Chapter 7 / Capítulo 7

Digital Cauca: Building Spaces for Competitiveness and the Well-Being of Society through Intensive Use of ICTs

Cauca digital: construcción de espacios para la competitividad y el bienestar de la sociedad a partir del uso intensivo de las TIC

Wilfred Fabián Rivera-Martínez

Abstract

This chapter highlights the partial results of research on Information and Communications Technology (ICT) and development, conducted by the Regional Competitiveness Models Research Group and based on advances in Cauca's ICT sector over the past ten years. This research has raised new questions about the close relationship between ICT, the well-being of society, and regional competitiveness. Partial advances can be seen in the Colombian State's interest in achieving higher levels of competitiveness and economic growth through the use of ICT tools, along with an installed capacity in Cauca that so far has been able to take advantage of this opportunity that will involve a transformation of the means of production and Cauca's society.

All of this points to the building of spaces that foster the construction of a digital society in Cauca, in which people and companies see demonstrable benefits in terms of greater productivity, employment, and income, as well as better education and health services, and a better State-citizen relationship.

Keywords: competitiveness, technology-based companies, development, ICT.

Resumen

El presente capítulo destaca los resultados parciales de la investigación alrededor de las TIC y el desarrollo que realiza el Grupo de Investigación en Modelos Regionales de Competitividad, a partir de los avances que se registran en el sector de las TIC en el Cauca en la última década.

Con esta investigación se han planteado nuevos cuestionamientos acerca de la estrecha relación entre las denominadas Tecnologías de la Información y la Comunicación, el bienestar de la sociedad y la competitividad de las regiones. Como avances parciales se evidencia tanto un interés del Estado colombiano en alcanzar mayores niveles de competitividad y crecimiento económico a partir del uso de herramientas TIC, como una capacidad instalada en el Cauca que, hasta el momento, ha logrado aprovechar esta oportunidad que implicará una transformación en el aparato productivo y en la sociedad caucana.

Todo esto apunta a la construcción de espacios que propicien la construcción de una sociedad caucana digital en la que las personas y las empresas perciban beneficios evidenciables en términos de mayor productividad, empleo, ingresos y mejores servicios de educación, salud y relación Estado-ciudadanía.

Palabras clave: competitividad, empresas de base tecnológica, desarrollo, TIC.

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Introduction

Towards the building of a digital society in Colombia

At the national level, Colombia has defined a technology plan for the period 2012-2014 that seeks to help the country take a great technological leap forward through the spread of the internet and the development of a national digital ecosystem.

With this plan, named *Vive Digital*, the country hopes to transform society and the means of production through intensive use of technological tools. To advance this plan in the regions and among citizens, however, the Ministry of Information and Communications Technology (MinTIC) also seeks to promote access, use, and mass appropriation of ICT through policies and programs that will achieve continuous and sustainable levels of development in all of Colombia's departments.

To fulfill this sectorial strategy, programs such as *Vive Digital Regional* have been created. This initiative seeks to take regions to the next level of technological development and is aligned with the MinTIC's nine government policies. It aims to support the departmental and municipal government plans, as well as their plans of competitiveness and development, by co-financing projects that promote regional innovation and technological development through ICT. To do this, it fosters synergies between the public sector, the private sector, and academia, as well as collaboration among regions on topics related to the Ministry's objectives.

Without a doubt, these attempts to transform society and the business network have the support and resources necessary to sustain the idea of a Cauca society with better opportunities and a more competitive business sector through the use of these tools.

Methodology

The methodology used in this chapter falls within the action research paradigm, or mode 2, in which the community being researched participates and affects the results according to their needs and preferences. This is in contrast to mode 1, or traditional research, which uses laboratory environments to keep external agents under control (Gibbons et al., 1994).

According to the criteria for classifying research suggested by Richardson (1999), this work is descriptive in that it seeks to understand and describe the dynamics of technology-based enterprises along with their contributions to Popayán's society.

This research uses a qualitative approach and a case study methodology for collecting and analyzing data. This methodology is appropriate because it helps in understanding the dynamics of some particular events (Eisenhardt, 1989), allowing

for a more comprehensive understanding of the situation studied (Yin, 2003) and an interpretation that recognizes the logic behind its constitution and development (García & Vanella, 2002).

