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The Role of an Effective IT Intervention for Micro-enterprises

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ABSTRACT

Information technology (IT) interventions for micro-enterprises are fragmented and their approach lacks theoretical foundations. While various researchers have conducted studies on the effects of IT adoption in micro-enterprises, little research has been conducted to explain critical aspects of an effective IT intervention for micro-enterprises from a theoretical perspective. This study aims to fill this gap and empirically investigate how IT interventions can effectively facilitate the process of IT adoption by micro-enterprises. This paper suggests that effective IT interventions may have considerable potential for facilitating IT adoption among micro-enterprises across the United States and the world. Following an analysis of four micro-enterprises using a theoretical lens developed from Actor Network Theory, this paper provides insight into the ways in which IT interventions can improve the ability of micro-enterprises to adopt IT to benefit and grow their businesses. The key contribution of this study is an analytical model that may assist researchers and practitioners in examining the effects of their IT interventions. This has implications for effective IT intervention policy development and implementation for micro-enterprises.

Keywords

IT for development, effective IT intervention, micro-enterprises, actor-network theory, translation

INTRODUCTION

Micro-enterprises are commonly defined as businesses with five or fewer employees (Association for Enterprise Opportunity, n. d.). They are the base of national and local economies; more than 87% of all businesses in the United States are micro-enterprises (Association for Enterprise Opportunity, n. d.). Smaller enterprises have been generating proportionately more jobs than larger enterprises (Hart, 2000). In addition, Micro-enterprises can serve as the seedbed for medium or large enterprises (Grosh and Somolekae, 1996) and foster sustainable community development (Vargas, 2000). Recognizing that micro-enterprises contribute to boosting and stabilizing national and local economies, the US government has operated various kinds of business support programs for micro-enterprises, including business training and micro-loans (Servon, 2006; Schreiner and Woller, 2003). According to Servon (2006), the US micro-enterprise support programs face various challenges such as fragmentation, insufficient data and narrow product lines. As far as information technology (IT) is concerned, support programs for micro-enterprises are very limited in its number and approach; the current IT intervention for micro-enterprises is fragmented, and its effectiveness is uncertain. An IT intervention can be defined as the act of intervening or interfering with the intent of facilitating IT adoption and utilization. Any IT intervention that lacks theoretical and empirical foundations with regard to their design and approach may lead to poorly designed programs and haphazard implementation schemes that do not account for various contextual challenges faced by micro-enterprises, resulting in projects which fail to meet their objectives. Hence, a need to understand critical components of an effective IT intervention is compelling.

IT, if appropriately adopted, can bring about various positive effects, including increased efficiencies of production and enhanced market reach (World Bank, 2003). However, micro-enterprises face various challenges with regard to their IT adoption, including lack of funding, knowledge, and confidence (Wolcott et al., 2008). Understanding what kinds of challenges micro-enterprises face about their IT adoption and how IT interventions can help micro-enterprises adopt IT by overcoming these challenges is important in terms of visioning an effective IT intervention. An effective approach may facilitate micro-enterprises' successful IT acceptance. While there has been significant research on the effects or outcomes of IT adoption by micro-enterprises (Kamal, 2009; Kamal et al., 2010; Qureshi et al., 2008, 2009), little research has been conducted to explain what an effective IT intervention for micro-enterprises would look like, through a theoretical lens. Previous research (Kamal et al., 2010; Qureshi et al., 2008, 2009; Wolcott et al., 2008) indicates that IT Therapy, a new IT intervention approach, assisted micro-enterprises in their IT adoption in some respects. IT Therapy is a pilot project that provides micro-enterprises with IT assistance and explore a (better) way to help micro-enterprises adopt IT solutions to grow their businesses. Since the IT Therapy process has been documented in prior studies (Wolcott et al. 2008, Qureshi et al. 2008), this paper will not go into detail about the actual process of applying the interventions. The findings of this study expand on this previous research and elaborate on

how IT Therapy facilitates micro-enterprises' IT adoption by showing how and in what context IT Therapy helps micro-enterprises overcome critical obstacles that hinder their IT adoption.

This study tries to bridge the gap: What makes an IT intervention for micro-enterprises effective is not given much attention nor examined theoretically and empirically. This paper aims to study what role an effective IT intervention should play during the process of IT adoption by micro-enterprises. The study tries to address the following research question: What are critical components of an effective IT intervention in facilitating the process of IT adoption by micro-enterprises? In other words, what role should an effective IT intervention play in order for micro-enterprises to adopt IT? To answer the research question, the paper draws on Actor-Network Theory (ANT) by considering the process of Translation, which is composed of four process elements: Problematization, interessement, enrollment, and mobilization. ANT provides an analytical framework to explain the process of micro-enterprises' IT adoption and the role of an effective IT intervention during the process; a primary focus of ANT is to try to trace and explain the processes whereby actors get problematized, interested, enrolled and mobilized, leading to a new network of aligned interests (Walsham and Sahay, 1999).

