INSTITUTO TECNOLÓGICO Y DE ESTUDIOS SUPERIORES DE MONTERREY

CAMPUS CIUDAD DE MÉXICO

A PRESCRIPTIVE MODEL FOR SUPPLY CHAIN INTEGRATION: AN EVOLUTIONARY APPROACH

DOCTORADO EN ADMINISTRACIÓN

TESIS PRESENTADA POR
CARLOS EDUARDO CANFIELD RIVERA

ASESOR
DR. JUAN GAYTAN INIESTRA

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ACKNOWLEDGEMENTS

The LORD Is My Shepherd
A Psalm of David

The LORD is my shepherd; I shall not want. He maketh me to lie down in green pastures: he leadeth me beside the still waters. Rev. 7.17
He restoreth my soul: he leadeth me in the paths of righteousness for his name's sake.
Yea, though I walk through the valley of the shadow of death,
I will fear no evil: for thou art with me; thy rod and thy staff they comfort me.
Thou preparest a table before me in the presence of mine enemies: thou anointest my head with oil; my cup runneth over.
Surely goodness and mercy shall follow me all the days of my life: and I will dwell in the house of the LORD for ever.

First of all, I would like to thank God for all the blessings received over this project. HE is the ultimate inspiration that allowed me to endure and overcome all hardships.

This work is dedicated to my family: my wife Angélica and my daughters Stephanie and Karen. A special mention is given to my parents: My father for all his support. My mother, who was not able to see its completion, but I am sure she knows.

I am sincerely grateful for the assistance of Dr. Pilar Arroyo and Juan Gaytán, who helped me along the dissertation research and writing process. Special thanks are given to the managerial staff of *PA*, whose collaboration in this project was invaluable.

And many and many thanks to all the people, that through their kind words and professional and otherwise advice, contributed in many ways to the completion of this document. In particular to Dr. Roberto Rueda, Dr. Pedro Grasa, Dr. Enrique Bores, Dr. Julio Cesar Borja, Dr. Cuauhtémoc Olmedo, Dr. Eduardo Carbajal and all family, friends and colleagues that made this effort finally come through.

ABSTRACT

Title of Dissertation: *"A Prescriptive Model for Supply Chain Integration: An evolutionary approach"*

Author: Carlos Eduardo Canfield Rivera

Institution: ITESM CCM

Director: Dr. Juan Gaytán Iniestra

Readers: Dra. Pilar Arroyo and Dr. Enrique Bores

Purpose: The main purpose of this study is to attain a deeper understanding about the evolutionary process that vertically integrated firms need to undertake towards supply chain integration. More specifically it attempts to answer two general research questions: (a) What are the factors that enable/inhibit the establishment of supply chain integration practices, in a vertically integrated firm and: (b) How can a congruent prescriptive model be traced to assist VI firms in their evolution towards supply chain integration.

Design/Methodology/Approach: This study is framed in a research program characterized by two concurrent action research projects. The core action research involving the researcher in an organization contributing with management to the solution of real-life problems and a dissertation action research whose main purpose is to make a distinctive contribution in the field of supply chain integration.

Findings: Both projects are based on a process maturity approach and consider the gradual evolution of vertically integrated firms through more integrated and participative approaches, characterized by relational exchanges. As a result of the research some guidelines are proposed to help managers in this transition. Supply chain integration is contingent on external variables that might hinder or foster its evolution. The collateral results of the core action research project revealed that supply chain integration was not only a matter of technical and tactical issues, but rather of strong

considerations about hierarchies, resistance to change and status-quo, incentive misalignment, hidden agendas and lack of a deliberate strategic process among other problems along the human dimension of integration.

Originality/value: As such, the model contributed to further advancement in the field, filling a gap by combining present with emergent knowledge in the process of implementing supply chain integration in a vertically integrated firm.

Keywords: Action research, Supply chain integration, Vertical integration, Contingency approach and Prescriptive model.

SÍNTESIS (Translation)

Título de la Tesis: *"Un Modelo prescriptivo para la integración de la Cadena de Suministro: Una aproximación evolutiva"*

Autor: Carlos Eduardo Canfield Rivera

Institución: ITESM CCM

Director: Dr. Juan Gaytán Iniestra

Lectores: Dra. Pilar Arroyo y Dr. Enrique Bores.

Objetivo: El propósito central del presente documento es aumentar la comprensión acerca del proceso evolutivo en el que incurren las empresas verticalmente integradas en su transición hacia la integración en cadenas de suministro. Específicamente tiene como propósito resolver dos preguntas generales: (a) ¿Cuáles son los factores que favorecen o limitan la implantación de prácticas de integración de la cadena en una empresa verticalmente integrada? y; (b) ¿Cómo se puede desarrollar un modelo congruente, de corte prescriptivo, que oriente la actividad de las empresas verticalmente organizadas en su evolución hacia dichas formas de integración?

Diseño/Metodología/Perspectiva: Este estudio se inserta en un programa de investigación caracterizado por dos proyectos concurrentes de investigación-acción. El proyecto central que involucra al investigador en una organización para contribuir con la administración de la misma en la solución conjunta de un problema real de interés para la misma y un proyecto de tesis que tiene como propósito fundamental el contribuir al avance en el conocimiento, en el área de integración de la cadena de suministro

Resultados: Ambos proyectos están basados en una perspectiva de maduración y consideran una evolución gradual de las empresas verticalmente integradas hacia intercambios más integrados y participativos con los demás miembros de la cadena. Como resultado de esta investigación, se proponen guías que permiten orientar las decisiones de los administradores para alcanzar la transición deseada. La integración de la cadena de suministro, está en función de variables externas que pueden limitar o favorecer su evolución. Los resultados colaterales del proyecto central mostraron que

los aspectos técnicos y tácticos no eran los únicos a considerar para la integración sino que de forma aún más decisiva, se deben considerar los aspectos jerárquicos, de resistencia al cambio y de status-quo, falta de alineación entre estrategias e incentivos, agendas ocultas y sobre todo la carencia de un proceso estratégico deliberado, como parte de lo problemas orientados en la dimensión humana de la integración.

Originalidad/contribución: Como tal el modelo contribuye al avance en el conocimiento en el área de la integración de la cadena, intentando reducir las brechas, tanto teóricas como prácticas al combinar el conocimiento actual con el emergente, resultado de este trabajo, para el proceso de implantación de la integración de la cadena de suministro en el caso de las empresas verticalmente integradas.

Palabras Clave: Investigación-acción, Integración de la cadena de suministro, Integración vertical, Perspectiva de contingencia y modelo prescriptivo.

LIST OF ABREVIATIONS

Action Research (AR)

Asociación Mexicana de Industriales de Galletas y Pastas A.C. (AMEXIGAPA)

Business Processes (BP)

Business-to business (B2B)

Business-to-consumer (B2C)

Collaborative Performance System (CPS)

Collaborative Programs of Forecasting and Replenishment (CPFR)

Competence-Based View (CB)

Competitive Advantage (CA)

Consumer-to business (C2B)

Consumer-to-consumer (C2C)

Continuous Replenishment Programs (CRP)

Core Action Research Project (CARP)

Data Envelopment Technique (DEA)

Deliveries in Dull on Time (DIFOT)

Dissertation Action Research Project, (DARP)

Efficient Consumer Response Movement (ECR)

Electronic data Interchange (EDI)

Fábrica de Alimentos (FA)

Financial Accounting Standards Board (FASB)

Information and Communications Technology (ICT)

Information Integration (IS)

Information Technology (IT)

Instituto Nacional de Geografía, Estadística e Informática (INEGI)

Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM)

Integrated Solution Provider (ISP)

Key Performance Indicators (KPI)

Materials requirements Planning (MRP)

Organizational Integration (OI)

Original Equipment Manufacturers (OEM)

Performance Measurement Systems (PMS)

Product Distributorship (PD)

Productos Alimenticios (PA)

Resource Based View of the Firm (RBV)

Securities and Exchange Commission (SEC)

Standard Industrial Classification (SIC)

Small and Medium Enterprises (SME)

Strategic Business Unit (SBU)

Supply Chain (SC)

Supply chain: Snacks in cardboard exhibitors of 4.47 Kg (SC#1)

Supply Chain: Sweet Cookies (SC#2)

Supply Chain Integration (SCI)

Supply Chain Planning Systems (SCP)

Supply Chain Management (SCM)

Supply Chain Orientation (SCO)

Sustained Competitive Advantage (SCA)

The Association for Operations Management (APICS)

Transaction Costs Economics (TCE)

Vendor Managed Inventories (VMI)

Vertical Integration (VI)

LIST OF GRAPHS

LIST OF TABLES

LIST OF FIGURES

LIST OF MENTAL MAPS

PREFACE

This dissertation has four parts, divided into seven chapters. The first part deals with the nature of the problem as it relates with external pressures towards disintegration and the need of precise guidelines that could orient managers of vertically integrated firms in their effort towards supply chain integration. The main purpose of this research is to deepen understanding around SCI as it relates to VI firms.

The second part reviews the literature along the notions of supply chain management and vertical and supply chain integrations. The claim that firms need to expand their boundaries, transcending adversarial transactions and engage in relational exchanges is supported. Moreover section three deals with the notion that integration is a multi-dimensional concept, and for the present study is characterized by three proposed dimensions, namely: Organizational, information and coordination structure integration.

The third part supports the use of Action Research as the appropriate method of research, as well as explains the process for data collection and analysis. And in Section five it analyzes the actual data as collected in both the CAR and DAR projects, and concludes by establishing a prescriptive model of SCI, based on a process maturity approach.

The part number four considers the actual implementation of the model in the case of *PA* a vertically integrated group that operates in the food retail sector, and includes the conclusions, limitations and implications for further research.

The primary emphasis of this dissertation lies in further advancements in the field of SCI nevertheless, the solution of an organizational problem, basically the adoption of a supply chain perspective in the operation of a VI firm, is concurrent with the main purpose.

1. Introduction

For a better understanding of the significant changes that mold the scheme of competition today, a brief review of the historical background of production and organizational relationships is deemed appropriate.

The decades of the 1960s and 1970s, saw corporations focused on function optimization. Firms were organized under vertical hierarchies. Exchanges with vendors were mainly adversarial. Very few relationships were established, but only with strategic partners. Manufacturing systems concentrated on *materials requirements planning* (MRP). Some firms, due to market failures and uncertainty, decided to produce its own inputs or control/own its distribution channels. *Vertical Integration* (VI) and virtual monopolies seemed to be reasonable strategic decisions at the time.

Notwithstanding as a result of ferocious competition in the decades of the 1980s and 1990s, the profitability of North-American manufacturers came under severe pressure, reflecting market-share loss to overseas producers. American companies shifted their strategic priorities in three ways: From low-cost production to quality, flexibility, short lead time and dependable delivery; implemented new technologies and philosophies of production management (Johnston, 1994; Holmberg, 2000) and began the search for better opportunities to increase competitiveness, (Lonsdale, 1999; McIvor, 2000) leading the way to what was called the out-sourcing movement (Rao and Young, 1994; Mason, Cole et al., 2002).

The analysis between costs and manufacturing conditions in-house compared with capabilities available from external suppliers reinforced the idea that many items in the value chain could be outsourced or subcontracted at lower total costs (Brown, 1997). By the early 1990s, reengineering, total quality management, downsizing, and outsourcing, among others, became common practices in the market-place.

1.1. The new terms of competition:

Even though such efforts aimed at optimizing the performance of certain processes, firms soon discovered that the performance advantages obtained from such

methods quickly eroded as competitors implemented similar approaches. Eventually organizations realized that single firm operations would not result in appreciable system improvements, therefore inducing firms to seek a closer coordination and integration with suppliers and customers that was possible through adversarial relations, in order to remain competitive (Deffee and Stank 2005).

Today is a fact that organizations confront a dynamic, complex and unpredictable environment. Changes such as increasing global competition, complexity and uncertainty, new manufacturing philosophies, mergers and acquisitions, downsizing and outsourcing trends, deregulation, environmental awareness, innovation and greater use of information technology and value added activities in the supply chain, have caused a profound impact over firm behavior and performance.

Under the new terms of competition, the management shift therefore is to recognize that competition now does not longer take place among individual businesses, but between entire value chains. The competitive imperative, which by any means is a matter of choice, becomes: finding the best way to get the right products, at the right place, at the right time for the right price for consumers. This challenge is beyond the basis for enterprise success and definitively becomes the key to survival. .

The new terms of global competition have forced corporations, particularly those historically organized around vertical hierarchies, to reorient their high-level strategies, from independent operations characterized by adversarial transactions towards more articulated strategic partnerships. It can be generally alleged that the road to success now depends on assembling a team of companies that can rise above arm's length relationships and work together to deliver greater value for consumers (Taylor, 2003).

1.2. Implementation problems of Supply Chain Management (SCM) and Supply Chain Integration (SCI) initiatives

During the past few years, supply chain excellence, optimization, and integration have become the focus and goal of many organizations worldwide. SCM and SCI have received great attention in the past decades. Both terms appear frequently in both, the

trade press and brochures for leading professional programs, yet reality shows that very few companies have engaged in SCI. Indeed, few companies have adopted and disseminated a formal SCM definition. Even fewer have meticulously mapped out their supply chains so that they know who their suppliers' suppliers or customers' customers really are. Thus, a legitimate question arises: *How do companies define and approach supply chain integration today?* (Fawcett and Magnan, 2002)

Implementation of SCM is not without problems. Interestingly enough, on one hand there are many academic and trade publications, emphasizing the successful application of SCM initiatives. Yet on the other hand, there are empirical studies reporting many difficulties in SCM implementation, (Mentzer et al., 2000; Fawcett and Magnan, 2002). The above-mentioned situation is amplified in the absence of theoretical and empirical developments linking the corresponding strategic management notion of vertical integration with the applied concept of supply chain integration. Svenson (2005) argues that given the scarcity of theoretical development on successful SCM implementation, managers need further academic support at explaining, how can a vertically integrated firm engage in the process of supply chain integration? And even more, they lack contextual and practical guidelines that could orient their efforts at achieving such necessity.

As it has been shown above, vertically integrated (VI) firms, under strong competitive and environmental pressures for disintegration and differentiation, have the urge to evolve towards more participative SC approaches. Yet, there are forces both external (environmental) and internal (managerial opposition to change), that delay, to say the least, such evolution. For that matter, practitioners and managers alike have a strong need for a framework, linking corporate strategy with effective supply chain management that eventually could guide the integrative efforts of VI firms.

1.3. The purpose of the present research

The main purpose of this study is to attain a deeper understanding about the evolutionary process that vertically integrated firms need to undertake towards supply chain integration. More specifically three particular objectives are proposed:

1. Understand the main facilitators and inhibitors that affect VI firms in the process of supply chain integration.

2. Propose a prescriptive model that could guide managers of VI firms, in their efforts to achieve strategic supply chain integration.

3. Attempt to validate the congruence of such model and its applicability in the contextual setting of "*Fábrica de Alimentos*" *(FA)* a subsidiary of a large vertically integrated firm *"Productos Alimenticios" (PA)* in the Mexican food retail industry.

1.4. Research Questions

The main questions addressed in the present research are:

1. What are the factors that enable SCI? What factors inhibit the establishment of SCI practices in a VI firm? , and how can they be overcome?

2. How can a congruent prescriptive model be traced to assist VI firms for their successful evolution towards supply chain integration?

1.5. Unit of analysis and study settings:

In the present study the unit of analysis is a vertically integrated firm, undertaking a supply chain integration process. The strategic context of the study of the VI firm is defined by its apparent adherence to a specific value discipline: In this case, and following Treacy and Wiersema (1993), either operational excellence or customer intimacy. That is, whether the realized strategy of the firm appears to fall into one of the value categories mentioned above (Mintzberg, 1978).

The specific contextual setting for the application of a prescriptive model for supply chain integration is the food retail sector in Mexico. Retail is important because of the

dramatic changes that have transformed its landscape in recent times. The nature of retail competition itself has changed, with an increase in business range and concentration. From being a local activity, retailing for some companies has progressed through the national, international and in certain cases to a global scale. Wal-Mart and Carrefour, number 1 and 2 as worldwide leaders in their activity, have successfully adopted SCM initiatives that have contributed towards widening the gap between them and the rest, and lead the way for long overdue imitations on behalf of competitors.

The interest in the food retail sector resides in the co-existence of world class retailers, -global leaders in SCM initiatives- with large VI firms, mainly family business, that struggle trough evolution towards SCI. Contrasting with the full extent of SCI, the VI firm lags on SCM initiatives and continuously attempts to delay integration.

Interestingly enough, the strategy adopted by this later type of companies has been to resort to distribution channels, with low degrees of integration, actually similar to their own. There is no need to mention that this survival strategy is temporary and only useful for deferring business failure.

Large vertically integrated firms are common in the food and beverages industry in Mexico. For the present research *Fábrica de Alimentos* a fully-owned subsidiary of a large VI public group in the Mexican food industry named *Productos Alimenticios* is considered a firm with a proper profile to be selected as the unity of analysis for this study.

Productos Alimenticios: The vertically integrated group

Productos Alimenticios is a large Mexican corporate group, dominant in the pasta industry and with a stronghold in the flour processing, grain mill products, bakery, manufacturing processed foods and packaging. It is a public company -with substantial family ownership- that exhibits a vertical control corporate strategy, based on full ownership of firms comprising their corresponding value chains.

Two important subsidiaries of *PA* are considered in this research. *FA* is part of the biscuit division and operates in the baked snacks industrial segment. And *Product Distributorship PD*, that operates the distribution of most of the corporation's products

Supply chains under study

Two supply chains were selected for this study. Supply chain number 1, containing *Snacks in cardboard exhibitors of 4.47 Kg* is dedicated to manufacturing and distributing various and differentiated baked snacks, individually wrapped, for sale through *PA's* distribution subsidiary *PD*.

Supply chain Number 2, namely *Sweet Cookies in 1 Kg cardboard boxes* manufactures the simplest type of baked products which are distributed through two channels. In the first channel and using *PA's* brand name, *FA* sells the product to *PD* and delivers directly in appropriate warehouses, which in turn wholesale to regional distributorships as in SC #1 above, with the exception of international sales that include large scale retailers.

The second channel is directed by a world-class retailer, - the focal firm- who in turn provides the operation guidelines and procedures to be followed by *FA*, marketing the baked products under the retailer's generic brand name for domestic consumption.

FA operates very differently under the two channels that comprise SC #2. In the first channel all transactions between suppliers and customers are adversarial. But on the second channel, the world-class retailer emerges as the focal firm and establishes SCM initiatives leaving *FA* to a role of simply another supplier, part of the chain.

It is convenient to emphasize that for the present research, the unit of analysis is the vertically integrated firm and as such only the supply chains where *FA* becomes the focal firm would be studied, that is Supply Chain number 1 (*Cardboard Exhibitors*) and Supply Chain number two (*Sweet Cookies*) distributing through *PD*.

Under the notion of the *value discipline* (Webster, 1994), the strategic operation context of both SCs is *operational excellence*, where firms intend to lead the industry both in price and convenience (Treacy and Wiersema, 1993). That is, competition takes place with solid brands and strong corporate reputation as pre-requisites for high levels

of efficiency in production and distribution, particularly in chains dominated by a world-class retailer, as it seems to be the norm in the market-place.

These two SCs were selected as subjects of the present study because they are representative of big family businesses, organized through vertical hierarchies that today are struggling to remain competitive under the new market conditions. *PA* until now has managed to delay integration, yet today it is found at the crossroad for deciding its next step. There are pending changes and decisions to be made and *PA* has decided to review its whole strategic approach, and closely considered integration.

Both the management and research teams are in the process of reviewing, designing and implementing an organizational change towards a SC approach and further through supply chain integration. The project initiates with the development of a SC balanced performance measurement system, and concludes with the proper design of a prescriptive model of SCI, where VI firms find some guidelines about how to engage in such integration process. It is important to mention that the present research project, becomes a first-hand opportunity to reflect and orient, from within the firm, such desired transformation.

1.6. Project description and deliverables

The concurrence of events being, the nature of the problem, the questions envisioned, the purpose of the present study and above all the imperative of the firm to engage in organizational change, towards an articulated approach to SCI provide the ground for selecting Action Research (AR) as the appropriate research method.

AR is initially characterized by four fundamental issues, which are clearly reflected in the study (Coughlan and Coughlan, 2002; Eden and Huxman, 2002):

1. AR refers to research in action. A scientific approach is used for the resolution, in this case, of an organizational problem jointly with those who directly experience it.
2. AR is participative. Here management participates in the solution of the problem, instead of simply being the object under scrutiny.

3. AR is concurrent with action. Because organizational change takes place at the same time when there are developments in the body of knowledge
4. AR is a sequential approach to problem solving. Members of the research and management teams jointly participate the solution of the problem and in the research process itself, through various cycles of sequential steps of planning, action and evaluation

On one hand, the current market conditions and on the other, the stated objectives above, imply the engagement of the firm under study, in a reflection process around its present VI strategy and the necessary steps –action- required to include SCM initiatives in its operation and attempt to evolve through further stages of integration, in order to remain competitive. This demands the interaction of the management and research teams in a collaborative process of change in the organization, under different roles. Practitioners under their organizational roles, plan, design and execute the intended change, whereas researchers act as facilitators of the action and reflection within an organization attempting to understand both the process and the impact of such change, with a view to replication at another setting and with an ultimate perspective of contributing to theoretical advancement in the field (Coughlan and Coughlan, 2002, p.227).

Therefore action research is selected as the proper methodology to respond to the research questions. The present study is framed in a research program characterized by two concurrent *action research projects* in SCI. The first is the *Core Action Research Project* (CARP), involving the researcher in an organization, with the specific purpose of contributing with management to the solution of a real-life problem, namely the joint design of a Supply Chain Performance Measurement System (PMS) for *PA* based on balanced measures.

And second, the *Dissertation Action Research Project*, (DARP) (Zuber-Skerrit and Perry, 2002) where the candidate would concentrate on the thesis-writing, and its main purpose would be to make a distinctive contribution to knowledge, in the context of the strategic evolution of vertically integrated firms through SCI.

The relationship between CARP and DARP is graphically shown in Figure 1.6-1 bellow. Bearing the latter in mind, the project would be developed in at least two

reinforcing cycles of four sequential phases: Plan, act, observe and reflect in both AR projects.

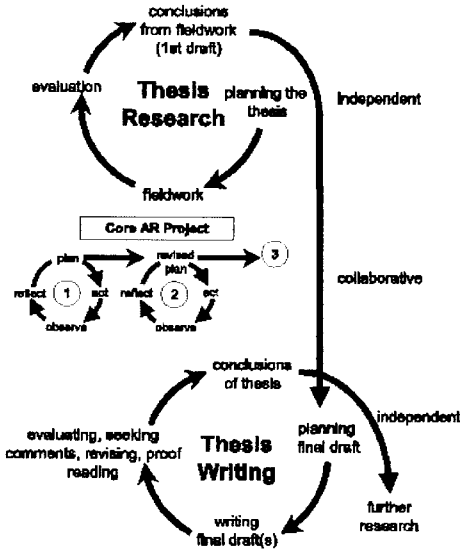


Figure 1.6-1: The relationship between CARP and DARP. Adapted from (Zuber-Skerrit and Perry, 2002)

The deliverables, in the case of the CAR project are: A SC based performance measurement system operating in the case of *FA* and in the DAR Project, a proposed prescriptive model for SCI applicable to VI firms with some guidelines about its implementation and the co-validation of main elements in the first stages of SCI in the case of the firm under study.

1.7. Relevance and significance of research

The study of the integration of VI firms is important for several reasons: First the study has theoretical implications in the field of integration and SCM implementation in the sense that there is a gap in research, attempting to explain the evolution of a VI firm into more articulated forms of integration.

Second, the proposed model would provide new descriptive and prescriptive tools for practitioners and managers alike, for attempting SCI, considered to be a pre-requisite for successfully implementing SCM initiatives.

Third, by analyzing the adoption of integration by VI firms in emergent markets, the study would provide richer contextual information about the development of SCM activities.

Fourth, the contextual setting is relevant. Retail landscape has dramatically changed in the last few years, and is now characterized by high concentration, extensive use of information technologies and successful SCM initiatives. Nevertheless, and not only in emergent markets but everywhere, highly integrated firms, articulated small and medium enterprises (SME) and large VI firms (quite a few family-owned) concur in the retail market-place. Competition favors the coordination of the former and vertically integrated firms would only strive for survival in the medium range.

And last, the study would yield readily contextual and applicable knowledge in SCI in the case of the Mexican food retail industry, with focus on suppliers.

1.8. **Dissertation Outline**

As a result of the DAR project, this study would be structured along the following lines. The first chapter is a general introduction for this project. The chapter begins with an introduction to the problem under study from a historical perspective where the change in business dynamics gives place to competition through supply chains instead of firms. Vertically integrated firms have the urge to evolve, from arms-length transactions to more collaborative relationships and partnerships. It recognizes that managers and practitioners lack a framework linking SCI with strategic decisions and overall performance, laying the groundwork for this research.

Moreover, the chapter defines the problem under study, the associated objectives and research questions, the unit of analysis and the settings of the present study. It further explains the research program in supply chain integration, which is made of two concurrent projects: The core action research and the dissertation action research. Expressly states the relevance and significance of this study.

Chapter two, references the theoretical framework for supply chain integration. It deals with definitions of supply chain, supply chain orientation and supply chain

management. It is argued that such concepts are widely used –and misused- in the literature, leading to a certain level of confusion. This chapter provides working definitions in use for this study.

The strategic perspective of SCM is also addressed in this second chapter. The relationship between SCM and competitive advantage is observed through the lens of strategic decisions in the firm. Strategy is defined as a pattern in a stream of decisions, over-riding the conflict between intended and realized strategy.

Further the notion of vertical integration is introduced. This concept is analyzed under two main schools of thought, transaction costs economics (TCE) and the resource based view of the firm (RBV). These perspectives are complemented through the core competences argument and moreover vertical integration is defined as a multi-faceted construct made of four related dimensions: breadth, stages, degree and forms.

Supply chain integration follows from the notion that its theoretical foundation was initially based on the economic and financial theories of vertical integration, therefore considering SCI as an application and extension of VI theory. A complementary perspective for SCI stems from the works of Porter (1985) on its value chain approach and the concept of transvection devised by Alderson (1957). It is argued through the chapter, that SCI follows an evolving path. Based on the literature, a positive relationship between SCI and performance is established.

Chapter three recognizes that SCI is itself a multi-faceted construct, and describes how for the present study, this complex notion is identified and summarized to establish three articulated dimensions: Organizational; information and coordination structure. Hence, such dimensions comprise several stages, which are articulated and interact to enhance the intensity of SCI.

The VI firm's management must recognize two issues: i) That the engagement in a SCI process implies advancement along the three articulated dimensions -which are clarified as part of this chapter- and ii) the need of a specific framework that could assist them in the identification of the concurrent steps to achieve such advancement.

Chapter four details the design of the study, describing and making sense of the methods used for this research. Basically action research (AR) which is suitable for analyzing and implementing organizational changes trough supply chain studies. The nature of the research, the paradigm selection, the data collection and analysis methods are discussed in this chapter.

Chapter five explicitly deals with the data analysis process. It explains the interaction of the literature review, the research team's experience as SC consultants, the data gathered and the reflection process generated as part of AR and concludes with a prescriptive model for evolving through SCI for VI firms.

The resulting model is based on an evolutionary approach and presents two runways. On one hand SCI implies the transition from adversarial transactions to relational exchanges and on the other the throughput from vertical disintegration to supply chain integration. Integration intensity is modeled after a contingency approach, where the contingent variables are: The focal company's bargaining power, the industry, business environment and the product type.

The model recognizes that the firm must diagnose the operation of its present VI strategy and reflect about the necessity to adopt a supply chain orientation in order to begin with the implementation of any SCM initiative, as a mean to overcome organizational change resistance.

Chapter six explains the operation of the prescriptive model through its application at *Fábrica de Alimentos* a subsidiary of *Productos Alimenticios*, a large VI publicly held group in Mexico. The firm is studied in its strategic context and the model is validated on its congruence.

The guidelines for supply chain integration in *Fábrica de Alimentos* are set forth as part of this research program and the chapter further discusses its generalization potential in other VI firm related settings.

In Chapter seven, the main conclusions, delimitations, and the implications for further research of the present study are set forth, followed by the appendices A and B

comprising information about the field-work at *FA* and a detail of communications among the working committee.

2. Theoretical Framework for SCI

Supply Chain and Supply Chain Management are not only umbrella terms for different understandings of such concepts, but also allow the application of different research methodologies (Seuring et al., 2005). The background of these two paramount concepts -not only in management and logistics but in many other disciplines- can be traced back to historical and theoretical developments in the field.

2.1. The notion of Supply Chain

The concept of *Supply Chain* (SC) developed from the historical evolution of manufacturing into more specialized and complex operations. *"In the earliest versions of the supply chain concept, firms sought to achieve vertical integration, that is, a firm would establish control over the chain and obtain the desired efficiency and responsiveness by owning each element of the chain"* (LaLonde and Masters, 1994, p.39).

The dependence on suppliers, at first and consumers later, developed into a chain of diverse links between organizations, brought together to fulfill the customers' final demand.

Forrester (1958, p.37) introduced the theoretical notion of SC. He recognized that successful industrial companies needed to understand the integrative nature of organizational relationships arising from the interaction between flows of information, materials, money, labor and capital equipment.

Researchers and managers alike demand a clear understanding of the notions of supply chain and supply chain management. Various definitions emphasize some characteristics of the supply chain, yet there is a need for an integrated working concept.

For example, Handfield and Nichols (2002) focusing on functionality along the chain, define SC as including all activities associated with the flow and transformation of goods from the raw materials stage, through to the end user, as well as the associated

information flows. Further Oliver and Webber (1992), state that a supply chain should be viewed as a single entity that is "guided by strategic decision-making."

The APICS Dictionary describes the supply chain as: *1) the processes from the initial raw materials to the ultimate consumption of the finished product linking across supplier user companies; and 2) the functions within and outside a company that enable the value chain to make products and provide services to the customer* (Cox and Blackstone, 2001).(Cox, Blackstone et al., 1995; Lummus and Vokurka, 1999)Lummus and Vokurka (1999) define SC as the network of entities through which material flows. Among such entities suppliers, carriers, manufacturing sites, distribution centers, retailers, and customers are included. Furthermore, Quinn (1997) defines the supply chain as all activities associated with moving goods from the raw-materials stage through to the end user, including sourcing and procurement, production scheduling, order processing, inventory management, transportation, warehousing, customer service and moreover it also embodies the information systems necessary to monitor all of those activities.

As the literature reveals, there is a consistent lack of clarity in the definition of such concepts as a consequence of its indiscriminate use in various disciplines yet, there have been many attempts to conciliate on such differences (Harland, 1996).

Supply Chain: A definition for the present study

For the present study, following Mentzer et al. (2001, p.4) supply chain is defined *"...as a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flow of products, services, finances, and information, [or all of them], from a source to a customer"*. The authors further distinguish three degrees of complexity: A *direct supply chain* -comprised by the focal firm and the firm's suppliers and customers; An *extended chain*-including supplier's suppliers and customer's customers-; And the *ultimate chain* including all participants in the value chain.

The above-cited definition implies that customers and suppliers should work together, yet in their own best interest, to trade and interact -based on their functions and capabilities- first among themselves and eventually, in the creation of goods or services requested by final demand.

Today, definitely supply chains exist, and firms are part of one or many of them. Moreover their inclusion is not a decision to be made on their own. The participation of a company in a particular supply chain is defined by either, suppliers and middle and high-end manufacturers -e.g. *Original Equipment Manufacturers* (OEM) and final goods producers- or both, or by customers that buy such products or services.

2.2. Supply Chain Management

The term *Supply Chain Management* has received great attention in both literature and practice. Research in the field of SCM has evolved from its core concerns around logistics/ operations processes through the incorporation of theoretical concepts and research in strategic management, industrial organization, institutional and production economics -transaction costs-, inter-organizational relationships, knowledge management and systems theory (Giannakis and Croom, 2004, p.29).

In the early literature, Jones and Riley (1985) defined SCM as the planning and control of total materials flow from suppliers through customers. Later literature referred to the management, not only of materials flow, but of both materials *and* information flows. Houlihan (1985) argues that the explicit purpose of SCM is to meet customer service objectives, while at the same time, minimizing inventory, reducing waste and related costs. Underlying this goal has been the need to boost competitiveness and profitability in increasingly tougher global markets.

A review of the supply chain management literature during the late 1980s and the early 1990s reveals the interchangeable use of neologisms: *logistics management, network sourcing, supplier-base reduction, and inter-organizational integration.* In the late 1990s, to some extent, supply chain management supplanted the term "logistics" (Rogers and Leuschner, 2004). SCM is considered to be a multi-faceted concept and the tasks around its implementation are quite complex. It has been used by various disciplines to represent different meanings. The broad scope of SCM enhances the difficulty of finding a suitable definition. It generates confusion therefore limiting possibilities in research, and forming barriers for its successful implementation by managers.

The origin of the term "*supply chain management*" is thought to reside in the work of consultants during the early 1980s. Oliver and Webber (1992) discussed the potential benefits of integrating the internal business functions of purchasing, manufacturing, sales and distribution along the organization, yet the concept was extended beyond the firm's boundaries to include "*upstream*" production chains and "*downstream*" distribution channels. Yu et al. (2001) consider that SCM emphasizes the overall and long-time benefit of all parties on the chain through cooperation and information sharing

Harland (1996) describes a four-stage supply chain typology delimiting the main uses for the concept of SCM and classifies such approaches and definition attempts accordingly:

1. The internal supply chain which integrates business functions involved in the flow of materials and information,(Stevens, 1989; Oliver and Webber, 1992; Houlihan, 1985).
2. The management of a dyad with immediate suppliers, (Christopher, 1992; Womack and Jones, 1994).
3. The management of a chain of businesses including second tier suppliers and customers (Hayes and Wheelwright, 1984; Macbeth and Ferguson, 1984).
4. The management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers (Hakansson and Snehota, 1995)

Lambert and Cooper (2000) developed a conceptual framework, as graphically presented in Figure 2.2-1 emphasizing the interrelated nature of SCM. It consists of three closely interrelated elements: the supply chain network structure, the supply chain business processes, and the supply chain management components. The supply chain network structure consists of the member firms and the links between these firms. Business processes are the activities that produce a specific output of value to the customer. The management components are the managerial variables by which the business processes are integrated and managed across the supply chain.

The first element in Lambert's framework represents a key decision issue in SCM and answers the question with whom should the firm integrate? ; The second element answers the question about what business processes must be integrated? ; And third, what level of integration is desired across the SC?

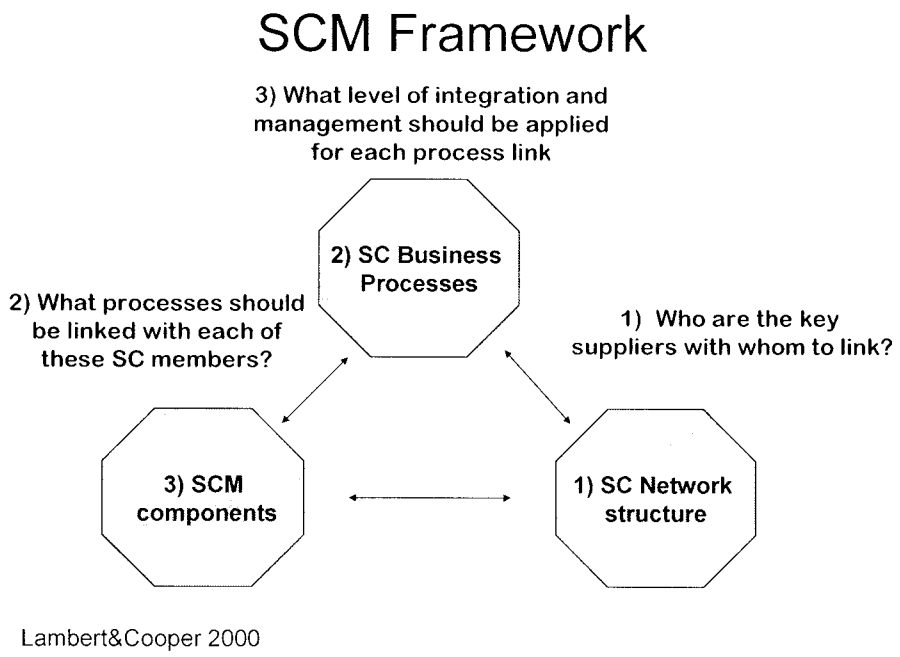


Figure 2.2-1 SCM framework in (Lambert and Cooper, 2000, p.70)

In an effort to incorporate unity in the discussion of SCM, Mentzer et al. (2001) argue that the numerous definitions of SCM can be classified into three categories, namely: *a management philosophy* (Ellram and Cooper, 1990; Shapiro, 2004) , *the implementation of a management philosophy* (Russell, 2001; Handfield and Nichols 1999a) , *and a set of management processes* (Sengupta and Turnbull, 1996).

Tan (2001) traces the evolution of SCM around two different paths: Purchasing and supply activities; and the transportation and logistics functions with focus on integration, visibility, cycle time reduction and streamlined channels.

Giannakis and Croom (2004, p.28) proposed the emergence of SCM as a new discipline, supported by various research avenues, and that it can be characterized following *[the 3-S]* three dimensions of interest to supply chain scholars and practitioners: *The synthesis of the business and resources network; the characteristics of*

synergy between different actors in the network; and the synchronization of all operational decisions related to the control of the production and delivery of goods and services.

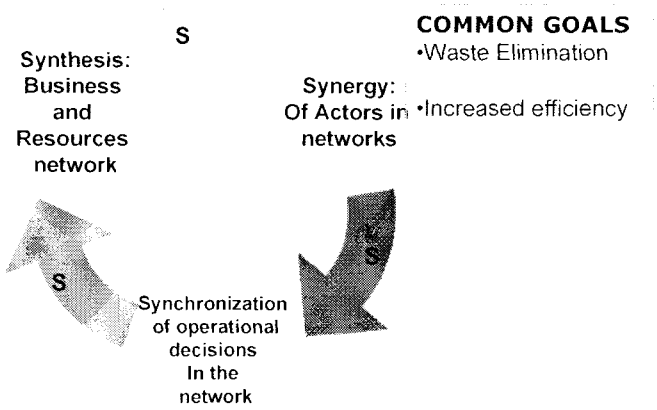


Figure 2.2-2: The 3-S Framework for SCM, adapted from Giannakis and Croom (2004).

Notwithstanding the above-mentioned diverse perspectives, Tan et al. (2002) assert that knowledge about SCM has matured and eventually merged into a unified body of literature with a common goal of waste elimination and increased efficiency.

Supply Chain Management: A definition for the present study

Mentzer et al. (2001) differentiate *Supply Chain Orientation* (SCO) from Supply Chain management. On one hand, SCO is a construct closer to the first category-management philosophy- and a pre-requisite for SCM. Therefore, SCO is defined as *the recognition by an organization of the systemic, strategic implications of the tactical activities involved in managing the various flows in a supply chain.* On the other hand, SCM is more closely related with the overt management actions directed towards implementing such management philosophy.

From that standpoint in this study, and following Mentzer et al. (2001, p.18) SCM will be defined as *...the systemic, strategic coordination of the traditional business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply*

chain as a whole, in a consistent manner with definitions also found on CSCMP (2005) and Wisner (2003).

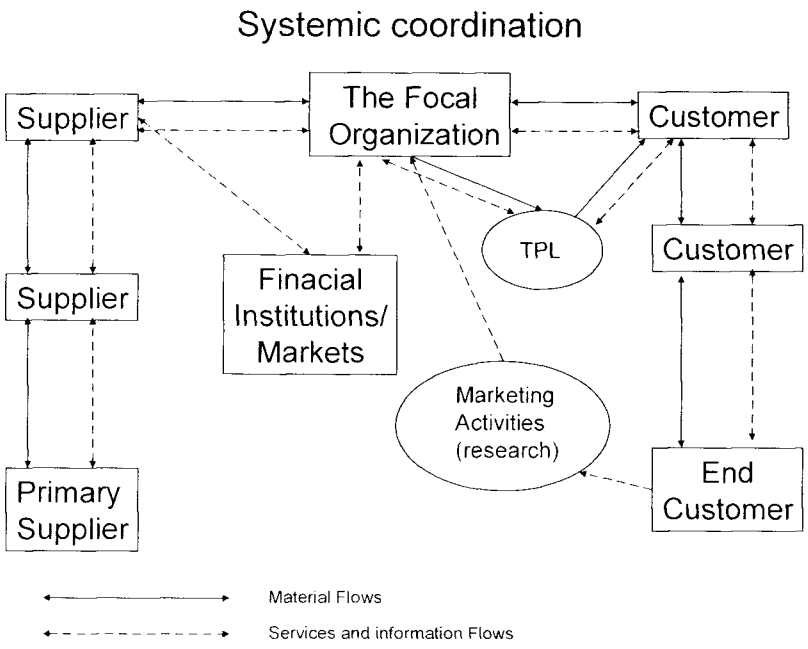


Figure 2.2-3 Diagram of SCM, based on Mentzer et al. (2001)

2.3. The Strategic Nature of SCM:

> *"The challenges associated with getting a product or service to the right place at the right time intensified as competition in the 1990s did. In today's manufacturing environment, one of the key challenges is to be both efficient and contribute to high effectiveness"* (Zailani and Rajagopal, 2005), p.379).

Perspectives on Competitive Advantage

Early literature on competition serves antecedes the development of the concept of Sustained Competitive Advantage (SCA). Alderson (1937) hinted at a basic tenet of SCA, that a fundamental aspect of competitive adaptation is the specialization of suppliers to meet variations in buyer's demand. This author was one of the first to recognize that firms should strive for unique characteristics in order to distinguish themselves from competitors in the eyes of the consumer.

Historical Perspective

The idea of SCA surfaced when Day (1984) suggested types of strategies that may help to "*sustain the competitive advantage*". Barney (1991) argued that a firm is said to have a sustained competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors and when these other firms are unable to duplicate the benefits of this strategy.

A more formal definition of SCA can be found in Hoffman (2000, p.102): "*An SCA is the prolonged benefit of implementing some unique value-creating strategy not simultaneously being implemented by any current or potential competitors along with the inability to duplicate the benefits of this strategy.*"

SCA relevance in theory and practice

The concepts of competitiveness and competitive performance have assumed increasing importance as a result of seminal contributions by Porter (1985) and Peters and Waterman (1982). The actual term "*SCA*" emerged in 1985, when Porter discussed the basic types of competitive strategies firms can possess (low-cost or differentiation) to achieve SCA.

Attainment of competitive positions in markets depends on a variety of factors, among them: increased productivity, market share, economies of scale, knowledge, unique and value added products leveraged by distinct competences, to mention some. Each and every factor to be considered has been studied as a source of SCA, which is a central topic in the field of strategy and relates to the long term sustainable privileges, that result in supra-normal profits and rents over the competition.

There are two initially dominant perspectives in the field of strategy, accounting for the explanation of differences in performance across firms.

The first, the *industry structure view* -mostly associated with the work of Michael Porter- using the industry as its unit of analysis, argues that rents are primarily a function of a firm's membership in an industry with favorable structural characteristics. (That is, barriers to entry and relative bargaining power of the firms, among others).

The second one, the *resource-based view* of the firm (RBV) and its less formal and more management-oriented derivative, the concept of core competencies, (or *Competence-Based View* CB) have become the leading research paradigms in the field of strategic management.

RBV synthetically considers the firm, its unit of analysis, as a collection of resources. For that matter those firms that are able to accumulate resources and capabilities that are rare, valuable, non-substitutable and difficult to imitate will achieve a competitive advantage over firms and will earn extraordinary rents (Wernerfelt, 1984; Rumelt 1991). From the marketing perspective a similar argument can be found in (Day, 1984; Day and Wensley, 1988).

Meanwhile (CB), extends the above-mentioned argument to incorporate the idea that in order to become successful, the firm has to be in a position to make use of the available resources more effectively and efficiently than its competitors (Teece, Pisano et al., 1997).

A key difference between RBV and CB is the chain of causality (Freiling, 2004). RBV concludes that superior resources will cause performance differences among companies. CB prefers a more subtle reasoning where homogeneous assets and heterogeneous resources are the starting point of the chain. However, the resource endowment is not enough in order to explain performance differences. The firm itself has to be in a position to make use of these resources in a goal- and market-oriented way. This is only possible in case of available action-related competences.

Critical resources extend beyond the firm's boundaries. Dyer (1996) found that productivity gains in the value chain were possible when trading partners are willing to make relation-specific investments and combine resources in unique ways.

More in line with recent developments in business dynamics, both in theory and practice, a third perspective the *relational view* argues that idiosyncratic inter-firm linkages are a source of "relational rents" and SCA (Dyer and Singh, 1998). The relational view focuses on a dyad/network as a unit of analysis and considers four

categories to develop relational rents, which are only created through idiosyncratic contribution of the specific alliance partners.

1. Investments in relation-specific assets (Williamson, 1981; Perry, 1989; Dyer, 1996).
2. Knowledge sharing routines (Dyer and Nobeoka, 2000)
3. Complementary resources/capabilities (Harrigan, 1985)
4. Effective governance leading to lower transaction costs than competitors (Williamson, 1985)

Moreover, under the latter perspective, recent alternative explanations regarding the source and attainment of SCA have emerged. Hax and Wilde (2001) argue that previous strategic models have focused on rivalry and do not account for the more complex economic forces and business relationships in today's networked environments.

Based on their consulting work, the authors propose a Delta model based on bonding, where companies forge new relationships with customers, suppliers, competitors, substitutes, and complementors. The authors describe competition based upon product, customer, and system economics, the three distinct and sequential strategic options of the Delta model's *Triangle*. (Figure 2.3-1)

In another line of argumentation, Poirier (1999) suggests that rents derived from CA are temporary, therefore the validity of a particular initiative is determined by the clock-speed of the industry, which reflects the rate of change in products, processes, technologies, and organizational structures in that industry (Fine, 1999).

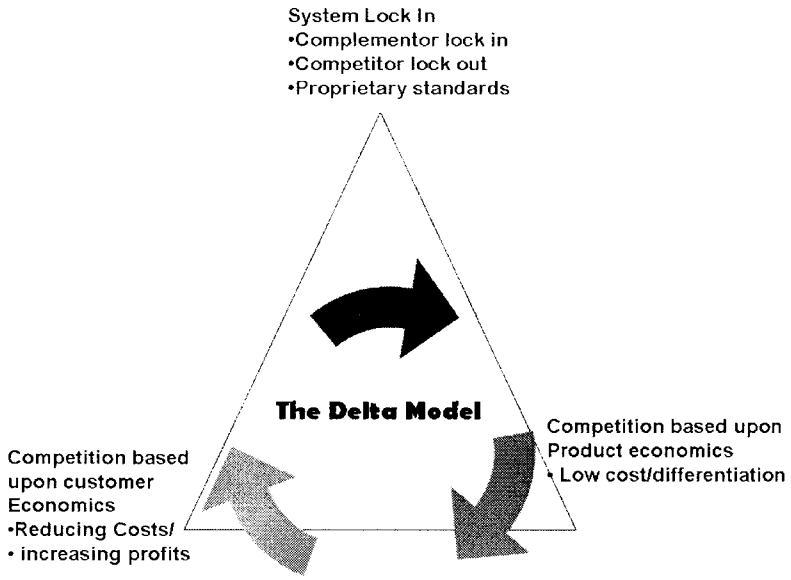


Figure 2.3-1 The Delta Model, adapted from Hax and Wilde (2001, p.10)

SCM and strategy

The relationship between these two fields reside, on one hand, on the advancement of theoretical research in the field of SC, and multiple successful applications in practice that suggest that SCM efforts geared toward generating value and customer satisfaction, can and must be levered into significant competitive advantages for firms Gulati, 1998; Poirier, 1999).

And on the other hand, where SCM research has incorporated theories and methodologies from other disciplines such as marketing and operations (Stock, 1997). As SCM has been considered fundamental in achieving such competitive advantages, more strategy researchers have turned over the study of more specific advantage-generating activities, in their search of sources of SCA (Wisner, 2003; Bowersox, et al., 2000). The bottom line is that competitive advantage is embedded in the concept of relative performance (Giménez and Ventura, 2003).

From the above considerations and as a two way street, it can be asserted that strategy theory is relevant -as an academic perspective- in the study and or research of SCM (Cheng and Grimm, 2006).

Richardson (1972) from the economic theory perspective stressed the importance of relationships between firms, by arguing that planned coordination does not stop at the firm's boundaries. Complementary and dissimilar activities must be coordinated through relationships which in turn become mechanisms alternative to hierarchy (directed coordination) and market (spontaneous coordination). A systemic perspective sets forth that SCM must optimize globally across al the chain, leaving behind local optimization of business units (Heikkila , 2000).

The strategic integration of business units involves the coordination of separate elements of each SBU so that efficiency or market prominence can be achieved. In today's changing environment, many firms strive to respond with different counter-acting initiatives, integration is one of them, yet they fail to accomplish the desired levels of competitive advantages. Fuchs et al. (2000) argue that for such initiatives to become successful they need to integrate into a cohesive strategy. That is the organization's direction, product market focus, and execution capabilities must fit together.

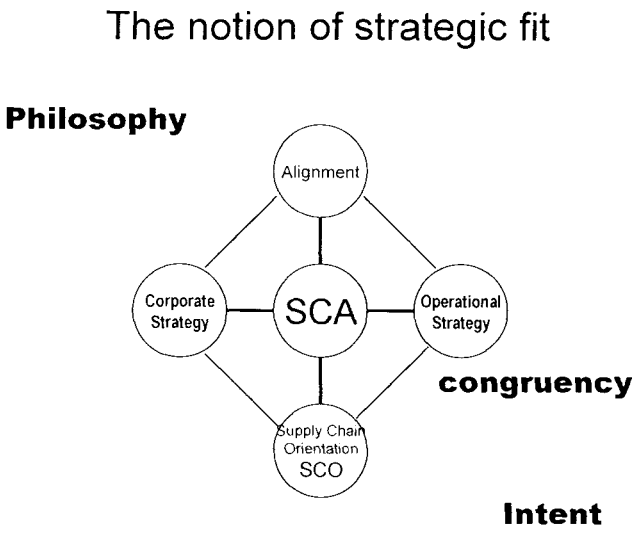


Figure 2.3-2: The notion of Strategic Fit

It has been argued that effective integration of suppliers into product value/supply chains will be a key factor for some manufacturers in achieving the

improvements necessary to remain competitive (Ragatz, Handfield et al., 1997). The strategic importance of integrating suppliers, manufacturers and customers has been analyzed by diverse researchers (Bowersox et al., 1989; Cammish and Keough, 1991; Barrat and Oliveira, 2001; Clinton and Closs, 1997 and Shapiro, 2001).

The Supply-Chain Operations Reference (SCOR) model provides a framework for characterizing supply-chain management practices and processes that result in best-in-class performance (Lockamy and McCormack, 2004a). Moreover the SCOR model emphasizes the strategic importance of integration assuming that all business must include sourcing, making and delivering process strategically linking suppliers and customers to manufacturers.

Strategy is a prerequisite for implementing a SCM initiative in any firm and it is crucial, since it gives direction to any program (Varma, Wadhwa et al., 2006). At the same time, SCM is strongly embedded in corporate strategy. Mentzer et al. (2001) (Mentzer, DeWitt et al., 2001)propose that the only way that competitive advantages could be attained, is when all SCM efforts are coordinated -*strategic orientation*- throughout the entire supply chain -*systemic perspective*-. All supply chain's relationships and processes, at the tactical and operative levels, must be continuously integrated and aligned with corporate strategy in order for value to be created for the customer and partially appropriated by the firm (Morash and Clinton, 1998). Further, Tan (2001) argues that a customer-focus corporate vision driving change -throughout a firm's internal and external linkages- is an important facilitator for SCM evolution.

Even though, there is a diversity in SCM perspectives, it is clear by now, that the unifying concept around the successful implementation of strategic SCM is alignment (Chen and Paulraj, 2004).

2.4. The antecedent for Supply Chain Integration: Vertical Integration

The determination of a firm's boundaries poses important theoretical and practical inquiries. Extant literature -from different perspectives- has addressed the problem. The basis for integration can be found in Lawrence and Lorsch (1967) and in Thompson (1967).

The economics' view studies the boundaries of the firm beginning with the question raised by Coase (1937), of why we observe intense economic activity inside a firm if markets are the most powerful and efficient mechanisms for resource allocation. Some possible explanations came from the transaction costs approach (TCE) that asserted that if transacting in a world of incomplete information was costly then firms might be better off by coordinating production in-house.

The limit of the firm was considered a decision variable under evaluation by the company. Williamson (1973) follows on from Coase in treating vertical integration as being the result of market failure. The question is when a firm decides to integrate and when instead, rely on the market? (Williamson, 1981)

The boundaries problem describes how the information and coordination advantages associated with integration may provide scale and scope benefits (Chandler, 1962), reduce transaction costs (Williamson, 1973; Coase, 1937), align incentives (Grossman and Hart, 1986), exploit powerful relationships (Pfeffer and Salancik, 1978), and allow an organization to reduce its dependence on buyers and suppliers (Pfeffer and Salancik, 1978; Leiblein and Miller, 2003).

Main Theoretical perspectives about Integration

Integration: A view from Transaction Cost Economics (TCE).

The issue of vertical firm boundaries continues to attract a great deal of interest from economics and management research (Mota and de Castro, 2004). The dominant perspective of TCE literature emphasizes transaction-specific assets and opportunism in order to explain discrete 'make-or-buy' decisions (Williamson, 1985). TCE poses that such make-buy decisions are also influenced by characteristics associated with the efficiency of the chosen form of organization, where efficiency is assumed to be inversely related to the magnitude of the costs of organizing the economic system or, more specifically, the costs of adversarial transactions (Klein et al., 1978) and contracts and the associated costs with monitoring and enforcing such contractual relationships (Klein and Murphy, 1997).

Williamson argued that the optimal form of organization is primarily a function of the characteristics underlying a given exchange. Under the assumption that economic actors make decisions under bounded rationality (Simon, 1976) and are potentially opportunistic, TCE explains how unfavorable exchange conditions can increase the cost of writing enforceable contracts and create ex post mal-adaptation and hold-up problems (Williamson, 1985).

Moreover, TCE asserts that in these unfavorable situations, a hierarchical organization will be beneficial because it aligns the interests of exchange parties, provides for the reconciliation of differences via fiat, and permits a more effective, sequentially adaptive decision-making process (Williamson, 1973) This logic has been used to argue that integration will be a more efficient form of organization than market contracting in transactions that involve either highly specific assets or high levels of uncertainty (Klein et al., 1978; Williamson, 1973; Levy, 1985).

The Resource Based View of the Firm (RBV) and Integration.

Synthetically RBV consider the firm as a collection of resources, therefore those firms with superior resources will earn extraordinary rents (Wernerfelt, 1984) and (Rumelt, 1991).

The VI decision is based on two important conditions under the RBV perspective: The first is that firms are largely heterogeneous in terms of their resources and capabilities (Wernerfelt, 1984), the second is that some of these resources and capabilities are limited in supply or costly to imitate (Barney, 1991; Dierickx and Cool, 1989). Therefore RBV argues that firms' governance choices are directed by their attempts to leverage and protect unique capabilities (Barney, 1999).

While TCE focuses on the relationship between characteristics of isolated transactions and the likelihood of ex-post opportunistic behavior, the RBV emphasizes how the opportunity to create competitive advantage by exploiting unique firm-level attributes affects the value of the incentives, administrative controls, and adaptation mechanisms offered by competing forms of organization.

As an alternative between markets and hierarchies and beyond the

recommendations of the above mentioned theoretical perspectives. Powell (1987) argues that external pressures toward efficiency and flexibility are pushing more and more firms to experiment with hybrid arrangements. These arrangements use resources and governance structures or both, from more than one existing organization -Alliances, mergers, license agreements and networks among others- (Borys, 1989). Hybrids are relevant for managers since they become an alternative for expanding the capabilities of organizations.

From an integrative perspective, the supply network combine the best of both arrangements -markets and hierarchies- (Powell, 1990). This hybrid structure, based in collaboration, allows an efficient exchange of information and provides the means for a reliable flow of goods.

The strategic choice: Vertical Integration (VI)

The economics perspective considered vertical integration or *vertical control* as an attempt to earn monopoly charges by gaining control of input markets or distribution channels (Klein, 2004).

Definition attempts for VI

Vertical integration is broadly defined as a high degree of internal transfers of goods (D'Aveni and Ravenscraft, 1994). In earlier research Adelman (1955) stated that vertical integration exists whenever a company transmits from one of its departments to another a good or service which could, without major adaptation, be sold in the market.

The vertical scope of an industry is schematically shown on Figure 2.3-1, and VI is the division of these stages between a company and its suppliers and customers (Porter, 1985). If an industry consists of the above four stages, then companies operating in this industry have the choice as to which stages to incorporate internally and which stages to purchase from outside suppliers (Nugent and Hamblin, 1996).

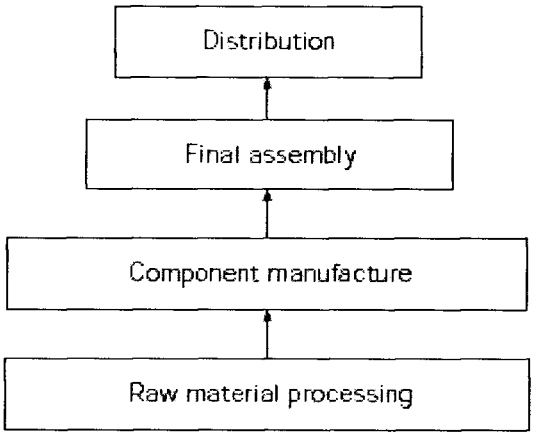


Figure 2.4-1 Vertical scope of an industry in Nugent and Hamblin (1996)

Harrigan (1985, p.37) defines VI as *"...involving a variety of decisions concerning whether corporations, trough their business units, should provide certain goods or services in-house or purchase them from outsiders instead"*

More recently Cox and Blackstone (2001) defined VI as the degree to which a firm chooses to produce in multiple value-adding stages from raw material to the ultimate consumer. Important to mention that such definition emphasizes the choices and trade-offs resulting from managing all said activities. Forward integration implies control over the activities of customers, while backward integration involves certain degree of control over suppliers.

