

Chapter XII

The Influence of New Information and Communication Technologies on Transaction Costs of Micro-, Small- and, Medium-Sized Enterprises

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ABSTRACT

This chapter discusses the relationship between the use of information and communication technologies and transaction costs within micro, small, and medium-sized enterprises (MSMEs). The fundamental problem in this relationship is the asymmetric distribution of information. This asymmetry leads to problems such as adverse selection and moral hazards. Thus, the links between ICTs and the improvement of economic performance can be explained based on the capability of these technologies in reducing information asymmetries and therefore increasing firms' competitiveness. In the case of MSMEs, implementing new ICTs help diminish their frequent lack of information. However, the reduction of transaction costs and their better performance depend not only on the use of ICTs, but also on the integration of these technologies in the strategies and day-to-day activities of the MSMEs. For this reason, the training of the personnel and management is crucial when implementing ICTs in these firms.

INTRODUCTION

The links between new information and communication technologies and the improvement of the economic performance of enterprises can be explained based on the capability of these technologies in reducing information asymmetries. Due to the reduction of information asymmetries, it is possible to reduce transaction costs of the respective companies, which is reflected in their economic performance. Furthermore, the new ICTs increase the entrepreneur's negotiating power with his or her customers and suppliers as well as foster the creation of new business connections. From this, there is a contribution to the optimization of the competitive position of companies, which influences their commercial and economic performance.

All these benefits are derived from the adaptation of new technologies in the day-to-day activities of the firm and are perfectly applicable to micro, small, and medium-sized enterprises (MSMEs). In fact, it is within this economic sector where companies can profit most from the implementation of these new technologies. Implementing new ICTs enables companies to diminish the problematic lack of information they often face. In this way, these firms get stronger due to their inherent flexibility (owing to their own small-sized nature), and this in the end represents a differential advantage in the competitive world of business.

However, there is still a debate regarding whether and how the adoption of ICTs reduces transaction costs and improves firm competitiveness. Several empirical studies could not establish a clear correlation between the adoption of ICTs and performance indicators of the respective MSMEs.

This chapter provides the theoretical background and empirical evidence to discuss the relationship between the use of ICTs and transaction costs within MSMEs. It also analyzes different factors that could help interpret the

controversial results of empirical investigations, makes recommendations on how ICTs could be better utilized, and provides insight into future research trends.

THEORETICAL BACKGROUND

Transaction Costs, Economic Development, and ICTs

The transaction costs theory defined by Ronald Coase (1937) in his article "The Nature of the Firm" suggests that the main reason for establishing a firm was the existence of costs for using the price mechanism of the market. As opposed to the principles of Neoclassicism, Coase establishes that market information is not complete and that limited human mental capacity exists for its processing (North, 1995). However, the amount of information is limited mainly because the information spreads asymmetrically. This asymmetry constitutes one of the main reasons for high transaction costs, uncertainty, and therefore deficits in approaching the market. The proper use of ICTs reduces this distribution of inequality by producing the contrary effect, hence leading to the reduction of transaction costs and uncertainty as well as the increase of market efficiency.

Leff (1984) and Norton (1992) establish a clear correlation between transactional costs and development, and telecommunications.¹ Norton bases this relation on two facts. First, in many underdeveloped economies, there exists a lack of information due to its high access costs. Hence, these economies possess poor information markets, leading, as a result, to inefficient decisions. Second, when using telecommunication facilities, the information can flow easier, increasing the market efficiencies by improving the decision-making process and reducing transactional costs.

In an attempt to give a more detailed explanation of the relationship between telecom-

munications, the reduction of transaction costs, and economic growth, Leff (1984) affirms that telecommunications allow for a reduction in the fixed costs of acquiring information as well as the variable costs of participating in the market, thus promoting economic improvement of these organizations using the market.