In addition, this study enables the challenges, including lack of knowledge, time, funding, and confidence, to be investigated as the micro-enterprises go through each phase of the translation for their IT adoption. An effective IT intervention should help micro-enterprises overcome these challenges by providing them with relevant verbal persuasion, guidance, IT solutions, and trainings through relevant social interaction with micro-enterprises. Based on the findings, implications are suggested for scholars and practitioners and future research directions. The following section develops the theoretical lens through which a set of propositions are developed that enable IT interventions in micro-enterprises to be investigated. The processes of translation in micro-enterprises are identified through an interpretive case study approach developed in the methodology section. Through an analysis of four micro enterprises, the role of IT interventions on IT adoption is analyzed.

THEORETICAL BACKGROUND

IT, if appropriately adopted, can bring about various positive effects, including increased efficiencies of production, enhanced market reach, improved delivery of government services, and increased access to basic social goods and services (World Bank, 2003). Matthews (2007) noted that IT plays an important role in the growth of enterprises by contributing to profitability and by offering "foundations for the evolution of operations from a micro to a medium level" (p. 817). According to Qureshi (2005), IT can increase access to information and expertise, competitiveness and access to markets, administrative efficiencies, learning and labor productivity, and reduced poverty. IT can facilitate both social and economic development by enabling information and knowledge transfer (Duncombe and Heeks, 2002; Qureshi, 2005; World Bank, 2003). Qureshi (2005) suggested a model of IT for development that shows a process by which social and economic development activities can be accelerated by adopting relevant IT. According to Duncombe and Heeks (2002), IT can play a role as an intermediary in providing relevant information on markets, customers and suppliers for rural micro-enterprises. E-business adoption can provide small and medium enterprises with increased access to new markets and reduced costs through administrative efficiencies (Brown and Lockett, 2004).

Association for Enterprise Opportunity (n. d.) defines a micro-enterprise as a business with five or fewer employees, requiring $35,000 or less in initial capital. According to AEO, there are an estimated 24 million micro-enterprises in U.S. today, representing 18% of all private employment and more than 87% of all businesses in U.S. Although micro-enterprises have been considered as the base of national and local economies, relatively little attention has been paid to understanding their IT adoption and use. If it is assumed that micro-enterprises significantly contribute to national and local economic growth and that IT enables micro-enterprises to grow, then studying micro-enterprises IT adoption and related issues is compelling.

Previous research on micro-enterprises' IT adoption identifies significant evidence that IT helps micro-enterprises operate in a more efficient and effective fashion (Kamal, 2009; Kamal et al., 2010; Qureshi et al., 2008, 2009). Kamal et al. (2010) developed a conceptual logic model to show how IT adoption by micro-enterprises can lead to long-term economic development and poverty reduction and empirically investigated short-term effects of IT adoption on micro-enterprises that are suggested by Qureshi (2005). Qureshi et al. (2008) provided insights about how IT can bring about sustainable business improvement in micro-enterprises. Qureshi et al. (2009) empirically investigated how IT adoption by micro-enterprises can enable them to achieve and increase competitiveness, based on the resource based view of the micro-enterprise to develop a model of micro-enterprise growth through IT. These studies define a role for the IT professional to be that of an "IT Therapist" who works together with the micro-entrepreneurs to understand and assist in supporting the micro-entrepreneur in adopting IT to grow their businesses. The role of the IT therapist is different from that of a consultant in that the IT therapist works to help overcome fear of technology and assist in developing the micro-entrepreneur's capability to use technology to grow their business.

However, IT adoption by micro-enterprises is limited due to various challenges they uniquely face (Qureshi et al., 2009; Riemenschneider et al., 2003; Wolcott et al., 2008), including lack of funding and knowledge and skills (Duncombe and Heeks,

2003). Few micro-enterprises have information systems needed to support their business operations (Qureshi et al., 2009). While micro-enterprises can serve as the seedbed for overall economic development (Grosh and Somolekae, 1996), they have to overcome lots of challenges that inhibit their IT adoption (Qureshi et al, 2009). Wolcott et al. (2008) empirically investigated a host of challenges that micro-enterprise face in adopting and using IT and grouped those challenges into six categories: capabilities, resources, access, attitude, context, and operations.