The VI strategic decision

Various theoretical rationale support vertical integration, including the economies of pro-rating management and overhead costs across a greater range of production/distribution processes and the efficiencies of communication among serially-related activities (Stonebraker and Liao, 2004, p.1037).

Baumol (1997, p. 27) discusses that aside from the issue of economies of scope, the analysis of the grounds for vertical integration are formally identical with the theory of market failure, suggesting "*...that analysis of the optimal degree of vertical integration in a particular firm or industry can profitably be studied with the aid of three bodies of literature: welfare economics, transactions-cost theory and the theory of multi-product firms and industries*". Furthermore he argues that there is no such thing as

a completely integrated or a completely un-integrated firm. Thus the issue is not a choice between these two polar alternatives. Rather, it is a matter of selecting the optimal degree of vertical integration.

VI as a multifaceted concept

Based on the notion that: a) vertical control does not require full ownership, b) all output produced does not need to be transferred internally, c) the firm does not need to perform a variety of integrated activities at any particular processing stage and d) and that firms may engage in some stages of production ranging from materials to the ultimate consumer, Harrigan (1985, pp.400-402) considers that VI is a multi-dimension strategy compelling four dimensions:

1. *Stages of integration* refers to The number of steps in the chain of processing which a firm engages in-from ultra-raw materials to the final consumer.
2. *Breadth of integration* defined as the number of activities that firms perform in-house at any particular level of the vertical chain.
3. *Degree of integration* is conceptualized as the percentage of total production outputs exchanged with sister units.
4. *Form of integration* means ownership of integrated units or quasi-integrated arrangements to control a business unit, such as shared ownership with other firms.

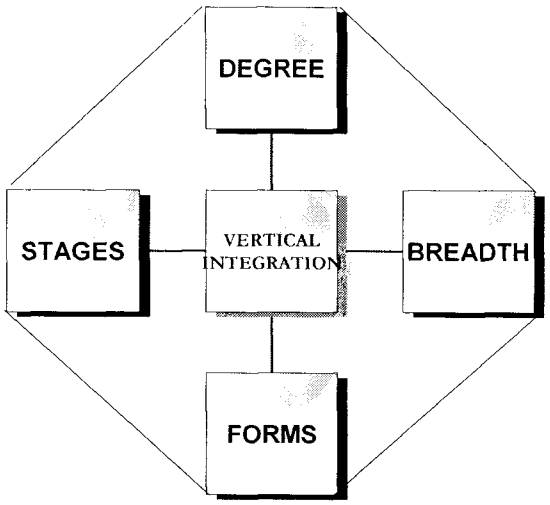


Figure 2.4-2: Dimensions of vertical integration. Adapted from Harrigan (1985)

A contingency approach towards VI

Moreover Harrigan (1985) suggests a contingency approach to VI where the variables to be considered are: a) The phase of industry developments, b) industry volatility, c) asymmetries in bargaining positions of participants; and d) a firm's strategy objectives.

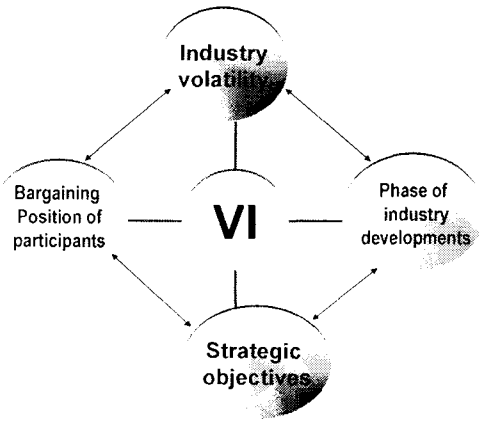


Figure 2.4-3: A contingency approach to VI. Harrigan (1985)

In a further elaboration Harrigan (1985) poses that corporate strategy objectives and the industry phase have a strong influence over the number of stages involved, whereas volatility of competition (Bernhardt, 1977) and the bargaining power (dominance), influence the degree of internal transfers. The form is affected by the phase of the industry and dominance and the breadth of integration within a business unit is influenced by the phase of the industry and the nature of competition (DÁveni and Ilinitch, 1992).

2.5. Supply Chain Integration

The concept of integration is paramount for SCM, yet it is not clear in the literature whether integration is an activity, (Mintzberg and Quinn, 1991), a process (Harmon and Mayer, 1986) or a result of an organizational structure (Lawrence and Lorsch , 1967).

In the earliest versions of the supply chain concept, firms sought to achieve vertical integration. That is, a firm would establish control over the chain and obtain the desired efficiency and responsiveness by owning each element of the chain.

On that line of thought, this study is based upon the notion that the foundations of supply chain integration theory initially lies on a) the economic and financial theories of vertical integration (Stonebraker and Liao, 2006) and is complemented with b) the evolving notions of the value chain approach (Porter, 1985) and the transvection concept of (Alderson, 1957). For that matter in the present study, SCI is considered as an application and extension –*particular case*-of vertical integration theory.

The evolving path towards SCI

Early supply chain integration efforts, usually involving full ownership, were often called "vertical integration". However, more recently, increasingly dynamic competitive environments have required the greater flexibility of non-full ownership based relationships, such as partial and joint ownership, long-term supplier and customer contracts, or shared process, product, or information technologies (Stonebraker and Afifi, 2004). Actors along the supply chain identified tradeoffs, forward with customers and backward with suppliers in order to reduce supply chain duplication and eliminate non value-adding work. Therefore integration through a participative approach, allows the organization to focus on what is offered to the end customer in terms of cost and service (Huang, Uppal et al., 2002).

Since efficiency and internal excellence are not enough in today's changing business environment (Defee and Stank, 2005), the need to collaborate with customers/suppliers across the chain seems to be the next critical step. The major advantage of the supply chain concept is to make the firms -closely interacting in the process of creating value- aware of the existence of potential sources of inefficiency at certain interfaces, and of the urgency of a strategic determination to eliminate them (Mentzer et al., 2001), this in turn will very likely lead to the design of new logistical combinations, whose philosophy would be based on a "theory of optimization" (Fulconis and Pache, 2005).

SCI from historical/progressive perspectives

In the early years, integration meant integrated decision making across the functional areas of the firm. Stevens (1989) first suggested an evolutionary path in the direction of supply chain integration, by identifying four sequential stages, ranging from adversarial-transactions -market based- to relational exchanges –partnerships-. In the baseline, stage one the functional areas operate as separate and independent entities, comprising the status quo. On the second stage or functional integration the emphasis is on the inward flow of goods. Here procurement and material inventories combine into materials management. Production is then manufacturing management and sales and distribution merge into what is called as the distribution function. All activities focus on cost reduction rather than performance improvement, and areas are separated through buffer inventories. In the internal integration, stage three the inventory buffers are removed and distribution visibility through purchasing begins. There is an initial systemic approach in the SC that reacts to final demand, instead of managing customer relations. Extensive use of IT allows communication between clients and manufacturer. Finally internal integration is extended to suppliers and customers, thus creating inter-firm relations (networks) based on long-term partnerships. The fourth, external integration, stage exists where full SCI actually occurs.

Based on a TCE approach, Hobbs (1996) proposed an alternative to Stevens' path for integration, where vertical coordination can be viewed as a continuum. At one extreme lie spot markets where goods are exchanged between multiple buyers and sellers in the current time period, with price as the sole determinant of the final transaction and at the other end, lies full vertical integration, where products move between various stages of the production-processing-distribution chain as a result of within-firm managerial orders rather than at the direction of prices.

LaLonde and Masters (1994) described the historical evolution of the logistics profession and of supply chain into three phases; functional management (1960-70s); Internal integration (1980s); And external integration (1990s). Mourits and Evers (1995) describe four stages of development such as: Arrangement, deployment, flow and operation. Supporting such arguments, Ellram (1991) poses that SCM, is a way of

combining many of the advantages of vertical integration and obligation contracts, while overcoming some of their disadvantages.

Poirier (1999) proposed a progressive framework consisting of five levels of supply chain optimization and included both, activities and processes and organizational integration. The initial -Level 0- *Pre-Supply Chain* is characterized by continuous improvement and focuses upon the findings of the organization's previous efforts of improvement. Next, the first two levels of progress, "*sourcing and logistics*" and "*internal excellence*", focus on internal integration, whereas the last two levels "*network construction*" and "*industry leadership*" reflect the collaborative efforts among participating members.

Strategic integration of activities/functions

Bowersox et al., (1985) described the integrated materials logistics management concept, focusing on the coordination and cost trade-offs between the diverse functional areas originating the integrated logistics concept suggested by Lambert and Stock (1987). Moreover, Bowersox et al. (2000) argue that SCI is a competency that links the enterprise with its customers and suppliers and involves both internal and external integration. The authors classify SCI into six types: Customer integration, internal integration, material and services supplier integration, measurement integration and relationship integration. Whereas Lambert et al. (1998) pose that internal integration refers to the coordination, collaboration and integration of logistics with other functional areas, while external integration refers to the integration of a firm's logistics activities with those of their customers and suppliers.

In a further theoretical argument, in the farthest end of the continuum, collaboration in the supply chain is defined, as two or more companies working together to create a competitive advantage and higher profits than can be achieved by acting alone. The concept of collaboration is based on the idea that customer's demand can be effectively fulfilled at less cost, the stated goal for SCM (Houlihan, 1985).

Beyond these theoretical considerations, two fundamental questions arise in the manager's minds regarding integration. The first one relates to the sense of integration: In which direction must the firm integrate? Would it be with customers or with

suppliers: and the second one, of degree, to what extent must shared activities be developed? (Frohlich and Westbrook, 2001) In part, the answer to these basic questions sets the ground for the prescriptive model to be developed in the present study.

SCI as a multi-faceted concept

Lee (2000) considers the multi-dimensionality of SCI and outlines its three key dimensions: Information integration, coordination, and organizational relationships linkages. Information integration refers to the sharing of information and knowledge among members of the supply chain. Coordination refers to the redeployment of decision rights, work, and resources to the best positioned supply chain member. Organizational linkages include the channels employed for communication, supply chain performance metrics and implementation of measurement systems and objectives and incentives alignment.

Simatupang and Sridharan (2005) define five interacting dimensions that constitute collaboration, the ultimate end in SCI

1. A collaborative performance system (CPS),
2. Decision synchronization,
3. Incentive alignment,
4. Integrated supply chain process, and
5. Information sharing

The strategic integration of business units (SBU) involves the coordination of separate elements of each SBU, so that efficiency or market prominence can be achieved. In today's changing environment, many firms strive to respond with different counter-acting initiatives, being integration one of them, yet they fail to accomplish the desired levels of competitive advantage. Fuchs et al., (2000) argue that for such initiatives to become successful they need to integrate into a cohesive strategy. That is the organization's direction, product market focus, and execution capabilities must fit together.

The bottom line is that vertically integrated firms are initially interested in attenuating the bullwhip effect (Lee. Padmanabhan et al., 1997a) reducing both inefficiencies and production. distribution and inventory variability and higher costs and consequently improving customer service.

All of the above-mentioned objectives are driven by the need of improved sustainable competitive positions and even more, for mere survival. Each organization needs to capitalize on supply chain capabilities and resources to bring products and services to the market faster. at the lowest possible cost, with the appropriate product or service features, and with the best overall value {Hamel & Prahalad 1989 #630}(Gunasekaran. Patel et al., 2001), for that matter, supply chain integration seems to be the key.

Anteceding SCI frameworks in the literature

As diverse frameworks attempt to organize and explain the multi-dimensionality of SCI, the evolution of SCI process can be generally characterized in the following five ways:

1. Business Focus: from process control to customer satisfaction;
2. Competitive priority: from cost, to cost/quality, to cost/quality/ flexibility, and finally to cost/quality/flexibility/time
3. Methods of improvement: from large-scale, large-lot, process-focused, and analytic and engineering emphases to small-scale, optimized lot size, systematic, incremental, and continuous emphases;
4. Supply chain relations: from short-term adversarial to longer-term relational efforts, with recent increases in the extent and type of sharing; and
5. Human involvement: from untrusting attitudes, centralized decision making, and narrow, mechanistic and unit-based tasks in tall structures by untrained employees to systemic trust, distributed decision-making and broader, more participative, organic tasks in flatter structures by continuously trained employees. (Stonebraker and Afifi, 2004)

In their study of partnerships Lambert et al. (1996) propose six types of relationships ranging from adversarial (arms-length) transactions to joint-ventures and vertical integration between two firms. Whereas in the middle lie three types of

partnerships: limited, long-term coordination and significant level of operational integration.

Articulating SCI dimensions

As evidenced above, previous research on collaborative approaches towards SCI is deemed to be unilateral and emphasizes individual features of Supply Chain Integration contributing to a poor understanding of the complex concept of collaboration. Simatupang and Sridharan (2005, pp.258-260) pose that a reciprocal approach is more appropriate for defining supply chain collaboration because it explicitly reveals the interaction of various features that determine the concept, in the process of improving overall performance in the SC. The reciprocal approach intends to assure that the key features match or complement each other and become the base for a dialog between the SC agents in order to design a mutually beneficial SCI agreement.

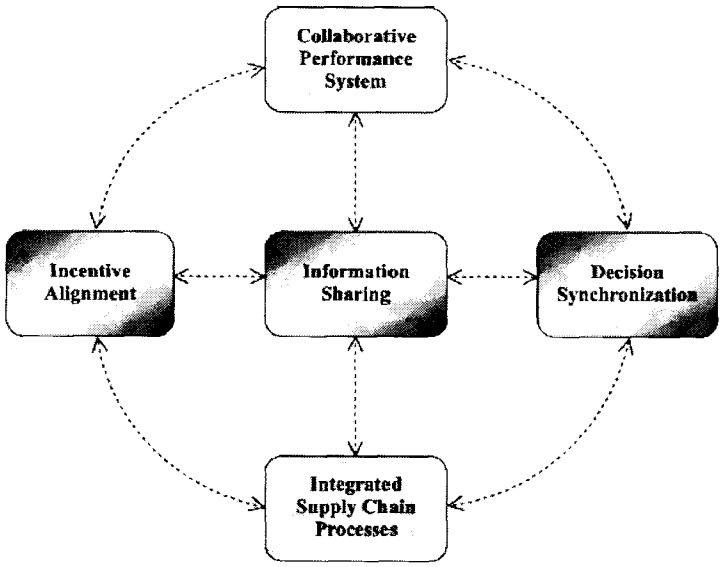


Figure 2.5-1: Reciprocal approach to understand the interacting dimensions of SC collaboration adapted from (Simatupang and Sridharan, 2005)

A contingency approach towards SCI

Bagchi and Skjoett-Larsen (2002a) propose a contingency approach to SCI, arguing that factors such as dominance versus balanced power in the supply chain, the degree of competition in the industry, the maturity of the industry, and the nature of the products may determine the desired level of integration in a supply chain. Analyzing firms in the European manufacturing sector, and based on two dimensions: Information

and organizational integration, the authors developed a framework for studying the scope and intensity in SCI.

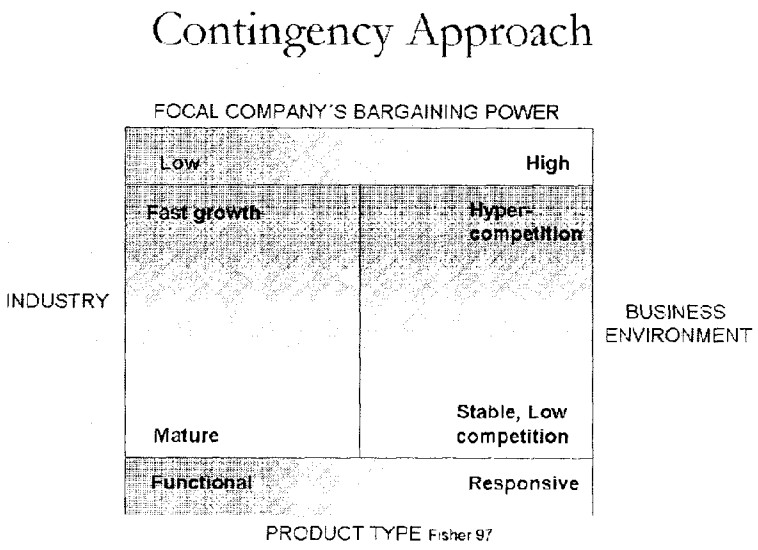


Figure 2.5-2: A contingency approach to Supply Chain Integration adapted from Bagchi and Skjoett-Larsen (2002b)

Their framework measures three intensity levels: *High, Medium* and *Low* across such dimensions which are attributable to observed characteristics. Notwithstanding the subjective and somewhat arbitrary notion of their scales, the authors could classify the firm's relative standing with respect to SCI, sketching a possible migration path for its fulfillment.

Stonebraker and Liao (2004) found evidence of a positive influence of variables such as environmental turbulence (Quinn, 1997; Miles and Snow, 1986) and strategic orientation over SCI, moderated by the core production technology. On one hand, environmental turbulence refers to changes on both, industry structure and competition (Caves and Porter, 1977) and on the other a firm's strategic orientation looks for possible explanations as to how an organization uses strategy to adapt and change aspects of its environment for a more favorable alignment (Manu and Sriram, 1996).

Fisher (1997) found that supply-chain performance problems derive from the mismatch between characteristics of products and their supply chains. He further characterized supply chains from the demand perspective, where the products are either

functional or innovative, where the first require more efficient processes (supply side capabilities) and the later, responsive processes (demand-side capabilities). Moreover Treacy and Wiersema (1993) support such perspective by arguing that "customer intimacy" -tightly related with innovative products- requires closeness with customers in order to satisfy ever-changing needs and is favored by a more collaborative environment (Morash, 2001). Moreover Gimenez (2006) suggests that Spanish food manufacturers seem to initiate integration by coordinating logistics and production.

Supply Chain Integration and performance: a strategic approach.

Even though there is a relative wide acceptance of the strategic importance of SCI (Christopher, 1998; Christopher and Ryals, 1999; Ellram and Cooper, 1990; Zailani and Rajagopal, 2005) there are few studies that actually deal specifically with the empirical analysis about the influence of such integration –both internal and external- over performance. Stank et al. (2001) and Giménez and Ventura (2003) conclude that internal collaboration improves performance and as such is a source of competitive advantage, yet only in the later, external integration, in the case of the Spanish grocery sector proved to be a positive influence over performance. A possible account for such a difference lies in the sample of industries under study. Stank et al. (2001) considered very heterogeneous industries in the same model, and this could be the reason why they failed to demonstrate that external integration leads to a better relative performance.

Allowing for industry specificity might prove different conclusions, for example, Stank et al. (1999) conducted a similar study in the food industry, and they found that inter-firm supply chain coordination (external integration) led to a better absolute and relative performance. Giménez and Ventura (2003) considered that collaborative practices in the auto industry are essential for survival but not enough to attain competitive advantage.

As evidenced above, the literature review does support a contingency approach towards implementation of SCI (Stonebraker and Liao, 2004; 2006; Bagchi and Skjoett-Larsen, 2002b; Harrigan, 1986). This perspective would be in place in the design of the prescriptive model, purpose of the present study.

Alignment between corporate strategies, supply chain strategies and capabilities: Where the problems may arise?

Even though there is wide acceptance of SCM among practitioners and academics, and vast literature supporting the relationship between, SCM efforts and performance, many problems arise from integration and collaboration.

In a study of fifty supply chains, Narayanan and Raman (2004) found low performance because companies often didn't act in ways that maximized the network's profits. Managerial problems, among them, misalignment of companies' incentives and difficulties in coordinating actions across firms, caused excess inventory, stock-outs, incorrect forecasts, inadequate sales efforts, and even poor customer service.

Fawcett and Magnan (2002) found that the great enthusiasm, in theory, for SCM is not well reflected in practice. Other studies that support similar claims can be found in (Neuman and Samuels, 1996: Mouritsen, Skjot-Larsen et al., 2003)

For that matter an important step to a more effective implementation of SCM is the understanding of the notion of alignment. "In order to create value for the consumers, and furthermore capture value for the firm, supply chain's relationships and processes must be continuously integrated and aligned with strategy" (Morash and Clinton, 1998) The alignment of the firm's strategic priorities and market positions with supply chain capabilities would allow them to unlock the many benefits derived from supply chain management (Cousins, 2005). But this process is not without problems, because even though the principle of aligning practices with strategy appears straightforward, the success rate of actually implementing this principle is a mixed bag at best (Tamas, 2000).

SCI a unified approach, ground for the present work

Even though perspectives and definitions of integration vary across disciplines (Glouberman and Mintzberg, 2001; Lee and Billington, 1993; Chandra and Kumar, 2001) a broadly unified approach can be initially identified in the work of Lawrence and Lorsch (1967). Accordingly the authors define integration as the process, and

necessarily the outcome of achieving unity of effort among the various subsystems in the accomplishment of the organization's task. Such notion must be enhanced in order to account for integration, not only within, but across the boundaries of the firm in what is known as supply chain.

As evidenced above, the literature supports that integration, in general is progressive and it does refer to the coordination of a set of activities and the management of their inter-dependencies, and furthermore, it supports the claim that integration is indeed a multifaceted concept.

With an evolutionary perspective in mind and for the purpose of the present study, *Supply Chain Integration* will be defined *as the comprehensive collaboration among SC network members in strategic, tactical and operational SCM.* In that sense the degree of advancement from adversarial relationships to full collaboration across channel members in the SC, along multiple dimensions, will account for the *intensity of supply chain integration.*

For that matter, in the present research and following Lee (2000), Bagchi et al., (2002a) and Simatupang and Sridharan (2005), SCI will be characterized by three articulated dimensions:

a. Organizational Integration
b. Information integration
c. Coordination Structure and Resource Sharing Integration

The study of the articulation of such dimensions would be based on a reciprocal approach, (Simatupang and Sridharan, 2005, pp.258-260), where it is deemed necessary to consider the interaction of the three proposed SCI dimensions to ensure the proper alignment required to achieve improved levels of performance across the SC and would provide the analytical ground for measuring SCI intensity in the prescriptive model resulting from this research.

3. The Multi-dimensional transition from VI to SCI

As shown before, earlier literature supports the notion that integration in general, does refer to the coordination of a set of activities and the management of their inter-dependencies and furthermore it backs the claim that integration is indeed a multifaceted concept consisting of various articulated dimensions and features as it would be explained bellow (Harrigan 1985; Stonebraker et al., 2004; Bagchi et al., 2002b; Simatupang and Sridharan 2005).

3.1. Organizational Integration in the present study

In their seminal work Lawrence and Lorsch (1967) defined the organization as a system of interrelated behaviors of people who are performing a task that has been differentiated into several distinct subsystems. Each subsystem performs a portion of the task and the efforts of each are integrated to achieve effective performance of the system. From that perspective, there is extant literature around this dimension.

Perspectives on Organizational Integration

Barki and Pinsonneault (2005) coined a particular concept labeled as organizational integration (OI) and defined it as the extent to which distinct and interdependent organizational components constitute a unified whole, where the term component refers to organizational units, departments, or partners and includes the business processes, people, and technology involved.

Porter (1985) proposed the notion of the value chain, both as the surroundings of the firm and as an analytical tool for desegregating businesses into strategically relevant activities, allowing the identification of the source of CA by performing such activities more cheaply or better than the competition (Brown, 1997).

Organizational relationships tie firms to each other and eventually may link their success to the chain as a whole (Schary and Skjott-Larsen, 1995). Chandra and Kumar (2001) consider that integration across the supply chain is achieved through

synchronization of activities at the member entity and aggregating its impact through process, function, business, and on to enterprise levels, either at the member entity or the group entity.

Lee (2000) proposes that the organizational linkages, a third stage in SC integration -according to his framework- includes communication channels, performance measurement and objectives and incentives alignment

Bagchi and Skjoett-Larsen (2002b, p.92) argue that OI encourages unity among partners and instills a sense of belonging to the SC. *With OI it becomes easier to generate trust, which in turn promotes collaboration and decision delegation, reduces irrational behavior and "second guessing", thus paving the way to avoid the bullwhip effect.*

Organizational Integration: Working definitions for the present study

The concept of organizational integration is based on the identity of the channel members with the supply chain. Thus OI paves the way for individual members of the chain to behave more like one unified entity, sharing ideas, skills, and culture alike (Bagchi and Skjoett-Larsen, 2002a). If SCM is going to positively affect overall performance, then all the company goals -supply chain alignment- must be systemically directed towards maximizing the long-term performance of each partner in the supply chain.

Stages of Organizational Integration

For the present study, organizational integration would revolve around three main stages:

1. The attitudinal perspective towards SCM (Khan and Mentzer, 1996; Bowersox et al., 2003; Mentzer et al., 2001).
2. A Collaborative Performance System (CPS) (Simatupang and Sridharan, 2005)
3. Organization Characteristics (Lee , 2000; Bagchi et al., 2002a)

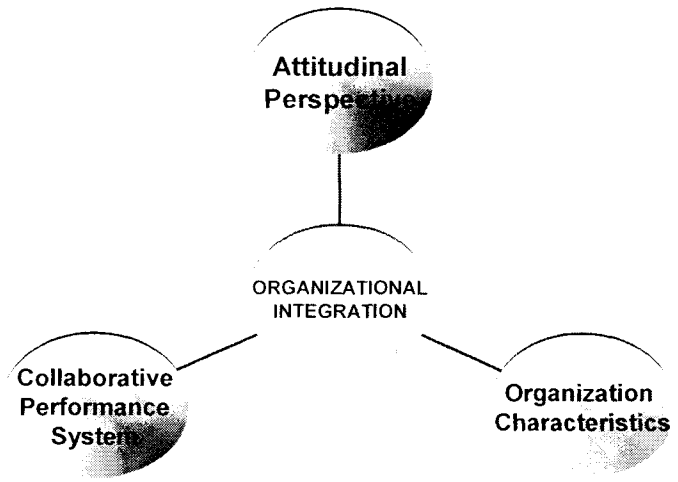


Figure 3.1-1: Dimensions of Organizational Integration

The process of defining OI in this study is based on previous work by Bagchi et al. (2002a) where they argue that the organizational integration achieved, would fall under three levels: High, Medium and Low as observed in Table 3.1-1 bellow and can be classified according to some broad-base observed characteristics.

ORGANIZATIONAL INTEGRATION
STAGES OF ATTITUDINAL PERSPECTIVE, COLLABORATIVE PERFORMANCE SYSTEMS AND ORGANIZATION CHARACTERISTICS

Integration through	LOW Integration	MEDIUM Integration	HIGH Integration
	The attitudinal perspective towards SCM		
Commitment of channel members with SCM	Non existing	Declared (SCO) by channel members.	Total commitment to SCM. Sharing mutual goals and values.
Attitude of top level management with SCM	SCM is not a critical managerial issue	Top management asserts a substantial degree of SCO	Top Management leads SCM process. Cross-Enterprise Collaboration.
	Collaborative Performance System (CPS)		
Responsibility: Design and application of SC performance measurement systems	Isolated measurement systems at the firm's level	Unsystematic design and application of global operational and financial indicators. Not associated with strategic alignment	Balanced performance measurement systems as a result of collaborative efforts across SC.
The application of Supply Chain Metrics	Measurement of delivery service and	The measurement of order lead time, logistics	All processes are measured for

	inventory levels in some parts of the supply chain	costs and service levels. Joint Measurement in some interfaces. *Operational Indicators*	performance and shared across the SC. *KPI's.* Global Scorecards. Focus on end-customer value. Aim at incentive alignment
	Organization Characteristics		
Status of Logistics/SCM in the Organization	Logistics sub-function. Not part of senior Management	Unified logistics function under one organizational entity	Logistics/SCM member of corporate management group
Degree of Integration	Fragmented logistics activities	Internal Integration across functions	Integrated across supply chain/process oriented
Importance of Logistics	Logistics not considered a core competence	Logistics considered a critical activity	Logistics/SCM considered a core competence
Communication Across Agents in the Supply Chain	Few contact points between companies in the supply chain	Regular contact at top/senior levels-rare operational level contact	Multiple contact points at all management levels
Governance Structure	Arm's length relationship-market-based	Partnership only at selected areas and levels Rare operational level contact	Multiple contact points at all management levels
The existence of Formal Lateral Organizations	No cross-functional teams	Cross-functional teams in some areas. Key account managers	Teams across the supply chain-regular interaction

Table 3.1-1: Stages of Organizational Integration

The first stage: The attitudinal perspective towards SCI

The first stage of organizational integration refers to two comprising elements: On one hand to the level of commitment of channel members to the collaborative aspects of supply chain management, and on the other, to the role of senior level executives in leading the process of SCI.

Theoretical foundations for the attitudinal perspective

Even though much has been written on the need to focus on supply chains and create more cooperative and integrative relationships with key organizations in the supply chain (Fawcett and Magnan, 2001; Cooper et al., 1997; Scott and Westbrook, 1991; Bechtel and Jayaram, 1997) relatively less has been studied regarding supply chain commitment (Fawcett, Magnan et al., 2006)

Commitment

The first element, commitment in SC refers to the member's willingness to compromise in the short term in order to maintain a stable partnership relation in the long term. Fawcett et al. (2006) laid out four distinct types of commitment necessary for SCM implementation: top management commitment, broad-based functional support, channel support, and a commitment to infrastructural development and governance.

Attaining CA through integration requires a strong managerial commitment to SCM (Kuglin, 1998) where high-echelon management, all the way to the CEO, must endorse SCM initiatives and provide the necessary resources (Marien, 2000; Stalk et al., 1992).

(Wu, Chaig et al., 2004) Wu et al. (2004) propose that commitment is influenced by both marketing and behavioral determinants. Among the first, asset specificity, product salability and dependence can be found. Whereas the behavioral components include such important dimensions as continuity (Heide, 1990), communication (Anderson and Narus, 1990), power (Cox, 2001) and trust (So and Sculli, 2002).

Even though, the analysis of behavioral and market determinants of SCI are out of the scope of this study, commitment itself is a fundamental building block for organizational integration and as such it would be incorporated in its observable approach as part of SCI intensity.

Characterization

For the present study and in that line of thought, a low level of organizational integration is characterized by the total absence of a supply chain perspective therefore any commitment on collaborative initiatives is in practice, non-existent. On the other end of the range, channel members share common goals and a unified vision of business.

Attitude of Top Level Management

The second part analyzed in this stage deals with the relevance of the management's role towards SCM. This element has been otherwise studied in the literature (Van-Hoek, Chatham et al., 2002). Monczka et al., (1993) argue that the role of top management in understanding the complexities and willingness to support changes in the existing supply chain is a critical requirement.

With respect to the leadership role of senior management, it is important to consider that integration -as the implementation of any other SC initiative- follows a top-down approach and must be supported by top level executives.

Regarding risks, benefits and rewards of any collaborative initiative, it is important to say that partners need not share all business perspectives, rather they do become quite selective on deciding: Where and with whom are they going to partner?; What activities must be shared across the value chain?; and what are the elements of collaboration? (Barratt, 2004)

Characterization

For this study low levels of managerial attitude imply that SCM is not a critical issue for management, whereas the intermediate level requires the explicit recognition of the importance of SCM, in essence as a management philosophy. Mentzer et al. (2001) define Supply Chain orientation (SCO) as the recognition by an organization of the systemic, strategic implications of the tactical activities involved in managing the various flows in a supply chain. Indeed SCO is a pre-requisite for SCM. Yet on the high-end integration level, senior management internalizes SCM across the channel members and contributes to true cross-enterprise collaboration (Bowersox, Closs et al., 2003).

The second stage: The collaborative performance system

The second stage of organizational integration deals with the adoption of a Collaborative Performance System (CPS). Lee (2000) argues that organizational relationships integration starts with the right set of performance measures used across the supply chain and old sayings such as "*You get what you measure*" or "*People perform*

the way they are measured" emphasize the importance of a proper performance management system and illustrate how outcomes are derived from measurement.

Design and application of the CPS

A CPS is defined as the process of devising and implementing integrated performance metrics implied in a measurement system (PMS) that could guide the chain members towards the improvement of overall performance. The CPS needs to answer two basic questions: The first being who should be involved in determining the mutual objective? And the second, what performance metrics should be specified with respect to the mutual objective?

Characterization

In that line of thought, regarding the process of devising the PMS, an observed low level of integration implies the absence of a systematic performance appraisal of the SC. Whereas high integration, implies the existence of a balanced performance measurement across the whole SC, (Brewer and Speh, 2000) dealing with all processes, emphasizing on incentive alignment and focusing on end-customer value.

Regarding the application of the PMS, the lowest end of the continuum is characterized by the measurement of isolated performance indicators at the firm level related to delivery service and inventories, whereas high integration means the balanced measurement of all shared processes and the identification and measurement of key performance indicators across the SC.

The third stage: Organization Characteristics

Following Bagchi et al., (2002a) this third stage deals with the necessary organizational characteristics and the observed maturity of the organization, as required for the best implementation of the integrated logistics function in the SC. It can be assessed through five observable elements namely:

a) Status of Logistics and SCM in the organization
b) Degree of Integration
c) Importance of Logistics
d) Communication Across Agents in the Supply Chain

e) Governance Structure and:

f) The existence of *Formal Lateral Organizations*.

Comprising the organization characteristics phase

Items a) status of the logistics function within the organization and c) the importance of logistics, deal with the formality of the organization structure regarding an SCM approach. Furthermore, the degree of integration (item b) express the unity of processes and activities across the SC. Item d) the communication channels, foster organizational coordination by means of extensive avenues for information exchange and coordination at all levels of hierarchy. The governance structure (item e) deals with the realignment of activities in a SC. Based on TCE (Williamson, 1985), it is recommended that in situations with transaction-specific investments, the activities should be performed within the hierarchy of the VI firm, whereas situations with low asset specificity should be performed in the market. Leaving a middle road for hybrid organizations (Powell, 1987) in the case of medium asset specificity situations. Last item f), implies that task uncertainty can be reduced by the existence of formal lateral linkages, where the direct contact between managers at different levels and from different functions or organizations can establish project teams and liaisons in the company (Bagchi et al., 2002a; Galbraith, 1983).

Characterization

As above and as a means of diagnostic, the organizations characteristics contrast against an ideal continuum where, on one hand, the low end implies that logistics is not part of senior management, its activities are fragmented and it is not considered a core competence. There are few contact points between companies in the supply chain, relationships between firms and even between departments are adversarial, and cross-functional teams are nonexistent. And on the other hand, high integration implies that logistics is internalized and becomes part of the corporate management group, activities are integrated across the SC and the logistics function is considered a core competence. For that matter, the SC provides multiple contact points at all management levels and SC teams interact frequently.

3.2. **Information integration in the present study**

The importance of information sharing across the SC is highlighted by Lee (2000, p.32) where he stresses that: "*Because of the network complexity, communication between entities and accurate and timely transfer of information can be extremely difficult. In particular, the multiple layers in a supply chain can distort demand information. This distortion can lead to excessive inventory, idle capacity, high manufacturing and transportation costs—and increasingly dissatisfied customers. Achieving supply chain efficiency requires accurate and timely information. And the more complicated the chain, the greater the requirement.*"

Perspectives on Information integration

In earlier conceptions, and within the boundaries of the firm, Wyse and Higgins (1993) define Information systems (IS) integration, as the integrated technology that allows sharing of information and applications, being its main purpose to provide consistent information support throughout the organization, responding to dynamic challenges in the markets. Mudie and Schafer (1985) analyzed IS integration in process terms, as they believe IS integration should not only facilitate the consistent use of data and applications but also provide the flexibility to meet future business demands in information and applications.

Madnick (1995) conceptualized IS as a multidimensional phenomenon consisting of two interrelated dimensions, that is, data integration and communication network integration. Communication networks integration is further decomposed into communication networks connectivity, and communication networks flexibility. (Madnick 1995; (Wyse and Higgins, 1993). Thus, IS integration is measured through data integration, communication networks connectivity and communication networks flexibility (Bhatt and Troutt, 2005).

Working definitions for Information Integration and its managerial implications

Simatupang and Sridharan (2005) consider information sharing as the access to private data in all partners' systems enabling the monitoring of the progress of products as they pass through each process in the supply chain. The activities included are: data acquisition, processing, representation, storage, and dissemination of demand conditions, end-to-end inventory status and locations, order status, cost-related data, and performance status.

For that matter in this study, and following Lee (2000, p.32) the concept of Information Integration refers to the ... *"sharing of basic information and knowledge among members of the supply chain.* [The participants in the SC]... *share demand information and forecasts, inventory information, capacity, production and promotion plans, and shipment schedules and also coordinate forecasting and replenishment."*

Information integration allows management to examine the operations of the organization in totality and not in a fragmented, functionally isolated manner and by making inventory and production visible through the SC, contribute for a better climate for collaborative planning and forecasting (Bagchi and Skjoett-Larsen, 2002a, p.91). Interestingly enough, total visibility is cited as one of the best practices of outstanding SC. It demands complete information sharing and efficient and open communication across SC channels.

Efforts in this area, between manufacturers and retailers, in the form of information sharing, synchronized replenishment, and collaborative product design and development, have been cited as SCM major means to improve supply chain performance (Stank et al., 1999; Lambert and Cooper, 2000; Lau and Lee, 2000; Walker, 1994; Sahin and Powell, 2002). The fruits of information integration such as reduced cycle time, increased visibility of transactions, better tracking and tracing, reduced transaction costs and enhanced customer service offer greater CA for all participants in the SC (Bagchi and Skjoett-Larsen, 2002a).

For that matter, and in this line of thought, Kulp et al. (2004) propose two levels of information integration, being a) demand-driven information sharing, considered, among other things, as a step forward to the solution of the bullwhip effect and a positive influence on performance trough waste and cost reduction (Stank et al., 1996) (Stank, Daugherty et al., 1996)and b) exchange of knowledge as the basis for CPFR programs in the industry (Lee, 2000). The above-mentioned levels are complemented with a third one, Collaborative Planning, which refers to the coordination of the design, development, and introduction of new products and services as well as the reverse logistics system (Kulp et al., 2004).

This last level introduces, among other things, the ground-work for the implementation of such initiatives generically known as VMI. (Disney and Towill, 2003), and more recently developed techniques such as the Continuous Replenishment Program (CRP) which emerged as a business practice in early 1990s attempting to address and improve the Efficient Consumer Response Movement (ECR's) four core strategies (Barratt and Oliveira, 2001).

Incidence of Information and Communication Technology (ICT) in SCI

Building integrated information systems which allow efficient data transmission across its boundaries, is paramount for the companies' efforts towards activities coordination, decision synchronization and effective management of materials flow trough the SC.

Handfield and Nichols (1999) pose that IT encompasses the information that business creates and use as well as a wide spectrum of increasingly convergent and linked technologies that process the information. IT has changed the way firms conduct transactions, particularly in understanding and relating with other channel members. Among some relationships, business-to business (B2B), business-to-consumer (B2C), consumer-to business (C2B), and consumer-to-consumer (C2C) are identified. IT is considered a very important strategic factor in managing supply chains; it acts as the disseminator and enabler (Fulconis and Pache, 2005) for process and product communication along with reducing paperwork and lead times (Handfield and Nichols, 1999).

Rapid developments in technology have created numerous choices from information technology software (Tummala et al., 2006)(Tummala, Phillips et al., 2006). Yet the adoption of a specific technology per se, is not as important as it is the analysis about how effectively it is coordinated with internal and external supply chain partners; along with its compatibility with other relevant technologies used by them, and furthermore the organization's ability to adapt its structure to exploit the insights which these systems provide (Shapiro, 1991).

Stages of Information Integration

Broadly speaking, in the present study, information integration would be consolidated into two main stages:

1) The adoption and use of IT in information integration (Lee, 2000) (Bagchi and Skjoett-Larsen, 2002a) and;
2) Information sharing for SC visibility.

As stated before and following Bagchi and Skjoett-Larsen (2002a) the information integration achieved, given some general and observable characteristics, can be classified according to three levels: High, Medium and Low as presented on Table 3.2-1.

The first stage: The adoption and use of IT

The first stage analyzed the adoption of IT along the transaction systems, communications and tracing and tracking tools. Both transaction and tracking and tracing systems provide visibility in the inventory and production information throughout the SC creating a more congenial climate for collaborative planning and forecasting. Moreover a reliable communication infrastructure paves the way for timely and efficient information exchange among partners. For example the use of EDI by manufacturers provides timely information about their procurement needs to suppliers and product availability to customers. Even more, vendors can arrange deliveries without paper records facilitating the process (Bagchi and Skjoett-Larsen, 2002a).

Figure 3.2-1: Information Integration dimension

INFORMATION INTEGRATION
STAGES OF IT ADOPTION AND INFORMATION SHARING FOR SC VISIBILITY

Supply Chain Integration Using:	LOW integration	MEDIUM Integration	HIGH integration
Information Technology Adoption			
Transactions Systems	MRP II Systems Legacy Systems	ERP Systems • Intra-company • Rigid interfaces Value: Mechanization of existing processes	ERP and Supply Chain Planning (SCP) systems • Inter-company integration • Flexible interfaces Value: Process Improvement
Communication Systems, Internet/Extranet	Limited use of E-mail/Fax/Phone Internet/Extranet	Few ED/Internet links to customers/suppliers Extranet	Extensive use of EDI/Internet/XML links within supply chain
Bar-coding and Track-and-trace Systems, Electronic POS (point-of-sale) Data Capture, Inventory Visibility	Only Bar-coding of finished products Track-and-trace and Electronic POS not used	More extensive bar-coding, automated e-mail updates and confirmations	Bar-coding from entry to dispatch Track-and-trace throughout the SC Key suppliers and customers connected
Information sharing for SC visibility			
Use of tools for Collaborative Planning, Forecasting and Replenishment (CPFR), Customer Relationship Management (CRM), among others.	Not used	Experimental stage with one or a few suppliers/customers	Decision models and IT strategies. Strategic suppliers have access to production plans, materials requirements, sales Forecasts and orders. CPFR with key suppliers/ customers CRM with key customers.
Information sharing about consumer needs; store and warehouse inventory levels.	Information Misalignment. One way communication Actual orders from immediate customers.	Simple Data exchange. Information enrichment	End-to-end supply chain visibility

Table 3.2-1: Stages of Information Integration

Characterization

The first stage of information integration, analyzes the adoption and use of IT in the supply chain. As an example a firm still using MRP II type systems and with

limited use of e-tools for communicating with SC partners, can be considered as presenting low levels of information integration. Whereas a company using Enterprise Resource Planning (ERP) and Supply Chain Planning (SCP) systems, extensive application of bar codes, Electronic Data Integration (EDI) and XML technologies and providing on-line access to production, inventory and shipment data to partners (supply chain visibility) can be regarded as presenting a high level of information integration.

Information sharing for SCI visibility

Customer focus refers to organizational commitment to identify and satisfy customer concerns about the quality and timeliness of their orders as well as meet their demands in new products in services (Pine, Victor et al., 1993). Bearing the later in mind, this second stage, on one hand analyzes the application of IT and decision models for information sharing -not only about business processes in the supply chain but also about customer's behaviors and needs- and on the other hand, the way this information actually flows and is shared across the supply chain. The main idea behind this information exchange is supply chain visibility.

Supply chain visibility is defined as "*the sharing of all relevant information between supply chain partners, also over echelons, in the chain*" (Kaipia and Hartiala, 2006) and includes sharing proprietary data such as strategic planning, market research, product blueprint, and sensitive costs-related data (Fisher, 1997).

Characterization

As stated before, regarding the use of tools for collaborative information exchange, the range begins with the absence of such models, through its selective use at a experimental stage, and concludes with decision models where strategic suppliers have full access to production, procurement, sales and distribution information, allowing to engage the SC in SCM collaborative initiatives..

Regarding the data itself, the lowest end of the continuum implies the exchange of data comprising only actual orders by immediate customers (Sahin and Powell, 2002) generating information misalignment, when information necessary to support decision-making processes is not readily available, not usable or incorrect. (Piplani and Fu, 2005)

In the mid-range the application of sales information (information enrichment) into the integration process, is considered one of the first steps toward completion of the information integration dimension (Mason-Jones and Towill, 1997). Whereas the full extent of information integration is achieved in what would be called, end-to end supply chain visibility.

3.3. Coordination structure integration in the present study

Thompson (1967), in his early work, pioneered the study of coordination concerned with the forms of task interdependence between groups. He conceptualized task interdependence as the extent to which the relationship between groups could be characterized into one of the three patterns of workflow that exist between them. The three forms of interdependence among actors are pooled, sequential, and reciprocal and for each form, the author identified three generic coordination mechanisms: standardization or rules, plans and schedules, and mutual adjustment.

A general definition of coordination can be found in Malone and Crowston (1994) as being the act of managing interdependencies between activities performed to achieve a goal. Interdependences are paramount for coordination (Lawrence and Lorsch , 1967).

Perspectives on Coordination Structure

Coordination theory is based on an idea of conceptual separation of two types of activities that are present within a process: activities that directly contribute to the output of the process or task, and additional activities called coordination mechanism, which must be carried out in order to synchronize the decisions of different agents, by taking into account their associated dependencies among activities and resources (Malone and Crowston, 1994).

In the supply chain context, coordination can be viewed as an act of properly combining (relating, harmonizing, adjusting, aligning) a number of objects (actions, objectives, decisions, information, knowledge, funds) for the achievement of the chain goal (Simatupang et al., 2002). Under shared decision-making in the SC, the

responsibility for different decision variables relies on each individual member and based on diverse information. Therefore, addressing the problem of coordination means the recognition of three kinds of diversity along SC: (1) a diversity of decision rights; (2) a diversity of private information; and (3) a diversity of incentive. Furthermore, according to Simatupang and Sridharan (2005, p.359) **the problem of coordination can be summarized as**: *"...to choose a coordination structure which energizes the chain members to pursue competitive outcomes, recognizing the constraints imposed by the diversity of decision rights, private information, and incentives among the chain members*".

There is abundant literature arguing about the positive incidence of coordination and integration in supply chain performance (Cooper et al., 1997; Morash et al., 1996). Defee et al. (2005) pose that when managers understood that optimization of single firm operations did not provide substantial system improvements, their organizations strived for closer coordination and integration with suppliers than was possible through transactional relationships, in order to enhance performance. Empirical studies in the Turkish automobile industry showed that business performance achieved through effective functional coordination was higher than the performance achieved when the tasks are performed individually (Sezen, 2005). Such results are in line with other studies about the positive effect of coordination on performance (Ellinger et al., 2000).

Coordination Structure Integration: Working definition

For the purpose of the present study and following Simatupang and Sridharan (2005) a coordination structure is defined as a strategic choice of shared responsibility of decision rights and levels of incentive alignment in order to enhance the overall mutual benefits of the collaboration, such as increasing customer value and lowering total supply chain costs.

In addition to the realignment of decision rights and work, supply chain partners can coordinate and share their resources jointly to gain synergistic advantages. Pfohl and Gareis (2005) in their study about the generalized spread of supplier parks in Germany, argue that the dynamic and complex environment of today's markets, forces companies to concentrate on their core competences and to transform fixed into variable costs. Araujo-De Souza et al. (2003) analyzed infrastructure sharing in the shipping industry. Further examples of shared resources such as warehouses, inventories and

supplier hubs can be found in Lee (2000).

Stages of Coordination Structure

In the present work coordination structure integration would consolidate into six main stages, as shown below:

a) Decision Synchronization
b) Shared Business Processes
c) Incentive alignment
d) Redeployment of decision rights
e) Work realignment decisions
f) Shared resources

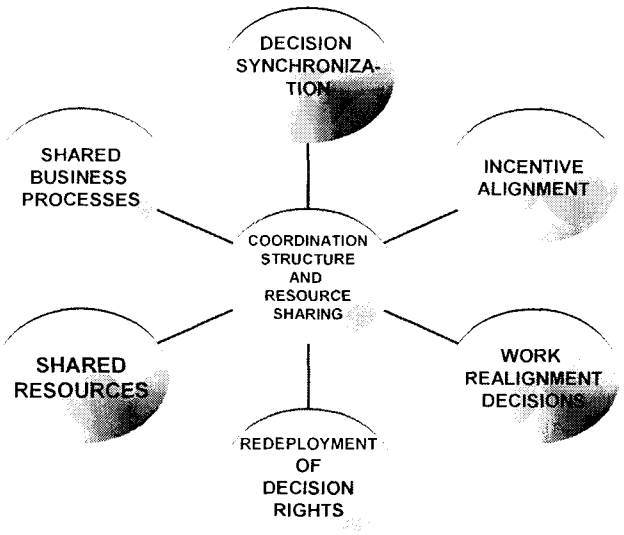


Figure 3.3-1: Coordination Structure Integration

COORDINATION STRUCTURE INTEGRATION
STAGES OF DECISION SYNCHRONIZATION, BUSINESS PROCESS INTEGRATION, INCENTIVE ALIGNMENT, REDEPLOYMENT OF DECISION RIGHTS, WORK REALIGNMENT DECISIONS AND RESOURCE SHARING

Supply Chain Integration using	LOW Integration	MEDIUM Integration	HIGH Integration
Decision synchronization			
Intensity of decision synchronization	independent decision-making (i.e. no allocation of decision rights)	Consultative decision making (i.e. joint exercise of decision rights and responsibilities)	Synchronized decision-making (i.e. redesigning decision rights and responsibilities

Shared Business Process Integration			
Formal Demand Forecasting/ Planning activities	Lack of shared vision across SC. Planning/ Forecasting activities at the firm level.	Joint planning/ demand forecasting across firms	Shared objectives across such processes in the SC.
Product Design & Development	Independent design /development process	Participative design process. Partial Involvement. Experimental stage with one or a few suppliers/customers	Joint Product design/ development. Strategic suppliers/customers participate in the process in order to reduce time to market.
Joint inventory management	Independent decision making. Conflicting objectives.	Consultative decision making	Synchronized decision making. Shared performance measurement.
Customer relationships management	Independent decision making. Conflicting objectives.	Consultative decision making	Synchronized decision making. Shared performance measurement.
Demand management	Independent decision making. Conflicting objectives.	Consultative decision making	Synchronized decision making. Shared performance measurement.
Incentive Alignment			
Incentive systems and alignment: cost, risk and benefits sharing	From non-existent to Elementary	Professional	Sophisticated
Redeployment of decision rights (delegation) Policies of:			
Inventory management through the adoption of VMI	Not Used	Experimental stage with one or a few suppliers/customers	Strategic Suppliers access production plans, materials requirements, sales forecasts and orders VMI with key suppliers/ customers
Production through the adoption of CPFR	Not Used	Experimental stage with one or a few suppliers/customers	Strategic Suppliers access to production plans, materials requirements, sales forecasts and order. CPFR with key suppliers/customers
Demand& Client Relationships Management through CRM systems.	Not Used	Experimental stage with one or a few suppliers/customers	CRM with key customers
Work realignment decisions			
Transferring activities across the chain (best positioned member)	Not Used	Experimental stage with one or a few suppliers/customers. Some outsourcing.	Chanel production configuration. Outsourcing.
Shared resources Policies of:			
Shared warehouses, inventory pooling, and supplier hubs	Not Used	Experimental stage with one or a few suppliers/customers..	Full resource share across the SC.

Table 3.3-1 Stages of Coordination Structure

The stage of Decision Synchronization

The first stage. Decision Synchronization, is based on Simatupang and Sridharan (2005) and is defined as the degree of cooperative decision-making amongst chain members, that jointly determine areas of responsibilities, allocation of decision rights, and orchestrate critical decisions at the planning and execution levels for optimizing supply chain profitability.

Characterization

The intensity of decision synchronization ranges in the low end, from independent decision-making (i.e. no allocation of decision rights) to consultative decision-making (i.e. joint exercise of decision rights and responsibilities), and concludes with synchronized decision-making (That is, redesigning decision rights and responsibilities) when achieving the full extent of SCI over this dimension.

The stage of shared processes

As per the literature review, the stage of Shared Business Processes, encompasses both, shared supply chain processes and coordination (Piplani and Fu., 2005; Wu et al., 2004). The main processes under study are: Formal demand forecasting and planning activities, product design and development, joint inventory management, customer relationships management and demand management.

Characterization

The low-end of the continuum implies independent activities and a lack of a shared vision, whereas the middle-end is characterized by consultative and participative decision making on behalf of channel members. The achievement of full integration requires shared objectives, decision synchronization and shared performance measures on such matters.

The stage of incentive alignment

The stage of Incentive alignment refers to the process of sharing costs, risks, and benefits among the participating members. The theory underlying incentive alignment

assumes that an individual chain member tends to act in a certain way based on the expectation that the act will result in a mutual benefit and on the attractiveness of that benefit to individual chain members (Simatupang et al., 2002).

This scheme motivates the members to act in a manner consistent with their mutual strategic objectives, including making decisions that are optimal for the overall supply chain and revealing truthful private information. It covers calculating costs, risks, and benefits as well as formulating incentive schemes that promote compensation fairness. That is, ensures that aligned incentives motivate the chain members to share equitably the loads and benefits that result from collaborative efforts

Characterization

As above the incentive systems range from non-existent and elementary or both to sophisticated incentives inducements. An elementary scheme consists mainly of transfer payments based on current market mechanisms – such as zoning, quota, rebates, warranties, price discount, quantity discount, and so on – necessary to move products swiftly to end customers (Buzzell et al., 1990). A professional scheme attempts to share costs and benefits tied to mutual objectives. Options can be made more economically attractive by applying inducements – such as accurate forecast, quick response (e.g. on-time or responsiveness related payment), shared cost-savings, and gain sharing – based on improved performance (Chopra and Meindl, 2001). A sophisticated scheme is a change of priorities within the partners' decision framework of risk sharing (Billington et al., 2003) and it clearly spells out obligations, expectations, and remedies.

The stages of Redeployment of decision rights, work realignment decisions and Shared resources

The fourth, fifth and sixth stages follow from Lee (2000). For the author, coordination refers to the redeployment of decision rights, work, and resources to the best-positioned supply chain member.

In that line of thought, through coordination, channel members decide who can better perform an activity creating and enhancing value for the rest of the SC. For that

matter programs SCM initiatives like VMI. CPFR or CRM are put in place by channel members.

Characterization

At the first mentioned stage. the range of integration is quite simple. The lowest end implies that such programs are non-existent. with experimental implementation at the middle and in the highest end of the continuum. fully in place with key chain agents.

Regarding Work Realignment Decisions and Shared Resources the transfer of activities and polices of common resource allocation range from non-existing to total channel production configuration and full resource share across the SC.

3.4. A reciprocal approach to the study of SCI

The three dimensions that characterize the intensity of SCI: Organizational. information and coordination structure. interact among each other. reinforcing the integration effect and its incidence over corporate performance.

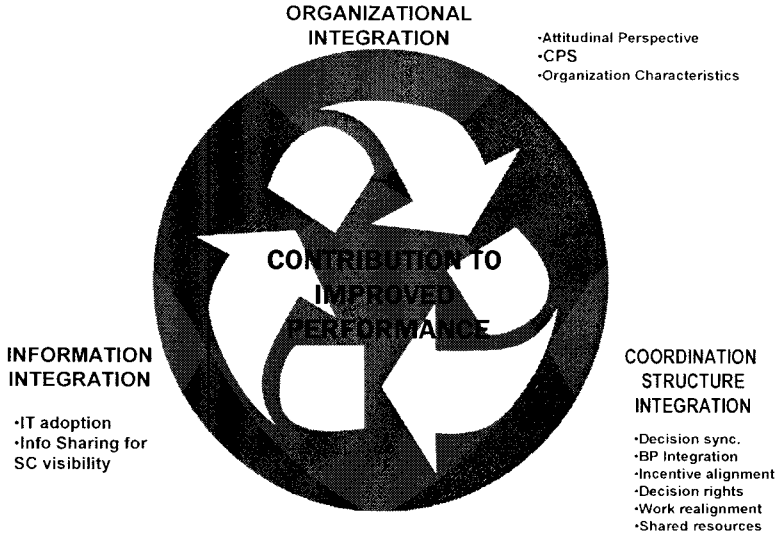


Figure 3.4-1: Interacting dimensions of Supply Chain Integration

For that matter, participants in the SC require a better understanding of the complexity behind the SCI process, in order to evaluate the benefits gained through coordination and collaboration and their particular contribution to improved operation. A reciprocal approach would consider such interactions and constitute a balancing activity, identifying the factors that guide and enable the integration process, where

chain members must be able to coordinate and match such integration dimensions, becoming, then, a problem of strategic alignment (Simatupang and Sridharan, 2005).

The interacting dimensions in the present study

Starting with organizational integration as the guiding force, and a focus on waste reduction and increased efficiency, the top level management as part of its strategic approach adopts an SCO perspective and reflects about various decisions regarding SCI's possible contribution to improved performance.

Moreover, the conformation of SCM initiatives into a real SCI approach requires, from the top echelons of management, further decision making over the two other -enabling- dimensions of integration, namely information and coordination structure and resource sharing.

As a result of such a reflection process, four fundamental questions arising in the manager's minds must be solved (Frohlich and Westbrook, 2001):

a) Who must the firm integrate with?
b) What processes are going to be integrated?
c) What information must be shared? ; And overall
d) How much integration is required? *Intensity* (Lee, 2000);

For the present study the above-mentioned interactions are summarized in matrix form in the following Table 3.4-1. Stages for each dimension are labeled accordingly with letters (from *a* to *f*) in rows and with numbers (from *1* through *6*) in columns. At every cell the main impact of the corresponding stage over the others is briefly described.

