UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

INTERNAL DRIVERS OF EXTERNAL FLEXIBILITY: A DETAILED ANALYSIS

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

Degree of

DOCTOR OF PHILOSOPHY

By

DANIEL D. MATTIODA
Norman, Oklahoma
2007

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INTERNAL DRIVERS OF EXTERNAL FLEXIBILITY: A DETAILED ANALYSIS

A DISSERTATION APPROVED FOR THE
MICHAEL F. PRICE COLLEGE OF BUSINESS

BY

//Signed//
Patricia J. Daugherty, Chair

//Signed//
Samir Barman

//Signed//
Michael R. Buckley

//Signed//
Anthony S. Roath

//Signed//
Jeffrey B. Schmidt

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ACKNOWLEDGEMENTS

First and foremost, I want to thank my beautiful wife, Melissa, for her support, compassion, and love. She is the inspiration and driving force in my life. Her selflessness is only eclipsed by her dedication to our family. My wonderful sons, Casey, Jim, and Jon, are the joys of my life. My grandparents, Dom and Ange Mattioda, taught me respect, dedication, and hard work. I can only hope I have made them proud. To my mom, Nola Chubb, thank you for your unending love, and to Ted and Lucy Rores, and Jim and Angelina Rores for welcoming me with open arms into their family.

I want to thank the United States Air Force (USAF), especially the Logistics Management department faculty at the Air Force Institute of Technology, Brad Anderson, Bill Cunningham, Stan Griffis, and Stephen Swartz for giving me the opportunity to obtain my Ph. D.. Dave Ulrich, Basilio Perez, Kevin James, and Pete Cabrera were my first USAF supervisors who instilled in me that the Air Force has many opportunities for its airmen, you just have to be willing to go after them. Colonel Kent Mueller, USAF retired, through personal mentoring and guidance taught me to lead by example and set the standard for excellence.

Sincere appreciation and gratitude goes to the faculty and staff of the Marketing and Supply Chain Management Division of the Michael F. Price College of Business at The University of Oklahoma. Ken Gross, John Hobbs, Jack Kasulis, and Ford Smith are wonderful individuals and I wish you all the best. Johnie Ferguson kept me out of trouble and helped me in more ways than she will ever know. Tim Landry and Hong Min

provided a strong foundation in marketing and research methods and helped me through the academic portion of my doctorate.

I'm deeply indebted to my dissertation committee, Patricia Daugherty – Chair, Tony Roath, Samir Barman, Jeff Schmidt, and Mike Buckley. Thank you for all your support and constructive criticism. Patricia (Pat) Daugherty went above and beyond to align courses so I could complete my Ph. D. in the stringent time requirements set by the USAF. She provided me the opportunity to work with her on numerous publications which I am thoroughly grateful. Her drive and dedication to her career is only shadowed by her relentlessness to see her students excel. Pat reminds me of my sixth grade teacher, Joanne Ellis, both do not tolerate mediocrity. I can only hope that I live up to Pat's expectations. Tony Roath kept me on track through the program and provided encouragement when I needed it the most. His friendship at school and at home will always be appreciated. I'm grateful to Samir Barman for getting me back in touch with simulation and to help me understand statistical testing and techniques via our research project. Jeff Schmidt and Mike Buckley, both stepped outside their areas of expertise and added valuable insight to my dissertation. Thank you!

My fellow doctoral students, Elten Briggs, Stefan Genchev, Haozhe Chen, Aaron Arndt, and Scott Grawe, I couldn't have made it without you. Elten Briggs was the "senior" doctoral student when I arrived and when he graduated I saw the fruits of our labor. Haozhe and Stefan's abilities and skills are humbling. I cannot imagine obtaining a Ph. D. in a second language. Haozhe's work ethic and ability is second to none. It has been an honor and privilege to share an office with you. Stefan kept me laughing when I

needed it the most. Aaron's heated debates were always interesting and brought a different perspective to the seminars. Scott's work in the private sector brought new perspectives to my course of study. I look forward to working with each of you in the future.

I would also like to thank the men and women of Tinker Air Force, John Carrier, and my best friend from high school Bob Brownfield, for providing valuable information to start my dissertation. Their real world examples provided substance to my research. I also want to thank Sean Williams and his staff at SYSCO for their ceaseless efforts in answering all my dissertation questions.

Last, I would like to thank the Lord for giving me the strength to complete this program and for always being there!

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ABSTRACT

This research examines internal logistics flexibility (ILF), i.e., how a supplier is able to meet changing customer demand through its logistics activities.

The dissertation follows a three paper format. The first two papers are conceptual pieces, while the third is a case study. The first paper extends previous research on logistics flexibility by identifying from a customer perspective, what a supplier has to do in order to be considered logistically flexible. Research showed that suppliers need physical, human, and organizational capital resources to set a foundation for internal logistics flexibility. Internal logistics flexibility has both a customer orientation and organizational structure component which allow a supplier to understand customer demand and dedicate resources to meet that demand.

The second paper develops an assessment tool which managers can use to identify current levels of internal logistics flexibility and areas that need improvement. The internal logistics flexibility assessment tool (ILFAT) is grounded in the strategy-structure-performance framework.

The third paper focuses on a food service provider, SYSCO, whose customer orientation strategy puts them in tune with the needs of their customers and has used that insight to build logistics operations focused on fulfilling those needs. A supplier's customer orientation is critically important in meeting customer demand.

LOGISTICS FLEXIBILITY: A SUPPLIER and CUSTOMER PERSPECTIVE

Abstract

Purpose - This paper extends previous research on logistics flexibility by identifying from a customer perspective, what a supplier has to do in order to be considered logistically flexible.

Design/methodology/approach - Literature on logistics flexibility was reviewed and supplemented with in-depth interviews with logistics managers and directors of both supplier and customer organizations. The interviews were audio taped, transcribed, and reviewed by four researchers covering: resources critical for internal logistics flexibility, internal logistics flexibility, and external logistics flexibility.

Findings - This research showed that suppliers need physical, human, and organizational capital resources to set a foundation for internal logistics flexibility. Internal logistics flexibility has both a customer orientation and organizational structure component which allow the organization to understand customer demand and dedicate resources to meet that demand. Finally, internal logistics flexibility allows organizations the ability to provide external logistics flexibility which customer's desire.

Research limitations/implications - The paper presents an initial qualitative study on internal logistics flexibility at the operational level. Future research should expand the level of internal logistics flexibility to the tactical and strategic level. A limited number of industries were involved in the current research. Future research should expand the breadth of industries as well as develop measures for internal and external logistics flexibility. Further studies should also investigate the impact of internal logistics flexibility on external logistics flexibility and the subsequent impact on firm and logistics performance.

Practical implications - The primary implication is that firms need to understand their customers' needs and focus resources to meet those needs.

Originality/value - This paper highlights that suppliers must not only understand their customers' demands, more importantly, suppliers must willingly dedicate resources to meet their customers' demand.

Keywords - Logistics flexibility, internal logistics flexibility, external logistics flexibility

Paper type - Research paper

Introduction

What do you do when your business is 800 times larger than it was just 5 years ago? How do you control a supply chain that stretches from Asia and Central America to customers in downtown Denver? Logistics flexibility is often the answer. It was for Red Bull and Sara Lee Branded Apparel.

Energy drink maker Red Bull sold half a million individual drinks in 1998. During the next 5 years, demand increased to over 400 million annually. A rise in sales was expected, but an eight fold increase was unanticipated. Red Bull worked with a third party logistics provider (3PL) to realign their distribution, warehouse, and inventory system to meet the unexpected increase in customer demand (Page, 2005). Sara Lee Branded Apparel (SLBA) opened a 250,000 sq. ft. West Coast distribution center in Rancho Cucamonga, California to meet increased demand for their product and reduce delivery lead-time. The facility managed by APL Logistics allows the company to efficiently distribute products produced in Asia and Central America. With APL's help, SLBA realigned their internal processes, reduced overall lead times, and improved speed-to-market to meet external demand. In both examples, the organizations had to adapt and change logistics operations to meet customer demand. Their logistics systems became more flexible as a result.

High levels of flexibility allow organizations to respond to customer needs and overcome unforeseen contingencies (Bowersox et al., 1989). Flexible responses are critical; customer demands not met in a timely manner can result in lost sales, lost customers, and obsolete inventories. Therefore, logistics flexibility should be a strategic priority and deserves greater attention. The objective of the current research is to

determine what makes a supplier logistically flexible from a customer perspective and in turn identify what a supplier needs to do in order to provide that flexibility. In the next sections, a literature review is presented followed by the theoretical framework and methodology sections. Key items critical to logistics flexibility identified during 22 in-depth interviews are then discussed followed by limitations and future research, and conclusion sections.

Flexibility

Flexibility is often associated with speed and the capability to adapt to new, different, or changing requirements. One common thread throughout the flexibility literature is the issue of responsiveness. Flexibility is a firm's ability to respond to competitive requirements, such as shorter lead times, special requests, and unexpected events in a rapid manner (Sanchez, 1977). Flexibility is also viewed as the ability to respond to customer requests and tailor services to the specific customer (Daugherty and Pittman, 1995).

Flexibility has been examined on a continuum from individual flexibility to supply chain flexibility (Figure 1). Individual flexibility pertains to the worker level and centers on the areas of cross-training, part-time labor, work-sharing, and adjusting length of workdays to meet customer demand (Sanders and Ritzman, 2004; Schultz et al., 2003; Vokurka and O'Leary-Kelly, 2000; Yang et al., 2002). The other end of the continuum is supply chain flexibility, which "encompasses dimensions that directly impact a firm's customers and are the shared responsibility of two or more functions along the supply chain, whether internal (for example, marketing and manufacturing) or external (supplier,

channel members) to the firm" (Sánchez and Pérez, 2005, p. 682). Supply chain flexibility centers on the promptness and the degree to which supply chains can adjust their speed, destinations, and volumes in response to changes in customer demand (Christopher and Towill, 2001; Lummus et al., 2003; Prater et al., 2001). The core concept of adapting and changing to meet customer demand is the same. The primary difference is a change in scope from individual to supply chain.

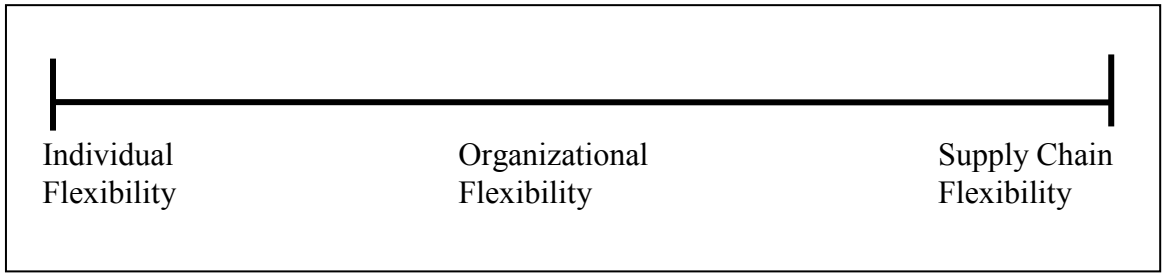

Figure 1: Flexibility Continuum

In the middle of the continuum is organizational flexibility, defined as a firm's ability to adapt operations through organic change or modularity (Chandrashekar and Schary, 1999) in response to environmental changes (Palanisamy, 2005) to meet customer demand. Organic change involves functional changes in an organization, while retaining established relationships, communication links, and higher-level management positions. Examples include functional spin-offs separating inventory holding from distributors, the shift of some production operations to third-party logistics service providers, or moving production away from manufacturing organizations to specialized subcontractors. Modularity is the use of specialized groups of people with similar competencies and skills brought together to perform different specialized tasks and then released as the task ends (Chandrashekar and Schary, 1999; Gratton and Ghoshal, 2005).

