

COOPWORKS – A CASE STUDY ON AN INFORMATION SYSTEM MEANT TO ENHANCE THE CAPACITIES OF AGRICULTURAL CO-OPERATIVES

Jussi Nissilä (jussi.nissila@tse.fi)

Jussi Puhakainen (jussi.puhakainen@tse.fi)

Turku School of Economics, Finland

Inkeri Tanhua (inkeri.tanhua@wom.fi)

WoM World of Management

Abstract: In this paper we will present a case of a publicly-funded open source project aiming for capacity building in Kenya and other developing countries, in order to study the rationale of using open source in capacity development. The Food and Agriculture Organisation of the United Nation (FAO) with the financial support of the Government of Finland has undertaken an inter-regional project titled "Development of a Management and Member Information System (MMIS)". The objective of the project was to enhance the capacities of agricultural co-operatives and producer organizations in developing countries to improve their business efficiency and competitiveness in national, regional and global markets through the development and dissemination of a low-cost and marketable prototype computerized management and member information system. The development of this open source licensed prototype software builds on an existing system recently developed within a FAO Technical Cooperation Programme project in one pilot dairy co-operative in Kenya. The MMIS has been given the name CoopWorks – Business Management Information System for Producer Organizations. The case study provides us with first-hand experiences on how open source may be used in capacity building, as well as experiences on the challenges such venture may face.

Keywords: open source software, capacity development, ICT

INTRODUCTION

In this paper we will present a case of a publicly-funded open source software (OSS) project aiming for capacity building in Kenya and other developing countries. The case study provides us with first-hand experiences on how open source software may be used in capacity building, as well as experiences on the challenges such a venture may face. The paper has three goals, namely first to illustrate both the importance of open source and the challenges of adopting open source software in this context. Secondly, the paper illustrates via short literature review the current state of capacity development and its goals and how ICT can potentially help in capacity development. Thirdly, we seek to pinpoint the key challenges in capacity development in the context of the presented case and illustrate the successes and failures of the case project.

There has been a multitude of research on information system adaptation and investment successes, less on failures and recovery (see for example Montealegre and Keil 2001). OSS in developing countries context has also been widely researched. However, there are few articles concentrating on OSS software projects in developing country context that focus on capacity development and reflect on project successes and failures in this context. Thus the nature of the paper is to offer normative insights to any academic or practitioner meeting similar situation.

1.1 BACKGROUND

Free (libre) software and open source software (FLOSS) is a tempting choice for many software projects in developing countries. The lack of expensive licenses for software and independence from major software producers attract projects with limited resources and even countries, who wish for political or economical reasons base their ICT-strategies on “free” software (see for example Weerawarana and Weeratunge 2003, Noronha 2002, Wright 2006). Likewise as naturally the costs of software project do not revolve only around software licenses, nor is the cost the only issue in the growing popularity of OSS in developing countries. “I don’t think the cost (alone) is an issue...But more than price, what matters is the application development. The idea of the openness should be kept there. Openness and sharing...these are great values in themselves”, Pierre Dandjinou, ICT-D Policy advisor for Africa (quoted by Noronha 2002).

Open source software is traditionally developed “to scratch an itch” of the developers themselves (Raymond 2001). This means that software is developed, mostly by voluntary individuals, to solve a problem the developers have themselves. Increasingly, open source software projects are founded also based on commercial motivations, where an entrepreneur or enterprise strives for profit by providing services or complementary products together with open

source software. However, there are many cases where another party is scratching the itch of another, but where also economic sustainable development of the project and high impact of the software are key issues to be taken care of. Unlike voluntary or commercial OSS projects mentioned before, these kinds of projects are usually interorganizational; i.e. there are many developers from different organizations involved, and a complex stakeholder network.

The seeds of this research project lie in the late 80's research project, in which the researchers of the Turku School of Economics, Finland, surveyed Kenyan agricultural coffee and dairy sector co-operatives. The project was funded by Food and Agriculture Organisation of the United Nation (FAO). The general aim of the project was to give normative advice how Kenyan farmer owned co-operatives could enhance their capital formation and management efficiency. There is a long tradition in Scandinavian research on third world co-operatives. For example the Scandinavian Institutes of African Studies published a book as early as 1972 focusing solely on co-operatives and efficiency (Widstrand 1972). The final report of the project suggested computerization as one of the key elements in accomplishing this aim (Jämsén et al. 1999). A decade later this recommendation was put into action.