COLUMNS (numbers) / ROWS (letters)	**Organizational** 1) Attitudinal Perspective 2) Collaborative performance System 3) Organization Characteristics	**Information** 1) Adoption of IT 2) Information sharing for SC visibility	**Coord. Structure** 1) Decision synchronization 2) Business process Integration 3) Incentive alignment 4) Decision rights 5) Work realignment decisions 6) Shared resources
Organizational a) Attitudinal Perspective b) Collaborative performance System c) Organization Characteristics	**Stage a): Provides the appropriate organizational context for 1) SCO: influencing over the design of the CPS, 2), and the communications across the SC, the governance and the organization forms 3).**	**Stage a): Provides the organization with an adequate CPS b) that would re-define the processes of 1) data collection, 2) information sharing, IT and knowledge management across the SC.**	**Through coordination, CPS Stage b), joint planning, organization and formal agreements, Stages a) & c): provide the basis and content definition for stages 1) through 6).**
Information a) Adoption of IT b) Information sharing for SC visibility	**Stages a) & b): provide management with the relevant, accurate and timely information for decision making at the three levels: corporate (top), tactical and operational influencing the monitoring and re-appraisal processes 2) & 3)**	**Stage b): Lays the ground for the definition of IT policy 1) and information coordination across channel members, with a focus on SC visibility 2).**	**Stages a) & b): Provide the necessary visibility across the SC, as a fundamental ground for decision making in Stages 1) through 6). In particular, they provide a solid foundation for stage 3).**
Coordination Structure a) Decision synchronization b) Business process Integration c) Incentive alignment d) Decision rights e) Work realignment decisions f) Shared resources	**The interaction of stages a) through f), enables management of the participating SC members to orchestrate decisions concerning the achievement of SC overall performance 2), reinforce SCO 1) and shape organization characteristics 3) towards the ultimate goal of SCI.**	**Stages a) & b): Influence the design of IT 1) and the contents to be appraised and incorporated under stage 2). In general stages a) through f) define when, what, and how is to be relevantly measured under an integrated SC performance framework.**	**Stage a): Guides decisions about integrated processes 2) such as inventories, logistics and customer service and jointly with c) shapes content definition and decision making in stages 4) through 6).**

Table 3.4-1: A matrix form summary of the interacting dimensions of SCI: A reciprocal approach

4. Methodology

The main goal of this study is to gain a better understanding about the processes undertaken by VI firms in order to achieve SCI and remain competitive under a changing business environment. Moreover, the interest of the researcher resides not only on organizational change, but on obtaining specific knowledge about SCI that could be useful in future settings. For that matter, as expressed in section 1.6, action research is the appropriate method for the present study.

4.1. Action research

Action research originates in the work of Kurt Lewin and his colleagues in the decade of the 1940s and is an approach to research that considers taking action and creating knowledge about that action (Coughlan and Coughlan, 2002, p.220). It aims at solving specific problems within an organization and explicitly and purposefully becomes part of the change process by engaging people in the organization to study their own problems in order to find a solution (Patton, 2002)

Rather than attempting a formal definition of Action Research (AR), Eden and Huxman (2002, p.255) present the boundaries of the method, where *"[AR]...involves the researcher in working with members of organizations over a matter which is of genuine concern to them and in which there is an intent by the organization members to take action based on the intervention"*.

Comprising Action Research in the present study

This research program on SCI includes two concurrent projects: The Core Action Research and a Dissertation Action Research.

The main goal of the CARP was the determination of efficiency and efficacy in the operation of *Productos Alimenticios*. The purpose of the generalizing project or DARP was to provide the means for a distinctive contribution to knowledge in the field of SCI, in particular the design of a prescriptive model for SCI. This model would eventually offer the necessary guidelines for the integration of VI firms in the context of

the Mexican food retail industry and contribute to the completion of the present dissertation.

AR cycles

The research methods for both, the CAR and the DAR projects would include two full spiral cycles of the main sequential stages of AR, (McKay and Marshall, 2001) namely:

a) Planning
b) Action
c) Observation and
d) Reflection over the results

Implementing AR

Following Coughlan and Coughlan (2002, p.230), the implementation of the four stages of the AR cycles comprises three types of steps (Figure 4.1-1):

1. A pre-understanding step- to provide context and purpose for the research;
2. Six main steps- to gather, feed back and analyze data, and to plan, implement and evaluate action.
3. A meta-step to monitor, the focus of the dissertation, where the AR project inquires about the enactment of the organizational cycles.

Nature of the research: Paradigm Selection

The selection of the appropriate techniques and methodologies is driven initially by the beliefs about the nature of reality (ontology) within a paradigm, which in term defines how knowledge about that reality is attained (epistemology). In that sense, paradigms are not correct or incorrect they simply reflect the researcher's beliefs about existence (Thompson and Perry, 2004, p.403).

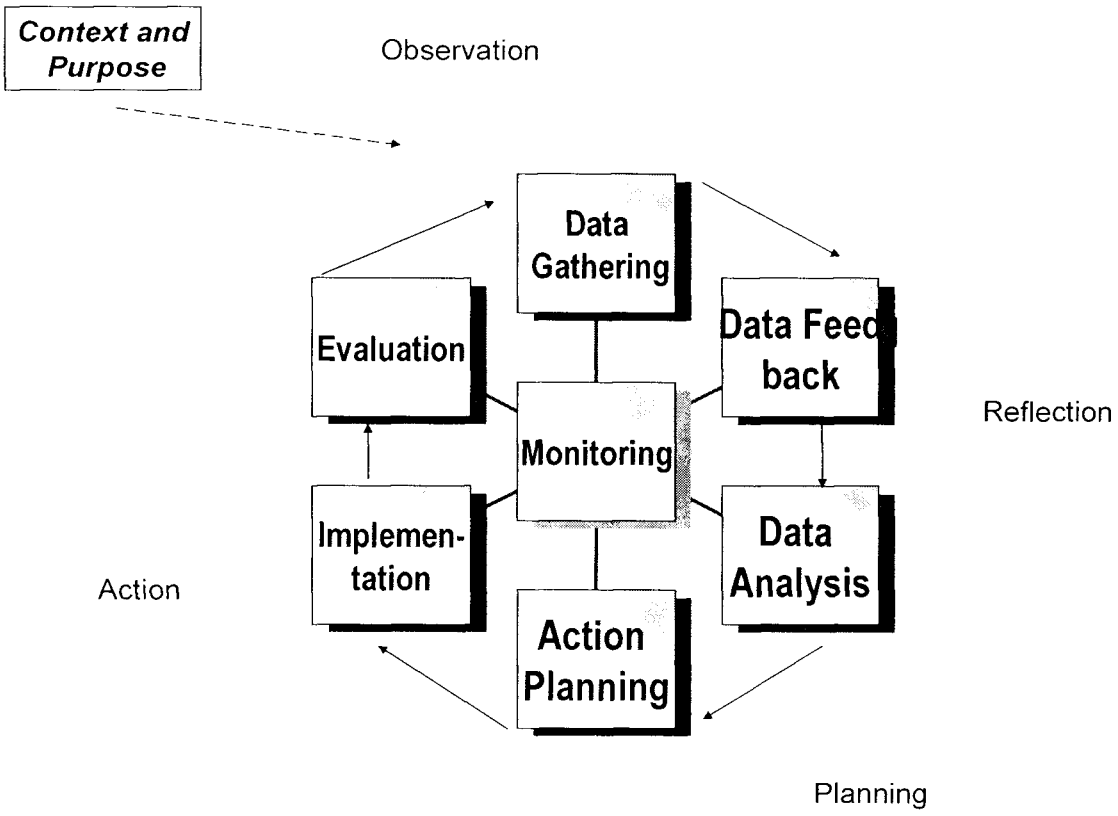


Figure 4.1-1: Action Research Cycle implementation. (Coughlan and Coughlan, 2002)

The CAR project is rooted in the critical theory paradigm, given the fact that reality is nonetheless deemed as *virtual* and reflects the social, political cultural and power dimensions of the participating key actors, more specifically top-management in the VI firm. The methodology suggested is intellectual transformation (Thompson and Perry, 2004).

The generalizing project, DARP, is strongly rooted in the phenomenological paradigm, more precisely under realism which is the preferred paradigm for action research, (Healy and Perry, 2000). Here reality is considered as *real* but difficult to apprehend. Findings are probabilistically true, and the appropriate techniques that would be used are: convergent interviewing, triangulation and qualitative and quantitative interpretation of research issues.

A-priori theory has a central function in the design of the case study and analysis of its data. Just as pure induction can possibly prevent the researcher from benefiting from existing theory, pure deduction might prevent the development of new and useful theory (Perry, 1998). Therefore this study follows an inductive-deductive spiral research cycle, joining preliminary theoretical perspectives with emergent theory.

The present study can be characterized as research-driven initiation, (Avison et al., 2001) given that the researcher started with a general theoretical approach of supply chain characterization, in the sense of a *seamless pipeline*, as presented in the literature and further confirmed in the pre-understanding stage by Mr. HC.

Moreover, the use of conceptual research methods offers a significant improvement in our ability to build valid theories in operations management. They lead naturally to synthesizing previous research, thus building on earlier studies, and depend heavily on real-world description, thereby serving as a check on the external validity of the research findings.

Role of Pre-understanding in AR

Action research requires a breadth of pre-understanding of the corporate environment, the condition of business, the structure and dynamics of operating systems and the theoretical underpinnings of such systems (Coughlan and Coughlan, 2002). So even-though the researcher must refrain for bringing bias to the study, still there is some A-priori knowledge that is incorporated in the same (Gummesson, 2006).

In this case the initial knowledge, mostly included the experience of the researcher's team members associated with the necessary alignment –fit- between strategies, actions, tactics and resource allocation along the SC as a mean for attaining CA. Moreover it also considered the need, for a comprehensive and balanced PMS for application along the entire SC, yet simple and manageable for corporate use. The importance of these PMS requirements was reinforced through the review of literature, the previous engagement of the researcher's team engagement in other consultancy projects and confirmed in the pre-understanding stage of this AR project.

More specifically, the balanced measures notion was based on a the application of the Balanced Scorecard approach for supply chain (Brewer and Speh, 2000) and the

reduction process for attaining a unifying performance measure, based on a single efficiency indicator, through the Data Envelopment Approach (DEA), (Charnes et al., 1978). As expressed in the *Corporate Presentation Document* as referred in Appendix B, the initial objective of the research project was the design, measurement and corporate implementation for such a PMS in supply chains.

4.2. The subject of study: A detailed account of *PA*

Both management and researcher teams agreed on the profile of *Fábrica de Alimentos (FA)* a fully-owned subsidiary of a large VI public group in the Mexican food industry named *Productos Alimenticios (PA)*, to be considered as the subject of research, having reviewed the criterion for the unit of analysis selection in this AR study.

Access Negotiation:

The engagement process of *PA* in the AR program was an interesting opportunity for gaining contextual information about the SCI process to be undertaken. Methodologically access negotiation was based on the following six issues (Lewis, 2003, p.62).

1.-Sensitivity to hierarchy or organizational structure [... *getting clearance from ... the gatekeepers*] (Rossman and Rallis, 2003).

2.-Developing formal and unique contacts with the organization researched,

For that account, *PA* was accessed through its CFO, Mr. GB, a person with a strong recognition in both the researched (*PA*) and the research-host (*ITESM*) institutions. By becoming the research program facilitator, he provided the much needed access to *PA's* hierarchy. Mr. GB developed all the formal contacts between the research team, the steering committee, the working committee and all operational and managerial instances at both institutions.

3.-Provision of clear information about the scope and purpose of the research

4.-Explanation of how the findings would be used –effective management confidentiality and responsibility issues- (reporting, deliverables and research purpose).

Through diverse instances, proposals, briefings and meetings every effort was made to assure the understanding of both the higher echelons of management and the operative agents about the very nature of the research project and precisely how the results would be included, not only on the problem solving research, fundamental for the CAR project, but as part of the necessary information for the thesis, as part of the DAR project.

5.-Being flexible about research and accepting advice

Every effort was made to include the corporation main concerns in both the DAR and CAR projects, in particular regarding *Fábrica de Alimentos*, as part of a vertically integrated operation. The Board of Directors integrated the steering committee, and acted as senior advisors for the CAR project.

6.-Reflection and preliminary results sharing

Through the formal contacts, every effort to share information -even in its early stages- was made. Briefings and thorough discussion, lead to collaborative and adaptive processes and results, across the extended research team –including participation from PA agents- providing the necessary additional insight into problem formulation and solution.

As a result of this activity, the Board of Directors of the *PA* Group, jointly with the researcher's team defined two SCs that would be under study, accredited all the clearances, established the working committee, provided the necessary support and commitment for engaging in such a research program and, furthermore they provided a practitioner's perspective, from the owners and managers point of view, towards the study of supply chain initiatives, in particular SCI, the basis for the present DAR project.

A detailed perspective on Productos Alimenticios

Productos Alimenticios is a large Mexican corporate group with over 500 million dollars in market capitalization and 3,700 employees on average. This

organization is dominant in the pasta industry and possesses a stronghold in the flour processing, grain mill products, bakery, manufacturing processed foods and packaging business segments. The company is classified in the industry according to the following SIC codes:

SIC Code	Description
2098	Macaroni and spaghetti
2052	Cookies and crackers
2099	Food preparations,
0119	Cash grains,
0139	Field crops, except cash grains,
2041	Flour and other grain mill products
2671	Paper coated & laminated, packaging
8742	Management consulting services

Table 4.2-1: Industrial classification of Productos Alimenticios according to SIC codes adapted from information presented by W/D Partners World scope in Lexis Nexis Academic Universe, accessed on 26 March 2007

The Group's principal activities are carried out through five divisions, namely: pasta, biscuits, mills, packaging and services. The Pasta division is into manufacturing different kinds of pasta such as short, long, fancy, instant, pellets, packaged and ramen type soups and pasta with fiber. It has five production plants: Estado de Mexico, Jalisco, Coahuila and Durango and one abroad in Guatemala, CA. as well as five distribution centers in the cities of Toluca, Guadalajara, Laguna, Saltillo and Laredo.

The group holds a good reputation and well positioned brands. Mills is into milling wheat for the production of bread and biscuit flour, semolina flour and by-products of wheat and rice flour. Packaging is into producing flexible wrappers and cardboard boxes. With respect to services *PA* is into providing administrative, commercial and IT consultation services. *Productos Alimenticios* has adopted a vertical control corporate strategy, based on full ownership of firms comprising their corresponding value chains. This company evolved in ownership from being a large family business to a publicly held company with still a great deal of control on behalf of the original *MY* family.

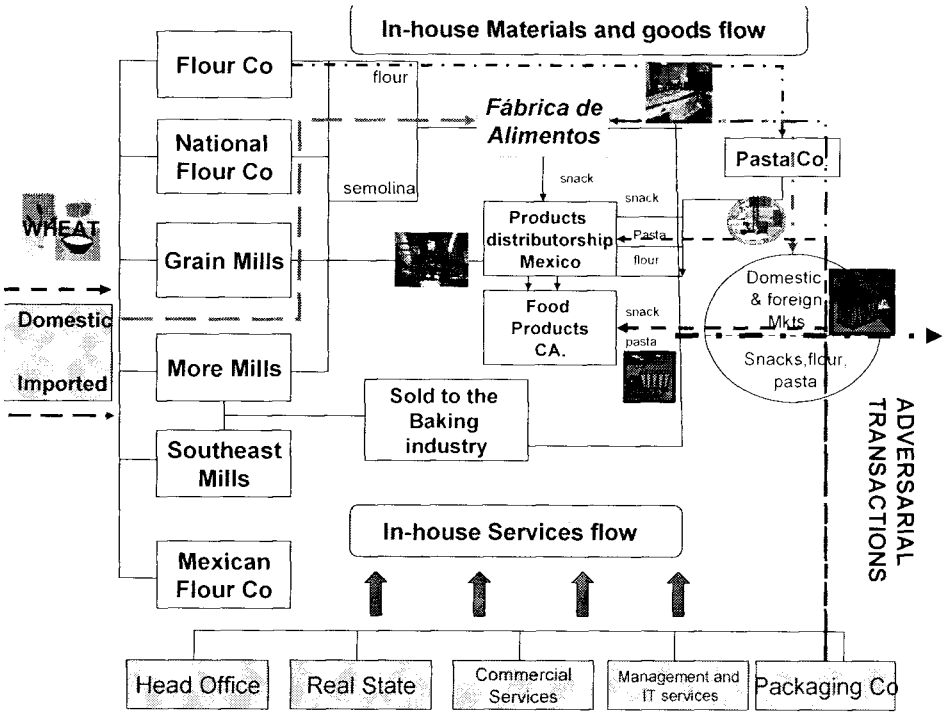


Figure 4.2-1: PA's stream of operations. FA in the value chain

Mapping the supply chains under study

Derived both, from the main corporate concerns of *Productos Alimenticios* and from the interest of the researcher's team members to work with two contrasting types of supply chains, characterized by different levels of complexity in their operation, two of them were selected for study.

Chain Number 1: Snacks in cardboard exhibitors of 4.47 Kg.

The first selected chain is dedicated to manufacturing and distributing various and differentiated baked snacks, individually wrapped, for sale in cardboard exhibitors. Production is relatively complex given the nature of the different processes for each individual item, in terms of ingredients, molding, baking procedures, fillings, oven times and packaging.

The distribution of these snacks is made through *"Product Distributorship Mexico" (PD)* a subsidiary of *PA*. The focal firm, *FA*, directly sells the product to *PD* and delivers directly in the appropriate warehouse. *PD* in turn wholesales to low-

integration distributors that attend final customers which consists basically of school age children.

Interestingly enough *FA* does not rely on sales forecasts for its manufacturing plan, in particular those elaborated by *PD*, which has extensive contact with the end-customer and it is better positioned to gauge consumer demand.

Regarding materials procurement, flour is supplied directly from *PA* and butter, shortening and other oils are obtained through market transactions.

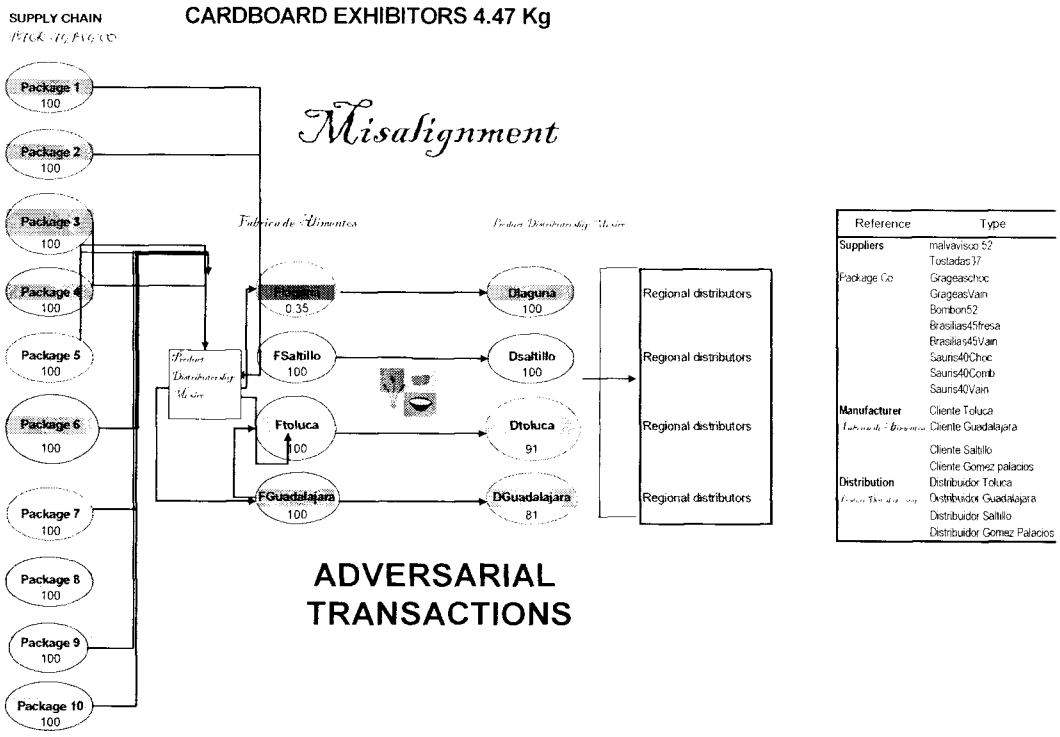


Figure 4.2-2: SC number 1 (cardboard exhibitors)

In this case, the relevant supply chain includes, as first-tier, ten different package suppliers, belonging to *Packaging Co* another fully-owned subsidiary of *PA*, each representing one adversarial transaction with *FA*. The later firm in turn manufactures as four units: Laguna, Saltillo, Toluca and Guadalajara, and sells directly to *PD*, -first tier customer- delivering directly in the appropriate warehouses located in Toluca, Guadalajara, Saltillo and Gomez Palacio.

PD wholesales to small and medium regional distributors. Indeed it was found that consumer's demand is quite variable and seasonal, with a strong center in school days, as it would be expected.

Chain Number 2: Sugar Cookies in 1 Kg cardboard boxes

In the second SC studied, *FA* manufactures the simplest type of baked products, -*sugar cookies*- where production and packaging is quite straightforward. These items are distributed in two channels:

a) In the first channel, using *PA's* brand name, as in SC #1, *FA* sells the product to *PD* and delivers directly in warehouses located in Laguna, Toluca, Saltillo, Guadalajara and Laredo in the border. This last one handles international sales, mainly to Hispanic markets in the US. In turn each warehouse wholesales to medium size regional distributors that sell in cash to smaller stores, with the exception of international sales that might include large scale retailers.

b) In the second channel, *FA* forfeits its decision rights to a world-class retailer, which directs both the production and distribution processes becoming the focal firm instead. For that matter this segment of the chain operates wholly under a different set of rules and it is not considered as part of the unit of study.

Under the terms of the study, this SC was selected, besides for its low level of complexity, because of the fact that it operates completely different across the two channels. In the first channel all exchanges, even those among subsidiaries of *PA*, are based on adversarial transactions. In this case, only one package type -provided by outsiders- is required. Both procurement and distribution follow the same patterns as in SC number one above, where *FA* obtains supplementary materials in the market and distributes through *PD*

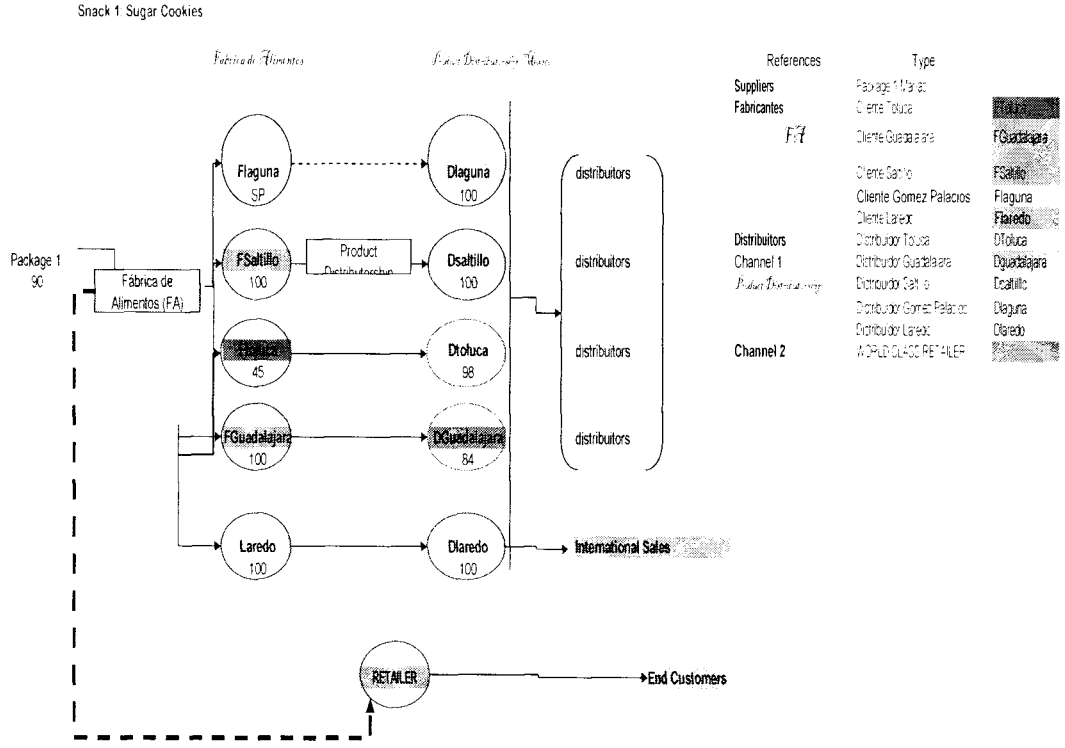


Figure 4.2-3: SC number two (Sugar Cookies)

Under the terms of the study, this SC was selected, besides for its low level of complexity, because of the fact that it operates completely different across the two channels. In the first channel all exchanges, even those among subsidiaries of *PA*, are based on adversarial transactions. In this case, only one package type -provided by outsiders- is required. Both procurement and distribution follow the same patterns as in SC number one above, where *FA* obtains supplementary materials in the market and distributes through *PD*

As a means of contrast in the second channel, production and distribution is dominated by a world-class retailer, which determines SC membership and provides all operational terms and conditions by marketing the product under its generic brand name in Mexico. Under the retailer's rule, *FA* participates in SCM initiatives, but it has not learned yet how to translate such knowledge into the chains where it becomes the focal

firm. For that matter this leg of the chain would not be analyzed, per se, under the present research.

4.3. Data Collection Methods

The process of gathering data is a deliberate, conscious and systematic process that entails complex and intertwined decisions and actions. Such choices are based on the strategy adopted, the views on epistemology, the qualitative genre adopted and how these preliminary choices interact with the setting. The dimensions for such technique decisions are: depth or breadth, focus and mix (Rossman and Rallis, 2003, p.175).

Given that consideration, the data collection methods selected for this AR project were: Observation, interviews and documentary analysis. Its specific application would follow:

Observation

The naturally occurring operating conditions for the SC were the subject of observation. The role of the observer was as a participant, recording the information as it was revealed.

Most observations were structured along a topic and event guide or both, specifically developed for that purpose (Lewis, 2003, p.118), allowing the research team to focus on the information requirements and the possibility of further confirmation of data collected through other techniques.

Aside from certain scheduled location visits, the researcher considered every interaction opportunity with *PA* to gather additional information that could not be otherwise obtained through interviews or documental work due to their proprietary or private conditions.

The areas of observation, besides production facilities and distribution channels were those related with hierarchies in *PA* and with hidden agendas in the management team, particularly those related to resistance to change and discomfort.

Interviews

Been the main purpose of the study *"to deepen understanding..."*, interviews are considered the most recommended techniques for data collection, allowing the researcher more control over the line of questioning (Creswell, 2003).

This project registered a mix between formal and informal interviews. Scheduled interviews, were in-depth and based on interview guides (Patton, 2002) for better control on the topics. The subject of the interviews was mainly Mr. IP, general manager of *FA*, official contact with *PA* as chairman of the working committee and one of the formal *gatekeepers*.

Informal interviews conducted with members of the working committee were unstructured and complemented the data collected through the observation techniques. They provided very rich information that was contrasted, for confirmation, with the official version of Mr. IP. More specifically, this type of interviews provided first-hand information about hidden agendas.

Even as they were not explicitly designed for that purpose, the two board presentations and meetings or both, allowed the research team to gather valuable information about *PA* under the perspective of its participants. These interviews were informal, in the sense that occurred in the process of normal conversation, yet given the occasion provided, were conducted in a semi-structured way through the use of a topic guide.

Moreover the interaction of the different echelons of management, ownership and the research team, under stressful hierarchical conditions, provided rich information about *PA's* hierarchies, hidden agendas and overall strategic decisions for the VI group. They allowed joint decision making and compromises on fundamental topics related, not only to the AR project itself, but to the organizational change process that *PA* was engaging in.

Documentary work

The main sources of documentary data were official statistical sources, trade associations and publications, *PA's* own records and financial and business official public information as provided to government regulators.

The information collected allowed completion of the CAR project, confirmation on strategies adopted by *PA* and contextual information for diagnosing PA's position regarding VI and SCI.

4.4. **Data Analysis Methods**

The information collected through the various methods above described and following the topic guides for each one of the main activities, was rich yet intertwined in content. For that matter a simple but rigorous analytical approach, following Lewis (2003) allowed for all data to be initially classified according to a thematic framework based on indexing.

Further coding and analysis allowed data reduction and classification by means of a thematic chart (Lewis, 2003, p.234) and for presentation ease, all the information was summarized in mental maps.

4.5. **Application of Research Methods in the Present AR**

The actual implementation of the AR methodology in the case of both the CAR and DAR projects, in the specific setting of *PA* follows:

The Fieldwork at PA

The activities that encompass the fieldwork at *PA* are initially classified along the following lines:

1. Access Negotiation (AN)
2. Pre-understanding (PU)
3. Initial contact (IC)
4. Distribution channel observation (DS)
5. Documentary work (DW)

6. Board Meeting Presentation (BP)
7. Briefing meeting (interview) (BR)
8. Data collection/analysis (DA)
9. Reflection (RF)
10. Complementary information (CI)
11. Results presentation (RP)

A log containing a chronological brief description of the activities comprising the data collection at *PA* is found in the following table 4.5-1:

Fábrica de Alimentos Fieldwork Log

CHRONOLOGICAL SUMMARY ACCOUNT

ID #	Activity/ Type	Date	Contacts/ /Means	Questions/ Issues Raised
PU1	Pre-understanding activity: Performance Measurement Systems Consultation (D&T Consulting Firm)	September 27th, 2005	Mr. HC (Senior operations consultant for D&T Consulting)/ meeting/presentation – interview	♦ Consultant's perspective over SC. performance measurement systems / Proprietary Systems.
AN1	PA Initial Contact	November the 9th, 2005	Mr. GB CFO/ Letter	♦ Cover Letter/ requesting PA's Participation in Research Program
AN2	PA Follow-up	November the 23rd	Mr. GB CFO/Telephone Conversation	♦ Requesting PA's participation /Overview of problem of interest at PA: FA's operation.
IC1	Initial contact with FA	December the 1st, 2005	Mr. IP General Manager/ Meeting at location	♦ Overview of Research Program/ Overview of FA
IC2	Location visit	December the 1st, 2005	Operating managers of FA	♦ General Layout presentation ♦ Initial considerations for FA's operation
DS1	Distribution Channels (Fieldwork)	December 4th through 12th, 2005	Supermarkets/ convenience stores/ corner stores /mid-size wholesalers-distributors	♦ Observation of distribution channels and marketing conditions for FA products and from the competition. ♦ Concern about product availability.
AN3	Approval for presentation at the monthly board meeting	December the 5th, 2005	Mr. GB CFO/Telephone Conversation	♦ Authorization for Board meeting Presentation
DW1	Archival work	December 6th	Annual reports/ public	♦ Financial/Operation

		through 12th, 2005	business databases.	reports from public information
DW2	Context Information	December 6th through 12th, 2005	INEGI (national accounts), AMEXIGAPA (trade association)	♦ Production, sales, employment, international trade, competition.
BP1	Board Meeting	December the 16th, 2005	Board Meeting/ The board audience consisted of two members of the MY family (owners of the PA group), Mr. GB CFO, the General Controller Mrs. G, Mr. IP, other members of the directorate of the group and operating managers of FA.	♦ An initial proposal on a SC measurement system was made and further problems of the selected firm, Fábrica de Alimentos a subsidiary of the group were raised. ♦ Preliminary presentation of the seamless pipeline perspective.
BR1	Briefing Meeting	February the 7th, 2006	Mr. IP Director of FA and chairman of working committee/ Meeting	♦ Briefing for project initiation/ logistics of the meeting.
BR2	Initial meeting with the designed working committee	February the 7th, 2006	Mr. IP Director of *FA*, Mr. F, from Product Distributorship, Mr. JP, from the Packaging Company , Mr. TB controller of *FA* and Mrs. D, chief accountant for *FA* / Meeting	♦ Planning session for the CARP. ♦ Scope of the project. ♦ Formal establishment of the working committee. ♦ Communication channels
DC1	Data Collection about performance measures for FA.	February the 11th, 2006	Data provision: Mr. TB (Controller)/e-mail – telephone informal interview	♦ Performance data for FA and itemized financial information for FA/ inquiry about the data collection process and ERP system.
DC2	Data Collection about performance measures for Packaging Co.	February the 13th, 2006/ February the 15th, 2006	Mr. JP (Packaging Co)/ e-mail	♦ Request for performance data and itemized financial information for Packaging Co.
DC3	Data Collection about performance measures for Product Distributorship.	February the 11th, 2006	Mr. F (PD)/e-mail	♦ Performance data for PD
DC4	Information Request: Itemized financial information for PD	February 13th/ 14th, 2006	Mr. F (PD)/e-mail	♦ Itemized Financial information for PD -
DC5	Financial data collection for PD	February 15th, 2006	Public accounting records	♦ General profitability measures for PD
DC6	Data collection about sales: Actual and forecasted for PD and FA.	February the 17th, 2006	Mr. F (PD) and Mr. IP (FA) /e-mail	♦ Itemized sales and demand forecasts figures requested
DA1	Data Analysis over performance measurement and sales forecast	February 12th through 18th, 2006	Researcher Analysis	♦ DEA model and sales forecasts using time-series

				methods.
RF1	Preliminary reflection over the efficiency in both SCs	February the 18th, 2006	Mr. TB (FA controller & operative key contact)/ meeting and informal interview.	♦ Comments and observations about the PMS and sales forecasts/ ♦ Operative problems and limitations of information provision by the ERP.
RF2	Preliminary reflection over the efficiency in both SCs.	February the 23rd , 2006	Mr. IP (FA) /e-mail and telephone conversation	♦ Brief comments about results
RP1	Request for a working committee meeting for results presentation	February the 28th, 2006	Mr. IP (FA) /e-mail and telephone conversation. Further contact with the working committee members	♦ Meeting Requested
DC7	Additional information requested about sales for an extended period. (2000-2005) and updates for 2006.	February the 20th/ February the 28th, 2006	Mr. F (PD) and Mr. TB (FA) /e-mail	♦ Information requested
DA2	Data Analysis over performance measurement and sales forecast	March 1st through 5th , 2006	Researcher Analysis	♦ DEA model and sales forecasts using time-series methods.
BR3	Briefing Meeting/ Interview	March the 8th, 2006	Mr. IP (FA)/ informal interview	♦ Briefing/ informal inquiry about the results
RP2	Preliminary results presentation **Formal conclusion of the first AR cycle/ Beginning of the second AR cycle**	March the 8th, 2006	Mr. IP (FA), Mr. F (PD), Mr. AP (Packaging Co), MR TB (FA) / Working committee meeting	♦ Reflection about the overall performance of SC/ Additional Performance information requested for year 2005 and February
DC8	Information request	March 24th through April 21st ,2006	Mr. IP and Mr. TB (FA), Mr. F (PD) and Mr. JP (Packaging Co)./ e-mail	♦ Additional information request
DA2	Data Analysis over performance measurement and sales forecast	March 24th through 18th, 2006	Researcher Analysis	♦ DEA analytical framework and sales forecasts using time-series methods.
DS2	Distribution Channels (Fieldwork)	October the 21st , 2006	Supermarkets/ convenience stores/ corner stores /mid-size wholesalers-distributors	♦ Observation of changes in distribution channels regarding brand and product management
BR4	Briefing Meeting	October the 24th, 2006	Mr. IP Director of FA/ Meeting & informal interview Mr. TB brief interview	♦ Briefing for results presentation. ♦ Information triangulation regarding brand and product management at distribution channels.
RP3	Request for final presentation for CARP	October the 20th, 2006	Mr. GB (CFO)/e-mail	♦ Meeting request
BP2	Board Presentation	October the 25th, 2006	Board Meeting/ The board audience consisted of two	♦ Final presentation

			members of the MY family (owners of the PA group), Mr. GB CFO, the General Controller Mrs. G, Mr. IP, Mr. S. (Logistics PA), other members of the directorate of the group.	of the Performance Measurement System (PMS). ◆ Bullwhip effect presentation and Sales forecast provision for FA and PD. ◆ Presentation of SCI perspective for PA
RP4	Model and forecast system transfer over PA	October the 27th, 2006	Mr. S (Logistics PA)	◆ Model transfer over to PA
CI1	Information follow-up. Integral Information outsourcing to an ISP	March 2007	Integrated solution provider (ISP)/Public Notice in trade press.	◆ Public Notice of decision
CI2	Information follow-up. Acquisition of Disney Franchise	March 2007	Public Notice in trade press.	◆ Public Notice of decision
CI3	Industry and Company complementary information	Feb-March 2007	Annual reports/ public business databases, INEGI (national accounts), AMEXIGAPA (trade association)	◆ Financial/Operation reports from public information, Production, sales, employment, international trade and competition

Table 4.5-1: Chronological activity log for the AR project at *PA*

5. Analysis of the results: The implementation of the AR cycles

AR implies that research is concurrent with action and for that matter, both the researcher's and the management teams engaged in two simultaneous projects, aiming at organizational change, the CAR and the DAR.

The first project has its own identity and proceeds irrespective of whether or not it is being studied, while the second one involves the researcher's inquiry into the organizational project. Even though both projects comply in full, with the four designated stages of AR, the emphasis of the first cycle is on the CARP, whereas the emphasis of the second cycle is on the DARP.

Under a general perspective, the first AR cycle concludes with the presentation, at the working committee, of the PMS for the two chains under study. The reflection around the preliminary results of the measurement system, derived in the identification of the bullwhip effect at *FA* and the implications under a downturn of operational and financial performance of *PA* were discussed. Time series forecasts for volume of sales were initially suggested as an aiding tool for reducing the bullwhip effect. Moreover, both teams engaged in a thorough reflection process regarding a possible systemic approach towards supply chain operation for *Fábrica de Alimentos*.

As pre-requisites for SCI implementation, changes in the marketing and organizational strategies were suggested by both teams and presented eventually before the board of directors.

The DAR project benefited from reflection among the managerial and researcher's teams, in particular regarding the clarification of objectives, research questions, methods selection, scope of the fieldwork and schedules. The intermediate result at this time was an authorized dissertation proposal, laying the groundwork for theoretical advancement, basis for the second AR cycle.

In a monitoring meta-step, the researcher's team articulated all experience attained in the first cycle and gave careful thought around the dissertation process. For

one thing, and regarding organizational change, a preliminary conclusion was that beyond the initially considered PMS, further advancement in SCI would be a more suitable strategic decision for an ailing *Fábrica de Alimentos'* operation. For the other, problems in SCM and SCI implementation were identified, both from the theoretical and the practitioner's perspective and the need for operative guidelines for SCI implementation was identified.

On one hand, the second cycle of the CARP concluded with the implementation of a strategic PMS for *Productos Alimenticios* and further recommendations for reducing the bullwhip effect by sales forecast's sharing across key agents in the SCs and the adoption of an overall SCO approach, leading to the implementation of SCI initiatives.

On the other hand, results of the DARP provided additional understanding of the SCI processes, as a result of designing a prescriptive model guiding VI firms in their transition towards SCI. This model, supported by the literature review, follows from continuous work derived from the concurrent results of both AR projects. It is based on the notion of maturity of the processes, where this type of models assumes that progress towards goal realization comes in stages (Lockamy and McCormack, 2004b). The model is characterized by the following issues:

1. An evolutionary perspective towards SCI: The earlier literature suggests that the stages of the transition towards SCI evolve, in a continuum, from an initial state characterized by unarticulated functions -based on adversarial transactions- through internal and eventually external integration across the SC, based mostly on collaborative relationships.

2. An urge to transit from vertical integration towards more relational forms of supply chain integration: Both, more complex competition schemes and a dynamic environment are compelling pressures that constantly drive businesses, VI firms in particular, to expand their capabilities, in order to remain competitive. Organizations today need to focus on core enhanced competences and capabilities and benefit from a higher degree of relational exchanges.

3. A process maturity approach with respect to SCI: A maturity model assumes that progress towards goal achievement, in this case organizational change in the line of integration, is gradual and comes in stages.

4. Multi-dimensionality of integration: The advancement of both, vertical integration and its extension across the supply chain runs along multiple dimensions, as proposed in the model and supported by the literature.

5. A contingency approach towards integration: The intensity of integration is moderated both by external environment factors and by internal forces that mainly run along the human dimension, such as resistance to change, hierarchies across the organization and participant's hidden agendas.

5.1. Pre-understanding in this study

Usually the starting point for action research is a practical, problematic or unsatisfying, situation at work or in other social environment. The purpose of a preliminary –contextual stage- phase is to define the current situation, with the objective of visioning and planning the phases of the action research (Kyrö, 2004).

The pre-step is driven by two issues, concerning the rationale for research and for action. Under this study, the pre-understanding stage, involved gathering the necessary information to comprehend both, the practical and theoretical relevance of this project and the business environment conditions that drive the need for action.

As it is schematically shown on Figure 4.1-1, AR implementation begins with a pre-understanding step. Initially this stage aims at making sense of contextual insights into SC and SCM under the consultant's perspective, providing the basis for engaging in an AR project. The data gathered at this instance encompassed a presentation of a proposed PMS devised by the researcher's team and a semi-structured interview with Mr. HC, senior advisor in the topic of SCM for a world class consultancy firm. The activities included at this stage were based on the Topic Guide 0, as referred in Appendix A. The detail of these activities is further explained in the next section and a summarized view of this instance is found on the Mental Map number 1, bellow.

The seamless pipeline stage

This phase of the research program, labeled the Seamless Pipeline, regained first-hand insights into consulting in supply chain and supply chain management, where Mr. H.C. presented an overall practitioner's approach on SCI, providing contextual setting relevant for the following planning stage in the DAR and CAR projects. The two main goals stated for activity PU1, as per the fieldwork's chronological log Table 5.1-1 bellow, were:

a) Obtaining a practitioner's opinion over the proposed PMS in supply chains.
b) Getting professional advice for consulting services in SC and SCM

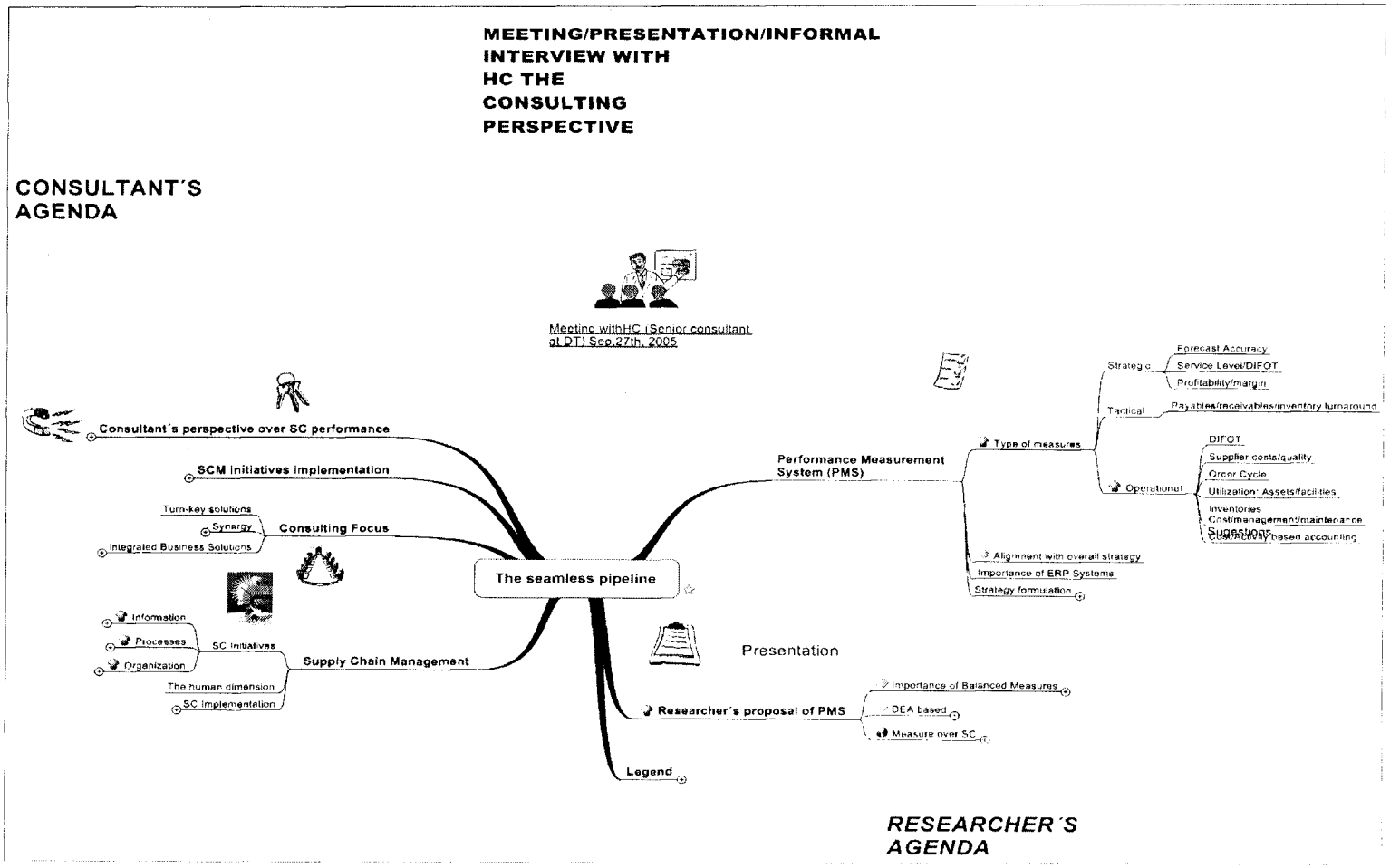
More specifically, to deepen the understanding about:

1. The researcher's team proposed PMS for supply chains (Presentation)
2. The seamless pipeline concept (Reflection)
3. The practitioner's perspective towards the SCI notion.
4. The consulting focus on SC and SCM.

The meeting and interview with Mr. H.C. furnished a reflection outlet for discussing PMS and measures in the supply chain. As a result the foundation for the CAR project to be engaged by the researcher's team was provided. Furthermore the notion of SCI was introduced in the AR project from the practitioner's lens and moreover this activity contributed to the professional networking of the researcher's team members. The actual results and their incidence in the ARP are discussed bellow.

Id #	Activity/ Type	Date	Contacts /Means	Questions/ Issues Raised	Results	AR stages supported by activity
PU1	Pre-understanding activity: Performance Measurement Systems Consultation (D&T Consulting Firm)	September 27th, 2005	Mr. HC (Senior operations advisor for D&T Consulting)/ meeting/presentation –interview	◆ Consultant's perspective over SC. ◆ Performance measurement systems / Proprietary Systems.	◆ Consulting approach towards seamless pipeline. ◆ Practitioner's opinion over PMS in SC. ◆ Specific measures to be implemented.	◆ Pre-understanding stage: Provided contextual setting relevant for the following planning stage in DARP and CARP.

Table 5.1-1: Chronological account for activities under the pre-understanding stage



Mental Map 1: A summarized view of the pre-understanding stage

Pre-understanding's contribution to AR cycle's results

The main contributions from the consulting perspective follow:

1. An operation model for supply chains, labeled "*The Seamless Pipeline*": Confirmed through the interview and as initially presented in SCM literature, this ideal model was confronted with reality under a practitioner's perspective. This view of the SC contrasted sharply with previous findings from the researcher's team professional experience, regarding SC operation.

2. The multi-dimensionality of SCI initiatives: Three dimensions of integration were highlighted, namely: Information and IT, business processes and organizational issues. This notion is further supported by a large stream of literature, as expressed in chapter three, in this study.

3. Performance Measure Systems across the SC: Three levels for SC metrics were identified: strategic, tactical and operational. It was stressed that measures must be balanced and aligned with overall corporate and SC strategy. The following: Forecast Accuracy, Service Level (DIFOT) and profitability were suggested by the consultant, as part of the strategic set of measures.

4. Comments on, suggestions and eventually a consultant's consideration over the proposed metrics and techniques used to develop a supply chain PMS

Even though, as expected, the consultant's perspective was based on turnkey solutions, proprietary PMS and integrated solutions (hardware, software and other goods and services provided), the close interaction with Mr. HC provided a sensitive approach towards the human dimension of SCM initiatives implementation. More specifically, this stage provided an important discernment into potential problems for collection, measures and implementation of PMS systems and possible ways for solving the same.

5.2. **The first AR cycle**

Following from the pre-understanding stage above, the researcher's team members initiated the CAR project with both a theoretical approach of SCI based on the literature, regarding the un-interrupted flows of goods, services, information and cash

flow across the SC, and from the practitioner's perspective, the strategic importance of a balanced PMS -consistent with corporate and supply chain strategy- and an initial proposal for its implementation.

The actual design of the CARP included: The negotiation of *PA's* involvement in the research project and the necessary clearances as well as obtaining managerial commitment to the project and the inside information required for the definition of the problem at hand.

Compliance with the four stages of the AR cycle implied first, all steps involved in the planning stage such as schedules, data collection and the preliminary literature review in SCI. The implementation of a balanced PMS for the designated supply chains at *PA* constituted the second *-action- stage-*. The third stage included the analysis of the collected data and its implications on SC performance. The fourth stage encompassed two activities: A preliminary feedback -aiming at possible explanations of SC performance down-turns- and a thorough reflection process between the managerial and researcher's teams that resulted in recommendations for organizational change regarding both, marketing and organizational strategies and the adoption of a systemic approach towards SC operation.

Moreover the DAR project, in its first instance, initiated with a proposal on mapping and measuring performance across the SC and -as a joint result of the literature review, the experience attained from the pre-understanding phase, the results from the first AR cycle regarding the CARP and the analysis, reflection and discussion processes engaged by the researcher's team- eventually evolved to the study of organizational transition towards SCI.

This DARP cycle concluded with the problem clarification and the formal presentation and approval of the dissertation proposal. The detail of the four main stages of both CAR and DAR projects follow and a summarized graphical perspective of the first AR cycle is found in the Mental Map 2 bellow.

The first stage of the AR project: Planning

The actual cycle begins with the planning stage. For that matter the first of the fieldwork's related activities, namely *action negotiation* (AN) lays the ground for further

development of the research process. This stage proceeds with the formal planning arrangements for the research project and concludes with the data collection process for further implementation of the PMS at *PA*.

The involvement of PA in the research project

This phase began by negotiating access to *PA* through a key facilitator, Mr. GB, chief financial officer of *Productos Alimenticios*, by means of a formal written communication and a follow-up informal interview, as presented in the chronological account in Table 5.2-1 bellow and the corresponding detailed Topic Guide 1 is referred in Appendix A.

Special consideration was given to the personal and institutional links between this company and the research-host: ITESM. On one hand and as a direct result of this activity the research project ensured *PA's* participation obtaining the Board's Support and acknowledgment, draw the initial contract conditions for the research program and established formal contacts within *PA's* hierarchies, institutional bonds based on trust and mutual benefit and the corresponding operating links

On the other hand the research team introduced at *PA* the notion of the *Seamless Pipeline*, identified the SCs under study, obtained an operational preview, reassured the need for a balanced PMS and gathered insights into efficiency and efficacy problems in *PA* due to possible disintegration and or strategic misalignments in the SCs.

Id #	Activity/ Type	Date	Contacts/Means	Questions/ Issues Raised	Results	AR stages supported by activity
AN1	PA Initial Contact	November the 9th, 2005	Mr. GB CFO/ Letter	◆ Cover Letter/ requests Participation in Research Prg.	◆ Consideration of Mr. GB as a key facilitator for the research program	◆ First AR Cycle. Planning stage.
AN2	PA Follow-up	November the 23rd	Mr. GB CFO/Telephone Conversation	◆ Obtains PA's participation / Brief overview of problem of interest at PA which is FA	◆ Means for an initial appointment directly with FA	◆ 1st AR Cycle Planning stage. ◆ CARP Preliminaries ◆ 1st gatekeeper clearance.

Table 5.2-1: Chronological account for Access Negotiation (*AN* Activities) with *PA*

Data Collection at PA

After gaining formal access to work with *PA* in this AR project, the following activities were the collection, initial feedback and data analysis for implementing this first planning stage, as summarized in Figure 5.2-1 bellow.

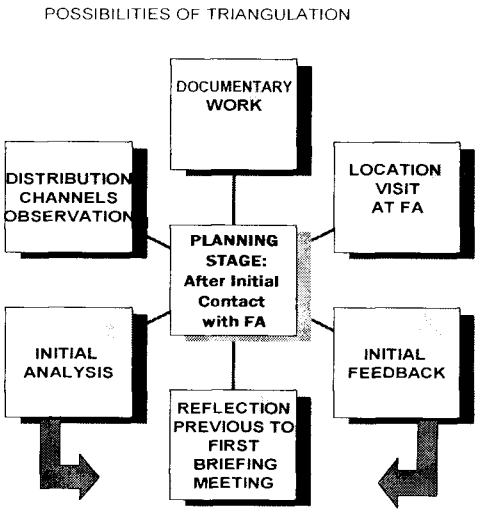
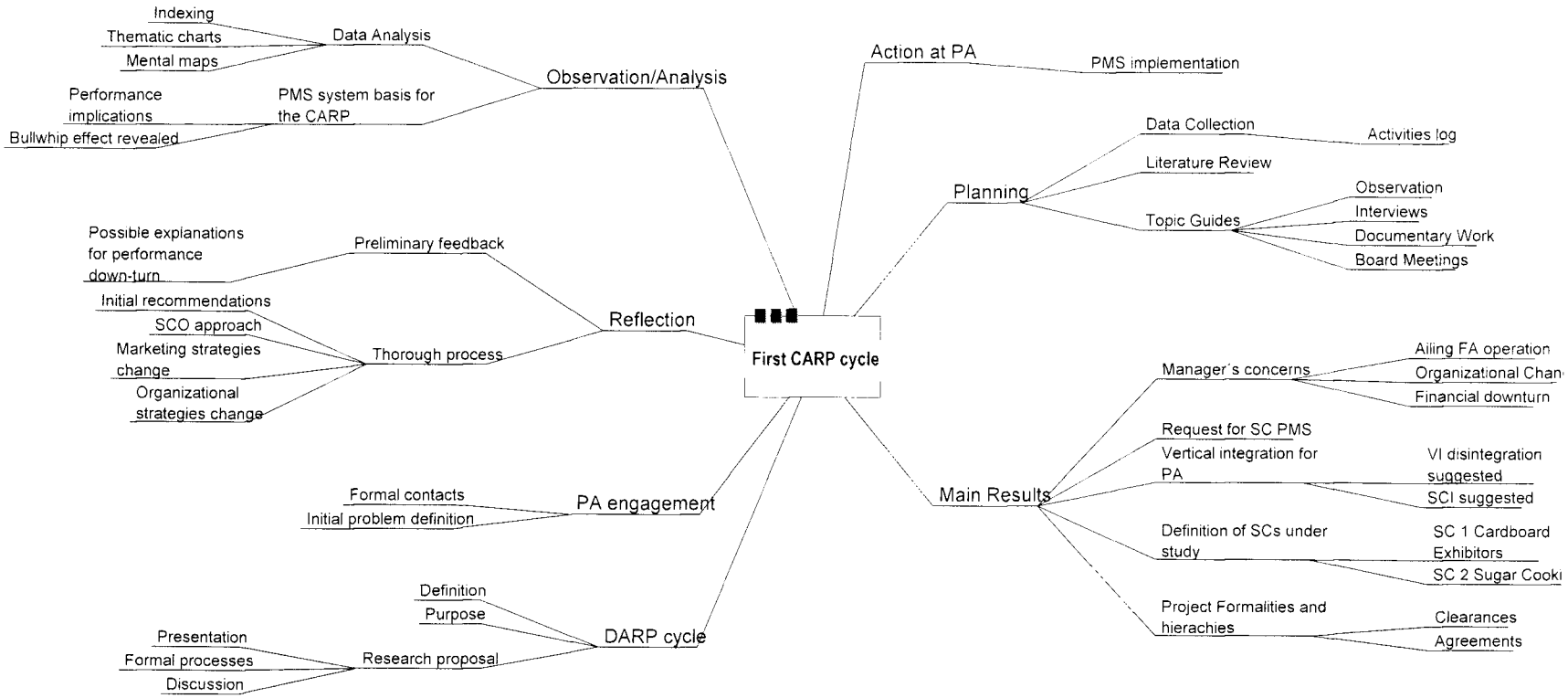


Figure 5.2-1: Diagram showing the activities comprising the planning stage in the first AR cycle

After the initial contact, Mr. IP, general director of *FA*, in his role as second gatekeeper, needed assurance about the benefits derived from *PA's* inclusion in the research program. Mr. IP was asked to provide the research team with an ample and thorough overview of *FA* and *PA*, regarding vertical integration, brands and products, infrastructure, main concerns, organization and hierarchies.

Complementing the information, data was collected trough informal interviews, observation and documentary work. This process was considered crucial for the future meeting with the Board and/or owners which would be decisive for *PA's* engagement in the project.



Mental Map 2: A Summarized view of the first AR cycle

The activities encompassed in this initial planning stage, include labels IC (initial contact), AN (Access negotiation), DW (documentary work), DS (distribution channels visits), BP (Board presentation) and BR (Briefing meetings). A chronological account, with the results and implications of each activity in the AR project is shown in Table 5.2-2 bellow and the corresponding Topic Guide 2 is referred in Appendix A.