Modularity is temporary with an emphasis on matching a firm's capabilities to environmental requirements and allowing the organization to respond rapidly to market demands (Chandrashekar and Schary, 1999).

At the organizational level in a supply chain, two types of flexibility are commonly discussed – manufacturing flexibility and logistics flexibility. Manufacturing flexibility deals with the production process (Upton, 1994). Types of manufacturing flexibility include routing, product, mix, volume, program, and machine. For a detailed list see Upton (1994). While research has addressed manufacturing flexibility, research on logistics flexibility is lacking (Bowersox et al. 1992; Closs et al., 2005). Logistics flexibility encompasses each of the levels from individual to supply chain. Further research is required to understand the full potential of logistics flexibility.

Logistics flexibility

Logistics flexibility is "the ability of a firm to respond quickly and efficiently to changing customer needs in inbound and outbound delivery, support and services" (Zhang et al., p. 71). Shapiro and Heskett (1985) were among the first to research logistics flexibility. Bowersox and his colleagues (1989, 1992, 1995) found evidence that logistics flexibility provided firms with a superior level of logistics competency. Stalk et al. (1992) showed that logistics flexibility leads to a competitive advantage. Closs et al. (2005) concluded that flexible logistics programs had a positive impact on responsiveness to key customers; delivery competence in the areas of speed, dependability, and consistency; and asset productivity dealing with return on assets, inventory turns, and low logistics costs.

Zhang et al. (2005) provide the most in-depth research on logistics flexibility to date. Their research proposed that logistics flexibility is a second order construct made up of two logistics *competence* constructs (physical supply flexibility and purchasing flexibility) and two logistics *capability* constructs (physical distribution flexibility and demand management flexibility). A competence is an internal strength of an organization that is not seen by the customer. A capability is a customer desired strength that is readily seen by the customer (Zhang et al., 2005). For example, order processing within a supplier's firm is a competence. Meeting customer demand by providing a consistent delivery schedule is a capability as it is seen/experienced first-hand by the customer.

Research gaps

Previous research on flexibility has focused on taxonomies and the benefits provided to an organization. Only two studies were identified that investigated the antecedents to internal logistics flexibility and their impact on external logistics flexibility. Specifically, Scannel et al. (2000) measured organizational flexibility, while Zhang et al. (2005) conducted research on logistics flexibility's competence and capability components. Further research is needed to more completely conceptualize components of logistics flexibility and their impact on performance (Closs et al., 2005).

The objective of the current research is to understand internal logistics flexibility at the organizational level. Three research questions address the objective:

(1) What resources are critical to internal logistics flexibility?

(2) Which organizational areas are crucial to internal logistics flexibility?

(3) How do customers define external logistics flexibility?

The first two questions identify what an organization needs in order to be a flexible supplier. The last research question adopts the customer perspective -- how customers define a flexible supplier.

Theoretical framework

The resource-based view (RBV) of the firm provides the overarching theoretical framework for the current research (Figure 2). The RBV of the firm attributes superior performance to organizational resources and capabilities (Barney, 1991; Bharadwaj, 2000). Competencies, internal strengths of a firm, are created by the alignment and development of resources. These competencies enhance a firm's existing capabilities and provide the foundation for creating additional capabilities by realigning a firm's resources (Day, 1994; Teece et al., 1997).

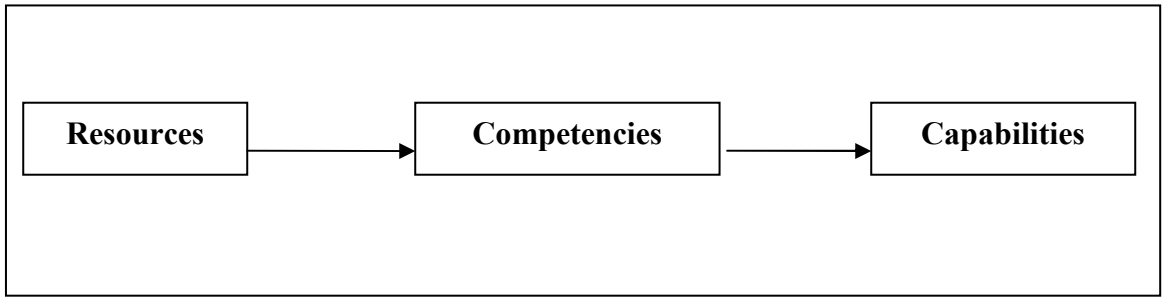

Figure 2: Theoretical Framework

Resources are endowments owned or controlled by an organization (Amit and Schoemaker, 1993; Day, 1994) or generated through a process of accumulation, consisting of investments over time (Olavarrieta and Ellinger, 1997). Organizational resources are strengths that allow organizations to work and implement strategies (Barney, 1991; Porter, 1981). These resources may be developed inside the organization

or acquired in the market. They can be tangible or intangible, but have the characteristic of being "visible" (Hall, 1992). Resources are often classified into three categories: physical capital, human capital, and organizational capital. Physical capital resources include facility layout and location and information technology used in a firm (Williamson, 1975). Training, experience, and job knowledge of workers are examples of human capital resources (Becker, 1964). A firm's formal and informal planning and relations among groups within the firm and between the firm and its environment are examples of organizational capital resources (Tomer, 1987). In the current research, all three types of resources are considered instrumental to internal logistics flexibility. The resources do not guarantee internal logistics flexibility; however, they do provide the foundation for creating internal logistics flexibility.

When firm resources are combined or integrated into a specific cluster spanning individuals or groups, a competency is created that enables distinctive activities to be performed (Teece et al., 1997). This corresponds with Upton's (1994, p. 75) view of internal flexibility as "what an organization can do." The effects of internal flexibility are not directly linked to the customer, but the results help to ultimately produce a customer benefit. Internal logistics flexibility as a potential competency is examined in the current research.

Capabilities are complex bundles of skills and accumulated knowledge, exercised through organizational processes (competencies), which enable firms to coordinate activities and make use of their resources (Day, 1994). Capabilities allow an organization to respond and adapt to meet customer demand and provide a competitive

advantage (Teece et al., 1997). External flexibility, a capability easily observed by the customer, is examined in this research.

The conceptual model (Figure 3) depicts the relationships among resources, competencies, and capabilities. The alignment and configuration of competencies enhance and promote a firm's capabilities. Rationale for the proposed relationships is presented based upon in-depth interviews.

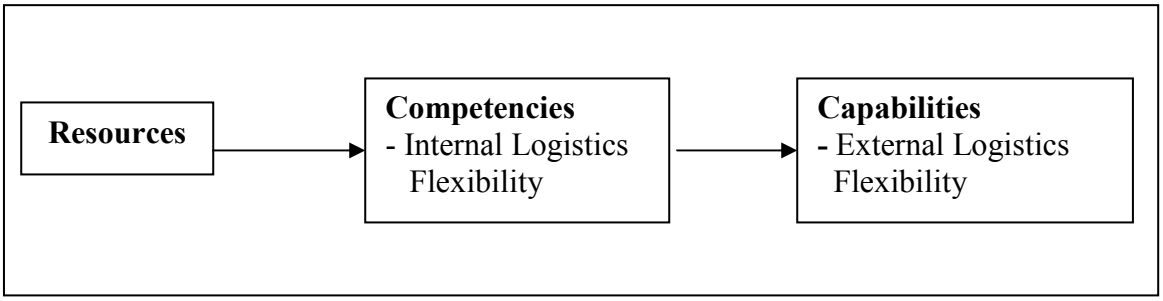

Figure 3: Conceptual Model

Methodology

Twenty-two in-depth interviews were conducted to better define internal and external logistics flexibility. The 2006 Council of Supply Chain Management Professionals (CSCMP) membership roster was used to select a convenience sample covering companies located within a 200-mile radius of the lead researcher's office. Care was taken to include a range of different industries. Logistics managers and directors in the military, manufacturing, distribution, and transportation areas were interviewed. These individuals are regarded as appropriate key informants because they are involved with the management of day-to-day logistics functions within their organization and able to provide valid commentary about functional operations (Phillips, 1981). Further,

qualitative research can provide "extensive insights of a few key informants to develop a comprehensive understanding of a particular area" (Ellinger et al., 2006, p. 3).

The industries included beverage and vending machine companies, defense contractors, electronics manufacturers, food service and product distributors, transportation providers, and the United States military. Respondent demographics appear in Appendix A.

Face-to-face interviews were conducted following a semi-structured interview guide (Appendix B). A specific set of questions kept the interviewees focused on relevant points of interest. The interview guide was reviewed by two academics with logistics flexibility research background and four industry experts.

The first round of interviews focused on the customer perspective of what makes a flexible supplier. At the end of the interview, the customers were asked to provide a contact for suppliers they considered flexible. The suppliers were then contacted. The suppliers were asked what resources, processes, and procedures were needed to develop and maintain internal logistics flexibility.

The lead researcher conducted each of the interviews at the respondent's place of business (each lasted approximately 70 minutes). The interviews were audio taped and transcribed for further review. Three graduate assistants and the lead researcher reviewed each transcription separately, then met and consolidated topics. A comprehensive review of interview material is presented next.

Resources

Logistics resources can include, but are not limited to warehouses, information networks as well as people and buyer-supplier relationships. Interviews with logistics directors and managers suggest that physical, human, and organizational capital resources are all critical to internal flexibility (Table 1).

Table 1: Resources Critical to Internal Logistics Flexibility

Physical capital	Information technology Facility location Facility layout
Human capital	Trained Experienced Knowledgeable
Organizational capital	Open dialogue Trust Supplier-customer planning

Physical capital resources

Three types of physical capital resources are discussed: information technology (IT), facility location, and facility layout. These resources enhance organizational communication, integration between divisions, and decision making.

Information technology

Information technology was cited by logistics managers as a crucial resource for internal logistics flexibility. Information technology includes the internet, email, telephone, video conferencing, fax, and electronic data interchange (EDI). When face-to-face communication is impractical, many managers opt to use IT services. However, when serious problems arise, face-to-face communication is preferred for communication

and information exchange. During normal day-to-day operations, making telephone calls, or sending faxes and emails allow logistics personnel to transfer information, and update status as well as making last minute changes or corrections to orders. The substitution of "information for inventory" supports today's "reduce-cost" environment and enhances the organization's decision making ability (Christopher and Lee, 2004; Dudley and Lasserre, 1989).