Actor-Network Theory

Actor-network theory (ANT) suggests a socio-technical account in which either social or technical positions are not given a special advantage. ANT denies that "purely technical or purely social relations are possible" (Tatnall and Burgess, 2002, p. 183) and views the world as being composed of hybrid entities, entailing both human and non-human elements (Callon, 1986; Latour, 1987; Law, 1991; Law and Hassard, 1999). Adopting and utilizing IT is, by its nature, a socio-technical interaction (Bostrom and Heinen, 1977). In the field of information systems (IS) research, ANT has been recognized as a potentially useful tool to help understand the complicated social-technical interaction and has been applied to interpret the "social processes associated with technology implementation initiatives" (Sarker, Sarker and Sidorova, 2006, p. 53). ANT focuses on the way in which actors interact in their own interest and the processes by which they put components of their material world together in pursuit of their intended goals (Hardy and Williams, 2007). From the perspective of ANT, the alignment of interests relies on "the enrollment of a sufficient body of allies and the translation of their interests into particular ways of thinking and willingness" to behave according to the prescribed notions of key actors (Hardy and Williams, 2007, p. 160). Hardy and Williams (2007) note that translation is related to the endeavor and outcome of aligning the interests of multiple actors. Callon (1986) elaborates the concept of translation, identifying four critical moments in the translation process: Problematization, interessement, enrollment, and mobilization. These moments are constituted by the different phases of the process of translation; during the process of translation, "the identity of actors, the possibility of interaction and the margines of manoeuvre are negotiated and delimited" (Callon, 1986, p. 203).

The first moment of translation is problematization. During this phase, the identities and interests of actors are defined and are consistent with one or more key (focal) actor's interests called obligatory passage point (OPP) in the network of relationships being built. In other words, key actors try to define the core essence of the pending problems and the roles of other actors to fit a solution suggested. Key actors show that "the interests of other actors lie in admitting the proposed [solution]" (Callon, 1986, p. 205). The problem is redefined in the context of the solutions offered by those key actors that then try to construct themselves as an OPP (Tatnall and Burgess, 2002). As such, problematization indicates the movements or paths that must be accepted by engaged actors (Callon, 1986). In the case of micro-enterprises, we expect that a process of defining the essence of the problems and identifying ways to solve these problems would lead to a better diagnosis of the business problem. Problematization takes place when micro-entrepreneurs recognize relevant IT solutions and related interests or benefits that could enable their business growth. This is done in a participative manner in which the micro-entrepreneur will work with and IT therapist to assist in understanding the problems faced by the business. This leads to the definition of the following proposition: *Proposition 1: The process of problematization in which business problems are redefined in the context of IT solutions would lead to a better diagnosis of the business problem and development of appropriate IT solutions.*

The second moment of translation is interessement and it is engaged in negotiating with actors to accept definitions and descriptions of key actors. At this moment, a series of trials are conducted to determine the solidity of key actors' problematization (Callon, 1986). Interessement entails convincing other heterogeneous actors that the interests defined by key actors are consistent with other actors' interests (Sarker, Sarker and Sidorova, 2006). As such, interessement involves interesting and attracting other actors (Tatnall and Burgess, 2002). Interessement helps force the involved actors to be enrolled and attempts to interrupt other competing alliances and to create a system of new alliances. In the case of micro-enterprises, the process of interessement entails repeated episodes of trial and error in which the micro-entrepreneur is trained to use the technologies available to them in ways that benefit their businesses. Interessement takes place as micro-entrepreneurs undergo some trials that allow them to have a better idea of how IT solutions work and benefit their businesses. The role of the IT therapist, who consults with a team of other professionals, is in assisting the micro-entrepreneur in overcoming their fears and other psychological barriers so that the micro-entrepreneur can take advantage of the technology and other resources. This leads to our second proposition defined as follows: *Proposition 2: The process of interessement enables micro-entrepreneurs to take advantage of technology and other resources so that they can create a system of new alliances to benefit their business.*

The third moment of translation is called enrollment. In this phase, other actors in the network accept the device of interessement imposed on them by key actors (Callon, 1986). The device of interessement does not necessarily guarantee actual enrollment; that is, "it requires more than just one set of actors imposing their will on others (Tatnall and Burgess, 2002); according to Singleton and Michael, it also requires other actors to accept the roles defined for and imposed on them (as cited in Tatnall and Burgess, 2002). According to Callon (1986), "The definition and distribution of roles . . . are a result of multilateral negotiations

during which the identity of the actors is determined and tested" (p. 214). Inscription defined by Latour as "a process of creation of artifacts that would ensure the protection of certain interests" (as cited in Sarker, Sarker and Sidorova, 2006, p. 56) occurs as part of the enrollment process. Other actors, realizing the inscription, are enrolled by "persuasion and incentives through processes of fabrication and negotiation leading to a network of alliances" (Hardy and Williams, 2008, p. 160). In the case of micro-enterprises, the process of enrollment takes place when the micro-entrepreneurs take control of the IT solutions and become comfortable with using them and even implementing some of the solutions they feel would benefit their businesses. The role of the IT therapist is to assist in the development of these solutions and support the creation of the micro-entrepreneurs social identities that result from the use of these solutions. This process leads us to the third proposition of this study: *Proposition 3: The process of enrollment enables micro-entrepreneurs to take control of the implementation and use of the IT solutions they feel will benefit their business.*