ID #	Activity/ Type	Date	Contacts/Means	Questions/ Issues Raised	Results	AR stages supported by activity
IC1	Initial contact with FA	December the 1st, 2005	Mr. IP General Manager/ Meeting at location	◆ Overview of Research Program/ Overview of FA	◆ Preliminary Approval	◆ First AR Cycle. Planning stage. ◆ Second gatekeeper clearance.
IC2	Location visit	December the 1st, 2005	Operating managers of FA	◆ General Layout presentation and initial consideration for FA´s operation	◆ Initial observations/ informal interviews with operating managers.	◆ First AR Cycle. Planning stage. Preliminary diagnostic. ◆ CARP and DARP objectives determination.
DS1	Distribution Channels (Fieldwork)	December 4th through 12th, 2005	Supermarkets/ convenience stores/ corner stores /mid-size wholesalers-distributors	◆ Observation of distribution channels and marketing conditions for FA products and from the competition. ◆ Concern around product availability.	◆ Observations of: Products, prices and marketing layouts. ◆ Contextual information about marketing conditions. Limited supply and variety of FA´s products.	◆ First AR Cycle. Planning stage. Preliminary diagnostic. ◆ Info confirmation.
AN3	Approval for presentation at the monthly board meeting	December the 5th, 2005	Mr. GB CFO/Telephone Conversation	◆ Authorization for Board meeting Presentation	◆ Approval for presentation	◆ First AR Cycle. Planning stage
DW1	Archival work	December 6th through 12th, 2005	Annual reports/ public business databases.	◆ Financial/Operation reports from public information	◆ Contextual information for PA and FA.	◆ First AR Cycle. Planning stage
DW2	Context Information	December 6th through 12th, 2005	INEGI (national accounts), AMEXIGAPA (trade association)	◆ Production, sales, employment, international trade, competition.	◆ Contextual information for the industry.	◆ First AR Cycle. Planning stage.
BP1	Board Meeting	December the 16th, 2005	Board Meeting/ The board audience consisted of two members of the MY family (owners of the PA group), Mr. GB CFO, the General Controller Mrs. G, Mr. IP, other members of the directorate of the	◆ An initial proposal on a SC measurement system was made and ◆ Further problems of the selected firm, Fábrica de Alimentos a subsidiary of the group were raised. ◆ Preliminary presentation of the seamless pipeline	◆ Authorization to analyze and solve problems on two SC: Sweet Cookies and Cardboard Exhibitors. ◆ Bases for drawing the research contract. ◆ Steering	◆ First AR Cycle. Planning stage. ◆ Main ideas of the CARP are presented. ◆ Clearances granted. ◆ Data triangulation and confirmation.

			group and operating managers of FA.	perspective. ◆	committee formation and formal contact establishment.	◆ Managerial concerns, hidden agendas and problems around the human dimension (hierarchies) are revealed. ◆ Initial reflection around problems at PA. ◆ Groundwork for the DARP. Proposal clarification.
BR1	Briefing Meeting	February the 7th, 2006	Mr. IP Director of FA and chairman of working committee/ Meeting	◆ Briefing for project initiation/ logistics of the meeting.	◆ Verbal contractual agreement for research/ observations and comments by the working committee	◆ First AR Cycle. Planning stage. Details arrangement. Initial problem clarification. Implications for the DARP were identified.
BR2	Initial meeting with the designed working committee	February the 7th, 2006	Mr. IP Director of *FA*, Mr. F, from Product Distributorship, Mr. JP, from the Packaging Company , Mr. TB controller of *FA* and Mrs. D, chief accountant for *FA* / Meeting	◆ Planning session for the CARP. ◆ Scope of the project. ◆ Formal establishment of the working committee. ◆ Communication channels ◆	◆ Agreement over supply chains under study, ◆ Performance measures, analytical framework using DEA. ◆ Data collection, analytical procedures, periodicity and schedule of activities, deliverables and other basic working agreements	◆ First AR Cycle. Planning stage. Operational definitions. Purpose, metrics, measurement, schedules. ◆ Action stage: conformation of the performance measurement system. Initial researcher's team recommendations for PA.

Table 5.2-2: Chronological account of the planning stage in the first AR cycle

The main objectives of these activities were:

a) Establishing real contact with the designated chairman of the working committee and the basis for a contractual agreement ruling over the research program
b) Obtaining a general view of the subject of study *(FA)*, from the perspective of its general manager by means of an in-depth interview
c) Identifying beforehand the corporation's main concerns towards *FA* and its confirmation in a preliminary briefing
d) Laying the foundation for the Board Meeting Presentation

e) Confirmation of the perspective provided through observations, brief informal interviews with operating *FA's* managers and documentary work (Possibility for triangulation)

The key results of this stage revolve around four issues:

1. PA's engagement: Regarding the CARP, in this process, an agreement was reached along basic coordination principles, formal and real contacts, SCs under study, project logistics and a formal agenda. Problems with *FA* were identified in the course of action and hidden agendas were discovered. The common theme was reluctance, hierarchies and resistance to change. Incidentally, from the beginning, the researcher's team and the working committee engaged in a thorough discussion about the adequacy of vertical control strategy exerted by *PA*. Moreover the notion that VI continued to be a sound strategy for *FA*, as opposed to a SCO approach, in the future was severely challenged by the researcher's team. Nevertheless and after some discussion, *PA's* involvement in the project was formally authorized by the Board.

2. Fábrica de Alimentos' operation understanding: This stage provided valuable insights about products and brands, marketing strategies, factories, production and layouts, distribution and clients. Managerial concerns were hinted and real operative concerns were somehow identified, regarding sales variability and sales forecast problems. Formal briefing allowed the identification of IT and PMS problems. In the process the presence of adversarial transactions was identified. This stage included also the initial definitions for SC selection, mapping and the proposal of an initial performance measurement system for *PA*.

3. Distribution Channels: The presence of a deliberate marketing strategy based on resorting to lowly integrated regional wholesalers was identified as a counteracting measure aiming to delay SCI. Problems such as sales variability and seasonality as well as non-deliberate promotions based on quantity discounts arose. Other problems in distribution relate to foreign markets not satisfactorily catered by PA, reliance on an uncontrolled sales-force, dominance by world class retailers and marketing through generic brands with null advertisement and positioning. Neglecting the marketing strategy, on behalf of the board of directors proved to be a costly decision for the competitiveness of *FA*.

4. And last, Competition *(Market)* Facts: Regarding this issue, it was found that competitors rely on homogeneous price and products, yet differentiated trough stronger brands and

reputation, better exhibition space in retail outlets and improved packing and advertising. Some competitors resorted to niche markets -not big enough to attract the crowd- such as health-conscious consumers and/or franchise products.

General Considerations in the planning stage

Under a collaborative approach between the manager and the researcher's teams, a preliminary analysis of the data collected in this stage recognized the adoption of a vertical control strategy on behalf of *PA* and identified one of the management's concerns, namely that the recurrent volatile and decreasing demand on *FA's* products and the derived inefficiencies and low performance, raised serious concerns in top-level management, otherwise contempt with overall performance of *PA*.

Even more, increasing competition from world-class rivals and the impossibility to distribute its branded products over a SC dominated by global retailers raised the issue, among the board members, and leading them to reflect about whether to modify or even discontinue operations in *FA*.

After some thought, around those issues, the researcher's team suggested, before the working committee, two venues of work: a) The continuation of the PMS design and implementation processes for *FA's* supply chains and b) the statistical analysis of sales figures under a time series approach, with a future forecasting perspective.

Moreover and with the proper formality regarding the CAR project, the steering committee, jointly with the researchers team, acting as consultants, formally defined the relevant issues around *PA's* engagement and agreed on the design of a new balanced PMS for the supply chains identified with numbers one and two as above, where *PA's* subsidiaries: *PD. FA* and *Packaging Co*, operated under a vertical hierarchy.

The concurrent planning phase for the DARP

The main objectives of the DARP under the first AR cycle were: The clarification of the research questions, refinement of methods and procedures and

preliminary data collection, elements that concluded in a formally approved dissertation proposal.

The pre-understanding stage provided the researcher's team with the practical notion of the *"Seamless supply chain"*, the contextual information for PMS design and the most needed consultant's perspective for entering into a SCI project based on the AR methodological approach.

The planning and design stages, based on a reflection process between the researcher's team members, involved the definition of the research problem, thesis design and rationale, literature review, internet search, justification, methodology, activities suggested and schedules.

The literature review provided the foundation of the theoretical approach of SCI based on the multi-dimensionality of integration, as expressed in chapter three of this document. The interaction with the managerial team allowed both, motivation for and the clarification of the SCI problem and laid the ground for the dissertation proposal.

The second stage: Action in the AR project

The first transformation stage of the AR project deals directly with the establishment of a performance measurement system across the supply chain in order to determine efficiency and efficacy of *FA* along the two SCs selected. This -action- stage required close collaboration with the firm's key actors for data collection, PMS design and implementation. For that matter, jointly, the management and researcher's teams engaged in the design of a strategic PMS. A graphical perspective of the action stage in the CARP is provided on Figure 5.2-2 bellow.

Originating on the information collected at the pre-understanding stage, the literature review and the thorough internal discussion of the working committee regarding available measures along the agents mapped in the SC, two following measurement categories were initially selected: Level of service and supply chain cost.

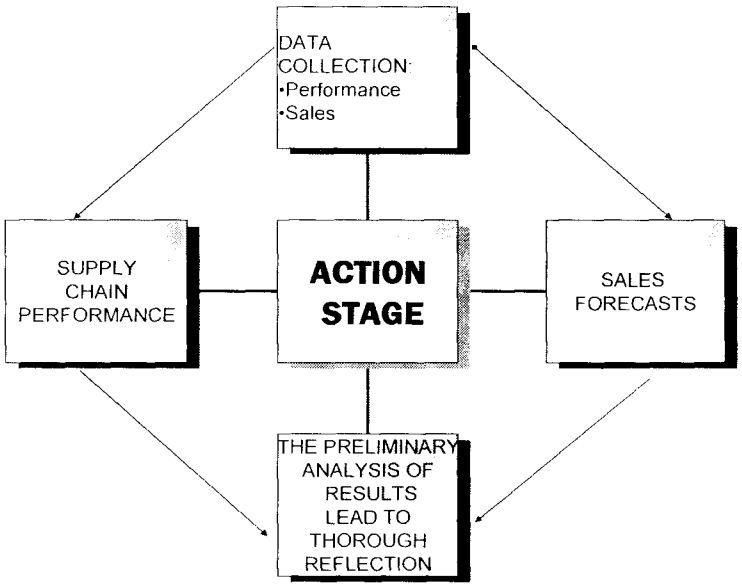


Figure 5.2-2 Diagram showing the general activities comprising the action stage in the first AR cycle

The data collection process included activities DC1 through DC6, as shown in Table 5.2-3 as well as a summarized version of the action stage of the ARP that is found in the Mental Map 3 bellow:

ID #	Activity/ Type	Date	Contacts/Means	Questions/ Issues Raised	Results	AR stages supported by activity
DC1	Data Collection about performance measures for FA.	February the 11th, 2006	Mr. TB (Controller)/e-mail – telephone informal interview	♦ Performance data for FA and itemized financial information for FA/ inquiry about the data collection process and ERP system.	♦ January 2006 Figures provided for both requests/ ♦ Commentaries over the data gathering process	♦ First AR cycle. Action stage. PMS implementation in focal firm.
DC2	Data Collection about performance measures for Packaging Co.	February the 13th, 2006/ February the 15th, 2006	Mr. JP (Packaging Co)/ e-mail	♦ Request for performance data and itemized financial information for Packaging Co.	♦ January 2006 Figures provided for both requests	♦ First AR cycle. Action stage. PMS implementation in first-tier supplier.
DC3	Data Collection about performance measures for Product Distributorship.	February the 11th, 2006	Mr. F (PD)/e-mail	♦ Performance data for PD	♦ January 2006 Figures about performance	♦ First AR cycle. Action stage. PMS implementation in first-tier customer.
DC4	Information Request: Itemized financial information for PD	February 13th/ 14th, 2006	Mr. F (PD)/e-mail	♦ Itemized Financial information for PD -	♦ Information denied (either non-existent or classified) agreed with the Board Director, Mr. MY	♦ First AR cycle. Action stage. PMS implementation in first-tier customer. ♦ Hierarchical problems observed. ♦ Financial

						information denied.
DC5	Financial data collection for PD	February 15th, 2006	Public accounting records	♦ General profitability measures for PD requested	♦ Information obtained and applied in the measurement system	♦ First AR cycle. Action stage. PMS implementation in first-tier customer. ♦ Supplementary data collection required.
DC6	Data collection about sales: Actual and forecasted for PD and FA.	February the 17th, 2006	Mr. F (PD) and Mr. IP (FA) /e-mail	♦ Itemized sales and demand forecasts figures requested	♦ Info obtained about monthly itemized figures as requested	♦ First AR cycle. Action stage. PMS implementation in focal firm and first-tier customer.
DA1	Data Analysis over performance measurement and sales forecast	February 12th through 18th, 2006	Researcher Analysis	♦ DEA model and sales forecasts using time-series methods.	♦ Supply Chain performance results and sales forecasts. ♦ Bullwhip effect detected.	♦ First AR cycle. Analysis-Observation stage. Information review and analysis. ♦ Results of the CARP project for discussion in the working committee. ♦ Triangulation and confirmation with contextual and preliminary information from previous activities, included above.

Table 5.2-3 Chronological account of the data collection process in the first AR cycle

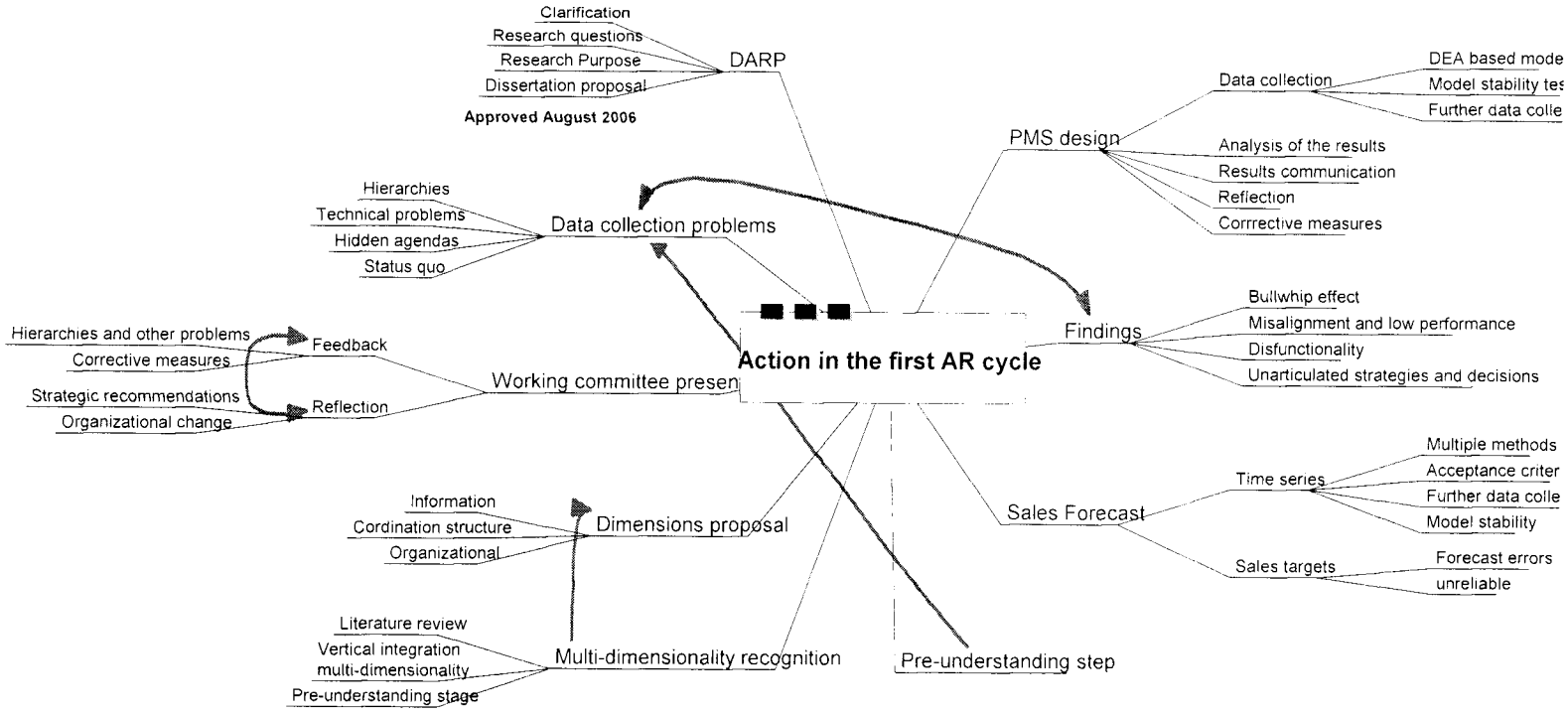
At this point, the CARP was oriented towards mapping the relevant portion of the SC, devising a simple -yet integral- supply chain PMS based on the Data Envelopment Approach (Charnes, Cooper et al., 1978). It included both, operational and financial measures using available homogeneous data for the channel members under VI control and provided certain guidelines towards the possible elimination of waste and inefficiencies in the supply chain.

At the beginning four measures were defined: Deliveries on-time, deliveries in full, Delivery in full & on-time (*DIFOT*) and operating margin. In the case of chain # 1, eighteen strategic business units (SBU's) under VI control were included, as were eleven SBU's under chain #2. It is important to mention that only the SCs where *FA* was considered to be the focal firm were studied.

Regarding the action stage in the DARP, its main purpose was the further clarification of the research problem. Activities under this heading included both, the initial field-work and the review of literature. The candidate possessed initial theoretical

perspectives, based on a) the multi-dimensionality of integration, as expressed in chapter three and b) an evolutionary theory for addressing SCI problems at *FA*. Furthermore in his study about SCI, the candidate continued to search for familiar characterizations of such settings in what is called research-driven initiation (Avison et al., 2001).

The result of the action stage in the DARP was a draft of a dissertation proposal for evaluation and reflection inside the researcher's team, and its possible approval by the appropriate dissertation committee.



Mental Map 3: A summarized view of the action stage in the first AR cycle

Observation and reflection stages

These stages in the CARP include the analysis and evaluation resulting from the PMS implementation across first-tier customers and suppliers in the two SCs under study. The managerial and researcher's teams participated in a preliminary discussion about PMS compliance, attempting to identify possible sources of divergence from standards and suggested some short-term corrective measures. A graphical perspective is found in figure 5.2-3 bellow

In the case of the DARP, based on the CARP's results, confirming operational problems for *FA*, mostly due to SC disintegration, and with the aid of a larger stream of literature, the researcher's team's original idea about measuring efficiency and efficacy in the SC evolved towards the possible application of SCI as a suitable tool for solving *FA's* competitiveness problems. At this point, both, the theoretical and practical gaps regarding guidelines for SCI were confirmed, and the researcher's team eventually attempted to reorient the DARP over this ground. A summary of these stages is shown on the Mental Map 4.

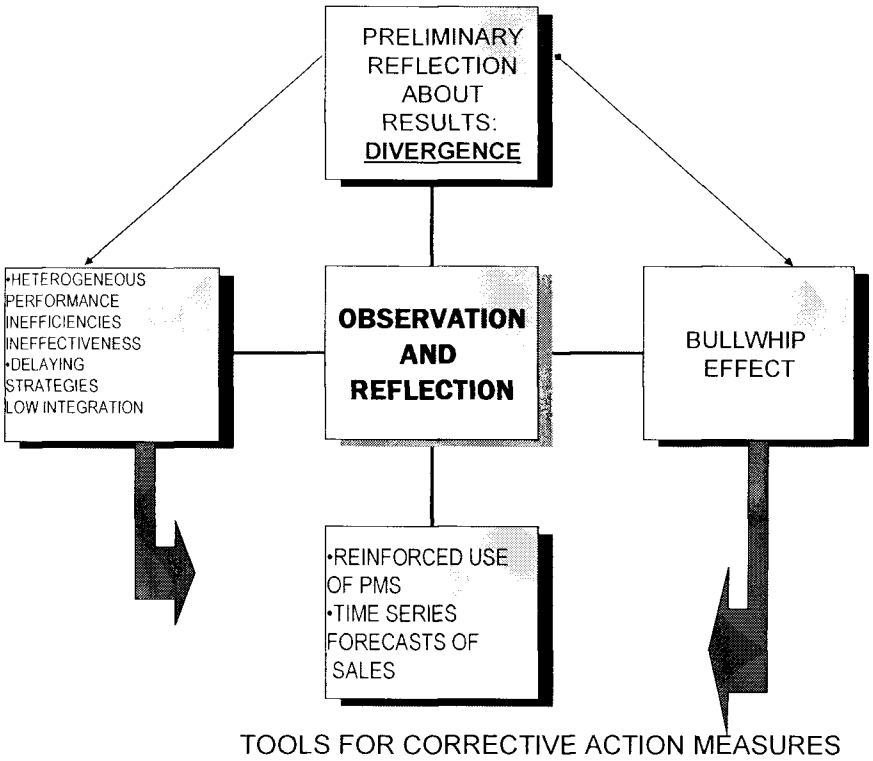


Figure 5.2-3 Diagram showing the general activities comprising the observation and reflection stages in the first AR cycle

Observation and reflection in the CARP

These stages include the following three field-work related activities, namely DA1, RF1 and RF2 as shown in Table 5.2-4 bellow:

ID #	Activity/ Type	Date	Contacts/Means	Questions/ Issues Raised	Results	AR stages supported by activity
DA1	Data Analysis over performance measurement and sales forecast	February 12th through 18th, 2006	Researcher Analysis	♦ DEA model and sales forecasts using time-series methods.	♦ Supply Chain performance results and sales forecasts. ♦ Bullwhip effect detected.	♦ First AR cycle. Analysis-Observation stage. Information review and analysis. ♦ Results of the CARP project for discussion in the working committee. ♦ Data triangulation and confirmation with contextual and preliminary information from previous activities, included above.
RF1	Preliminary reflection over the efficiency in both SC's	February the 18th, 2006	Mr. TB (FA controller & operative key contact)/ meeting and informal interview.	♦ Comments and observations about the PMS and sales forecasts/ ♦ Operative problems and limitations of information provision by the ERP.	♦ Personal perspective from the operative key contact. ♦ Observations on main results in the PMS. ♦ Extensive explanation of measures and results. ♦ Problems arising and limitations of the PMS detected	♦ First AR cycle. Observation-analysis/ reflection stages.. ♦ Additional managerial concerns and issues were raised.
RF2	Preliminary reflection over the efficiency in both SC's.	February the 23rd , 2006	Mr. IP (FA) /e-mail and telephone conversation	♦ Brief comments about results	♦ Request for a formal result presentation meeting	♦ First AR cycle. Reflection stage. Managerial concerns were raised within the working committee.. ♦ Managerial and researcher's

						teams proposed sales forecast with additional data.

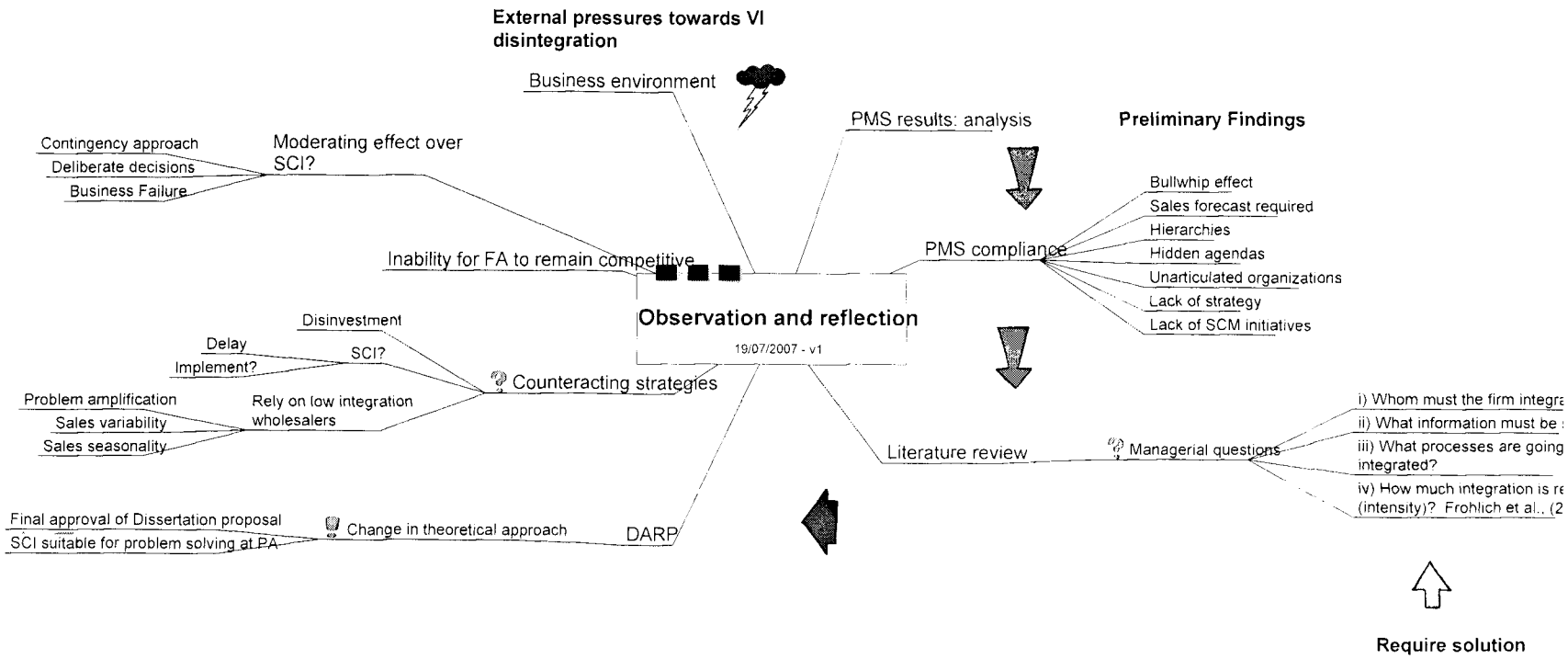
Table 5.2-4 : Chronological account for observation and reflection activities in the CARP

Key results of the observation and reflection stages in the CARP

The results from the analysis were presented at a formal meeting and showed that even-though *FA* complied, on average, with the norms, namely deliveries on time and deliveries in full, at pre-determined levels of 95%, there were times when whole orders could not be fulfilled due to excess in *PD's* inventories. Those situations were clearly identified and discussed upon inside the working committee.

After additional analysis -as agreed by the working committee- data revealed the existence of the bullwhip effect for both supply chains. Technically this means that the information transferred in the form of orders tends to be distorted and can misguide upstream members in their inventory and production decisions (Lee et al., 1997). In particular, it was found that the variance of orders for *FA* was larger (in the order of 30%) than that of sales, and such distortion tends to increase as one follows upstream, leading towards excessive costs, conflict across channel members and incentive misalignment, all characteristics of loosely articulated functions at the lowest end of the evolutionary continuum of integration Stevens (1989).

The working committee engaged in the process of devising better solutions for counteracting the bullwhip effect. As a result, the CARP presented alternative forecast estimations based on time-series methods, attempting to smooth the variation between production and stocks. In the process it was evidenced, that the problems caused by adversarial transactions across the chain. In addition, demand variability and limited forecasting capabilities, required closer attention from top-level management and suggested strategic organizational changes, regarding the adoption of a more systemic approach towards SC operation and a distribution function reorientation in favor of highly integrated channels and differentiation through stronger brands and corporate reputation.



Mental Map 4: A summarized view of the observation and reflection stages in the first AR cycle

Observation and reflection in the DARP

As part of the dissertation proposal design, the researcher's team engaged in a discussion in order to arrive to an initial consensus for project scope. The necessary interaction between both stages of action research lead the way for reorienting the DARP from the initial attempt to map and measure SC performance to the study of the implementation of SCM initiatives, particularly SCI, since this perspective seemed a suitable tool for addressing the complexity of the SC problems of *PA*.

Moreover, the observed difficulties arising from the possible orientation of *FA* towards a SC approach, not only from the technical but specifically from the hierarchical perspective, oriented the reflection process towards the need for a prescriptive model for SCI aiming at VI firms: A need confirmed through the extant stream of documental accounts reviewed.

Furthermore, as per suggestions in the literature, and identified in practice at *PA*, (*Compare Mental Map 4 above*), four questions, to be answered by managers regarding SCI implementation arose:

1. Whom must the firm integrate with?
2. What information must be shared?
3. What processes are going to be integrated? and overall,
4. How much integration is required (*intensity*)? (Frohlich and Westbrook, 2001)

The consideration of possible applications of an SCI framework in other settings motivated the research team to continue with further engagement in this field.

Key results of the DARP's observation and reflection stages

In the case of the DARP cycle, the modifications to the proposed research program and the dissertation initial document were properly approved, both by the steering committee at *PA* and by the dissertation committee at the research-host institution on August, 2006.

Monitor meta-step:

The insights obtained in the pre-understanding stage, the literature review, the practitioner's perspective of integration along with the experience attained through the concurrent AR cycles, allowed the research team to confirm the gap, both in the literature and in practice for a prescriptive account for SCI accomplishment. In that sense a strong need for a prescriptive model that could orient managers in the SCI process, and for the specific case of VI firms was both identified and clearly established, laying the ground for theoretical advancement in the field of SCI.

For that matter the initial research based on SC mapping and PMS design evolved towards the study of SCI, considered to be a suitable tool for diagnostic and influence over *FA's* ailing operation. A summarized version of the Monitor Meta-step step is shown on the Mental Map 5 bellow:

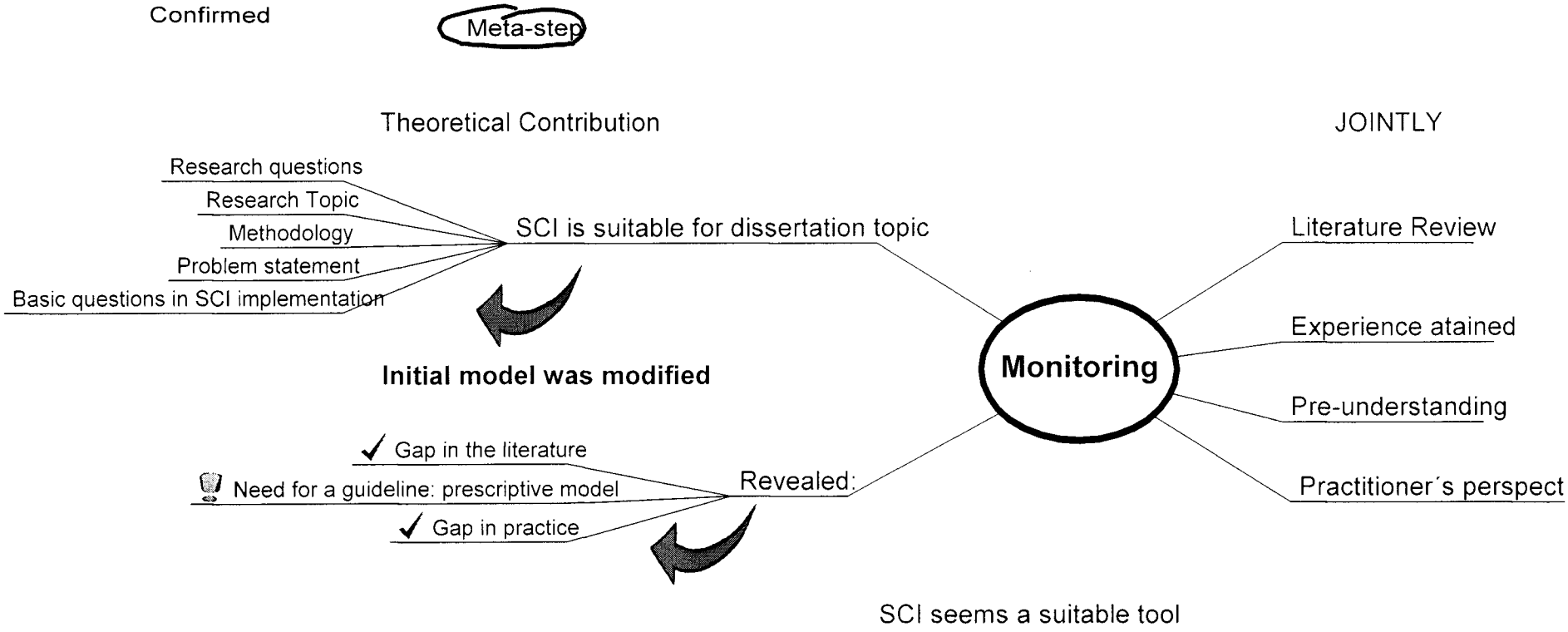
5.3. Reinforcing the research process: The second AR cycle

The main objectives of the second CAR project's cycle were to develop a better understanding about the SCI process, propose improved information requirements for SCI and further advancement of the SCO perspective for *FA* in the top-management's mindset.

The means for accomplishing such goals were:

a. Trough the analysis and discussion of the proposed supply chain performance system for *(FA)* based on data envelopment and its possible extension over the whole VI group, and
b. A SC internal coordination attempt based on time series demand forecasts sharing across key channel members.

Whereas the objective of the DARP's second cycle, was the application of the knowledge obtained in the whole process, to the design of a congruent prescriptive model for SCI in the particular case of organizations under vertical control.



Mental Map 5: Summarized view of the Monitoring Meta-step

The second CARP cycle at PA

After the experience obtained in the first cycle and sequentially, the AR stages rapidly succeeded. The initial field-work related activities included -as jointly requested by the working committee and the research team- a data extension and further analysis for implementation of a PMS and a sales forecasting system, as shown in Table 5.3-1 bellow.

ID #	Activity/ Type	Date	Contacts/Means	Questions/ Issues Raised	Results	AR stages supported by activity
DC7	Additional information requested about sales (2000-2005) and 2006 updates	February the 20th/ February the 28th, 2006	Mr. F (PD) and Mr. TB (FA) /e-mail	♦ Information requested	♦ Complementary information provided for the first AR cycle (data extension	♦ First AR cycle. Observation stage. Complementary information provided
BR3	Briefing Meeting/ Interview	March the 8th, 2006	Mr. IP (FA)/ informal interview	♦ Briefing/ informal inquiry about the results	♦ Perspective from the chairman of the working committee. Leads the way for the second AR cycle.	♦ First AR cycle reflection stage and Second AR cycle. Planning stage. ♦ Informal and preliminary reflection around CARP and Initial discussion for further activities in the AR process.
RP2	Preliminary results presentation **Formal conclusion of First AR cycle/ beginning of Second AR cycle**	March the 8th, 2006	Mr. IP (FA), Mr. F (PD), Mr. AP (Packaging Co), MR TB (FA) / Working committee meeting	♦ Reflection about the overall performance of SC/ ♦ Additional Performance information requested for year 2005 and February	♦ Intense Reflection around the performance measures results. ♦ Need for more information over an extended period. ♦ Presentation of the SCM and SCI perspectives. ♦ The seamless pipeline model. ♦ An initial approach towards Supply Chain Orientation (SCO)	♦ First AR cycle Reflection stage. / Leads the way for second AR cycle. ♦ Managerial and researcher's teams joint analysis of initial CARP results. ♦ Organizational change towards SCO is formally suggested for PA. ♦ Researcher's recommendations for further PMS advancement/ confirmation. ♦ (additional data) ♦ Basis for AR meta-step
DC8	Information request	March 24th through April 21st ,2006	Mr. IP and Mr. TB (FA), Mr. F (PD) and Mr. JP (Packaging Co)./ e-mail	♦ Additional information request	♦ Information provided	♦ Second AR cycle planning and action stages. ♦ PMS implementation with enhanced data.
DA2	Data Analysis over performance measurement	March 24th through 18th, 2006	Researcher Analysis	♦ DEA framework and sales forecasts	♦ SC performance results and sales forecasts.	♦ Second AR cycle analysis- observation stage.

	and sales forecast			using time-series methods.	♦ Bullwhip effect detected.	Results confirmed

Table 5.3-1: Chronological account for additional data collection and analysis

Derived from the reflection process, both the research and the management teams requested an extension of the time-frame under study in order to analyze the stability of the PMS and the design of a better sales forecast system based on time series methods. The additional information was agreed upon, and the collection process was arranged.

After the analysis of the collected data, both tools the DEA-based performance measurement system and the time series sales forecast, confirmed the initial findings regarding operating inefficiencies at the corresponding SCs and the occurrence of the bullwhip effect, and in turn were presented to the proper authorities at *PA*.

At that meeting, (*RP2 activity in table 5.3-1 above*), the consideration about the persistence of the bullwhip effect in SCs #1 and #2 laid the ground for intense conversation inside the working committee. Important deviations from the level of service norms from key channel members caused stressful discussions, reflecting hierarchical problems on one hand, and serious issues such as misguiding incentives and strategy misalignment across the SCs, on the other.

Immediate key results for the second cycle of CARP

In general it can be asserted that the second cycle aimed at generating a process of systemic awareness across *PA*, trying to understand the origins of performance divergence across the SBUs. As it could be observed, managers clearly took note of the problems and considered the possibility to find alternative solutions, by reconsidering the persistence of VI as a deliberate strategy. This approach was confirmed, off-the-record, through further informal communications with members of the working committee.

The main results of such project were: The elaboration of a time series forecast of demand, the mapping of the supply chains for *FA* and as expected, the initial

adoption of a collaborative performance measurement system based on DEA, using both operational and financial measures.

Both the PMS and the sales forecast systems were transferred by the research team through the logistics department of *PA* under the command of Mr. S. and were expected to be shared among *Packaging Co. FA* and *PD*, attempting an initial integration initiative. Its potential use at other *PA's* business segments would be given further consideration.

ID #	Activity/ Type	Date	Contacts/Means	Questions/ Issues Raised	Results	AR stages supported by activity
RP4	Model and forecast system transfer over PA	October the 27th, 2006	Mr. S (Logistics PA)	◆ Model transfer over to PA	◆ Instructions for the PMS and sales forecast results. ◆ Implications for daily operation.	◆ 2nd AR cycle. Action stage. As a result of steering committee's clearance the PMS was formally implemented.

Table 5.3-2: Chronological account of the process of CARP's knowledge transfer to *PA*.

The conclusions of the CAR project questioned basic management attitudes regarding *PA's* vertical rule over *FA* and lead to managerial reflection around the adoption of an SCO perspective, not only of *FA*, but of the whole VI group.

The planning stage for the DARP

As the original idea of the research was modified towards the design of a prescriptive model for SCI, as shown in its summarized account in Mental Map 6, this stage required an initial assessment of the availability of the contextual information supporting: a) The concept of multi-dimensionality of integration, particularly in the case of the VI firm, as previously identified and b) a contingency perspective acting as a moderator of the intensity of the integration process, as it was suggested for both issues by the literature review, and confirmed in the pre-understanding and the observation and reflection stages of the first CARP cycle above.

For that matter the objective at this point was to obtain second-hand information about the industry and *PA* related data. This stage began with the definition of

information requirements and continued with the collection of data in order to evaluate integration from this perspective.

The activities included in this stage are shown in the following Table 5.3-3, and the corresponding Topic Guide 3 is referred to, in Appendix A.

Id #	Activity/ Type	Date	Contacts/Means	Questions/ Issues Raised	Results	AR stages supported by activity
CI3	Archival work	March 2007	Annual reports/ public business databases.	♦ Financial/Operation reports from public information	♦ Complementary contextual information for PA and FA.	♦ Second AR cycle. (DARP) Observation-analysis (complementary). Information ♦ Confirmation around changes in strategy.
CI3a)	Context Information	Feb-march 2007	INEGI (national accounts), AMEXIGAPA (trade association)	♦ Production, sales, employment, international trade, competition.	♦ Complementary contextual information for the industry.	♦ Second AR cycle. (DARP) Observation-analysis (complementary). Information ♦ Confirmation around changes in strategy.

Table 5.3-3 Chronological account of the complementary documentary work

The following second-hand sources of information such as: INEGI, US Economic Bureau, AMEXIGAPA and Secretaría de Economía as well as Infosel, Dow Jones PR Wire, *PA's* annual reports, Edgar-SEC, EBSCO, Lexis-Nexis and Trade Press were consulted. The results relate to the multi-dimensionality appraisal of *PA* as a VI firm and are presented in the following section.

Appraising the four dimensions of Vertical Integration in the case of PA

Following Harrigan (1985), the four dimensions of VI: Stages, breadth, degrees and forms, were studied for diagnosing the initial level of vertical control of *Productos Alimenticios* as participating, through its subsidiaries *FA, PD* and *Packaging Co*, in the two supply chains where *FA, actually* operates as the focal firm.

Stages of integration

The dimension of *stages of integration* refers to the number of steps in the chain of processing which a firm engages in (from ultra-raw materials to the final consumer). When firms integrate up-stream is called backward integration and when they integrate downstream is called forward integration (Harrigan, 1985, p.399).

In supply chain #1 -*Cardboard Exhibitors*- *PA* engages in two stages upstream -flour supply and packaging materials- and two downstream -some transportation and marketing-. *Fábrica de Alimentos* is both, the focal firm, and the relevant SBU in this chain in charge of the whole manufacturing process. Distribution to the end-customer is made trough low-integration distributors that mostly cater neighborhood stores as presented in Figure 5.3-1.

Moreover as seen in Figure 5.3-2 bellow, in the distribution of the sugar cookies, as belonging to SC# 2, there are two quite distinct channels. The first channel, under study, distributes in-house through *PD*. The second one, mentioned for reference only uses the distribution channels of a world class retailer. Even though this last segment of the SC would not be analyzed, it is important to mention that it is the world-class retailer that becomes the focal firm and organizes production. In SC #1, it is clear that *PA* is fully vertically integrated, whereas in SC #2, VI is conclusive only in the first channel, since in the second one, the retailer takes advantage of the vertical control exerted by the *PA* over its subsidiaries.

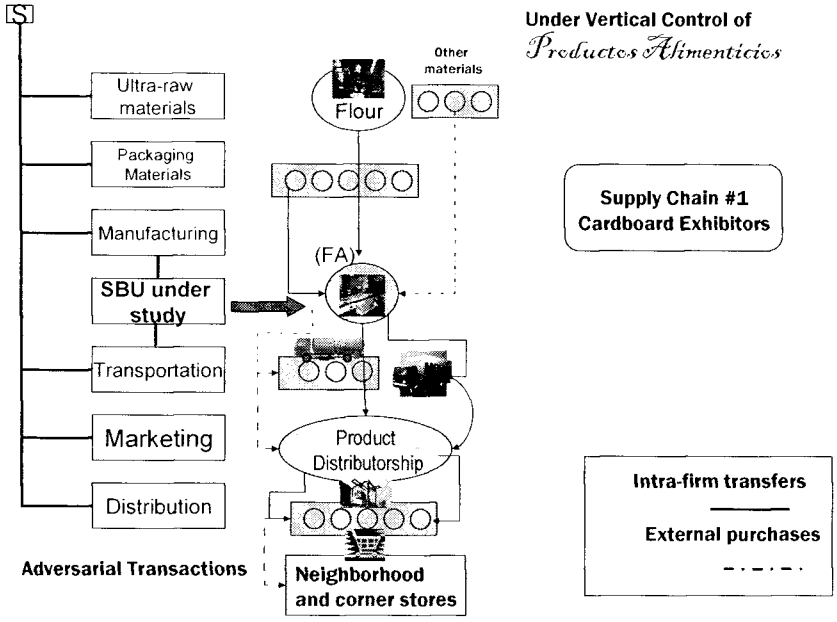


Figure 5.3-1: The stages dimension of SCI adapted from (Harrigan, 1985). SC #1

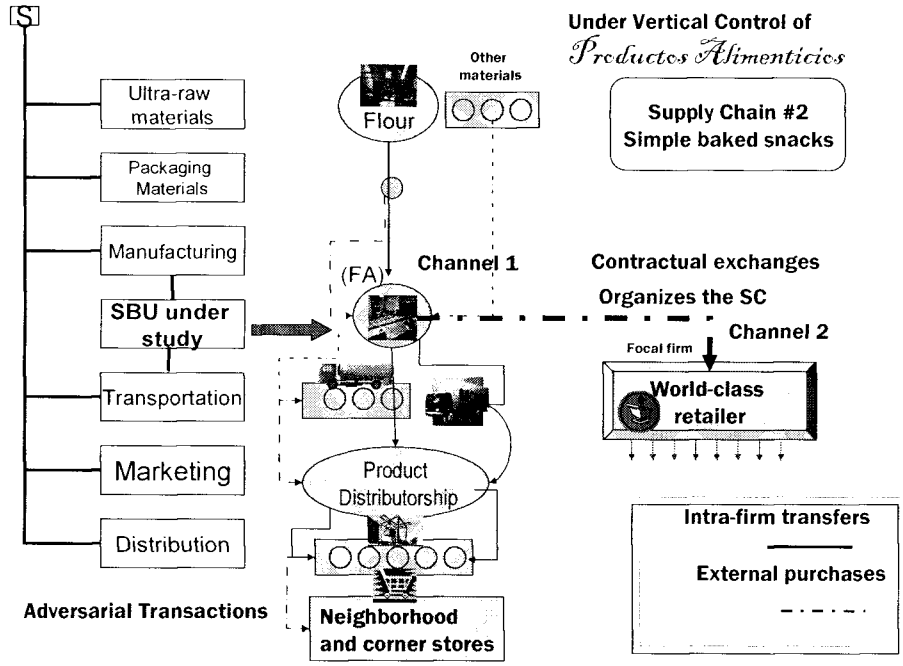


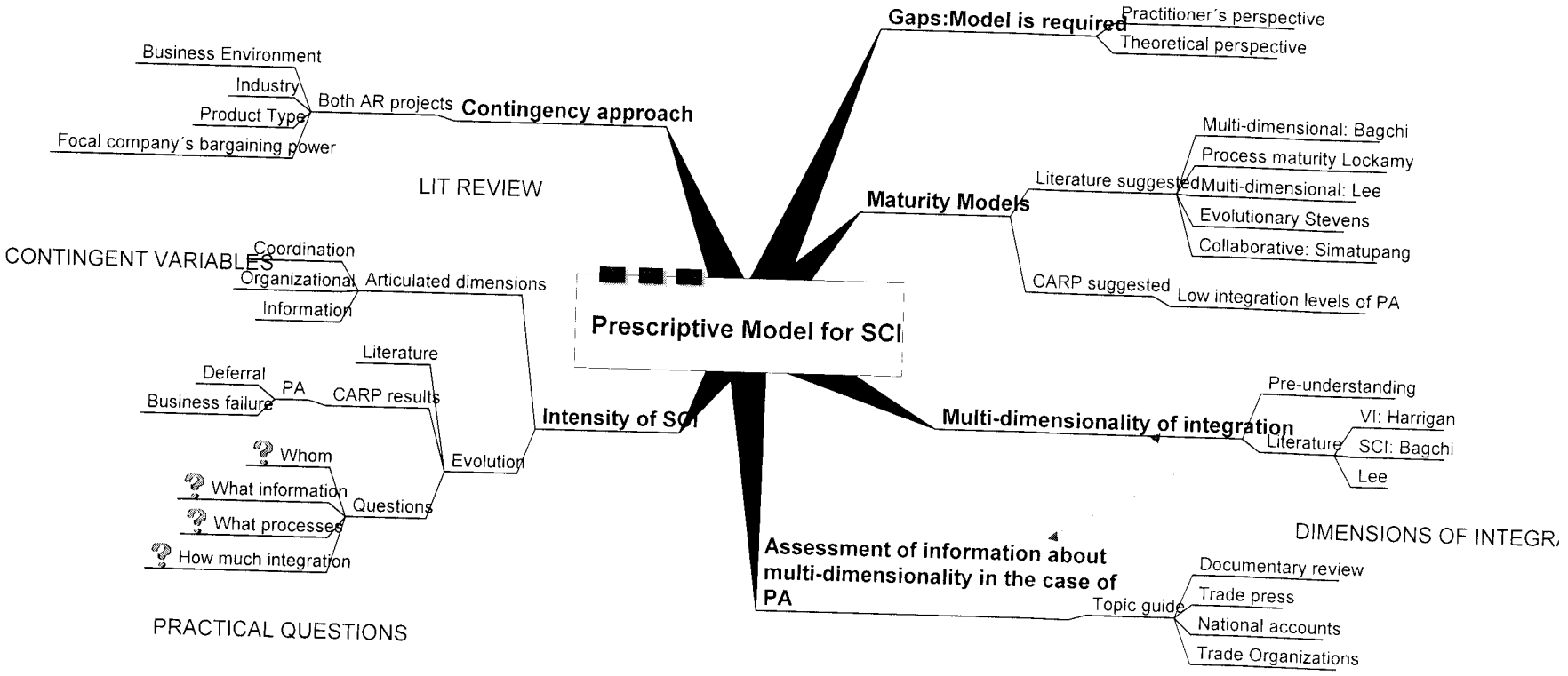
Figure 5.3-2: The stages dimension of SCI adapted from (Harrigan, 1985). SC #2

A comparison of both SCs shows that in the chains where *FA* operates as the focal firm –that is SC #1 and SC #2 under *PD's* distribution, all relationships even those among subsidiaries, are based on adversarial transactions. Its predominant distribution

strategy is to resort to lower integration level wholesalers, with the corresponding inefficiencies and sales variability, expressed above.

Whereas in the second distribution channel, Figure 5.3-2, the world class retailer determines membership and provides the guidelines for operating in the chain. Given the impossibility of marketing its brand at the retailer's channel, *FA* forfeits its decision rights and becomes a simple supplier in this segment of the chain, yet it operates efficiently enough to be considered for continuing membership, as decided by the retailer in its integrator role. Interestingly enough, *FA*, despite compliance with the retailer's norms -as it was confirmed both by Mr. IP and by the factual market conditions- did not consider the SCM experiences obtained in this process and hence did not applied them where it became -in turn- the focal firm.

Thereby channel 1 as opposed to channel 2 of the second SC –and for that matter the operation of SC #1- represent examples of important missed opportunities for reorienting *PA's* marketing strategy and probably benefit from larger scale operations under the retailer's distribution channel. This instance was considered as the basis for the researcher's team suggestion for a SCO approach and for a reorientation of the marketing strategy in favor of stronger brand and product differentiation, and changes in the distribution function.



Mental Map 6: A summarized view of the design of a prescriptive model for SCI

Breadth

Breadth of integration refers to the way that companies define the boundaries of the firm. That is the number of activities that the firm perform in-house at any particular level of the vertical chain. (Harrigan, 1985, p.401)

The measurement of the breadth of integrated activities, refers to the parent company exerting vertical control and was derived initially from an instrument based on the concept of business segments (Davis and Duhaime, 1992). The Securities and Exchange Commission divides each company into business segments, each having one or two businesses as referenced in the FASB rules of 1976. Businesses are defined in terms of 4-digit SIC codes. The authors suggested that when a segment has two or more SIC codes (*that is two businesses*) and the first two digits of both SIC codes are different, then vertical integration can be reasonably assumed (Davis and Duhaime, 1992).

Moreover, Mpoyi (2003, pp. 47-48) developed an index of vertical integration using the concept of business segments. Accordingly, the index of vertical integration was calculated as the ratio of the number of vertically integrated segments over the total number of segments. From the corresponding Table 4.3-1 above, in the case of *PA*, the index is 0.5 (four out of eight segments), revealing high levels of VI.

Degree

Degree of integration, relates to the proportion of total output that an SBU purchases or sells to its sister SBUs. In the case of SC #1, *Fábrica de Alimentos* buys most of its flour supply and packaging material needs to *PA's* subsidiaries and sells the totality of its production to its sister SBU "*Products Distributorships*". In SC #2, provision of flour is the same, but packaging materials are bought generally outside the firm. In the first channel, downstream, *FA* sells all its production in-house, but in channel two, most of the output goes directly to the world-class retailer under its generic brand name.

Forms

The last dimension, forms, refers to the ownership status of SBUs under vertical control. *PA* explicitly prefers to exert full ownership over its subsidiaries, as evidenced in the table 5.3-4 bellow:

Subsidiaries of Productos Alimenticios		Interest
Company Names	Country	Owned
National Flour SA de CV	**Mexico**	99.80%
Productos Alimenticios Corporation SA de CV	**Mexico**	99.99%
Commercial services of Toluca SA de CV	**Mexico**	99.99%
Fábrica de Alimentos SA de CV	**Mexico**	99.72%
Product Distributorship SA de CV	**Mexico**	99.93%
Grain Mills SA de CV	**Mexico**	93.74%
Real State of Toluca SA de CV	**Mexico**	99.00%
Productos Alimenticios de Guatemala	**Guatemala, CA**	NA

Table 5.3-4: Productos Alimenticios interests adapted from Thomson Financial, "Thomson Extel Cards Database" in Lexis-Nexis Academic Universe, accessed on the 27th of March, 2007

In support of the multi-dimensionality of integration perspective

As evidenced in the documentary information collected and after the analysis of the four dimensions of vertical integration as they are applied to *PA*, the claim that the corporate group exhibits a high-level of vertical control over the two chains considered in this study for their analysis, is supported.

In particular the relevant SBU in this case, *Fábrica de Alimentos*, as part of corporate strategy, fully operates under the control exerted by the parent company, *PA*.

Information identification: Assessing the contingency approach of integration in the case of PA

It has been elsewhere argued in the literature that integration is contingent both on organizational and environmental variables (Bagchi and Skjoett-Larsen, 2002b; Harrigan 1985). For that matter, at this stage, the availability of information related the competitive environment was appraised for the case of *Productos Alimenticios*.

The competitive environment:

Fábrica de Alimentos operates in the pasta and baked products business segment. Suppliers exert a very small influence over *FA*, since the most important products, flour and packaging materials are considered commodities and procured through PA's subsidiaries. End-consumers are highly atomized and -even though they have lower switching costs and many alternatives as product substitutes- alone by themselves are not considered as a determinant of *FA's* competitive behavior.

Notwithstanding, distributors as first-tier clients do exert a strong influence over *FA*, to the extent of an extreme case, where the firm forfeits its operating decisions in the supply chains dominated, in whole, by a world-class retailer.

There are no formal barriers to entry and exit, or both, in the industry, and differentiation and hence competition is through brand name. The adequate and recommended production strategy in this business sub-segment is based on operational excellence especially in the chains dominated by world-class retailers.

Fábrica de Alimentos trails well behind the dominant firms, producing non-differentiated bakery confections, and stays away from more specialized markets, particularly those related with health-conscious consumers.

To counteract competition, *PA* has resorted to operate in SCs with low levels of integration. The cost of such strategy is high due to greater demand variability and further exposure to seasonal effects.

Under this marketing approach, *FA* has been able to out-maneuver the retailer's effort to direct overall production, yet as evidence suggests, this diverting strategy is not for long and it is doomed to fail in the short run. Having no differentiating alternatives, *FA* has relentlessly agreed to participate in SCM initiatives, especially through SC #2 (Sugar cookies), by manufacturing products under the retailer's generic brand name, with a low degree of bargaining power, and hence forfeiting most of the decision rights in the chain.

Demand Conditions

Market demand for baked snacks in Mexico, as measured by the National Institute of Economics, Geography and Informatics (INEGI) has grown at annual rates of around 10% in the years 2000-2006. Demand shows a seasonal behavior yet reflects stability in the industry, due to the absence of technological leaps and changing trends in consumption, with the exception of the surge of more health-conscious consumers, who have been adequately catered by the dominant firms.

In other instance, the analysis of both *FA* and *PD's* sales for the two products under consideration revealed the presence of the bullwhip effect in both supply chains. Sales forecasts made by *PD* were based on volume targets, and due to big errors, they were simply ignored by *FA*.

In support of a contingency approach towards SCI

As the evidence above hinted, an initial appraisal of the documentary information available in the case of *PA* supports the possibility of incorporating contingent variables to explain past and future strategic decisions of integration in this organization.

The action, observation and reflection stages in the second DARP cycle

The joint analysis about the historical development of the firm, between the management and research teams showed that as a means of counteracting the effects of an ailing operation of *FA*, the authorities at *PA* decided to adopt a strategy aiming to defer integration by dealing with the exchanges on an adversarial basis, procuring materials from subsidiaries if possible, and selling through regional and local distributors with lower levels of integration. At the end, the cost of such strategies was the presence of a volatile demand characterized by seasonality and high variability, interrupting the most sought smoothness in SC operational flows.

Without further differentiation, *FA* lost market share to more customer-oriented competitors, and could not attend a business sub-segment consisting of more health-conscious consumers. Needless to say that by avoiding corrective measures, mostly

related with integration, *FA* just delayed the problems and the adoption of such counteracting strategies was certainly doomed to fail in the short run.

The CARP showed that *FA* had struggled to survive its competitors under the vertical control of *PA*. The firm could not benefit enough from the experience derived from participating in integration initiatives in supply chains under a global retailer's dominance, limiting even more its market possibilities. *PA* did consider the decision to disinvest in *FA*, but had not reflected over other alternatives for solving the problem in particular, integration, was certainly not in the managers' original mindset.

As suggested by a stream of theoretical and trade accounts, and confirmed by the CARP's results, the strategic decision to integrate is not anymore a matter of choice, but rather one of selecting a degree. In particular, the decision of *PA* to exert full vertical control over all operations, a practice that was successful in the past, was severely challenged both by the researcher's and -with less commitment- by the managerial teams, at the sight of the ailing results of *FA*. For that matter, the rationale behind the second DARP cycle became assisting organizations in their transition from VI disintegration towards SCI. The intervention stage in the second DARP cycle resulted -as an aid to managers- in a proposed prescriptive model for SCI.

The design of the Prescriptive Model for SCI

The process of defining and designing the corresponding elements of the proposed prescriptive model for SCI are summarized in Mental Map # 7 and detailed in the sections bellow.