Facility location

Facility location was identified by suppliers as important to internal logistics flexibility. Close proximity to customers allows suppliers to make quick, small quantity shipments to customers. For example, suppliers to a jet engine manufacturer locate near the manufacturer's production plant to improve responsiveness to the manufacturer's demands. The suppliers maintain inventory at their operating locations and deliver material as needed. Since the suppliers are nearby, delivery time is reduced and manufacturers aren't required to hold extensive inventory.

Close proximity of suppliers to customers is good; co-location is even better. Having a supplier's representative located in the same facility as the customer increases face-to-face communication and improves information exchange. This allows the supplier to better know what the customer wants and provides a single, easily accessible point of contact to the customer for status updates. Additionally, when problems arise, close location increases the chances of correcting the problem or providing workarounds before the problem gets out of hand.

It should be noted that co-location was not a common theme during the interviews. Only premier customers have the advantage of having a supplier representative located in their facility. In most cases, the supplier locates near the customer. In instances where the supplier provides a dedicated individual to the customer, the cost to the supplier must be outweighed by the revenue generated.

Facility layout

Facility layout was identified as providing critical support for meeting customer demand. In one situation, a distribution center was designed and built to decrease loading and unloading time. The facility design allows trailers to be moved for loading as needed instead of moving product to the trailer. This decreases the amount of material handling equipment required and reduces product damage during handling. As a result, customer orders are filled quicker, lead time is reduced, and customer returns are reduced which all leads to a satisfied customer.

In some instances, the interviewees stated that their organizations do not have the capital to invest in new facilities or make extensive modifications. These organizations use existing facilities. In these cases, logistics managers stated human capital resources are used to close gaps created by less than state-of-the-art facilities. In effect, they are substituting human capital for facility-related resources.

Human capital resources

Workers are essential to flexibility. The logistics managers' comments focused on training, experience, and knowledge of work staff. These attributes empower workers to make better decisions which can enhance internal logistics flexibility.

Trained workforce

The interviewees stated that initial training should be supplemented with recurring training to keep employees current on improvements or changes to business processes. However, training takes employees away from their primary duties. If absences are not filled by other workers, the work is held up until the trainees return. In spite of this, training of personnel was identified as critical to organization success. The tradeoff between immediate reduction in performance due to low staffing during training and possible future long-term performance increases must be calculated and justified. Managers also noted that training provides the foundation for job progression…moving up the corporate ladder.

Experienced workforce

An experienced workforce ensures that "the job gets done." Experience allows workers to complete tasks faster and with fewer errors. Experienced workers are also able to anticipate problems and make corrections/adjustments as needed. One logistics manager stated that "most problems are not new and with an experienced staff, someone has encountered the problem before and knows what works to correct it." Hand-in-hand with a worker's experience and training is a worker's knowledge of the job.

Knowledgeable workforce

Logistics managers defined job knowledge as an employee's understanding of the rules, regulations, policies, and procedures of the organization, industry, and business partners both up- and down-stream. For example, logistics personnel who deal with the

United States military must understand and abide by Federal Acquisition Regulations (FARs). FARs determine how materials are bought and define appropriate suppliers. Another example was provided by a national food equipment distributor. Key accounts are only serviced by individuals who have a thorough understanding of the supplier's ordering procedures and have proven dependability on filling orders with no discrepancies. This ensures that the key accounts are given the highest level of service.

Organizational capital resources

The last resource area is organizational capital consisting of information and human resources to include open dialogue, trust, and planning between suppliers and customers (Barney, 1991; Gort et al., 1985; Zsidisin et al., 2003). These resources provide the foundation for enhanced customer orientation, which is a key component of internal logistics flexibility.

Open dialogue

Logistics managers and directors stressed the importance of open dialogue involving communication and information exchange between suppliers and customers. One interviewee stated, "I have both ends of a spectrum when it comes to supplier sales reps. One tells me only what I want to hear. According to him, his company can make everything happen and when it doesn't he makes excuses. This supplier didn't last very long. Another rep is straightforward. He provides answers, not exaggerations, and if he doesn't know he tells me so, but gets me an answer as soon as possible. He doesn't make promises his company can't keep. I don't mind if a supplier can't immediately deliver a

product as long as they are up-front about it. This way I can plan accordingly and not be caught off guard at the last minute."

At each level in the customer and supplier organizations, members must communicate with their cohorts. Honest, open, and candid communication is essential. An "I've got a secret" mentality has no place in the workplace. An organization's salesforce needs to know what logistics can deliver and then transmit that information to the customer. In return, the customer needs to tell the sales representative exactly what he wants. With this information, the supplier is in a better position to fulfill demand. If the supplier is unable to meet demand, the sales representative must be open with the customer and provide alternative delivery schedules. An emerging business practice is for the supplier to find an alternate source of supply for the customer. The primary supplier will subcontract the work or let the customer deal directly with the alternative supplier. This creates different options for meeting customer demand.

Trust

Interviewees also stated that trust was necessary to support long-term business relationships. Suppliers indicated willingness to forego immediate profits to help a customer because they knew that the customer would be there in the future. For example, a supplier did not have the resources available to meet the customer's immediate demand. The supplier willingly shared this information with the customer knowing that the customer could go to another supplier to fill the demand. However, the supplier also knew that the customer was willing to work with them to identify alternative solutions. The customer was asked the priority of the request and if the order could be held until the

supplier had the resources available or if the customer was willing to pay an increased amount to cover additional costs of quick response. The supplier's logistics manager stated, "I told the customer we couldn't fill their demand immediately because he had a right to know. I also knew the customer wouldn't jump ship and find another supplier. I knew he would work with me to find an answer that benefited both of us." Another option provided by the supplier was to find an alternate provider for the customer and either subcontract the service or let the customer deal directly with the competitor. The supplier was willing to forgo immediate profits in order to meet customer demand and strengthen the relationship with the customer. The supplier stated, "This alternative was only possible because I knew that our relationship was long-term and that it was more important to help the customer now instead of making an immediate profit." The ability of the supplier to provide different options to the customer gives the supplier much needed flexibility to meet customer demand.

Supplier-customer planning

Planning for future demand is mandatory. Advanced planning helps suppliers and customers be prepared to handle both routine and unexpected events. Forecasts should be based on past history as well as predicted changes in demand and customer input. A logistics manager for a repair parts supplier noted that an increase or decrease in utilization of equipment causes a ripple effect for replacement parts. When a customer knows that equipment utilization will increase, the information needs to be transmitted to the supplier and factored into the forecast. For example, one of their customers advised them of a 50 percent increase in production line operating time. The increase in

operating time corresponds to an increase in replacement parts for the production line equipment. The supplier recalculated replacement times for parts and ramped up production to provide parts ahead of demand. The customer's production line never shut down due to lack of replacement parts. Consideration of future operating conditions and requirements are essential for quality forecasts. In order to forecast the quantity of products needed at a sporting event, a food service provider took into account past demand for that particular event along with date, time, and weather conditions for the upcoming event. During the event, the food service provider had enough product available. If the provider had not factored in weather conditions for the event, they would not have been able to meet customer demand and sales would have suffered.

Open dialogue, trust, and supplier-customer planning are organizational capital resources. Organizational capital resources along with physical capital and human capital resources provide the foundation for internal logistics flexibility.

Internal logistics flexibility

Internal logistics flexibility is the development of an organization's resources to quickly, efficiently, and accurately adapt an organization's movement, storage, and distribution of goods or services, along with associated information, within an organization to meet customer demand and overcome environmental uncertainty. The researchers identified two areas critical for internal logistics flexibility after consolidating responses from the suppliers' interviews: 1) customer orientation, 2) organizational structure (Table 2).

Table 2: Internal logistics flexibility components

Customer orientation - Understanding customers demands - Superior service and products to customers - Willingness to meet customer demand
Organizational structure - Leadership - Communication/information exchange - Internal integration - Decision making (empowerment) - Formalization

Customer orientation

Customer orientation is the first area identified through the interviews allowing internal logistics flexibility. Customer orientation is "the sufficient understanding of one's target buyers to be able to create superior value for them" (Narver and Slater, 1990, p. 21). Interview results identified three areas critical to customer orientation: understanding customer demands, providing superior service and product to customers, and willingness to meet customer demand. Each area is discussed in the following sections.

Understanding customers demands

Understanding a customer's needs was identified as critical for internal logistics flexibility. Understanding a customer's use of a product or service allows the supplier to tailor the item or service to meet the customer demands (Lambert, 1992). For example, a metal supplier initially provided steel to one customer in 10-foot sections which was the norm for other customers. However, once the supplier knew the customer's purpose for the steel, an arrangement was made to deliver it in 25-foot sections. This reduced

manufacturing costs and transportation costs to the supplier and provided the customer with a product that would more effectively meet its needs.

Understanding a customer's current needs is not enough, consideration of future requirements is also essential. Logistics managers at supplier organizations noted that customer's needs constantly change. Once future requirements are known, the supplier is able to position resources to meet that demand, provide feedback to the customer on alternatives, or let the customer know in advance that they cannot meet demand.

A supplier stated quarterly visits to customer facilities are used to gain a better understanding of customers. Corporate level visits are supplemented with daily, weekly, and monthly visits and/or interchanges with the salesforce and relevant program and product managers.

Superior service and products to customers

Customer orientation focuses on providing superior service and products to customers by either increasing the buyer's benefits in relation to buyer's costs or decreasing the buyer's costs in relation to buyer's benefits (Narver and Slater, 1990). Suppliers stated that they increased value to customers by providing customized service (delivering, unloading, and storing of products during the customer's non-operating hours; maintaining store displays; vendor managed inventory; extended ordering times; and after-hour delivery of expedited products). For example, a food distributor delivers products to one of its customers when the customer's business is closed. The food distributor unloads and stocks the product without involvement from the customer.

When the customer's employees arrive for work, all the products required for that day's operation are in place and ready to go.

Reducing the cost to the customer, while providing the same level of service, is the second way that a supplier provides a benefit to its customers. For example, a national food distribution company reorganized its distribution route and delivery times to consolidate deliveries in one metropolitan area. Two deliveries on different days were consolidated into one. Transportation costs were reduced for the distributor.

Willingness to meet customer demand

Interviewees also stated that customer orientation involves the willingness of suppliers to meet customer demand or implement alternate plans of action when necessary. A supplier described how one of his customers wanted a specific carrier to deliver goods to their facility because of the carrier's electronic data interchange capability which increased asset visibility and reduced transfer time at the customer docks. The supplier switched to the requested carrier even though there was a cost increase involved.

Logistics managers as well as supervisors and top-level management indicated a willingness to allocate resources to meet customer demand. Their mantra is meeting customer demand at all times. If meeting the customer's demand is not possible due to resource constraints or the costs involved, candid and direct communication stating the problem and possible solutions is required.

