



UNIVERSIDAD DE  
COSTA RICA

**iice**

Instituto de Investigaciones en  
Ciencias Económicas

# Serie de Divulgación Económica

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**THE EFFECT OF LOGISTICS ON THE COST OF  
INVENTORY OF SMALL BUSINESSES:  
A PERSPECTIVE OF COSTA RICAN  
COMPETITIVE ADVANTAGE**

**EL EFECTO DE LA LOGÍSTICA EN EL COSTO DE  
INVENTARIO DE EMPRESAS PEQUEÑAS: UNA  
PERSPECTIVA DE VENTAJA  
COMPETITIVA COSTARRICENSE**

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## ACRONYMS AND ABBREVIATIONS

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As acronyms (siglas) are plentiful in Costa Rica for just about every governmental and non-governmental (NGO) entity, the following are listed for easy reference, along with abbreviations of other terms mentioned in discussion.

BCCR	Central Bank of Costa Rica (Banco Central de Costa Rica)
CACEX	Center for Assistance in Exporting (Centro de Asesoría para el Comercio Exterior)—a service offered by PROCOMER
CACIA	Costa Rican Chamber of Food Industry
CCSS	Costa Rican Social Security System
CINDE	Costa Rican Investment Board (Coalición Costarricense de Iniciativas para el Desarrollo)
DIGEPYME	General Direction for Support to the Small and Medium-Sized Business
FUNDES	Foundation for Latin American Sustainable Development
IICE	Research Institute of Economic Science of the University of Costa Rica
INA	National Institute of Learning
INCOFER	Costa Rican Railway Institute (Instituto Costarricense de Ferrocarriles)
INEC	National Institute of Statistics and Census
JIT	Just In Time
LPI	Logistics Performance Index
MEIC	Ministry of the Economy, Industry and Commerce (Ministerio de Economía, Industria, y Comercio)
MIPYMES	Micro, Small, and Medium-Sized Businesses

MOPT            Ministry of Transportation and Public Works

PROCOMER    The Foreign Trade Corporation of Costa Rica

PyMES           Small and Medium-Sized Enterprises

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The information discussed in this paper was generated from field interviews conducted in Costa Rica from mid-May, 2012 to early July, 2012, primarily with small businesses, as well as other organizations from the private and public sector. Special thanks goes to the Research Institute in Economic Science (IICE), and Director, Professor Max Soto, for his assistance and support with an office, administrative assistance—particularly Jennifer Gutiérrez, Ana Ruth Zuñiga, Office Manager, Yorleny González, Administrative Assistant to Don Max, and competent researchers such as Freddy Rojas and Gabriela Zuñiga for insightful brainstorming sessions. I also appreciate the peer review of this report provided by consultant and collaborator, Dr. Maria Progoulaki. Of course, none of this would have been possible without the funding provided through a Senior Specialist Fulbright grant, and support from the Office of International Affairs and External Cooperation and Director, Dr. Ana Sittenfeld. I am deeply grateful to have received this prestigious award, and to the assistance from the Council from the International Exchange of Scholars (CIES), administrators of the grant, and to their counterparts here in Costa Rica.



# 1. INTRODUCTION

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Fundes Internacional asegura que las Pymes produce el 50% del Producto Interno Bruto (PIB) de cualquier país de Latinoamérica, el 75 % del empleo y representan un 99 % del total de compañías establecidas en la región.<sup>1</sup>

Fundes International maintains that the Pymes (small to medium sized businesses) produce 50% of the Gross Domestic Product (GDP) of any country in Latin America, 75% of jobs, and represent 99% of the total of companies established in the region.

Sí, nosotros lo que tenemos que hacer es que nosotros jugamos con un colchón; y pero ese colchón, ... tiene un costo; pero tenemos que hacerlo porque ahí es donde uno tiene que balancear. Bueno, voy a tener un costo de materia prima que está para llegar o le incumplo a mi cliente.

Yes, what we have to do is that we play with a cushion, and...but that cushion, ... has a cost; but we have to do it because here is where one has to balance ok, I am going to have a cost of raw materials that is about to arrive or I wind up not meeting my obligations to my customer.<sup>2</sup>

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While there may be little agreement internationally regarding how to define micro, small, and medium sized businesses, clearly there is wide agreement that “small businesses”—later defined for the purposes of this study—are important generators of economic growth. The opening first quote by the Executive Director of the Foundation for Latin American Sustainable Development (FUNDES) International, makes this argument as it relates to Latin America. However, numerous other agencies and authorities on economic growth tout the importance of small business, characterizing them in many ways: as a stabilizing force to national, regional and global economies, as generators of innovation—often measured by the percentage of patents held in comparison to large businesses, as seeds that grow the future of large businesses, as engines for job creation, as a vital source of entrepreneurial skills, and as essential to the activities and outputs of large business for outsourcing, component manufacture, and financial and other services.<sup>3</sup>

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1 Fundes (2011). At the time this article was written, the Executive Director of Fundes International, Ulrich Frei, indicated that Pymes growth was essential to the region in order to emerge from the global economic crisis in which they live.

2 E. Potoker (2008, p. 22).

3 See R. Dababneh and F. Tukan (2007), “The new SME definition” (2003), J. Deskins et al. (2012), and “The small business agenda”... (2011), for arguments of this nature.

Despite the apparent national, regional and international acknowledgement of the value of “small business,” such enterprises indisputably face many challenges to their vitality. Those include, but are not limited to, access to financing, the impact of regulatory agencies, time involved in working through the *trámites* or governmental requirements for business formation, and the impact of infrastructure on efficient logistics systems.

This report focuses on “small businesses,” an important segment of PyMES (small-medium sized businesses) in Costa Rica. In a broad context, it addresses the availability (or lack of availability) of efficient logistic systems—to be defined—to small businesses. Specifically, as example, it asks, what impact does infrastructure have on inventory management? Said another way, while carrying inventory may compensate for inefficiencies that may occur in the supply and demand chain, stocking too much, or a cushion (*colchón*), carries a cost. Therefore, the business owner struggles with how much of *colchón* he/she needs to carry in order to assure customer satisfaction, against not having enough. The second quote that introduces this report illustrates this issue and the inherent challenge it poses to the business owner. The quote is an outgrowth of an earlier study published by the Research Institute of Economic Science (IICE) of the University of Costa Rica, *Report on the State of Logistics Integration and Workforce “Readiness” in Costa Rica, Post DR-CAFTA, and Pre-EU Trade Accord: Implications to Competitive Advantage*<sup>4</sup>. It was clear that the cost of inventory to small business competitive advantage was deserving of further study.

Thanks to a second Fulbright award to this author, and the hospitality of the IICE, “The Effect of Logistics on the Cost of Inventory of Small Businesses: A Perspective of Costa Rican Competitive Advantage,” was pursued as a topic for further research. The original focus of the study was the theme of this title. Nevertheless, as is common with qualitative research endeavors, a number of unanticipated results also emerged from the investigation. These are addressed within this report, and deemed quite significant to the future productivity and longevity of the small business in Costa Rica.

Before turning to the content to follow, it is important to note that from a global perspective, country and regional logistics performance is important part of the general environment surrounding businesses of all sizes. In fact, there can be no doubt that the competitiveness of any country is closely linked to the viability of its logistics chain and the service that it provides to internal markets. The Logistics Performance Index (LPI) provides insight into the logistics environment, and therefore, relevant to this study. The LPI is provided by the Trade Logistics and Facilitation Unit of the World Bank, and is generated through information gathered by surveying operators such as global freight forwards and carriers who are “on the ground.” Therefore, as a decision-making tool, it is significant as an indicator of “logistics ‘friendliness.’”<sup>5</sup> Countries are rated according to the following criteria:

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4 See footnote 2. The IICE is the organization responsible for economic research at the University of Costa Rica, and is located in San Pedro Montes de Oca. See <http://www.eldis.org/assets/Orgs/4309.html> for more details about their activities. Last access: 21 October 2012. “Post-DR-CAFTA” refers to after the passage of the DR-CAFTA trade agreement.

5 See <http://lpiurvey.worldbank.org/about> for more information. Last access: 21 October 2012.

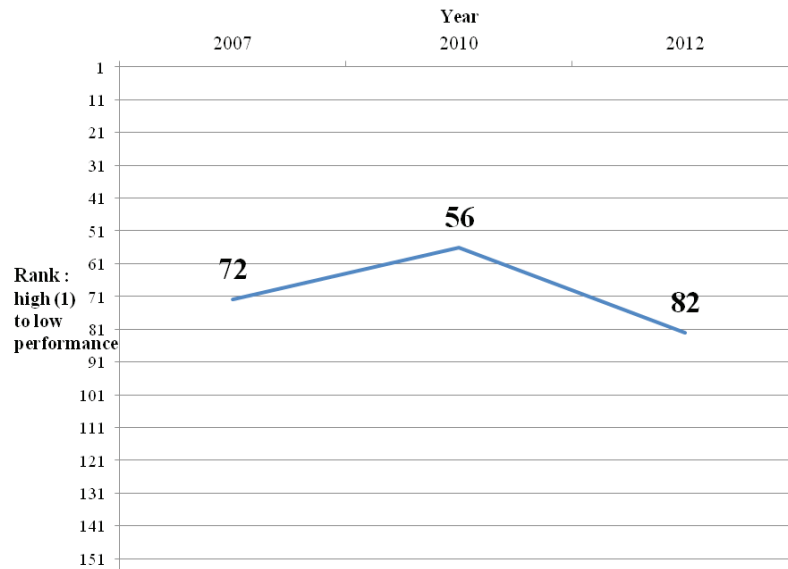
- a) *Customs efficiencies*: speed, formalities, predictability;
- b) *Infrastructure quality*: ports, rail, information technology;
- c) *International shipments*: ease of scheduling competitive pricing of international shipments;
- d) *Logistics services*: competency in terms of knowledge and performance of logistics providers;
- e) *Tracking and tracing of shipments*: also related to technology;
- f) *Timeliness*: how long it actually takes for shipments to arrive compared to what was anticipated.<sup>6</sup>

Table 1 and graphic Exhibit 1 are compiled from World Bank LPI data, and show that Costa Rica's logistics performance worsened in 2012, dropping in rank from 56 in 2010 to 82 in 2012 on the LPI. The data displayed will be integrated later with discussion of findings.

**Table 1: Logistics Performance Index - Costa Rica's Global Ranking**

Year	LPI Rank	LPI Score	LPI Criteria					
			Customs	Infra structure	International Shipments	Logistics Competence	Tracking & Tracing	Timeliness
2007	72	2.55	2.49	2.43	2.53	2.43	2.57	2.89
2010	56	2.91	2.61	2.56	2.64	2.80	3.13	3.71
2012	82	2.75	2.47	2.60	2.85	2.53	2.81	3.19

6 <http://lpiurvey.worldbank.org/international/global/2012>. Last access: 21 October 2012.

**Exhibit 1: LPI Rank of Costa Rica**

The following outlines the progression of this report: definitions of concepts that relate to this investigation, discussion of the methodology involving selection of businesses to be interviewed, findings, discussion of findings, and implications and recommendations for future research and/or development.



