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USING THE CAPABILITIES FRAMEWORK TO UNDERSTAND SOCIAL IMPACT OF ICT ADOPTION IN MICROENTERPRISES

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ABSTRACT
Technology adoption in micro-enterprises depends upon the unique conditions in which they find themselves. The goal of this study was to investigate and assess such adoption through a very systematic and contextualized approach. An action research methodology was used to investigate a microenterprise 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 nature of the grass-root level impact within the microenterprise from the technology adoption and use.

Keywords
ICT, Capabilities, Socio-Economic, Development, Technology

INTRODUCTION
Micro-enterprises have the potential to serve as the seedbed for economic development (Grosh et al. 1996). 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. 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. Businesses can grow 3.4% faster in terms of sales when email is used for customer communication (Qiang et al. 2006). 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, which are businesses with five or fewer employees, 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 that possess the finances and technical acumen to efficiently run ICTs. 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. 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. The research questions therefore, being addressed in this study are, How can resource constrained microenterprises build ICT capabilities? And, what is the resulting social impact from ICT adoption and use? In this study, we investigate these research questions by analyzing a single in-depth case study of a local microenterprise in using technology to overcome some of their challenges using a contextualized approach. An action research methodology was used to investigate a microenterprise 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 understanding the nature of the grass-root level social impact from the ICT adoption and use.

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, 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 aversive 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). Training and use of good software further promote growth (Harrison et al. 1997). From a macroeconomic perspective, ICT innovations have
the potential to enhance economic growth via self-reinforcing cycles of disruptive change, in which ICT adoption decisions serve as the basis for new business opportunities.

**ICTs, Capabilities, and Development**

This research will draw upon the field of Information Technology for Development (ITD) to understand and assess the impact of ICTs in micro-enterprises. The field of ITD entails the implementation, use and management of Information Technology infrastructures to stimulate human, social and economic development (Qureshi 2005). However, it is first important to have an understanding of what is meant by development. In order to do this, we draw on Sen’s view of development – which essentially considers development to mean an increase in freedom, both the freedoms of what one can do in theory, and the freedoms of what one can actually do in practice. Freedoms are understood as two related things – capabilities and functionings. In simple terms, “a functioning is an achievement, whereas a capability is the ability to achieve” (Sen 1987). From their set of capabilities, a person has a choice about what they seek to realize as functionings; with realized functionings being “what a person is actually able to do” (Sen 1987). According to Sen’s capabilities approach, development can therefore be understood as combining three things. On a broad scale, expansion of the contextual capabilities that provide a context of opportunities. And at a narrower scale, expansion of the specific capabilities an individual can select from, and expansion of the realized functionings they are able to do or be in practice. These differences create the basis to understand the pattern of incremental development. For this study, we use Sen’s capability framework as a foundational lens to assess the impact of ICTs. Heeks (2018) built on work done by Zheng and Walsham (2008) to link ICTs directly to Sen’s ideas. The conceptual model is shown in Figure 1 below.

**Figure 1. ICTs and the Capabilities framework (Heeks 2018)**

In this model, ICTs are considered to be commodities (Zheng and Walsham 2008; Heeks 2018). ICT commodities are a means to achieve functionings such as information, communication, computation, transaction, coordination, etc. Which of these baseline functionalities of ICTs actually becomes a capability in any given context depends on a set of conversion factors. Heeks (2018) outlines the following conversion factors: (i) Personal – an individual’s resource endowment, (ii) Social – the institutional and other structural conditions in a particular context, and (iii) Environmental – including geography, human/technological infrastructure, and other public goods and resources. Then, from among the digital capabilities – what an individual is able to achieve with ICTs – they will choose the particular digital functionings to achieve such as better communication, increased knowledge, etc. Choice is determined by a combination primarily of personal and social/institutional factors, though wider environmental elements may play a role. We use the Heeks (2018) model to make sense of the impact of ICTs in micro-enterprises.

**METHODOLOGY**

This study uses an inductive interpretive case study (Walsham 1995) to understand ICT adoption and use in a micro-enterprise to grow their business and facilitate development. An action research methodology (Baskerville, 1999) is used to apply ICT interventions within a 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-enterprise from the ICT adoption and use within the context of socioeconomic development.

