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CLLOUD SERVICES FOR MICROENTERPRISE SUSTAINABILITY – MULTI CASE ANALYSIS

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ABSTRACT

In this study, the opportunity offered by cloud services within microenterprises is investigated. Since the ability of micro-enterprises to adopt technology depends upon the unique conditions in which they find themselves, the goal of this study is to investigate and assess such adoption through a very systematic and contextualized approach. An action research methodology was used to investigate three micro-enterprises in Western New York during a five-month timespan. The contribution of this study is in applying a modified adaptation of the capabilities framework to understand the impact from adopting and using cloud services within micro-enterprises.

Keywords

Cloud, ICT, Microenterprises, Capabilities, Socio-Economic, Development, Technology

INTRODUCTION

In the United States, there are over 25 million micro-enterprises, which encompasses 88% of all businesses. In New York State alone, 90% of all businesses are micro-enterprises. Micro-enterprises have the potential to serve as the seedbed for economic development (Grosh et al. 1996). Yet many micro-enterprises are hindered from growing and functioning efficiently by an inability to use information and communication technology (ICT) effectively (Honig 1998). There is some research that suggest the benefits of ICT use within small businesses (Leong, Pan, Newell, & Cui, 2016; Palvia, Baqir, & Nemati, 2018). Although current literature supporting utilization of technology by small businesses exists, in practice, this is not the scenario in the case of micro-enterprises. Micro-enterprises are resource-constrained – with one of the many areas being the lack of technical skills. Their inability to acquire and use these skills causes them to be at a disadvantage to larger corporations. The challenge for global development lies in enabling these micro-enterprises to adopt the appropriate ICT solution that fits their needs. Often the tools available to them are either too expensive or require more resources than they have available. Cloud services have the potential to enable microenterprises to access needed computing resources. However, the adoption of IT is dependent upon a combination of economic, social and human factors, all three of which are very limited. In this study, we investigate the opportunity offered by cloud services within microenterprises. Since the ability of micro-enterprises to adopt technology depends upon the unique conditions in which they find themselves, the goal of this study is to investigate and assess such adoption through a very systematic and contextualized approach. An action research methodology was used to investigate three micro-enterprises in Western New York during a five-month timespan. The contribution of this study is in applying a modified adaptation of the capabilities framework to understand the impact from adopting and using cloud services within micro-enterprises.

BACKGROUND

Micro-enterprises

Many ICT adoption challenges stem from the very nature of micro-enterprises. A company of one to five employees, one run by a proprietor of limited means, may want for the depth and breadth of skills necessary to gather business intelligence, solve problems, (Qureshi et al. 2009), and the ability to access to networks of capital and professional services (Grosh et al. 1996). Lack of information, against the backdrop of an enterprise’s constantly being on the verge of failure, can foster risk averse and/or fearful behaviors. In two related studies by Wolcott et al. (2007) and Qureshi et al. (2008), it was seen that a group of micro-enterprises were awarded certain technologies through a technology grant program but even after six months, the boxes containing the new ICT devices were unopened. The researchers in those studies discovered that although almost all the micro-entrepreneurs realized that technology can help their business in some way, this realization was not sufficient to drive them or motivate them to incorporate and use the new ICT. One of the greatest potential benefits of technology usage by micro-enterprises is access to new markets, made possible due an increase in internet usage and e-commerce worldwide (Qureshi et al. 2007, Leong, Pan, Newell, & Cui, 2016; Palvia, Baqir, & Nemati, 2018). Training and use of good software further promote growth (Horne, Nickerson, and DeFanti, 2015).

