society which creates the job for those that have certain restriction. From the organization perspective, it is helped the organization to manage such activities and reduce the time and people to operate the CSR project. The application could distribute information, manage job load and alert the deadline of the job offer which help reduce manpower to run the CSR project. This showed that technology such as mobile application can be beneficial to the organization to help save cost of operating activity such as CSR activity and should be considered to apply to other CSR activities.

VII. Future Work

Currently the application only supports android operating system. The next step is to adjust the application to support other operating systems on the smart phone to be able to distribute information more widely and equaled. The prototype application can be enhance and modified to other CSR project types to help support both organization and community. This will help make a better community where they can support themselves without relying on the organization to support. If many organizations join and use application to promote CSR project then the location service can be used to be the best benefit. The application will alert users when they are closed to the pinpoint location to get the job notification. Other CSR project that the application can be modified to support including Garbage Bank, Community Service, Blood Donation, and so forth.

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