Organizational structure

Organizational structure is the second area identified through the interviews that allows internal logistics flexibility. Burns and Stalker (1961) of the Tavistock Institute in London developed the theory of mechanistic and organic systems while examining rapid technological change in the British and Scottish electronic industry in the post-World War II years. They found that stable conditions suggest the use of the mechanistic form of organization characterized by a traditional pattern of hierarchy, reliance on formal rules and regulations, vertical communication, and structured decision. In contrast, an organic form of organization is more appropriate for dynamic conditions with rapid environmental changes. The organic organization is less rigid with more participation and more reliance on workers to define and redefine their positions and relationships; decision making is decentralized.

The supplier interview results suggest that an organic organizational structure is most appropriate for developing and maintaining internal logistics flexibility. Relevant structural components include leadership, communication/information exchange, integration, decision making (empowerment), and formalization. Each area is discussed.

Leadership

In an organic structure, leadership provides guidance and support for organizational change. Upper management is the champion for reinventing processes and procedures. Ideas and opinions are solicited from subordinates; subordinates are encouraged to discuss job problems. Interviewees referred to the support of and confidence in their management. They were able to discuss problems with their superiors

with little fear of reprisal. Superiors were open to new ideas and provide needed resources and management intervention as appropriate. This allows the organization the flexibility to quickly adapt to changes in customer demand and the business environment. For example, one interviewee stated that her organization had monthly process improvement meetings in which workers' ideas were solicited to improve work areas and the workers were praised for innovative actions that increased productivity.

Communication/information exchange

Communication/information exchange is the second area of an organic structure that promotes internal logistics flexibility. Employees communicate as needed which allows information to flow freely throughout the organization: upward, downward, and laterally. Communication/information exchange between divisions within the supplier's organization was noted by interviewees as essential to provide relevant product/service information to customers. Divisions involved must work together and not be at odds. For example, communicating customer order status throughout the supplier's organization focuses all divisions on meeting customer demand.

Interviewees also noted that sharing of ideas, such as best practices, within the division and throughout the organization was beneficial. Conferences and internal web sites allowed the exchange of ideas and practices that increased efficiency and effectiveness and resulted in greater flexibility.

Internal integration

The third area of organic structure, integration, has both an internal and external component. Internal integration refers to unifying functions and processes inside the firm into a seamless process to support customer requirements (Germain and Iyer, 2006; Stank et al., 2001). External integration refers to unified control of functions and processes across trading partners (Germain and Iyer, 2006). Internal integration is the primary area of interest in the current research. Internal integration allows superiors and subordinates to achieve organizational goals, streamline procedures, and consolidate activities by bringing together experts from different areas of the organization in product teams (Germain and Iyer, 2006; Lambert, 2004; Stank et al., 2001). One interviewee stated that a product team comprised of operations, transportation, and sales realigned delivery schedules when an A-level customer needed delivery on Saturdays instead of Fridays. Sales worked with other customers in the same area to change their delivery dates, while operations and transportation realigned work shifts to accommodate Saturday delivery. The results were satisfied customers and a more evenly distributed weekly workload.

A work cell is a grouping of manual or machine processes that produce a complete item or family of items from start to finish (Schonberger, 2004). Work cells are most applicable to manufacturing contexts. However, interviewees used the term to define a group of individuals from different areas of an organization working together to complete a task. For example, a logistics manager highlighted the importance of his distribution work cell comprised of loaders, load planners/routers, and drivers. The loaders gather the products from inventory in preparation for loading delivery trucks. The load planners/routers develop the load plans for the delivery vehicles and specify the

delivery route. At one time, these individuals worked in separate areas with little or no information exchange. Damaged products and late deliveries were normal. The logistics manager brought the individuals together to discuss the problems and how they could be solved. A distribution work cell was created made up of individuals from each of the sections. By working in the same area, the load planners/routers using input from the loaders and drivers were better able to design the load of the vehicle to decrease on- and off-loading time and decrease damage.

Decision making (empowerment)

The final area of an organic structure that promotes internal logistics flexibility identified by logistics managers and directors is decision making (empowerment) which is ideally decentralized and resident in the lowest appropriate level. Formal decisions that involve routine operations of the divisions are made by individuals directly involved in the processes which speeds implementation time. When decisions concern non-routine circumstances, the decision is transferred to the appropriate level within the organization. One interviewee noted that front line supervisors are allowed to re-route delivery vehicles to meet customer demand as long as other customers are not affected. However, shifting resources dedicated to one customer to another requires approval of the distribution director.

Formalization

While formalization is more commonly associated with mechanistic organizations, organic organizations can also effectively employ formalization for

internal logistics flexibility. With formalization, policies, procedures, rules, and regulations are written down and followed throughout the organization. The interviewees noted that formalization allowed their organization logistics flexibility. Formalized processes provide stability. For example, the delivery of A-level products to A-level customers is the priority. All other work is secondary until those orders are filled. A second example is the policy of filling expedited orders based on customer impact, shipping distance, and available resources. With set procedures in place, workers know what needs to be done to fill the orders. There is no ambiguity which might cause different divisions to work at odds with each other. In another example, a food distributor highlighted a situation in which formalized procedures reduced the impact of severe weather. Severe weather caused the closure of their distribution center and many missed customer deliveries. The distributor had formalized operating procedures in place for handling disruptions caused by severe weather. The formalized procedures included increased manning, rerouting of vehicles, and priority of customer deliveries. The following day operations, distribution, and sales coordinated all activities based on pre-defined operating procedures and were able to deliver products to missed customers and get daily deliveries back on schedule.

In the area of formalization, organizations with internal logistics flexibility exhibit a hybrid type of organizational structure. They use formalization, a mechanistic function, for routine procedures and the development of actions plans for unexpected events. The events are not unexpected, but the timing is. These formalized procedures allow the organization to respond quickly and dedicate resources to unexpected events in a more organic way.

Understanding customer demands, having the resources, and an organizational mind-set to meet that demand leads to external logistics flexibility.

External logistics flexibility

External logistics flexibility is the ability of suppliers to meet customers' demand (Nilsson and Nordahl, 1995). Interviews conducted with customers highlighted the following areas in describing a flexible supplier: 1) accommodate demand changes and special orders, 2) provide customized service, 3) accurate exchange of information – status reports, 4) an experienced staff, and 5) supplier's willingness to meet customer's demand (Table 3).

Table 3: External logistics flexibility components

Accommodate demand changes and special orders
Provide customized service
Accurate exchange of information – status reports
Experienced staff
Willingness to meet customer's demand

Accommodate demand changes and special orders

Demand changes occur due to sales promotions, shifting usage patterns, and seasonal variations. Special orders are often caused by customer errors or backorders (out-of-stock situations). In such circumstances, suppliers able to react to the changes, adjust orders, recover from errors, and fill the customer orders are considered flexible.

Provide customized service

Sometimes customers want more than the basics. Examples of customized service include specialized labeling of products, unloading delivery vehicles during customer's non-operating hours, setting up and maintaining displays in stores, extended time to place orders, and expedited returns process. One additional area that buyers highlighted as a key customized service was the personal delivery of expedited products by the supplier's sales representative. In most cases, only premier customers warranted the customized service. In these cases, revenue generated from the customer outweighed the additional expense involved.

Accurate exchange of information – status reports

Customers want to know the status of their order…when it is going to arrive, if the order is complete, and back order status if applicable. And they want this information immediately. If there is a problem, they want to talk to someone who can answer their questions. Suppliers providing accurate and instant feedback on orders whether it is web-based response, emails, or faxes are considered flexible.

Experienced staff

Customers feel more comfortable with experienced, trained individuals familiar with their operations especially when critical or essential products are involved. A buyer of electronics noted that a familiar supplier point-of-contact is important because their purchases involve complex product lines with multiple SKUs requiring a variety of

configurations. An experienced liaison addresses potential problems before the order is placed saving time and money for both the customer and supplier.

Willingness to meet customer's demand

Supplier ability to meet customer demand is extremely important and can be considered an order qualifier. However, it is not enough. Customers want a supplier willing to precisely meet demands. They defined *willingness* in a supplier as an attitude and the actual reallocation of resources to meet their demand. Suppliers providing extra resources in order to go above and beyond normal procedures to meet customer demand are seen as extremely flexible by customers.

The willingness to meet customer demand, accommodate demand changes and special orders, provide immediate feedback on orders, and provide specialized services were equated with external logistics flexibility.

Limitations and future research

This study is the initial step toward better understanding internal and external logistics flexibility. The qualitative, in-depth interviews undertaken for this research provide the foundation for further research. Logistics experts in a limited number of industries were interviewed to develop a working definition of internal and external logistics flexibility. Interviewing individuals on both sides of the supplier/customer relationship provided important insights. However, the time consuming nature of the in-depth interview process limited the number that could be completed. Future research should extend the current examination by including other industries.

The second limitation is the managerial level of participants. All interviewees were logistics managers or directors in either a customer or supplier organization. The definition and attributes of internal and external logistics flexibility may have different connotations at different levels in an organization. Operational-level workers may view flexibility as an ability to move from one process to another quickly and efficiently, while executives may see it as a strategic ability that involves the creation, maintenance, and realization of options for a firm's future.

Future research should develop measures for the flexibility constructs to provide confirmation or disconfirmation of explanations given by logistics. Surveys can be used to assess validity and reliability. Additionally, different industries should be sampled to determine if the definitions for internal and external logistics flexibility are valid, and to identify any significant differences across industries. Finally, research should investigate how internal logistics flexibility impacts external logistics performance and the impact on firm and logistics performance.

Conclusion

Internal logistics flexibility requires an organizational willingness to meet customer demand. This must be a corporate philosophy, embraced by top management and permeating throughout the organization. Of course, the willingness implies that the organizations *know* what customers want. The interviewed managers acknowledged that their companies developed *focused flexibility*. They identified what their customers valued and then built competencies to allow them to be responsive. In turn, this translated to external logistics flexibility at the customer level.

Suppliers need to know the true use of their products by the customer. With this understanding, suppliers are better able to provide the customer with product options. Supplier's boundary spanning personnel are in the best position to "know" the customer and what they want. They serve a dual role. They provide product recommendations to the customer and serve as the liaison to the supplier. These individuals need to be highly trained in order to provide the best service to the customer. Communication plays a critical role, too. Suppliers need information systems tailored to the customers' needs. Customer order information quickly transferred to the supplier and dispersed throughout the organization facilitates coordination which allows quick reaction by the supplier. The overall objective is to find out what customers want and then develop the ability to be responsive -- flexibility.

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Appendix A.

A-I. Respondent Profile

Respondent Title	Frequency	Percentage
Logistics Director	9	41.0
Logistics Manager	11	54.5
Other/Unspecified	2	4.5
Total	**22**	**100**

A-II. Industry Profile

Industry*	Frequency	Percentage
Beverage and vending machine companies	4	18.2
Defense contractors	4	18.2
Electronic manufacturers	3	13.6
Food service and product distributors	5	22.7
Transportation providers	2	9.1
United States military	4	18.2
Total	**22**	**100**

* Firms did not give permission to use their names

Appendix B.