METHODOLOGY

This study uses an inductive interpretive case study (Walsham 1995) to understand ICT adoption and use in micro-enterprises. An action research methodology (Baskerville, 1999) is used to apply ICT interventions within three micro-enterprises in Western New York, a region known for its high poverty levels and lack of resources, and the results analyzed. The research design used is shown in Figure 2 below. As seen in the Figure 2, there are four distinct stages at which activities will be conducted. At T0, the researcher will interview the micro-entrepreneur to understand their past, present, and future use of technology and how the owner thinks ICT could benefit the business. Stages T1 through T3 comprise the action research cycle that will be conducted. At T1, the researcher will once again meet with the micro-entrepreneur to inquire about any of the immediate ICT needs and also get an in-depth understanding of the business. Equipped with that information along with the information obtained from the interviews at the T0 stage, the researcher will then plan what type of ICT intervention would be appropriate to apply to the micro-enterprise. At T2, the actual ICT interventions will be applied. At stage T3, the researcher will evaluate whether the ICT interventions applied to the micro-enterprise actually meets and/or solves the needs expressed by the micro-entrepreneur. If not, then modifications are made and additional ICT interventions are applied.

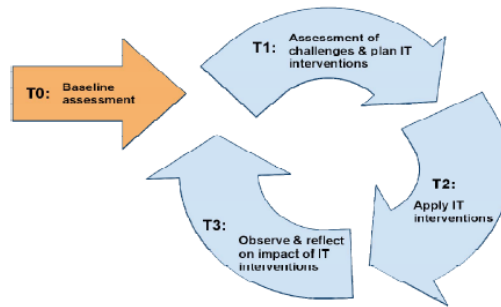


Figure 2. Research Design

Iteration between stages T1 through T3 represents the cyclical nature of the action research approach. The researcher will then integrate all the data from the interviews and observations and carry out a case analysis to understand the nature of the impact in the micro-enterprises from the ICT adoption and use within the context of socioeconomic development.

CASE STUDIES

Three micro-enterprises were selected for this study. These businesses were selected based on number of employees being between one and five and having annual revenues of less than \$25,000. A key selection criterion was the willingness to grow their businesses with technology. The first case is WY, which is a yoga studio that opened in 2017. The owner of WY is the sole employee of the business. The second case is LP, which is a consulting firm that provides services for the cultural heritage field, specializing in preservation environments. This business began in 2017 and besides the owner, has one additional part-time employee, the owner’s wife that assists with the financials. The third case is FH, which is a custom furniture and craft business and has been in operation since 2015. The owner had started the business with the idea of showing people his knowledge and passion of creating unique and finely crafted products by hand. The owner wants to grow his business by expanding all over the world. The owner is the sole employee of the business.

RESULTS FROM THE CASES

T0 – Baseline Assessment

The researcher met with the micro-entrepreneurs and asked questions regarding how they perceived information technology and how they thought their business may benefit from technology. Table 1 gives summaries from the businesses.

WY	LP	FH
<ul style="list-style-type: none"> Eager to adopt new technologies Adapting to new technologies will benefit her business 	<ul style="list-style-type: none"> Positive attitude of technology Overwhelmed with rapid change in IT Insecurity of not knowing which IT to adopt and learn how to use. 	<ul style="list-style-type: none"> The owner shies away from the use of IT unless absolutely necessary. The owner is willing to learn new technology as long as someone can teach him how to use it.

Table 1. Baseline Assessment

T1 – Assessment of Challenges and Plan IT interventions

The interview responses from the T0 stage provide an initial glimpse as to how the micro-entrepreneurs view technology. Once the initial assessment is completed, the researchers then interviewed the micro-entrepreneurs again – with open-ended questions

– but this time with the intention to get a better in-depth understanding of the historical and social context of the business (Table 2 below). Doing so enabled the researcher to decide on appropriate ICT interventions to apply.

WY	LP	FH
<ul style="list-style-type: none"> • Need to promote business via a website and social media • Limited technical skills in developing website and integrating social media • Old website was outdated and non-functional • Need online appointment scheduling. • Outdated hardware 	<ul style="list-style-type: none"> • Limited time to keep up with technology • Limited IT skills • Need to redesign website to be more professional • Need to create & integrate social media presence to showcase projects & travels to client sites • Needed a digital program to create charts for presentation to clients. 	<ul style="list-style-type: none"> • Website isn't professional • No social media presence to promote the business • Owner has little to no IT skills • No means for customer communication • The current website does not allow customers to pay online

Table 2. Assessment of Challenges

T2 – Apply IT Interventions

Based on responses from the T0 and T1 phases, the following interventions were carried out for each micro-enterprise.