Three technology-based companies in Popayán were selected for this study, all of which met the following criteria: They were the product of a technological enterprise process; they had been formally constituted; and they had at least one sales operation registered for their products. Additionally, primary information was obtained through the participation of Jairo Erazo, engineer and CEO of ParqueSoft Popayán. Table 7.1 lists the tools and instruments used to collect data during the research process.

Table 7.1 Data collection instruments

Instrument	Description	Variables
In-depth interviews	Semi-structured dialogue between researcher and the main people in charge of the companies studied, allowing for a wide and comprehensive view of the phenomenon	Company history, entrepreneurs' history, view of events that have occurred in the company, organizational culture
Group sessions	Meeting of experts to discuss the topic of technology-based ventures and their implications	Regional context and prospects of technological ventures
Review of documents	Gathering, reading, and analysis of documents that provide information about the company and the context of the documents	Of the company: economic performance, organizational structure, philosophical foundation. Of the environment: support policies and strategies, institutions, socioeconomic indicators in the region.
Field trips	In situ observation of the organizations and the employees' work	Facilities, work atmosphere

Source: Rivera, 2012.

Discussion

ICT as a development tool: Potential and risks

Combining some of the elements touched on above, it is possible to outline ideas that reveal the potential of ICT tools to drive regional development.

ICT as a tools for fostering economic growth

Professor Jorge Sábato (1968), in what is known as Sábato's Triangle, and Henry Etzkowitz (2003), in the triple helix model, posited that the interaction among certain stakeholders is essential for fostering processes of innovation and productivity and to generate greater levels of development in nations. The stakeholders

in this process are: The universities, as producers of knowledge; the State as the supplier of a regulatory framework appropriate for creating conditions for growth that will ultimately drive the country toward a dynamic of sustainable and constant growth; and companies, as creators of new business, employment, and income opportunities.

These relationships, however, demand complete trust as well as technological support to facilitate the flow of information, to identify opportunities, and to take advantage of them. It is proposed, therefore, that using new technologies can not only optimize the work of each stakeholder, but also stimulate and take advantage of the interactions among them. This facilitates the adaptation of global products to local conditions, the identification of local products with global potential, the development of local markets, and access to new markets that allow economic growth.

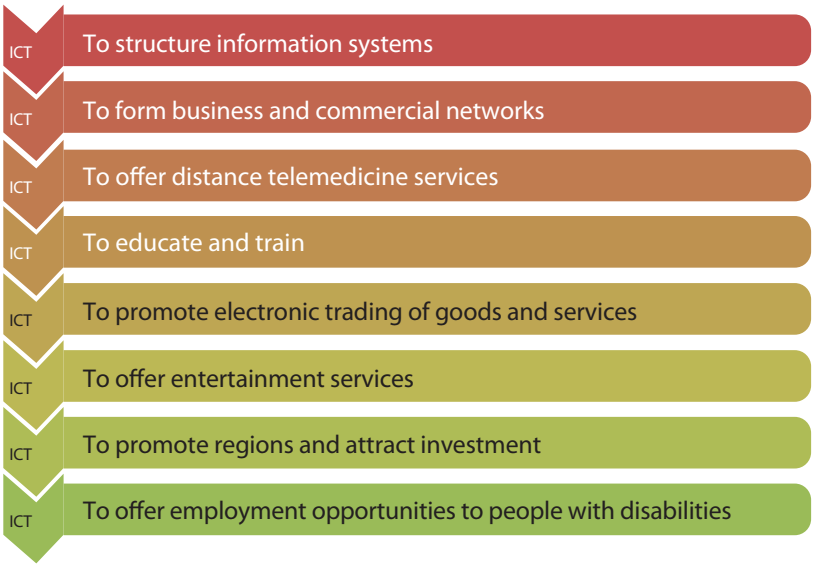
ICT as a tool for well-being and the improvement of social conditions

These technologies, as well as supporting economic growth, can also help improve the population's quality of life. For example, TIC clearly plays a role in making the generation and dissemination of knowledge more dynamic. If information is an essential resource for human development, then ICT has the potential to form part of the basic toolkit for development (Pérez, 2010).