THE CASE

A microenterprise was selected for this study. A key selection criterion was the willingness to grow the business with technology. The microenterprise is a custom furniture and craft business which has been in operation for the last five years. 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 show that taking the time to make products by hand is the best way to give customers the best craftsmanship they can get and to show the difference between handmade and machine made. The owner wants to continue to grow his business for the future by expanding his business all over the world and continue to give current and future customers the best products made. The owner is the sole employee of the business.

RESULTS FROM THE CASE

T0 – Baseline Assessment

The researcher met with the micro-entrepreneur and asked questions regarding how he perceived information technology and how he thought his business might benefit from technology. Table 1 gives a summary of the findings.

- The owner shies away from the use of IT unless absolutely necessary.
- The owner is confident of his existing knowledge but is “technologically challenged” when it comes to learning new technology.
- The owner is willing to learn new technology as long as someone can teach him how to use it.
- The owner realizes that in order to reach more customers, technology will be an integral part of his business.
- Being able to grow his business through an online platform with improved features to attract new customers and drive sales is important for the owner.

Table 1. Baseline Assessment

T1 – Assessment of Challenges & Plan IT Interventions

The interview responses from the T0 stage provide an initial glimpse as to how the owner of the business views technology. Once the initial assessment is completed, the researchers then interviewed the owner 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.

- The current website does not allow customers to pay online thereby limiting customer convenience. Payments either need to be mailed in via check or made in person.
- No social media presence exists to promote the business thereby limiting exposure/awareness to prospective customers.
- Very cluttered and confusing product menu
- Overall website layout is not professional
- The owner has little to no technical skills in developing website.
- No means to communicate with existing and/or prospective customers about products.
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 the microenterprise.

- Redesigned the website to be professional & user-friendly to promote the products of the business. This was done using WordPress which is a content management system.
- A new logo was also created and placed on the website.
- Enabled online payment of products through PayPal via new redesigned website. Added PayPal Pay Later plug in to give customers the option to make payment in installments. This is especially helpful for larger custom furniture products.
- Incorporated a “Compare Products” feature that allows customers to select multiple items to view on one screen and make an informed decision prior to finalizing purchase.
- Integrated a newsletter sign-up feature into the website. This will allow interested customers to sign up to receive updates of new products being offered. The email marketing will be done using MailChimp.
- Created a new social media account on Instagram to promote the custom furniture products and engage potential customers. The social media account was also integrated into the newly redesigned website.
- Trained the owner on how to maintain the website, and social media account, as well as how to create/send newsletter.

Table 3. IT Interventions

T3 – Observe & Reflection

Over the course of five months during which the ICT adoption was being carried out, the micro-entrepreneur continued to show a positive attitude towards incorporating technology into his business operations. He understood the importance of technology and that it would play a critical role in helping to promote the business and reach new customers. The micro-entrepreneur 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. With the new redesigned website being much more user-friendly and ease to navigate, it is hoped that it will attract customers.

UNDERSTANDING SOCIAL IMPACT THROUGH THE CAPABILITIES FRAMEWORK

Our analysis of the case is summarized in table 4. The interventions carried out, and outcomes obtained from the case are correlated to Heek’s (2018) adapted capabilities conceptual model (figure 1). Humans are diverse and have different opportunities to benefit from interventions. This is essential in our analysis of ITD interventions. “We are deeply diverse in our internal characteristics (such as age, gender, general abilities, particular talents, proneness to illness, and so on) as well as in external circumstances (such as ownership of assets, social backgrounds, environmental predicaments, and so on)” (Sen, 1992). In our analysis, we have to take this into consideration and 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). It then appears that the phases we carried out and described in the methodology section above i.e. T0 – T3 serve as an integrated conversion factor. These phases together provided the requisite information as to the challenges faced within the micro-enterprise context. The challenges identified, lead systematically to applying the right intervention to ameliorate the situation. For example, one digital commodity was an online content management system. Phase, T1 revealed the reasons behind the need for the digital commodity. Phase T2 enabled the digital commodity to transform into a digital capability through the outcome of a new redesigned customized website for the micro-enterprise. 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 methodology of cycling through T1 – T3 (figure 2) and context-based technology training as outlined in table 3 helped to build personal confidence in the micro-entrepreneur’s technology skills. Subsequently, this allowed him to choose the digital capabilities that will provide the greatest value for his business as outlined in the last column in table 4. This idea integrated with the data outlined in table 4 is represented by figure 3 following table 4 below.