The final moment of translation is mobilization. Mobilization occurs as the proposed device of interessement attains wider acceptance among other actors as key actors become spokespersons for others (Tatnall and Burgess, 2002). As whatever technology or solution gains wider acceptance, the newly created network becomes stabilized (Hardy and Williams, 2008). If a consensus is reached, the margins of maneuver of individual entity or actor are tightly delimited, forcing actors to accept the proposed solution (Callon, 1986). At the end of four moments, a new constraining network of relationships is complete. According to Callon (1986), however, "This consensus and the alliances which it implies can be contested at any moment" (pp. 218-219). In the case of the micro-enterprises, mobilization takes place when proposed IT solutions attain wider acceptance among other actors: micro-enterprises and their customers or clients. As IT solutions gain wider acceptance, a newly created network becomes stabilized as the new IT solutions are used for business operations, and more customers or clients are involved with the new solutions or as more business processes rely on the IT solutions. This may allow micro-enterprises to operate in a more productive manner. This leads us to the final proposition of this study: *Proposition 4: The process of mobilization enables micro-entrepreneurs to use the IT solutions to support their daily business operations. As their IT solutions gain wider acceptance with customers, suppliers and potentially other micro-enterprises, the micro-enterprise will be delimited by IT solutions.*

The processes of translation will be investigated through case studies of micro-enterprises in which IT solutions have been implemented in a participatory manner among the actors involved. The process of translation within microenterprises can be identified by asking questions related to the concepts described above and observing these concepts. These are described in the following table:

Process of Translation	*Description*	*Identification*	*Outcomes*
Problematization	Identification of problems	What are the business problems? What are the (IT) knowledge barriers? Do the MEs think they need IT solutions?	Diagnosis of problems
Interessement	Negotiation through trials with new IT solutions	What is a system of new alliances (IT solutions) to solve the business problems? What are the resource constraints in trying new IT solutions and how can they be overcome?	Identification and trial of alternative solutions
Enrollment	Acceptance of new IT solutions	Are MEs technically comfortable with new IT solution? Are MEs confident with potential benefits of new IT solutions?	Development and implementation of IT solution
Mobilization	Wider acceptance of new IT solutions	Are new IT solutions accepted by other actors (i.e., customers and other micro-entrepreneurs)? Are MEs being delimited by new IT solutions?	Adoption and use of IT solution

Table 1: Identifying Processes of Translation in Micro-enterprises

The data will be collected using a framework for the data analysis that draws on the four phases of translation of ANT as shown in Figure 1. ANT is especially useful in understanding the process of IT implementation; the ANT approach raises and helps address questions of how IT implementation "got started, developed and is being performed" (Hardy and Williams, 2008, p. 162). These processes will be investigated in micro-enterprises using a case study methodology described in the following section.

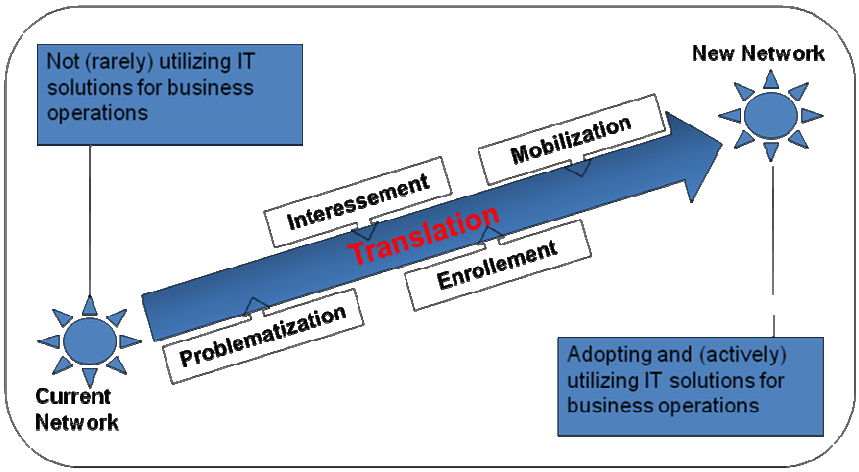

Figure 1: Framework for the Data Analysis

METHODOLOGY

The process of translation in micro-enterprises' IT adoption is investigated using an interpretive research approach. According to Walsham (1995), interpretive research methods are based on the position that "our knowledge of reality is a social construction by human actors" (p. 376). Klein and Myers (1999) asserted that Information Systems research can be interpretive one if it is assumed that "our knowledge of reality is gained only through social constructions" (p. 69) and proposed seven principles for interpretive field research. While most of them were applied to this interpretive case study, it was guided especially by three principles: The principle of contextualization, the principle of abstraction and generalization, the principle of interaction between the researchers and the subjects. The principle of contextualization was adhered to by observing and listening to each of micro-enterprises participating in the research as they described their unique situations related to IT adoption. According to Klein and Myers (1999), the principle of abstraction and generalization requires "relating the idiographic details revealed by the data interpretation . . . to theoretical, general concepts that describe the nature of human understanding and social action" (p. 72). The study involves the concept of translation of ANT to describe the nature of micro-enterprises' IT adoption. Finally, the principle of interaction between the researchers and the subjects requires critical reflection on how the research data were socially constructed (Klein and Myers, 1999); within the context of this study, the principle entailed participatory observations through the IT Therapy process and multiple interviews with each of micro-enterprises during the given time frame.