A review of the work done by the World Bank's InfoDev (Information for Development Program) Program helps explain this. The InfoDev program is focused on supporting processes in which ICT is a tool for reducing poverty, promoting opportunities, and strengthening empowerment and growth in developing countries. The report of success stories in this program published in 2003: *ICT for Development Contributing to the Millennium Development Goals*, presents the flagship projects within the program, as well as their impact in terms of access to education, telehealth services, technical training, new markets for small rural producers and entrepreneurs, new work opportunities for people with disabilities, regional marketing, attracting investment, and entertainment.

By studying these exercises, it can be seen that the fundamental contribution of ICT to reducing poverty and inequality lies in the access it offers to a global public, access that is extremely fast and features low operation costs. ICT also provides the opportunity to train and certify people at lower cost; these options, previously unthinkable given the high costs of mass marketing and the relocation that face-to-face training required, are now available to different social strata.

Figure 7.1 ICT applications that benefit society



Source: Rivera, 2012.

ICT as a platform for competitiveness

In more industrialized countries it has been shown that heavy investment in infrastructure for digital connectivity creates the conditions needed to develop new businesses and more efficient forms of interaction. This platform essentially consists of two elements: broadband internet and mobile phone service.

According to the Internet World Stats (2011) report, the penetration of mobile phone service in Latin America was 95% of the total population, and internet access 32%. Meanwhile, in the U.S., the percentages were 96% and 77% of the population, respectively. These figures show that in terms of mobile phone service, the installed platforms are relatively similar in both contexts, whereas a lag exists in internet access due to conditions of accessibility, attainability, and appropriation as mentioned previously.

The same report, however, includes an assessment of strengths and weaknesses in countries' ICT, based on the environment they offer for developing and using these technologies; the readiness and willingness of individuals, businesspeople, and the Government to take advantage of them; and the effective use of ICT by these stakeholders. This index analyzes not only the infrastructure itself, but also the quality and uses that are applied to the infrastructure. The report shows that in this area,

the difference between industrialized and developing countries is much greater; for example, in this ranking the U.S. is in fifth place, while Colombia is in 66th place.

Without a doubt, the statistics show that the frenzied race to implement infrastructure that will facilitate the development of ICT in the country and in Latin America is not accompanied by effective strategies to allow our countries to enter into the global economy, or make meaningful contributions to reducing poverty. Establishing a solid and efficient platform for developing ICT is therefore essential, but it is not enough if these tools are to contribute to regional development.

In the words of Professor Fernando Fajnzylber (1989), when international integration is promoted based on boosting productivity in specific sectors, the foundations are laid for a more competitive region. It is worth adding that this foundation simply offers the necessary conditions; also required is structured planning that leads the productive sectors and society to achieve the expected results.

Technology-based ventures in Cauca. The ParqueSoft example

Although the National Government's strategy is focused on creating a favorable environment for development in society and for competitiveness in the means of production, the entrepreneur is a key player, triggering and boosting the ecosystem of digitally-based ventures.

In Colombia, this phenomenon can be seen in the consolidation of ParqueSoft. According to its creators, ParqueSoft Nation is one of Latin America's main suppliers of information technology (IT) and IT-related solutions, products, and services. Thanks to its wide portfolio, strategic global partnerships, technological resources, experience in different types of projects, and above all its human resources, it is a market provider that could potentially offer complete coverage for demand in IT and IT-related products and services. This makes it one of the most important players in IT project integration.

The purpose of creating a network of technology parks in Colombia was to build a favorable ecosystem for the development of innovation, applied research, rapid knowledge acquisition, and work in leading-edge technology. ParqueSoft thus emerged as an attempt to integrate a model of production processes for goods and services based on industry best practices, in order to meet its business challenges.

ParqueSoft's Network of Software Technology Parks currently includes more than 300 companies specializing in the knowledge industry. This forms a community of over one thousand professionals who develop knowledge products and services and are specialized in the industry's latest technological paradigms, along with

hundreds of others who provide support in professional services, administration, and business development processes.

This organization has set itself the medium-term goal of creating more than 1,000 competitive and productive IT and IT-related companies that export their products and services to international markets, thereby generating 6,000 new permanent jobs in Colombia in a new innovative sector.

On a local level, this initiative was undertaken by local stakeholders due to the technical potential in Popayán. The initiative was created in 2002 with the aim of generating entrepreneurship in the software sector based on the potential of higher education and a skilled workforce. Its objective—to generate employment and create a productive network, starting with the software sector—was one of various productive initiatives in the Cauca department for creating competitive advantage based on a model of innovation, and for projecting an image of itself as a world-class sector. Cauca's Internal Agenda has included the software industry as one of its regional productive initiatives.