1.2 RESEARCH METHOD

Our team of researchers was invited to participate and share our knowledge on the key issues of the project, and later contracted to provide research based support for project decision making. At the same time, the team gathered qualitative empirical data of different aspects of the project. The data was gathered mainly with interviews and observation during field missions at the planning phase, the early execution phase, and at the end of the project. In addition, the team had close communication with the project management during the whole project. We use this data as a descriptive case and make an analysis of FLOSS in capacity development.

The main research strategy of this study was case study (Yin 1994; Gummesson 2000). As strong researcher involvement in the research process was required, the type of approach in this study was action research (Gummesson 2000; Gill 1986; Greenwood & Levin 1998).

Although action research is hard to define in a generic way, some accepted guidelines exist. One of the most used definitions is by Rapoport (1970), who describes action research as contributing:

"...both to the practical concerns of people in an immediate problematic situation and to goals of social science by joint collaboration within a mutually ethical framework."

CAPACITY DEVELOPMENT WITH ICT

1.3 ACHIEVING THE GOALS OF DEVELOPMENT THROUGH BUILDING CAPACITIES

Developing countries face many problems: poverty, hunger, diseases, environmental disasters and other problems, such as inequality, corruption, prohibition of association or self-expression, and a lack of educational infrastructure. The discourse about the goals of development refers to efforts of addressing these problems. The Millennium Development Goals are a good example of the goals of an international development program. There are eight Millennium Development Goals that all 191 United Nations member states have agreed to try to achieve by the year 2015 (<http://www.un.org/millenniumgoals/>).

In addition to people's basic needs, such as nutrition and healthcare, Millennium Development Goals emphasize strategic needs, such as education, income improvement, equity, and global partnership. Answering to basic needs equals to surviving and coping with day-to-day life. Answering to the strategic needs, on the other hand, is synonymous to capacity development: finding solutions to strategic needs means building capacities to achieve the future needs, too. According to UNDP, capacity development is the process through which individuals, organizations and societies obtain, strengthen and maintain the capabilities to set and achieve their own development objectives over time (<http://www.undp.org/mdg/basics.shtml>).

It is significant to understand that capacity development requires more than individual skills development. First, individual capacity development covers also such areas as social capital and motivation, which create capacities for an individual to use the acquired skills. Secondly, in addition to skills people need the kinds of opportunities that enable them to use and expand their skills and capacities to the fullest. Without the opportunities, people will find that their skills rapidly erode. Hence, in addition to individual level, capacity development needs to be addressed at organizational and societal levels. (Fukuda-Parr et al. 2002, 9-10) The aim of the societal capacity building is to strengthen the capacities of a society so that the society provides more choices and possibilities for people. The objectives of the societal capacity development can be, for example, facilitation of economic development or providing more equal opportunities for all.

As understood in the composition of the Millennium Development Goals, equity is one of the significant aspects and goals of development. First, equity can be seen as a societal capacity: equity creates more opportunities for individuals. Equity benefits also the process of development. For example, a broad sharing of economic and political opportunities is instrumental for economic growth and development (World Development Report 2006). Equity is also a basic right and a goal of development itself.

To summarize, the aim of capacity development is that individuals, organizations and societies strengthen their capacities to achieve their development objectives. Development objectives referred by capacity development can include such areas as education, income improvement, equity and global partnership. The emphasis of capacity building is both in individuals and in organizational and societal structures.

1.4 CHALLENGES IN CAPACITY DEVELOPMENT

Capacity development takes place through multiple processes in the public sector, civil society and the private sector. Because capacity development is fundamental in the process of development, the importance of building local capacities should be recognized especially in development cooperation projects. However, development cooperation projects are often criticized for not supporting the development of local capacities. For example, Kingsbury, Remenyi, McKay and Hunt (2004, 8) argue that what has been learned about development over the past half century is that much of the development process to date has been inadequate: development fads have changed while the lives of many poor people remain much the same. They affirm that investment in new industries to modernize the economy during the 50's has been inappropriate or inadequate; that investment in education alone during the 60's has in most cases not been sustained to reveal the benefits it could have delivered; that investment in basic needs during the 70's has not been enough or sufficiently applied; that investment in 'getting policies right' to facilitate technology transfer during the 80's has been misguided, mishandled or was simply unsustainable; and that investment in alliances that were intended to achieve sectoral reforms, especially in finance and export-led development, during the 90's has not achieved the sort of gains in development that have led to a sustainable reduction of poverty on a global scale. (Kingsbury et al. 2004, 8-9)