Site Selection

The intent of an IT intervention for micro-enterprises is to help micro-enterprises that are willing to utilize IT for their business operations but not capable of doing so due to their resources constraints, including time and funding. Hence, four micro-enterprises were selected for this case based on the following characteristics: limited income, resource constraints, and willingness to use IT to improve their businesses. The researchers conducted initial screening interviews in order to select micro-enterprises that satisfy these characteristics. These micro-enterprises were referred through a community partner who knew that these businesses were motivated to adopt IT to grow their businesses.

Data Collection and Mode of Analysis

Data were collected through open-ended interviews conducted with the micro-entrepreneurs and participant observation through real IT interventions. The interviews were developed using Patton's (2002) Interview Guide Approach that calls for the interviewer to have an outline of topics or issues to be covered, but is free to vary the wording and order of the questions to some extent. Three sets of structured interviews were conducted with each micro-enterprise: Initial IT needs assessment, IT Therapy effects assessment, and IT Therapy roles assessment. The initial IT needs assessment was to acquire general information on business operations and IT needs of each micro-enterprise. Data from the initial needs assessment included each micro-enterprise's IT, hardware and software, utilization, general perception and knowledge about IT, computer skills, available resources, and limitations. The IT Therapy effects assessment was to examine behavioral changes and immediate outcomes generated by IT Therapy. Interview questions were about increased labor productivity and administrative efficiency, increased access to market and potential customers, and learning and empowerment. Finally, the IT Therapy roles assessment interviews were to investigate the roles of IT Therapy perceived by the owners of micro-enterprises. Data from the roles assessment include each micro-enterprise's motivation to participate in the IT Therapy project, goal achievement, and roles and limitations of IT

Therapy. A total of 12 interviews were conducted, and interviewers visited micro-enterprise sites to conduct interviews and observe their IT use as guided by IT Therapy.

IT Therapy	*Time*	*IT Therapy Roles*
Initial IT Needs Assessment	September-October, 2008	Related to problematization
IT Intervention	October-December, 2008	Related to Interessement
Effects Assessment	March-April, 2009	Related to Enrollment
Roles Assessment	October-November, 2009	-

Table 2: Timeline for Data Collection

Although structured interviews were initially designed, interviews were conversational in an attempt to get interviewees to further discuss something they have mentioned with regard to the research question (Kvale, 1996). Each interview lasted approximately 30 to 40 minutes and was conducted at the place where the micro-enterprises typically used IT for their businesses. Whenever possible, interviews were audio taped and transcribed immediately after the interviews. Participant observations throughout IT Therapy provide validation of information acquired through interviews, as well as reveal potential mismatches between interview data and behaviors.

RESULTS

Four micro-enterprises are involved in this study: DN, PK, AM, and JT; they received customized IT interventions based on an assessment together with the micro-enterprise owner as to the most appropriate intervention. The interventions took place through a process of IT Therapy. The process of IT Therapy took place through trained practitioners who are able to diagnose, identify alternative solutions, develop or implement these and support the adoption and use of the IT. The characteristics of each of these micro-enterprises and the interventions they received are summarized in the following table.

Name	*Business*	*Initial IT Utilization*	*IT Interventions*
DN	Science Education	Desktop and laptop computers, Internet, QuickBooks, and MS Office	Backup system and wireless networking setup, website building
PK	Life Coaching	Desktop and laptop computers, Internet, palm pilot, MS Office, QuickBooks	Consolidation of tools into laptop computer
AM	Music composition	Desktop computer, Internet	Integrating a music software to keyboard
JT	Decoration	Desktop computer, Internet (only at home), Quicken, MS Office	Website building

Table 3: Characteristics of Micro-enterprises

DN operates a business that sells various kinds of products for science education, which include books, chemicals, kits, rocks, minerals, and so on, and provides science education for children, and offer related workshops to science teachers. DN received IT assistance for building an informational website, setting up a backup system and setting up a wireless network at her home office. In addition, she learned how to build a website for her business. Effects of IT assistance that DN received were about marketing her business and reaching more clients. From the perspective of her clients, her website allowed them to do business with her in a more convenient manner; DN's clients could register and pay online for a workshop or class, making DN's business more effective and efficient.

PK provides coaching services on a one-to-one basis as well as in groups (parents, vitality groups, etc.), including coaching to small business owners whereby the small business owners can get together and share their business plans and acquire ideas and help from one another. The IT assistance PK received was mainly about integration or migration of software into her notebook so that she can use them anywhere, regardless of her physical location. As a result of IT Therapy, PK found herself clearly more focused in using IT. According to PK, IT resources became better organized, and business operations became more flexible, bringing up a higher quality to her services.