## 2. DEFINITION OF TERMS

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To assure shared understanding of the discussion that follows, the following definitions ground this study:

*Competitive Advantage:* Generally refers to the superiority that a company can gain over its rivals in terms of cost advantage and customer service.

*Inventory Management:* Generally refers to effective supervision of supply, storage, accessibility, and disposal of items in order to insure an adequate supply of product without “stock outs”, or excessive oversupply in order to maximize net profits. Such administrative skill is a critical component of efficient logistics systems that aim to get the right amount of product to customers in the right place at the right time. While inventory “control” frequently refers to protecting the inventory stored in the warehouse, for the purposes of this exploratory study, “control” and “management” are used interchangeably.

*Just-in-time:* Generally referred to as an approach that aims to reduce or even eliminate safety stock (*inventarios de seguridad*); those who implement a JIT philosophy seek to assure that required materials arrive at the production site at the exact time they are needed.

Logistics/Logistics management: “Logistics management activities typically include inbound and outbound transportation management, fleet management, warehousing, materials handling, order fulfillment, logistics network design, inventory management, supply/demand planning, and management of third party logistics services providers. To varying degrees, the logistics function also includes sourcing and procurement, production planning and scheduling, packaging and assembly, and customer service. It is involved in all levels of planning and execution—strategic, operational and tactical. Logistics management is an integrating function, which coordinates and optimizes all logistics activities, as well as integrates logistics activities with other functions including marketing, sales manufacturing, finance, and information technology.” (Council of Supply Chain Management Professionals <http://cscmp.org/aboutcscmp/definitions.asp>)

*Logistics systems (efficient):* For the purposes of this exploratory study, this expression refers to the part of the supply chain that is concerned with the management of the movement of products from the providers: e.g., raw materials, components, etc. from the point of origin to the consumers, and reverse flow as it may be necessary to satisfy the demands of the customer. (This was translated to Spanish on the questionnaire that was directed to the interview sample; see Appendix, Exhibit A.3.)

*Small business:* While definitions may vary in developed and developing countries according to varied criteria such as number of employees, annual revenue, capital investment, net worth and more, “small business,” herein, refers to “formal” businesses of 6 - 30 employees. The categories below were formulated from bank reports, research studies, and NGOs interviewed during this investigation.

Costa Rica *: 1-10 (micro); <b>6 - 30 (small)</b> ; 31 - 100 (medium); more 100 (large) <sup>7</sup>
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\*For Costa Rica, the definition is also tied to other criteria such as sales revenues and total asset value, which explains the overlap with micro and small.

Small business (formal): Generally refers to a business that is registered and pays into the Costa Rican Social Security system (CCSS), pays taxes, has the appropriate government/municipal permits to run the business, and pays workers’ compensation, as applicable.

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7. Refer to G. Castillo and L. Chaves (2001) for further discussion.

### 3. METHODOLOGY

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The time available to accomplish this project was approximately six weeks after a May 13, 2012 arrival to Costa Rica. Notification of the “Senior Specialist” project opportunity was communicated by the Fulbright Office in Washington on April 5, 2012, and the official Fulbright grant authorization for project was communicated to the invited researcher on April 26<sup>th</sup>. Nevertheless, from date of submission of proposal request by the IICE to the Fulbright Office in December, 2011, and again in February, 2012, it was obvious that this exploratory research endeavor would be a qualitative one, relying primarily on structured, open-ended interviews.<sup>8</sup> Why a “qualitative” research endeavor? It is generally agreed that qualitative research is devoted to understanding *why* certain phenomena take place through the analysis of information such as interview transcripts, open-ended survey responses, e-mails, notes, feedback forms, photos and videos. Qualitative research does not attempt to exclude or restrict environmental variables that may be factors —existing or evolving— that might cause the phenomenon being observed, as is the case in quantitative research. Rather, it seeks to discover aspects of the phenomenon in all of its complexity, and relies on more than statistics or numbers that are primarily the domain of quantitative researchers. Said alternatively, “In contrast to designs that manipulate and measure the relationships among a few carefully selected and narrowly defined variables,” the approach here is a holistic one, gathering “data on multiple aspects of the setting under study in order to assemble a ... complete picture of the social dynamic of the particular situation...”<sup>9</sup>

Regarding the format of the interviews, the “standardized open-ended interview” format is suggested for situations where it only may be possible to interview participants for a limited period of time, and only on one occasion, which clearly describes the scenario for this project.<sup>10</sup> The value of choosing this particular interview format was to give the researcher some latitude to pursue and, very importantly, to explore emerging issues during the interview. This rationale is standard as an approach to interviewing and key to qualitative research endeavors where causes and effects are seldom limited in order to understand the topic holistically.<sup>11</sup>

Small business sample selection for the study was challenging for a number of reasons. In terms of sheer numbers, in 2011, one study involving micro, small, and medium-sized businesses

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8 The standardized open-ended interview is structured in terms of the wording of the questions. Participants are always asked identical questions, but the questions are worded so that responses are open-ended. Turner (2010, p. 756).

9 See M. Patton (1990, p. 8).

10 A Likert scale (Likert, 1932), ranging from 1: most important to 5: less important was used.

11 R. Bogdan and S. Biklen (1992, p. 97).

(MIPYMES), identified 60,782 “formal businesses,” of which 98.1% were MIPYMES. Of that 98.1%, 67% were micro, 27.6% were small as defined in the present study, or *approximately* 16,775 *companies*, and 4.3% medium-sized.<sup>12</sup> The small business sample to be interviewed needed to be identified during the first of the six weeks of stay in Costa Rica. Trying to find a “representative sample” chosen *at random* of a larger group was never a consideration: Attempting to gather such a sample, while perhaps ideal, was not practical. Clearly, it would have to be a convenience sample due to factors of time, business location, activities, effects of the torrential rain on travel during winter in Costa Rica, particularly in the afternoons, and the availability of key personnel during the time period of the project.

During the first week of the stay, brainstorming and discussion with the Director and two experienced researchers of the IICE helped identify a potential resource for a convenience sample for the study. This resource was the National Institute of Statistics and the Census (INEC). INEC maintains a directory which is a registry of all companies/establishments that exist in Costa Rica. The registry provides information such as company size, location and principal activities. The directory is generally used as guide to follow the development and trends in the industries that are represented by these companies. Additionally, it is used as a basis for economic surveys that aim to optimize services and planning for different industrial sectors, as needed or of interest. The IICE researchers were using a sample supplied to them by INEC for a quarterly business poll they were conducting. It included firms that were of six or more employees from different economic sectors such as manufacture, farming/agriculture, commerce, construction, and other activities. It was decided that this resource would be used for the Fulbright study.

In an effort to identify a sample in a timely way, the first “cut” from the list supplied to IICE from INEC amounted to 74 firms from the manufacturing sector. The second “cut” involved eliminating all businesses that did *not* meet the criterion for business size, or 6 - 30 employees. Subsequently, individual companies that were further away than a 1 - 1/2 hour drive by car from the metropolitan area San José were eliminated, except for a cluster of four companies located about 3 - 1/2 hours north of San José in the area of San Carlos. All but one of the manufacturing companies shown as having 20 to 30 employees were included in the final sample. Subsequently, companies having 10 - 19 employees were also added through random selection. The final sample selected totaled 36 companies from the manufacturing sector, representing a variety of manufacturing activities. Each was phoned, thanks to the administrative assistance provided by the IICE, to verify company activities, location and contact information, and most importantly, business size.

The initial list of 36 received a letter introducing the researcher and the nature and importance of the study (Exhibit A.1). Since a letter of introduction with an endorsement is generally a necessary cultural protocol in attempting any kind of case study/fieldwork here, the letter was signed by the Director of the IICE. The letter was sent electronically along with a pilot questionnaire (Exhibit A.2, *Cuestionario Pre-diagnóstico*) that was to be used as

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12. E. Briceño and A. De Sárraga (2011, p. 4).

an open-ended, yet standardized guide for all the interviews. The Exhibit A.2 questionnaire was used for the first few interviews, but then modified to Exhibit A.3 due to initial findings that indicated the necessity to include an additional question—to be discussed later on in “Findings.” The Exhibit A.1 letter and the A.2 questionnaire were also shown to NGO and the two IICE researchers mentioned earlier to assure that the information for the interview was communicated clearly and in an appropriate and user-friendly format. Several NGO and large business organizations from the private sector also received the letter of introduction prior to scheduling of an interview with them. Such interviews were deemed important to understand the current environment impacting small business. The large businesses chosen were ones that counted on small businesses as part of their current supply chain.

Six of the 36 companies chosen for the sample were eventually eliminated because it was discovered that they were not a “small business,” after all, based on number of employees. Of the 30 that remained, 64% eventually had to be dropped from the potential group of interviewees: They either could not be contacted, key personnel were unavailable due to other activities, and/or—a surprise to this researcher—they had already participated in another recent IICE research endeavor, and were simply not willing to devote further time. This unavailability was understandable as these are small businesses, and time is precious for dealing with day-to-day operations. Even with the companies who participated, scheduling interviews was a challenge due to cultural protocols involving reporting relationships. Therefore, we had to wait for the person in charge (or a very empowered assistant) to grant the interview. To augment the sample size with companies that fit the selection criteria, one NGO organization provided an additional 5 companies, four of which were available for an interview. Through Rotary International in San José, an additional list of 13 was obtained through the Cámara Costarricense de Industria Alimentaria (CACIA — Costa Rican Chamber of Food Industry). Two from that list were available to be interviewed. An additional company was solicited from the study completed in 2008, mentioned earlier. Another was recommended by personnel at the IICE as the company fit the criteria and was located along the way to other interviews in Cartago. In total, 20 small businesses were interviewed.

All interviews were scheduled for one hour, as necessary, which generally allowed for ample opportunity to explore themes further with the respondents. All respondents allowed the conversation to be taped. Therefore, all interview commentary that is incorporated with this report is quite accurate — verifiable on tape and in the respective typewritten transcription. Additionally, all respondents filled out the questionnaire, further corroborating the information gleaned during the interview.

Table 2, “Interviewees by Organizational Category,” shows that a total of 30 interviews were realized, despite rain, road congestion, and delays due to cultural protocols that needed to be followed.

**Table 2: Interviews by Organizational Category (Costa Rica: May 13 – July 8, 2012)\***

Private Sector			State	NGO	Other
Small	Medium **	Large			
20	1	4	1	3	1

*State: refers to Ministries or semi-autonomous State organizations.*

*NGO: refers to non-governmental organizations offering services and/or collaborating with the private sectors; two of the 3 interviews represented above were with different personnel in the same organization.*

*Private: refers to those who were interviewed from the private sector*

*Other: refers to those who were interviewed while at a conference or in an academic setting.*

*\* All interviewees from State, NGO, and Private enterprise, and Other held top management or administrative positions.*

*\*\* The medium-sized firm was deleted from the sample; it was discovered it was not a small business, but rather part of a larger company.*

Table 3, “Profile of the Business Sample and Interviewees,” details the characteristics of the sample and respondents, to be discussed later on.