The Popayán Software Company Incubator Corporation (ParqueSoft Popayán) therefore arose to encourage the promotion and support of entrepreneurship in digital content development in Popayán and Cauca. It forms part of one of the most favorable ecosystems for innovation, applied research, rapid knowledge acquisition, and work in leading-edge technology, namely, the Popayán and Cauca Ecosystem for Entrepreneurship in Technology-Based Companies.

ParqueSoft Popayán forms part of ParqueSoftNation. This institution is a leader in regional coordination for the sector and serves as a consultant for regional institutions in related subjects. It leads processes of entrepreneurship and has been working to become the spearhead for other entrepreneurship initiatives.

In the vast and still rapidly growing software market, many countries have identified the opportunity to place high added-value products that help create wealth and well-being. Since Colombia, and specifically Popayán, has a tradition of training software development professionals, the software industry has been considered as an option for the Cauca department's economic development.

In the case of Colombia, and specifically in Cauca, one of the standout initiatives in software enterprise and industry development has been the creation of a Software Network. Started in 2006 in Popayán, it now includes 20 entrepreneurs from the sector.

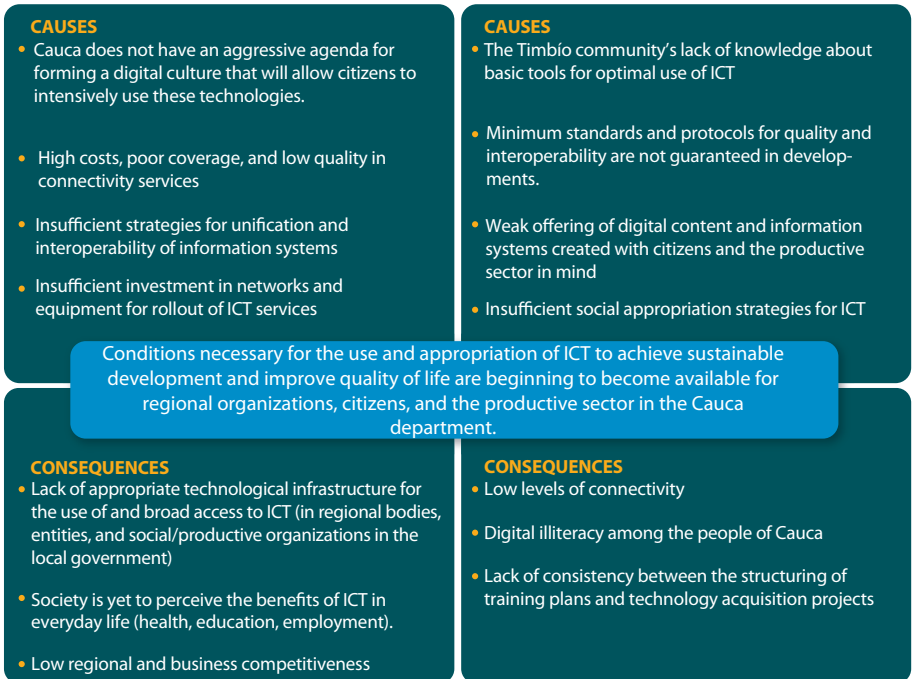
Results

In principle, the process of building a digital society in Cauca has advanced on two fronts of prime importance: The concerted creation of a diagnostic review of ICT in Cauca; and the development of important dynamics that provide concrete solutions to problems presented.

First, the diagnostic review conducted in the ICT sector can be summarized using a problem tree (Figure 7.2) that shows the central problem, its causes, and consequences.

Based on the situations identified, and given the limits on maximizing the intensive use of ICT in the department, different projects and programs have been developed in Cauca to help construct a digital society. The following advances have been achieved in this area.

Figure 7.2 ICT diagnostic review - Problem tree



Source: Rivera, 2012.

Together, the initiatives in Table 7.2 represent approximately COP$21,000 million (approximately US$11.88 million as of January 2013), a considerable sum

compared with investments in traditional sectors in Cauca. The existence of a Digital Plan for the department should be noted, as it provides a road map to guide the efforts of all ICT stakeholders in Cauca.