AM is a musician who composes a religious music. The IT interventions for AM included basic computer setup and music application software configuration and connection to Keyboard. AM received hands-on instruction about how the application works for his music composition business. IT Therapy allowed AM to be able to do his business in a totally different fashion: From analog to digital. Before IT Therapy, AM used a tape (analog) recording method, but he started to use a computer (digital)

recording method. AM found that the solution saved a substantial amount of time. AM also identified the quality improvement of his product; he mentioned that changing analog recording into digital recording improved the quality of the recording.

And finally, JT operates a store that sells home decorations and gifts. The IT assistance that JT received was building an informational business website and training about how to manage the website. JT identified that the newly developed website let more people know about her business and see what she carried. According to JT, potential customers who found her products through the website have contacted to buy the products.

ANALYSIS OF TRANSLATION: THE ROLE OF IT INTERVENTIONS IN THE IT ADOPTION OF MICRO-ENTERPRISES

IT Therapy in this case study involves various heterogeneous elements, human or non-human. Main human entities include the owners of the four micro-enterprises, customers or clients of the four micro-enterprises, and IT therapists at the University of Nebraska at Omaha. Meanwhile, primary non-human entities include IT, the university, and various solutions offered by IT therapists. The outcomes of these interventions on micro enterprises are illustrated in the following table:

Micro-enterprise	*Technology Adoption*	*Training (Empowerment)*	*Behavioral Change*	*IT for Development Outcome*
DN	Business website, back-up and wireless networking system	Website building and management	Increased computing hours, search for more IT	Access to more clients, increased administrative efficiency, improved service quality
PK	Software tools consolidated into laptop computer	Software tools	Increased computing hours, search for more IT	Labor productivity, increased administrative efficiency, improved service quality
AM	Music composition system	Software tools and web search	Increased computing hours	Increased administrative efficiency, improved product quality
JT	Business website	Website building and management	Increased computing hours	Access to more customers

Table 4: The Outcome of IT Interventions

The process of translation that took place in each micro-enterprise was unique to the way in which each micro-entrepreneur interacted with the IT therapists, the technology and actors in their social network. In this section the process of translation for each of the micro-enterprises will be analyzed based on the above outcomes to determine the role of an effective IT intervention in facilitating the process of IT adoption.

Problematization

As stated earlier, the key actor renders itself "indispensible" in the network during this phase. The key actor in the given IT Therapy situation is IT itself in which various interests, including administrative efficiency, increased access to market and potential customers, and learning and empowerment, are inscribed. IT tries to define its core essence of the pending problems in accordance with its own interest and the roles of other actors to fit a suggested solution. Problematization occurs once other actors recognize their interest to be consistent with that of the key actor. In the given micro-enterprises' IT adoption situation, problematization can occur when micro-enterprises recognize relevant IT solutions and related interests or benefits that could enable their business growth. Our proposition here is that the process of problematization enabled by IT Therapy would lead to a better diagnosis of the business problems and appropriate IT solutions to solve the problems.

The degree to which the four micro-enterprises were aware of the solutions and related benefits of IT varied, depending on the individual contexts of those micro-enterprises due to their knowledge limitations. Some micro-enterprises were aware of issues directly related to IT; for example, DN was aware of what IT would be relevant for her business marketing but didn't have any knowledge of IT solutions and related skill sets to utilize it. JT was in a similar situation; JT recognized a web presence as a business marketing solution but didn't know what to do for it. Meanwhile, AM didn't recognize any relevant IT for his business although he felt that he would need to implement some IT. It was apparent that the four micro-enterprises were undergoing problematization in a sense that they recognized IT as a solution to improve their business operations. However, their problematization was not enough to move forward to trials with appropriate IT solutions to solve their business problems due to their lack of awareness and knowledge.

Recognizing micro-enterprises' lack of IT awareness and relevant knowledge, IT Therapy helped micro-enterprises be (better) aware of relevant IT solutions and its potential benefits that would help grow their businesses so that micro-enterprises could be completely and effectively problematized and move forward. IT therapists investigated and identified micro-enterprises' IT needs, introduced relevant IT solutions to micro-enterprises and informed them of potential benefits that would be brought about

by the solutions. In this manner, micro-enterprises became more clearly aware of their problems and an alternative path or network that would resolve their problematic situations. As evidenced from the cases, an effective IT intervention for micro-enterprises should be able to assist micro-enterprises in entering the stage of problematization by helping them (better) recognize how IT can resolve their business problems, what benefits IT can bring to their business, and what solutions are available for them. This suggests that the process of problematization enabled by IT Therapy did indeed lead to a better diagnosis of the business problems and appropriate IT solutions to solve the problems

Interessement

The second moment of translation is interessement, which is engaged in negotiating with micro-enterprises to accept definitions and descriptions of the key actor (IT). As stated earlier, a series of trials are conducted to determine the solidity of the key actors' problematization at this moment (Callon, 1986) and to interest and attract other actors. In the given IT Therapy situation, interessement can be described as micro-enterprises' experiment with relevant IT solutions. Interessement is hard to occur if micro-enterprises cannot undergo some trials that allow a better idea of how IT solutions work and benefit their businesses. Our proposition with regard to interessement is that the process of interessement facilitated by IT Therapy would enable micro-entrepreneurs to take advantage of technology and other resources.