**Table 3: Profile of Business Sample and Interviewees**

	Business Activities*	Number ** Employees	Years in Business (since)	Job *** Responsibility	Education of Person Interviewed ****	Family Business Yes (x)	Location (Province) *****
1.	Metal structures in stainless and carbon steel	15 - 20	2004	President, S.A., Mgr., Admin., warehousing, finance, logistics	Coll.grad.; Indus. Eng.	X	San José
2.	Metal cyclone fences	7 - 10	1978	Administrator	Coll.grad; Bus. Admin.	X	San José
3.	Pharmaceutical products - OTC (over the counter)	18	1953	an Owner in S.A., Manager	Coll. Grad., Bus.Admin.; Masters, Intl. Business	X	San José
4.	Mining/extraction of sand, gravel, stone	16 - 20	1992	Administrative; Acct./ finance/auditor	Coll.grad., CPA (Certified Public Accountant equivalent)	X	Alajuela (admin. office)
5.	Bakery products - Wholesale & Retail	20 - 25	1982	Management	Coll. Grad., Masters-all but thesis.	Employee owned cooperative	Alajuela
6.	Sales and distribution of steel products and hardware	12	1987	Administrator	Coll. Grad. + Technical Certificate	X	Alajuela
7.	Metal Structures- Telecommunications	20	1982	Manager	Began College; all but final requirements for Civil Eng.	X	Heredia
8.	Wooden carts and repair	9	1967	An Owner, in S.A.	Began general studies in College	X	Alajuela
9.	Conveyer belts	7	2002	Administrator	Began university studies		San José
10	Machine and replacement parts for industry	20	2000	Sole Proprietor, Administrator	Technical Certificate		Cartago
11.	Clothing assembly ("maquiladora")	18	1992	Comptroller	Licenciado	X	San José
12.	Machine Parts (Medical Sector) + Work Stations for Clean Rooms	7	2006	an Owner	Began College; Technical Certificate		Heredia
13.	Refrigeration Units and Repair	6	1976	General Manager	College Grad. (psychology) + Certificates in specialized courses	X	Heredia

*Continúa...*



Table 3: Profile of Business Sample and Interviewees

	Business Activities*	Number ** Employees	Years in Business (since)	Job *** Responsibility	Education of Person Interviewed ****	Family Business Yes (x)	Location (Province) *****
14.	Sales and distribution of steel products + aluminum, copper, other	17	1999	General Manager	Licenciado		Cartago
15.	Textile (threads, cloth)	12-38*****	1978	Owner	A or less	X	San José
16.	Beverages, syrup, and distribution of beverages	27	1909	Manager	Licenciado	X	Alajuela
17.	Tamales*****	6 - 15	1982	(daughter)Owner	College Grad. in Masters program	X	Cartago
18.	Wine production	6	1982	Owner	Began College	X	San José
19.	Industrial chemicals; also toxic waste management	20 - 30	1995	Owner	College Grad. (Indus. Eng.)	X	Cartago
20.	Frozen food processing	10	2010	Owner	Technical. Certificate	X	Cartago

\* All businesses were in the manufacturing sector unless otherwise noted.

\*\* Range indicates number of employees changed according to demand

\*\*\* All individuals interviewed were in management. However, each referred to their role differently, due to the unique characteristics of their business.

\*\*\*\* Educational levels: While the equivalents are not precisely matched in every country, levels of educational attainment in CR:

A) High School=Secundaria-Bachiller Educación Diversificada; B) Técnico Medio (beyond A), a vocational certificate in some specialty such as business administration, accounting, secretary, information science, graphic design and more; C) Diplomado – similar to an associate degree in the U.S.; D) Bachillers Degree; E) Licenciatura; F) Masters; G) Doctorate; H) Began college- didn't finish.

City is not disclosed to for reasons of confidentiality

This company claimed to be a small business; their business structure was complicated due to separate holdings.

A prepared typical/local dish of varied ingredients such as pork and peas, masa-- seasoned, wrapped in cornhusks and steamed.

\*\*\*\*\*

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Exhibit 2, “Map of Costa Rica” show provinces mentioned in Table 3.

**Exhibit 2: Map of Costa Rica**



All transcripts and notes were reviewed for common themes and reported in the section that follows.

## 4. FINDINGS AND DISCUSSION

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This section is divided into three subsections. The first two "*Questionnaire - Related Responses Part I and II*", details findings that are directly related to the questionnaire (Appendix Exhibit A.3); the third, "*Other Related Findings*", addresses findings that were related and/or unexpected outgrowths of the study, all triangulated through a review of the transcripts of the digitally recorded interviews.

### *4.1 Questionnaire Responses: Part I*

Part I of the questionnaire aimed to provide a general framework to the central issues of the exploratory study. In other words, Part I introduced the general topic of efficient logistics systems. The researcher wanted to assure that the interviewees had an understanding of the information that was being researched; it was also meant to serve as a platform opportunity to probe further into other related and significant factors such as transportation and infrastructure that might affect management and control of inventory, which she did with all interviewees. Following the questionnaire itself:

*Question 1: ¿Qué importancia tiene para usted la necesidad de los sistemas eficaces de logística dentro del país para la gestión y control de su inventario?*

[How do you view the importance of the need for efficient logistics systems within the country for management and control of your inventory? (Reiterating, “efficient logistic systems” was defined on the questionnaire.)]

*Response:* **15/20 Very important (75%); 4/20 somewhat important; 1/20 neutral.**  
No one chose or suggested that this issue was of little or no importance.

*Discussion:* For those who chose #1 (very important), several added that efficient logistics systems were *demasiado* importante, or *de suma importancia*—meaning that they were beyond just “very important,” but rather should be considered extremely important. In the case of the four firms that chose #2 (somewhat important), each of the respondents mentioned that this issue is not as important for them now since they have learned about and implemented inventory control systems. The “neutral” respondent was a company that extracts and processes its own raw materials, and was experiencing low demand. This explains his choice of #3. However, he recognized (during the course of the interview) that in times of peaked demand, the way they were managing control of inventory and following

deliveries to customers would need further development and improved logistics systems, as defined herein.

*Comments:* The following comments point to other issues and variables that are pertinent to Question 1. Every comment listed below was an issue that was mentioned in one way or another by at least three companies during interview or on the questionnaire itself:

a. delivery times:

*Los tiempos de entrega son uno de los problemas que genera la falta de mejores sistemas de logística, ya que esto afecta directamente la competencia como empresa pequeña frente a empresas más grandes.*

[Delivery times are one of the problems that affects better logistic systems, since this (delivery times) directly affects competition on how a small business fares against larger companies.]

b. transparency and integration issues: Those small businesses that depend on larger businesses for their raw materials wished for more transparency, or the ability to know what their providers had in stock. As an example,

*Yo necesito tener ese control, incluso desde la parte externa, saber que mis proveedores van a tener determinados productos que yo voy a necesitar en determinados meses. Que no haya un desfase, que cuando yo llegue y necesite "X" material, ellos me digan, ¡Mira no, para ese mes no tenemos! Entonces yo tenga un plan de contingencia, buscar por otro lado, nunca tener ese faltante.*

[I need to have that control, including (for) the external part; to know that my suppliers will have certain products that I will need during certain months. That there be no lag, so when I arrive and need X materials, then tell me, no! we don't have it this month! So I can have a contingency plan, and look elsewhere so that I don't have that missing.]

This issue is addressed further in subsequent discussion as it has tremendous implications to production planning, scheduling, negotiating costs and importing of raw materials, and, ultimately, to sustainable supply chain relationships. In short, the findings support that the issue addressed through Question #1 was significantly important to those interviewed.

*Question 2: ¿Qué importancia tiene para usted la necesidad de programas de educación para PyMES sobre el tema de mejores medidas prácticas para la gestión efectiva de inventario?*

[How do you view the importance of educational programs for PyMES that address best practices for effective management of inventory?]

*Response:* 13/20 Very important (65%); 2/20 somewhat important; 5/20 neutral.

No one chose or suggested that this issue was of little or no importance.

*Comments and Discussion:* The comments below indicate that while some companies feel they have sufficient education specific to inventory control, others feel that it is an area of need. Specific to the importance of training/education in this area:

*a. Es muy importante ya que por lo general solo las empresas grandes tienen un mayor conocimiento sobre logística y pueden invertir más en mejores técnicas e infraestructura, por lo que la desventaja de las pymes es muy marcada.*

[It is very important since in general only big companies have a greater understanding regarding logistics and they can invest in better techniques/technologies and infrastructure, therefore, the disadvantage for PyMES' is very notable.]

This view is expanded later on in this report in the context of what concerns received more attention by interviewees in terms of prioritization and resource allocation.

The following written comment suggests that a lack of education/training in the realm of inventory control and logistics management represents a competitive disadvantage to small business:

*b. Es necesario que los empresarios pequeños y medianos estemos informados y capacitados en los diferentes temas administrativos y manejo de logística para darle un mayor seguimiento a la materia prima desde que entra a la bodega hasta que llega convertida en producto al cliente. Es necesario que se diseñen canales de comunicación para que los clientes den retroalimentación con respecto a los productos que recibieron, si estuvieron a tiempo y se llegaron en buenas condiciones, así como si les da la atención que requieren y les proveen las cantidades que ellos desean + 0 -. (Nuestra empresa) en este*

*momento tiene altas deficiencias en este aspecto y ello se convierte en una desventaja competitiva.*

[It's necessary that small and medium-sized "empresarios" be informed and trained regarding different administrative areas and in logistics management in order to afford greater tracking of raw material from the time it enters the warehouse until it is converted into product to the customer. It is necessary that communication channels be designed so that customers can provide feedback regarding the products they received, if they got there on time, and if they arrived in good condition, as well as if they are getting the attention they require and if the quantities they want are provided or if they are +, 0, or – (i.e., too much to not enough). At this time, our company has high deficiencies (is lacking) in this regard and that turns into a competitive disadvantage].

This comment is also interesting since the interviewee recognizes the relationship of inventory control to other aspects of effective logistics systems:

*c. Super importante ya que la mayoría de propietarios y en muchos casos colaboradores de empresas PyMES no tienen estudios y muchas de las actividades que realizan son con base en su experiencia sin considerar que tal vez existen mejores métodos.*

[Super important since the majority of owners and in many cases collaborators of PyMES don't have education (in this realm) and many of the activities that they carry out are based on experience without considering that maybe there are better methods.]

This comment is particularly significant as it may be an explanation for those "empresarios" who were neutral—to be discussed later on.

The following business manager also emphasized the impact of such educational programs might have. During the interview, this person also mentioned that courses need to be available in the evening; during the day is impractical for business owners and managers.

*d. Con esto se abrirían espacios de diálogo y se verían las verdaderas necesidades de sistemas de manejo de inventario.*

[With this, new areas for dialogue would open up and we would see the true needs in managing inventory.]