WY	LP	FH
<ul style="list-style-type: none"> • Created a professional website to promote business that is easy to update - Wix. • Integrated online appointment scheduling & payment through website • Created and integrated social media accounts on Facebook and Instagram with new website • Taught owner how to maintain website & social media accounts 	<ul style="list-style-type: none"> • Created a professional website to promote business that has better information organization • Created & integrated business social media account on Instagram with website. • Trained owner on incorporating social media live feeds to website • Trained owner on using a digital chart creation application to make presentations to clients more professional – Lucidchart 	<ul style="list-style-type: none"> • Redesigned the website to be professional – WordPress • Created a new social media account on Instagram • Enabled online payment of products through PayPal • Integrated a newsletter sign-up feature into the website. • Trained owner on maintaining the website and social media account

Table 3. IT Interventions

T3 – Observation & Reflection

Following are descriptions of the observations made in both micro-enterprises as the interventions were being carried out.

WY - Over the course of five months during which the ICT adoption was being conducted, the owner of WY showed dramatic improvements. Being the owner and sole employee of this new business, although she had an overall positive attitude towards technology, she did not have much time to devote to technology related issues. Initially, the micro-entrepreneur was confused on how to edit some of the content on her website, and she could not get the calendar feature that she was paying extra for, to work. The micro-entrepreneur did not have much experience with ICT and in the past, would get confused when trying to edit the old website. She was not resistant to adopting new technology but she was unknowing of the correct steps to take which had become her technological barrier. However, after creating the new website and walking her through how to edit it, she was ecstatic and seemed to be more confident and motivated to edit her website and keep it current.

LP – The owner of LP was skeptical about incorporating social media into the business, mainly due to lack of time and knowledge of social media use. However, the researcher showed him a way that would automatically update the website as he posted to the social media platform. The micro-entrepreneur’s attitude about social media is that he is now very excited and ready to start posting pictures of his travels and work. The owner mentioned that in the past, clients that he has worked for have tried to tag him (and his company) in social media posts but have not been able to due to lack of presence. Now they will be able to. Using social media and having it integrated into his website can help him expand and access possibly new clients.

FH - The owner is an older citizen possessing little to no ICT skills. However, this skill barrier was overcome by providing very context-sensitive training and by providing him with very detailed user guides in both document and video format on how to customize/add/edit the new website and social media account as well as how to create and send newsletters to customers. There was no noticeable resistance towards the adoption of the various technology applications introduced. The micro-entrepreneur was very willing to learn what he needed to in order to be able to maintain the website for the business.

UNDERSTANDING SOCIO-ECONOMIC IMPACT OF CLOUD SERVICES THROUGH THE CAPABILITIES FRAMEWORK

Our analysis of the three cases is summarized in table 4 below. The interventions carried out, and outcomes obtained from each of the cases are correlated to Heek’s (2018) adapted capabilities conceptual model (figure 1).