B. Interview Guide

INTERVIEW GUIDE FOR ORGANIZATIONAL FLEXIBILITY RESEARCH

Job Info

1. Describe your job.
2. What are your responsibilities?

External Flexibility (customer perspective):

1. What is flexibility in general?
2. What does logistics flexibility mean to you?
3. Which of your suppliers are flexible?
    a. On a scale from 1 to 10, with 1 being not flexible and 10 being very flexible, how would you rate those suppliers?
4. What makes them flexible?
    a. Can you elaborate more on how they are flexible?
5. Which of the flexibility elements you just discussed are the most important?
6. Why are they the most important?
7. Do you have any suppliers that you consider to be inflexible?
8. Why?
    a. What do they fail to do or do poorly?

Internal Flexibility (supplier perspective):

Your organization has been identified as being flexible (responsive in meeting customer demand):

1. What is flexibility in general? Explain?
2. What does logistics flexibility mean?

3. Can you provide examples of logistics flexibility within *your organization*?

4. Do you have tiered service for your customers?

5. How do you know that you are flexible?

6. What processes in *your organization* need to be flexible in order to have logistics flexibility?

    - Focus interview on the following logistics areas:

        a. order processing

        b. inventory

        c. transportation

        d. warehousing, materials handling, and packaging

        e. facility network

    - How flexible is your organization in these areas?

    - Are there any other areas which are critical to internal logistics flexibility?

    - How do you interact with the customer?

7. What is it that allows *your organization* this flexibility?

8. What resources and assets are needed for flexibility with logistics tasks/buyer requests?

9. How does *your organization* manage those assets in order to be flexible?

10. Which are the most important?

11. How do you maintain flexibility?

INTERNAL LOGISTICS FLEXIBILITY

ABSTRACT

Internal logistics flexibility (ILF) is the ability to meet customer demand and manage environmental uncertainty. The purpose of this research is to develop an assessment tool which managers can use to identify current levels of ILF and areas that need improvement. The ILF assessment tool (ILFAT) is grounded in the strategy-structure-performance framework. Review of the literature and 22 in-depth interviews with logistics managers and directors provide the foundation for the ILFAT.

INTRODUCTION

The global economy has opened the doors to new suppliers and put buyers in a commanding position to pick and choose. Many buyers use their increased leverage to demand more from suppliers. With so many options available to buyers, what are they looking for in a supplier? What does a supplier have to do in order to meet or exceed buyer expectations?

In-depth interviews by the lead researcher with buyers pinpointed what they expect from a premier supplier. Providing reliable, dependable, and high quality products are only order-qualifiers. Suppliers who are flexible and responsive to customers' demands win the orders. Ocean Spray, the leading producer of canned and bottled juice drinks in North America, responds to customer demands by using dedicated carriers as specified by their buyers, shipping less-than-truckload quantities, and honoring 3-day deliveries instead of the normal 5-days. Philips Medical Systems, a producer of medical equipment, looked for a third party logistics provider that could manage the storage, transportation, installation, and training on its equipment while complying with demanding company guidelines focusing on quality, cost, and accuracy. Philips chose UPS Supply Chain Solutions (SCS) to take on the task (Harrington and O'Reilly 2006).

How are Ocean Spray and UPS SCS able to respond to the demands of their customers? The answer is internal logistics flexibility (ILF).

The purpose of this research is to identify areas critical to developing ILF and to suggest how organizations can assess their level of ILF. The theoretical framework is presented next with a literature review of relevant constructs. The ILF assessment tool (ILFAT) is discussed with managerial implications following.

FLEXIBILITY

Flexibility is defined as a ready ability to adjust to new, different, or changing requirements (Fawcett, Calantone, and Smith 1996; Upton 1994). Depending on the context, flexibility is conceptualized as a capability to modify actions in response to dynamic market conditions (Evans 1991), a response or activity (Zeng and Rossetti 2003), or a performance dimension (Sanchez 1995). The common underlying theme is if a firm is able to react to changes in the market place its potential for enhanced performance increases. Another perspective views flexibility as an ability to recover from disruptive environmental events (Evans 1991). In addition to considering flexibility as a reactive phenomenon, firms can be proactive in their anticipation of market changes. Tracey (1998) views flexibility as an offensive capability to confront potential problems in the market.

Researchers have also investigated different types of flexibility including manufacturing and production flexibility (Upton 1997), information flexibility (Byrd and Turner 2001), market-focused flexibility (Johnson et al. 2003), and logistics flexibility (Bowersox et al. 1989) and their association on firm performance. Flexibility is a multi-

level construct ranging from strategic to tactical to operational (Johnson et al. 2003). Strategic flexibility involves the creation, maintenance, and realization of options for a firm's long-term future. Tactical flexibility deals with responses to changes in the market environment. At the lowest level, operational flexibility is short-term phenomenon pertaining to day-to-day operations.

Improving operational-level logistics flexibility positions a firm to capitalize on that opportunity and enhance competitive positioning. Thus the current research focuses on logistics flexibility at the operational level. Customers have more alternatives than ever before in choosing a supplier. Suppliers need to differentiate themselves. Logistics flexibility provides suppliers that opportunity by responding quickly and efficiently to changing customer demands.

LOGISTICS FLEXIBILITY

Logistics flexibility deals with the movement and control of materials before, during, and after manufacturing. It is the "ability of an organization to alter operations to meet demand and supply fluctuations," or in more general terms "an organization's ability to react to unexpected variations" (Bowersox and Closs 1992, p. 123). Examples include cross-docking, fast and responsive transportation fleets, and just-in-time inventory (Stalk, Evans, and Shulman 1992).

Logistics flexibility has been linked to competitive advantage (Stalk Evans, and Shulman 1992). Daugherty and Pittman's (1995) research results emphasized the important role that distribution/logistics flexibility plays in supporting manufacturing and marketing efforts. Closs, Swink, and Nair (2005) concluded that flexible logistics

programs have a positive impact on responsiveness to key customers; delivery competence in the areas of speed, dependability, and consistency; and asset productivity dealing with return on assets, inventory turns, and low logistics costs. Logistics flexibility has both internal and external dimensions.

Internal Logistics Flexibility

A competency is an assembly of firm-specific assets into integrated clusters spanning individuals and groups that enable performance of distinct activities (Teece, Pisano, and Shuen 1997). It is an internal strength that is not visible to the customer (Zhang, Vonderembse, and Lim 2005) which can be tangible or intangible. A competency focuses a firm's resources to meet customer requirements (Stank, Keller, and Closs 2001).

Internal flexibility is "what an *organization* can do" (Upton 1994, p. 75). The effects of internal flexibility are not directly felt by the customer, but the results produce a customer benefit (Upton 1994). Thus, internal logistics flexibility (ILF) is a competency that aligns the firm's resources and assets to meet customer demand. ILF is a firm's ability to quickly, efficiently, and accurately adapt the movement, storage, and distribution of goods or services, along with associated information to meet customer demand and overcome environmental uncertainty.

External Logistics Flexibility

A capability is an "attribute, ability, organizational process, knowledge, and skill that allow a firm to achieve superior performance and sustained competitive advantage

over competitors" (Morash, Dröge, Vickery 1996, p. 1). A logistics capability is a customer-desired and visible strength that results from a logistics competency within the firm (Zhang, Vonderembse, and Lim 2005). External flexibility is a supplier's response to meeting customer demands -- "what the *customer* sees" (Upton 1994, p. 75). Thus, external logistics flexibility (ELF) is a capability resulting from a firm's logistical ability (a competency) to meet customer demand. ELF examples include on-time delivery of products, quick and accurate response to customer order changes, and customized service.

Internal logistics flexibility allows a firm to provide external logistics flexibility to their customers. Internal logistics flexibility is therefore critical to meeting customer demands. This leads to the primary research question of this study: How can a firm develop internal logistics flexibility? The intent of this research is to determine what provides an organization internal logistics flexibility and to develop an assessment tool by which an organization can identify its current level of internal logistics flexibility.

METHODOLOGY

A two part research plan was employed. The first part entailed a thorough literature review on flexibility to gain an understanding of concepts, identify areas which require further investigation, and most importantly highlight areas that are relevant to internal logistics flexibility. The next step involved 22 in-depth interviews. These interviews were used to increase understanding of internal logistics flexibility by clarifying concepts identified in the literature review, identifying new concepts, and providing internal logistics flexibility. A regional convenience sample was selected from

Council of Supply Chain Management Professionals (CSCMP) member. Logistics directors and logistics managers at buying organizations (customers) were interviewed to determine their perspectives on what makes a flexible supplier. The people interviewed were then asked to provide contacts at their supplier organizations. The secondary contacts represented companies deemed most flexible in meeting their demands. From the customers' perspective, these suppliers were the easiest to work with and consistently provided superior service and products.

Logistics managers and directors in the military, manufacturing, distribution, and transportation areas were interviewed. These individuals are regarded as appropriate key informants because they are involved with the management of day-to-day logistics functions within their organization (Phillips 1981).

The industries included beverage and vending machine companies, defense contractors, electronics manufacturers, food service and product distributors, transportation providers, and the United States military. Respondent demographics appear in Table 1.

TABLE 1

RESPONDENT DEMOGRAPHICS

Respondent Title	**Frequency**	**Percentage**
Logistics Director	9	41.0
Logistics Manager	11	54.5
Other/Unspecified	2	4.5
Total	**22**	**100**
Industry*	**Frequency**	**Percentage**
Beverage and vending machine companies	4	18.2
Defense contractors	4	18.2
Electronic manufacturers	3	13.6
Food service and product distributors	5	22.7
Transportation providers	2	9.1
United States military	4	18.2
Total	**22**	**100**

* Firms did not give permission to use their names

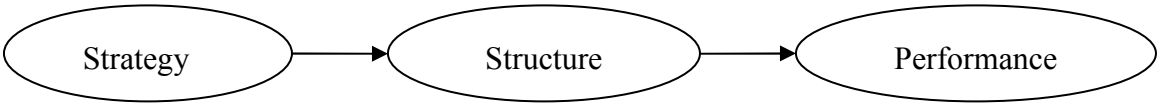
During face-to-face interviews using a semi-structured questionnaire, suppliers were asked to focus on the processes and procedures needed to develop and maintain internal logistics flexibility. Potential interview questions were reviewed by two academics and four industry experts. The resulting interview guide ensured that the same general areas were covered by each respondent, but allowed the researcher to probe additional areas as appropriate.

The lead researcher conducted interviews at the respondent's place of business; each lasted from 45 to 90 minutes. The interviews were audio recorded and then transcribed for further review. The lead researcher and three graduate assistants reviewed each transcription separately looking for common themes. The four individuals met and reconciled differences through discussion and negotiation until agreement was reached.

A conceptual model linking strategy (customer orientation) to organizational structure and resultant ILF emerged from the literature review and in-depth interviews. The strategy-structure-performance framework (Figure 1) provides the theoretical foundation for the proposed model and is discussed next (Chandler 1962).