The importance of this issue is further supported in the following comment; the interesting addition here is that the owner recognizes that if the business cannot manage inventory, they cannot move to the next level (an issue to be addressed in Table 4a). This comment was made in the context of business readiness to consider exporting:

*e. Es muy importante ya que la pequeña y mediana empresa depende del inventario y e buen manejo para poder desarrollarse.*

[It is very important since the small and medium-sized businesses depend upon inventory and good management in order to develop.]

The following comment pointed to the complexity of managing efficient logistics systems. This company addressed reverse logistics—in their case, product returns due to damage. These returns amounted to 7% their annual sales. The interviewee acknowledged that they had not figured out how to turn this annual loss into a business development venture. Additionally, routing their drivers optimally was a skill they apparently lacked, and recognized as an important factor of efficient logistics systems:

*f. Capacitación en distribución de rutas y manejo de inventarios; reciclar para ganar (negocio).*

[Training in routing distribution (of products) and in management of inventory; (training in) how to make a business out of recycling.]

Of the two interviewees that chose #2, “somewhat important,” one claimed to already have experience and knowledge regarding the subject of inventory management. The other interviewee chose #2 because she was influenced by the fact that these programs are generally offered during the day and she could not devote day time hours away from business operation to attend:

*Sí, el horario de estas capacitaciones deben ser programadas fuera de horas de trabajo o aún por el internet.*

[Yes, (acknowledging the importance) the schedule of these trainings should be programmed outside of business working hours or even through the Internet.]

Of the 5 that chose, “neutral”, three believed that while such education was important, it was not a priority for them because they felt they already had gained knowledge or had experience in inventory management and control. One interviewee acknowledged that his company maintained little inventory as they work on a project basis; therefore, he felt this issue was important to his suppliers. Another indicated that his company had no training in effective management of inventory, and did not regard it a necessity to have it. In short, the findings support that the issue addressed through Question #2 was generally deemed important.

#### *4.2 Questionnaire-Related Responses: Part II A*

Part II aimed to explore how (and if) these small businesses monitor and analyze factors that are important to inventory management, as defined. Following the order of Part II of the questionnaire:

*A. Favor comentar sobre el sistema que se usa en su empresa para analizar el nivel de inventario que se necesite para satisfacer la demanda de sus clientes. Además, ¿cómo mantienen un registro de materias primas, ¿cómo realizan un seguimiento de productos a sus clientes?*

[Please comment regarding the system that you use at your company to analyze the level of inventory that is necessary in order to satisfy the demand of your clients. Additionally, how do you maintain a record (keep track) of raw materials; how do you track/monitor products to your customers?]

As mentioned in the “Methodology” section earlier, section “A” was added after the initial pilot questionnaire (Appendix: Exhibit A.2, “Pre-diagnostic Questionnaire”) was mailed with the introductory letter. When it was discovered during the initial interviews that several small business managers or owners were unsure of what percentage their inventory was of annual sales, it seemed important to verify how and if they were tracking factors related to management of inventory. [If they were not, or if they were not doing it effectively for whatever reason, then it would seem improbable that they could provide a perspective to the impact that country logistics performance—to include infrastructure—has on inventory management. The reader is reminded that in qualitative research, interaction between variables is quite important for a holistic assessment of an issue.] Subsequently, section A of Part II was inserted; the revised questionnaire was then e-mailed. This section was then addressed in all of the 20 standard, open-ended interview sessions. The results are illustrated in Table 4a, and as is discussed, they are considered to be quite significant in terms of the implications to training and development of small businesses in the realm of inventory management.

**Table 4 a: Inventory Management: Description of Range of Capabilities of Small Business Sample**

Level	Description
0 <sub>1</sub>	Maintains little to no inventory of raw materials or finished product; relies on their providers who they claim provide good service; orders generated by phone, e-mail, or personal visits
0 <sub>2</sub>	Maintains little to no inventory of raw materials or finished product; service from providers is not to their level of satisfaction for various reasons; orders generated by phone, e-mail, or personal visits
1	Manual system (e.g. recorded in books) for managing some inventory of raw materials, but not others; not apparently knowledgeable of relationship between inventory management and business costs or of what “logistics” means or entails
2	Manual system (e.g. recorded in books); minimal analysis of demand (or based on previous weeks or years); phone calls to customers to assess customer satisfaction and delivery; no computerized raw material order generating, no system to optimize routing of deliveries to customer
3	Home-made ( <i>tipo casero</i> ), Excel-based or similar to track raw materials and delivery of final product, computer generated invoices; some analysis of demand and forecasting; no computerized raw material order generating, no system to optimize routing of deliveries to customer
4	Use of software to track raw materials and delivery of final product; regular analysis of demand, forecasting, computer generated invoices; no computerized raw material order generating, no system to optimize routing of deliveries to customer
5	Use of software to track raw materials and delivery of final product; regular analysis of demand, forecasting, integrated computer-based system used to manage internal and external resources and to generate orders for materials needed to satisfy customer demand; tracking of distribution and routing optimization. As applicable, system also serves to optimize use of raw materials and reduce waste from manufacturing

**Table 4 b: Inventory Management: Profile of Small Business Sample**

Level 0 <sub>1</sub>	Level 0 <sub>2</sub>	Level 1	Level 2	Level 2-3	Level 3	Level 4	Level 5
3	3	1	2	2	3	1	5

*Time period: May – mid July 2012*



Tables 4a and 4b were formulated as a result of the review of the interview transcripts—i.e., after the interviews. Table 4a captures and groups defining characteristics of the 20 small businesses with respect to the management of inventory, as defined herein. While, admittedly, all potential elements of “inventory management” are not addressed in Table 4a; those elements that are included were those that distinguished one level from another. “Levels” refer to the interviewees’ respective stage(s) of development as related to ability and/or resources to manage inventory effectively. As a matter of convenience to display relevant data, other distinguishing aspects of the businesses’ profiles that are generally associated with effective logistics management are also noted. Recalling information displayed in Table 3, all of the individuals interviewed were not without education, and, from a management oversight perspective, all were qualified to discuss the business issues addressed in Part II. Further, all but two had been in business for over six years, and most for well over six years. These factors lend more credibility to the responses of the interviewees.

*Level 0<sub>1</sub> and 0<sub>2</sub>*<sup>13</sup>: 01 companies were generally satisfied with the service of their providers. Some illustrative commentary at the 0<sub>1</sub> and 0<sub>2</sub> levels:

*a. 0<sub>1</sub>: Es de suma importancia que nuestros proveedores tengan un sistema de inventarios robusto para que nos puedan garantizar el suministro de materiales.*

[It is very important that our suppliers have a robust system of inventory so that they can guarantee delivery of materials.]

I asked the interviewee if there were certain customers who had a pattern of ordering the same materials within certain periods. He acknowledged that there were. I then asked if these long-time relationships could become an alliance between his providers and his customers—something his business could forecast and program with suppliers to guarantee. His reply:

*b. 0<sub>1</sub>: Estamos deseando que esto se dé, porque esto nos aseguraría mucho trabajo para nosotros, nos ayudaría a tener más oportunidades...*

[We’re hoping that we get this, because this would insure more work for us, and help us to have more opportunities.]

---

13. We verified via phone that all companies selected for the sample maintained some inventory. Although six maintained very little to none, their comments regarding their suppliers were still deemed to be important to the study.

As with  $O_1$  companies,  $O_2$  companies maintained little to no inventory; yet they expressed some areas where service from providers was not to their total satisfaction. As examples,

*c.  $O_2$ : Yo pienso que podría funcionar mejor; nosotros con nuestros clientes tratamos de tener una comunicación muy ágil, muy rápida, y a veces el no tener un sistema así con nuestros proveedores de enlace en donde podamos consultar nosotros en línea nos hace perder tiempo; entonces considero yo acá que un...como decimos aquí “una piedra en el zapato” que tenemos ahí; es que a veces nuestros proveedores atrasan nuestro proceso con el cliente...*

[I think it would be able to work better if we tried to have more agile, very rapid communication with them. Sometimes the fact that we don't have such a communication system with them, where we would be able to consult on-line (what they have in stock) makes us lose time; then I look at it like what we say here is a “rock in your shoe”; it's like sometimes our suppliers delay the process with our customer.]

He adds that he has a supplier in the U.S. that has his catalog on the internet, and they can consult prices, specification, and what is in stock. He further adds,

*“Para mí, trabajar con ellos es excelente porque tengo todo a la mano en el momento nada más que hago la consulta; me parece que sería muy beneficioso para nosotros y para el país inclusive que esa cultura, ese ejemplo de ese proveedor lo podamos ir aquí todos inculcando en nuestras empresas para tener ese enlace y que la logística sea muy fluida.*

[For me, working with them is excellent, because I have everything at my fingertips at the time, I just need to check with them (meaning, on-line); that example of that supplier would be very beneficial for us and also for the country including that culture, (with) that example of that supplier, we could all strive to instill in our businesses to have that bond so that logistics be more fluid].

This type of a comment surfaced in questions discussed earlier—i.e., the need for better communication systems with suppliers. In the case of the  $O_2$ 's, every interviewee spoke of this issue.

It is important to note that alliances and relationships are important to effective and efficient logistics management. Nevertheless, comments indicating sentiments of helplessness, and/or isolationism, and/or lack of ability of many small business

owners/managers to influence the supply chain was apparent within many Levels detailed in Table 4a. Yet, what was striking here was a sense of acceptance of waiting for deliveries of their suppliers. In short, many were accustomed and/or resigned to have to wait—a factor that is discussed later in the report.

*Tables 4a and 4b, Levels 1-5:*

If a picture could be worth 1,000 words, then the following three photos, Exhibits 3a, 3b, and Exhibit 4, suggest a wide range in levels of progression between Level 1 and Level 5 (Table 4a). The Level 1 firm did not apparently have a system of inventory management in place. There is manual tracking of raw materials such as hardware and paint used in the production process, and recorded in a notebook. However, the quantity in terms of the primary production material, the wood itself, was not measured, tracked or considered in terms of the cost to warehouse it. Exhibit 3b illustrates scrap as part of the production process, but there is no apparent effort to recycle these desperdicios (waste) into gainful venture for this firm. Observation of the various storage areas showed large piles of scrap material that were either given away or occupying space. The owner expressed that he was not aware of where he could obtain training on the subject of inventory management.

Exhibit 4 is a warehouse picture taken at a Level 5 business site. Table 4b shows that 5 of the 20 businesses represented the level of sophistication as described in Table 4a: Software is used to track raw materials and delivery of final product; there is a regular analysis of demand, forecasting, an integrated computer-based system used to manage internal and external resources. The system also aims to optimize the use of raw materials and reduce waste (scrap) materials. In the case of this company, as orders come in, software calculates what type of cuts can be made to optimize use of raw materials through “intelligent searches.” Whatever scrap that is unsalvageable is sold to be used in other businesses.

**Exhibit 3a: Level 1—Inventory Management****Exhibit 3b: Level 1**



#### Exhibit 4: Level 5—Inventory Management



Within Level 5, there were also ranges of sophistication. At the highest end of inventory management sophistication, companies counted on an operating system that not only monitored inventory, but also generated purchases of raw materials as part of an enterprise resource planning (ERP) system.