Table 7.2 ICT initiatives in Cauca

Initiative	Description
Creation of ParqueSoft: Popayán Software Company Incubator Corporation	ParqueSoft is an innovative model of association that is consolidating the most important cluster of digital art, science, technology, and related services in Colombia, integrating software technology parks into Colombia's main cities. Currently, ParqueSoft's Network of Software Technology Parks, ParqueSoft Nation, includes more than 300 companies specializing in the knowledge industry, with over one thousand professionals working in software development and hundreds of others supporting professional services, administration, and business development processes.
Consolidation of the Software Network: Creatic	In 2005, CREPIC began work to recognize stakeholders and raise awareness in order to involve the business community in partnership-building initiatives and the creation of a business network in this sector. This includes a business incubator that brings together software entrepreneurs (ParqueSoft Popayán) and recognizes other companies that carry out activities related to the sector but are not in the incubator group.
Vive Digital program 2011	The goal of the Cauca Vive Digital project was to install 38 kilometers of fiber optic cable to interconnect the seven branches of the Popayán public hospital (ESE) and three branches of the Quilisalud ESE, as well as providing seven local area networks in the Popayán ESE; two server rooms, eight servers, and 87 computers for the Cauca departmental government; 39 digital whiteboards for public schools in Cauca; an interactive platform for the Cauca Vive Digital project; a Document Management application for the Cauca departmental government; an agricultural planning application for the Cauca departmental government's Ministry of Agriculture and Farmers; an Information System application for the Ministry of Education's Educational Institutions; and the Certification of 600 digital citizens in the Cauca department.

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Initiative	Description
ViveLab Cauca project	The ViveLabs are a project of the Ministry of Information and Communications Technology (MinTIC) which seeks to give form to creative processes of environments where centers can be set up for specialized training in science, technology, and innovation, thereby helping to develop the MSMEs of the digital content sector. With the backing of the Cauca departmental government, ParqueSoft was a formulator and one of five winners of the call for proposals for COP$1,200 million (approximately US$675,000 as of January 2013). ViveLab Cauca falls within the regional initiative for strengthening the technology-based entrepreneurship ecosystem, which has been operating since 2011 with the assistance of Colciencias in relation to the activities carried out around call for proposals 523 to Define a Bank of Eligible Projects for Creating Technology-Based Companies or Business Units.
Approval of Cauca Vive Digital 2012 project	An initiative of the MinTIC and Colciencias directed at developing digital content and the appropriation of technology by public officials, students, and producers in Cauca's traditional sectors.
Access to domestic sources of financing to strengthen companies	Through sources of domestic financing such as INNpulsa Colombia, projects have been undertaken that offer MSMEs producing mobile apps an effective way of positioning their development, bringing results in terms of mass downloads and their respective monetization.
Diagnostic review, definition, and work plan for the Technology-Based Entrepreneurship Ecosystem	This proposal emerged as a response to the current problems in Cauca's ICT industry related to the lack of ICT-based entrepreneurship with the abilities needed to compete in the global market. The initiative therefore maximizes opportunities and reduces potential risks, securing an advantageous position for the department in this sector. Its prime objective is to create sustainable entrepreneurial processes in ICT in the Cauca department.
Formulating the Cauca Vive Digital plan	This project seeks to create an ICT plan to build an information society in Cauca, in coordination with the Vive Digital Colombia project and the Vive Digital Regional strategy.
Approval of the Tablets for Education project	Through the Computadores para Educar program, the Ministry of Information and Communications Technology ran a regional tablet competition for official educational centers as part of the strategy for pedagogical appropriation of digital mobile devices in educative environments. Thanks to this program, 2,000 children benefited in the municipalities of Popayán, Miranda, Sucre, and Morales.

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Initiative	Description
International recognition for companies in the sector	In addition to the companies within ParqueSoft receiving recognition at the local and national levels, Seratic recently won a prize at the Global Forum on Innovation & Technology Entrepreneurship 2011. Seratic was selected by the Finnish government, Nokia, and the World Bank as one of the best SMEs from developing countries in creating innovative technology or using technology for transformative ends.
Creation of strong links with academia through research groups	In 2007, ICT was prioritized as a key sector for departmental development in the Cauca Internal Agenda for Productivity and Competitiveness, and this was later ratified by the Cauca Regional Competitiveness Plan. As a result, academic, State, and business efforts have focused on supporting ICT-related projects and initiatives in Cauca. Currently, there are strong links with organizations such as CREPIC and CIAgua, and with two groups ranked by Colciencias as A1—Telematics Engineering Group and Environmental Studies Group—as well as an active participation on the Departmental Board of Science, Technology, and Innovation (Codecti).

