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The Impact of Mobile Technology on Small Service Businesses

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ABSTRACT

This research explores the potential impact of the smartphone as a disruptive technology for small service businesses such as plumbers, painters, and similar businesses. This research postulates that use of mobile technology in these businesses is primarily restricted to phone calls and text messages with limited impact on business processes or operations. The research further postulates that this impact is limited due to a perception of these users that there is little the device can do for them. To address these questions, we will use a Design Science Research (DSR) approach to 1) conduct structured interviews with small business owners to establish the need for mobile technologies to affect business processes and operations, 2) demonstrate that a mobile app for scheduling and tracking can be helpful to these businesses, and 3) create and implement such an app in one or more of the businesses and track its performance longitudinally.

Keywords

Mobile Technology, Small Business, Design Science Research

INTRODUCTION

The modern “smartphone” was first introduced in 2007 in the form of the iPhone, followed by the competing Android phone in 2008 (McCarty, 2011). The smartphone’s interactive computing and sensing capabilities make the device a potentially disruptive technology. Additionally, “apps” for these devices are typically low cost compared to applications with similar capabilities for desktop computers. These capabilities and cost lead one to imagine that apps on these devices could support or transform the operations of traditionally “low tech” small businesses such as plumbers, landscapers, fence builders, painters, and other small service organizations that employ a limited number of people. Potential problems faced by these businesses that could be addressed include scheduling work and crews, tracking inventory, improving billing accuracy as well as other processes important to the productivity and profitability of the organization.

This research explores the impact and potential impact of this disruptive technology on small service businesses. While the penetration of this technology in these businesses is relatively significant in terms of the employer’s and employee’s use of these devices, this research postulates that this use is primarily restricted to traditional communication via the phone and more recently, text messages, and has had a limited impact in changing process or transforming operations. The research further postulates that this impact is limited due to a perception on the part of these users that there is little the device can do for them. To address these questions, we will perform a series of interviews with owners of these businesses which will include the demonstration of a prototype scheduling app.

METHOD

This research will follow a Design Science Research approach (A. R. Hevner, March, Park, & Ram, 2004) and be executed in three distinct phases:

1. Conduct structured interviews with owners and managers of small service businesses, including demonstration of currently available mobile technology to support. The businesses we intend to examine all fit well within the definition of a small business by the Small Business Administration (“SBA,” 2016). However, they may be better considered “Micro Businesses.” While there is no official definition of a micro business they are generally defined as employing less than five people. The organizations in our sample range from two to 30 employees.
2. Following this initial work, we will to develop a mobile app to support scheduling work crews.
3. Once created, the app will be deployed into several of the small businesses interviewed. Once implemented, we will assess the use of the app and refine the technology to improve the support for improving business operations.

Design Science Research

As identified by Hevner (2007), Design Science Research (DSR) follows a three-cycle pattern:

1. **Relevance:** Determine the actual problems existing in the application domain.
2. **Rigor:** Base the creation of an IT artifact on the existing state-of-the-art and knowledge base that already exists.
3. **Design:** Create and evaluate an IT artifact that attempts to solve the problems in the application domain.

DSR provides a strong framework for studying emerging phenomena, such as mobile technology support in small businesses, where existing IT solutions are either weak or non-existent. Further, by having the researcher involved in the creation of the artifact, it allows for improving the artifact based on feedback gained from the evaluation of the use of the artifact in the organizational setting.

Structured Interviews

In preliminary discussion with owners of the targeted businesses it appears that many do not envision that any kind of app can help their business beyond the traditional phone capabilities. This may be due to a limited number of apps designed for such purposes, the cost of those apps, or a lack of knowledge of such apps that could help their business. Again, preliminary discussions suggest all of these reasons may be true. For example, the owner of a fence building business said scheduling jobs and crew was a significant problem for his business and he had looked extensively for an app that would help him perform this task. However, he only looked at free apps because “I never pay for an app.” Other owners did not even look for apps that could help them in their business. However, since the sample size was extremely small, other owners and similar businesses may make extensive use of apps to support their operations.