The increased costs of information transmission lead to a reduction in the quantity and quality of the available information. At this point, the influence of using ICTs increases in importance because it should reduce the cost of acquiring information. This cost reduction illustrates benefits in both the quality and quantity of acquired information, which in turn improve the decision-making processes of the firms. The consequence is an overall increase in efficiency of public and private organizations, finally reflecting generalized economic growth.

In short, the expansion of better telecommunication technologies consequently leads to the reduction of costs in the acquisition of new information. This effect produces a decrease of uncertainty, promoting an increase in arbitrage,² market efficiency, and participation in the market. All these factors also have a direct influence on economic growth.

These affirmations were demonstrated empirically by Norton (1992). In his empirical analysis, which was made by using an equation for determining the level of a country's development and the influence of the telecommunications factor on it, he observed the following:

- There is a strong and positive correlation between the indicators of the telecommunications infrastructure and the respective economic growth.
- Telecommunications increase growth by reducing macroeconomic uncertainty. This issue is demonstrated by the fact that the average number of telephones shows a strong negative effect on the monetary instability of a country.

Thanks to the reduction of transaction costs caused by the use of telecommunications, the efficiency of capital markets and investment channels increased. Norton (1992) finally concludes that, although these data have to be considered with caution, his analyses show that the communication infrastructure is crucial for economic growth. Thus, the communication infrastructure becomes an aid for activities that improve the development and promotion of investments. Nevertheless, this factor is less important than other conventional macroeconomic forces like, for example, stable monetary growth, low inflation rates, or the level of market openness.

Influence of ICT on Business Transactions of MSMEs

As mentioned above, one of the fundamental problems faced when talking about the relationship between transaction costs, ICTs, and economic development is the asymmetric distribution of information on the market. This asymmetry consequently leads to new problems such as adverse selection and moral risks in economic relationships.

Adverse selection occurs when, due to the information inequalities between the buyer and seller, bad products or customers have a higher probability of being chosen. A clear example of choosing bad products due to a lack of information is the case of used-cars sales. In this case, the seller of used cars knows which cars are good and which are bad. The seller looks for chances to take advantage of this information, intending to sell the bad cars by hiding important information to the buyer. The opposite case is the health insurance business. Here, the insurance holder is the one possessing more information about his or her habits and customs, which might endanger his or her health. The insurance holder can hide this information from the insurance company in order to get a lower premium. In this case, the

insurance company bears the risk of choosing a bad insurance holder.

The moral risk is the risk of one contracting party changing his or her behavior and causing damage to the other party after signing a contract. Insurance companies can once again illustrate an example of this problem. After signing an insurance agreement against theft, if the insurance holder suffers an assault, the insurance company, due to a lack of information, has to verify that the robbery really happened.

Information asymmetry leads to problems closely connected to three kinds of transaction costs:

- Transaction costs *ex ante*, that is, previous to concluding a contract. These are the costs of searching for information about business partners and products or services. These costs are related to the adverse-selection issue.
- Negotiation and decision costs that occur during the process of signing a contract.
- Transaction costs *ex post*, that is, costs appearing after signing a contract. These costs are related to the moral-risk problem.

Normally, MSMEs are hardly affected by the information asymmetries mainly caused by the lack of knowledge of the market. However, this problem often cannot be avoided due to the high transaction costs arising by trying to increase the amount of information close to the market where MSMEs are participating. A way to reduce this information asymmetry and to reach positive effects in reducing transaction costs is the use of ICTs. Applying ICTs, MSMEs can reduce the costs of searching for information, negotiating, and controlling. This reduction of costs reduces the information asymmetry and allows small businesses to participate in the market in a more active way. This improved participation leads to a reduced risk of making wrong decisions due to a lack of information.

Flexibility is an important competitive characteristic of the MSMEs that enables them to adapt to fast-changing market environments. Adaptability to market fluctuations is considered to be strongly influenced by the quantity of information MSMEs obtain from their competitive surroundings. In this aspect, ICT's capacity to improve information flowing between companies becomes a promoting factor of the flexibility in this economic sector.