Through the open-ended interview process, Levels 2 - 4, and even Level 5 firms, generally recognized what it would take to get to the next Level of sophistication. As examples:

- A Level 2 interviewee mentioned that he was interested in doing direct imports (so as to not rely on intermediaries), but acknowledged that to do this, it would be necessary to implement inventory management systems.
- A Level 2 - 3 company utilized a manual system for some aspects of inventory management and an Excel-based type system for others.
- A Level 3 company called their inventory control system a *tipo casero* (homemade type), developed since a manual system was no longer satisfactory to meet demand, grow their business, and reduce costs. They mentioned that they would need a more intelligent system to track recycled materials that they buy in large quantities, and also other materials they store in various stages of production. The owner and son acknowledged that they watch the costs of their employees, raw materials, but then added,

*... pero realmente un costo de almacenamiento, de cuánto cuesta tenerlo ahí, la plata ahí parada, no lo tomamos en cuenta.*

[but really a cost of storage, of how much it costs to have it here, the money just sitting here (so-to-speak); we don't take it into account.]

They both agreed that in order to get to the next stage of development, they would need to factor in these costs.

- Another Level 3 company (Table 4b) moved from a Level 2 (manual system) to Level 3 in recent months for the following reason:

*La necesidad de un control, y segundo, un conocimiento básico de la situación real de la compañía, porque no es lo mismo decir, "aquí hay mucho, pero, ¿mucho de qué?; "aquí hay poco," pero, ¿poco de qué?"*

[The need for control, and secondly, (the need for) basic knowledge of the real situation of the company, because it isn't the same to say, "here there is a lot, but, a lot of what?" or, "here this is a little, but a little of what?"]

This company does not have an intelligent system to measure or reduce waste of raw materials as yet. The manager saw opportunities for growth in exporting, but in order to do that, he acknowledged he would need more resources to improve their inventory management systems.

There is a great deal more that could be analyzed regarding Part IIB: For example, how these businesses decide what to order and when, methods of deciding what to stock (by sales margins, by number of times ordered per month or by year); however, these issues, while important to training implications, are too tangential to the central issue of this study to explore further herein, or beyond the scope of this exploratory study. Therefore, we proceed to the next sections of Part II.

#### *Questionnaire-Related Responses: Part II B, C, D*

*B. De acuerdo con su experiencia en los últimos dos años, ¿Qué nivel de inventario mantiene la empresa como porcentaje de las ventas anuales? Marque con una X.*

[Based on your experience within the last 2 years, what level of inventory does your company maintain as a percentage of annual sales? Mark with an X.]

---

( ) 0 – 5%                      ( ) 6 – 10%                      ( ) 11 – 20%                      ( ) más de 20%

*Comentarios:* [comments listed here]

*C. ¿Cuál sería el nivel de inventario que le gustaría mantener como porcentaje de sus ventas anuales? Marque con una X.*

[What level of inventory would you like to maintain as a percentage of annual sales?]

( ) 0 – 5%                      ( ) 6 – 10%                      ( ) 11 – 20%                      ( ) más de 20%

*Comentarios:* [comments listed here]

Obviously, for the six  $0_1$  and  $0_2$  companies. this section was **n/a** (not applicable). For the rest of the companies, it became clear that the ability to respond to this question was a factor of having an effective inventory management system in the first place: Without such a system, how could one be sure the business was analyzing costs of raw materials, storage, etc.? Table 5 details how the 14 remaining companies responded either on the questionnaire or through interview. In the table, each row corresponds to one company.

**Table 5: Part II A & B: Control and Management of Inventory**

Level (Table 4a)	% Real	% Desired
1	not able to answer	not able to answer
2	0-5%	0-5%
2	?	?
2-3	0-6%*	0-6%*
2-3	6-10%	6-10%
3	> 20% (Up to 33%)**	11-20%
3	6-10%	11-20% > 20%
3	> 20%	> 20%
4	6-10%	6-10%
5	11-20%	11-20%
5	>20%	11-20%
5	6-10%	0-5%
5	11-20%	6-10%
5	> 20%	> 20%

\* The manager wrote/circled: 0-6%

\*\* For one particular recycled (major) product used in production, the owner claimed the figure was around 33%.

While ideal inventory levels generally vary by industry, carrying too much can effect on profit margins and Return On Investment (ROI). The information detailed have an Table 5 is interesting for a number of reasons:

- Regarding the Level 1 firm's response to Part 2, B & C (Exhibit 3a and 3b), the owner writes, *sería difícil contestar*. [It would be difficult to answer.] There is a correlation between level of capacitation to manage inventory and ability to respond to this question.
- Level 2, and 2-3 companies, were either unsure *or* based their responses on experience over the years. All recognized that having too much inventory represented a cost.
- Only one company (Level 3) expressed a desire to have available more inventory of raw materials for their customers—up to 11-20% or even more than 20%. This was an unexpected response. When asked why, the manager/owner said that carrying more, in his view, gave them a strategic advantage against larger companies:



*Pero sí, a veces es bueno tener un poco más de reservas en este tipo de trabajo porque incluso a nosotros nos dan una competencia estratégica, ya que a veces se dan faltantes en el mercado y si uno tuviera material de más significar poder, o le adjudiquen o no un proyecto.*

[But yes, sometimes it is good to have a little more in reserve (inventory) for this type of work because even for us it gives us a competitive advantage, since at times there is shortage in the market, and if one has material it may mean more ability or not to win a project (job).]

Reiterating, it becomes clear that infrastructure and transportation systems — to be addressed in the following section — is not the only factor that might influence businesses to possibly carry more inventory (a *colchón*) than they might need or might be advisable in terms of ROI.

- As Table 4a shows, the Level 4 and 5 companies had more developed inventory management systems. Table 5 shows that the interviewees either felt comfortable with their inventory levels; yet, three of the Level 5 companies would like to see them reduced further. They based their responses on information systems that they claimed were regularly monitored and analyzed. Therefore, one might argue that those with more intelligent systems and training might be more qualified to judge the effects of logistics on the cost of inventory. In other words, we cannot measure what we do not know or have the capacity (e.g., training and systems) to find out.

*D. ¿Qué otros temas referente al efecto de la logística en el costo de inventario de empresas pequeñas, recomienda usted que son importantes de contemplar en este estudio?*

[What other important issues regarding the effect of logistics on the cost of inventory of small businesses do you recommend to be considered in this study?]

Of the 20 small businesses interviewed, the following are the comments of those who chose to respond. The number that precedes the comment indicates how many businesses wrote this type of a comment on their questionnaire.

- (1) Land transportation, particularly through San José.  
*Es necesario diversificar los medios de transporte, ya que se depende mucho del transporte terrestre y con los problemas viales que existen en el país se saturan las carreteras y los tiempos de entrega se elevan.*

[It is necessary to diversify the means of transportation, since it depends a lot on land transportation, and with the road problems that exist in the country, the highways are saturated and delivery times grow higher.]

While only one interviewee wrote this comment on his/her questionnaire, it was mentioned by others too, during the interview.

- (1) Infrastructure. Poor roads and congestion by passenger cars. Again, this is another issue mentioned in interviews.
- (3) Financing for small businesses.

*La facilidad de financiar los pedidos de la materia prima y suministros. Un financiamiento ágil y oportuno.*

[Financing for (purchase of) raw materials and supplies. Financing that is agile and opportune.]

While three companies wrote this type of comment on their questionnaire, this was an issue raised by those in *all* categories shown in Table 4a during the interviews.

- (2) The problem of minimum order quantities. This was a big issue for many of the businesses — mentioned in interviews, and to be discussed further.
- (1) Assistance with importation of products. Another issue, mentioned in interviews — again, to be discussed further.
- (2) Training. The recognition that the company needs training in inventory management.
- (3) Technology. The need for improved technology in this realm of inventory management and also better systems for following product to their customers.
- (1) Training. For efficiency and effectiveness in human resources.

#### *4.3 Related Findings*

There are a number of findings that are deemed to be significant to this exploratory study, gleaned from analysis of the interviews of all of the organizations interviewed — in other words, the 20 small businesses, the NGOs, the State organization, and the large businesses

organizations all represented in Table 2, “Interviews by Organizational Category” — a total of 30. Most of these findings are addressed in “Conclusions” and/or as action items in “Recommendations for Further Study.”

### Logistics Performance Issues

What were the perceptions of the interviewees specific to the impact of country logistics performance on inventory control? Starting with a Level 5 company (for reasons that should now be apparent in terms of competency to address this issue), this company’s profile of inventory management included all of the characteristics listed on Table 4a. Additionally, the owner emphasized that from the beginning, he has always recognized the importance of hiring people who are knowledgeable in this particular area of business management. His comments regarding logistics performance issues in Costa Rica and the relationship to inventory management:

- Freight forwarder competency. This owner said *que son de mis más grandes obstáculos*. [That (freight forwarders) are among his biggest obstacles.]

*Me dicen que el producto viene en el container, y luego 4 días después, cuando el barco llega, me doy cuenta que no, que fue por error de un documento. No le puedo hablar bien de los freight forwarders.*

[They tell me that the product is coming on the container, and then 4 days later when the vessel arrives, I realize that "no",... that is was (late) because of a documentation error. No, I can’t say anything good to you about freight forwarders.]

While he would prefer to carry less inventory (0-5% of annual sales vs. 6-10%), he attributes the need to carry a *colchón* to several factors:

- a) minimum order requirements of his providers,
- b) freight forwarder issues as described;
- c) delays and poor service in Port Limón and high costs.

- Infrastructure. One NGO director’s view of infrastructure in Costa Rica:

*Para mí, es la infraestructura física menos desarrollada de Centroamérica; yo creo que la infraestructura de Managua y El Salvador funciona mejor que*

*la de Costa Rica, tanto el puerto como carreteras; entonces es un desafío muy largo, muy costoso, y muy a largo plazo.*

[For me, the physical infrastructure is the least developed in Central America. I believe that the infrastructure of Managua and El Salvador functions better than that of Costa Rica, as much with the port as with the roads; so it is a big and costly challenge over the long term.]

He also pointed out that this was a factor that influenced collection of taxes by the government: the citizens see the continuing bad conditions of the road, so their view is, “why should I pay taxes?” Therefore, he sees this situation is an economic one that becomes a vicious cycle which impacts the economy in a negative way. His views regarding the efficiency of Puerto Limón were not favorable, calling it a *desgracia* (disgrace). He emphasized the need for an integrated system of transport in the country.

Not all of the small businesses complained about infrastructure. Those who did, were primarily those who were located in San José, or depended on routing through San José, or from Limón, and/or where road collapses and repair planning frequently interrupted timely deliveries.