It was apparent from our cases that micro-enterprises' experiment with relevant IT solutions could not occur because most micro-enterprises, more or less, suffered from lack of resources such as funding, time, and relevant skills. Hence, taking micro-enterprises' resource limitations into account, IT Therapy at this phase helped micro-enterprises experiment with some relevant IT solutions that would meet the micro-enterprises' business needs. For example, IT therapists traveled to the business sites of the micro-enterprises and scheduled the meeting at the micro-enterprises' convenience as much as possible; they explored and suggested open-source (free) software whenever possible; and they empowered micro-enterprises with overall IT knowledge and specific skills. As described at the beginning of cases section, DN could successfully experiment with building of an informational website and setup of a backup system and a wireless network at her home office. The intervention for PK included experimenting with integration or migration of software into her notebook. As far as AM was concerned, the experiment occurred with basic computer setup and music application software configuration and connection to Keyboard. Finally, JT successfully experimented with a web solution that looked appropriate for the building and management of an informational business website. As such, IT Therapy enabled micro-entrepreneurs to experiment with and take advantage of relevant IT solutions so that they could create a system of new alliances (IT solutions) to benefit their businesses.

Undergoing trials and errors, micro-enterprises became accustomed to using IT solutions for their businesses and observed some immediate outcomes or benefits brought about by the IT solutions. From the cases in this study, it was apparent that an effective IT intervention for micro-enterprises should be able to take each micro-enterprise's resource limitations into consideration so that micro-enterprises can experiment with some relevant solutions, become effectively interested, and move forward to the enrollment phase. This suggests that our second proposition with regard to interessement is that the process of interessement facilitated by IT Therapy would enable micro-entrepreneurs to take advantage of technology and other resources, holds true.

Enrollment

Enrollment is the third moment of translation. For enrollment to occur, it requires micro-enterprises to accept the roles defined for and imposed on them. IT solutions themselves do not necessarily guarantee actual enrollment; a series of more certain statements are needed. Micro-enterprises' IT adoption is challenged by their lack of value or personal incentives, confidence and trust (Wolcott et. al., 2008). For example, the micro-enterprises in this case study showed some degree of lack of confidence about controlling the IT solutions imposed on them; they repetitively made sure that they could control the IT solutions offered to them. Our proposition as related to enrollment is that the process of enrollment facilitated by IT Therapy would enable micro-entrepreneurs to feel confident about taking control of the implementation and use of the IT solutions and about creating a new network of alliances (IT solutions) that contributes to their business growth.

IT Therapy offered continuous verbal persuasion to each of the four micro-enterprises that there would be no problem handling and controlling the IT solutions and that additional help would be available for them if they met any technical problems that they could not handle. At the same time, easy-to-understand manuals were developed and offered to micro-enterprises so that micro-enterprises could refer to them as necessary. In this manner, micro-enterprises became more comfortable about taking control of the implementation of the IT solutions offered to them. Meanwhile, IT Therapy continuously informed micro-enterprises of how the solutions would work for their businesses in order to make them convinced that substantial values would be brought about by adopting and utilizing the suggested IT solutions, and thereby to ensure or reinforce micro-enterprises' enrollment in the newly created alliance or network. For example, IT therapists repetitively communicated that DN and JT would reach more clients through Web presence; PK's IT resources would be better organized, and her business would be more flexible, bringing up a

higher quality to her services; and AM could increase administrative efficiency and recording quality through digitalized work process. In this manner, each of the four micro-enterprises could become more confident that they were creating a new network of alliances that would enable them to grow their businesses.

As such, IT Therapy helped micro-enterprises overcome various challenges, including mental factors like lack of confidence and value, and move forward to adopting the IT solutions. It is apparent that an effective IT intervention for micro-enterprises should be able to offer continuously repetitive and relevant verbal persuasion and encouragement so that they can successfully enroll in the new network of adopting and using new IT solutions. This suggests that our third proposition related to enrollment holds true.

Mobilization

The final moment of translation is mobilization. Mobilization occurred as proposed solutions attained wider acceptance among other actors: micro-enterprises and their customers or clients. As IT solutions gained wider acceptance, a newly created network became stabilized. As stated earlier, if a consensus is reached, the margins of maneuver of the individual entity or actor are tightly delimited, forcing actors to accept the proposed solution (Callon, 1986). Our proposition with regard to IT adoption by micro-enterprises is that the process of mobilization would force micro-entrepreneurs to use the IT solutions to support their daily business operations as the IT solutions gain wider acceptance among other actors, including customers and other micro-entrepreneurs, and thereby micro-enterprises operate in a more productive manner.

DN showed how she became delimited by her customers who used her new IT solution, which is her website; a similar situation applied to JT. In case of AM and PK, they were delimited by their own business operations that came to rely on IT solutions. PK mentioned that she would be much more disorganized without the IT solution developed through IT Therapy. AM stated how he was delimited as his business relied on the solution.