Even though the mistakes made in the past have been recognized, development cooperation projects still suffer from the same problems. For example, many of the recommendations made in the OECD's Development Assistance Committee's (DAC) Principles and Rethinking Technical Cooperation in 1991 have not been implemented in technical development cooperation projects. Instead, technical cooperation projects are still frequently criticized for undermining local capacity, distorting priorities, choosing high-profile activities, fragmenting management, using expensive methods, ignoring local wishes, and fixating on targets (Fukuda-Parr et al. 2002, 8).

Because of the problems faced in the development cooperation projects, there are also strong critiques against the traditional forms of development cooperation. Traditionally, development cooperation is cooperation between the personnel of different development agencies – such as experts, consultants and volunteers – and local stakeholders, such as local government, private sector

and individuals. These donor and recipient roles in development cooperation create an asymmetric relationship. Thereby the development industry often creates objects out of development initiatives rather than partners. However, the old model of development cooperation ignores the fact that an asymmetric relationship can be an obstacle to building partnerships. (Fukuda-Parr et al. 2002, 9-10) The aim to address the problem of asymmetric relationships in development cooperation has also changed the jargon: first the term development aid changed to development cooperation and now the emphasis is on local capacity development and ownership. Fostering local ownership requires the consideration of the role of the development industry and the time-span for development interventions. In addition, it has to be discussed which approaches actually are national and indigenous. (Fukuda-Parr et al. 2002, 14)

1.5 HOW DOES THE USAGE OF ICTs SUPPORT THE PROCESS OF DEVELOPMENT?

Access to information and possibilities to communicate, innovate and learn are significant issues in capacity development. Today ICTs play a significant role in communicating and in using, storing and distributing knowledge. Hence, ICTs have become essential not only for big multinational corporations, but also for individuals and small and medium sized companies. ICTs provide also many possibilities for organizations and companies in developing countries.

The relation between ICTs diffusion and economic development has also been studied and generally proved to be positive (e.g. Indjikian & Siegel 2005). Many institutions claim that science and ICTs could play a key role in alleviation of the problems in developing countries, too. For example, the World Summit on the Information Society (WSIS) member states have committed to investing in ICTs for enhancing socioeconomic development in developing countries, and institutions such as United Nations, World Bank and International Telecommunications Union (ITU) promote ICTs for governments of developing countries.

Though ICTs alone are not an answer for problems developing countries are facing, ICTs can be used as tools for addressing the development goals. The eight Millennium Development Goals can be addressed by ICTs for example in following ways: ICTs can help in eradicating poverty by increasing farmers and traders access to market information, and by increasing efficiency and competitiveness of firms owned by people living in developing countries. Primary education can be supported by increasing supply of trained teachers through virtual training, teacher networks, and by providing educational material through ICTs. Gender equality can be supported by delivering specifically targeted educational programs. Healthcare can also be improved through ICTs by increasing an access to health information. For example, information about HIV/AIDS can be provided through locally appropriate

content in local languages. (World Telecommunication Development Report 2003)

Mark Warschauer (2001) argues that the use of the Internet extends also people's social capital. The Internet provides expanded opportunities for communication and association with broad numbers of people. Some studies show also that those with the Internet access maintain and develop more extensive social networks of contact and support both within and outside the local community. Internet provides a possibility to participate in virtual communities and a new tool for organizing social alliances. For example, many non-profit organizations have Internet sites. Communication through the Internet can also improve communication in civil society, which consists of networks, groups, organizations, and forms of association that exist between the private sphere and the state (Warschauer 2001). ICTs are also one area of innovations. ICT related innovations can be technical, social or organizational.

Overall, it can be summarized that the main role of ICTs in development is in providing information and communication channels to increase awareness, transparency, competitiveness and social capital. New business opportunities can also be created through the information systems, which enhance information processing.