FIGURE 1

STRATEGY-STRUCTURE-PERFORMANCE FRAMEWORK



STRATEGY-STRUCTURE-PERFORMANCE

Organizational strategy and structure are of particular interest to management because of their impact on performance. Logistics researchers have explored the relationship between organizational strategy, structure, and performance (Bowersox and Daugherty 1995; Chow, Heaver, and Henriksson 1995).

Strategy

Strategy is "a fundamental pattern of present and planned resource deployments and environmental interactions that indicates how the organization will achieve its objectives" (Hofer and Schendel 1978, p. 25). It encompasses "the vital missions of an organization, the goals which must be attained, and the principal ways in which the resources available are to be used" (Hall and Saias 1980, p. 151). Broadly speaking, strategy is management's game plan for running the firm (Chow, Heaver, and Henriksson

1995). Strategy provides the organization an opportunity for competitive advantage based on aligning its resources to achieve its operational goals (Hofer and Schendel 1978). Strategies can focus on competition such as: cost leadership strategy - achieve and maintain low cost in an industry; differentiation strategy - create unique image or value for a product or service; and focus strategy – compete in a specific industry segment (Porter 1980). Strategy channels a firm's resources to meet their organizational objectives.

Structure

Organizational structure covers "formal allocation of work roles and the administrative mechanisms to control and integrate work activities including those which cross formal organizational boundaries" (Child 1972, p. 2). Formal written rules and work related procedures provide guidance on the routine day-to-day operations (Germain, Dröge, and Daugherty 1994). Structure has two critical components: (1) formal lines of authority and communication, and (2) the information and data that flow along those lines (Chandler 1962). Formal roles define the duties and responsibilities of leadership. Leaders have the discretion to make changes to the firm, the leniency to listen to their employees' improvement suggestions, and can implement those ideas beneficial to the firm. Communication and information exchange within a firm facilitate control and integration between a firm's divisions (Germain, Dröge, and Daugherty 1994).

Organizational structure is typically classified as centralized or decentralized. This indicates the dispersion of decision-making authority throughout the organization. With a centralized approach, one or a very few top managers retain most of the decision

making authority. Decentralization implies that middle and lower level managers are empowered to make decisions. Decentralized structures tend to allow faster response to events and opportunities (Hall and Saias 1980).

Performance

Performance is "the extent to which a firm's goals are achieved" (Ellinger, Daugherty, and Keller 2000, p. 4). A few examples include customer satisfaction, efficiency, and effectiveness; return on investment, and return on assets. Performance encompasses: (1) actual *behavior* which is what an individual or firm does, and (2) the *outcome* of that behavior which is the results experienced by the individual or firm (Haytko 1994). For a thorough review of performance see Haytko (1994) and logistics performance see Chow, Heaver, and Henriksson (1994). Strategic and logistics management research has addressed the interrelationships among, strategy, structure, and performance, and empirically validated the strategy/structure/performance relationship (Chow, Heaver, and Henriksson 1995; Rumelt 1974).

Strategy/Structure Relationship

Some researchers argue that strategic choices determine structure (Chandler 1962; Rumelt 1974). Changes in market strategy, product, and service offerings will require organizational structure changes to accommodate new operational requirements. Other researchers (Hall and Saias 1980) suggest a reverse relationship. They contend that "strategy depends upon structure." Committing to a specific organizational structure limits the range of future strategies. Still other researchers suggest that the relationship between strategy and structure may be situational (Bowersox and Daugherty 1995).

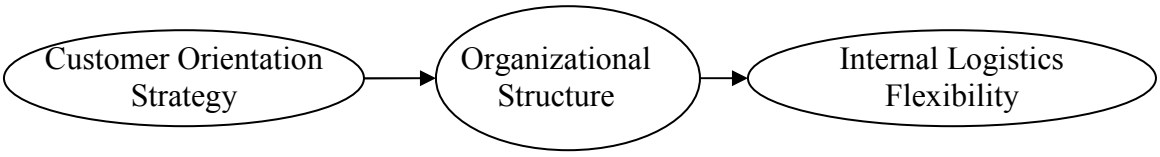
Depending upon the situation, one may proceed or follow the other. From the viewpoint of this paper, it is argued that a firm's customer orientation strategy necessitates a particular organizational structure adaptation to develop ILF. The proposed model of ILF is discussed next.

INTERNAL LOGISTICS FLEXIBILITY MODEL

The proposed model is detailed in Figure 2. The components of the model (developed and based on the literature and in-depth interviews) include customer orientation (strategy), organizational structure, and internal logistics flexibility (performance).

FIGURE 2

INTERNAL LOGISTICS FLEXIBILITY MODEL



Customer Orientation

Customer orientation is an organizational strategy focused on providing superior service quality to customers (Sinkovics and Roath 2004). The current research identified three components of customer orientation considered critical to ILF: (1) understanding customer demands; (2) superior service to customers; and (3) willingness to meet customer demands.

Understanding Customers Demands

Market volatility, shorter product life cycles and time to market, globalization, and product proliferation all result in increased/changing customer demands. Firms must be able to respond quickly to customer's requirements and must fully understand what their customers want (Pelham and Wilson 1996).

Understanding a customer's demands, allows firms to focus on product or service differentiation and service enhancement by providing unique, value-added activities (Mentzer, Min, and Bobbitt 2004). Understanding customer demands is one of the best methods of providing the right products to customers (Lambert and Harrington 1989). Understanding can be gained through external audits, internal audits, evaluation of customer perceptions, and identification of opportunities (Lambert 1992).

It is not only essential to know customers' current requirements, but also future requirements (i.e., forecasting). Boundary-spanning personnel are in the most advantageous position to gather intelligence from customers and to engage in collaborative forecasting efforts. Conversations with customers can elicit information on decisions involving promotions, new store openings, discontinued items, and other factors that impact demand and forecast accuracy (McCarthy and Golicic 2002). The organization can then adjust lead-times and deliveries as necessary.

During the interviews, managers stated that boundary spanning employees such as sales representatives and customer service representatives are critical to understanding customers. Boundary spanners are responsible for listening to the customers and determining their real concerns. They can then develop unique solutions to customer's problems. One particular interviewee stated that she performs random spot checks of

customers to determine if the sales force is addressing their concerns, and, in turn, relaying relevant information to the rest of her organization.

Managers stated that they continually assess their firms' responsiveness to customer demands. One supplier described a situation in which their warehouse operation worked overtime to fill a customer order, but transportation did not deliver the product until the next work day. Once this problem was identified, immediate action was taken to align work shifts across all divisions.

Another supplier stated they routinely conduct self assessments. The self assessments examine internal company performance data such as on-time deliveries, percentage of orders filled, back-orders, and returned products. The self assessments serve as an "early warning system."

Superior Service to Customers

Suppliers can provide superior service to customers by either increasing benefits or decreasing costs and adding value to the customer's order (Lynch, Keller, and Ozment 2000). This includes the supplier's ability to customize or tailor services to the buyer's demands. In logistics, superior service depends upon order processing (Byrne and Markham 1991); quality of contact personnel (Innis and LaLonde 1994); information at order placement (Byrne and Markham 1991; Innis and LaLonde 1994); order accuracy (Byrne and Markham 1991); order completeness, including accuracy, condition, and quality (Byrne and Markham 1991); and the procedures for handling damaged, inaccurate, or return shipments (Innis and LaLonde 1994). These areas are linked

through customer service to create customer satisfaction (Rinehart, Cooper, Wagenheim 1989).

Logistics managers stated that they monitor their logistics systems to ensure quick and efficient response to changing customer needs. They examine time between order receipt and customer delivery, the difference between quoted and actual delivery dates, and any differences in quantities ordered and shipped. One electronics supplier regularly reviews information on his logistics system's ability to modify order size, volume, and composition to accommodate special or non-routine requests, handle unexpected events, and provide rapid response to customer requests. A food service provider stated that he monitors the quantity of customer orders for abnormalities. Large increases or decreases focus his attention. For example, orders from a particular customer decreased unexpectedly. When the supplier asked the customer the reason, the customer stated that late deliveries from his company caused a backup at their loading dock. The customer had shifted his order to another supplier even though the product cost more. The supplier immediately took action to meet the customer's delivery requirements and order quantities increased.

Pre-notification on deliveries is another example of customized service, which gives the customer time to coordinate actions and prepare for arrival. An electronics company manager stated that it's routine practice to send a customer an advance ship notice of incoming products prior to the delivery vehicle leaving their facility. Providing the service and products customers want along with value-added and customized activities is essential to a customer orientation strategy.

Willingness to Meet Customer Demand

Due to competition levels and pressure to improve operating profit margins, managers are focusing on being more responsive to customer needs (Day 2006). Top managers play a critical role in shaping their firm's values and orientation toward meeting customer demand. Managers need to promote a customer focus by their actions and statements (Jaworski and Kohli 1993). Sharma (2002) showed that organizations that identify specific (as opposed to general) customer needs first, and then willingly dedicate resources to meet those needs experience increases in customer satisfaction. Top management reinforcement of the importance of meeting customer demand encourages individuals in the organization to track markets changes, share customer intelligence with others in the organization, and be responsive to customer needs (Jaworski and Kohli 1993).

Not all customer demands can be met due to suppliers' limited resources. This is the underlying rationale for key account management. Investing in key account programs that cater to specific customer demands can lead to higher sales and profits (Heide and John 1990). Firms' willingness to meet customer demands is evidenced by differentially allocating assets by account (Anderson and Narus 1990). Suppliers stated they identify key account requirements including any special procedures for handling products and services. An electronics supplier determined that a key account required immediate delivery of replacement electronic parts. The supplier set a procedure in place in which an individual in the transportation department used a company vehicle to hand-deliver the part instead of using the normal daily delivery vehicle.

A defense contractor stated that his firm adapts their logistics processes to meet customer demand. For example, they adopted the customer's quality control standards, placed employees in the customer's facilities, and incorporated business processes such as vendor managed inventory.

The current research argues that a customer orientation strategy of understanding customer demands, providing service to meet those demands, and willingly dedicating resources to meet customer demand helps to identify an appropriate organizational structure able to meet customer demands.

Organizational Structure

The following elements of organizational structure were identified as crucial to ILF: leadership, communication/information exchange, integration, decision making (empowerment) at the lowest level, and formalization of processes and procedures.

Leadership

Leaders influence firm members by aligning values, goals, and aspirations to facilitate customer-centered work behaviors (Mackenzie, Podsakoff, and Rich 2001). Leaders can articulate a vision and motivate employees to adopt a customer-driven strategy throughout the organization (MacKenzie, Podsakoff, and Fetter 1993).

Managers, supervisors, and directors are in key positions as leaders to foster change and champion new ideas in their divisions (Maidique 1980). A key characteristic of a leader is inspiring and respecting subordinates. At the operational level, front-line employees are responsible for making logistic processes a reality. They are the ones that

pick the products, load the trucks, and meet with the customers. These workers are in the best position to identify and correct faulty processes, streamline activities, and make suggestions for improvements. Leaders are critical to implementation of innovative ideas suggested by subordinates throughout the organization (Maidique 1980).