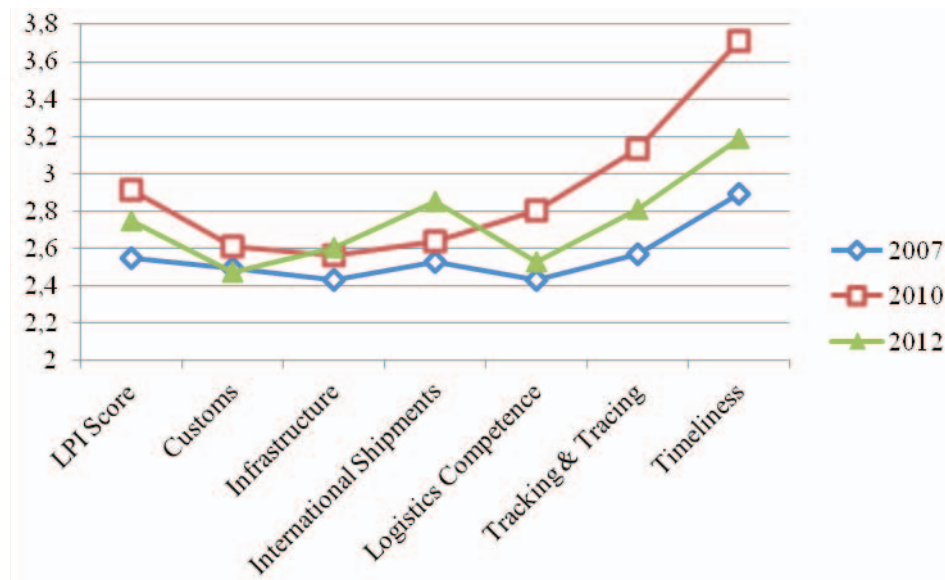
One business owner expresses his view of Just in Time (JIT) systems:

*a mí me da la gracia porque yo, cuando estudié ingeniería industrial, nos hablaban mucho de Just In Time y todo eso. Cuando yo lo veía, decía, sería muy bonito, pero en un mundo ideal que en todo fuera más fácil transportar las cosas.*

[For me, it strikes me funny because when I studied industrial engineering, they spoke a lot about “Just in Time” and all that. When I used to see that, I would say that it would be nice, but in an ideal world in where it would be easy to transport things.] He pointed to integrated transportation networks being developed in Brazil and Colombia as potential models for Costa Rica.

The above comments are interesting as they appear to parallel several elements of Costa Rica’s current performance on the LPI Index mentioned earlier in the Introduction to this report.

**Exhibit 5: Logistics Performance Ratings for Costa Rica**



Recalling Table 1, Costa Rica's logistics performance dropped significantly from 56 (2010) to 82 (2012) in LPI Rankings, or in 4 out of 6 areas. There was slight improvement, however, from 2010 in the categories of infrastructure and international shipments.

- “Just in time” supply chain realities. Despite the small size of these companies, their activities regarding sourcing, procurement, and production planning can be very extensive, or perhaps better stated: quite complicated, particularly in for the Level 3 - Level 5 companies. In the case of one Level 5 company, 50% of their raw materials are imported; others are purchased locally; prior to recent years it was 80% and 20%, respectively. They depend on intermediaries for some materials imported from Guatemala and China, others are purchased locally; for another they depend on an individual who arranges consolidation directly from suppliers in Germany. The owner pointed to problems with delays with import permits:

*Todo se atrasa; este tipo de problemas son los que existen para una pequeña empresa.*

[Everything is delayed; these types of problems are those that exist for a small business.]

Note the dialogue that follows between the interviewer and respondent regarding this issue:

Business Owner:

*De México, que México es complicado, complicado. Entonces ahí todo como es muy lento, como que no, no funciona!... Tenemos otro proveedor, también de México...Entonces, ahora hay regulaciones en cuanto a esto, porque esto tiene alcohol, entonces no se puede traer en avión; entonces un ( X ) muy pequeñito de 25 kg., pero tiene que venir por tierra con un montón de cargamento porque no se puede venir en avión.*

[From Mexico, Mexico is complicated, complicated. There everything is slow... not even slow...it doesn't work! We have another supplier, also from Mexico...So, now there are regulations regarding this (product), because it has alcohol, so it can't be brought in by plane; so a very small 25mg. of (X) has to go over land with a ton of cargo because it can't come by plane.]

Interviewer: *Así, un análogo es, si yo quiero cocinar un queque, ¿verdad?, que* [So the analogy (to all of this) is that if I want to bake a cake...right? that..]

Business Owner: *Tiene que estar todo.* [Everything has to be ready.]

Interviewer: *Necesito todos los ingredientes...* [I need all the ingredients.]

Business Owner: *Exactamente, exactamente.* [Exactly, exactly.]

It boggles the mind to try to comprehend how a small business could manage all of this *without oversight and integration assistance (and/or training)* to facilitate and optimize aspects of procurement and production planning. However, such assistance alone would not be enough to resolve these issues, as so many other factors are involved. This brings us to another related "Findings" issue.

- Expertise and oversight in achieving logistics efficiencies. Interviews and the questionnaire results strongly support that there is definitely a need for assistance, training, education in elements critical to logistics management. Recalling the earlier definition, all the following elements, in particular, emerged as areas of need: "inbound and outbound transportation management, warehousing, order fulfillment, logistics network design, inventory management, supply/demand planning, management of third party logistics services providers...sourcing and procurement, production planning and scheduling."

There *are* apparently free workshops offered by NGOs and others that address soft skills needed by managers to manage and develop their workforce and other aspects of business administration. There is marketing and logistics assistance available, access provided to data bases, and even a relatively new web portal through an export promotion dedicated NGO: Companies can determine export opportunities and costs, evaluate shipping alternatives, applicable duties, and identify permit requirements and more. An agency representative also mentioned that they assist to remove whatever obstacles there might be to become “export-ready.” A business might also be developed as part of the supply chain of a multinational company looking to enrich their supply chain with local producers, possibly PyMES and others. In fact, a primary focus of this agency is to offer assistance to multinationals or exporters in identifying inputs, services, etc. that can be provided directly in the country, whether provided by PyMES or other local suppliers in their area of specialization. Companies that are not viewed as export-ready or export-conscious, or ones that are in need of business development and/or establishment of assistance for the local market, must turn to other agencies that provide support to small and medium sized businesses such as (DIGEPYME) of the Ministry of Economy, Industry, and Commerce (MEIC), or others such as the National Institute of Learning (INA).

Yet, despite the availability of workshops and other forms of assistance provided through agencies, findings do show that there apparently may be a gap between *asesoría* (advice), *acercamiento* (bringing people to information sources), and *acompañamiento* (accompaniment—i.e., hand-holding). As example, results mentioned in earlier sections of this report suggest that businesses needed assistance in the elements identified under logistics management. To exemplify the differences between *asesoría*, *acercamiento*, and *acompañamiento*:

- *Asesoría*: “Go see the following agency or agencies; they are in a better position to determine what tools might be available for you.”
- *Acercamiento*: “On X website, there is information regarding how to assess if you are “export ready.” [Of course, developing competency in inventory management is an important step along the way to “export readiness.”]
- *Acompañamiento*: An agency representative progresses the client (business owner) to reach realistic outcomes that are mutually identified.

An interview with an export focused NGO representative, whose specialization is logistics, points to a potential gap as described earlier:

*Te cuento que hasta este momento, el enfoque no ha cambiado o sea lamentablemente, y así te lo tengo que decir; no ha cambiado mayor cosa. Nosotros seguimos viendo al exportador cuando ya tiene el producto listo para*



*exportar. Ok, si tú dices, ahorita me preguntas, ¿Cuántos, en los 3 años que tengo en la promotora, cuántos talleres han hecho ustedes para capacitar a la empresas en materia de inventarios? Te puedo decir, a través de la unidad mía, cero.*

[I'll tell you that up to this moment, the focus hasn't changed. We continue seeing the exporter when he already has the product export - ready. Ok, if you were to say, now you're asking me, how many, in the 3 years that I have worked (at ...), how many workshops have you done to train businesses on the subject of inventories?, I can tell you, that through my unit, zero.]

There can be no doubt that there was an abundance of interest at a national level in developing PyMES at the time of this research endeavor, as evidenced both in interviews and in media reports. The NGOs, the state institution, and “other” organizations interviewed, confirmed that there was a need for more integration between agencies and institutions of higher education. As stated by one NGO representative: *Siento que hay mucho por trabajar; eso es un hecho; sin embargo, ya se han hecho esfuerzos.* [I feel that there is much to do; that's a fact; nevertheless, some efforts have already been made.] His organization participates in an initiative with MEIC called, CREA PYME, dedicated to help with management issues of PyMES—including but not limited to legal and administrative issues with business establishment. Yet, he acknowledged that integration of the various agencies would be optimized if there were clearer understanding and focus of objectives and what each organization was doing (e.g., NGOs, colleges, Chambers, etc.).

- Rail service. Further to the E. Potoker (2008) *Serie de Divulgación Económica, IIICE-02* Report, modernization of Costa Rica's railroads continues. In 2008, active routes included passenger trains that run from San José to Caldera, in the San José/San Pedro Universidad Latina and Pavas area, some freight trains running from San José to Caldera, from Guápiles to Limón—banana for many years, and steel and paper more recently. Other lines include Cariari in Limón to Río Frío en Heredia, with restoration of a bridge in progress.

Interview with the Costa Rican Institute of Railroads (INCOFER) and secondary research findings confirmed that the transport of cargo in the Caribbean zone continues to be constant and stable with significant increases in the quantities of cargo transported. There are apparently no plans to put in a route from Limón to San José, as such a route is fraught with challenges due to the mountains—that's not to say it would be ideal to have to relieve the congestion and wear and tear on the famous Route 32. However, there are further plans to do basic rehab in the Limón coastal zone, since transport of bananas and steel continues to be very viable. This same route would be used to transport tourists who arrive on cruise ships in Limón, and do trips from the port to the interior and then return.

In short, progress goes forward to get passengers off the road to address the problems of congestion on the highways: Lines restored and opened include one between Pavas to San



Pedro, the route from Heredia to San José, and from San Antonio de Belén to San José. Also projected is to open service from Cartago. For 2014 they (Incofer) anticipate opening service to Alajuela from Heredia so as to establish a rail corridor for passenger transport which would then be extended between Alajuela and Cartago.