The evolving path towards SCI

The model, as presented on Figure 5.3-5, initially recognizes the need for direction in the integration process, and pose that the firm has to evolve from unarticulated functions based on mere adversarial transactions, towards more articulated and relation-based exchanges across the boundaries of the firm, in order to remain competitive.

The bottom runway of the model indicates both, direction and level of advancement towards SCI fulfillment as shown on Figure 5.3.3 bellow. The sketch of this path was mainly suggested by the literature, where integration is considered as an evolutionary and sequential process (Stevens, 1989). Firms undertaking this transition must first comply with both functional and internal integration as initial steps towards more collaborative efforts (Giménez and Ventura, 2003). CARP's findings showed that as a result of managerial decisions, *PA* was deliberately located in the extreme left corner of the runway, and was urged to evolve by the compelling forces of business dynamics.

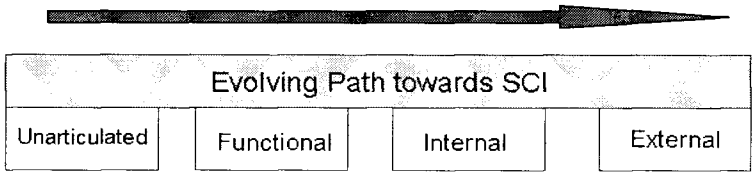


Figure 5.3-3: The bottom runway for the proposed prescriptive model (Evolution)

The road to VI disintegration

As expressed before, the joint influence of more complex competition schemes, changing economic conditions and new organizational forms influences the attitude of companies under VI control towards SCI. In the case under study, and under SC #1 *FA*, by not deliberately attempting VI disintegration –particularly regarding the distribution function- has not been able to participate in the market through the use of the retailer's distribution channels.

Moreover, the pressure exerted by the retailer, under the second channel of SC #2, has forced *FA* to forfeit its decision rights and become a mere supplier, distributing under a generic brand, and complying with the prescribed guidelines, in a manner efficient enough to sustain membership in the chain. The importance of benefiting from such SCM initiatives, as per channel 2 on SC #2 has not yet permeated in all chains where *FA* actually is the focal firm.

By delaying corrective measures regarding integration, the operating conditions of *FA* have deteriorated to a point of no-return, forcing the parent company to either re-direct its strategy or else, consider a possible disinvestment.

This fact is assimilated in the top runway of the proposed model by identifying that VI firms need to decide about the degree of disintegration, considering the present state of vertical control exhibited and the difficult choices that need to be assumed in this process.

The main idea behind disintegration is that even though it is a compelling result from external pressures derived not only from the environment but from actions and initiatives prescribed by powerful business partners, the VI firm, under certain external conditions can deliberately adopt a gradual and sequential strategy attempting to select the optimal level of disintegration. This strategy allows focus on core competences and capabilities. Furthermore, the model is based on a process maturity approach, (Lockamy and McCormack, 2004b) reinforcing the notion that SCI is a process and can be attained in a sequence of deliberate steps.

The design of the top runway, Figure 5.3-4, follows from the CARP's reflection process. It was initially derived from the ailing operating conditions of *FA*, and the necessary corrective measures that needed to be adopted. This perspective is also supported by the literature, more specifically in practitioner's accounts of cases of success in SCM initiatives' implementation.

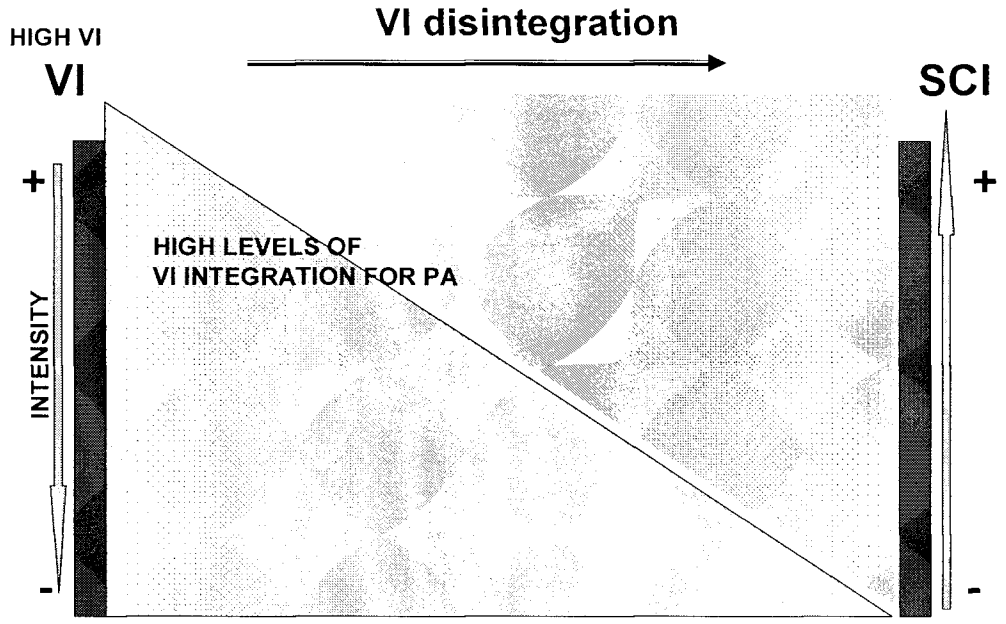
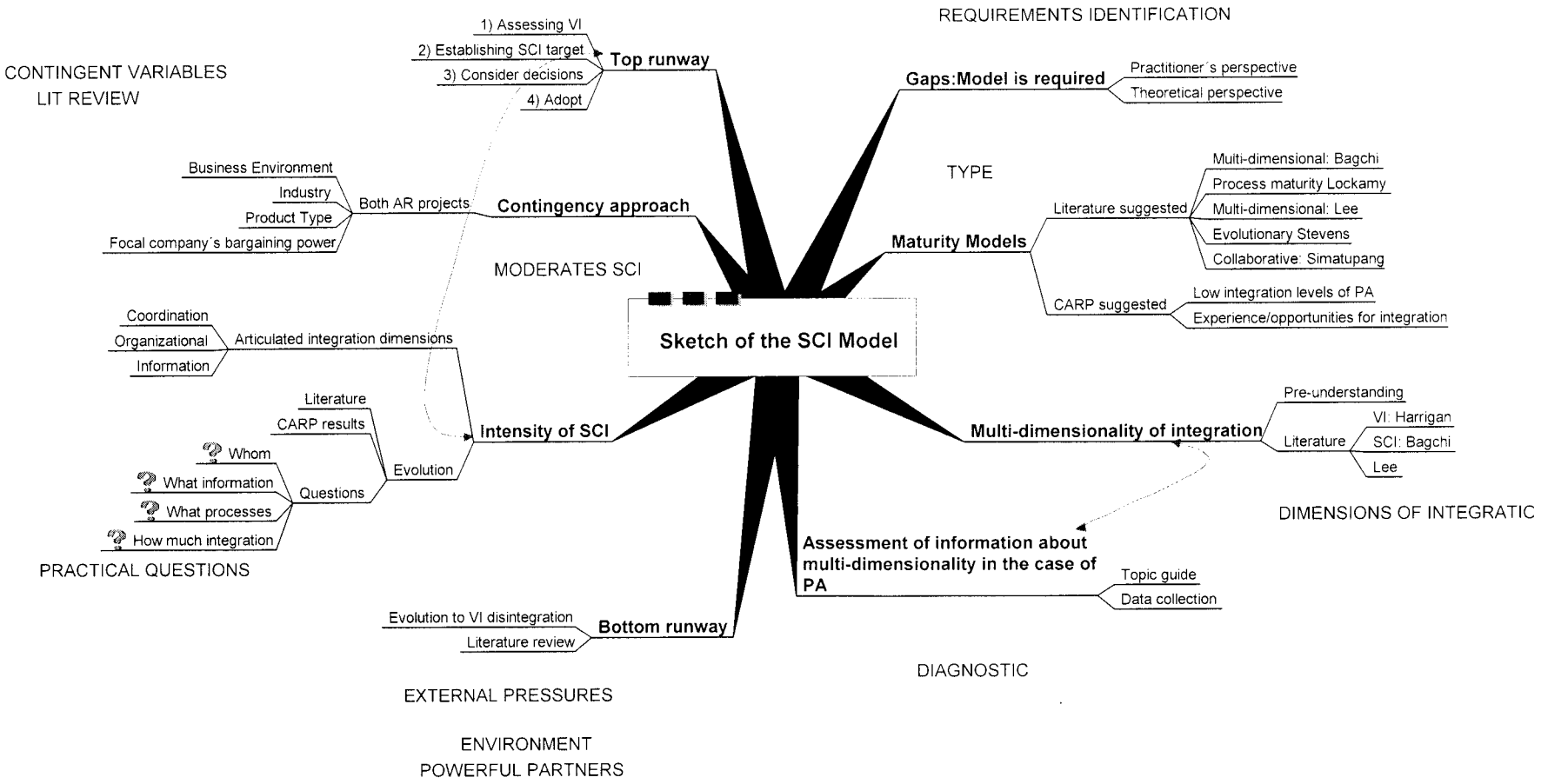


Figure 5.3-4: The top runway for the proposed prescriptive model for SCI (VI disintegration)


Sketch of the SCI Model
REQUIREMENTS IDENTIFICATION
Gaps:Model is required
Practitioner´s perspective
Theoretical perspective
TYPE
Maturity Models
Literature suggested
Multi-dimensional: Bagchi
Process maturity Lockamy
Multi-dimensional: Lee
Evolutionary Stevens
Collaborative: Simatupang
CARP suggested
Low integration levels of PA
Experience/opportunities for integration
Multi-dimensionality of integration
Literature
Pre-understanding
VI: Harrigan
SCI: Bagchi
Lee
DIMENSIONS OF INTEGRATIC
Assessment of information about multi-dimensionality in the case of PA
Topic guide
Data collection
DIAGNOSTIC
Top runway
1) Assessing VI
2) Establishing SCI target
3) Consider decisions
4) Adopt
CONTINGENT VARIABLES
LIT REVIEW
Contingency approach
Both AR projects
Business Environment
Industry
Product Type
Focal company´s bargaining power
MODERATES SCI
Intensity of SCI
Articulated integration dimensions
Coordination
Organizational
Information
Evolution
Literature
CARP results
Questions
Whom
What information
What processes
How much integration
PRACTICAL QUESTIONS
Bottom runway
Evolution to VI disintegration
Literature review
EXTERNAL PRESSURES
ENVIRONMENT
POWERFUL PARTNERS

Mental Map 7: A summarized view of the process of sketching the prescriptive model for SCI

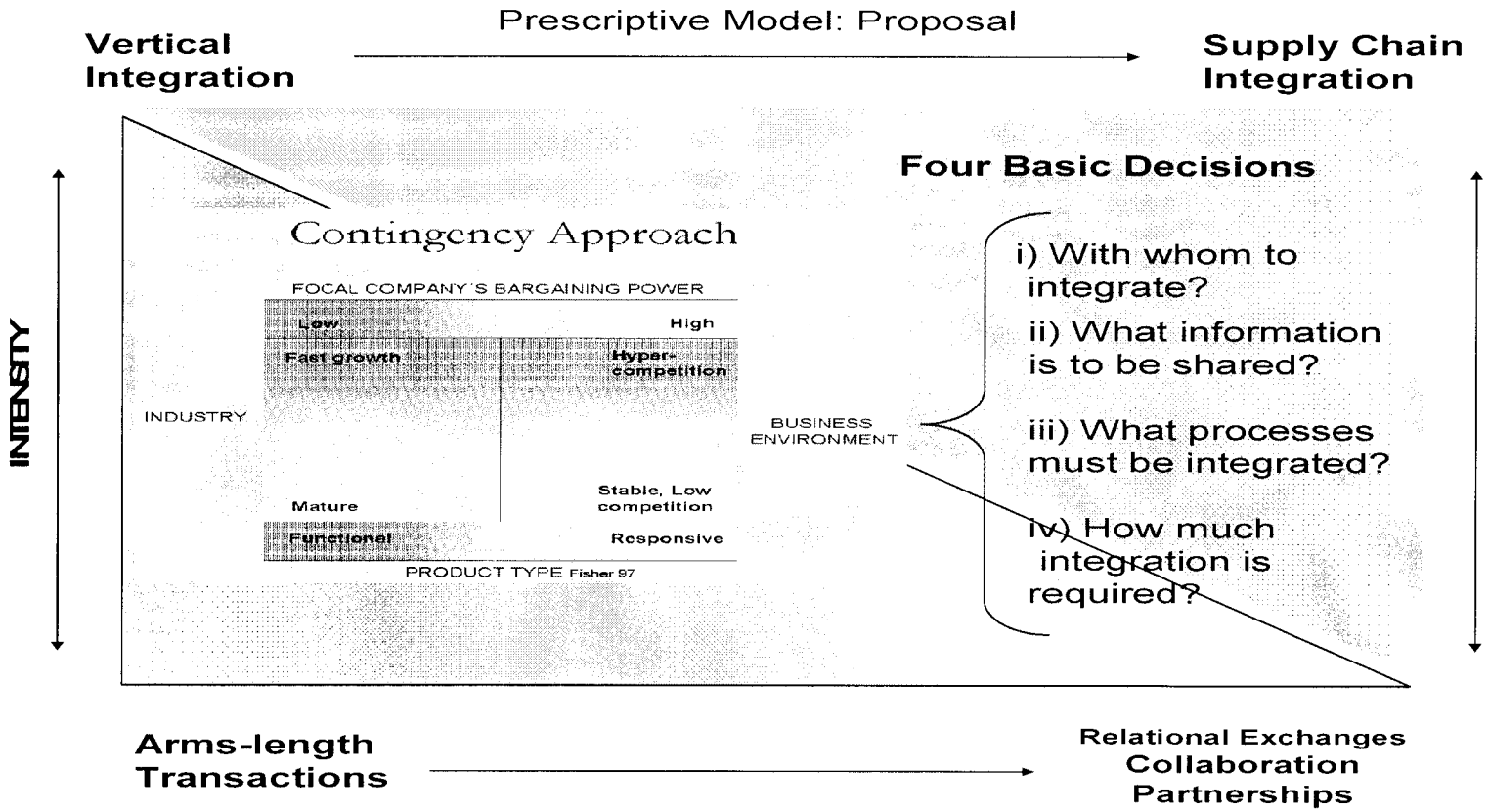


Figure 5.3-5: The proposed prescriptive model for Supply Chain Integration

Multi-dimensionality of integration in the proposed model

The model specifically recognized that integration –for both VI and SCI types- is multi-dimensional. For that matter, advancement in one or the other implies movement along multiple dimensions that jointly constitute the intensity of integration. Further the model recognizes that such dimensions comprise several stages, which are articulated and interact to enhance the intensity of SCI.

The incorporation of multi-dimensionality regarding supply chain integration was originally suggested by Mr. HC in the pre-understanding stage of the AR project and was supported by the VI (Harrigan, 1985) and SCI (Lee, 2000; Bagchi et al., 2002) literatures.

In order to advance in the top runway the firm must establish the corresponding level over the four dimensions of VI (Harrigan, 1985). After that, it must deliberately establish a target level of SCI intensity as per the three SCI dimensions namely: Organizational, coordination structure and information as shown on Figure 5.3-6 bellow.

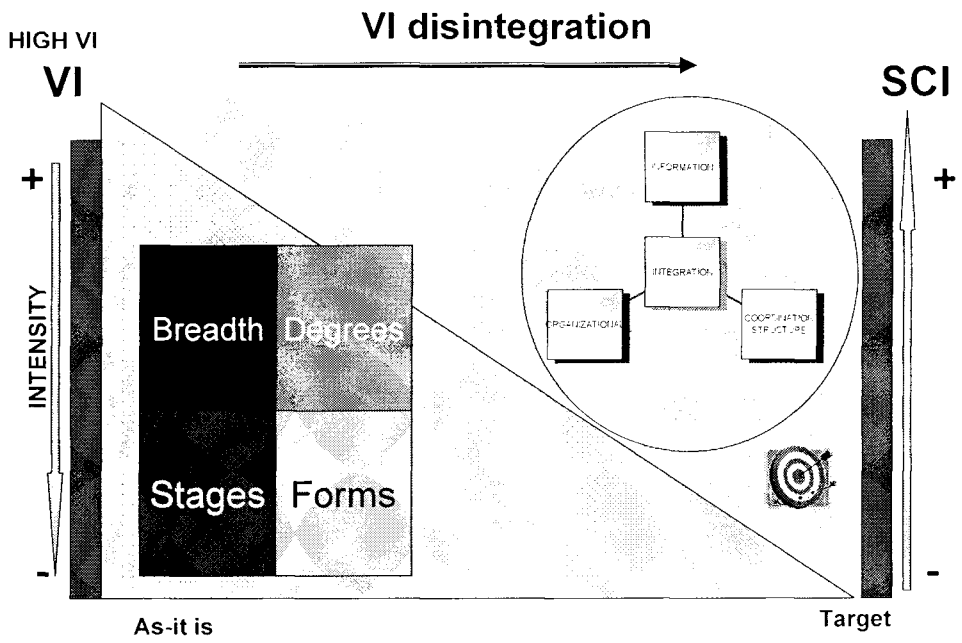


Figure 5.3-6: Multi-dimensionality in the proposed prescriptive model

A contingency approach to SCI: A practitioner's approach

Interestingly enough the observed differences in SC #1 and SC #2 under study and their corresponding distribution channels (section 5.3.3), confirmed the need for assessing the moderating effect of external variables over SCI under the light of a contingency approach, and their role in selecting a target level for SC integration.

The CARP revealed, among other things, the historical and deliberate adoption of vertical control on behalf of *PA*. That strategy proved to be very successful at the time, yet in the present, it yielded disappointing results for *FA*. Whereas the same is adequate -in the eyes of the owners- for the group, in particular in the pasta business segment, where *PA* is the dominant firm.

As a matter of fact, *PA's* authorities expressed discontent when challenged about this strategy, under the steering committee's reflection process.

These findings, contrasted with the global trend towards VI disintegration as shown in the literature. The question about, why is VI still a sound strategic decision for PA? , guided this issue in the model.

Both literature, regarding VI and SCI, support the notion of a contingency approach towards integration, mainly in the form of theoretical studies. Yet there are not enough empirical accounts that explain the influence of the moderating forces inside and outside the organization. Given this ambiguity, managers require practical guidelines that could help them sort the transition towards SCI, under the complexity of the new business dynamics.

In the design of the contingency approach, the variable selection is initially based on the literature, and attempts to answer important and practical questions arising in the manager's minds with respect to integration (Frohlich and Westbrook, 2001) and to provide the much sought guidelines in the specific case of VI firms attempting SCM initiatives.

For that matter, under numerous variables suggested, the researcher's team selected, specially after having contrasted SC #1 and SC# 2 above, four contingency variables for this study: a) Focal firm influence, b) maturity of the industry, c) business environment and d) type of product as they relate to the multi-cited managerial questions driving SCI (*Compare Figure 5.3-7*).

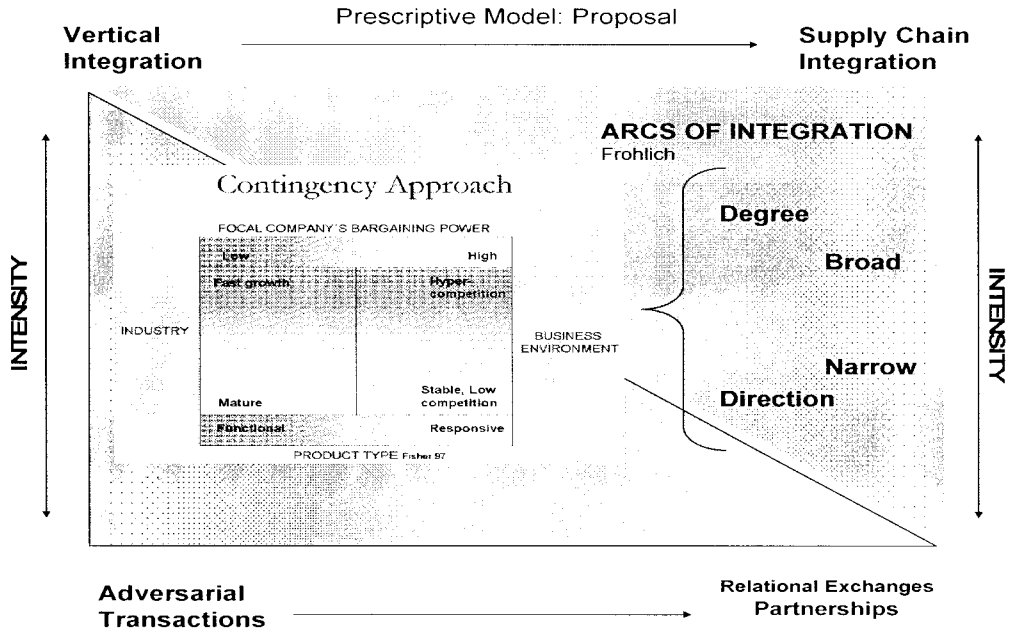


Figure 5.3-7: A contingency approach in the proposed prescriptive model.

The magnitude and direction of contingent forces, as moderators of SCI stem from the literature. Under this study the expected values for these variables are shown in the following Table 5.3-5:

Contingency Variable	Direction of influence	Aspect of influence	Preferred Dimension	Question supported
♦ Focal firm's bargaining power	Positive (+)	SC membership. Operating guidelines	♦ Organizational Integration	a) **Whom to integrate with?**
♦ Product Type	Positive (+)	Information and operating decisions	♦ Coordination ♦ IT as an enabler	b) **What information to share?** c) **What processes to share**
♦ **External conditions: Maturity of the industry and competitive conditions**	**Negative (-)**	**The extent of integration**	♦ **Overall strategy**	d) **How much to integrate?**

Table 5.3-5: Expected values for contingency variables influence

Final Reflection in the CARP

The reflection process with PA concluded with the Board Presentation of the CARP's results. The activities included in this last stage with the VI firm are summarized in the following Table 5.3-6:

ID #	Activity/ Type	Date	Contacts/Means	Questions/ Issues Raised	Results
BP2	Board Presentation	October the 25th, 2006	Board Meeting/ The board audience consisted of two members of the MY family (owners of the PA group), Mr. GB CFO, the General Controller Mrs. G, Mr. IP, Mr. S. (Logistics PA), other members of the directorate of the group.	♦ Final presentation of the PMS. ♦ Bullwhip effect presentation and Sales forecast provision for FA and PD. ♦ Presentation of SCI perspective for PA	♦ Deliverable: Final CARP report. ♦ Plant Visit. ♦ Reflection around the PMS. Discussion over and decision making to counteract the bullwhip effect. ♦ Additional information considered for enhancing the PMS. Need to improve information systems. ♦ Course of action and model transfer

					over to PA. ◆ Reflection around the SCI perspective for PA. ◆ Considerations around SCO as opposed to vertical integration for the case of PA. ◆ Announcing Board's decision to acquire Disney franchise for baked snacks on behalf of top-level executives.
CI1	Information follow-up. Integral Information outsourcing to an ISP	March 2007	Integrated solution provider (ISP)/Public Notice in trade press.	◆ Public Notice of decision	◆ Executive action towards using IT as an enabler of SCI.
CI2	Information follow-up. Acquisition of Disney Franchise	March 2007	Public Notice in trade press.	◆ Public Notice of decision	◆ Executive action towards reinforcing product brand.

Table 5.3-6: Chronological Account of the field-work related activities

As part of the reflection process in both the CAR and the AR projects, the notion of VI as a valid continuing strategy over *FA* was challenged. It was discussed -within the steering committee- that all the experiences obtained from SCM initiatives under the domain of the world-class retailer, should permeate other chains where *FA* actually becomes the focal firm. In turn such activities should be used to promote the desired organizational change towards further integration.

Even more, it was argued at the board meeting that given the fact that *FA* manufactures functional products (Fisher, 1997), that differentiate only through brand name and reputation -with high standard levels of quality- all corporate resources must be assigned and all efforts must be met, towards the alignment with an operational excellence strategy (Treacy and Wiersema, 1993).

Interesting results: Not enough SC awareness, yet

PA formally received the proposed PMS and forecasts devised by the working committee, as they were transferred to Mr. S., in the logistics department. It was agreed at the Board Presentation that the results would be considered for evaluation and probable implementation –in due time- at the VI group level.

Moreover, after reflecting around the results presentation and not without resistance, the Board of Directors of *PA* generated certain awareness about operating as a SC, and decided to remake both their IT and marketing strategies. The group adopted the suggestion of the CARP to comply with internal integration, using information technology as an enabling leverage.

As a matter of fact, *PA* recently announced the outsourcing of all information and performance measurement systems to an *Integrated Solutions Provider*. Even more, the Board of *FA* agreed, in the meeting, to engage in further marketing initiatives, such as distributing new quality-based, baked products, under *PA's* premium brands in global retailers' chains across Mexico and for export towards the Hispanic markets in the United States, and the adoption of a positioning strategy through the use of franchise brands (Disney™) in an attempt to reconfigure its marketing strategy along further brand differentiation. The above-mentioned information was confirmed upon triangulation through informal conversations and documentary information.

6. The Prescriptive Model in Action

The initial driver of the model results from external pressures in contemporary SCM towards VI disintegration, divergence and differentiation as documented in the literature and, in the particular case of *FA*, such forces are complemented through the influence of powerful partners that establish SCM initiatives attempting to control the chains that they participate in. For that matter, the model is, in general, based on the claim that success today depends on expanding beyond the boundaries of the firm, assembling a team of companies that can rise above arm's length relationships and collaborate to deliver greater value for consumers (Taylor, 2003).

6.1. Description of the model

As expressed before, the complete prescriptive model on Figure 5.3-5 consists of two parallel runways. The bottom road is made up by a continuum of sequential stages that begins with a functionally disconnected organization and evolves through external integration -*SCM*- (Mentzer et al., 2001; Wisner, 2003) , leaving functional and internal integration in the middle ((Stevens, 1989; Cheng and Grimm, 2006; Masters and Pohlen, 1994) as it is graphically presented in Figure 6.1-1.

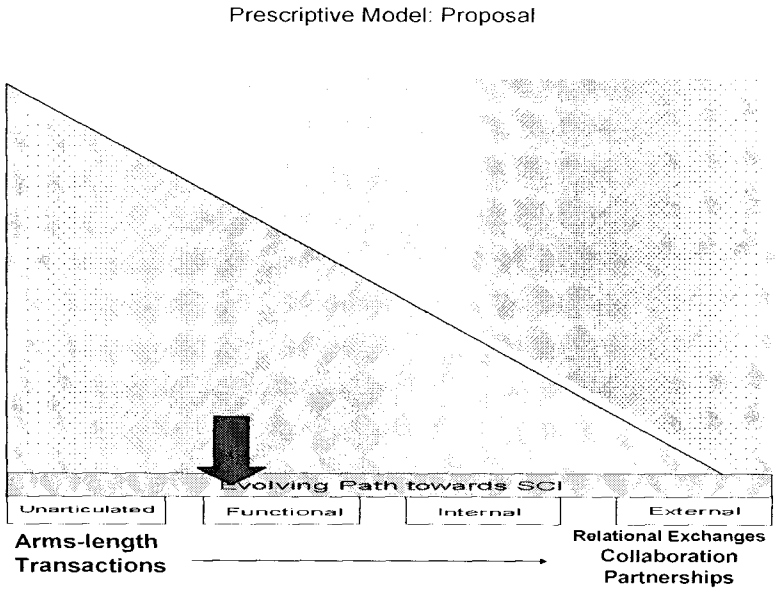


Figure 6.1-1: The bottom runway ranges from unarticulated functions through external integration Stevens (1989)

The main thrust of such evolution resides in the transition from adversarial transactions to relational exchanges with focus on cooperative agreements and partnerships, in the understanding that full collaboration becomes the ideal of supply chain integration-both internal and external-.

The top runway expresses the path that firms must follow towards VI disintegration. It recognizes the fact, that firms can deliberate delay the decision to disintegrate yet at the end, in order to remain competitive. VI disintegration becomes not too much a question of choice but rather of selecting the optimal degree, according to specific circumstances.

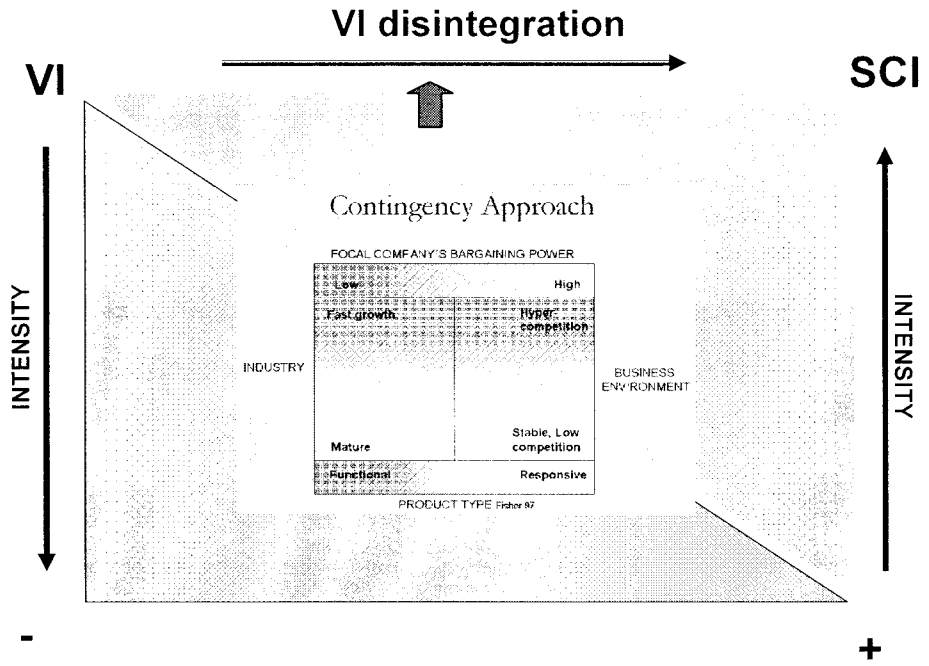


Figure 6.1-2: The top runway, from VI through SCI. Not a matter of choice but one of degree

A contingency approach to SCI in the model

As it was mentioned earlier, the implementation of SCI implies answering four basic questions that arise in the manager's minds at the moment of entering into this process, namely:

a) Whom must the firm integrate with?

b) What information must be shared?

c) What processes are going to be integrated? and overall,

d) How much integration is required (*intensity*)?

Questions b) and c) above address the issue of the content of integration, whereas question a) defines the subjects of integration. Finally, question d) addresses the necessary extent of integration. The model, based on VI theory, proposes a contingency approach that could guide the solution to the above-mentioned inquiries and lead the way towards disintegration as seen on Figure 6.1-3

Among others, the four contingent variables particularly selected in this study are: The focal company's bargaining power; Product Type; Maturity in the industry and the overall business environment. The interactions between these variables and the questions above are dealt with, in future sections of this chapter.

The multi-dimensionality of integration in the model

The model explicitly recognizes that integration is complex and multi-dimensional. On one hand VI is defined over four dimensions: breadth, stages, degrees and forms, Harrigan (1985) and on the other, SCI is characterized by three proposed dimensions: organizational, information and coordination structure, in turn consisting of various stages.

The intensity of integration is measured through characterizations determined by observed attributes across the stages that comprise the SCI dimensions. Based on the approach posed by (Bagchi and Skjoett-Larsen, 2002b), the various stages representing an organization's stand in integration are contrasted with an ideal perspective, that classifies them into a low-medium-high scale.

Simultaneously in the process of implementing the model, such scales are used as a diagnostic tool -*as-it-is situation*- for evaluating initial levels of integration intensity and in addition, they constitute, under the maturity of processes perspective (Lockamy and McCormack, 2004b) also a prescriptive path, orienting the manager's efforts towards collaboration.

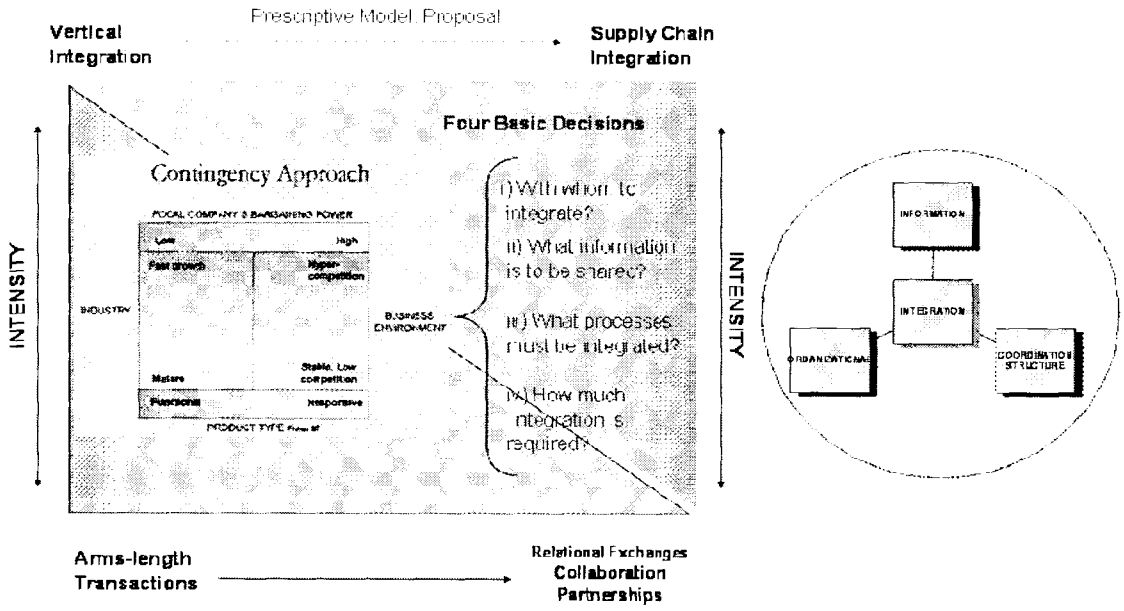


Figure 6.1-3: SCI intensity is measured across three dimensions: Organization, information and coordination structure.

6.2. Operating the model

The guiding pull of the model resides in the articulation of the three proposed SCI dimensions as expressed in section three, above. The process is as follows: Resulting from a deliberately top-down approach to strategy, the SCI process starts with organizational integration as the initial driver. The stages of a) attitude of top level management with SCM and b) commitment of channel members with SCM lead to the adoption of a supply chain orientation (Mentzer et al., 2001) in focal organizations, and give further thought around various decisions regarding SCI's possible contribution to improved performance, as shown in Table 3.4-1 above.

As expected, under the guidance of the focal firm, every initiative towards SCM must expand the reflection and dialog processes beyond the boundaries of the firm and include key channel members. The conformation of SCM's attempts into a real SCI approach, requires from managers, further decision making over the two other enabling-dimensions of integration, namely information and coordination structure.

Moreover the above-mentioned fundamental questions about integration, re-direct the strategic process towards formal definitions about the preferable level of SCI.

The reciprocal and interacting nature of SCI dimensions allow that short-term improvements resulting from collaborative initiatives would develop into further advancement of organizational integration by means of self-reinforcing cycles *(Compare Table 3.4-1 above).*

On one hand, information technology levers into better collaborative performance systems and therefore better organization characteristics. On the other, the experience derived from successful implementation of SCM initiatives has a positive influence over management and given the appropriate incentives, would certainly foster further integration. Beyond the rhetoric of the trade and as it might be expected, successful implementation of an SCI strategy is based on obtaining immediate results expressed in substantial performance improvements (Wu et al., 2004), and avoiding conflicting interests such as specific wants, perceived needs, and expectations amongst chain members

6.3. Five steps toward implementation of SCI in the VI firm under the guidelines of the prescriptive model

To facilitate the process of SCI by VI firms, the management, must engage in a strategic decision process and course of action summarized in the proposed following five general steps as schematically shown on Figure 6.3-1.

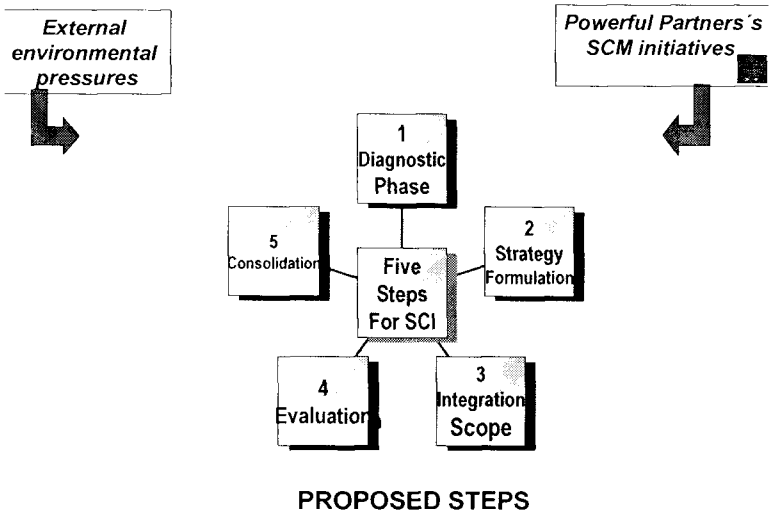


Figure 6.3-1 Proposed five steps for SCI

1. **Diagnostic Phase:** The reflection about the current competitive situation leads the VI firm to adopt a SCO approach. This implies a deliberate effort to identify potential benefits resulting from waste reduction and elimination of redundancies and inefficiencies in the SC. For that matter, the organization must comply with the first form of integration -functional integration-. This step constitutes a pre-requisite for engaging in SCI activities. (Stonebraker and Liao, 2004) At this point the VI firm understands the importance of managing both, relationships and materials and information flows and decides to operate as part of a supply chain.

2. **Strategy Formulation:** Top-level management attempts to identify the requirements for a successful operation in their specific competitive setting. As a result they adopt a succession of decisions aiming at the definition of strategies, at the corporate, tactical and operative levels for the whole supply chain (Varma et al., 2006), paving the way for advancement in organizational integration.

3. **Subject, content and extent of integration:** Considering the influence of the contingency variables expressed earlier, the VI firm must answer the four fundamental questions that shape SCI, taking proper decisions in technology, material and information flows and relationships management. Such decisions lead to advancement in the information and coordination dimensions.

4. **Evaluation:** Under the focal firm's direction, and based on a collaborative perspective, the channel members evaluate not only the positive effects of SCI but also the problems arising from any collaborative initiatives. Special care is due to the reinforcing effects of the interactions between stages of SCI and further decisions about coordination and information sharing are considered. Advancement in SCI is dependent on such results

5. **Consolidation:** The supply chain as a whole consolidates the development and implementation of a comprehensive set of SC performance measures and the alignment of incentives, therefore establishing the framework for continuously successful SCI implementation. Ideally, the integrated end of the continuum can be characterized by such concepts as: The *seamless supply chain* (Towill,

1997), *virtual supply chain* (Stevens, 2006) and *supply networks* (Jarillo, 1988; Gulati, 2000; Harland et al., 2001).

6.4. **Model implementation at PA**

The collateral results of the CAR project revealed that SCI implementation in *PA* was not only a matter of technical and tactical issues, but rather of strong considerations about hierarchies, resistance to change and status-quo, incentive misalignment, hidden agendas and lack of a deliberate strategic process among other problems along the human dimension of integration.

The SCI process was initiated as a consequence of both the CAR and the DAR projects, yet the model resulting from the last DAR cycle could not be implemented in full at *PA*. Nevertheless, there is evidence (*Compare activities CI1 and CI2 in Table 4.6-1.*) that the Board members of *FA*, regained awareness of the problems related with VI, and decided to deliberately implement a strategic change approach towards marketing and IT adoption, that included, in the last case, not only data exchange but broad base performance measures for the SC to enhance visibility.

For that matter, the prescriptions of the maturity model of SCI for the case of *Productos Alimenticios* would be set-forth and evaluated in its congruence, in the following sections.

The first step: The diagnostic phase

This first step begins with an initial assessment of the current operating conditions of *FA* as they relate to VI and concludes with a certain degree of awareness, on behalf of top-level managers about the benefits derived from operating as a SC.

The idea, as expressed before, consists on identifying performance improvements due to waste and inefficiencies reduction. Ideally this step would conclude with a SCO as proposed by Mentzer et al., (2001).

As a pre-requisite for this step, the focal firm, the relevant channel members and their whole operation must be mapped under a SC approach. In our case, two supply chains were identified: SC #1, *Cardboard exhibitors* and SC # 2, *Sweet Cookies*, as it relates to channel one, distributing over *PA's* subsidiaries.

Assessing VI: The case of FA

The intensity of VI control of *PA* measured around the four dimensions proposed by Harrigan (1985), (expressed in section 5.3-2), revealed that the group presents a high-level of vertical integration over the two chains only considered in this study. Moreover, *FA*, *PD* and *Packaging Co*, as part of a deliberate corporate strategy, fully operate under the vertical control exerted by the parent company.

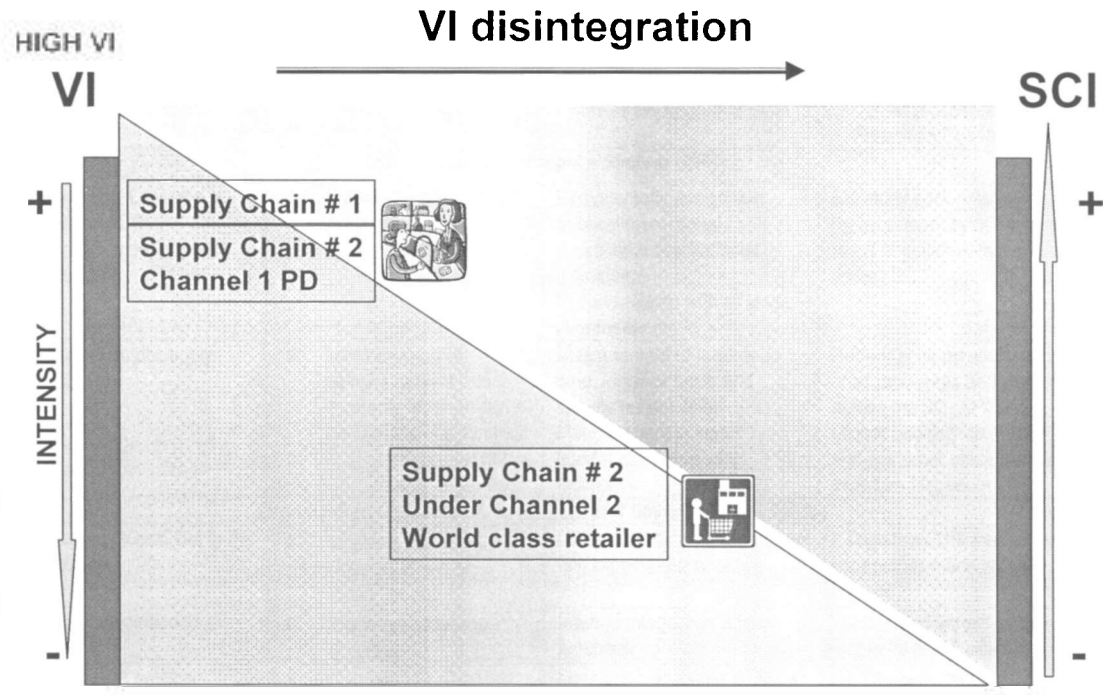


Figure 6.4-1: FA revealed a high level of VI in SC #1 &2, under PA's vertical control

An as-it-is diagnostic of SC operation at FA: The building blocks of SCI

The initial level of SCI intensity (*as-it-is-today*), in the case of *FA* is measured through the contrast of observed attributes across the stages of the three SCI dimensions with an ideal target, that classifies them into a *low-medium-high scale* (Bagchi and Skjoett-Larsen, 2002b)

From the application of the SCI dimensions formats, as shown on chapter three as per Tables 3.1-1, 3.2-1 and 3.3-1, the results of the diagnostic for *FA*, are shown on the following tables labeled 6.4-1 through 6.4-3 bellow:

As-it-is Organizational Integration: SC#1 and SC#2

Company Fábrica de Alimentos
Supply chain: SC #1, Cardboard exhibitors and SC#2, Sweet Cookies
Contact: Ing. Mr. IP, Officer in charge: CP. Mr. TB

Integration through	✔ LOW Integration	MEDIUM Integration	HIGH Integration
The attitudinal perspective towards SCM			
Commitment of channel members with SCM	✔ Non existing	Declared (SCO) by channel members.	Total commitment to SCM. Sharing mutual goals and values.
Attitude of top level management with SCM	✔ SCM is not a critical managerial issue	Top management asserts a substantial degree of SCO	Top Management leads the SCM process. Cross-Enterprise Collaboration.
Collaborative Performance System (CPS)			
Responsibility: Design and application of SC performance measurement systems	✔ Isolated measurement systems at the firm's level	Unsystematic design and application of global operational and financial indicators. Not associated with strategic alignment	Balanced performance measurement systems as a result of collaborative efforts across SC.
The application of Supply Chain Metrics	✔ Measurement of delivery service and inventory levels in some parts of the supply chain	Measurement of order lead time, logistics costs and service levels. Joint Measurement in some interfaces. *Operational Indicators*	Performance measurement of all processes and shared across the SC. *KPI's.* Global Scorecards. Focus on end-customer value. Aim at incentive alignment
Organization Characteristics (Bagchi and Skjoett-Larsen, 2002a)			
Status of Logistics/SCM in the Organization	◆ Logistics sub-function. Not part of senior Management	Unified logistics function under one organizational entity	Logistics/SCM member of corporate management group
Degree of Integration	◆ Fragmented logistics activities	Internal Integration across functions	Integrated across supply chain/process oriented
Importance of Logistics	◆ Logistics not considered a core competence	Logistics considered a critical activity	Logistics/SCM considered a core competence
Communication Across Agents in the Supply Chain	Few contact points between companies in the supply chain	✔ Regular contact at top/senior levels-rare operational level contact	Multiple contact points at all management levels
Governance Structure	✔ Arm's length relationship-market-based	Partnership only at selected areas and levels Rare operational level contact	Multiple contact points at all management levels
The existence of Formal Lateral Organizations	No cross-functional teams	✔ Cross-functional teams in some areas. Key account managers	Teams across the supply chain-regular interaction

Table 6.4-1: As-it-is diagnostic of Organizational Integration in SC#1 and SC#2

As-it-is Stage of Information Integration: SC#1and SC#2

Company: Fábrica de Alimentos
Supply chain: SC # 1, Cardboard exhibitors and SC#2, Sweet Cookies.
Contact: Ing: Mr. IP, Officer in charge: Acct. Mr. TB

Supply Chain Integration Using:	✔ LOW integration	MEDIUM Integration	HIGH integration
Information Technology Adoption			
Transactions Systems	MRP II Systems Legacy Systems	✔ ERP Systems • Intra-company • Rigid interfaces Value: Mechanization of existing processes	ERP and Supply Chain Planning (SCP) systems • Inter-company integration • Flexible interfaces Value: Process Improvement
Communication Systems, Internet/Extranet	✔ Limited use of E-mail/Fax/Phone Internet/Extranet	Few ED/Internet links to customers/suppliers Extranet	Extensive use of EDI/Internet/XML links within supply chain
Bar-coding and Track-and-trace Systems, Electronic POS (point-of-sale) Data Capture, Inventory Visibility	✔ Only Bar-coding of finished products Track-and-trace and Electronic POS not used	More extensive bar-coding, automated e-mail updates and confirmations	Bar-coding from entry to dispatch Track-and-trace throughout the SC Key suppliers and customers connected
Information sharing for SC visibility			
Use of tools for Collaborative Planning, Forecasting and Replenishment (CPFR), Customer Relationship Management (CRM), among others.	✔ Not used	Experimental stage with one or a few suppliers/customers	Decision models and IT strategies. Strategic suppliers have access to production plans, materials requirements, sales Forecasts and orders. CPFR with key suppliers/ customers CRM with key customers.
Information sharing about consumer needs; store and warehouse inventory levels.	✔ Information Misalignment. One way communication. Actual orders from immediate customers.	Simple Data exchange. Information enrichment	End-to-end supply chain visibility

Table 6.4-2: As-it-is diagnostic of Information Integration in SC#1 and SC#2

As-it-is Stage of Coordination Structure Integration: SC#1and SC#2

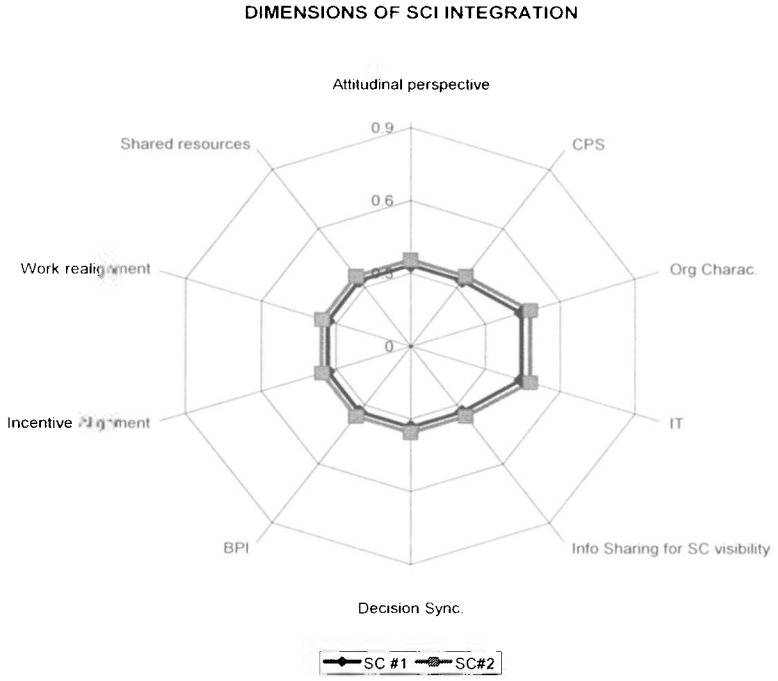
Company Fábrica de Alimentos
Supply chain: SC # 1, Cardboard exhibitors, SC#2 Sweet Cookies
Contact Ing. Mr.IP, Officer in charge Acct. Mr. TB

Supply Chain Integration using	✔ LOW Integration	MEDIUM Integration	HIGH Integration
Decision synchronization			
Intensity of decision synchronization	✔ MOSTLY independent decision-making	Consultative decision making (i.e. joint exercise of decision rights and responsibilities)	Synchronized decision-making (i.e. redesigning decision rights and responsibilities
Shared Business Process Integration			
Formal Demand Forecasting/ Planning activities	✔ Lack of shared vision across SC. Planning/ Forecasting activities at the firm level.	Joint planning/ demand forecasting across firms	Shared objectives across such processes in the SC.
Product Design & Development	✔ Independent design /development process	Participative design process. Partial Involvement. Experimental stage with one or a few suppliers/customers	Joint Product design/ development. Strategic suppliers/customers participate in the process in order to reduce time to market.
Joint inventory	✔ Independent decision	Consultative decision making	Synchronized decision

management	making. Conflicting objectives.		making. Shared performance measurement.
Customer relationships management	✔ Independent decision making. Conflicting objectives.	Consultative decision making	Synchronized decision making. Shared performance measurement.
Demand management	✔ Independent decision making. Conflicting objectives.	Consultative decision making	Synchronized decision making. Shared performance measurement.
Incentive Alignment (Simatupang and Sridharan., 2004)			
Incentive systems and alignment: cost, risk and benefits sharing	✔ From non-existent to Elementary	Professional	Sophisticated
Redeployment of decision rights (delegation) Policies of:			
Inventory management through the adoption of VMI	✔ Not Used	Experimental stage with one or a few suppliers/customers	Strategic Suppliers access production plans, materials requirements, sales forecasts and orders VMI with key suppliers/ customers
Production through the adoption of CPFR	✔ Not Used	Experimental stage with one or a few suppliers/customers	Strategic Suppliers access to production plans, materials requirements, sales forecasts and order. CPFR with key suppliers/customers
Demand& Client Relationships Management through CRM systems.	✔ Not Used	Experimental stage with one or a few suppliers/customers	CRM with key customers
Work realignment decisions			
Transferring activities across the chain (best positioned member)	✔ Not Used	Experimental stage with one or a few suppliers/customers. Some outsourcing.	Chanel production configuration. Outsourcing.
Shared resources Policies of:			
Shared warehouses, inventory pooling, and supplier hubs	✔ Not Used	Experimental stage with one or a few suppliers/customers..	Full resource share across the SC.

Table 6.4-3 As-it-is diagnostic of Coordination Structure Integration in SC#1 and SC#2

For the purpose of further contrast, the initial diagnostic (*as-it-is*) of the two selected supply chain reveals minimum levels of SCI along the ten dimensions under consideration. Only in the stages of organization characteristics and IT, some improvements are found. This initial evaluation lays the ground for strong opportunities in the exercise of SCI. A summary of the measured levels across the SCI dimensions is shown in the following multi-dimensional graph 6.4-1.



Graph 6.4-1: Initial diagnostic of as-it-is conditions for SCI at FA.

Monitoring the business environment

The industrial conditions for baked products, present in the marketplace are summarized through the use of a Porter's five forces diagram, shown bellow in Figure 6.4-2 and detailed in the following paragraphs:

Suppliers and customers influence

As expressed before, the influence of suppliers over *FA* is small. Flour and packaging materials are considered commodities and are procured under the vertical control of *PA*. End-consumers are highly atomized and are not considered as determinants of *FA's* competitive behavior. Notwithstanding, distributors as first-tier clients do exert a strong influence over *FA*, to the extent of an extreme case, where the firm forfeits its operating decisions in the supply chains dominated, in whole, by a world-class retailer.

Barriers to entry/exit

There are no formal barriers to entry/exit in the industry, nevertheless, there are still some benefits derived from two sources: Number one, vertical control, in particular,

in the provision of flour and number two, brand name and company's reputation, where there is ample market's recognition for firms already in the business.

Rivalry

Differentiation and hence competition is through brand name. There are two dominating firms in the industry that have adopted a horizontal integration strategy, buying out competition, specially old and re-known brand names. There is a third well positioned manufacturer, with premium brands in some selected segments -a tobacco conglomerate searching for diversification-. Otherwise competitors are similar in size as *FA*, and some producers that cater to some market's niches, small enough to keep competition away.

Production Strategy

The adequate production strategy in this business sub-segment is based on operational excellence, where given some quality standards, the market privileges opportunity of delivery (freshness and availability) and lower distribution costs, specially in the chains dominated by world-class retailers, as it is the case of the second channel in *FA's* SC #2 .

PA's assessment over the performance of Fábrica de Alimentos

Even though, *Productos Alimenticios* is a leading firm in the pasta business, with a market share of over 65%, *Fábrica de Alimentos*, its subsidiary, has not been successful in the baked products segment. It trails well behind the dominant firms, producing non-differentiated bakery confections, and stays away from more differentiated markets, especially those related with health-conscious consumers.

The strategic marketing approach of our firm has been to resort to SCs with low levels of integration, as it is the case of medium and small wholesalers -competing through price-. The cost of such strategy is high: greater demand variability and further exposure to seasonal effects that hinder the most necessary smooth flow of production.

Under this marketing approach, *FA* was able for a time to out-maneuver the retailer's effort to direct production, yet this diverting strategy is not for long and doomed to fail in the very short run. Having no differentiating alternatives, *FA* has relentlessly agreed to participate, especially through channel 2 of SC #2 Baked Snacks (*Sweet Cookies*), by manufacturing products under the retailer's generic brand name.

Interestingly enough, the knowledge obtained through participation in SCM initiatives -motivated by the retailer's interest- as a deliberate strategic attempt should but has not otherwise permeated the other chains and assimilated by *FA*. This behavior indeed limited the possibilities of counteracting the downturns in financial and operational performance of our company, as exhibited in its role of focal firm in SCs # 1 and 2 in this study.