The capacity of a company to acquire customers and suppliers is closely tied to its competitiveness. This is also influenced by the information that flows through the enterprise. The relationship between competitiveness and information is deeply discussed by McFarlan (1984) and Porter and Millar (1985). While McFarlan determines in which way information technology has changed competition in markets, Porter and Millar gives a deeper insight into the role information plays as part of a company's competitiveness. The improved access to market information by using ICTs favors the company's negotiating power with its customers and suppliers. Furthermore, ICTs help strengthen already existing business relations with customers and/or suppliers.

CONTROVERSIAL EMPIRICAL EVIDENCE

Despite the potential benefits of ICTs, there is a debate on whether and how the adoption of ICTs improves the performance of enterprises. While many empirical studies provide evidence of the positive effects of ICT adoption on the performance of the firm (Brynjolfsson & Hitt, 2000; Matambalaya & Wolf, 2001; Müller-Falcke, 2002; Organization for Economic Cooperation and Development [OECD], 2004) Others have shown no relation between computer use and firms' performance (Bitler, 2001). A large statistical survey prepared in 13 OECD countries provides evidence that the use of ICTs has contributed to

improve firm performance in terms of increased market share, expanded product range, customized products, and better response to clients' demand. In developing countries, studies in East Africa (Matambalaya & Wolf) and India (Müller-Falcke) show that ICTs have a positive impact on the productivity of MSMEs.

On the other hand, a study carried out in 1998 by the U.S. Survey of Small Business Finances (SSBF), which focused on firms with fewer than 500 employees, suggests that firm performance, as measured by profit or sales, is not associated with computer use (Bitler, 2001).

Controversial results were also obtained by empirical investigations focusing on the impact of ICTs on transaction costs as well as customer development in MSMEs. Lohrke, McClure Franklin, and Frownfelter-Lohrke (2006) highlighted that MSMEs can apply ICTs to establish direct customer contact, thereby reducing reliance on channel intermediaries for customer support. MSMEs facing high asset specificity in product information transmitted to and received from customers employed the Internet to a greater degree than those facing lower information specificity. These findings highlight the important benefit that Internet use can provide in reducing the transaction costs of MSMEs (Lohrke et al.). The fact that ICTs increase business relations is substantiated by another empirical study published by the United States Agency for International Development (USAID, 2000) regarding projects promoting the use of ICTs in Croatia. One of the study's conclusions indicated that the application of ICTs caused the creation of 285 new business relations on a local, regional, and national level in the participating countries.

In contrast, a large empirical study of 1,915 micro and small-sized enterprises analyzing the impact of ICTs on transaction costs as well as the capability to gain new clients and suppliers shows different results (Bernal Vera, 2005). Based on the research data, the author found it was neither possible to reject nor to corroborate the influence

of new ICTs on transaction costs. Furthermore, a significant correlation between the use of new ICTs and access to new clients and suppliers could not be observed. The main reasons are as follows:

- Despite the high perception regarding the importance of the use of the new ICTs (e.g., the Internet) in managerial activities, these technologies still do not have the usage level of traditional technologies like the telephone. This means that Peruvian MSMEs are still not taking full advantage of the benefits of the new ICTs.
- Even though most of the firms in this survey agreed that the importance of using computer programs for controlling their internal activities was very high, its implementation inside the evaluated enterprises is still at an intermediary stage.
- Regarding the use of the Internet, indicators show a very advanced stage of connectivity of the investigated MSMEs. Furthermore, the great importance of "Internet cabins" as Web connectivity promoters for small enterprises could be proved. However, in spite of the high connectivity indexes, the number of MSMEs that have an active presence on the Internet was very low. This situation shows that these MSMEs are not able to take full advantage of the benefits regarding their commercial contacts that are possible to achieve using this technology.
- It is important to note the low level of investment in new ICTs that is revealed by this study. Although the usage index of these kinds of technologies among the studied firms is high, the lack of investment in both updated equipment and training in the use of new ICTs may limit the future benefits derived from the utilization of these technologies.