THE CASE: Coopworks

1.6 PROJECT BACKGROUND

The Food and Agriculture Organisation (FAO) of the United Nation headquarters in Rome with the financial support of the Government of Finland has undertaken an inter-regional project titled "Development of Prototype Computerized Cooperative Management and Member Information System (MMIS)". The objective of the project was to enhance the capacities of agricultural cooperatives and producer organizations in developing countries to improve their business efficiency and competitiveness in national, regional and global markets. This was to be achieved through the development and dissemination of a low-cost and marketable prototype computerized management and member information system (MMIS). The development of this FLOSS licensed prototype software was built on an existing system recently developed within a FAO Technical Cooperation Programme project "Computerization of Agricultural Cooperatives and Emerging Producer's Associations in Kenya" where the first version of the MMIS software was developed and piloted in a Kenyan dairy cooperative. Later the MMIS has been given the name CoopWorks – Business Management Information System for Producer Organizations (see www.coopworks.org).

The computerization initiative was build on findings from an earlier study on capital formation processes in Kenyan agricultural cooperatives (see Jämsén et

al. 1999). The study revealed that the cooperative management lacked up-to-date operational information and that the cooperative members did not receive proper information of how their funds had been managed. Low level of computerization was seen as a major obstacle in efficient member capitalization and in improving cooperative business performance. There was need for transparency and competitiveness that information systems would bring. However, in addition to the problems with the affordability of computer systems and the lack of electrical infrastructure in rural parts of Kenya, there was no affordable and suitable software for managing cooperatives. The first computerization project therefore developed a pilot version of such a software product. In the aftermath of the pilot project, the various stakeholders were brought together, and the plan for the follow-up project was jointly negotiated by various stakeholders. The follow-up project was set up in order to further develop the software, and to introduce the software Kenyan agricultural producers and to other countries. The idea was to build the critical mass of users and developers, to develop more modules, and to gather experiences widely – however, due to lack of resources and incompleteness of the software, it was decided later not to introduce the software in any other countries, but to concentrate on Kenya.

1.7 THE SOFTWARE - CoopWorks

The pilot version of the software was developed by a subcontracted Kenyan small software company in collaboration with the management of the pilot cooperative. This first version was already licensed with a FLOSS license. However, only the MMIS software itself was FLOSS, but it was built on a proprietary technology platform. The project had acknowledged that FLOSS licensing would lower acquisition costs, and possibly also maintenance and updating costs. In addition, FLOSS licencing would facilitate local customization, independently from the project or the main developer. One of the key issues recognized already in the early planning phase of the follow-up project was the sustainability of the action in the long run. The project management was worried that once the two-to-three year funding from the Government of Finland would end, the software would not be further developed, supported or marketed. The FLOSS licensing of the software was envisioned to enhance dissemination and adoption of the software by users, developers and also local companies, and thus create a critical mass and a business ecosystem that would independently develop, support and market the software – providing the support framework that the use of CoopWorks would require, but also rousing the local economy. The fact the software stack on which CoopWorks was build was not FLOSS was seen as a problem, because it would increase the adoption costs and impede the planned collaborative development aspects. It was hence decided that a new version of the software would be created, and it would not only provide better usability, security, modularity, and functionality compared to the pilot software, but also be build on nearly all-FLOSS platform, namely WAMP (Windows, Apache, MySQL,

PHP). The platform choice was a compromise between the advantages deriving from the FLOSS nature and the availability of existing user and developer skills and commercial support, which did not favor other FLOSS products.

1.8 PROJECT EXECUTION

The main governing body of the project was the joint coordination committee (JCC), which consisted of the project coordinator and representatives of the main stakeholders, namely FAO Kenyan office, a Kenyan ministry responsible of cooperatives, an agricultural producers' apex (or "umbrella") organization, an ICT companies' apex organization, and a foreign NGO which financed related actions. The JCC was responsible for coordinating the actions related to the project mission, which involved all the stakeholders and not just the FAO. One of the key activities was to disseminate information about the software. This was done mainly by organizing seminars for all potential stakeholders (coops, ICT-sector companies and governmental and producer union officials).

Inside the JCC there was opposing visions on how to manage the software and who to involve in the activities. It was in the interests of some parties to try to keep the management of the joined activities and the software development in the hands of just a few players, where as others thought this would lead to dominance of those players, their limited views and to high service fees supported by monopoly positions. The interviews at the end of the project revealed that there had been power struggle between the project players, and there had been a risk of seizure of power, but that the FLOSS nature of the software project made this kind of ambitions difficult, since the software itself could not be appropriated.