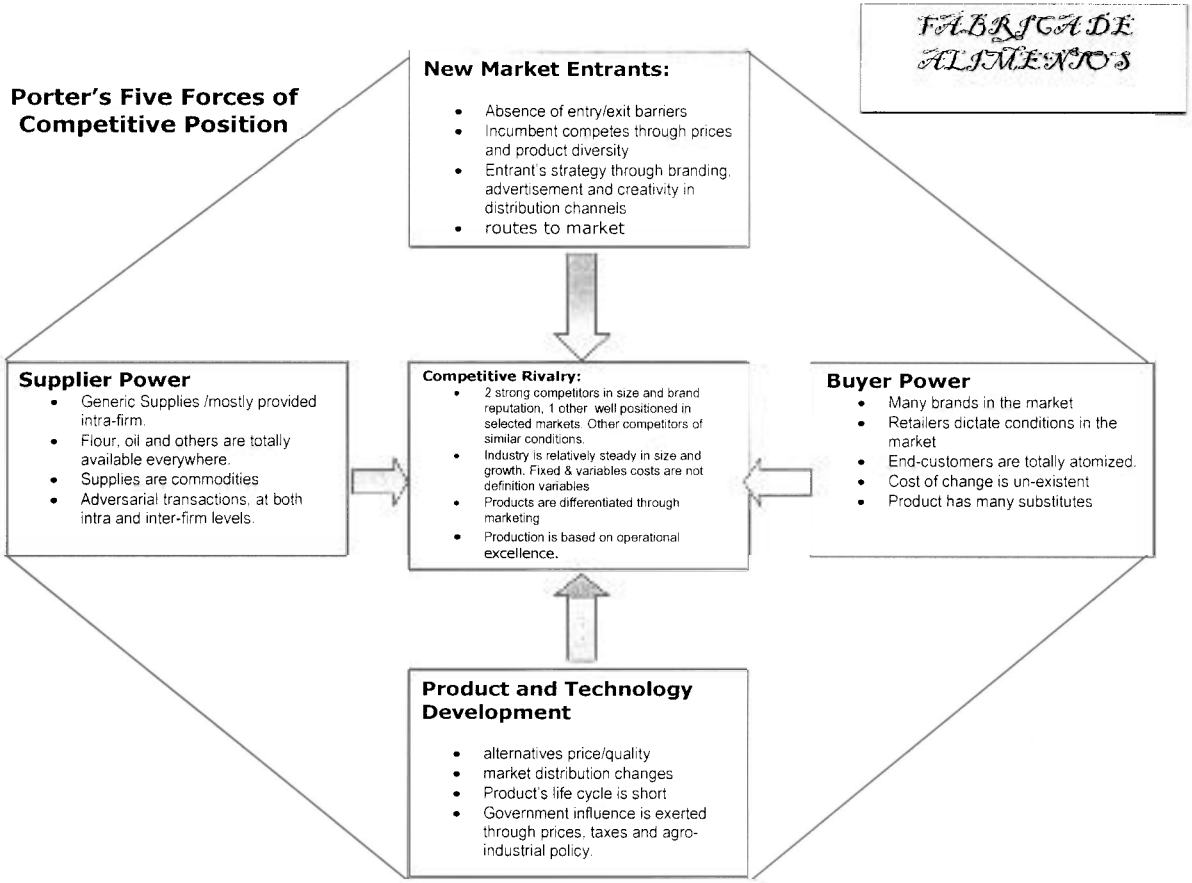
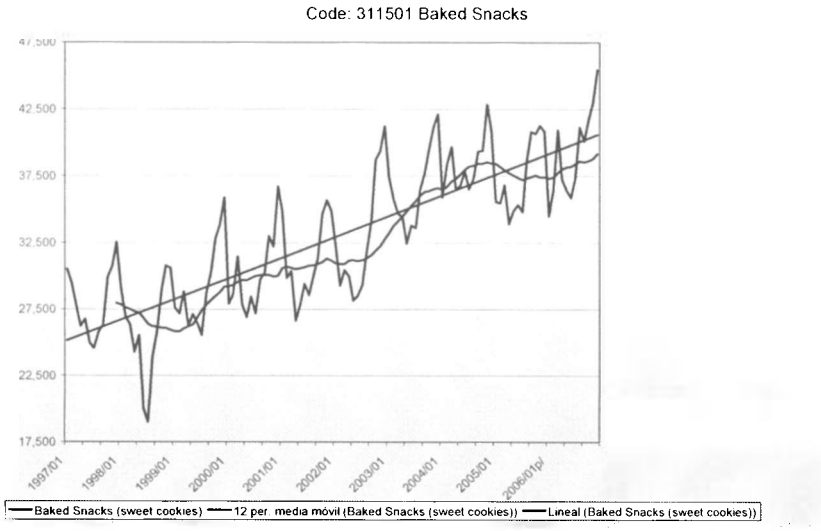


Figure 6.4-2: Porter's five forces diagram for the baked products industrial segment

Market demand in Mexico for baked snacks has grown at annual rates of around 10% in the years 2000-2006. Demand is seasonal yet reflects stability in the industry, due to the absence of technological leaps and changing trends in consumption. The exception resides in the surge of more health-conscious consumers, whose demand has been otherwise attended by the dominant firms.



Graph 6.4-2: Monthly sales of sweet cookies (Code 311501) in Mexico BIE, INEGI

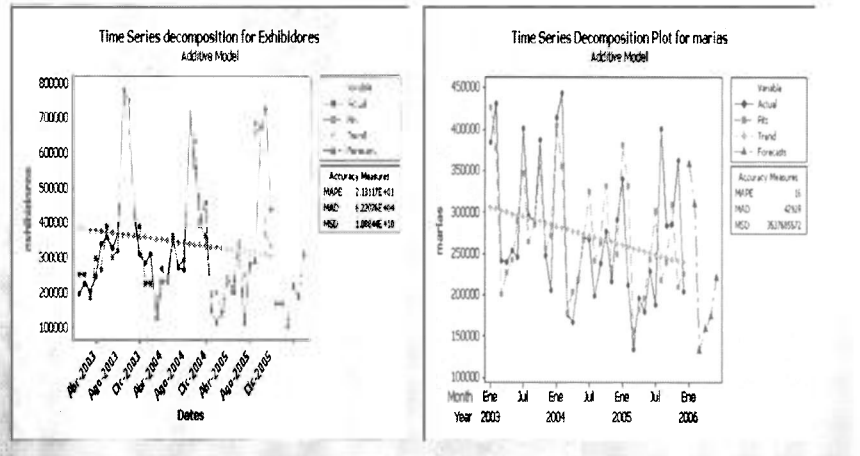
This positive growth trend -as shown in the graph 6.4-2 above- contrasts with the demand behavior for *FA's* products, (*as it is the case of products elaborated under SC #1, cardboard exhibitors and SC#2 baked snacks*) as shown in the graph 6.4-3 bellow, which presents higher volatility and a decreasing trend, attributable in great extent to *PA's* marketing strategy. Gradually *FA*, with a totally ineffective market strategy, has been losing market share to stronger and more customer-oriented competitors.

Derived from the CARP, further analysis of internal sales data, showed that due to a lack of customer's information sharing across the channel members, both supply chains revealed the presence of the bullwhip effect in ranges closer to 30%. Sales

forecasts made by *Products Distributorship* were based on sales targets, and due to big differences with actual sales, they were simply ignored by *FA*.

As expected, excess of stock served as a buffer, and out-guessing customer's demand became the manufacturing norm for the firm.

Cardboard exhibitors SC#1 and baked snacks SC#2
Fábrica de Alimentos volatile demand



Graph 6.4-3: Volatile demand and a decreasing trend **Source: Based on *FA*'s sales data.**

The board members, usually content with the overall performance of *PA*, were not satisfied with a lagging *FA*, a firm struggling for survival and under strong pressures from the competition. At the time of entering the CARP, the members of the board were in the process of undertaking corrective measures -where disinvestment was one of such considerations- after the failure of their counteracting strategic maneuvers.

As part of an organizational change process, the reflection around the CARP above, generated some degree of awareness in the manager's mind-set towards operating as a SC, as evidenced in the results of the field-work presented in section five of this document.

The second step: Strategy Formulation

As a result of the CARP, the Board Members recognized that the initial strategic decision intended to counteract competition and defer integration were causing additional failures. Initially *PA* used the results of the proposed PMS, basis for the CARP, and of the sales forecasts generated for additional internal analysis for considering the possibility to engage in SCM initiatives and possibly in the future, into SCI.

Two main strategic decisions were undertaken. On one hand, regarding IT, the firm decided to outsource all their information and communications requirements, including the design of an integrated performance system to an ISP. On the other hand and following the competition, they decide to re-design their marketing strategies through brand reputation. This strategy resulted in the distribution of premium brands through world-class retailers and the use of franchise brands aiming at the younger markets.

The third step: Subject, content and extent of integration

Before entering into SCI, managers at the VI firm require some precisions about the integration processes, as identified in the extensively mentioned, four basic questions

The contingent variable's influence over managerial decisions about SCI

The interactions between the contingent variables under consideration and their influence over solutions to questions a) through d) in section 6.1-1 above, as observed in the case of *FA*, will be detailed bellow and are summarized in matrix form as seen on Table 6.4-4:

The focal firm's bargaining power

The focal firm has a strong positive influence in decisions related to the subject of integration, in particular at the time of developing SCM initiatives (Question a). The bargaining power allows both, the definition of membership in a SC and at the same time, of the necessary guidelines and procedures orienting the processes around a

specific SCM initiative. The channel members forfeit some decision rights in favor of the focal firm.

The contingency approach suggests that *Fábrica de Alimentos* would benefit by translating the experiences obtained in the participation in SCM initiatives under the retailer's rule (channel 2, in SC # 2) to its everyday's operation. By embracing a SCI strategy, first by adopting SCM initiatives with the world-class retailers the recent changes in *FA's* marketing strategy -competition through brand reputation and franchise products- could be oriented towards positioning such brands in the consumer's mind-set using the retailer's distribution channels.

Notwithstanding the low bargaining power of *FA* over world-class retailers, it is important that it assimilates all learning derived from SCM initiatives and transfer them into action specifically over SCs #1 and #2, taking proper care of the distribution function as an initial source of operational disturbance. For that matter all experiences attained must be evaluated and incorporated in the SCI process, where *FA* in turn is the focal firm.

The business environment: Environmental turbulence and industry maturity

The competitive environment, characterized by low environmental turbulence and the maturity level of the selected sub-segments of the retail food industry, along with the current degree of vertical control of *PA* over certain stages of production in *FA's* participating chains, provide both the necessary time and the resources required for implementing a future top-down corporate strategy, based on SCI.

On one hand, maturity of the industry and low market volatility allow VI firms to defer integration initiatives, but on the other, they provide the necessary time to engage in a deliberate organizational change process, as part of a top-down strategic approach.

In that sense, regarding questions b) and c), relatively mild external conditions do favor a gradual approach for *FA*, characterized by the attainment of lower stages of SCI by delaying strong corrective action, particularly complete disinvestment, by the VI firm.

The resulting improvement in today's ailing position of *FA*, in the new dynamics of the food retail competition could imply that in the near future, these strategies could permeate across all chains and be extended to *PA's* operation as a group

Product Type

With respect to question d), the product type determines the appropriate SC strategy for adoption, aiming to solve questions such as what processes require immediate attention, and on the side what type of information must be shared in the underlying process, in order to attempt more collaborative initiatives. By focusing on core competences, the VI firm can identify inner strengths and weaknesses that could be enhanced or overcome through further coordination and to the last extent, at the end of the continuum, through more collaborative relationships.

In this case since baked products are categorized as functional (Fisher, 1997), an operational excellence strategy is considered adequate. The model prescribes that integration, in the case of *FA*, requires focus over two dimensions: Organizational and coordination structure integration. To that extent, all efforts under the organizational integration dimension must be aligned with such strategy. It is important to mention that information integration, even though it is not at the core of this initiative, becomes an enabler of first order for SCI, and should not be left without consideration.

This approach suggests that IT can be used to reinforce the SCO required for further developments in the collaborative performance system and incentive alignment (visibility) across the SC.

Specifically for question b) and as suggested by the CARP, information about SC performance and sales forecasts must be initially considered for sharing across the key agents in the channel, namely *FA, PD and Packaging Co.*

Contingent Variables	Fundamental Questions Issued by Top-level management/ level of influence over SCI			
	The Case of Productos Alimenticios			
	a) Whom to integrate with?	b) What information must be shared?	c) What processes must be integrated?	d) How much integration is required?
Focal company's bargaining power	**Positively influences SCI, in particular where the focal firm has a strong-hold in the SC**	Provides certain guidelines over information sharing	Defines the guidelines and procedures for operating the SC	**Establishes the necessary contractual agreements**
The Industry				**Deferring implementation of SCI in this case where industry is mature and stable**
Business Environment				**Low industry volatility acts as a deterrent of SCI, yet it raises concern over *FA's* management.**
Product Type	**Guides the process of mapping the relevant SC members in the channel. *Organizational integration dimension.***	**Orients the process of the intra-firm *information integration dimension.***	**Favors integration under the operational excellence strategy**	**Favors higher integration in the *coordination structure dimension.***

Table 6.4-4: Interactions between contingent variables and manager's inquiries. The case of *PA*

Fábrica de Alimentos proposed stand in SCI as suggested by the prescriptive model

Based on a contingency approach, the prescriptive model suggests that *FA* , at the moment, must make the transition towards an overall medium level of SCI. That implies, along the bottom runway, full compliance with functional and internal integration as a pre-requisite for more collaborative approaches in the future. It demands a new perspective on relational exchanges, leaving behind extensive use of adversarial transactions for solving the flows of information and goods across the chain along subsidiaries.

As per question c). on the top runway. the model suggests that *FA* could benefit from an initial approach towards VI disintegration, in particular regarding the distribution function aligning all corporate efforts and resources with the operational excellence strategy by engaging in further SCM initiatives with world-class retailers as a means for breaking inertia and reducing inefficiencies, attempting to permeate the experiences across the chains where it operates.

A summary of the proposed stand in SCI for both SCs is presented in the figure 6.4-3 bellow:

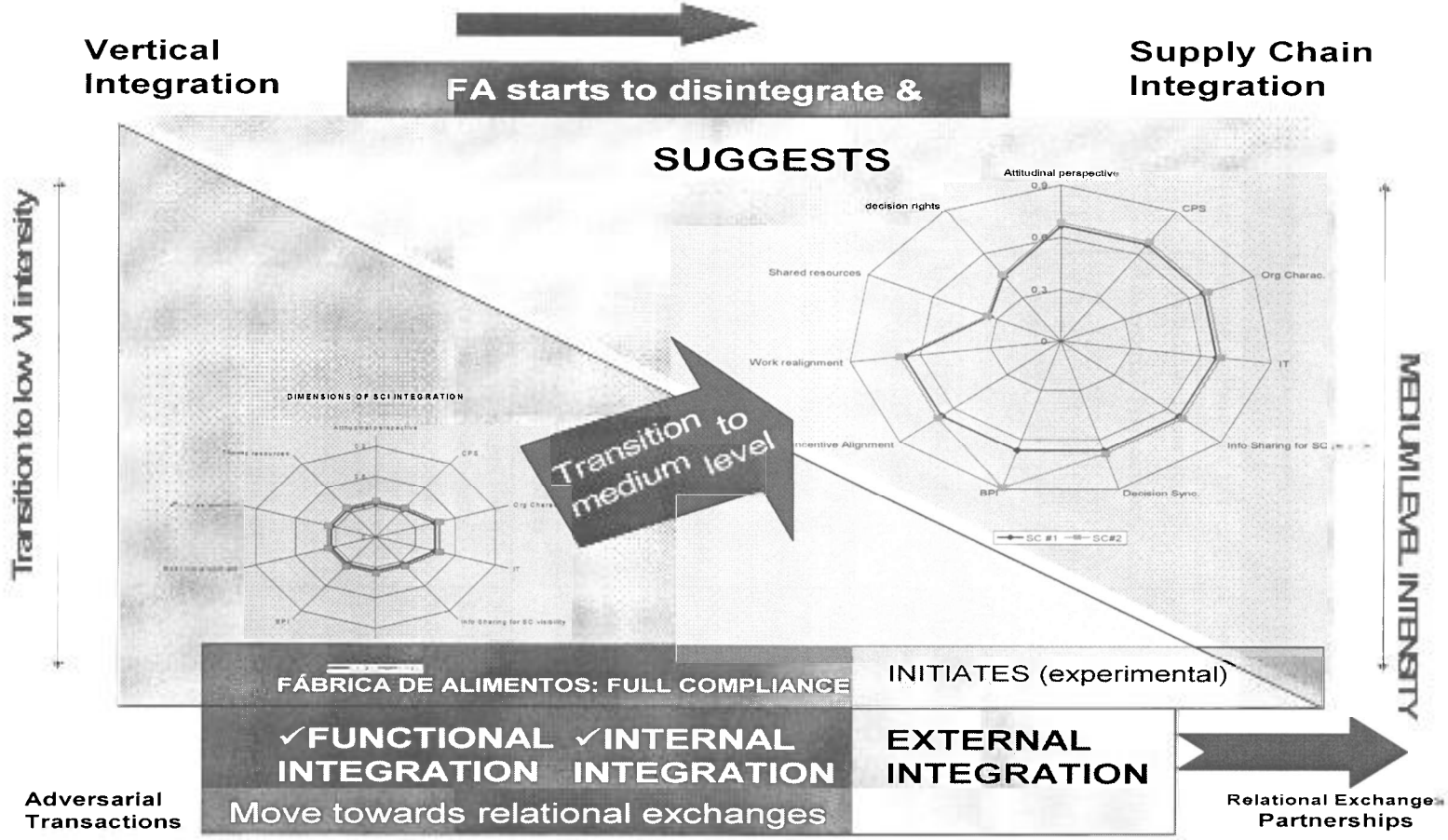


Figure 6.4-3: The proposed stand for SCI in the case of Fábrica de Alimentos

Key Model Prescriptions for FA

Based on the process maturity approach (Lockamy and McCormack, 2004b), the results of the model are highlighted in the following table 6.4-5.

Model Prescription	As it is today:	Must Evolve to:
Issues revolving around the prescriptive model		
1. Bottom Runway: Evolutionary path for integration	Unarticulated functions Adversarial Transactions	**Full functional and internal integration compliance. External integration of *FA* with key channel members (PD and Packaging Co – experimental-)** **Relational Exchanges**
2. Top Runway: VI disintegration	Low levels of Integration	**Medium level of integration as characterized by section *6.4 formats*.**
3. VI intensity level	Characterized as high across all four VI dimensions	**Ranging from medium to low, particularly in the distribution function.**
4. SCI intensity	Low to non-existent integration across the SCs. In all dimensions.	**Medium level with focus on organization and coordination structure dimensions. Information integration dimension has an enabler role.**
Contingent Variables		
1. Focal Firm's bargaining power	Reluctance to accept the role. Counteracting maneuvers.	**Experience transfer from SCM initiatives in SCs where FA has the role of the focal firm.**
2. External Environment	Used as a means for deferring corrective measures for FA	**Provides time and resources to adopt a top-down strategy for SCI**
3. Product Type	Non-differentiated product distributed under generic brands in a market dominated by brand reputation.	**Adoption of an operational excellence strategy, reinforced with a marketing strategy based on brand reputation and positioning through world-class retailers' distribution channels**

Table 6.4-5: Results of the prescriptive model in the case of FA

The fourth and Fifth steps: Evaluation and consolidation

Even though these two final steps, were not subject of the present study, their functionality reside in their ability to assure that the VI firm gradually continues to advance into SCI, aiming at more collaborative relationships. The supply chain as an entity, implements a comprehensive CPS and aligns both strategy and incentives across key channel members laying the ground for a reinforcing sequence of actions, that at the end of the continuum arrive to what is called in the literature the *seamless SC* (Towill, 1997), the *virtual* supply chain (Magretta, 1998) or the more ample concept of *supply networks* (Jarillo, 1988)

6.5. Congruence Validation of the Prescriptive Model at *FA*

The application of the prescriptive model to the case of *FA* concludes with the congruence validation phase. Congruence can be validated through an analysis of its prescriptions under the light of both, factual information about the VI firm and the process engaged for its collection.

The bottom runway

This model, in conjunction with other reported experiences (Kurt Salmon Associates, 2002) prescribes that *FA* must first comply with both functional and internal integration as initial steps towards more collaborative efforts (Giménez and Ventura, 2003). To accomplish those objectives the firm has to evolve from mere adversarial transactions, towards more articulated and relation-based exchanges.

As explained earlier, *FA* lagged well behind its competitors and could not benefit from the experience obtained from entering into SCM initiatives promoted by the world-class retailer, due to a lack of functional integration. *FA* authorities attempted to moderate the effects of competition by adopting counteracting strategic maneuvers that included dealing, on an adversarial basis, with regional and local distributors presenting lower levels of integration.

The cost of such strategy was the surge of a volatile demand characterized by seasonality and high variability, interrupting the necessary smoothness in SC operational flows. Without further differentiation, *FA* lost market share to stronger and reputable competitors, and did not pay attention to a growing business sub-segment comprised of more

health-conscious consumers. Needless to say that by avoiding integration, *FA* just delayed business failure and the adoption of such strategies was certainly doomed to fail in the short run.

The top runway

The mild environmental conditions of the industry, along with the dominance of *PA* in the pasta sub-segment of food retail, set aside the most needed corrective measures for *FA*. The firm used adversarial transactions -more characteristic of un-articulated hierarchies, even with sister units under VI control- thus, forfeiting the opportunity to consider operations under a SC perspective, at times when the market competition was moving towards SCI.

Furthermore, the model also prescribes that under changing economic conditions, the firm might benefit from VI disintegration. The prescription runs along the distribution function, where *FA* might benefit from embracing SCM initiatives originated by the retailer's role as a focal firm. The experience obtained from such initiatives should necessary permeate other chains where *FA* becomes the focal firm and promote further integration.

For that matter, by focusing on core competences and capabilities the firm can attain SCA. Nevertheless, the contrarian strategy was adopted and *FA* rapidly started to sink. Counteracting measures included -in the outside- initially further isolation and more adversarial transactions and in the inside, greater disfunctionality due to a lack of an overall strategic approach and incentive misalignment. Problems along the human dimension, such as hierarchies, hidden agendas and back-scratching dominated the opposing background for SCI.

The influence of contingency variables

PA does not provide its subsidiaries with a clear strategic approach. Even though *FA* manufactures functional products (Fisher, 1997), that differentiate through brand name and reputation, the corporate resources were not assigned towards the alignment with an operational excellence strategy (Treacy and Wiersema, 1993). Information was not shared, specifically that related to sales forecasts and levels of service. Business process such as distribution and production were not part of any deliberate collaborative initiative among sister units.

Even though this issue was raised several times inside the working and steering committees, it took a long time to get it incorporated into the manager's mind-set hence the model prescription regarding a change in strategy was not timely considered.

As opposed to the prescriptions of the model, industry maturity and low turbulence otherwise leading to time-gaining opportunities, acted as SCI deferrals, when *PA* did not establish the appropriate strategic correctives to regain control over *FA's* performance. The permanence of VI control, was considered a sound strategy for *PA* as a group, but its results could not be extended to the ailing operating conditions of a lagging *FA*.

As the deferral strategies failed and the operation of FA was deemed as a failure, the managerial team reflected about and decided, under a top-down approach, to reorient its strategy. This last situation was implemented under not-so-hostile external conditions with possibilities to become successful in the near future.

Under more realistic conditions, the model initially suggests that *FA* requires further advancement, up to an overall medium level, along the organizational and coordination structure dimensions, without forgetting that IT operates as an enabler, especially in the accomplishment of functional and internal integration. After some rapidly accomplished performance improvements, self reinforcing cycles of integration activities would allow for further advancement in the SCI process.

As it was observed the influence of the contingency variables is summarized in the table 6.5-1 and its magnitudes are consistent with expectations. (Compare with expected values in Table 5.3-5 above)

Contingency Variable	Direction of influence	Aspect of influence	Preferred Dimension	Question supported
Focal firm's bargaining power	Positive (+) **Experiences must permeate all SCs where *FA* operates**	SC membership. Operating guidelines	Organizational Integration	**a): Whom to integrate with?**
Product Type	Positive (+) **Needs strategic alignment and resource allocation**	Information and operating decisions	Coordination IT as an enabler	**b) What information to share? c) What processes to share**
External conditions: Maturity of the industry and competitive conditions	**Negative (-) Used for delaying corrective action rather than as an opportunity for**	**The extent of integration**	**Overall strategy**	**d) How much to integrate?**

	deliberate strategy formulation			

Table 6.5-1: The influence of contingency variables

A schematic account of the congruence of the model is shown in the following figure 6.5-1 where gradual advancement towards SCI is recommended

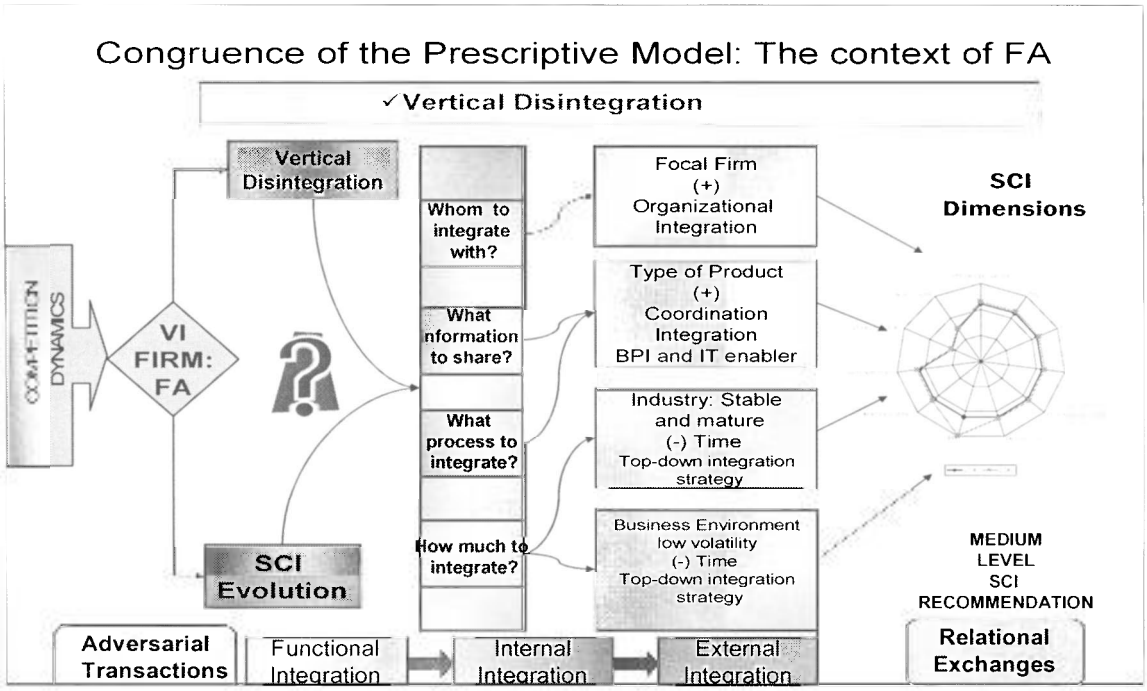


Figure 6.5-1: Congruence of the prescriptive model for *FA* : An schematic perspective

Key results in the AR project

Not without resistance and derived from the conclusions of the CAR project, *PA's* management -pressed by a downturn in the financial results of FA- reflected around the adoption of an SCO perspective towards the operation, not only of such firm, but of the whole *PA* group.

The main results of the project were the time series forecast of demand, the mapping of the supply chains for *FA* and the adoption of a collaborative performance measurement system based on a Data Envelopment approach using both operational and financial measures.

As expressed earlier, the group adopted the suggestion of the CARP to comply with internal integration, using IT as an enabling leverage. *PA* recently announced the outsourcing of all information and performance measurement systems to an *Integrated Solution Provider (ISP)*. Even more, *FA* agreed to engage in further initiatives, such as marketing new quality-based baked products, under *PA's* premium brands in the world-class retail chains across Mexico and for export towards the Hispanic markets in the United States, in an attempt to reconfigure its marketing strategy along further brand differentiation.

A gap in both literature and trade accounts as well as in practice, as observed through the ARP, regarding the necessary guidelines for SCI implementation were established. The prescriptive model resulting from this research, responds to current conditions in *PA* and furthermore, it can be modified and applied under different settings contributing to the theoretical advancement in the field of integration.

The suggestions for *FA* as a result from the prescriptive model appear to reasonably comply with current theoretical developments in the field of SCI, the whole AR process engaged and with the later strategic choices and decisions made by *PA's* authorities over its strategic reconfiguration.

6.6. Assessing the quality of the present AR projects

Even though AR enhances action in research and considers that its outcomes must be useful for the client, the reflection process proves to be an important mean for benefiting from some generality by relating its findings to implication in future situations. That is practitioners and researchers benefit from generalization by *"... having something to say about other contexts than that within which this specific practitioner operates"* (Eden and Huxman, 2002, p.256). For that matter generalization draws the attention to the issues of reliability and validity in qualitative -particularly in action- research.

Healy and Perry (2000) argue that judging the quality of research must be based on the paradigm where it is rooted, and that the findings in one project can not be transferred to another project based in a different paradigm, without changing their form and content (Thompson and Perry, 2004, p.406).

With respect to the present AR, as expressed before in section 4.2.2, the CARP is rooted in the critical theory paradigm whereas the DARP is rooted under realism.

Reliability and Validity

Both concepts reliability and validity were initially developed in the natural sciences, and as such can not be directly applied in qualitative research. Furthermore tests or measures of such concepts *"... as used in the mathematical or physical sciences are inappropriate for qualitative investigation and can cause considerable confusion when applied.* [Nevertheless], *... in their broadest conceptions, reliability meaning "sustainable" and validity meaning "well grounded" will have relevance for qualitative research since they help to define the strength of the data"* (Lewis, 2003, p. 270). Reliability and validity have different meanings across paradigms yet they can be assimilated through different concepts.

Reliability and Validity in qualitative research

Regarding qualitative research, reliability concerns the replicability of the study's findings and questions, whether the results would be repeated under the same or similar conditions. Riege (2003, p.81) considers that *"...reliability refers to the demonstration that the operations and procedures of the research inquiry can be repeated by other researchers which then achieve similar findings, that is, the extent of findings can be replicated assuming that, for example, interviewing techniques and procedures remain consistent."* Further the author suggests that "*Dependability*" in qualitative research is the concept analogous with reliability in the quantitative research.

In turn validity is understood to refer to the *"correctness"* or *"precision"* of a research finding (Lewis, 2003, p.273). Moreover under the positivism paradigm, validity is considered to be multi-dimensional, referring to construct, internal and external validity. In qualitative research and following Lincoln and Guba (1985) the concepts of *Confirmability*, *Credibility* and *Transferability/Generability* are considered analogous to the dimensions expressed above and preferred in the analysis of research quality.

Criteria for judging quality in AR projects

Following Thompson and Perry (2004), and based on the *"critical theory"* paradigm, the criteria for valuing the quality of the CARP would be those considered for qualitative research: Confirmability, credibility, transferability (Lincoln and Guba, 1985) and dependability (Thompson, Perry, 2004). Whereas, in the DARP rooted under *"realism"*, the criteria are: ontological appropriateness, contingent validity, multiple perceptions about a

single reality, methodological trustworthiness, analytic generalization and construct validity (Healy and Perry, 2000).

Quality Criteria for the CAIRP at Productos Alimenticios

Criterion 1, Confirmability:

This is analogous to the notion of neutrality and objectivity in positivism, corresponding closely to construct validity. The goal for testing confirmability is to evaluate ... *"whether the interpretation of data is drawn in a logical and unprejudiced manner. That is, to assess the extent to which the conclusions are the most reasonable ones obtainable from the data"* (Riege, p.81), and whether data is reliable, factual, confirmable or confirmed (Thompson and Perry, 2004).

Miles and Huberman (1994), proposed, for each criteria, key questions for appraisal. In this case such questions raise the following issues:

- Are the study's general methods and procedures described explicitly and in detail?
- Are study data retained and available for reanalysis by others?

In chapter five, the methods for collecting and analyzing data were detailed. Data was collected through interviews, documentary analysis and observation. The use of "Topic Guides", referred in Appendix A, allowed the researcher to implement semi-structured interviews and observation guides. The information was complemented through informal interviews and site and location visits. The board meetings allowed the researcher's team to perceive problems of hierarchies, hidden agendas and resistance to change on behalf of the operating management and the working committee. The possibility of triangulating information resulting from the different data collection methods employed was used to confirm information and provided richer descriptions of the main concerns at *Productos Alimenticios*. Documentary information and formal communications with *PA*, including operation related data are kept on file and shown in Appendix B. The fieldwork and the data analysis processes are summarized in the form of *Mental Maps* and are considered an integral part of the study.

Criterion 2. Credibility:

This is the parallel construct to internal validity. It involves the approval of research findings by either interviewees or peers as realities may be interpreted in multiple ways and attempts to evaluate how findings reflect the reality of the actual phenomenon investigated (Thompson and Perry, 2004, p.81). As above the key questions for appraisal are:

- Are the findings internally coherent?
- Are concepts systematically related?

The CARP implied collaborative work -for about a year- between the managerial and researcher's teams in order to implement organizational change, in this case designing a PMS for *FA* and reorienting the strategy from VI to SCI. Over this time the researcher's team had the opportunity to consider further theoretical developments related to performance measurement and SCI and also alternative tools (time series forecast and sales information sharing) for addressing *FA's* operating problems such as the bullwhip effect and distribution inefficiencies. Furthermore the triangulation of the different methods for collecting information confirmed important facts about *PA's* operation, and the interaction with the working and steering committees, allowed for a deeper understanding of the human dimension of organizational change at *PA*.

As a result of the CARP, the main objective of the DARP was established, and stepping from a joint reflection process, it evolved from a simple measure of performance in the SC to a systemic transformation of the VI firm towards further integration, as a suitable tool for alleviating FA's ailing condition. This process ended with the development of a prescriptive model that could be used to guide the practitioner's efforts to achieve such integration.

Criterion 3. Transferability:

This is analogous to the function of external validity or generalization in conventional quantitative research. For evaluation, the key questions are:

- Do the findings include enough *"thick descriptions"* for readers to assess the potential transferability appropriateness for their own settings?
- Are the findings congruent with, connected to, or confirmatory of prior theory?

The practitioner's perspective derived from the pre-understanding stage of the AR project provided the necessary insights into SCM consulting, the human dimension problems of performance measurement and the initial information required for designing the PMS. This discernment allowed the researcher's team members better communication with the managerial team and provided sensitive information and experience useful in the consultancy part of the AR project.

A review of the literature, and the application of diverse theoretical approaches through this project, confirmed the rationale for a balanced measurement system, yet the actual implementation conflicts raised, were not stressed enough in the bibliographical accounts, and contrasted sharply with the researcher's team previous experience in SCM initiatives.

Even though this project is based on a contextual setting -in this case VI firms in the food retail sector in Mexico- the actual research process, the information described and analyzed and the resulting prescriptive model, provide general guidelines for the transition to SCI. Furthermore readers can reflect not only about the diverse theoretical developments in the field of SCI, but also on SCM consulting experiences as well.

The experiences attained through this AR project and fully described in the present report, particularly those regarding SCM initiatives implementation are consistent with previous experiences of the researcher's team members, and the application of this prescriptive model in different settings is seriously considered as part of an ongoing research program at the research-host institution.

Regarding theoretical confirmation of issues in this AR project, it is important to mention that two main elements of the model, namely multi-dimensionality of integration and the contingency approach to integration were initially suggested at the pre-understanding stage, proposed in the review of an extant literature and confirmed through the different stages of the AR process in the case of *PA*.

Criterion 4. Dependability:

Allows testing of the consistency of research and actually deals with the research design. In this project the compliance of two full sequential cycles of the CARP under the AR program, the use of topic guides –as shown on Appendix A- as an aid for data collection

through semi-structured interviews, observation and documentary work, the information triangulation activities and the explicit documentation of the research process including model design, showed that this research falls under acceptable limits (Thompson and Perry, 2004) and contributes to establish this quality criterion in the present study.

Quality criteria for the DARP at Productos Alimenticios

Following Thompson and Perry (2004) the following six criteria are used for evaluating quality of th generalizing project (DARP)

Criterion 1. Ontological appropriateness:

This DAR project deals with complex phenomena at VI firms mainly associated with organizational change in a particular context characterized by hierarchies, hidden agendas and resistance to change.

Under the research design, AR was selected as the appropriate method for responding to the main research questions, regarding the factors that inhibit/enable the establishment of SCI practices in VI firms and the way for designing a prescriptive model to assist VI firms in their transition to SCI.

Moreover the researcher's team does incorporate certain theoretical and practitioner's insight into the AR project, particularly through the pre-understanding stage, but mainly integrates theory as it emerges from data, and as a result of the AR sequential cycles, allows for information triangulation derived from interviews –semi-structured and informal-, observation, focus group type of data collection (non-deliberately in the board meetings) and through documentary work.

Criterion 2. Contingent validity:

It establishes validity about generative mechanisms and the contexts that make them contingent. In the present AR the contextual and strategic setting for *PA* was thoroughly analyzed, both internally –operating problems- and externally -industry and competition- through the use of second hand information and internal data collection. In the process of

attempting to solve operating problems for *FA*, the DARP evolved in a new and promising approach, namely the study of the transition of VI firms to SCI.

Criterion 3. Multiple perception of participants:

The AR explicitly recognizes that participant's perception is not *reality* but merely a window to reality. For that matter the project allowed for confirmation and perception discovery by complementing briefing meetings and semi-structured interviews with members of the working and steering committees through informal questioning with plant and operating managers, observation at both plant and distribution sites and documentary work, both directly from *PA* and attained from secondary sources, such as trade publications and public databases.

The project emphasized the context-specific reflection about *PA's* vertical control over *FA*, and obtained important considerations used in the development of the contingency approach issue in the design of the prescriptive model. The following three criteria deal with methodology

Criterion 4. Methodological trustworthiness:

This criterion is concerned with establishment of the credibility of the report and is similar to constructivism's consistency or dependability criterion. It refers to the extent to which the research can be audited, by providing the actual data collected and the use of quotations. As expressed before, in this study the fieldwork structure and a detail of communications is referred to in the Appendices A and B, and proper quotations are used along the report.

Criterion 5. Analytic generalization or theory building:

"...It explores how research findings nestle within existing theories about the world and its complex interdependent phenomena. That is, this criterion concerns how the methodology was used to build theory" (Thompson and Perry, 2004, p. 412).

In the present study the pre-understanding stage provided some insights about SCM initiatives, under the concept of the seamless pipeline, developed the notion of balanced PMS and introduced the idea of using DEA as an analytical tool for benchmarking efficiency and efficacy in the SC. At this time the multi-dimensionality of integration was suggested and was later confirmed through preliminary literature review and data collected from *PA*.

The monitor meta-step allowed the evolution of the DARP from SC performance measurement to include the study of the transition of VI forms to SCI, and the need for a prescriptive model orienting such transition.

The conjunction of the literature review and the data collection and analysis allowed the inclusion of important issues in the design of the prescriptive model such as appraising dimensionality and intensity in integration and the contingency approach towards SCI. As part of the reflection process the dimensions of SCI, their characterization, the evolving path and the selection of contingent variables was achieved, the model was designed and tested in the case of *FA*. Further reflection allowed the consideration of implications and future applications of the mentioned prescriptive model.

Criterion 6. Construct Validity

This concept is similar to the construct validity of positivism research and refers to how well information about the constructs in the theory being built, are *"measured"* in the research.

In the present case, the three dimensions of SCI, namely Organization, coordination structure and information integration, derived from the literature review and were confirmed through the pre-understanding stage and appraised in the initial as-it-is diagnostic of *FA's* operating conditions. The scale of *low-medium-high* was adopted from earlier studies (Bagchi et al., 2002). Otherwise the dimensions of VI, and their characterization were adopted from Harrigan (1985) and the contingent variables that moderate SCI were also suggested elsewhere in the literature and their expected influence was confirmed through the project's results. To further ensure construct validity, the DARP included thorough reflection and advice on design and report presentation from the researcher's team senior members

7. Conclusions and recommendations

7.1. Initial Considerations

The main objective of this dissertation is to examine and attain a deeper understanding about the evolutionary process that VI firms need to undertake towards supply chain integration. For that matter, this examination takes place in the context of a vertically integrated group belonging to the food retail sector in Mexico.

The study addresses two fundamental research questions:

I) What are the factors that enable/inhibit SCI? ; And how can they be overcome?

I) How can a congruent prescriptive model be traced to assist VI firms for their successful evolution towards supply chain integration?

This research is based on the following premises:

1. The new terms of global competition have forced corporations, particularly those historically organized around vertical hierarchies, to reorient their high-level strategies, from independent operations characterized by adversarial transactions towards more articulated strategic partnerships (Taylor, 2003).VI firms, under strong competitive and environmental pressures for disintegration and differentiation, are urged to evolve towards more participative SC approaches.

2. SCM and SCI have received a great deal of attention yet reality shows that very few companies are engaged in SCI. Successful case studies that deal with SCM are documented but have not provided managers with a general and practical path that could lead them through successful SCM implementation. For that matter, practitioners and managers alike have a strong need for a framework, linking corporate strategy with effective supply chain management that eventually could guide the integrative efforts of VI firms.

3. In the earliest versions of the SC concept, firms sought to achieve vertical control and obtain the desired efficiency and responsiveness by owning each element of the chain. On that line of thought, this study is based upon the notion that the foundations of supply chain integration theory were initially based on the theory of vertical integration and the value chain concept as developed by Porter (1985) and Alderson (1957).

For that matter in the present study, SCI is considered both an application and an extension of VI theory, and it is defined as the comprehensive collaboration among SC network members in strategic, tactical and operational SCM. The degree of advancement from adversarial relationships to full collaboration across channel members will account for the intensity of supply chain integration, and furthermore characterized along three dimensions a) Organizational integration; b) Information integration and c) Coordination structure integration and across their respective stages, into three levels: Low, Medium and High, according to readily observed attributes (Bagchi et al., 2002).

The present study is framed in a research program characterized by two concurrent action research projects in SCI. The first is the *Core Action Research*, involving the researcher's and managerial teams in an organizational change program aimed at developing a supply chain systemic approach in a subsidiary of a vertical integrated group, by designing and implementing a supply chain performance measurement system and SCM initiatives oriented towards eliminating inefficiencies in the firm's operation.

The second, the *Generalizing* or *Dissertation Action Research Project*, where the candidate engaged in writing the present dissertation and whose main objective was to contribute to the theoretical advancement in the field of SCI by deepening the understanding about the factors that force upon and inhibit the transition of VI firms towards more integrative approaches and at the same time develop some guidelines that could aid managers and practitioners in their SCI initiatives.

The project concluded with two full cycles of AR phases, namely: Plan, act, observe and reflect in both the CAR and the DAR projects. The CARP concluded with a PMS based on balanced measures for *FA* that can be readily applied to the whole *PA* group, whereas the DARP concluded in the design and initial implementation at *FA*, of a prescriptive model for orienting VI firms in their evolution to SCI.

Our findings suggested that SCI today is not a matter of choice but rather of selecting an optimal degree. For that matter, VI firms can benefit from disintegration by engaging in a deliberate top-down strategy approach, reorienting their operation towards SCI by defining a target level and based on the prescriptions of the model, advance along the dimensions, which in turn articulate to enhance SCI.

7.2. Summary of Research Findings

The findings as a response to the two main research questions, as they relate to the study of *FA*, are summarized in the following section.

Incidence of factors on supply chain integration

As derived from the AR project, the factors identified to influence supply chain integration are both external and internal, and today span outside the boundaries of the firm. The actual business dynamics imposes on management the fact that competition now, does not longer take place among individual businesses, but between entire value chains.

As it emerged in this research process, in general it can be asserted that among the external factors, the increasing complexity of the ever changing business environment and the nature of competition, force today's enterprises to seek new ways to attain competitive advantages.

Theoretical accounts of the source of competitive advantage based on rivalry can not provide anymore the necessary answers for ailing corporations. As the basis for CA quickly erodes by imitation and extraordinary rents are determined by the *Clockspeed* of the industry, new ways for obtaining SCA are found on exploiting relationships and more collaborative based linkages.

At the light of current business conditions, vertical control, historically proven to be a sound strategy, is doomed to fail in the near future, leading the way for an evolution towards more collaborative approaches. Therefore the pressures derived from both, the external business complexity and, the establishment of SCM initiatives aiming at attaining SCA, on behalf of powerful business partners or competitors are found to exert a positive influence over SCI.

Moreover it has been found here that in the chains that operate under a focal firm with strong bargaining power, suppliers tend to forfeit its decision rights to such firms, which in turn define SC membership and prescribe the operation guidelines for the chain as a whole. In

this research, the findings suggested that, at the present time, ailing companies can strive for survival by articulating with the retailer in an integration process, and implement the knowledge obtained in other chains where they, in turn, become the focal firm.

With respect to the internal factors, interestingly enough the research findings suggest that initially, they do hinder SCI. On one hand, higher degrees of VI delay, to say the least the urge to evolve towards SCI. In our particular case, even though *FA* was trailing way behind its competitors, the parent company did not take corrective measures, such as disinvestment and adopted strategies that simply deferred business failure. When otherwise, VI has been adopted, and seemed to be a sound strategic decision in some contexts, disinvestment or other disintegration strategies are not readily considered as corrective measures and can be thought of as a problem by themselves, therefore managers tend to avoid this decision as much as possible (status-quo).

This finding is consistent both with the literature (Stonebraker et al., 2004; Harrigan 1985) and with insight attained in the pre-understanding stage of the ARP, and as such leads the way for introducing a contingency approach where variables such as focal firm bargaining power, industry maturity, business environment and product type, among others act as moderators of SCI implementation.

On the other hand, and along the human dimension, corrective measures, in this case transition towards SCI, were delayed due to managerial opposition to change. Problems such as hierarchies, hidden agendas and resistance to change proved to be important deterrents to SCI. Previous success of VI strategies altered the owners and managers perceptions about ailing operating conditions of a subsidiary, to say the least.

Altogether, in the case of *FA*, the deferring strategies failed and as a result of the joint reflection process of the researcher's and managerial teams, when the latter adopted a more SCO perspective towards the operation of the *PA* group, the moderating effect of the contingent variables was considered to have a positive influence over the SCI process.

The positive influence over SCI, of powerful partners in the chain, as suggested in the literature, was confirmed in the study and eventually applied at the time where the working committee suggested that the experiences attained through the world class retailer's SCM

initiatives could be extended to other chains where *PA* operates, and as such that recommendation was appraised by the Board of Directors.

As expected, once the SCO was established in the managers' mind-set, the relative stability of the industry and mild business environmental conditions for *FA*, along with the stronghold of *PA* in other business segments provided the necessary time to implement a deliberate top-down strategy of organizational change towards SCI initiatives.

Given the nature of the products considered (*Baked snacks*) the researcher's team recommended that the group must reorient its overall strategy by allocating resources towards strategic alignment under the operational excellence strategy (Treacy and Wiersema, 1993).

A summary of the magnitudes and expected incidences is replicated here in table 7.2-1.

Contingency Variable	Direction of influence	Aspect of influence	Preferred Dimension	Question supported
Focal firm's bargaining power	Positive (+) **Experiences must permeate all SCs where *FA* operates**	SC membership. Operating guidelines	Organizational Integration	**a): Whom to integrate with?**
Product Type	Positive (+) **Needs strategic alignment and resource allocation**	Information and operating decisions	Coordination IT as an enabler	**b) What information to share?** **c) What processes to share**
External conditions: Maturity of the industry and competitive conditions	**Negative (-)** **Used for delaying corrective action rather than as an opportunity for deliberate strategy formulation.** **After reflection provided the time opportunity to engage in a deliberate strategy reorientation.**	**The extent of integration**	**Overall strategy**	**d) How much to integrate?**

Table 7.2-1: Expected influence over SCI of contingent variable sunder the present study

Designing and implementing a prescriptive model for SCI

In the light of a downturn of *FA's* operating conditions and once the urge for VI transition towards SCI was embedded in the mind-set of the high level management, and the

need for a general framework that could guide such firms in the said evolution was identified. the DARP evolved itself from a project whose main objective was to measure SC performance to one that encompassed the need for designing and implementing such prescriptive framework.

For that matter, as a result of the AR project, this research proposed a -process maturity based- prescriptive model for SCI comprising two parallel runways: a) The bottom road made up by a continuum of sequential stages that begins with a functionally disconnected organization and evolves through external integration, where the basis for such evolution resides in the transition from adversarial transactions to relational exchanges, and b) the top runway that expresses the path that a VI firm must follow towards disintegration recognizing that the pressures in contemporary SCM favor such strategy, which in turn is not a question of choice among two extreme alternatives but rather of selecting the optimal degree according to specific circumstances (*Compare Figure 5.3-4*).

The model, based on VI theory, proposes a contingency approach that could aid in the solution to four fundamental questions: a) With whom must the firm integrate? b) What information must be shared? , c) What processes are going to be integrated? And; overall d) How much integration is required (*intensity*)? The four contingent variables are: The focal company's bargaining power, the maturity of the industry, the business environment and the product type.

The thrust of the model resides in the articulation of the three SCI dimensions. As a result of a top-down approach to strategy, the SCI process starts with organizational integration as the guiding force. The initial stages of a) attitude of top level management with SCM and b) commitment of channel members with SCM lead to the adoption of a supply chain orientation in focal organizations, and gives further thought around various decisions regarding SCI's possible contribution to improved performance. Every initiative towards SCM must expand the reflection and dialog processes beyond the boundaries of the firm and include key channel members. The conformation of SCM initiatives into a real SCI approach requires further decision making over the two other –enabling- dimensions of integration: information and coordination structure and resource sharing. Therefore the above-mentioned fundamental questions re-direct the strategic process towards formal definitions about the preferable level of SCI. Questions b) and c) address the issue of the content of integration,

whereas question i) defines the subjects of integration. Finally, question d) addresses the necessary extent of integration.

Model implementation at VI

As derived from the ARP, the implementation of SCI under the guideline of the prescriptive model runs along the following steps:

Diagnostic Phase: The VI firm adopts a SCO approach implying the identification of potential benefits resulting from waste and inefficiencies elimination. The organization must comply with functional and internal integration. This step constitutes a pre-requisite for engaging in SCI activities. The VI firm understands the importance of managing both, relationships and material and information flows and decides to operate as part of a supply chain.

Strategy Formulation: Top-level management identifies the requirements for a successful operation. As a result they adopt a succession of decisions aiming at the definition of strategies, at the corporate, tactical and operative levels for the whole supply chain, paving the way for advancement in organizational integration.

Subject, content and extent of integration: The VI firm must answer the four fundamental questions that shape SCI, taking proper decisions in technology, material and information flows and relationships management. Such decisions lead to advancement in the information and coordination dimensions.

Evaluation: The channel members evaluate the positive effects of SCI and also the problems arising from any collaborative initiatives. Special care is due to the reinforcing effects of the interactions between stages of SCI and further decisions about coordination and information sharing are considered. Advancement in SCI is dependent on such results.

Consolidation: The SC consolidates the development and implementation of a comprehensive set of performance measures and the alignment of incentives, therefore establishing the framework for continuously successful SCI implementation.

The collateral results of the CAR project revealed that SCI in *PA* was not only a matter of technical and tactical issues, but rather strong considerations about hierarchies, resistance to change and status-quo, incentive misalignment, hidden agendas and lack of a deliberate strategic process among other problems along the human dimension of integration.

The SCI process was initiated as a consequence of both the CAR and the DAR projects, yet the model resulting from the last DAR cycle could not be implemented in full at *PA*. Nevertheless, there is evidence that the Board members of *FA*, regained full awareness of the problems related with VI, and decided to deliberately implement a strategic change approach towards marketing and IT adoption. For that matter, the prescriptions of the maturity model of SCI for the case of *Productos Alimenticios* were presented and evaluated in this document

Prescriptions of the model in the case of FA

Based on a contingency approach the prescriptive model suggests that *FA* must transit towards an overall medium level of SCI. For that matter it implies, along the bottom runway, full compliance with functional and internal integration as a pre-requisite for more collaborative approaches in the future. It demands a new perspective on relational exchanges, leaving behind adversarial transactions for solving the flows of information and goods across the chain. On the top runway, the model suggests that *FA* could benefit from an initial approach towards VI disintegration, in particular regarding the distribution function aligning all corporate efforts and resources with the operational excellence strategy by engaging in further SCM initiatives with world-class retailers as a means for breaking inertia and reducing inefficiencies. Moreover the model explains in detail that *FA* requires further advancement in the organizational and coordination structure integration dimensions related to SCI and improvement in information integration related to compliance of both functional and internal integration (bottom runway of the model).

Congruence of the model

Derived from the conclusions of the CAR project, the top-level management of *PA* reflected around the adoption of an SCO perspective towards the operation, not only of *FA*, but of the whole *PA* group. The main results of such project were the time series forecast

of demand, the mapping of the supply chains for *FA* and the adoption of a collaborative performance measurement system based on a Data Envelopment approach using both operational and financial measures. The group adopted the suggestion of the CARP to comply with internal integration, using IT as an enabling leverage. *PA* recently announced the outsourcing of all information and performance measurement systems to an *Integrated Solution Provider (ISP)*. Even more, *FA* agreed to engage in further initiatives, such as marketing new quality-based baked products, under *PA's* premium brands in the world-class retail chains across Mexico and for export towards the Hispanic markets in the United States, in an attempt to reconfigure its marketing strategy along further brand differentiation.

The suggestions for *FA* as a result from the prescriptive model appear to reasonably comply with current theoretical developments in the field and with the strategic choices and decisions made by *PA's* authority over its reconfiguration strategy, therefore providing the necessary grounds for validating the congruence of the model.

Quality of the Research

Healy and Perry (2000) argue that judging the quality of research must be based on the paradigm where it is rooted, and that the findings in one project can not be transferred to another project based in a different paradigm, without changing their form and content (Thompson and Perry, 2004, p.406). With respect to the present AR, as expressed before in section 4.2.2, the CARP is rooted in the critical theory paradigm whereas the DARP is rooted under realism.

Following Thompson and Perry (2004), and based on the *"critical theory"* paradigm, the criteria for valuing the quality of the CARP would be those considered for qualitative research: Confirmability, credibility and transferability (Lincoln and Guba, 1985) and dependability (Thompson, Perry, 2004). Whereas, in the DARP rooted under *"realism"*, the criteria are: ontological appropriateness, contingent validity, multiple perceptions about a single reality, methodological trustworthiness, analytic generalization and construct validity (Healy and Perry, 2000).

As per the detailed analysis expressed in section 6.6, the quality of the research under each criterion, from the CAR and the DAR projects is assured under the normal limits established for that matter (Thompson and Perry, 2004).

7.3. Theoretical contributions

Even though the extant literature reflects around the theoretical rationale for SCI there are not enough empirical studies actually dealing with its implementation, particularly in a VI setting. The first contribution deals with the actual examination of the factors that inhibit/enable SCI, studied under a contextual setting.

As the literature suggested, the external factors that enable SCI were identified in the contextual setting under study, as expected. Yet the findings revealed additional issues beyond the technical scope of SCI and more along the human dimension problems of SCM initiatives implementation -*more internal factors*-. These findings are consistent with consultancy's experiences and are not well documented in both academic literature and consultant firm's white papers. Moreover, trade accounts do not stress enough such problems and do not provide guidelines for dealing with them accordingly, whereas this research attempts to prescribe ways to overcome such difficulties.

A gap in both literature and trade accounts as well as in practice -as observed through the ARP- regarding the necessary guidelines for SCI implementation was established. The second theoretical contribution resides in the prescriptive model, result from this research. By reconciling SCM and strategic management literature and by combining present with emergent knowledge in the process of implementing supply chain integration in a vertically integrated firm, this framework seeks to contribute to theoretical and practical advancement of SCI by filling such gap and at the same time respond to current conditions in *PA*.

As a continuation of this research venue in future work, this model can be modified and applied under different settings, first along VI firms and extended to other organization types contributing to further theoretical generalization and advancement in the field of supply chain integration.

7.4. Limitations, delimitations and implications for further study

As stated earlier, due to the nature of the research method adopted and the paradigm where it is rooted, the role of the researcher in the CAR project and the contextual nature of the study, at least three main methodological limitations are considered:

The first deals with the nature of the method. The theory developed by this study could not be explicitly tested again, since actions research does not lend itself to repeatable experimentation. In that sense, the appraisal of the validity of the study in terms of the positivist paradigm is likely to fail.

The second deals with the role of the researcher, where the latter forms part of the object of study. The researcher brought, into the CARP, its own theoretical perspective, the same that was confronted and revisited in the early stages of research, leading to a re-definition of the DAR project.

And third the impact of the contextual setting, where this study intends to address the main problems related with SCI, in particular in a vertically integrated firm in the Mexican food retail industry. On one hand the contextual nature of the study limits generalization, but on the other lends itself to experiment with a complex framework in particular when it is integrated from various disciplines and theoretical perspectives.

The congruency of the model was validated, yet despite its original context, it needs further testing under different settings. Managers require a yard-stick on which to measure their own SCI advancement.

It is suggested that the model could be applied in other situations than VI, arguing that firms are not atomized units competing in totally free markets. As a matter of fact, firms interact with each other and require the establishment of solid business exchanges. Managers must not only administer resources and activities but relationships. This perspective leads us to regard management as the art of relating firms with the environment rather than a mere adaptation to the environment. (Melo Brito, 2001).

Even though only four contingent variables. focal company's bargaining power, industry, type of product and business environment were analyzed in this study, there is room for enrichment in future research projects by incorporating to the understanding of the SCI process advancement, other variables.

Among them the following can be found: The level of technology and integration itself –differentiation, specialization and decentralization (Stonebraker and Afifi, 2004), munificence, product life-cycle and complexity (Stonebraker and Liao, 2006),culture (Kurt Salmon Associates, 2002), power (Cox, 2001), continuity (Heide, 1990), communication (Anderson and Narus, 1990), and trust (So and Sculli, 2002). Understanding the complexity of interactions that lead to better relationships would certainly guide firms through turbulent times.

APPENDIX A: FIELDWORK AT PRODUCTOS ALIMENTICIOS

CONTENTS

FIELDWORK AT PRODUCTOS ALIMENTICIOS

TOPIC GUIDES

Topic Guide 0: PRE-UNDERSTANDING STAGE

THE SEAMLESS PIPELINE: The consultant's perspective

Objectives:

- Obtain a breadth of pre-understanding of the corporate environment, the condition of business and the structure and dynamics of SC's and SCM initiatives from a practitioner's perspective.
- Acquire some insights and suggestions of the overall consulting process in SC and SCM.
- Present some preliminary ideas about a PMS proposal for supply chains.
- Reflect about PM systems and acquire suggestions over proposed measures for further implementation.
- Attain a deeper understanding of the seamless pipeline concept (SCI?)

Introduction:

This phase of the research program regains first-hand insights into consulting in SC and SCM. For the research team it provides a reflection outlet for discussing PMS and measures in Supply Chain sustaining the CAR projects to be engaged in. Introduces the researcher into the SCI perspective through the practitioner's lens, and contributes to the professional networking process.

Subjects:
Mr. HC (Senior SCM consultant at DT).

Participants: Research Team from ITESM.

Means of interaction:
Presentation & meeting/ informal interview (exploratory in nature)

Specific purpose:

- Obtain a practitioner's opinion over the proposed PMS in supply chains.
- Getting professional advice for consulting services in SC and SCM

THE SEAMLESS PIPELINE

INTERVIEW GUIDE INDEX

Goal:

Deepen the understanding about the following issues

5. Proposed PMS for supply chains (Presentation)
6. The seamless pipeline concept (Reflection)
7. The practitioner's perspective towards the SCI notion.
8. The consulting focus on SC and SCM.