A multi-pronged approach will be used in an attempt to determine the answer to these questions. The research will be based on interviews with small business owners operating in and around Oshkosh, Wisconsin. The planned sample size is ten (10). Questions will examine areas such as their current practice in scheduling, accounting, tracking inventory, and general business process as well as their current use of smartphone technology. Questions will also focus on their perception of the potential of mobile apps to support or improve their business operations. After questioning we will show them a prototype scheduling app (Figure 1). The app allows the user to enter job information and drag and drop schedule or reschedule a job. The app will also automatically send updated schedule information to the organization’s employees. After demonstrating the operation of the prototype, we will ask them if their perception of the impact of apps has changed at all. Preliminary to interviewing the subjects we will do an extensive search for other small-business technologies that leverage mobile technologies. If we are able to find such apps, we will present the owner with a representative sample of these apps and again ask them if their perception of the impact of apps has changed at all.

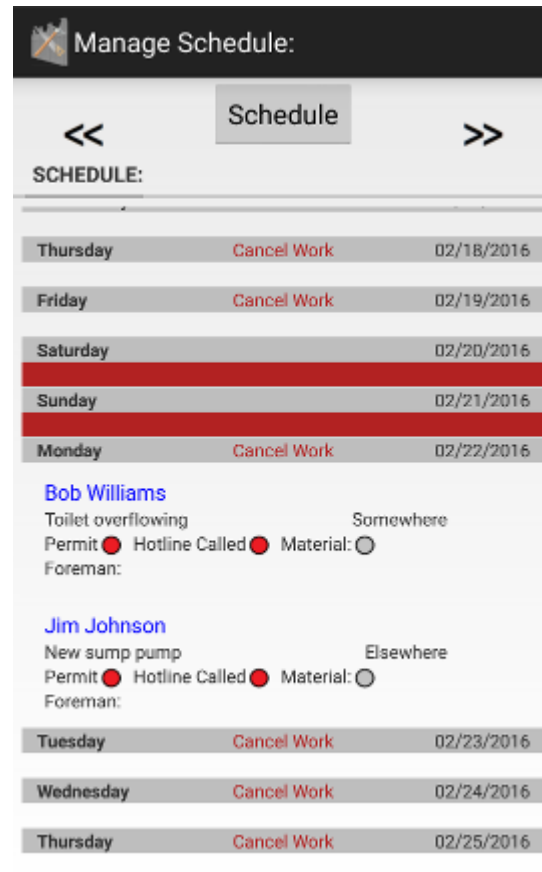


Figure 1. Scheduling App

Implementing the App

Currently, the IT artifact we propose to use has been implemented for Android. It allows managers to schedule work for one or more crews to carry out. The crews can see where their next job is, what materials are needed, and whether necessary permits have been obtained. The communication between devices is handled through JSON objects sent via SMS messages.

As part of the project, we will be adding an iOS version to allow for a wider range of users to be included. However, this necessitates a change in the backend platform as iOS apps cannot access SMS messages. We are currently evaluating various technical options for implementing this backend.

We plan to follow agile development practices (Highsmith & Cockburn, 2001) in order to ensure we can capture the changing requirements surfaced through actual use of the app.

Evaluating App Usage in Companies

Once the app is deployed in the companies, we will monitor success by

- Evaluate business impact through follow-up interviews with owners and employees
- Implementing analytics into the app allowing us to monitor real-world usage

STATUS OF THE RESEARCH

To date, we have conducted one lengthy structured interview with a single company and had several informal discussions with other small businesses. We have found that small businesses that use crews in the field have problems scheduling and tracking these crews. However, the companies also have such a low administrative overhead that it is very difficult to implement technology to change business processes, and are generally lack awareness of the availability of any technology to support improvement to business processes.

We have also developed a prototype mobile app on the Android operating system (Figure 1) and made this app available to one of the companies. However, as mentioned above, the company did not have enough overhead to start using it in earnest.

Based on these experiences we plan to expand the study by

- Conducting additional interviews with more small businesses to further understand the issues faced by small businesses in scheduling and tracking crews in the field (plumbers, painters, landscapers etc).
- Improve the app to be available for both iOS and Android.
- Put this app into use in several of the companies interviewed and then follow whether their use of the system improves their ability to schedule and track the crews. The impact will be examined using the reporting metrics used in the app and follow up interviews after a period of app use.

CONCLUSION

Small service organizations make a significant contribution to the economy in both employment and revenue¹. Improving profitability and productivity of these organizations with mobile technology has the potential to impact the economic well being of the owners and employees as well as the local communities in which they operate. This research explores the potential of this impact.

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¹ Data compiled from the Bureau of Labor Statics Occupational Outlook Handbook indicates that HVAC, Plumbers, Electricians, and Painters employ approximately 1.7 million people and generates over 76 billion dollars of revenue for those employees.