An interviewee noted her director is always receptive to new ideas, supports change, has an open door policy for his subordinates, and is described as the "Go to Guy" when problems arise in her division. The director consistently asks employees for improvement suggestions, publicly recognizes individuals that suggest improvement initiatives, and has placed suggestion boxes throughout the organization. She also stated that the director treats all employees with dignity and respect, is supportive and fair, praises in public, and admonishes in private.

Communication/Information Exchange

Communication is the process by which information is exchanged. Forms of communication include phone, fax, email, EDI, and face-to-face. Information exchange is the actual sharing of information within a firm. Information should flow freely throughout the firm: upward, downward, and laterally. Relevant information includes changes in the business environment such as market and customer preferences. In order for divisions within a firm to use the information effectively and efficiently, it must be exchanged as needed, in an appropriate format, without missing elements (Mohr and Sohi 1995). Information provides a framework for meeting customer demands by letting all involved divisions know order status and what actions are required by them to complete orders.

Both formal and informal channels are crucial to information exchange between divisions (Zhan and Dant 1997). Information on customer demands needs to be shared during regularly scheduled meetings between divisions as well as through casual interchanges.

During the interview, a defense contractor stated, "In the last four years, management has encouraged information exchange between divisions. Before that time, each division was on its own. The only time information was shared was if someone had a friend in the other division and they would pass information back and forth informally. At first, divisions were leery about sharing information. Everyone had their own 'kingdom' which they wanted to protect. It was only after top management continually promoted cooperation that information exchange started. It was slow going at first, but now information flows freely throughout the company."

Another interviewee described how his supply division uses electronic vending machines to track part usage within his organization. Commonly used parts are dispensed from electronic vending machines, which resemble beverage and snack machines. The worker swipes his identification card and picks the part he needs via a keyboard. The part is dispensed and a debit is registered to the worker's division for accounting purposes. Reorder points are preset for each part. An alert is sent to supply to restock the part when the reorder point is reached. Part usage and debit information is automatic and real-time. The supply division knows the exact quantity of all parts and other divisions have accurate and immediate cost accounting information.

Internal Integration

Internal integration is the linking of divisions within a firm into a seamless process to support customer requirements (Stank, Keller, and Closs 2001). Focusing logistical activities of a firm toward generating unique and profitable product/service offerings to meet customer demand requires a coordinated effort on the part of all divisions (Rodrigues, Stank, and Lynch 2004). This has led logistics to a more horizontal cross-functional structure emphasing process management (Rodrigues, Stank, and Lynch 2004).

Effective integration also involves mutual understanding, a common vision, and shared resources between divisions (Stank, Keller, and Daugherty 2001). Ruekert and Walker (1987) found that functions within an organization become more dependent on each other for expertise, information, and other resources as customer requirements change.

An electronics supplier interviewee stated that her company utilizes cross-functional work teams for managing day-to-day operations. Her company has shifted from managing functions to managing processes. A defense contractor noted that until recently his company was organized by functions. His company's reorganization centered on meeting customer demand by creating project teams comprised of members from engineering, finance, logistics, etc. These teams are formed based on the product or service required by the customer. The team stays together until the product is delivered to the customer, at that time the membership in the team is reduced to key players needed to provide customer support.

A food equipment supplier identified how employees from different functional areas are encouraged to work together, share information and resources, and provide input needed to meet customer demand. He went on to say that his upper management emphasizes the importance of working with other divisions to meet customer needs. There is a poster citing the importance of teamwork on every bulletin board throughout the company.

Decision Making (Empowerment)

Empowerment means delegating decision-making authority throughout a firm (Jaworski and Kohli 1993). This allows individuals to make decisions and solve problems in order to satisfy customers and improve work processes (Novack, Grenoble, and Goodbread 1993). Empowerment includes the concept of teams. In many firms, both teams and individuals are empowered to identify and solve problems, improve processes, and satisfy customers.

With empowerment, managers give employees the discretion to make day-to-day decisions. Employees are allowed to make decisions commensurate with their level of authority (Bowen and Lawler 1992; Jaworski and Kohli 1993). By allowing employees to make decisions, the manager relinquishes control over many aspects of the work environment. Empowerment is necessary because employees must be able to make on-the-spot decisions to meet customer demands. Managers must also encourage employee initiative in making decisions and trust employees to exercise good judgment in their decisions.

Allowing employees to use their discretion in meeting customer demands has potential positive aspects for both the employee and the customer. Bowen and Lawler (1992) showed that empowered employees feel better about their jobs and are more responsive to customer needs which results in higher quality service to customers.

A supplier stated that his shift supervisors are authorized to adjust work schedules in order to meet customer demand and request support from other divisions as required. He only gets involved when other divisions are unable to support his division. At that time, he meets with the other division manager to solve the problem. If the problem is not solved, it is elevated to their boss.

Formalization

Formalization represents the degree to which rules define roles, authority relations, communications, norms and sanctions, and procedures (Hall 1972). In the logistics area, formalization involves "the establishment of rules and procedures to guide routine logistics operations and facilitate day-to-day decision making" (Bowersox and Daugherty 1992, p. 14). Previous research showed that formalized organizations are more efficient (Pugh et al. 1968). Formalization provides a starting point for directing daily operations and eliminating the need to treat recurring situations as new decisions. Many business decisions are repetitive in nature and fairly straight forward. When rules or procedures are defined in advance, they can be applied to facilitate these routine decisions. Standardized policies, procedures, and practices reduce uncertainty associated with routine logistical operations, focusing resources on emergent situations and operational exceptions (Stank, Keller, and Close 2001). With formalized procedures in

place, an organization can coordinate activities, streamline logistics tasks, and shift resources to meet changing customer demands and still manage daily operations. Formalization also helps in achieving consistency, coordination, and economy when shifting resources to meet demand.

During an interview, a supplier stated his company's rules and regulations are published on the company's intranet. All employees have access. He went on to say that actions such as routing of products, order processing, and inventory accounting are covered by formal procedures. However, if a situation arises that is not covered by formal procedures, employees have the authority to develop informal rules or approaches.

An electronics supplier stated that in the computer chip packaging department her company evaluates employees based on how well they follow posted procedures. Supervisors validate that employees maintain a sterile work environment by following strict operational procedures at all times. This ensures that the computer chips are not contaminated by foreign debris.

An organizational structure comprised of leadership, communication/information exchange, internal integration, decision making (empowerment), and formalization is crucial for ILF.

ASSESSING INTERNAL LOGISTICS FLEXIBILITY

An assessment is a comprehensive, systematic, and regular review of an organization's activities (Van der Wiele et al. 1995). There are two primary types of assessments: (1) self assessments and, (2) ISO quality audits. Self-assessments are internal inspections comparing actual procedures against an organization's published

procedures, while ISO audits are based on industry standards. Assessments allow organizations to determine their strengths and areas for improvement. Organizational assessments highlight areas that require action and involve people at the strategic, tactical, and operational levels to develop process improvements (Duncan, Ginter, and Swayne 1998).

Effective management requires an understanding of a firm's resources and competencies as well as how each contributes to the formation of organizational strengths and ultimately to the development of a competitive advantage (Barney 1991). Identification of strengths and weaknesses allows management to focus efforts for improvement (Porter 1985). By paring down lists of strengths and weaknesses to ones that are competitively relevant, managers can understand precisely how each strength and weakness has the potential for adding or subtracting value (Porter 1991). Managers can then develop an array of strategies to correct the weak areas. After the plans are implemented, reassessments are made to evaluate if further development actions are required.

In order to assess a firm's level of ILF, the ILF assessment tool (ILFAT) was developed. Assessment items were adapted from existing scales to focus attention in areas of customer orientation and organizational structure (previously identified through the in-depth interviews and relevant literature). The items were reviewed for relevancy by an academic and 10 logistics practitioners with knowledge and experience in the research area. An overview of the assessment item sources is provided in Table 2 and the entire ILFAT is shown in Appendix A.

Table 2: ILFAT References

Customer Orientation	
Assessment Area	**Scale adapted from**
Understanding Customer Demands	Jaworski and Kohli (1993)
Superior Service to Customers	Stank, Keller, and Daugherty (2001)
Willingness to Meet Customer Demand	Gilliland and Bello (1997) Heide (1994) Jaworski and Kohli (1993) Sengupta, Krapfel, and Pusateri (1997) Sharma (2006) Workman, Homburg and Jensen (2003)
Organizational Structure	
Leadership	McElroy et al. (1993)
Communication/information exchange	Fisher, Maltz, and Jaworski (1997) Heide and John (1992) Zhan and Dant (1997)
Internal integration	Rodrigues, Stank, and Lynch (2004) Zacharia and Mentzer (2004)
Decision making (empowerment)	Jaworski and Kohli (1993)
Formalization	Ferrel and Skinner (1988) Sohi, Smith, and Ford (1996)

MANAGERIAL IMPLICATIONS

The research results represent a blueprint for how to create and/or increase internal logistics flexibility and thereby improve competitive positioning. The starting point is a form of environmental scanning. Organizations must be aware of what's going on in the market. What are competitors offering? In many instances, that becomes the threshold level for competing in the market. However, real success will require going beyond entry-level requirements. In addition to assessing current market conditions, it is also important to look at how dynamic the marketplace is. Boundary spanning personnel were specifically mentioned as a means of monitoring and keeping up with the dynamic

changes in the marketplace. Firms are well advised to develop close relationships with top tier and mid-level customers. Communication becomes critical. Early awareness of customer needs can help to frame service and product strategies.

Awareness of the dynamics related to customers must be backed up with an overall corporate philosophy of customer focus and willingness to be responsive as well as a commitment of the necessary resources. Internal efforts should be targeted to providing what customers want. One way to approach this is to think of being prepared, informed, and linked. These three components relate to the strategy and structure dimensions of the ILF model.

Preparation refers to adoption of the appropriate strategy (customer orientation in the current context) and putting the necessary structure in place. Reporting relationships along with authority or decision making power are critical in allowing for flexible operations. When unusual circumstances occur or special requests are received, there's usually an urgency involved. A decision needs to be made quickly. In order to make quick decisions, managers not only have to have the authority, they also have to be informed on what can and cannot be done. Often the requests cross functional lines. Integrated operations with close linkages and strong intra-organizational communications put managers in better positions to assess their ability to respond.

The objective of this research was to develop a tool that managers can use to assess their organization's internal logistics flexibility. The Internal Logistics Flexibility Assessment Tool (ILFAT) provides a pragmatic, easy-to-use means of gauging current level of internal logistics flexibility and identifying areas that warrant attention/change.

The components of ILF are internal to the firm which provides management with direct control and the opportunity to make changes in order to be responsive to their customers.