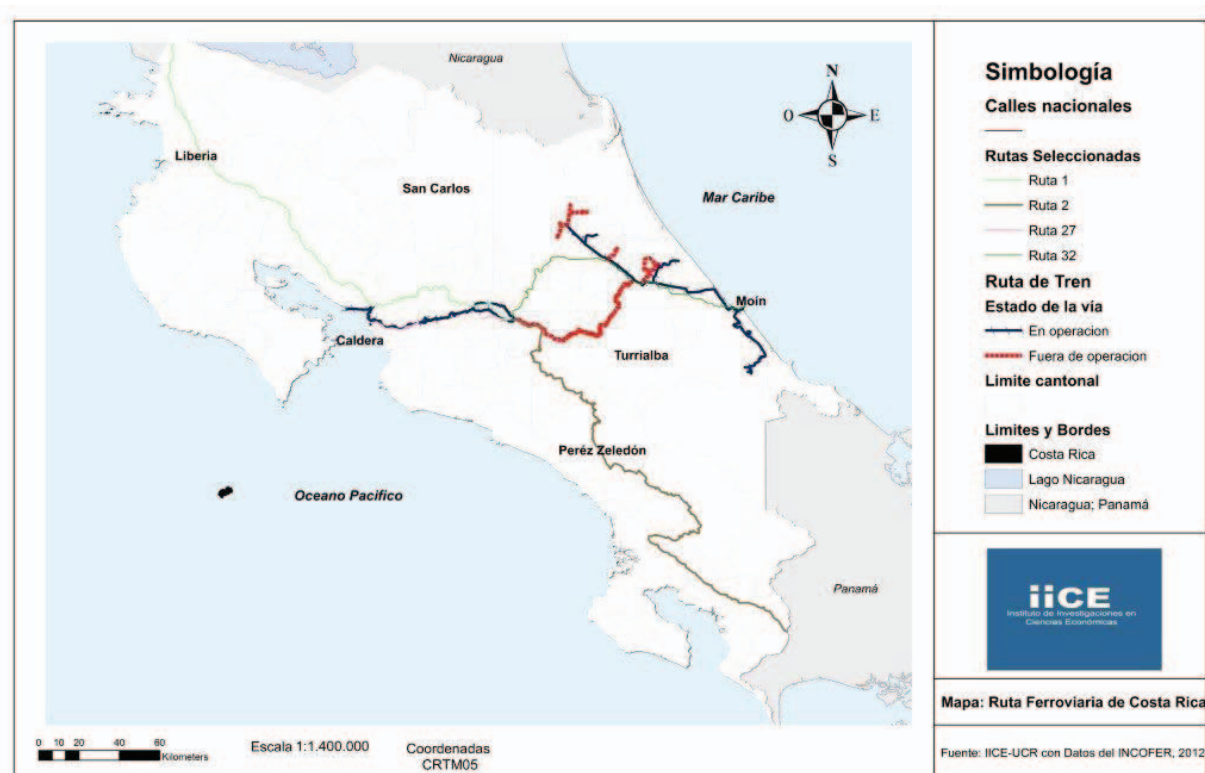
On the Pacific side, there are two rail cargo projects in the works targeted for 2013-2014: Grain transport (principally wheat and soy flour), and also consolidated container shipments where the route enters right into the port. These are modernization/restoration of routes that have been dormant.

One catalyst expected to advance these rail developments is the project entitled, *Proyecto Limón Ciudad-Puerto* (Project Limón City to Port)<sup>14</sup>; an investment of 80 million, 70 million of which will come from the World Bank and 10 million from the State. It is a project aimed to improve infrastructure. 5.8 million dollars is targeted for rail improvements. Restoration of the bridge in the Río Frio zone will be important to banana growers, opening the port to the north of the country into the region of San Carlos. There are businesses that apparently have keen interest getting product—mainly perishable product, such as banana and pineapple—to the ports for export; therefore, an interconnected rail service is very important to the agricultural community going forward. Refer to Exhibit 6 for a current illustration of rail service in Costa Rica.

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14 Confirmed in interview with INCOFER, June 11, 2012. Refer to [http://www.plcp.go.cr/web/index.php?option=com\\_content&view=article&id=104&Itemid=1](http://www.plcp.go.cr/web/index.php?option=com_content&view=article&id=104&Itemid=1) , and [www.ifam.go.cr/LimonPuerto.htm](http://www.ifam.go.cr/LimonPuerto.htm) for further information. Last access: 21 October 2012.

### Exhibit 6: Costa Rican Rail System (2012)



*Fuente: IICE-UCR con datos del INCOFER.*

Interviews with businesses transporting bulky products supported that if rail cargo service was available to them, they would use it. Even firms that do not transport bulky materials or other commodities well-suited for rail, acknowledged the importance of an integrated railway system as part of the transportation infrastructure in Costa Rica.

#### Other Issues

Other significant findings that revealed during the interviews were not necessarily directly related to logistics performance issues. However, as they were mentioned on three or more occasions, and considered important to small business vitality over the long term, they are noted herein.

- **Financing concerns.** Small businesses generally work with their own finances. As mentioned the previous report by this author in 2008, these business owners also emphasized that flexible financing is an important issue for them. One example that relates to inventory management:

*“yo creo que uno de los problemas más grandes de las PyMES a tener acceso a inventarios más controlados o más eficacia en lo que es transporte, y eso es la falta de capital económico.*

[I believe that one of the biggest problems PyMES face, to have access to more controlled inventories or more efficiency in transportation, is the lack of economic capital.]

Others also pointed to the need for working and investment capital to accommodate the different timelines involved in receiving the various “ingredients” required for production. As an example, in the following quote, the business owner expresses some frustration with the banking community, and also points to the important relationship of financing to production planning:

*Interviewee: Hay mucha, mucha habladuría de la pequeña empresa; pero a la hora que uno va a un banco es muy difícil. A mí me encantaría tener como decir una línea de crédito que tuve hace unos años, ¿verdad?, y entonces uno sabe que tiene el dinero ahí para pagar cuando uno necesita no es para largo plazo—sino que seis meses; pero a veces no tiene el dinero uno para trabajar.*

[There is a lot of talk about (support for) the small business; but at the moment that one goes to the bank, it is very difficult. I would love to have, let’s say, a line of credit like I had a few years ago, right?, then one knows that one has the money here to pay when what one needs; it is not for a long time—just for six months; but sometimes one doesn’t have the money to work.]

The owner discussed a bid (tender) for a government entity, who she emphasized, is an excellent client in terms of timely payment. For this small business, this tender was a large order. It would have been helpful to have had a line of credit to be able to finance the required raw materials they had to import and/or purchase locally. Given the payment history of the customer, more agile financing would have taken a good deal of stress away from the business owner.

Companies whose primary business focused on environmental protection or technological development reported that the banking community was becoming more supportive with funding than reported in the 2008 report.

- **JIT and Culture.** One result that emerged from the interviews involved the relationship between cultural norms and the JIT philosophy. Recall the conversation with the industrial engineer and business owner (see in *section Related Findings> Infrastructure*, of Report) who mentioned that JIT was a concept he studied in school, but difficult to implement for all of the reasons discussed

heretofore in this report. Yet, also mentioned was that the small business owner was simply accustomed to waiting. The question that emerged throughout the interviews regarding this point: *Do you think you've become accustomed to waiting?* In most cases, the reply was "yes" — they had become accustomed to waiting, as there were so many internal country factors historically influencing production planning.

Another issue involved the minimum order requirements that small business owners face, which, in turn, are potential reasons for costs associated with maintaining higher inventories. This situation obviously works against a JIT approach. Yet, when interviewees were asked if there were attempts to form associations, alliances, and/or consortiums to reduce these costs through mutual cooperation for materials sourcing, the replies were mixed. Several business owners spoke of the individualism that precludes the willingness to “cooperate.” As example, one NGO Executive Director commented,

*“El primer gran reto es la voluntad de asociarse, la voluntad de trabajar juntos con otras PyMES, la voluntad de cooperar en cooperativas o grupos asociativos.”*

[The first big challenge is the willingness to associate, the willingness to work together with other PyMES, the willingness to cooperate in cooperatives or with other “partnering” groups/alliances.]

So as a cultural phenomenon—along with the necessary education and tools required for implementation of JIT, and country-specific factors regarding infrastructure affecting JIT in real time, there are also the effects of an individualistic culture that may need to be factored into education regarding development of efficient logistics systems. Alliances, after all, are essential along the supply chain. This individual also mentioned several other challenges facing PyMES, which tie into others already mentioned:

- a) the access to knowledge; and,
- b) access to capital.

This individual emphasized that this is an issue, not only for Costa Rica, but also for other countries in the region as well.

- Prioritization of resources. It is clear that findings from the Questionnaire Part 1, Question 1 and Question 2 supported that efficient logistics systems and education on the subject of inventory management was deemed important to interviewees. Yet, throughout the interviews, it became obvious that scarce resources, particularly for those Level 1-3 companies categorized in Table 4a, would involve trade-offs. In other words, if the choice became whether to invest in human resources versus advanced inventory management systems, inventory control systems might have to wait.

## 5. CONCLUSIONS AND RECOMMENDATIONS

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The rationale to pursue this exploratory study grew out of an earlier investigation published in 2008 through the IICE, discussed in the introduction of this report. As the title suggests, at the outset, the study aimed to address the impact of logistics — further defined as “efficient logistics systems” — on the inventory of small businesses. It also aimed to point to the implications of the results to Costa Rican competitive advantage. A surprise result of the research was to discover the variation in the level of competency of the business owners or managers to analyze and follow their inventory costs in the first place. As results showed, there was no standard level of competency on this topic among all 20 businesses interviewed; and so the study discovered other areas of need considered vital to the longevity and competitive advantage of small businesses in Costa Rica. It is important to note that while this is a case study based on interviews of 20 small businesses, the results appear to corroborate with the Miebach Consulting study findings mentioned in this final section, along with findings derived from the interviews with other significant organizations detailed in Table 2, “Interviewees by Category.” Specific to conclusions and recommendations based on the present study:

- Education and training in logistics systems. There is obviously a need for education and training in all aspects of logistics management, as defined in this report. Such training should be offered at times and in venues that are convenient to the busy schedules of small business. Breaking down educationally *each* of the components of logistics management will be crucial to this endeavor. To do so effectively, will need to involve many collaborators who include, but are not limited to universities, NGOs, banking, and the businesses themselves.

Additionally, there are many agencies that appear to focus on small business development in Costa Rica. Improving integration between these entities, and auditing which ones actually do add value in terms of competitive advantage of the businesses themselves, appears critical going forward.

- Export Promotion focus. There is a tremendous emphasis in Costa Rica on export promotion, and “export readiness.” Exports of goods and services, as reported in sources such as CINDE, PROCOMER, and BCCR, show an increase of 8.3% in exports of goods and services since 2001.<sup>15</sup> As mentioned earlier in the report, there are on-line tools to assess export “readiness,” along with resources. However, on the basis of this exploratory study, there is apparently a gap between *asesoría* (advice), *acercamiento* (bringing people to information sources) and *acompañamiento* (accompaniment — i.e., hand-holding). Export readiness generally entails all of the

competencies mentioned under Level 5, Table 4a, and many more. Admittedly, not all firms may be destined to be exporters. However, whether they are destined for export or not, or need to develop domestically, they will still depend upon development of the logistics competencies addressed in this report, to varied extents. One interviewee from an agency providing support to small business in the realm of banking and finance, posits an important challenge for small business:

*“Entonces, me parece a mí que falta siempre un ciclo de apoyo a esa PyME... un ciclo de acompañamiento ¿Quién ayuda? Yo soy de la teoría que ... todavía (es) mucho más allá. Estas personas deberían de tener quien los asesore continuamente. A mí me gusta el concepto de los centros de acompañamiento y de apoyo...que me parece que en el país falta.*

[So it seems to me that what is needed is always having a cycle of support for that PyME — Who will help? I’m of the theory that we still have a ways to go. These people need to have someone that assists them continually. I like the idea of centers of accompaniment and support, which to me seems is lacking in this country].