Activities undertaken:

Id #	Activity/ Type	Date	Contacts/Means	Questions/ Issues Raised	Results
PU1	Pre-understanding activity: Performance Measurement Systems Consultation (D&T Consulting Firm)	September 27th, 2005	Mr. HC (Senior operations advisor for D&T Consulting)/ meeting/presentation – interview	♦ The Consultant's perspective over SC. ♦ Performance measurement systems / Proprietary Systems.	♦ Consulting approach towards seamless pipeline. ♦ Practitioner's opinion over PMS in SC. ♦ Specific measures to be implemented.

Table A1: Chronological account for the pre-understanding stage

Proposed Thematic Index

1. Performance Measurement System (PMS)
    1.1 Type of measures
    1.2 Alignment with overall strategy
    1.3 Importance of ERP Systems
    1.4 Strategy formulation
2. SCM initiatives implementation
    2.1 Success Cases
    2.2 Problematic Cases
3. Consultant's perspective over SC performance
    3.1 Proprietary PMS systems
4. Researcher's proposal of PMS
    4.1 Importance of Balanced Measures
    4.2 DEA based
    4.3 Measure over SC
5. Consulting Focus
    5.1 Turn-key solutions
    5.2 Synergy
    5.3 Integrated Business Solutions

6. Supply Chain Management
    6.1 SC Initiatives
    6.2 SC Implementation

Data Reduction and Analysis:

Proposed Main Thematic Categories:

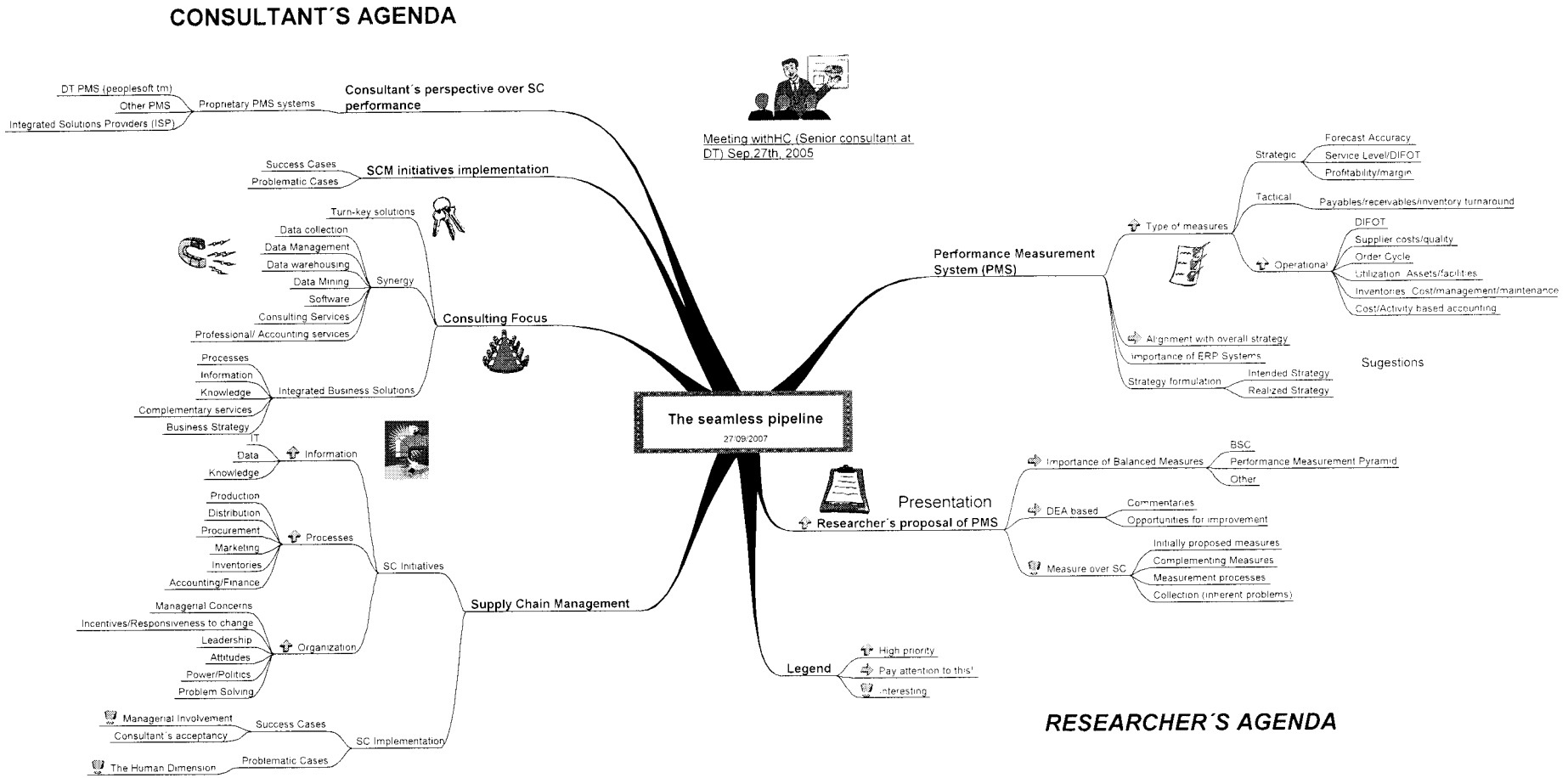
INDEX

CODES
1. Supply Chain Management and Supply Chain Integration
2. SCM initiatives implementation (Consultants perspective)
3. PMS in supply chains
4. Proposed performance measures

Code 1	Code 2	Code 3	Code 4
1.2 Alignment with overall strategy	1.1.2 Tactical	1 Performance Measurement System (PMS)	§ Forecast Accuracy
1.3 Importance of ERP Systems	1.4.2 Realized Strategy	1.1 Type of measures	§ Service Level/OIFOT
1.4 Strategy formulation	2 SCM initiatives implementation	1.1.1 Strategic	§ Profitability/margin
1.4.1 Intended Strategy	2.1 Success Cases	§ Cost/Activity based accounting	§ Payables/receivables/inventory turnaround
5.3 Integrated Business Solutions	2.2 Problematic Cases	4.1 Importance of Balanced Measures	1.1.3 Operational
5.3.1 Processes	3 Consultant's perspective over SC performance	4.1.1 BSC	§ OIFOT
5.3.2 Information	3.1 Proprietary PMS systems	4.1.2 Performance Measurement Pyramid	§ Supplier costs/quality
5.3.3 Knowledge	3.1.1 OT PMS (people soft tm)	4.1.3 Other	§ Order Cycle
5.3.4 Complementary services	3.1.2 Other PMS		§ Utilization: Assets/facilities
5.3.5 Business Strategy	3.1.3 Integrated Solutions Providers (ISP)		§ Inventories: Cost/management/maintenance
6 Supply Chain Management	4.2.1 Commentaries		4 Researcher's proposal of PMS
6.1 SC Initiatives	4.2.2 Opportunities for improvement		4.2 DEA based
6.1.1 Information	4.3.4 Collection (inherent problems)		4.3 Measure over SC
§ IT	5 Consulting Focus		4.3.1 Initially proposed measures
§ Data	5.1 Turn-key solutions		4.3.2 Complementing Measures
§ Knowledge	5.2 Synergy		4.3.3 Measurement processes
6.1.2 Processes	5.2.1 Data collection		
§ Production	5.2.2 Data Management		
§ Distribution	5.2.3 Data warehousing		
§ Procurement	5.2.4 Data Mining		
§ Marketing	5.2.5 Software		
§ Inventories	5.2.6 Consulting Services		
§ Accounting/Finance	5.2.7 Professional/ Accounting services		
6.1.3 Organization	6.2 SC Implementation		
§ Managerial Concerns	6.2.1 Success Cases		
§ Incentives/Responsiveness to change	§ Managerial Involvement		
§ Leadership	§ Consultant's acceptance		
§ Attitudes	6.2.2 Problematic Cases		
§ Power/Politics	§ The Human Dimension		
§ Problem Solving			

Table A2: Thematic Matrix for Pre-understanding

INTERVIEW WITH HC THE CONSULTING PERSPECTIVE



Thematic Chart A1: Pre-understanding stage the seamless pipeline

Results of Pre-understanding stage

- ✔ The Seamless Pipeline (as an operation model for SC)
- ✔ Supply chain initiatives revolve around three dimensions, namely: Information, processes and organization.
    - Information
        - IT
        - Data itself
        - Knowledge (tacit)
    - Processes
        - Production
        - Distribution
        - Procurement
        - Marketing
        - Inventories
        - Accounting/Finance/Control
    - Organization
        - Leadership
        - Attitudes
        - Power/politics
        - Problem solving
    - Success and Failure
        - Human dimension
            - From the consulting team
            - From the consulted firm team / i.e. management team

- ✔ Performance Measure Systems
    - Strategic, Tactical and operational
    - Forecast Accuracy, Service Level (DIFOT) and profitability (Strategic)
    - Alignment with strategy (overall and SC)
    - Aid in strategy formulation
    - Balanced Measures
    - Comments over proposed measures (DIFOT, cost/profitability) and forecast accuracy
- ✔ Consultant's perspective
    - Turnkey solutions
    - Proprietary PMS
    - Integrated solutions/ other goods and services provided

Consultant's agenda

- ✔ Consulting Experience
- ✔ Proprietary systems

Researcher's Agenda

- ✔ Comments over proposed PMS measures
- ✔ Comments over proposed PMS methods (DEA)
- ✔ Insight into potential problems for collection, measures and implementation of PMS systems. The human dimension

The main contributions from the consulting perspective follow:

1. An operation model for supply chains, labeled "The Seamless Pipeline": Confirmed through the interview and as initially presented in SCM literature, this ideal model was confronted with reality under a practitioner's perspective. This view of the SC contrasted sharply with previous findings from the researcher's team professional experience, regarding SC operation.

2. The multi-dimensionality of SCI initiatives: Three dimensions of integration were highlighted, namely: Information and IT, business processes and organizational issues. This notion is supported by a large stream of literature, as expressed in chapter three, in this study.

3. Performance Measure Systems across the SC: Three levels for SC metrics were identified: strategic, tactical and operational. It was stressed that measures must be balanced and aligned with overall corporate and SC strategy. The following: Forecast Accuracy, Service Level (DIFOT) and profitability were suggested by the consultant, as part of the strategic set of measures.

4. Comments on, and eventually a consultant's consideration over the proposed metrics and techniques used to develop a supply chain PMS

Topic Guide 1: ACCESS NEGOTIATION WITH PA

INITIAL CONTACT

Objectives:

- Negotiate access and participation of *PA* in the SCI research program.
- Obtain preliminary information around the main concerns of *PA* and its possible inclusion in the CAR project.

Introduction:

This phase of the research program, begun by negotiating access to *PA* through a key facilitator Mr. GB chief executive officer of Productos Alimenticios. Special consideration was given to the personal and institutional links between this company and the research-host: ITESM. Furthermore the necessary bonds based on trust, collaboration and mutual benefit were established.

Subjects:
Mr. GB (CFO of Productos Alimenticios).
Means of contact:
Cover letter and telephone conversation (Informal interview)

Specific purpose:
Obtain access and deepen understanding about the research process to be engaged with PA.

THE ACCESS NEGOTIATION PROCESS
INTERVIEW GUIDE INDEX (confirmation of cover letter information)

1. Present the main research objectives
2. Pre-view of project proposal
3. Formal contacts
4. Approval request
5. Hierarchy recognition
6. Identification of corporate main concerns

Chronological account:

Id #	Activity/ Type	Date	Contacts/Means	Questions/ Issues Raised	Results
AN1	PA Initial Contact	November the 9th, 2005	Mr. GB CFO/ Letter	Cover Letter/ requesting PA's Participation in Research Program	♦ Consideration of Mr. GB as a key facilitator for the research program
AN2	PA Follow-up	November the 23rd	Mr. GB CFO/Telephone Conversation	Requesting PA's participation // Brief overview of problem of interest at PA which is FA	♦ Means for an initial appointment directly with FA

Table A3: Access negotiation

Proposed Thematic Index for initial contact

1. Benefits
   - 1.1 Professional Service
   - 1.2 No-Cost
   - 1.3 Problem Solution
   - 1.4 Confidentiality
   - 1.5 Responsibility
   - 1.6 Efficiency vs. Efficacy
2. Formal Contacts
   - 2.1 Facilitator
   - 2.2 Coordinator
   - 2.3 Corporate Authority
3. PMS proposal pre-view
   - 3.1 Confidentiality assurance
   - 3.2 Institutional Cooperation
4. Cover Letter
   - 4.1 Institutional Presentation
   - 4.2 Researchers Presentation
   - 4.3 Brief Explanation
   - 4.4 Terms of Understanding

Proposed Thematic Index for PA's follow-up

1. Meeting with Board Members
   - 1.1 Proposal
   - 1.2 Initial Contract Conditions
2. Legend
3. CFO Support (Mr. GB)
   - 3.1 FA's Formal Contact
   - 3.2 Board Support
   - 3.3 Board Acknowledgment
4. Authorization
   - 4.1 CARP
   - 4.2 DARP
5. Main Corporate Concerns
   - 5.1 Vertical Integration?
   - 5.2 Efficiency (Always a concern)
   - 5.3 Efficacy (Quite questionable)

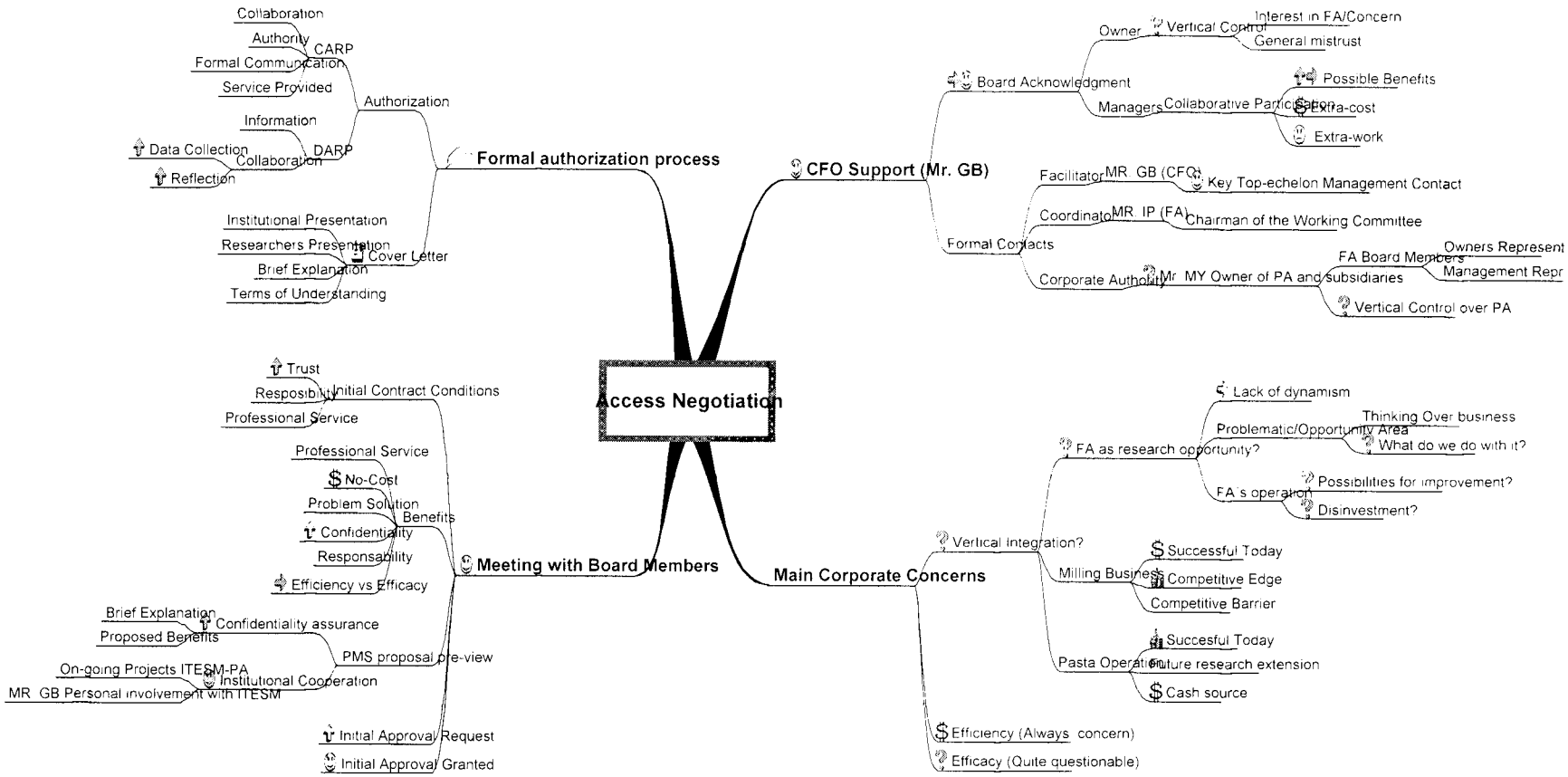
Data Reduction and Analysis: The access negotiation process:

Proposed Main Thematic Categories:

Codes
1. Formal authorization process
2. Meeting with Board Members
3. CFO Support
4. Main Corporate Concerns

Proposed Thematic Index of Access Negotiation

1. CFO Support (Mr. GB) Coded as (1)
1.1 Board Acknowledgment Coded as (3)
1.2 Formal Contacts Coded as (1)
2. Main Corporate Concerns Coded as (4)
3. Meeting with Board Members Coded as (2)
3.3.1 Confidentiality assurance Coded as (3)
3.3.2 Institutional Cooperation Coded as (3)
4. Formal authorization process Coded as (1)
4.2 Cover Letter Coded as (1)



Thematic Chart A2: Access negotiation

Results of Access Negotiation

- PA´s participation
- Board Support and acknowledgment
- Formal Contacts established
- Operating links established.

PA´s Agenda

- Main corporate concerns identified:
  Shall we continue with vertical integration?
  What do we do with FA?
- Defining a better PMS for FA (eventually extend to milling and pasta business segments)
- Drawing initial contract conditions for the research program (agreements)
- Establishing institutional bonds based on trust and mutual benefit.

Researcher's Agenda

- Introducing the notion of the seamless pipeline in *PA*
- Identification of possible supply chains for study
- Operational pre-view of a vertically integrated operation
- Need for a balanced Performance Measurement System for *PA* (preliminary insight).
- Insight into efficiency and efficacy problems in PA, due to possible disintegration/strategic misalignment in the SC´s

Main Contributions of this activity

1. As a direct result of this activity the research project ensured *PA´s* participation obtaining the Board's Support and acknowledgment, draw the initial contract conditions for the research program and established formal contacts within *PA´s* hierarchies, institutional bonds based on trust and mutual benefit and the corresponding operating links
2. The research team introduced the notion of the *Seamless Pipeline*, identified the SCs under study, obtained an operational preview, reassured the need for a balanced PMS and gathered insights into efficiency and efficacy problems in *PA* due to possible disintegration and or strategic misalignments in the SCs.

Topic Guide 2: PRELIMINARY DATA COLLECTION AT *PA*

THE PLANNING STAGE

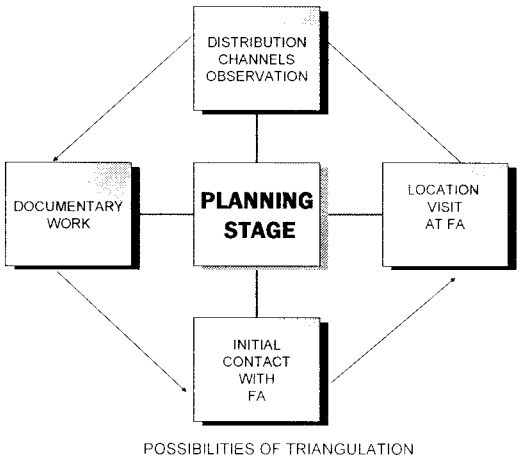


Figure A1: The planning stage overview

Objectives:

- Establishing real contact with the soon to be chairman of the working committee.
- Obtain a general initial perspective of the subject of study (FA), from the perspective of its general manager by means of an in-depth interview
- Identify beforehand the corporation's main concerns towards FA
- Obtain a preliminary briefing around the main concerns at FA
- Establish the basis for a contractual agreement ruling over the research program
- Lay the foundation for the Board Meeting Presentation
- Confirm the perspective provided through observations, brief informal interviews with operating FA´s managers and documentary work (Triangulation)

Introduction:

Acting as a second gatekeeper, Mr. IP needed to be assured about the benefits derived from PA´s inclusion in the research program. Mr. IP was asked to provide the research team with an ample and thorough overview of *FA* and *PA*, regarding vertical integration, brands and products, infrastructure, main concerns, organization and hierarchy.

Complementing the information, data was collected trough informal interviews, observation and documentary work. This process is crucial for the future meeting with the Board/owners which would be decisive for PA´s engagement.

Chronological account of the Planning Stage

ID #	Activity/ Type	Date	Contacts/Means	Questions/ Issues Raised	Results
IC1	Initial contact with FA	December the 1st, 2005	Mr. IP General Manager/ Meeting at location	♦ Overview of Research Program/ Overview of FA	♦ Preliminary Approval
IC2	Location visit	December the 1st, 2005	Operating managers of FA	♦ General Layout presentation and initial consideration for FA's operation	♦ Initial observations/ informal interviews with operating managers.
DS1	Distribution Channels (Fieldwork)	December 4th through 12th, 2005	Supermarkets/ convenience stores/ corner stores /mid-size wholesalers-distributors	♦ Observation of distribution channels and marketing conditions for FA products and from the competition. ♦ Concern around product availability.	♦ Observations of: Products, prices and marketing layouts. ♦ Contextual information about marketing conditions. Limited supply and variety of FA's products.
AN3	Approval for presentation at the monthly board meeting	December the 5th, 2005	Mr. GB CFO/Telephone Conversation	♦ Authorization for Board meeting Presentation	♦ Approval for presentation
DW1	Archival work	December 6th through 12th, 2005	Annual reports/ public business databases.	♦ Financial/Operation reports from public information	♦ Contextual information for PA and FA.
DW2	Context Information	December 6th through 12th, 2005	INEGI (national accounts), AMEXIGAPA (trade association)	♦ Production, sales, employment, international trade, competition.	♦ Contextual information for the industry.
BP1	Board Meeting	December the 16th, 2005	Board Meeting/ The board audience consisted of two members of the MY family (owners of the PA group), Mr. GB CFO, the General Controller Mrs. G, Mr. IP, other members of the directorate of the group and operating managers of FA.	♦ An initial proposal on a SC measurement system was made and ♦ Further problems of the selected firm, Fábrica de Alimentos a subsidiary of the group were raised. ♦ Preliminary presentation of the seamless pipeline perspective.	♦ Authorization to analyze and solve problems on two SC: Sweet Cookies and Cardboard Exhibitors. ♦ Bases for drawing the research contract. ♦ Steering committee formation and formal contact establishment.
BR1	Briefing Meeting	February the 7th, 2006	Mr. IP Director of FA and chairman of working committee/ Meeting	♦ Briefing for project initiation/ logistics	♦ Verbal contractual

				of the meeting.	agreement for research/ observations and comments by the working committee
BR2	Initial meeting with the designed working committee	February the 7th, 2006	Mr. IP Director of *FA*. Mr. F, from Product Distributorship. Mr. JP. from the Packaging Company . Mr. TB controller of *FA* and Mrs. D, chief accountant for *FA* / Meeting	♦ Planning session for the CARP. ♦ Scope of the project. ♦ Formal establishment of the working committee. ♦ Communication channels	♦ Agreement over supply chains under study, ♦ Performance measures, analytical framework using DEA. ♦ Data collection, analytical procedures, periodicity and schedule of activities, deliverables and other fundamental working agreements
ID #	Activity/ Type	Date	Contacts/Means	Questions/ Issues Raised	Results
IC1	Initial contact with FA	December the 1st, 2005	Mr. IP General Manager/ Meeting at location	♦ Overview of Research Program/ Overview of FA	♦ Preliminary Approval

Table A4: The planning stage

Interviewees: Mr. IP (general manager of *FA*). Mr. TB. FA's Controller and plant managers

Means of contact and information collection methods:

- In-depth interview using an interview guide complemented through
- Observations
- Informal interviews
- Documentary work.

Duration of interview and location visit:

Two and a half hours.

Proposed Thematic Index

1. Location visit
1.1 Formal Contacts
1.2 Concerns
1.3 Infrastructure
1.4 Products
2. Location Visit
2.1 Corner stores

2.2 Supermarkets
2.3 Convenience Stores
2.5 Changes in Distribution/marketing
3. Documentary work
3.1 Information used for:
3.2 What information to look for?
4.1 Current PM
4.2 Formal Contacts
4.3 Proposal Briefing
4.4 Vertical Integration of PA
4.5 Products
4.6 Channels
4.7 Information for decision making

DATA REDUCTION AND ANALYSIS:

Proposed Main Thematic Categories:

Codes:
1. Formal Contacts
2. Brands and Products
3. Markets and Distribution
4. Hidden agenda
5. Manager Concerns
6. Contextual

Operational Information Results of the planning stage

The results of this phase are summarized across the following concepts:

PA's engagement

- Basic coordination principles (Agreement on)
- Formal and real contacts: Operating management contacts established.
- Formal Agenda requested/presented. Problems with FA
- Hidden agenda discovered (Reluctance present at all times)
- VI has been a proved successful strategy
- Logistics of CARP. SC's defined for this study.
- Board presentation (authorized) and briefing prior to meeting

Fábrica de Alimentos operation understanding

- Products and brands. Marketing strategies.
- Factories, production and layouts
- Distribution and clients
- Manager's real concerns (somehow identified)
- Higher-echelons of management concerns (hinted)
- Sales variability/forecast problems
- Briefing over IT and PMS problems identified (overview)
- Vertical integration approach for FA's operation rather than a SC approach yet VI has been a success for PA

- Adversarial transactions identified
- Initial definitions for SC selection and mapping
- Initial proposal of the PMS

Distribution channels

Trough PD: Wholesalers and then through convenience and neighborhood stores

- Quantity discounts (promotions) Problem
- Sales variability and seasonality Problem
- Domestic markets Cardboard exhibitors, mix and sweet cookies
- Foreign (Hispanic markets in the US), mix and sweet cookies
- Rely on uncontrolled sales-force. (not well understood problem)
- Through world-class retailers
- Generic brands (No positioning possibilities)
- Premium brands under the PA umbrella.
- Premier access is void. Problems with availability
- Null advertisement and zero positioning. Marketing is not an issue.
- Riding against the wave

Competition (Market) FACTS

- Niche markets
- Stronger competing brands
- Better Reputation
- Better exhibition space
- Homogeneous price
- Edge: Better packaging/ and advertising

Main Contributions:

1. PA's engagement: In this process, an agreement was reached along basic coordination principles, formal and real contacts, SCs under study, CARP's logistics and a formal agenda. Problems with *FA* were identified in the course of action and hidden agendas were discovered. The common theme was reluctance, hierarchies and resistance to change. The notion that VI was a sound strategy, as opposed to a SCO approach, in the past and continued to be in the future was severely challenged by the researcher's team and finally *PA's* involvement was formally authorized by the Board.

2. Fábrica de Alimentos operation understanding: At this time insight about products and brands, marketing strategies, factories, production and layouts, distribution and clients was regained. Higher-echelons of management's concerns were hinted and operational real concerns were somehow identified, regarding sales variability and sales forecast problems.

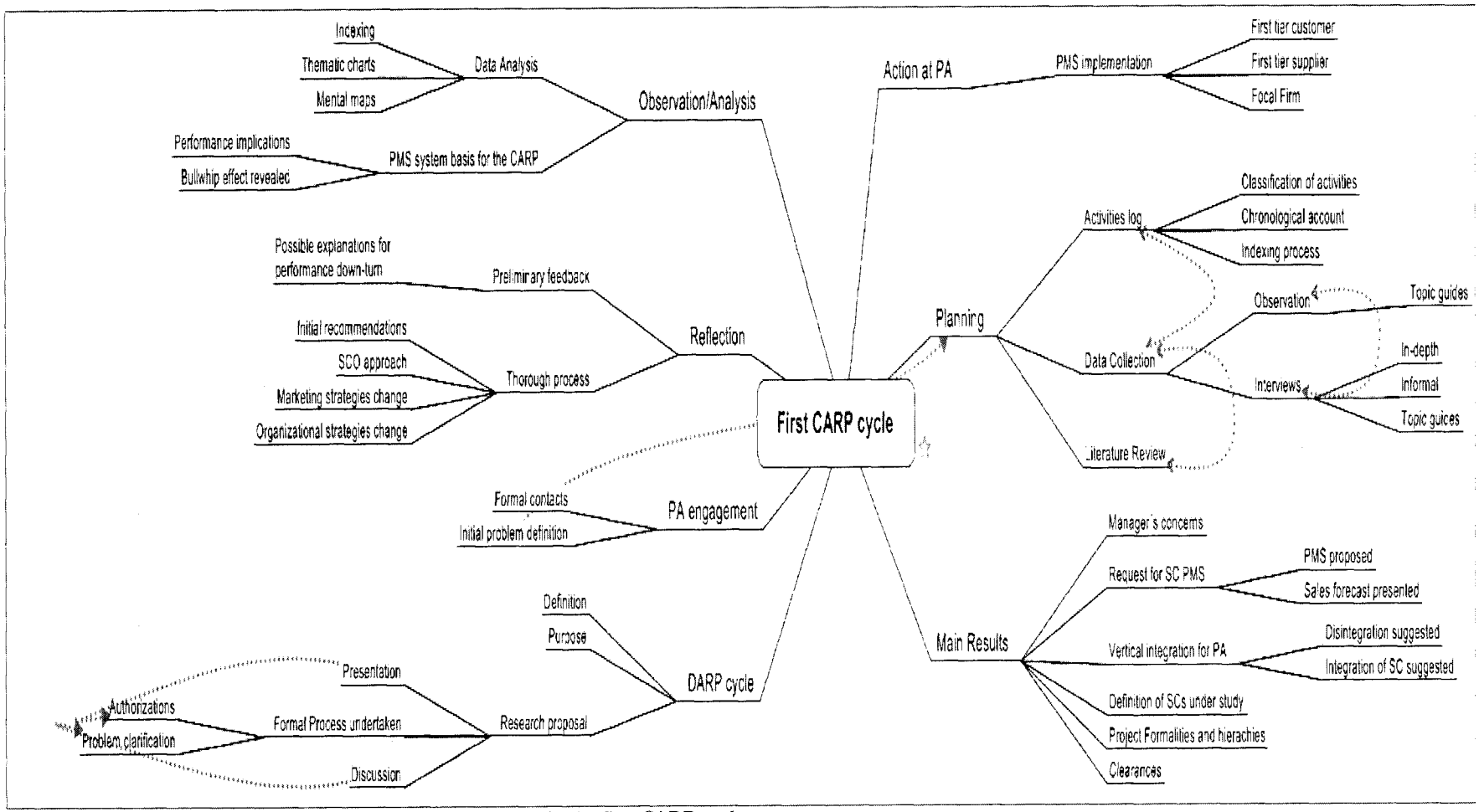
Briefing allowed the identification of IT and PMS problems. In the process the presence of adversarial transactions was identified. This stage included also the initial definitions for SC selection, mapping and the proposal of an initial performance measurement system for *PA*.

3. Distribution Channels: The marketing strategy based on resorting to lowly integrated regional wholesalers was identified as a counteracting measure for delaying SCI. Problems such as sales variability and seasonality as well as non-deliberate promotions based on quantity discounts arose. Other problems in distribution relate to foreign markets not satisfactorily catered by PA, reliance on an uncontrolled sales-force, dominance by world class retailers and marketing through generic brands with null advertisement and positioning. Neglecting the marketing strategy, on behalf of the board of directors proved to be a costly decision for the competitiveness of *FA*.

4. And last, Competition *(Market)* Facts: Competitors rely on homogeneous price and products, yet differentiated trough stronger brands and reputation, better exhibition space in retail outlets and improved packing and advertising. Some competitors resorted to niche markets -not big enough to attract the crowd- such as health-conscious consumers and/or franchise products.

Code 1	Code 2	Code 3	Code 4	Code 5	Code 6	Code 7
Formal Contacts	1 2 1 Cardboard Exhibitors	1 3 1 I Factory attending various markets	Key actors	Product Mix	3 Documentary work	4 1 Current PI
Facilitator	2 2 6 Possible solution	Foreign Markets	Not sold in Supermarkets	Intermediate goods storage	Brands/Products	4 1 1 Level of
MR GB (CFO)	Premium brands	Laredo	Variety mix partially sold at some supermarkets	Freshness	Marketing/Positioning	Orders in ful
Key Role	Franchise brands (Disney)	Domestic Markets	2 2 7 Products overload (excess competition)	Availability	Innovation (low)	Orders on-ti
Coordinator	Advertisement?	Toluca	2 3 1 Not enough presence	Various Processes	Competition	Accountabili
MR IP (FA)	2 3 Convenience Stores	Guadalajara	2 3 2 Good opportunity	Layout	Market concentration	Efficacy
Formal Contact	Brands	Laguna	4 3 2 Concerns on behalf of Mr IP	Packaging	Financial Analysis	Efficiency
Operation Managers at FA	Lack of clear marketing strategy	Saltillo	Extra-cost	Distribution	Financial Situation of the firm	Profitability
	Sizing down for price sensitive customers	1 3 2 Distribution Centers	Might not work?	Foreign Mkt	Mergers&Acquisitions	1 2 Concerns
	Franchise brands	Foreign Markets	Additional Concerns	Domestic Mkts	Profitability	
	Generic	Laredo	Extra-work	Corner stores	Vertical Integration	
		Domestic Markets	I Have other problems right now	Seasonality	3 1 2 Contextual	
		Toluca	Layout problems (Gauffrette line	Down-sizing for price sensitive customers	Five forces	
		Guadalajara	Packaging	School children as main clients	Industry	
		Laguna	Baking	Intermediate wholesalers	Employment	
		Saltillo	Additional costs	Suggested Sales Variability	Capacity used	
		1 3 3 Transportation	Over-use of storage space	Price Discount	Contingencies	
		Own Fleet	More financial resources	1 2 2 Sugar Cookies	Stability (high)	
		Consolidated Carriers	It is a nuisance	Distribution	Maturity (High)	
		1 4 Products	4 7 1 ERP systems	Distribution Channels	Clockspeed (low)	
		1 4 1 Cardboard Exhibitors	Sub-utilization	Supermarket	Growth	
		1 4 2 Sugar Cookies	Low control over system	Intermediate wholesalers	Foreign trade	
		1 4 3 Variety Mix	Low integration across subsidiaries	Corner stores	Hispanic markets in the US	
		1 4 4 Other Baked Snacks	Common across subsidiaries	Packaging	Import threats	
		2 Location Visit	Control tool only/no planning capacity	1 3 Infrastructure	3 2 What information to look for?	
		2 1 Corner stores	Communications only tool across subsidiaries	Price wars	3 2 1 Context Information	
		2 1 1 Price discounts based on volume		Quantity discounts		
		2 1 2 Variable sales		2 2 Supermarkets		
		2 1 3 School kids as clients		2 2 1 Availability		
		2 1 4 Smaller packaging for price sensitive customers		Some stores only		
		2 1 5 Mid-sized distributors (low integration)		Not all brands		
		Substitutes		2 2 2 Competition		
		Seasonality/slow turn-around		Niche markets		
		Stronger brands		Stronger brands		
		Promotions		Availability		
		Variable sales		Variety		
		2 5 Changes in Distribution/marketing		Price		
		2 5 1 Premium Brands		It is not an issue		
		Supermarket 1		Price equivalency according to quality (some discrimination)		
		Supermarket 2		Availability		
		2 5 2 Franchise Brands		Premium Brands		
		Advertising		Loss of Market Share		
		Packaging		2 2 3 Exhibition area		
		2 5 3 Sale under generic brands		Limited		
		Continued		Non-premier location		
		More agreements?		2 2 4 Sugar cookies		
		2 5 4 No change on:		Not sold as FA s brand		
		Availability		Generic Brands		
		Location		2 2 5 Cardboard Exhibitors		
		Price		4 1 2 Problems observed		
		Fixed costs coverage		Not aligned with incentives		
		Supermarket outlets		Descriptive/not analytical		
		4 6 Channels		Not integrated		
		4 6 1 Vertical Integration PD		Not part of PA s overall planning strategy		
		Foreign Mkts		Not aligned with planning systems		
		Hispanic Markets in US		Not intended to work as SC measures		
		World-class retailers		Not shared across SC		
		Other local/regional distributors		4 1 3 Opportunities		
		Domestic Mkts		New PMS design		
		Corner stores		Opportunity for SC strategy formulation		
		Low level wholesalers		Possible solution to owner s concern?		
		Price/volume discount		Good timing?		
		Lack of planning (Sales vs. Production)				
		Seasonality				
		Sales variability				
		4 6 2 Supermarkets				
		Generic Brands				
		Premium Brands (PA not FA)				
		4 7 Information for decision making				

Table A5: Thematic Matrix for the Planning Stage



Thematic Chart A3: A summarized view of the planning stage in the first CARP cycle

Topic Guide 3: DOCUMENTARY WORK

Context Information Evaluation

Objective:

Obtain second-hand information about the industry and PA related data

Introduction:

PA is a vertically integrated firm with a strong-hold position in the milling and pasta industry. One of its subsidiaries, *FA* is not a leading competitor in the baked snacks sub-sector, yet as part of a VI strategy needs to realign its competitive position. For the present research it is necessary to attain further information that would derive in sector and business segment specific studies required to understand the context for the strategic change of *FA* and lay the specific foundations for the SCI model to be developed.

Sources: Archival work and contextual data. Internet search

DOCUMENTARY WORK
SEARCH GUIDE INDEX

Contextual Information

Sources: INEGI, US Economic Bureau, AMAXIGAPA and Secretaría de Economía

Information requested: Competition (general), sector behavior, foreign trade, employment and capacity utilization

PA related information

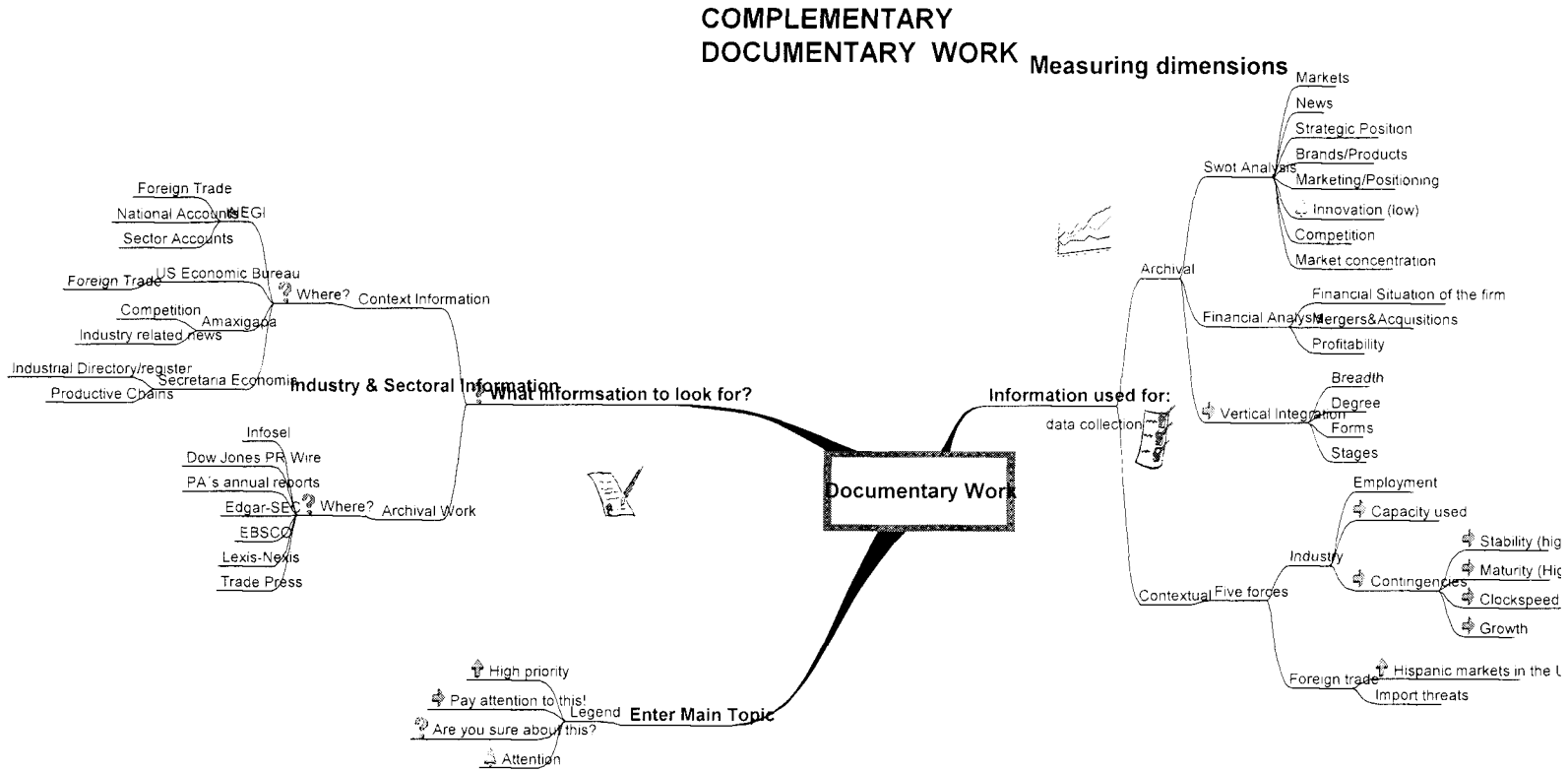
Sources: Infosel, Dow Jones PR Wire, PA's annual reports, Edgar-SEC, EBSCO, Lexis-Nexis, Trade Press

Information requested: Market concentration, products and brands, news, marketing and strategy declarations (Intended and explicit strategies), VI related,

Id #	Activity/ Type	Date	Contacts/Means	Questions/ Issues Raised	Results
CI3	Archival work	March 2007	Annual reports/ public business databases.	♦ Financial/Operation reports from public information	♦ Complementary contextual information for PA and FA.
CI3a)	Context Information	Feb-march 2007	INEGI (national accounts), AMEXIGAPA (trade association)	♦ Production, sales, employment, international trade, competition.	♦ Complementary contextual information for the industry.

Table A6 Complementary documentary work

The documentary collection process is summarized in the thematic chart



Thematic Chart A4: Documentary work for the VI firm.

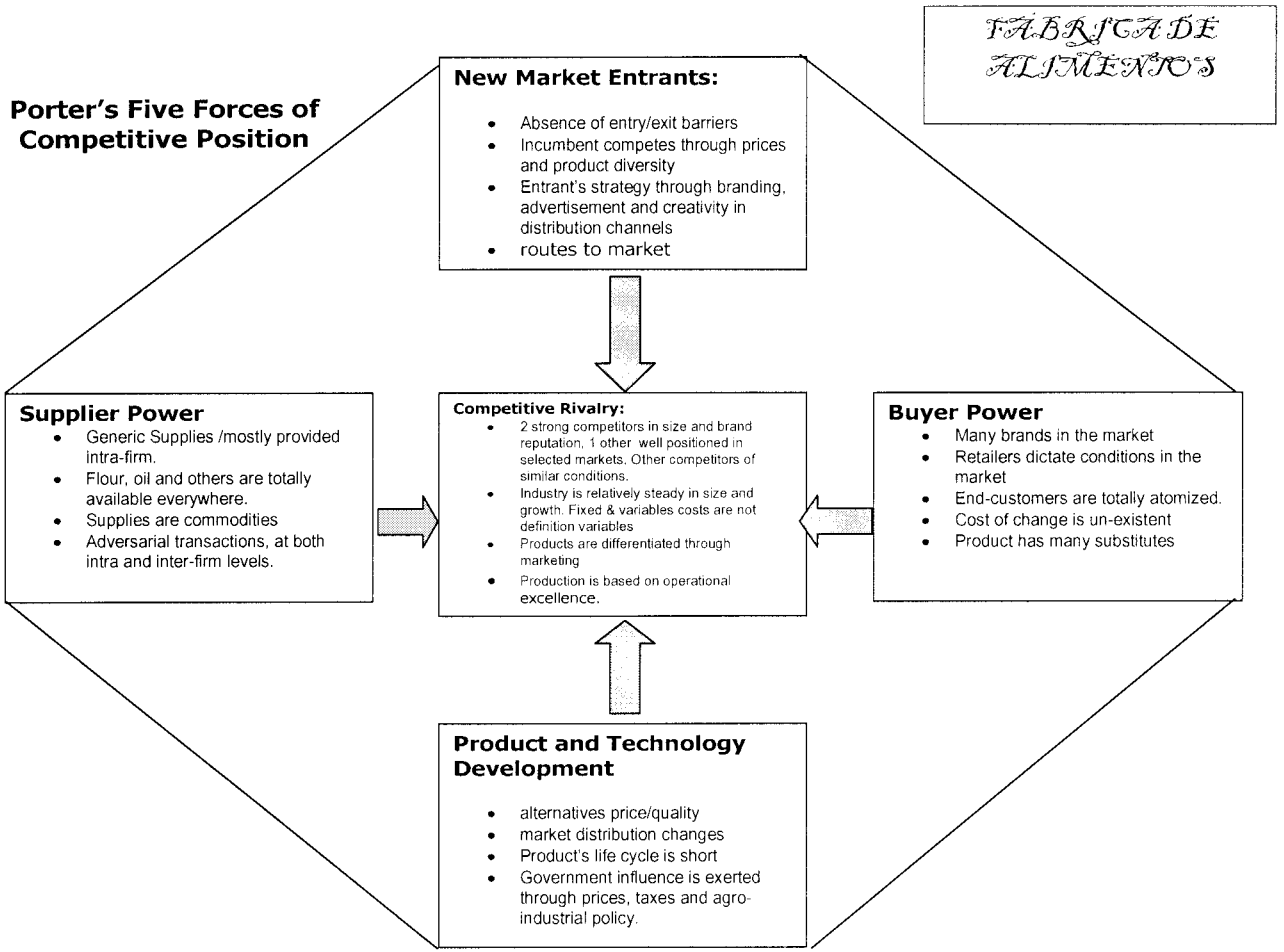


Figure A2: Porter's five forces diagram for PA

Main results: Assessing VI in Productos Alimenticios

Stages of integration

In supply chain #1 -*Cardboard Exhibitors*- *PA* engages in two stages upstream, flour supply and packaging materials and two downstream, some transportation and marketing. *Fábrica de Alimentos* is the focal firm, and the relevant SBU in this chain, in charge of the whole manufacturing process. Distribution to the end-customer is made trough low-integration distributors.

In supply chain #2, there are two quite distinct channels. The first one, under study, distributes, in-house, through *PD*, the other, through the distribution channels of a world class retailer. Even though this last segment of the SC would not be analyzed, it is important to mention that is the world-class retailer that becomes the focal firm and organizes production. In SC #1, it is clear that *PA* is fully integrated, whereas in SC #2, integration is conclusive only in the first channel, since in the second channel, the retailer takes advantage of the vertical control exerted by the firm over suppliers, therefore *FA* forfeits control of the chain.

Breadth

The index of vertical integration was calculated as the ratio of the number of vertically integrated segments over the total number of segments is 0.5 (four out of eight segments), revealing high levels of VI.

Degree

Degree of integration, relates to the proportion of total output that an SBU purchases or sells to its sister SBUs. In the case of SC #1, *Fábrica de Alimentos* buys most of its flour supply and packaging material needs to *PA's* subsidiaries and sells the totality of its production to its sister SBU "*Products Distributorships*". In SC #2, provision of flour is the same, but packaging materials are bought generally outside the firm. In the first channel, downstream, *FA* sells all its production in-house, but in channel two, most of the output goes directly to the world-class retailer under its generic brand name.

Forms

The last dimension, forms refers to the ownership status of SBUs under vertical control. PA prefers to exert full ownership over more than eight of its subsidiaries.

Main Contribution:

As evidenced in the documentary information collected and after the analysis of the four dimensions of vertical integration as they are applied to *PA*, the claim that the group exhibits a high-level of vertical integration over the two chains considered in this study is supported.

In particular the relevant SBU in this case, *Fábrica de Alimentos*, as part of corporate strategy, fully operates under the vertical control exerted by the parent company, *PA*.

APPENDIX B: COMMUNICATIONS SUMMARY WITH PRODUCTOS ALIMENTICIOS

CONTENTS

1) Cover Letter

2) Presentation Document

3) Electronic communication with PA

COMMUNICATIONS SUMMARY WITH PRODUCTOS ALIMENTICIOS

Access Negotiation

1) Cover Letter

TECNOLÓGICO DE MONTERREY

C.P: GB
Grupo Productos Alimenticios
Presente

Atizapán de Zaragoza a 09 de noviembre de 2005

Estimado Contador GB:

Los programas de investigación en el ITESM, tienen como prioridad la aplicación del conocimiento que en ellos se genera, al desarrollo económico y social de su comunidad. Por tal motivo se busca el contacto estrecho con los principales agentes económicos para establecer proyectos conjuntos, en áreas selectas, en donde destacan la atención a manufacturas, logística y competitividad.

Uno de los proyectos que inicia, es la medición de la alineación de los actores de la cadena a través de la cuantificación de la eficiencia de sus operaciones para cada uno de ellos y de la eficacia de la cadena en su conjunto.

Por tal motivo nos dirigimos a usted, por una parte para presentar al equipo de investigadores a cargo del proyecto, el Dr. Juan Gaytán Iniestra y el MSc. Carlos Canfield Rivera y por la otra solicitar la participación de Grupo Productos Alimenticios en dicho proyecto, sabiendo del interés que tiene su empresa en apoyar la investigación desarrollada por el Instituto.

La participación de Productos Alimenticios como empresa patrocinadora consiste en permitirnos recopilar información tendiente a medir la eficiencia de cada uno de los integrantes de la cadena. de suministro de su interés.

Para este fin, se requiere que establezcamos un mecanismo de coordinación con las áreas funcionales relacionadas con la cadena de abastecimiento de Productos Alimenticios, con el propósito de recopilar la información y proceder a su análisis e integración en un modelo de medición del desempeño de dicha cadena.

Los beneficios que Productos Alimenticios recibiría al participar en este proyecto son la definición o revisión de su sistema de medición del desempeño, la medición de la eficiencia de los participantes en la cadena y sugerencias de áreas de oportunidad de mejora. Asimismo, se incluye la transferencia de la operación del modelo resultante y la capacitación necesaria para su aplicación en la toma de decisiones.

Dado el carácter estrictamente académico de esta investigación, le ofrecemos la absoluta confidencialidad en el manejo de la información, además de que por su carácter experimental de la investigación, ésta no tendría ningún costo para su empresa.

Agradecemos su atención al presente y quedamos de Usted

A t e n t a m e n t e

Dr. Juan Gaytán Iniestra
Director del programa Doctoral
en Ingeniería Industrial.
ITESM Campus Toluca

Msc. Carlos Canfield Rivera
Profesor del Departamento de Finanzas
Candidato a Doctor en Administración
ITESM Campus Estado de México

2) Presentation Document

TECNOLÓGICO DE MONTERREY

CAMPUS ESTADO DE MÉXICO

PROYECTO DE INVESTIGACIÓN: *LA* ALINEACIÓN ENTRE LOS INTEGRANTES DE LA CADENA DE ABASTECIMIENTO A TRAVÉS DE LA MEDICIÓN DE SU EFICIENCIA. EMPRESAS DE MANUFACTURA

Presentado por Carlos Eduardo Canfield Rivera con el propósito de integrar la investigación de campo para complementar su tesis doctoral.

RESUMEN EJECUTIVO

LA INVESTIGACIÓN EN EL ITESM CAMPUS ESTADO DE MÉXICO

Los programas de investigación en el ITESM Campus Estado de México, tienen como prioridad la aplicación del conocimiento que en ellos se genera al desarrollo económico y social de su comunidad. Por tal motivo se busca un contacto estrecho con los agentes económicos de mayor impacto en la sociedad para establecer proyectos conjuntos, en áreas selectas, en donde destacan la atención a manufacturas, logística y competitividad.

En esta ocasión se presenta la oportunidad de vincular a la institución con la industria en un proyecto orientado a la integración de un sistema de medición del desempeño en la cadena de abastecimiento para el caso de empresas manufactureras mediante el uso de la técnica del *Data Envelopment Analysis* (DEA).

Antecedentes del Proyecto:

Las condiciones de los mercados en la actualidad, determinan que cada vez más, las empresas compiten a través de su participación en las cadenas de abastecimiento. La alineación de los integrantes de la cadena alrededor de una estrategia definida, sea ésta caracterizada por competencia en bajos costos, por diferenciación o por una combinación de ambas, es una de las fuentes más importantes de ventaja competitiva.

A pesar de grandes esfuerzos de estandarización, la industria aún no ha resuelto de manera satisfactoria el problema de la medición del desempeño. El exceso de medidas o la carencia de balance entre las diferentes dimensiones que las agrupan, siguen caracterizando hasta hoy, a su evaluación. Los sistemas de medición no han evolucionado a la par de los nuevos esquemas de la competencia motivo por el cual no buscan la integración de la cadena, como unidad de estudio.

Por tal motivo la posibilidad de alcanzar la reducción de las medidas y su posterior integración en un indicador único cobran relevancia en términos de competitividad al permitir que la Alta Dirección obtenga una visión de conjunto sobre las diversas cadenas de suministro en que participa de manera focal y tomar las decisiones necesarias para adoptar las "Mejores Prácticas" en la búsqueda del posicionamiento de su empresa como líder de una cadena de clase mundial.

Objetivo:

El proyecto de investigación tiene como propósito determinar el nivel de alineación de los integrantes de una cadena en torno a una estrategia definida, a partir de la identificación, revisión y estructura de las medidas tendientes a precisar la eficiencia, entendida como una relación en porcentaje entre output/input, primero de cada uno de los participantes y posteriormente de manera integral en cada cadena en donde participa la empresa, que en adelante se definirá como empresa focal del proceso de distribución.

Metodología:

1. Definición del objeto de estudio y la unidad de medida:

Se establece la cadena de abastecimiento como la unidad de medida del presente proyecto. Se Identifican las cadenas, objeto de estudio, de interés para la empresa y los investigadores. Es deseable por una parte que el nivel de desglose de la cadena incluya a proveedores y consumidores, tomando en cuenta a la empresa integradora como punto focal y por la otra, que el desglose se de a nivel de SKU´s ó UPC´s, según el caso.

2. Integración de las medidas del sistema de evaluación:

La identificación de las medidas de desempeño relevantes para la cadena de abastecimiento, parte de dos premisas fundamentales: i) probablemente la más importante, la necesidad de medir la habilidad de la cadena para proporcionar al cliente el bien o servicio prometido al costo óptimo. Esto es, las medidas deben ser relevantes para el cliente y ii) la determinación del usuario principal de la información (Alta Dirección, Gerencia o Supervisores Operativos).

Tomando en cuenta lo anterior, es necesario revisar los sistemas de medición de eficiencia existentes para la cadena. Se requiere llegar a un ***acuerdo*** con los participantes, sobre aquellas medidas deseables y a la vez factibles, procediendo a su recopilación y/o construcción, según sea el caso.

Para efectos de estructurar las medidas obtenidas como output en la medición de la eficiencia se sugiere el empleo del modelo del Balanced Scorecard, modificado para cadenas de abastecimiento en sus cuatro dimensiones: Desempeño Financiero, Procesos Internos, Clientes e Innovación.

Las medidas de desempeño, que en primera instancia se sugieren son:

Caso de Manufacturas: Output

Desempeño Financiero	***Procesos Internos***	***Clientes***	***Innovación***
1) Costo de Servir	2) Lead Time	3) DIFOT	4) Sugerencias por empleado
5) ciclo de efectivo (días)	6) % de Eficiencia de los pronósticos contra plan de producción.	7) % de garantías atendidas/ventas totales	8) % ó acciones de capacitación a distribuidores/proveedores
9) Rotación de inventarios/activos	10) Customer Facing Fill Rate	11) Competitividad en precios/costos	
12) ROI, ROA		13) Participación de mercado	

En primera instancia, se sugieren 13 medidas clave para la empresa.

Inputs: En este caso también se requiere llegar a un acuerdo en cuanto a aquellos insumos que la empresa considere pertinentes. *Se sugiere la incorporación de al menos las siguientes medidas: Tiempo dedicado a la atención de proveedores/clientes, % de utilización de maquinado, número de empleados y valor de los activos relacionados con la cadena en cuestión.*

Se considera que esta información deberá recopilarse durante el mes de _____ del 2005, para efectos de que pueda ser analizada en el mes de _____ del mismo año.

3. Análisis de la información y Construcción de Indicadores.

Construcción de la frontera eficiente: Una vez recopilada la información se procede a su análisis y a la construcción de indicadores de eficiencia para cada participante y de forma integral para la cadena, a partir de la técnica: Data Envelopment Analysis (DEA).