During the project, the JCC organized the development of the second version, which according to all parties was regarded as success. The new software was introduced in two more pilot cooperatives, which with the guidance and training provided by the project were able to successfully adopt the system into their daily use. Members of the JCC also organized many events for various target groups, such as local representatives of the ministry and cooperative management, with the purpose to inform them about the new opportunity CoopWorks now provided. CoopWorks was also introduced to software entrepreneurs, and a handful of them also claim readiness to provide support services if demand exists.

1.9 RESULTS OF THE PROJECT

At the end of the project, most of the JCC members stated that the greatest challenge in front of the wide-scale adoption of CoopWorks in the cooperatives is the quality of staff, namely their skills in managing the investment and recognizing the potential advantages of using a computerized system. It was also the comment from the previous project coordinator that in retrospect the

dairy cooperative sector was probably not ready to adopt the system, and that the project should have had invested even more on training initiatives. For the farmers, the fact that the software was FLOSS was hardly an issue. As such, the project seemed to have too much emphasis on the technology. One reason for this could be the way the project goals were agreed between FAO and the sponsor, and influenced by the various stakeholders such as consultants. Farmers or cooperative staff had little influence on the project goals, and were in fact represented in the JCC only indirectly. However, the project was not designed to be a standard technical cooperation project aiming for the capacity building of the Kenyan farmers, but a project aiming to develop usable software for global usage and therefore having a much larger client group.

Overall, if we consider what kind of cooperative can even be considered a potential client of the CoopWorks system, it is probably a fairly successful and relatively rich cooperative with business-minded management, close to the capital or some other big city. Poor or very small cooperatives can hardly afford the related investments, and those far from the big cities might not have reliable source of electricity or support services available. There is therefore the risk that computerization will widen the chasm between the winners and the losers. However, the pilot cooperatives were the only dairy cooperatives in their region, and therefore their advancement did not worsen the situation of their competitors. In addition, usually farmers are fairly free to join any cooperative they see fit, therefore also the poorest individuals can benefit from the achievements of the successful cooperatives.

Another challenge is that even at the end of the project the cooperatives are very dependant on the staff who know how to use CoopWorks and on the support service providers. This situation does not seem to be changing in the near future – the computer skills of people are generally low and the users and the developers have not reached the critical mass when the support services would be both lucrative and commonly available. However, in theory anybody has the opportunity to study the software, and work in the cooperatives or start providing commercial services for CoopWorks, so this might improve with time.

The original idea of the project was the cooperatives could independently make investment decisions, adopt the information system, and buy services required from local service providers on a commercial basis. In reality, however, the cooperative management is often not able to make investment (note: investment here is for total cost of ownership, not only hardware and software) calculations, or properly understand the potential of ICT; the cooperatives are poor; there are deficiencies in the infrastructure; loans for investments are insufficient or expensive. In addition, interviewed software entrepreneurs didn't consider CoopWorks to be very attractive business for software companies, a fact which limits the availability of services and increases service prices. The cooperatives are therefore not able to make positive investment decisions, but need both

knowledge and financial support for adopting the information system. The situation may change in the future, when marketing and training efforts bring results and the critical mass behind the software increase. It is also possible that the software will be used and developed further by players outside Kenya – it is after all a globally available FLOSS product. However, it is dubious that this would happen by itself. More likely the software will form a basis for other development projects.

When concluding the results of the case project, both the members of the JCC and the research team thought that the project succeeded in many things, but also failed in some. As described above, the cooperatives were not at the end of the project yet able to adopt the software on a large scale, due to problems with investing, skills and affordable services. On the other hand, during the project the software was developed from poor pilot software to a quality MMIS product of global potential, and the participants gained experience from collaboration that will benefit all in the future.

1.10 DISCUSSION

This paper had three goals: namely first to illustrate both the importance of open source and the challenges of adopting open source software in this context. Secondly, the paper aimed to illustrate the current state of capacity development and its goals and how ICT can potentially help in capacity development. Thirdly, we sought to pinpoint the key challenges in capacity development in the context of the presented case and illustrate the successes and failures of the case project.

FLOSS licensing was chosen for the software due to lower the costs of acquisition, maintenance and updating; and to support local customization. In fact, FAO headquarters actively encourages OSS development for the following reasons: a) It is cheaper, b) FAO works with partners in different organizations and member countries, and FLOSS allows everyone to participate in the development or the customization for the specific country. In the beginning of the project however, only the MMIS software itself was FLOSS while other required components were proprietary software. In order to further lower the costs, to promote the adoption, and especially to open up the technology to support the creation of the business ecosystem, the project increased the amount of FLOSS component in the second version of the software. In practice, removing the costly proprietary components did lower the acquisition costs of the information system, but on the other hand, due to relatively low availability of service providers the service costs were high.