Source: Rivera, 2012.

Without a doubt, the government has made resources available for the regions to participate in the different calls for proposals with their projects. Likewise, institutions in Cauca have demonstrated the ability to respond to these calls for proposals and the high-impact structures proposed. What remains is the extensive task of appropriation of these technologies in society and the productive sector in order to generate positive externalities from the investments. The conditions are already in place.

Conclusions

According to the studies of Raul Katz (2009) at Columbia University, a 10% increase in internet penetration caused a 2% reduction in unemployment. According to the economic report from the United Nations Conference on Trade and Development (UNCTAD, 2010), in developing countries, each job created in the ICT industry can generate between 2 and 3.5 additional jobs in the economy. And according to the world internet statistics report, Internet World Stats (2011), there is a direct correlation between the Network Readiness Index, which measures the use and development of ICT, and international competitiveness. All of these statistics—already empirically demonstrated in countries such as India, the Philippines, and Chile—show that technological tools can represent a powerful aid in combating

unemployment and poverty. Strategies such as social appropriation of ICT and promoting technology-based enterprise will certainly contribute to orienting the country's ICT efforts.

This chapter has highlighted the fact that investment in science and technology and the use of ICT tools does not in itself guarantee appropriation and development in society, nor competitiveness in economic sectors. Aligning economic growth, employment, and income distribution can only be achieved by combining diverse sectors and formulating a theory that is specific to the developing economies (Sarmiento, 1989).

As there is no preconceived framework that guarantees the alignment of the three objectives mentioned above, it is vital to start building a model that will have a positive impact on society and the productive sector. Pérez (2010) draws attention to the fact that the problems of low productivity and competitiveness in our means of production, as well as poverty and unequal distribution in Latin America, cannot be addressed from just one angle. A dual strategy is required that targets two development goals for our economies: economic growth and social inclusion.

A review of the figures and the current situation in Cauca reveals the lag in our means of production as well as the reality of poverty. The *Ranking report for departmental competitiveness in Colombia* (Cepal, 2009) provides factual support for these assertions, placing Cauca in the category of low competitive performance. According to studies by the School of Law and Political and Social Science at Universidad del Cauca, Cauca had the 10th highest Unsatisfied Basic Needs (UBN) in Colombia, and barely 61% of homes had decent living conditions—based on the Living Conditions Index (LCI)—while levels of poverty and destitution were above the national average. This shows the department's critical situation in social terms.

A proposal for departmental competitiveness based on ICT tools must therefore include strategies that support the integration of our means of production into the global economy, along with strategies that help reduce poverty in the department. This proposal cannot be implemented by the market alone, nor can it be imposed by the government, especially in the current paradigm which demands constant innovation and flexibility to face changes in the environment. It can only work suitably if it is the result of a socially shared vision in which diverse agents of change act independently in agreed-upon directions, coordinated by an active government with an adequate and effective institutional framework. Implementing it will require consensus building between companies, the government, universities, the media, and society in general, followed by suitable political measures for leading and facilitating market behavior in the agreed-upon directions (Pérez, 2010).

This proposal must be approached from two angles: First, with a view to competitiveness; and second, seeing competitiveness as a means of ensuring the well-being of the population. The sectors driven by the first goal would be the engines of economic growth, while the developers in the second would be the means of escaping poverty. The proposal is therefore to use and appropriate ICT tools, as the business community can improve its management and better take advantage of the opportunities around them by employing these tools efficiently. At the same time, small-scale producers and entrepreneurs can build networks that, through the principle of association, allow them to position themselves more competitively in the market. Finally, these tools also help improve the capabilities of the poorest parts of society, offering the possibility of better living conditions.

Without a doubt, thinking of an equitable transformation of production, according to Fajnzylber (1989), represents a huge but worthwhile challenge; indeed, it is a challenge that must be tackled urgently in our department. Over the course of this research project, feedback and input have been hoped for and looked forward to from varied disciplines and areas of knowledge, with the aim of putting forward a comprehensive proposal that allows us to reach our development goals through social constructions that we create.

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