Here again, improving integration between those entities claiming to support small business, and auditing which ones actually add value in terms of competitive advantage of the businesses themselves, appears critical going forward.

- **Logistics Performance.** This report’s findings, while limited to the sample interviewed in this research endeavor, appear to corroborate overall with World Bank data regarding Costa Rica’s Logistics Performance. Improvements have been noted in infrastructure, to include rail. As discussed earlier, specific to elements of the Logistics Performance Index, to gain competitive advantage, there is obviously still work to do to lower the cost of international shipments, improve infrastructure, and raise the level of logistics competency in the country.
- **Inventory Management systems.** It is recommended that a subsequent study be done to analyze the methods and systems that are being utilized for supply/demand planning and inventory management and control. Doing so was beyond the scope of this particular study. Yet, this aspect of efficient logistics systems is so important, particularly if companies are to progress from Level 1 to Level 5, or beyond, to include “export readiness.”
- **Rail.** This study further supports findings from the Potoker (2008) study. Costa Rica obviously needs to continue to develop its rail system to reduce congestion on the highways caused by passengers and by cargo-carrying trucks. An integrated transportation system that creates time and place utility for its people and customers — at home and

abroad — is of vital importance to Costa Rica’s logistics performance and, ultimately, to its competitive advantage.

On the subject of rail and competitive advantage, it is recommended that an up-to-date illustration of Costa Rica’s current rail system be developed through GPS technologies, posted and updated on key web sites such as MOPT and INCOFER. Companies and investors are choosing places to do business based on logistics integration needs. At the time of this study, there was no such illustration available to the writer. Information presented in this report was derived from interviews.

As a final note, in 2010, Miebach Consulting, Central America and the Caribbean ([www.miebach.com](http://www.miebach.com)), conducted a study of 400 companies throughout the world on the topic of “Global Logistics Tendencies.” The study was further developed in 2011 with the participation of more than 200 companies in Central America. The study showed that the biggest cost to business in Costa Rica was in inventory, followed by the costs of personnel, transportation, and infrastructure. It also found that one out of three businesses in the region and 24% of the businesses in Costa Rica knew what their logistics costs (e.g. purchasing, warehousing, costs of inventory, distribution) were as a percentage of annual sales. According to the researchers, that was a surprising outcome of their study — that companies would not know this information.<sup>16</sup> The Miebach report was not a study that focused on small businesses. Yet, given the results cited in this report, “not knowing” may be a factor of needed logistics-related competencies to do so. In short, in order to assess the impact of efficient logistics systems (or lack of them), to include infrastructure, on the costs of inventory, it will be necessary to evaluate the competencies and systems presently in place among small businesses in Costa Rica. This is a final recommendation of this study going forward: Just as form should follow function in questions of organizational design, so should centers of accompaniment be designed optimally to fit the needs of the small business community. Notably, let us not forget that this study only considered “formal” small businesses. As stated by one interviewee, how many other small businesses, not “formal,” create value for the Costa Rican economy, and how many of those will prioritize “effective logistics management” over other costs of doing business? The answer to this question is uncertain, but important in terms of future training, to include acculturation for the value of JIT, the importance of supply chain transparency, critical alliances along the supply chain, and ultimately to Costa Rican competitive advantage.

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## 7. APPENDIX



## Exhibit A.1 Letter of Introduction



### Exhibit A.1: Letter of Introduction

Fecha: \_\_\_\_\_, 2012

Señor  
Gerente General  
Empresa XXX

Estimado señor:

Por este medio le informo que la Dra. Elaine S. Potoker se encuentra en Costa Rica en calidad de investigadora invitada del Instituto de Investigaciones en Ciencias Económicas. La Dra. Potoker es catedrática e investigadora de Loeb-Sullivan School de Negocios Internacionales y Logística de Maine Maritime Academy, Castine, Maine; actualmente cuenta con una beca Fulbright para desarrollar una investigación sobre el tema: "El efecto de la logística en el costo de inventario de empresas pequeñas: Una perspectiva de ventaja competitiva costarricense".

El objetivo de la investigación es realizar una serie de entrevistas sobre el tema ya mencionado, en empresas costarricenses, tanto del sector público como del sector privado.

Con el fin de diseñar un cuestionario con preguntas relevantes al tema, se requiere realizar una prueba pre-diagnóstica, en donde se puedan identificar temas de interés que permitan la elaboración de este instrumento, por lo que le agradezco su colaboración brindándole una cita a la Dra. Potoker. Para ese fin, se preparó una serie de preguntas guía que se adjuntan a esta carta, la cual nos servirá para desarrollar la entrevista. La señora Jennifer Gutiérrez del IIICE, en los próximos días se estará comunicando con usted con el fin de poder concretar una cita.

No omito manifestarle que sus comentarios serán de gran importancia para desarrollar sistemas eficaces de la logística que sean beneficiosos para todos. La información que usted brinde será utilizada para fines de esta investigación y será tratada con toda confidencialidad.

Sin más por el momento,

Max A. Soto  
Director

Jgr  
cc. archivo / expediente



UNIVERSIDAD DE  
COSTA RICA

**iice**

Instituto de Investigaciones  
en Ciencias Económicas

Email: Dra. Elaine Potoker: [elaine.potoker@mma.edu](mailto:elaine.potoker@mma.edu)  
Jennifer Gutiérrez: [secretaria.iice@ucr.ac.cr](mailto:secretaria.iice@ucr.ac.cr)

## Exhibit A.2 Pre-diagnostic Questionnaire

### Exhibit A.2 Pre-diagnostic Questionnaire

#### CUESTIONARIO PRE-DIAGNÓSTICO

*"EL EFECTO DE LA LOGÍSTICA EN EL COSTO DE INVENTARIO DE EMPRESAS  
PEQUEÑAS: UNA PERSPECTIVA DE VENTAJA COMPETITIVA COSTARRICENSE."*

Empresa: \_\_\_\_\_

Nombre del informante: \_\_\_\_\_ Cargo: \_\_\_\_\_

Teléfono: \_\_\_\_\_ Email: \_\_\_\_\_

Las siguientes son las preguntas guía para la entrevista. Para cada una de los siguientes temas, indique el grado de importancia dentro de la empresa con la siguiente escala:

(1) muy importante (2) algo importante (3) neutral (4) poca importancia (5) sin importancia

#### PARTE I. ESTADO DE TRANSPORTACIÓN Y LOGÍSTICA EN EL PAÍS

A. ( ) ¿Qué importancia tiene para usted la necesidad de los sistemas eficaces de logística dentro del país para la gestión y control de su inventario?.

sistemas eficaces de logística: Para los propósitos de esta investigación se refiere a esa parte de la cadena de suministros que se ocupa del control del movimiento de productos desde los proveedores (p. ej. de materias primas, componentes desde el punto de origen) hasta los consumidores, y al revés cuando sea necesario para satisfacer las exigencias del cliente. Para una definición completa, véase <http://osomp.org/aboutosomp/definitions.asp>

Comentarios:

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B. ( ) ¿Qué importancia tiene para usted la necesidad de programas de educación para PyMES sobre el tema de mejores medidas prácticas para la gestión efectiva de inventario?.

Comentarios:

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## PARTE II. CONTROL Y EL MANEJO DE SU INVENTARIO

A. De acuerdo con su experiencia en los últimos dos años, ¿Qué nivel de inventario mantiene la empresa como porcentaje de las ventas anuales? Marque con una X.

( ) 0-5%

( ) 6-10%

( ) 11 - 20%

☐ más de 20%

Comentarios:

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B. ¿Cuál sería el nivel de inventario que le gustaría mantener como porcentaje de sus ventas anuales? Marque con una X.

( ) 0-5%

( ) 6 - 10%

( ) 11 - 20%

☐ más de 20%

Comentarios:

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C. ¿Qué otros temas referente al efecto de la logística en el costo de inventario de empresas Pequeñas, recomienda usted que son importantes de contemplar en este estudio?

Blank lined paper for writing.

Observaciones:

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¡Gracias por sus atenciones!  
Elaine S. Potoker, Ph.D.



**Exhibit A.3**  
**Questionnaire (Final), Revised June 7, 2012**

**Exhibit A.3: Questionnaire (Final). Revised June 7, 2012**

**CUESTIONARIO DIAGNÓSTICO**

**"EL EFECTO DE LA LOGÍSTICA EN EL COSTO DE INVENTARIO DE EMPRESAS  
PEQUEÑAS: UNA PERSPECTIVA DE VENTAJA COMPETITIVA COSTARRICENSE."**

Empresa: \_\_\_\_\_  
Nombre del informante: \_\_\_\_\_ Cargo: \_\_\_\_\_  
Teléfono: \_\_\_\_\_ Email: \_\_\_\_\_  
Fecha: \_\_\_\_\_

Las siguientes son las preguntas guía para la entrevista. Para cada una de los siguientes temas, indique el grado de importancia dentro de la empresa con la siguiente escala:

(1) muy importante (2) algo importante (3) neutral (4) poca importancia (5) sin importancia

**PARTE I. ESTADO DE TRANSPORTACIÓN Y LOGÍSTICA EN EL PAÍS**

A. ( ) ¿Qué importancia tiene para usted la necesidad de los sistemas eficaces de logística dentro del país para la gestión y control de su inventario?

sistemas eficaces de logística: Para los propósitos de esta investigación se refiere a esa parte de la cadena de suministros que se ocupa del control del movimiento de productos desde los proveedores (p. ej. de materias primas, componentes desde el punto de origen) hasta los consumidores, y al revés cuando sea necesario para satisfacer las exigencias del cliente. Para una definición completa, véase <http://cscmp.org/aboutcscmp/definitions.asp>

Comentarios:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

B. ( ) ¿Qué importancia tiene para usted la necesidad de programas de educación para PyMES sobre el tema de mejores medidas prácticas para la gestión efectiva de inventario?

Comentarios:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## PARTE II. CONTROL Y EL MANEJO DE SU INVENTARIO

**A.** Favor comentar sobre el sistema que se usa en su empresa para analizar el nivel de inventario que se necesite para satisfacer la demanda de sus clientes. Además, ¿cómo mantienen un registro de materias primas, ¿cómo realizan un seguimiento de productos a sus clientes?

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**B.** De acuerdo con su experiencia en los últimos dos años, ¿Qué nivel de inventario mantiene la empresa como porcentaje de las ventas anuales? Marque con una X.

( ) 0 – 5%      ( ) 6 – 10%      ( ) 11 – 20%      ( ) más de 20%

Comentarios:

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**C.** ¿Cuál sería el nivel de inventario que le gustaría mantener como porcentaje de sus ventas anuales? Marque con una X.

( ) 0 – 5%      ( ) 6 – 10%      ( ) 11 – 20%      ( ) más de 20%

Comentarios:

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**D.** ¿Qué otros temas referente al efecto de la logística en el costo de inventario de empresas Pequeñas, recomienda usted que son importantes de contemplar en este estudio?

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Observaciones: \_\_\_\_\_

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¡Gracias por sus atenciones!  
Elaine S. Potoker, Ph.D.