The main conclusion of this study is that a high level of ICT infrastructure does not represent a competitive factor per se. ICTs offer tools that,

if used in a proper way, increase the enterprise's competitiveness. For this reason, the demonstration of better economic performance depends not only on the use of these technologies, but also on the integration of these technologies in the entrepreneurial strategies of the MSMEs.

SOLUTIONS AND RECOMMENDATIONS

The claims that the high acquisition costs of the new technologies impede the access of micro and small businesses to them have been losing importance over time. The constant reduction in the prices of hardware, software, and telecommunications has brought along higher accessibility for all current and potential users, including the MSMEs. An excellent example of this matter is Peru, where public access points play a very important role as connectivity promoters for MSMEs. Regarding Internet penetration, Peru is one of the most advanced countries in South America. This is mainly because at the end of the 1990s, there was a rapid expansion of so-called public Internet cabins. According to the Organismo Supervisor de Inversión Privada en Telecomunicaciones (OSIPTEL, 2005), the Peruvian agency for the supervision of private investment in the telecommunications sector, at the end of the year 2005, there were more than 33,600 public Internet cabins all around the country. Due to their quantity and diffusion, these kinds of business units are nowadays the main access point to the Internet in the micro- and small-business sector.

One of the crucial factors that must be taken into account when dealing with the implementation of ICTs in MSMEs is the human factor, especially the capacity of the people inside the organization to assimilate the new technologies and ways of doing things. For these reasons, it is important to develop programs directed toward the acquisition of skills for maximizing the usage of information technologies within MSMEs. In

this way, internal barriers and resistance when it comes to the implementation of a new way of working and interacting with the clients and suppliers is not traumatic and is even proactive. Employees could be trained in such a way that they, by their own initiative, request changes and demand new implementations. Therefore, investment in new ICTs must be accompanied by training programs in the areas of strategy and entrepreneurial planning directed toward these specific kinds of enterprises. This will allow the MSMEs to clearly define both their goals as an enterprise as well as the ways they could benefit from the new ICTs when reaching these objectives. Training programs need to be more focused on managerial understanding and skills for the successful application of ICTs in order to get them integrated (formally) in the business strategy of the firm. The effective integration of e-business approaches in the marketing strategies of enterprises could be a typical example.

Recent studies in countries that are members of OECD (2004) show that most governments provide ICT training or training support. Financial support to cover part of the training costs is a common strategy in governmental training programs. Interestingly, several programs provide training and business consultation services dedicated to enhancing the integration of ICT and business strategies in enterprises. The U.K. Online for Business initiative is an example of such a program combining online training resources with off-line business support services. On the other hand, governments should also develop a favorable business environment that supports private ICT training and consulting providers offering more specialized services at reasonable prices. In fast-changing environments, governmental training programs can transfer basic ICT knowledge to MSMEs, whereas commercial training services may be more sensitive to the more specific needs of their clients.

It is very important to make the MSMEs aware of the strategic importance of using ICTs for

their own businesses in terms of the diminution of transaction costs as well as the differentiation that could be achieved over the competitors by implementing these technologies in an agile way and pressuring the utilization of these features inside their industry. In doing this, active MSMEs can force the exit of weak competitors that are not able to catch up and compete within the new market condition. Being the first in using a certain type of technology can easily develop into the denomination and recognition of being the company setting the standards in the market (or at least in the niche), which is very valuable in developing a successful strategy. As highlighted by Lohrke et al. (2006), MSMEs can use the Internet for establishing direct contacts with customers. MSMEs must take into account the range of possibilities of becoming integrated with their suppliers and clients by offering special services such as inventory administration, logistics coordination, demand forecast, and so forth based on ICT applications.