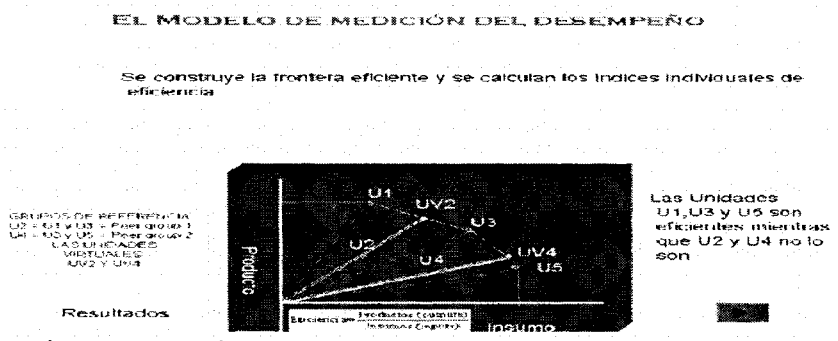


Ilustración 1: Construcción de la frontera eficiente a partir de DEA

4. Valores Meta y Posibilidades de Benchmarking

Se determinan los indicadores de eficiencia, los valores meta (para cada una de las variables incluidas y para cada participante en la cadena), y la efectividad de la cadena, medida a través de la alineación entre sus participantes sobre una estrategia definida, en este caso sobre *bajos costos*/ Diferenciación del producto de acuerdo con la estrategia implícita del negocio.

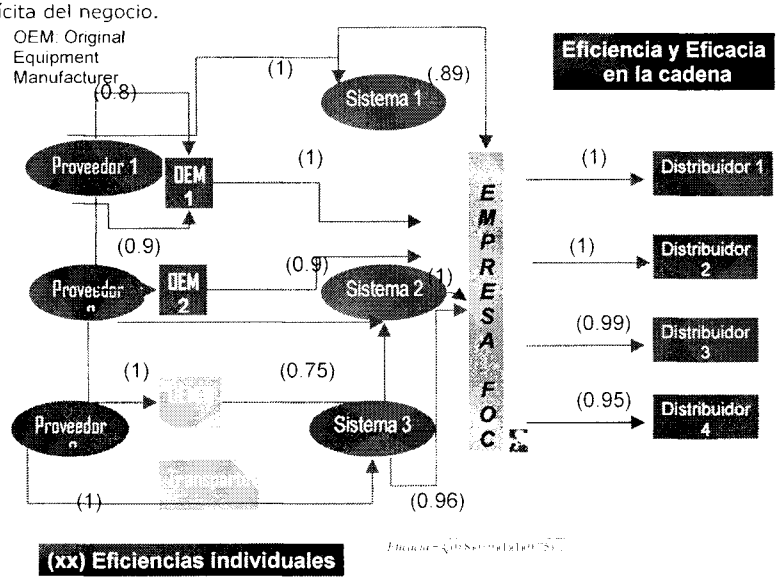


Ilustración 2: Ejemplo del modelo de medición de eficiencia y eficacia en la cadena de suministro

5. Validación de los Resultados del modelo de Evaluación.

Se analizan y validan los resultados de forma conjunta entre la empresa y los investigadores del ITESM.

Con base en las mejores prácticas a nivel de la cadena, se detectan áreas de oportunidad de mejora y se realizan sugerencias y recomendaciones, mismas que se jerarquizan en su importancia y en el tiempo. Entre estas oportunidades, se identifican aquellos beneficios que resulten de:
SATISFACCIÓN DEL CLIENTE: Incrementos en las Utilidades derivados del impacto sobre la satisfacción del cliente (demanda) debido a una mayor disponibilidad del bien o servicio en cuestión.(Oferta).
MEJORAS EN LOS MÁRGENES: A raíz de la reducción de costos. Reducción de ineficiencias y mejoras en los procesos de planeación.
UTILIZACIÓN DE ACTIVOS: Beneficios resultantes de la optimización operativa de los activos de la cadena, incluyendo el mejor uso de los recursos humanos, materiales y las tecnologías de la información.

6. Oportunidades y Áreas de Mejora en la Eficiencia. Transferencia y Operación del Modelo por parte de la Empresa.

A partir de las mejoras y adecuaciones resultantes del proceso inicial, se transfiere a la gerencia, la operación del sistema de seguimiento de los indicadores para la administración de la cadena.

Participación Requerida de la Empresa.

Esta participación se centra en el apoyo al grupo investigador para la identificación de las cadenas de interés para el estudio, la revisión y construcción en su caso, de los sistemas de medición del desempeño y eficiencia de la cadena, y las facilidades para la recopilación de la misma entre los elementos clave de la cadena (distribuidores, proveedores, terceros y clientes).

Costo de la Investigación para la Empresa

Dado el carácter experimental de la investigación y el consecuente objetivo académico, esta actividad no tiene ningún costo, salvo aquel que incurre la empresa al auxiliar al Grupo Investigador en la recopilación de la información para alimentar el modelo.

Beneficios del Estudio para la Empresa:

Como resultado de la participación en el proyecto, la Alta Dirección de la Empresa:

- Tendrá acceso ilimitado a un sistema de medición y seguimiento del desempeño y eficiencia de las cadenas de abastecimiento seleccionadas.
- Estará en capacidad de usar esta herramienta en apoyo a la gestión y a la toma de decisiones, pudiendo así identificar áreas de oportunidad, princiPDente en lo relacionado con la alineación de la cadena, desarrollo de proveedores y clientes en torno a la administración de la cadena de abastecimiento.

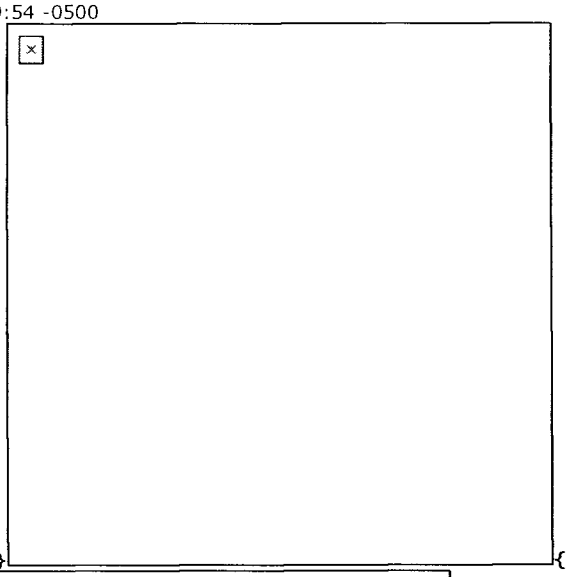
- Tendrá elementos para efectuar un benchmarking en torno a las mejores prácticas que identifican a las cadenas de clase mundial.

Principios de Confidencialidad de la Información:

El equipo de Investigadores del ITESM garantiza la total confidencialidad de la información, cuyo uso por parte de la Institución es eminentemente académico, con el fin de generar reportes y publicaciones académicas inclusive. Para tal efecto los investigadores aseguran en todo momento el cumplimiento de las políticas y disposiciones que la Empresa considere pertinentes para salvaguardar su información.

3) Electronic communication with PA

De: <cperez@packaking co.com.mx>
A: <carlos.canfield@itesm.mx>
Cc:
Asunto: RE: información sobre nivel de servicio
Fecha: Fri, 21 Apr 2006 16:09:54 -0500



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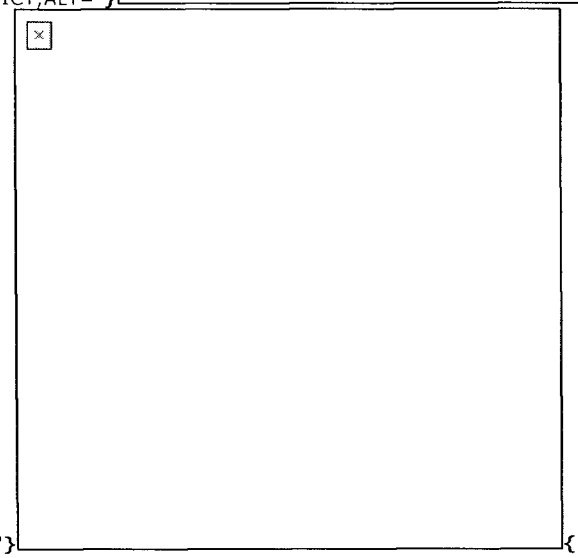

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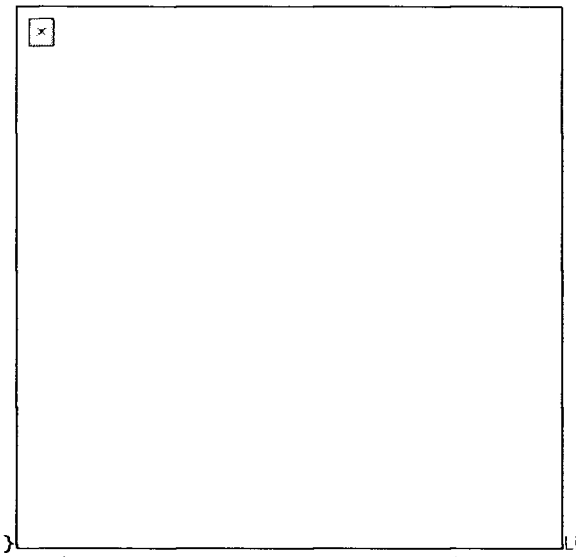


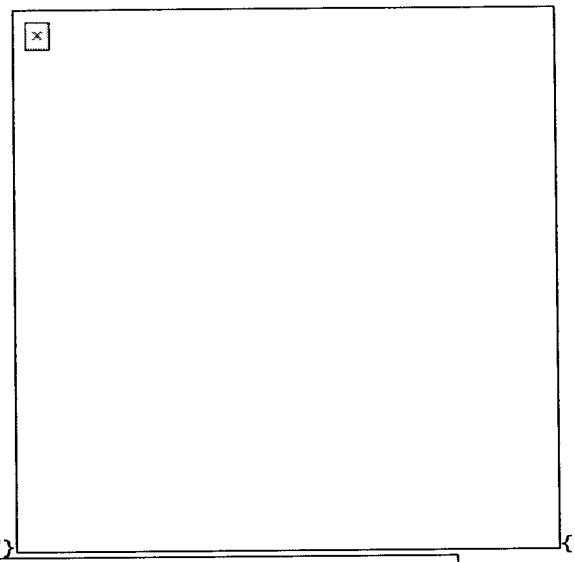
"TYPE=PICT;ALT="}Lic Canfield:
Ya tengo la de febrero, déjeme conseguir la de marzo y se la envió en breve.
SALUDOS

-----Mensaje original-----
De: Carlos Canfield [mailto:carlos.canfield@itesm.mx]
Enviado el: Viernes, 21 de Abril de 2006 02:21 p.m.
Para: Julio Cesar P (Películas)
Asunto: RE: información sobre nivel de servicio

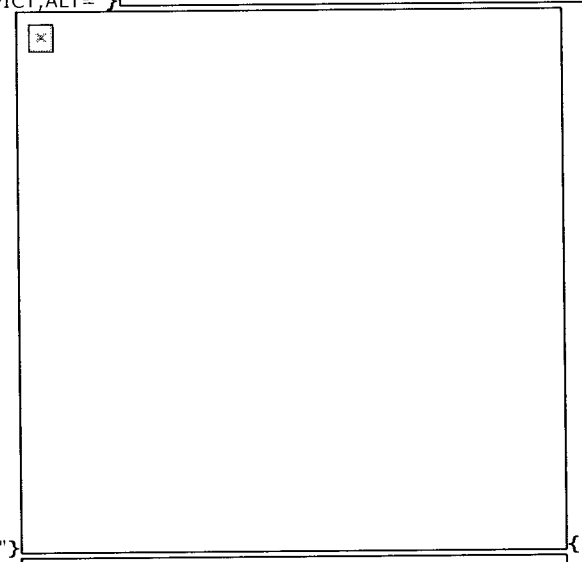
Ing. P, buenas tardes:
Aprovecho para informarle acerca de la dificultad para obtener cifras anuales de los niveles de servicio en FA, debido a las características propias del sistema. Sin embargo, para efectos de homogeneizar la información, sería tan amable de proporcionarme los datos sobre nivel de servicio (volumen y fecha) para los meses de febrero y marzo para los empaques relacionados con el exhibidor y de ser posible el margen correspondiente, como la vez anterior. Agradezco su atención y quedo en espera de su respuesta Atentamente Carlos Canfield
>-- Mensaje Original --
>Subject: RE: información sobre nivel de servicio
>Date: Wed, 15 Mar 2006 20:17:21 -0600
>From: <cperez@packaking co.com.mx>
>To: <carlos.canfield@itesm.mx>

Estimado Lic Canfield:
Antes que nada le pido una disculpa por no haber podido estar en la pasada reunión, pero si me comento el Lic Armando P de la información que se necesita, ya estamos trabajando en ella, en cuanto la tenga se la hago llegar. Por lo de la presentación, si me la hicieron llegar muchas gracias. >SALUDOS
>De: Carlos Canfield [mailto:carlos.canfield@itesm.mx]
Enviado el: Miércoles, 15 de Marzo de 2006 11:31 a.m.
Para: Julio Cesar P (Películas)
Asunto: información sobre nivel de servicio
Ing. P buenos días:
>Para efectos de terminar el proyecto de medición, me permito solicitar de usted la información de películas plásticas acerca del nivel de servicio por volumen y fecha de los empaques de los exhibidores para los periodos febrero y todo el año 2005. Esta información me permitirá complementar con la de FA y PD y consolidar los reportes correspondientes.
Una pregunta: ¿Recibió Ud. copia del avance
{PRIVATE "TYPE=PICT;ALT="}{PRIVATE "TYPE=PICT;ALT="}

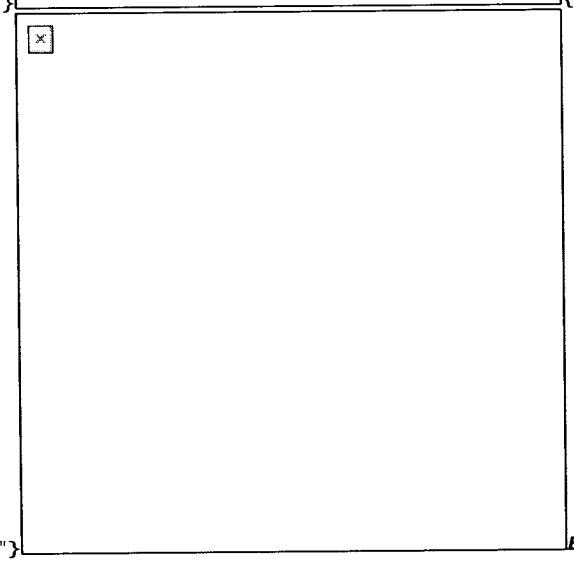
De: <MTB@alimenticios.com.mx>
A: <carlos.canfield@itesm.mx>
Cc: <IP@alimenticios.com.mx>
Asunto: información indicadores 2005 y 2006.
Fecha: Mon, 10 Apr 2006 17:53:23 -0500



{PRIVATE "TYPE=PICT;ALT="}{PRIVATE



"TYPE=PICT;ALT="}{PRIVATE



"TYPE=PICT;ALT="}***Estimado Licenciado Carlos:***

Los indicadores del mes de Febrero y Marzo de FA son:

Exhibidor 100 pqts	**59.48%SP**	**SP**	**SP**	**N/A**

María de Rollo	**1.30%**	**100.00%**	**100.00%SP**		**100.00%**
Exhibidor 100 pqts	**0.00%SP**	**SP**	**SP**	**N/A**	
María de Rollo	**25.00%**	**50.00%**	**100.00%SP**		**100.00%**
Exhibidor 100 pqts	***94.64%100.00%***	***SP***	***SP***	***NA***	
María de Rollo	***SP***	***SP***	***SP***	***SP***	***100.00%***
Exhibidor 100 pqts	***33.33%66.67%***	***SP***	***SP***	***NA***	
María de Rollo	***SP***	***SP***	***SP***	***SP***	***87.50%***

Rentabilidad

FABRICA DE Alimentos PRODUCTOS ALIMENTICIOS S.A. DE C.V.

RENTABILIDAD POR PRODUCTO

Margen Bruto

10038629001426 EXHIBIDOR 4.47 Kg.

	MP	ME	MO	GIF	CT	PN	PN-CT	% Mg. Real	Pronóstico	Diferencia
ENE ´05	6.6734	3.7851	0.8101	1.6587	12.9273	18.3445	5.4172	29.53%	25.79%	3.74%
Feb	6.6146	3.8586	0.8630	1.7670	13.1032	18.3445	5.2413	28.57%	24.64%	3.93%
Mar	6.5211	3.8957	0.8630	1.7670	13.0468	18.3445	5.2977	28.88%	14.87%	14.01%
Abr	6.6141	3.9382	0.8630	1.7670	13.1823	18.3445	5.1622	28.14%	17.79%	10.35%
May	6.4709	3.9425	0.8630	1.7670	13.0434	18.3445	5.3011	28.90%	16.05%	12.85%
Jun	6.6216	3.9671	0.8630	1.7670	13.2187	18.3445	5.1258	27.94%	21.87%	6.07%
Jul	6.5166	3.9528	0.8630	1.7670	13.0994	16.1432	3.0438	18.85%	18.98%	-0.13%
Ago	6.5239	3.9507	0.8630	1.7670	13.1046	16.1432	3.0386	18.82%	16.68%	2.14%
Sep	6.2867	3.9394	0.8630	1.7670	12.8561	16.1432	3.2871	20.36%	25.23%	-4.87%
Oct	6.4926	3.9617	0.8630	1.7670	13.0843	18.3445	5.2602	28.67%	27.92%	0.75%
Nov	6.4295	3.9624	0.8630	1.7670	13.0219	18.3445	5.3226	29.01%	22.72%	6.29%
Dic	6.4330	3.9477	0.8630	1.7670	13.0107	18.3445	5.3338	29.08%	17.13%	11.95%
ENE ´06	6.2356	3.9357	0.863	1.767	12.8013	17.6107	4.8094	27.31%		27.31%
Feb ´06	6.2632	3.9308	0.8630	1.7670	12.8240	17.6107	4.7867	27.18%		27.18%
Mar ´06	6.4011	3.9296	0.8633	1.7675	12.9615	17.6107	4.6492	26.40%		26.40%

10038629001693 MARÍAS 20/170 g

	MP	ME	MO	GIF	CT	PN	PN-CT	% Mg.	Pronóstico	Diferencia
ENE	4.7359	1.5178	0.2491	0.5099	7.0127	10.7353	3.7226	34.68%	25.79%	8.89%
Feb	4.6889	1.5358	0.2491	0.5099	6.9837	10.7353	3.7516	34.95%	24.64%	10.31%
Mar	4.6874	1.5703	0.2491	0.5099	7.0167	10.7353	3.7186	34.64%	14.87%	19.77%

Abr	4.7334	1.6665	0.24910.5099	7.158910.73533.576433.31%	17.79%	15.52%
May	4.6122	1.6425	0.24910.5099	7.013710.73533.721634.67%	16.05%	18.62%
Jun	4.7135	1.6613	0.24910.5099	7.133810.73533.601533.55%	21.87%	11.68%
Jul	4.5475	1.6401	0.24910.5099	6.9466 9.44712.500526.47%	18.98%	7.49%
Ago	4.7768	1.6945	0.24910.5099	7.2303 9.44712.216823.47%	16.68%	6.79%
Sep	4.6972	1.6798	0.24910.5099	7.1360 9.44712.311124.46%	25.23%	-0.77%
Oct	4.8191	1.7269	0.24910.5099	7.305010.73533.430331.95%	27.92%	4.03%
Nov	4.7703	1.7476	0.24910.5099	7.276910.73533.458432.22%	22.72%	9.50%
Dic	4.7795	1.5254	0.24910.5099	7.063910.73533.671434.20%	17.13%	17.07%
ENE '06	4.6554	1.5255	0.24910.5099	6.939910.3059 3.36632.66%		32.66%
Feb '06	4.6444	1.5257	0.24910.5099	6.929110.30593.376832.77%		32.77%
Mar '06	4.7910	1.5304	0.24910.5099	7.080410.30593.225531.30%		31.30%

Indicadores 2005.

Mes Serv. por fecha prometida Serv. por cantidad

Erne 82.5 % 97.3% Feb 80.7 79.2 Mar 72.3 78.9 Abr 72.2 95.4 May 71.2 91.6 Jun 76.8 98.8 Jul 81.95.8 Ago 60.1 82.2 Sep 69.1 72.1 Oct 62.8 55.5 Nov 55.6 55.3 Dic 71.5 67.0

Para el año 2005, no es posible obtener el detalle por cada artículo como lo venimos haciendo durante 2006, debido a que los registros de ese año, han sido eliminados del sistema. Sólo se guardan los porcentajes generales. Le pido considerarlo así para aplicarlo en el exhibidor y en la María de Rollo. Si tiene alguna pregunta no dude en contactarme. Saludos. C.P. TB Contraloría Fábrica de Alimentos Productos Alimenticios.

De: <IP@.com.mx>
A: <carlos.canfield@itesm.mx>
Asunto: RV: Indicadores 2005.
Fecha: Fri, 7 Apr 2006 19:23:08 -0500
{PRIVATE "TYPE=PICT;ALT="}Lic. Canfield: Para su información. Saludos

-----Mensaje original-----
De: TB (Alimentos)
Enviado el: Viernes, 07 de Abril de 2006 12:15 p.m.
Para: IP (Alimentos)
Asunto: RV: Indicadores 2005.

Ingeniero:

No he podido obtener la información de los indicadores para el año 2005, esto debido a que como explica sistemas, al depurarse las órdenes de venta cada mes, no es posible obtenerlo después de ello.

Sistemas tampoco guarda archivos de esto. para no dejarlo en blanco, le enviaré a Carlos Canfield el porcentaje general que arrojan los indicadores por mes.

Para el año 2006, cada mes sistemas me envía el soporte de tales indicadores a detalle lo cual me permite consultar por cada producto el desempeño del indicador.Para su información. Saludos.

-----Mensaje original-----
De: Gustavo Gutiérrez
Enviado el: Viernes, 07 de Abril de 2006 11:46 a.m.
Para: TB (Alimentos)
Asunto: RV: Indicadores 2005.

Saludos Marcelo, te comento que los reportes de cumplimiento y otros reportes de ventas, salen con la información correcta siempre y cuando no se hayan depurado las órdenes de ventas, de lo contrario solo aparecerán las líneas que se hayan surtido parcial o totalmente, y las líneas que se hayan depurado (porque no se surtió nada de las mismas) no aparecen en los reportes.

Gracias.

De: Gustavo Gutiérrez (Alimenticios)
Enviado el: Viernes, 07 de Abril de 2006 11:28 a.m.
Para: Hermilo Peña (Alimenticios)
Asunto: RE: Indicadores 2005.

Estuve revisando si hay alguna sesión que te pueda servir para checar lo que se ha entregado por rangos de fechas por artículo y solo encontré la sesión tdsls9451m058 y la tdsls9451m039 no se si te sirva alguna de estas. Otra

observación importante es que si depuran las órdenes de venta, por eso solo aparecen las líneas que se surtieron parcial o totalmente, pero las que no se surtió nada no aparecen en los reportes.

De: Hermilo Peña (Alimenticios)
Enviado el: Viernes, 07 de Abril de 2006 10:54 a.m.
Para: Gustavo Gutiérrez (Alimenticios)
Asunto: RV: Indicadores 2005.

De: TB (Alimentos)
Enviado el: Jueves, 06 de Abril de 2006 07:16 p.m.
Para: Hermilo Peña (Alimenticios)
Asunto: Indicadores 2005.

Estimado Hermilo:Los productos que te mencioné son 10038629001426 exhibidor de 4.47g.10038629001693 maría moderna 20/170 g10038629001129 maría moderna 20/170 g exp.

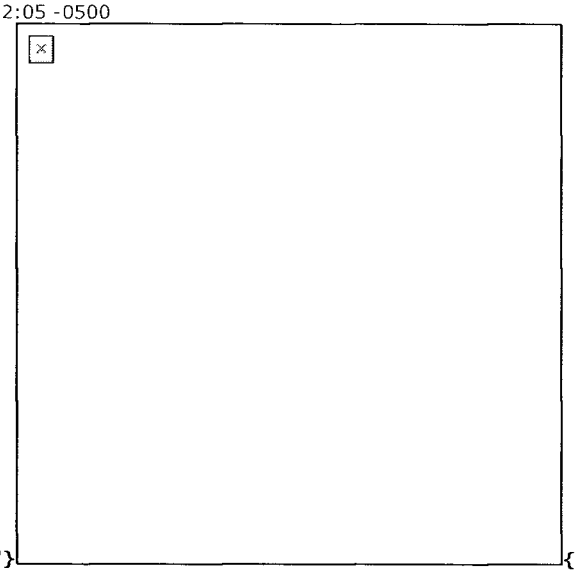
De los archivos que me hace favor de enviar Aline, desprendo el detalle por cliente (PD) para los indicadores de pedido y de fecha de forma mensual a detalle.Te agradezco por tu ayuda.Saludos.C.P. TB Contraloría Fábrica de Alimentos Productos Alimenticios.

De: TB (Alimentos)
Enviado el: Miércoles, 29 de Marzo de 2006 11:28 a.m.
Para: Hermilo Peña (Alimenticios)
Asunto: Indicador de servicio.

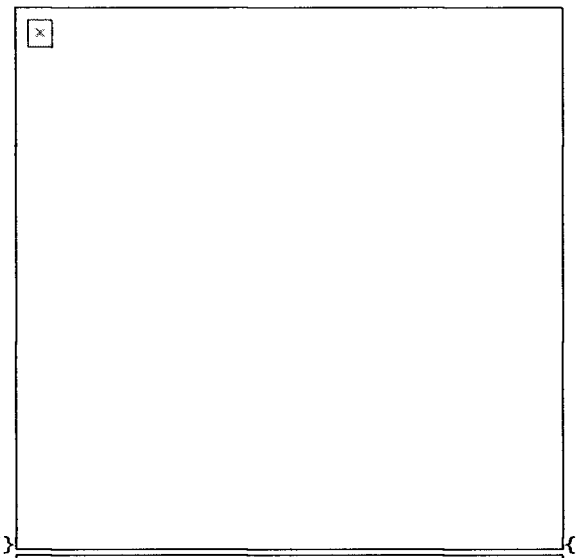
Estimado Hermilo:

Como te había comentado en otro correo, si corro la sesión tdsls9451m099 de pedido vs surtido ponderado, para el producto 10038629001426 durante el año de 2005, mes a mes me indica entregas del 100%, lo cual no lo creo. ya que durante 2006 tomando ese producto con el detalle que aline me hizo favor de enviar, el cumplimiento es por debajo del 50%.Ya leí todas las instrucciones que indican en el Intranet, pero incluso, colocando pedidos inicial y final en cada mes, el resultado es el mismo, al 100%.Qué otra opción podría utilizar para obtener el indicador más exacto para el producto referido? Te agradezco. C.P. TB

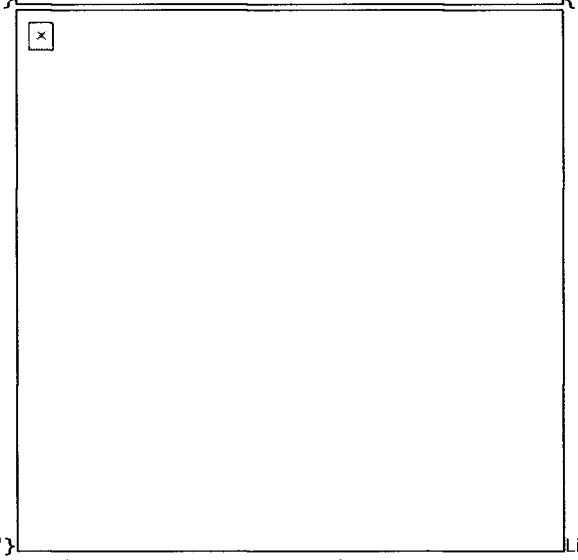
De: <IP@alimenticios.com.mx>
A: <carlos.canfield@itesm.mx>
Cc:
Asunto: RV: información sobre nivel de servicio
Fecha: Sun, 2 Apr 2006 09:32:05 -0500



{PRIVATE "TYPE=PICT;ALT="}{PRIVATE



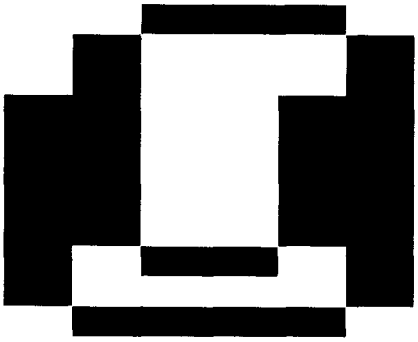
"TYPE=PICT;ALT="}{PRIVATE



"TYPE=PICT;ALT="}Lic. Canfield: Le anexo el archivo con las ventas mensuales de Marías y Exhibidores para el período 2000 - 2005. Estas ventas corresponden a las que factura FA. Entiendo que el Ing. F ya le envió la información referente al punto 3 y solamente mañana veré si el C.P. TB ya le envió la información sobre los niveles de servicio. Saludos

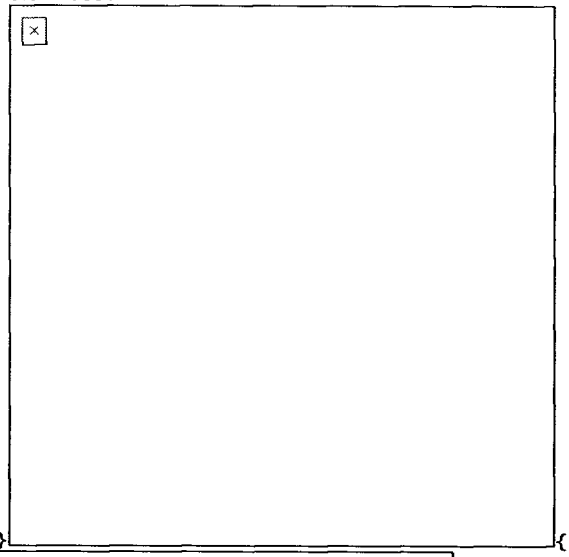
-----Mensaje original-----
De: Carlos Canfield [mailto:carlos.canfield@itesm.mx]
Enviado el: Miércoles, 15 de Marzo de 2006 11:26 a.m.
Para: IP (Alimentos)
Asunto: información sobre nivel de servicio

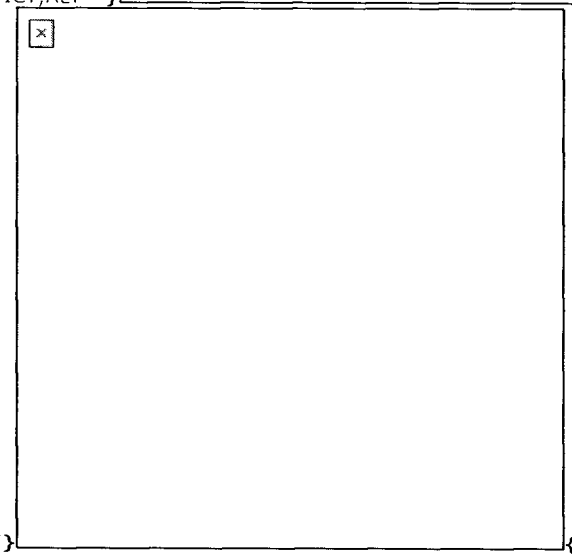
Ing. P, buenos días:Para efectos de concluir con la determinación de la medición de la eficiencia, me permito solicitar la información siguiente:1) Nivel de servicio por volumen y fecha para el año 2005 y del mes de febrero. 2) Ventas mensuales en Kg. 2000-2005 para alimentos marías y exhibidores que factura FA. 3) Los años 2000 al 2002 de las ventas finales en k.o. que realizan los centros regionales. (para complementar la información que tan amablemente me proporcionó anteriormente) La información sobre ventas no se requiere desglosada por centro de distribución. Solo me falta solicitar a películas plásticas su información de nivel de servicio para integrar las mediciones como habíamos acordado. Le agradezco su atención y me pongo a sus ordenes
Atentamente

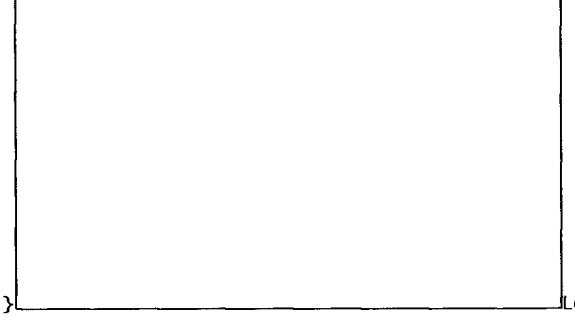


Carlos Canfield
<IF@alimenticios.com.mx>
A: <IP@alimenticios.com.mx>
Cc: <carlos.canfield@itesm.mx>
Asunto: RE: información sobre nivel de servicio
Fecha: Thu, 30 Mar 2006 11:16:14 -0600

VENTAS 2000-2005.xls (20.0 KB) **De:**





"TYPE=PICT;ALT="}  Le anexo la información solicitada. Ventas De Exhibidores 100 y Marías De Rollo.xls Saludos.

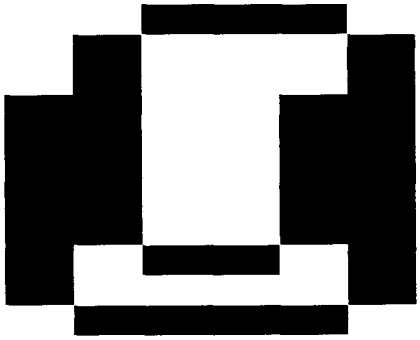
-----Mensaje original-----
De: IP (Alimentos)
Enviado el: Martes, 28 de Marzo de 2006 08:00 p.m.
Para: Leopoldo F (PD)
CC: Carlos Canfield
Asunto: RV: información sobre nivel de servicio

Polo: ¿Podría usted enviarle al Lic. Canfield la información sobre las ventas mensuales de PD de Marias de Rollo y Exhibidores de 100 para los años de 2000, 2001 y 2002? Saludos

-----Mensaje original-----
De: Carlos Canfield [mailto:carlos.canfield@itesm.mx]
Enviado el: Miércoles, 15 de Marzo de 2006 11:26 a.m.
Para: IP (Alimentos)
Asunto: información sobre nivel de servicio

Ing. P, buenos días: Para efectos de concluir con la determinación de la medición de la eficiencia, me permito solicitar la información siguiente: 1) Nivel de servicio por volumen y fecha para el año 2005 y del mes de febrero. 2) Ventas mensuales en k.o. 2000-2005 para alimentos marías y exhibidores que factura PA.
3) Los años 2000 al 2002 de las ventas finales en k.o. que realizan los centros regionales. (para complementar la información que tan amablemente me proporcionó anteriormente) La información sobre ventas no se requiere desglosada por centro de distribución. Solo me falta solicitar a películas plásticas su información de nivel de servicio para integrar las mediciones como habíamos acordado.

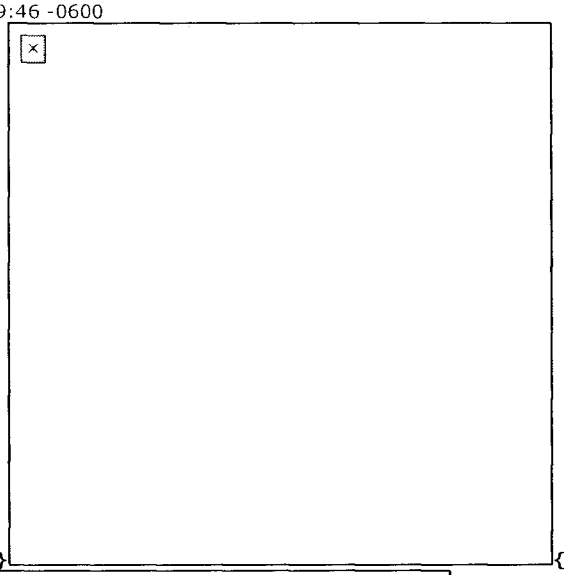
Le agradezco su atención y me pongo a sus ordenes Atentamente Carlos Canfield



Ventas De Exhibidores 100 y Marías De Rollo.xls (10.2 KB)

De: <MTB@alimenticios.com.mx>
A: <carlos.canfield@itesm.mx>

Asunto: RE: información sobre nivel de servicio
Fecha: Fri, 24 Mar 2006 12:49:46 -0600



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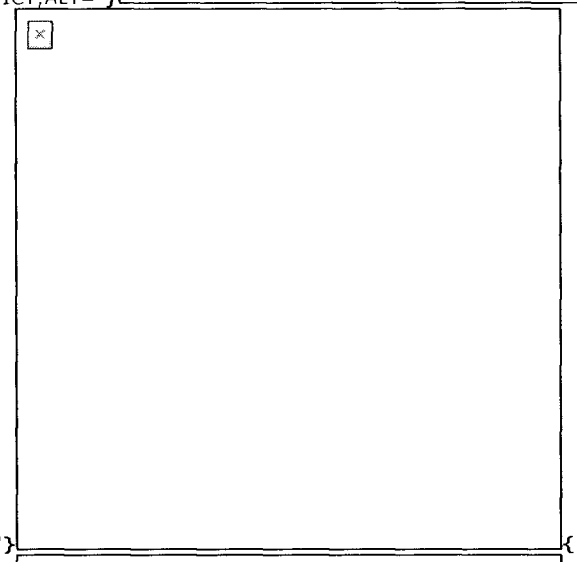

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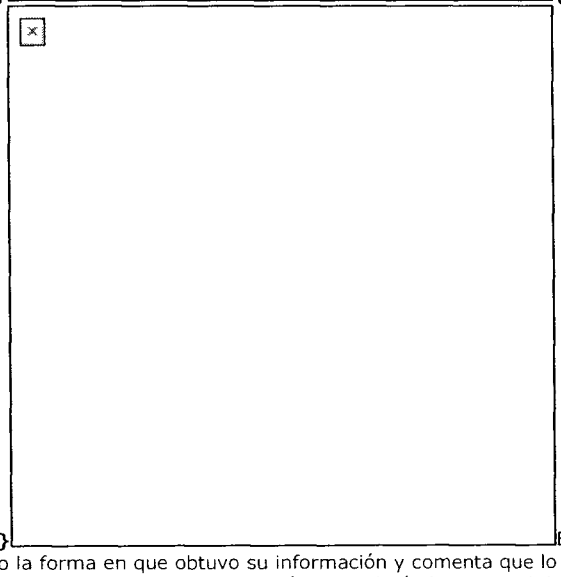
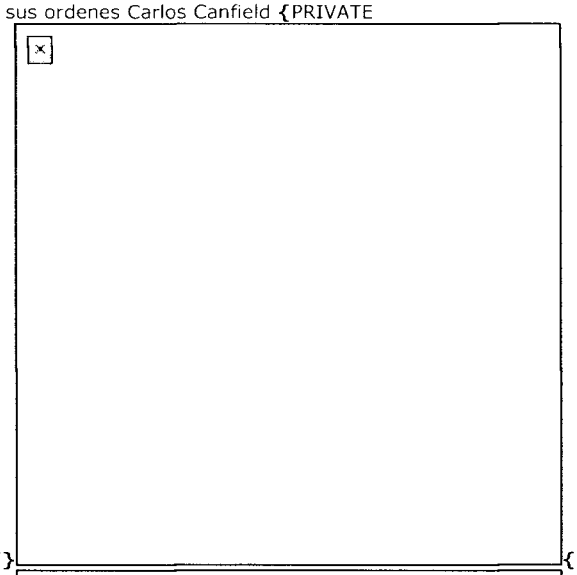


{PRIVATE "TYPE=PICT;ALT="}Estimado Licenciado Carlos:
Pregunté a Leopoldo la forma en que obtuvo su información y comenta que lo registró en base al detalle de un proceso que corre sistemas cada mes. Durante 2005 FA sólo consideró el gran total de cada mes, sin importar el detalle. Al día de hoy sistemas no tiene este detalle, por lo que correré algunas sesiones de ese año para ubicar los artículos en

cuestión y poder enviarle esa información. Espero tenerla la semana entrante. Saludos.
-----Mensaje original-----
De: Carlos Canfield [mailto:carlos.canfield@itesm.mx]
Enviado el: Miércoles, 15 de Marzo de 2006 11:26 a.m.
Para: IP (Alimentos)
Asunto: información sobre nivel de servicio
De: <cperez@packaking co.com.mx>
A: <carlos.canfield@itesm.mx>
Asunto: RE: información sobre nivel de servicio
Fecha: Wed, 15 Mar 2006 20:17:21 -0600
{PRIVATE "TYPE=PICT;ALT="}Estimado Lic Canfield: Antes que nada le pido una disculpa por no haber podido estar en la pasada reunión, pero si me comento el Lic Armando P de la información que se necesita, ya estamos trabajando en ella, en cuanto la tenga se la hago llegar. Por lo de la presentación, si me la hicieron llegar muchas gracias.
SALUDOS
-----Mensaje original-----
De: Carlos Canfield [mailto:carlos.canfield@itesm.mx]
Enviado el: Miércoles, 15 de Marzo de 2006 11:31 a.m.
Para: Julio Cesar P (Películas)
Asunto: información sobre nivel de servicio
Ing. P buenos días:Para efectos de terminar el proyecto de medición, me permito solicitar de usted la información de películas plásticas acerca del nivel de servicio por volumen y fecha de los empaques de los exhibidores para los periodos febrero y todo el año 2005. Esta información me permitirá complementar con la de FA y PD y consolidar los reportes correspondientes. Una pregunta: ¿Recibió Ud. copia del avance preliminar de los indicadores? Gracias por su atención y quedo a sus ordenes Carlos Canfield {PRIVATE



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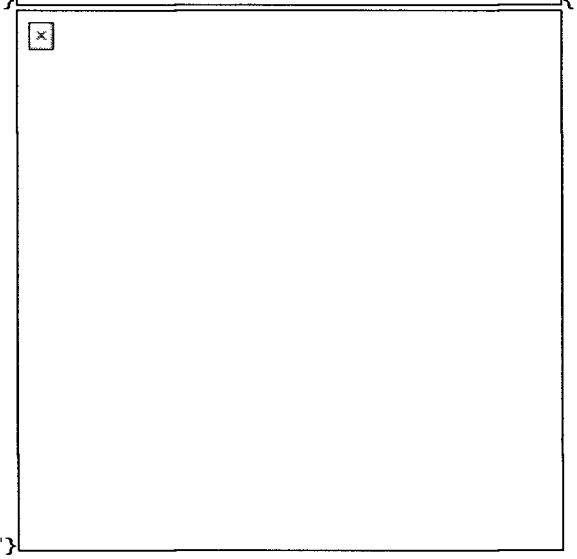


"TYPE=PICT;ALT="}

De: <IF@alimenticios.com.mx>
A: <carlos.canfield@itesm.mx>
Cc:
Asunto: RE: información sobre ventas y nivel de servicio

Fecha: Tue, 28 Feb 2006 17:09:24 -0600
{PRIVATE "TYPE=PICT;ALT="}{PRIVATE "TYPE=PICT;ALT="}{PRIVATE "TYPE=PICT;ALT="}Te anexo la información solicitada. Ver archivos anexos en tu mail Saludos.

-----Mensaje original-----

De: Carlos Canfield [SMTP:carlos.canfield@itesm.mx]

Enviado el: Lunes, 20 de Febrero de 2006 01:05 p.m.

Para: Leopoldo F (PD)

Asunto: información sobre ventas y nivel de servicio

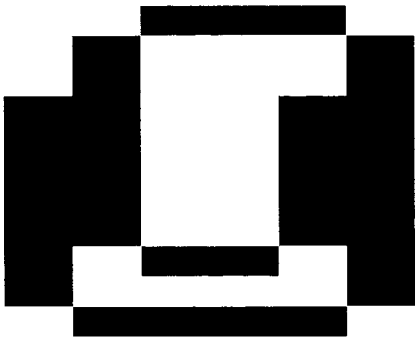
Ing. F, buenas tardes: Con la información que me proporcionaron pude iniciar la conformación de los indicadores de eficiencia para las cadenas de alimentos Marías y exhibidores, arrojando resultados preliminares bastante interesantes, como son un nivel de eficiencia de cerca del 95% en las marías y de 76% en el caso de los exhibidores. Acordamos trabajar de forma preliminar con las cifras de enero, para determinar la viabilidad inicial de las mediciones, y consideramos que en conjunto los resultados son alentadores. Por tal motivo y para complementar el análisis, me permito solicitar la siguiente información: 1) La misma información que fue proporcionada (nivel de servicio por volumen fecha y el diferencial de rentabilidad para las alimentos marías y los exhibidores por centro) para a) el mes de febrero y b) global para el año del 2005. dada la gran variabilidad estacional que presenta la venta de estos productos, la cifra anual nos proporcionará indicadores más robustos, principalmente a la hora de determinar las eficiencias individuales de cada uno de los participantes en la cadena de suministro.

Nivel de Servicio.xls>>

2) Las cifras relativas a las ventas mensuales de PD (demanda final) de alimentos Marías y exhibidores en k.o. para los años 2003 a 2005 y las cifras relativas a enero del 2006 y eventualmente la del mes en curso. De ser posible, también incorporar los pronósticos mensuales que se envían a FA. <<Ventas.xls>> <<Pronosticos.xls>> FA nos proporcionó sus cifras de ventas (ventas intermedias de estos productos) y encontramos una gran estacionalidad, axial como una tendencia decreciente, por lo que la información solicitada servirá para efectos de contraste y su inclusión en el indicador. En mucho le agradeceré la información proporcionada y como siempre le reitero nuestra mayor disposición a tratar dicha información con la mayor seriedad y con la reserva absoluta, respondiendo a la gran confianza que Productos Alimenticios ha depositado en el TEC como institución y en mi persona como investigador. Reciba un cordial saludo y quedo a sus ordenes. Carlos Canfield

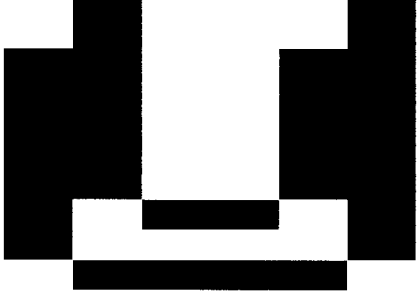
Anexo Graficas preliminares de pronósticos de ventas intermedias Prof. Carlos Canfield

Archivo: Time Series Decomposition Plot for exhibidores.jpg>> <<Archivo: Time Series Decomposition Plot for Marias.

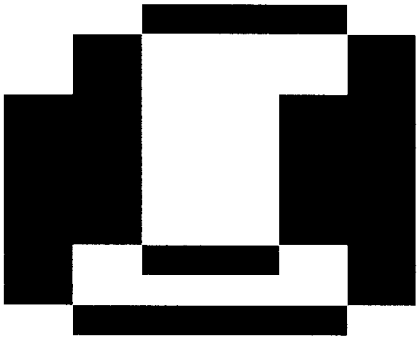


Jpg

Nivel de Servicio.xls (17.9 KB)



Ventas.xls (16.4 KB)



Pronosticos.xls (15.3 KB)

{PRIVATE "TYPE=PICT;ALT="}{PRIVATE "TYPE=PICT;ALT="}**De:** <IP@alimenticios.com.mx>
A: <carlos.canfield@itesm.mx>
Asunto: RE: resultados preliminares de la investigación
Fecha: Tue, 28 Feb 2006 11:29:39 -0600
{PRIVATE "TYPE=PICT;ALT="}{PRIVATE "TYPE=PICT;ALT="}{PRIVATE "TYPE=PICT;ALT="}Gracias Lic. Canfield. Aquí nos vemos. Saludos
-----Mensaje original-----
De: Carlos Canfield [mailto:carlos.canfield@itesm.mx]
Enviado el: Martes, 28 de Febrero de 2006 11:23 a.m.
Para: IP (Alimentos)
Asunto: RE: resultados preliminares de la investigación
Ing. P, le confirmo entonces el día miércoles 8 a las 10 de la mañana Gracias
-----Mensaje original-----
De: Carlos Canfield [mailto:carlos.canfield@itesm.mx]
Enviado el: Jueves, 23 de Febrero de 2006 03:42 p.m.
Para: IP (Alimentos)
CC: TB (Alimentos)
Asunto: resultados preliminares de la investigación Ing. P, buenas tardes: Me permito someter a su consideración los resultados preliminares de la investigación, para efectos de que podamos analizar los mismos y proceder en su caso, a complementar la misma a partir de la información solicitada. Me pongo a sus ordenes para cualquier aclaración al respecto. Atentamente Carlos Canfield

De: <IP@alimenticios.com.mx>
A: <carlos.canfield@itesm.mx>
Cc:
Asunto: RE: RV: información nivel de servicio (Productos Alimenticios Tec)
Fecha: Fri, 17 Feb 2006 10:06:38 -0600

Lic. Canfield:
Antes que nada una disculpa por no haberle enviado antes la información sobre las ventas de María y Exhibidor, misma que se encuentra en el archivo adjunto.Saludos

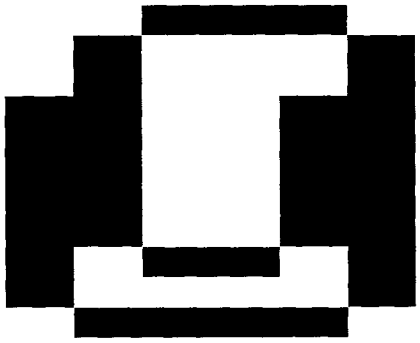
Ing. P, buenos días:
La información que me proporcionaron de PD fue la misma que se entrego el día de la junta en cuestión. El Ing. F me comento que era loa única información que poseían, y me reitero que la información respecto a la rentabilidad, de acuerdo con las instrucciones de su director general, no se tenia desglosada y que era de 0.
Esa información se integro a la que me hicieron favor de proporcionarme de FA y packaging Co.
Corrí el modelo y obtuve un resultado preliminar, el cual va de acuerdo con los datos presentados.

El día de ayer jueves platique con el Contador TB, para efecto de algunas inquietudes y requerimientos de información como son: Margen presupuestado para enero e información del empaque de las marías de rollo, que me comenta el Ing. P en películas, que ellos no surten dicho empaque.

Asimismo le comente al contador, que los resultados (preliminares pero ya cercanos a la realidad) son prometedores e indican un 97% de eficiencia para las marías y de poco mas del 75% de los exhibidores en Enero. Le comente que dadas las fluctuaciones estacionales mes con mes, consideraba adecuado además de las cifras de febrero, realizar una medición anual, al menos 2005, para ver colmo se desempeña la cadena en un periodo más estable y largo y contrastarlo con los indicadores mensuales, Asimismo encontré un dato interesante. FA con relación a sus cliente Centro Toluca tuvo un mal desempeño en cuanto a los indicadores de enero volumen y fecha, sin embargo la distribución de PD hacia Toluca estuvo perfecta. (Más que duplico sus niveles de servicio con respecto a FA). Esto indica un área de oportunidad excelente en materia de colaboración y cooperación en la entrega de información, al menos con relación a los pronósticos, según
percibo en primera instancia. Creo que PD pudo entregar bien gracias a los inventarios y a un mejor conocimiento del mercado, situación que por alguna razón no se transfirió a FA a la hora de hacer pedidos. Resulta importante porque el Centro Toluca es por mucho más grande que el resto de los clientes.
En fin información como esta resulta del análisis del modelo, y será valioso que Uds. lo puedan analizar en fin.

Asimismo, y entiendo que la semana que transcurrió no fue la mejor en cuestión de tiempo, pero si me gustaría solicitar los datos de venta para poder efectuar el pronostico, el cual estoy seguir será de gran ayuda para una mejor planificación, eso claro si Ud. lo considera conveniente. En la medida en que complete la información con lo que me envió el contador y tenga un resultado relativamente más completo del análisis, se lo haré llegar para platicar al respecto Le agradezco su atención y me pongo a sus ordenes para cualquier comentario al respecto
Carlos Canfield

De: Carlos Canfield [mailto:carlos.canfield@itesm.mx]
>Enviado el: Lunes, 13 de Febrero de 2006 05:36 p.m.
>Para: Leopoldo F (PD)
>Asunto: información nivel de servicio (Productos Alimenticios Tec)
>Ing. Leopoldo F:
ng. Buenas tardes. Agradezco la información que me hizo llegar con respecto al nivel de servicio y a la relación ventas reales/pronostico. Estaremos trabajando en este ultimo para determinar la posibilidad de estimaciones más cercanas a los valores reales. Sin embargo, revisando la información, y como Ud. sabe requerimos que la información sea homogénea a lo largo de la cadena, tenemos pendiente la
variable relativa a margen de rentabilidad. Si bien leí su correo en donde nos indica una rentabilidad 0 en promedio, requerimos para cada uno de los centros: Toluca, Guadalajara, Saltillo, Laguna y Laredo la variable: Diferencia entre margen real (obtenido mediante los precios diferenciados de venta y los costos
>-distancia, mercado etc.) y el presupuestado para la misma ubicación. Esta información nos permite determinar la eficiencia financiera con la que se sirve a un cierto cliente/centro. Estamos muy conscientes del esfuerzo que significa obtener esta información, pero también del beneficio que este desglose puede proporcionar a la dirección, en el diagnostico de la cadena de suministro. Agradezco su atención y me pongo a sus ordenes Atentamente Carlos Canfield



VENTAS MAR Y EXH 03-05.xls (22.0 KB)

De: <cperez@packaking co.com.mx>
A: <carlos.canfield@itesm.mx>
Cc:
Asunto: RE: información nivel de Servicio
Fecha: Wed, 15 Feb 2006 12:51:58 -0600

Lic Canfield:
1.-La información de nivel de servicio por cantidad la tengo, solamente que no en forma electrónica, pero si me da un numero de fax se la envió de inmediato. Solo le comento que nosotros no proveemos el empaque de Marías de Rollo y por lo tanto no tengo información del nivel de servicio.
2.-En cuanto al diferencial de margen obtenido en enero fue de 6.2 % debajo del objetivo, es el mismo para todos los productos.Cualquier duda o comentario estoy a sus ordenes.SALUDOS
-----Mensaje original-----
De: Carlos Canfield [mailto:carlos.canfield@itesm.mx]
Enviado el: Lunes, 13 de Febrero de 2006 05:25 p.m.
Para: Julio Cesar P (Películas)
Asunto: información nivel de Servicio
Ing. P, buenas tardes:
De acuerdo con nuestra conversación, atentamente me permito solicitar por este medio, si UD. no tiene inconveniente, la información del mes de enero con relación a: 1) Desglose del nivel de servicio (fecha y volumen) de 9 productos (empaques) y adicionar el relativo al empaque de las alimentos Marías de rollo, que estamos considerando adicionalmente a los exhibidores para efectos de contraste en el indicador.
2) La diferencia entre el margen real obtenido y el presupuestado para cada uno de los empaques mencionados (pudiera ser el mismo de acuerdo con nuestra conversación).
Mucho le agradecería me proporcionara esta información, por este mismo medio para efectos de completar el trabajo.
Muchas gracias y saludos cordiales. Carlos Canfield
>-- Mensaje Original --
>Subject: RE: JUNTA 07/02
>Date: Mon, 6 Feb 2006 16:48:40 -0600
>From: Julio Cesar P (Películas) <cperez@packaking co.com.mx>
>To: "Carlos Canfield" <carlos.canfield@itesm.mx>
>Cc: "IP (Alimentos)" <IP@alimenticios.com.mx>
>Lic. Efectivamente en Galletera no laboraron hoy. Le proponemos la reunión a las 16:00 hr ¿tiene algún inconveniente? JULIO C P
>-----Mensaje original-----
>De: Carlos Canfield [mailto:carlos.canfield@itesm.mx]
>Enviado el: Lunes, 06 de Febrero de 2006 04:24 p.m.
>Para: Julio Cesar P (Películas)
>Asunto: RE: JUNTA 07/02
>Ing. buenas tardes, apenas estoy viendo el mensaje y llame a la Galletera pero parece que no trabajaron hoy ¿ a que horas considera oportuno efectuar la reunión mañana? Gracias
>>-- Mensaje Original --
>>Subject: JUNTA 07/02
>>Date: Mon, 6 Feb 2006 15:16:27 -0600
>>From: Julio Cesar P (Películas) <cperez@packaking co.com.mx>
>>To: <carlos.canfield@itesm.mx>
>>Cc: "IP (Alimentos)" <IP@alimenticios.com.mx>
>>Estimado Lic. Canfield:Debido al descanso del día, se nos empalma la junta que tenemos programada el día de mañana a las 10:00 hr con otra reunión y quisiéramos reprogramarla para mas tarde. Si le es posible favor de

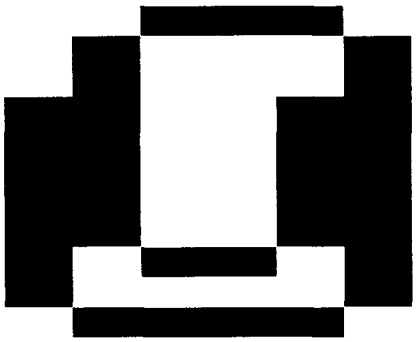
comunicarse con el Ing IP a Alimentos Productos Alimenticios a partir de las 8:30 para afinar la hora.SALUDOS JULIO C P

De: <IF@alimenticios.com.mx>
A: <carlos.canfield@itesm.mx>
Asunto: RE: información nivel de servicio (Productos Alimenticios Tec)
Fecha: Tue, 14 Feb 2006 11:16:32 -0600

Carlos : Verifique esto con el Ing. Francisco MY (Directo General) y me dice que la rentabilidad por planta no se tiene, por lo que te proporcionara únicamente el dato que tenemos, que es la rentabilidad global, sin importar el cliente. Saludos.

De: <MTBb@alimenticios.com.mx>
A: <carlos.canfield@itesm.mx>
Asunto: nivel de servicio enero 2006.xls
Fecha: Sat, 11 Feb 2006 16:09:29 -0600

Anexo nivel de servicio por Cedi de FA. Saludos. C.P. TB Contraloría Fábrica de Alimentos Productos



Alimenticios S.A. de C.V. Tel. nivel de servicio enero 2006.xls (11.2 KB)

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