<i>Means to achieve</i> Digital commodities	<i>Freedom to achieve</i> Digital capabilities	<i>Achievement</i> Realized digitally-enabled functionings
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WY		
Online Content Management System (Wix)	Customizable website	Stay connected with existing customers Reaching out to new customers Marketing their yoga services.
Online social media	Online marketing Engaging customers online	The owner is able to use social media to promote the business Can interact with customers through online posts
Online appointment scheduling application	Customizable schedule & booking	Easily & quickly informing customers of upcoming yoga classes Quick scheduling of customers for yoga classes online Easily manage all appointments within the site.
LP		
Online Content Management System	Customizable website	Reaching out to new customers Marketing their consulting services
Online social media	Online marketing Engaging customers online	Showcase business-related travels/project sites Can connect with clients online by being tagged in posts
Online diagramming software	Digital diagrams/charts	Can efficiently create diagrams digitally Save time by reusing digital diagrams previously created Easily incorporate into professional presentations to clients.
FH		
Online Content Management System (WordPress)	Customizable website	Generating awareness to the business products Reaching out to potential customers Facilitating professionalism & credibility through user-friendly and easy-to-navigate design
Online social media	Online marketing Engaging customers	Ability to use social media to promote the business products Can interact with customers through online posts Can promote traffic and subsequent sales through integration with the website
Online Payment (PayPal)	One-click payment for purchases	Payment for products can now be made electronically through PayPal integration on website, saving payment processing time. Added convenience to customers to not have to mail check.
Electronic newsletter subscription (MailChimp)	Customer engagement Product email marketing	Allows easy opt-in choice for customers to sign-up through website Time and cost savings from target marketing to only those customers that opted in to the newsletter. Keeps customers updated on new products and any product promotional offerings.

Table 4. Impact on socio-economic development

Humans are diverse and have different opportunities to benefit from interventions (Sen, 1992). We have to look at what conversion factors (personal, social and environmental) prevent individuals from expanding their capabilities. In ITD projects we can either, design the intervention to fit within the context or design interventions that change the context (i.e. the intervention can remedy problematic conversion factors) (Hatakka and De, 2011). Cloud services enable microenterprises to access needed computing resources thereby serving as the perfect conversion factor to remedy the resource constraint micro-enterprise. Micro-enterprises can achieve greater benefits of increased market access through the use of cloud services as these are easier to use and less expensive than regular systems that require hardware and software to be purchased and implemented. This is evident in column 3 in Table 4 above for all three microenterprises. By utilizing applications such as online social networking sites as well as online content management systems, the micro-entrepreneurs that had very limited IT skills and no prior website development skills, were able to set-up and develop customized website for their respective businesses within a very short amount of time. Cloud services also tend to be very cost effective and offer great scalability. This provides small businesses the ability to grow without the need to worry about hardware and software upgrades. The results of this analysis suggest that cloud services may be useful for micro-enterprises when they support specific needs relating to their challenges as described in each of the cases. The specific applications that may enable micro-enterprises to grow, entail a combination of services as well as features that require low levels of IT skills, training and costs of implementation.

In addition, the approach used to facilitate the cloud service adoption described in the methodology section i.e. going through the phases T0 – T3 served as a supplementary conversion factor to the cloud service digital commodities. Conversion factors will influence both the enablement of potential functioning and the ability of people to utilize the potential functioning i.e. their ability to make choices. What functionings the intervention enables must be evaluated within the context where it is deployed (Hatakka and De, 2011). Accordingly, in order to achieve greater realization of the digital functionings, our approach of cycling through T1 – T3 (figure 2) and context-based technology training as outlined in table 3 helped to build personal confidence in each of the micro-entrepreneurs' technology skills. Subsequently, this allowed them to choose the digital capabilities that will provide the greatest value for their business as outlined in the last column in table 4 and by extension enable them to feel in control of not only their business, but of their lives (Sen 1999).

CONCLUSION

The contribution of this study was in applying a modified adaptation of the capabilities framework to understand the impact of cloud service adoption and use within micro-enterprises. Using the action research methodology coupled with the capabilities perspective enabled us to take a bottom-up approach. Which capabilities may be enabled to enrich people's lives have to come from the users themselves. This means that the analysis has to be individualistic as there will be variations within otherwise heterogeneous groups (both in terms of which capabilities they value and what factors that hinders their choices). In our study, this appropriates to the level of the micro-entrepreneur. The achieved functionings were based on their context, their choice, and their ability to use the technology applications, as they deemed appropriate. The results indicate that cloud services helped to mitigate many of the obstacles micro-enterprises face. But for true growth to take place, the benefits offered by the cloud should be complimented with the micro-entrepreneur's ability to take control of their business with IT using an approach as presented in this study.

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