FUTURE TRENDS

International organizations have cited a myriad of benefits to MSMEs that can be gained from the adoption of new ICTs. Despite these benefits, MSMEs in developing countries as well as in OECD countries have shown different levels of ICT investment and use. The following trends will influence the adoption of ICTs in MSMEs in the near future, and will ultimately lead to a stronger division of ICT and non-ICT users in every economic sector.

- As in the case of Peru, the role played by the state is crucial in promoting the use and importance of new ICTs. In developing countries, the trend will be, from the side of the state, to move a large part of the information flow to the Internet. In this way, the calls and new contracts of the governments will

grow in transparency and accessibility for smaller firms, and enterprises will transfer other contact possibilities to authorities and agencies. Additionally, governments will also choose this information channel for providing information and receiving reports, like tax declarations and license applications. This situation will contribute to increase the motivation of formal registered MSMEs to obtain access to the Internet.

- Another important trend in the role played by the ICTs inside the MSMEs is the new generation's takeover. Young people are more likely to be familiarized with the new ICTs and apply them actively in several situations of their lives. Since a large part of the MSMEs are family businesses, there is a clear trend that the more influence the younger generation of the family clan has over their firms, the more intense the use of ICTs inside of them will be.
- Since the portion of MSMEs in developing countries using ICTs actively is relatively low, those enterprises utilizing them still possess a special feature that gives them a certain advantage when compared to their competitors. The trend in the developing countries will be the gradual recognition of the advantages that the use of ICTs produces, leading to the implementation of ICTs in more and more companies. Simultaneously, the rest of the companies will realize the danger of not taking the adoption of ICTs seriously, for without them, it will be difficult to survive.
- It is expected that those enterprises that are increasing their business activities in foreign countries will reinforce their own presence on the Internet due to strategic reasons; however, for the rest of the enterprises, the motivation of appearing online will remain low since this tool is still not perceived as an advantage and is relatively demanding in terms of time.

Future research can be built on the present findings by investigating the impact of ICT adoption on business performance in different sectors. Small traders or service firms may employ ICTs in different ways as in manufacturing firms. Distributors and retailers will especially benefit from the increasing connectivity of society in developing countries, resulting in new business-to-client interfaces that will be easily applicable for MSMEs.

CONCLUSION

As reviewed in the theoretical discussion, many investigations have tried to demonstrate a relationship between the use of ICTs and economic development. This chapter especially discusses the influence of the ICTs in diminishing transaction costs. There is still an ongoing debate about whether and how the adoption of ICTs helps reduce transaction costs and improves firms' general performance. The demonstration of the reduction in transaction costs and the better performance of firms depend not only on the use of ICTs, but also on the integration of these technologies in the entrepreneurial strategies of the MSMEs. Therefore, training programs in the areas of strategy and entrepreneurial planning must accompany investment in new ICTs. This will allow MSMEs to clearly define both their goals as an enterprise as well as the ways they could benefit from the new ICTs by reaching these objectives. These training programs need to be more focused on managerial understanding and skills for applying ICTs in order to implement business strategies successfully.

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NOTES

- ¹ Although in these paragraphs we use the term *telecommunication*, the concepts can be applied perfectly to the new ICTs.
- ² Arbitrage is the practice of obtaining the advantage of an unbalanced state between two

or more markets: a combination of business operations exploding this disequilibrium with the price differences in the different markets as profit.

ABBREVIATIONS

ICT: Information and communication technology

MSME: Micro, small, and medium-sized enterprises

OECD: Organization for Economic Cooperation and Development

OSIPTEL: Organismo Supervisor de Inversión Privada en Telecomunicaciones (Peruvian Agency for the Supervision of Private Investment in the Telecommunications Sector)

SME: Small and medium-sized enterprise

SSBF: Survey of Small Business Finances

UK: United Kingdom (of Great Britain and North Ireland)

U.S.: United States (of America)

USAID: United States Agency for International Development