The concept of mobilization implies that micro-enterprises can also be delimited as IT solutions get wider acceptance among other micro-enterprises. This mobilization may occur when micro-enterprises observe that more micro-enterprises are utilizing the same or similar IT solutions. Social networking among micro-enterprises that adopt and utilize IT solutions becomes imperative because the social network affects post implementation IT acceptance (Hsieh, Rai and Keil, 2008). IT Therapy tried to build a network among the micro-enterprises that received IT solutions through the process of IT Therapy, so that micro-enterprises could observe other micro-enterprises' IT use and share their experiences. From the perspective of mobilization, this was a relevant approach. Therefore, an effective IT intervention for micro-enterprises should be able to establish a social network among micro-enterprises in order to enable them to observe "the aggregate manifest behavior across one's personal network" (Hsieh, Rai and Keil, 2008, p. 112) and makes them be delimited by the newly created network. This suggests that our final proposition for mobilization hold true in that the micro-enterprises were able operate in a more productive manner as a result of the wider acceptance and adoption of their IT solutions.

Implications for Research and Practice

Depending on how IT Therapy influences micro-enterprises' IT adoption, there are significant implications for scholars and practitioners studying and promoting IT support for micro-enterprises. Scholars and practitioners studying and promoting IT adoption benefit greatly from enhanced knowledge about the context and effects of a new mode of IT support for micro-enterprises. The findings from this study serve to extend knowledge in the area of micro-enterprise motivations. One of the findings in this study was that just offering IT alone is not enough as Hsieh et al. (2008) demonstrated. The consequences of IT implementation depend on compatibility to the context in which it occurs (Avital et al., 2007; Kling, 2000). According to Hsieh et al. (2008), an effective IT intervention requires not only access to technology but also significant social support. The experience of IT Therapy demonstrates that one of the key success factors was that IT Therapy provided "appropriate oral support and guidance" through repeated social exchange (Hsieh et al., 2008, p. 115), based on the unique circumstances and environments that micro-enterprises faced. There are also implications for the importance of strong social networks of IT promotion. As ANT informs, it is imperative that a social network be built to enable micro-enterprises to share information and best practices of successful IT adoption in order to make them mobilized. A personal network exposure motivates people to change (Hsieh et al., 2008). Micro-enterprises may be better motivated by observing how other micro-enterprises adopt IT successfully for their businesses.

Limitations and Future Research Directions

Micro-enterprises were chosen so that they can represent different characteristics of micro-enterprises. Although the triangulated use of multiple interviews helps insure greater trustworthiness of subject reports, there is a chance that the four micro-enterprises chosen may not adequately represent all possible micro-enterprises' IT Therapy experiences. However, the number of cases is acceptable given the exploratory and qualitative nature of this study. In addition, a focus of this study was to investigate an

effective form of IT intervention-IT Therapy-drawing on ANT; the roles IT Therapy played during the translation may not change regardless of the number of cases.

Several directions emerge for further research related to IT interventions for micro-enterprises, which could build on findings from this study. Future research needs to clarify what factors affect micro-enterprises' IT adoption in general, and how effective IT interventions for micro-enterprises could reflect those factors to facilitate IT adoption by micro-enterprises. Although there have been more than 100 studies on IT acceptance models (Lee et al., 2003) since the introduction of seminal theories such as the theory of reasoned action (Fishbein and Ajzen, 1975) and the technology acceptance model (Davis et al., 1989), those models may not adequately explain IT adoption by micro-enterprises (Qureshi et al., 2008). Meanwhile, this study found that social exchange is significant mechanism to motivate and guide micro-enterprises' IT adoption. Future research needs to incorporate relevant social learning theories to attain plentiful insights for an effective IT intervention for micro-enterprises.

CONCLUSION

In conclusion, IT Therapy can serve as an effective instrument for facilitating the process of micro-enterprises' IT adoption. This case study demonstrated how IT Therapy as a form of effective IT intervention successfully facilitated micro-enterprises' IT adoption by intervening through the process of translation: problematization, interessement, enrollment, and mobilization. On the one hand, the lens of ANT was useful in examining and explaining the process of micro-enterprises' IT adoption and the role of IT Therapy. On the other hand, ANT informs what roles IT Therapy should assume. Although IT Therapy tried to build a social network for micro-enterprises' information sharing on IT adoption, the initial network was not sustainable. The phase of mobilization requires that IT Therapy rebuild a sustainable network to promote wider acceptance of IT solutions among micro-enterprises.

The need for tools to facilitate micro-enterprises' IT adoption in the United States has become imperative in the current social, political, and economic environment. Though arguments could certainly be made for a governmental intervention in these matters, the assumption underlying this study is that a greater role for government seems highly unlikely in the current political environment of budget cuts; this means an increasing reliance on non-governmental organizations like the university to provide responsive social services. Understanding the context and mechanism of IT Therapy in this study may be of significance in initiating and implementing effective IT interventions for micro-enterprises.

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