The interviewed software entrepreneurs were very excited about FLOSS in general, praising the low costs and freedom it offered. However, at the moment CoopWorks was not considered a very attractive business, mainly because the demand for services was low, and the cooperatives were not able to pay high

service fees. The demand from the cooperatives' side was low partly because of the low availability of services and their high price. It can be said that in this case it was not enough that the information system was almost all FLOSS and therefore affordable, since the other related investments and services proved to be difficult to acquire. It was expected that the situation with service availability and affordability would improve with the increase of user organizations and support providers, but this would demand further effort and financial support from the project until the business ecosystem would reach the critical mass.

The case project had a dualistic nature when it comes to ownership and independence issues. On the other hand, the software was developed in collaboration with a Kenyan cooperative, and the project did heavy collaboration with many local players. It was also the goal of the project that users, developers and entrepreneurs of the developing countries could in the future develop and support the software themselves, taking the responsibility in collaborative ownership. The FLOSS nature of the project did support these aims especially because FLOSS licensing permits free adoption and development of the software, supporting the uptake by cooperatives, learning by staff members, and business development by software entrepreneurs.

There was no doubt that the pilot dairy co-operative and its members felt the system was a success. ICT-generated benefits included lessened transaction costs, improved transparency, better possibilities for management to plan operations and so forth. These are generally seen as classical ICT-benefits and there are very little differences in developing country context.

However, it was also clear that in terms of capacity development, the project was largely a failure. Some individual and organizational development occurred, mainly in pilot dairies. When considering the project resources, this achievement is relatively modest. There is a real danger that the project will stall, and be an example of classical waterfall-project where too much emphasis was paid in technology and project management and too little to actual user needs. It is likely that our case would have benefited from a more iterative approach. Our case does not offer enough evidence to suggest that hierarchical, top down-approach is always wrong, but in this case the rather rigid project planning and management approach is in our minds the biggest explanation why capacity development did not occur, at least at the hoped for levels. When commercial organizations are largely moving toward more iterative, fluid project planning and management, perhaps there is a lesson to be learned here.

Finally, to give the project a final assessment, it is perhaps best classified as a good example what can be achieved with ICT (and FLOSS) in small scale capacity development. Thus, as a pilot project it can be seen as a success.

CONCLUSION

ICT could aid in capacity building, for example by improving business efficiency and competitiveness of farmers' organizations – improving the quality of information created trust and aided in capital formation and increased business performance.

Global development organizations such as FAO are using ICT as part of their technical cooperation, and even participating in software development where suitable and affordable software is not present on the market. They also actively promote OSS, although only in cases where it is viable in terms of available support and skills. However, as the case suggests, there can be lack of proper understanding of OSS, and the full potential of the OSS approach can be forfeit.

The case study suggests OSS is used in capacity building to lower costs of acquisition, maintenance and updating, and to facilitate local independent customization. The role of OSS was deemed important for the sustainability of the action, since projects involving ICT are also prone to discontinuity of capacity building actions as is other development cooperation. In the presented case the project aimed to create a critical mass of users and developers and a business ecosystem to support the software development, support and marketing. This proved to be challenging, since low level of demand causes low level of supply, and vice versa. Our conclusion here is that the low costs and high adoptability of OSS is not enough to create a critical mass and network effects if other related costs are too high. In the case project, the relative poorness of the client organizations also diminished the attractiveness of the business.

The independent nature of OSS creates not only a chance for the actors in the developing countries to carry out their own development and customization work, but also a sort of insurance against power issues. Since OSS cannot be fully controlled by any single party, it may exhort different actors to cooperate with others.

In terms of capacity development, the case project reminded us about the dangers of technology fetish – too strong emphasis on technological issues is inclined to lessen the attention to softer issues, such as education.

We also suggest that in similar computerization actions it is important to evaluate if digital divide between the winners and losers within the developing country is widened with the action, and make an effort to avoid such a situation.

We also point out that rigid project planning and management that has strong focus in producing something tangible in the end, in this case software, may not be an optimal approach.

As a general conclusion we can say that even though computerization in general seems to provide considerable benefits for certain organizations in the

developing countries, the circumstances may render it difficult to invest on information systems.

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