<table>
<thead>
<tr>
<th>Means to achieve Digital commodities</th>
<th>Freedom to achieve Digital capabilities</th>
<th>Achievement Realized digitally-enabled functionings</th>
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24th Proceedings of the Southern Association for Information Systems Conference, Myrtle Beach, SC, USA March 18th–19th, 2022 4
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 Payment (PayPal) | One-click payment for purchases
---|---
- Payment for products can now be made electronically through PayPal integration on website
- PayPal option to “Pay Later” through installments option integration on website
- Saves time in processing payment
- Added convenience to customers to not have to mail check.

Online Product Comparison | Product comparisons
---|---
- Ability to easily compare multiple products on one screen
- Ease of site navigation
- Facilitates consumer purchase decision

Online social media | Online marketing
---|---
- The micro-entrepreneur is now able 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

Electronic newsletter subscription (MailChimp) | Customer engagement
---|---
- Customer email marketing
- Allows easy pop-up opt-in choice for customers to sign-up through website
- Email list is auto-generated through customer subscription list.
- 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. Social Impact based on Capabilities framework

Figure 3. An approach to understanding social impact of ICT adoption in microenterprises through the capabilities framework

The analysis presented in this in-depth case study can then help us outline a number of implications that can shed preliminary light on using the capabilities framework as a lens to understanding technology adoption and use for socio-economic development at the grass-root level within the context of resource-constrained microenterprises.

1. The capabilities framework moves us beyond just focusing on rolling out ICT infrastructure – which is just a means to achieve – and beyond just the ability to access and use ICTs – which is a freedom to achieve – to think what is actually achieved by using ICTs i.e. the decisions and actions and results of those actions.
2. The framework also recognizes the enablers and barriers – skills and money; cultural norms and one’s position in society; extent of infrastructure – that intervene between the technology and its effective use; and also, the personal choices people make about how to use ICTs thus linking in to ideas about motivation.
3. The capabilities perspective demands a particular approach to ITD design. Socio-economic development is no longer generic but should be brought down to the level of the individual. Discovering this requires a “radically participatory, bottom-up approach” to ITD design and implementation (Klein et al. 2012). One that involves all beneficiaries; one that starts by discussing goals and values rather than jumping to focus on the technology; and one that retains involvement of beneficiaries throughout. This idea was operationalized in our study through the steps, T0 – T3 (figure 2).

4. A capabilities perspective on ICT also gives a rather different view of impact and evaluation. Instead of asking “What is the impact of ICTs?” in some general sense, a capabilities-oriented evaluation would ask, “To what extent do ICTs help people achieve the things they value doing or being?” “ICT usage patterns represent the choices people make about what is important to them and how they use technology to meet those needs” (Rangaswamy and Cutrell 2012). From a Senian viewpoint, then, these are developmental; they represent ICTs increasing freedoms: both substantive freedoms as ends in themselves, and also, instrumental freedoms in helping develop competencies which are means applicable to other developmental uses.

CONCLUSION

The ability of resource-constrained microenterprises to adopt technology depends upon the unique conditions in which they find themselves. In this study, we investigated and assessed such adoption through a very systematic and contextualized approach. The contribution of this study was in applying a modified adaptation of the capabilities framework to understanding the nature of the grass-root level social impact within the microenterprise from the ICT adoption and use. 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 his business context, his choice, and his ability to use the technology applications, as he deemed appropriate. Using a bottom-up contextualized approach, we captured the functionings that the technology interventions actually enabled, and not just how the outcome maps against the implemented intervention. This study provides insights for both academia and practice. For academia, the integration of the action research steps outlined along with the capabilities framework perspective presents a better lens for social development analysis at the individual level. It is better in the sense that the focus is on ends and not means, the case study is viewed within the context where it is deployed and we gain a better understanding of why and how social development come about. For the practitioner community, insights from this study can be used when planning and initiating ITD projects. The action research-capabilities perspective will focus practitioners’ attention to all aspects of the intervention, including the context (conversion factors) and the notion of choice. Future studies will entail a longitudinal monitoring of ICT use and its subsequent social impact within the microenterprise.

REFERENCES