LIMITATIONS AND FUTURE RESEARCH

This research resulted in the development of an instrument for assessing internal logistics flexibility based on the strategy-structure-performance framework. The ILFAT represents an initial attempt to assess a firm's ILF. The proposed assessment items were identified based on literature and in-depth interviews. Additional interviews and empirical testing is required to further refine the instrument.

A limited number of industries were involved in this research. Including a wider array of industries can increase consensus. Additionally, the ILFAT focuses on the operational level. Further research can adapt the ILFAT to the tactical and strategic levels.

Relationships between a firm's customer orientation strategy, organizational structure, and ILF are suggested. Empirical testing is required to validate the relationships. Additionally, customer orientation was assumed to be comprised of three components crucial to ILF and organizational structure as having five components. Further research is needed to determine if there are other relevant customer orientation and organizational structure components and to explore potential moderating and mediating variables.

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APPENDIX A

INTERNAL LOGISTICS FLEXIBILITY ASSESSMENT TOOL (ILFAT)

CUSTOMER ORIENTATION

I. Understanding of Customer Needs

1. Please indicate your level of agreement with the following statements about your organization's **ability to understand your customer's needs**.
(1 = Strongly Disagree, 7 = Strongly Agree)

	Strongly Disagree			Neutral			Strongly Agree
a) In this division, we meet customers at least once a year to find out what products or services they will need in the future.	1	2	3	4	5	6	7
b) Individuals from our logistics department interact directly with customers to learn how to serve them better.	1	2	3	4	5	6	7
c) In this organization, we do a lot of in-house market research to understand our customer's needs.	1	2	3	4	5	6	7
d) We poll customers at least once a year to assess the quality of our products and services.	1	2	3	4	5	6	7
e) We often talk with or survey those who can influence our customers' purchases.	1	2	3	4	5	6	7
f) We have interdepartmental meetings at least once a quarter to discuss customer needs.	1	2	3	4	5	6	7
g) Marketing personnel in our organization spend time discussing customers' future needs with other functional departments.	1	2	3	4	5	6	7
h) Our organization periodically circulates documents (e.g. reports, newsletters) that provide information about our customers.	1	2	3	4	5	6	7
i) We periodically review our logistics efforts to ensure that they are in line with what customers want.	1	2	3	4	5	6	7

II. Superior Service to Customers

2. Please indicate the level of your organization's **logistics performance** in comparison to your competitors in the following areas:
(1 = Worse than competitors, 7 = Better than competitors)

	Worse than Competitor			Same			Better than Competitor
a) The ability to reduce the time between order receipt and customer delivery to as close to zero as possible.	1	2	3	4	5	6	7
b) The ability to meet quoted anticipated delivery dates and quantities on a consistent basis.	1	2	3	4	5	6	7
c) The ability to respond to the needs and wants of key customers.	1	2	3	4	5	6	7
d) The ability to provide desired quantities on a consistent basis.	1	2	3	4	5	6	7
e) The ability to modify order size, volume, or composition during logistics operation.	1	2	3	4	5	6	7
f) The ability to accommodate delivery times for specific customers.	1	2	3	4	5	6	7
g) The global judgment regarding the extent to which perceived logistics performance matches customer expectations.	1	2	3	4	5	6	7

III. Willingness to Meet Customer Demand

3. Please indicate your level of agreement with the following statements about your organization's **willingness to meet customer demand**.
(1 = Strongly Disagree, 7 = Strongly Agree)

	Strongly Disagree			Neutral			Strongly Agree
a) According to top managers in my organization, serving the customer is the most important thing we do.	1	2	3	4	5	6	7
b) This organization is open to requests to modify a prior agreement in order to meet customer demand.	1	2	3	4	5	6	7
c) My organization has invested in assets (systems, infrastructure, or people) that are dedicated to specific customers in order to meet their demands.	1	2	3	4	5	6	7
d) My organization has invested in assets (systems, infrastructure, or people) that are dedicated to **key accounts** in order to meet their demands.	1	2	3	4	5	6	7
e) My organization has created processes to cater to specific customers in order to meet their demands.	1	2	3	4	5	6	7
f) My organization adapts our distribution and logistics activities (e.g. logistics and production processes, quality programs, placement of own employees in account's facilities, taking over business processes from customer) in order to meet customer demands.	1	2	3	4	5	6	7
g) My organization will work overtime in order to meet customer demand.	1	2	3	4	5	6	7
h) My organization has often made adjustments to changing circumstances in order to meet customer demand.	1	2	3	4	5	6	7
i) My organization has reallocated resources and effort when unexpected situations have arisen in order to meet customer demand.	1	2	3	4	5	6	7

ORGANIZATIONAL STRUCTURE

IV. Leadership

4. Please indicate your level of agreement with the following statements about your organization's **management**.
(1 = Strongly Disagree, 7 = Strongly Agree)

	Strongly Disagree			Neutral			Strongly Agree
a) Management asks for employees' opinions on work related matters.	1	2	3	4	5	6	7
b) Management treats us with respect and dignity.	1	2	3	4	5	6	7
c) Management gives credit to workers for a job well done.	1	2	3	4	5	6	7
d) Management provides clear expectations.	1	2	3	4	5	6	7
e) Management is fair.	1	2	3	4	5	6	7
f) Management is receptive to suggestions.	1	2	3	4	5	6	7
g) Management is supportive.	1	2	3	4	5	6	7

V. Communication

5. Please indicate your level of agreement with the following statements about **communication (information exchange)** in your organization.
(1 = Strongly Disagree, 7 = Strongly Agree)

	Strongly Disagree			Neutral			Strongly Agree
a) We keep each other informed about events that affect the other divisions.	1	2	3	4	5	6	7
b) We often exchange information informally.	1	2	3	4	5	6	7
c) We are expected to provide other divisions with information that may be of help.	1	2	3	4	5	6	7
d) There is a tradition of interdivision communication.	1	2	3	4	5	6	7
e) Information sharing between divisions is strongly encouraged.	1	2	3	4	5	6	7

VI. Internal Integration

6. **Internal integration** refers to linking work performed **across functional areas** into a seamless process to support customer requirements. Please indicate your level of agreement with the following statements about the **current level of internal integration** within your organization.
(1 = Strongly Disagree, 7 = Strongly Agree)

	Strongly Disagree			Neutral			Strongly Agree
a) My firm extensively utilizes cross-functional work teams for managing day-to-day operations.	1	2	3	4	5	6	7
b) Within my firm, employees from different functional areas are encouraged to work together.	1	2	3	4	5	6	7
c) Middle managers in my firm are encouraged to share information and provide input to other functional areas.	1	2	3	4	5	6	7
d) Within my firm, employees from different functional areas are encouraged to share resources.	1	2	3	4	5	6	7
e) The orientation of my firm has shifted from managing functions to managing processes.	1	2	3	4	5	6	7

VII. Decision Making (Empowerment)

7. Please indicate your level of agreement with the following statements about **how decisions are made** your organization.
(1 = Strongly Disagree, 7 = Strongly Agree)

	Strongly Disagree			Neutral			Strongly Agree
a) Individuals are encouraged to make their own decisions in this organization.	1	2	3	4	5	6	7
b) Only large matters have to be referred to someone higher up for a final answer.	1	2	3	4	5	6	7
c) I seldom have to ask my boss before I do anything.	1	2	3	4	5	6	7
d) Few decisions I make require my boss's approval.	1	2	3	4	5	6	7
e) There can be little action taken in our organization until a supervisor approves a decision.	1	2	3	4	5	6	7

VIII. Formalization

8-1. Please indicate your level of agreement with the following statements about **rules and procedures** in your organization.
(1 = Strongly Disagree, 7 = Strongly Agree)

	Strongly Disagree			Neutral			Strongly Agree
a) There are few things in my business that are not covered by some formal procedure.	1	2	3	4	5	6	7
b) I follow the rules and reach formal agreements to handle most situations.	1	2	3	4	5	6	7
c) If a written rule does not cover a situation, we make up informal rules for doing things as we go along.	1	2	3	4	5	6	7

8-2. Please indicate your level of agreement with the following statements about **formalization** in your organization.
(1 = Strongly Disagree, 7 = Strongly Agree)

	Strongly Disagree			Neutral			Strongly Agree
a) Going though proper channels for getting the job done is constantly stressed.	1	2	3	4	5	6	7
b) Everyone within the organization follows strict operational procedures at all times.	1	2	3	4	5	6	7
c) Our organization operates in a very informal way when it comes to getting things done.	1	2	3	4	5	6	7

CUSTOMER ORIENTATION IN LOGISTICS OPERATIONS: A CASE STUDY OF SYSCO CORPORATION

Abstract

A supplier's customer orientation is critically important in meeting customer demand. The first step for suppliers is to understand what they need to serve their customers. Not understanding customer requirements can cause a supplier to over-spend and provide products and services that are not valued by the customer. Once customer requirements are determined, suppliers can adapt existing logistical operations or design new operations to meet those needs while at the same time reduce operating costs. This paper focuses on a food service provider, SYSCO, whose customer orientation strategy puts them in-tune with the needs of their customers and has used that insight to build logistics operations focused on fulfilling those needs.

1. Introduction

Salespeople who tout their company's products and services without listening to the needs of the customer are setting the stage for disaster and limited business. The reality is that suppliers do not always know what customers expect (Parasuraman et al., 1985). A critical issue for suppliers is to identify expectations in order to provide what customers want (Atkinson, 1989). In some circumstances, customers may not know exactly what they need (Powers, 1988). A supplier's representative who is willing to listen to the customers and assist them with finding the best product to use can gain a competitive advantage for their company over rivals.

Many suppliers are trying to become more proactive and anticipate customer expectations (Stank et al., 1999). One proactive approach is through a customer orientation strategy which focuses on providing superior service quality to customers by understanding their requirements (Sinkovics and Roath, 2004). Marketing associates are in a key position to determine the needs, wants, and preferences of customers due to their continuous contact (Lambert, Marmorstein, & Sharma, 1990). Marketing associates who take the time to listen to the customer are in an advantageous position to match their

company's products and services to the customer's needs and build long-term relationships (Grace & Pointon, 1980; Lancioni, 1995).

Once firms understand what customers require, they must "follow through." Logistics is a key area in which suppliers can focus their efforts. Effective management of order processing, inventory, warehousing, inbound and outbound transportation, and scheduling/planning is required.

The purpose of this paper is to showcase a food industry supplier, SYSCO, who exhibits a customer orientation strategy by proactively interacting with its customers to determine customer requirements, and how SYSCO can best meet those requirements. SYSCO uses its Business Review and Business Development teams to identify the true needs of their customers, while continuous internal improvements allow SYSCO to accurately allocate resources to meet those needs.

In-depth interviews were conducted with SYSCO's management at their central United States distribution center. Interviewees included the Vice President of Marketing and Merchandising, Business Operations Manager, Customer Development Manager, Customer Review Manager, Merchandising Manager, Merchandisers, Sales Trainer, and Logistics personnel. The interviews lasted from 30 to 60 minutes and covered the topics of customer orientation and SYSCO's efforts to meet customer's needs. An overview of SYSCO is next followed by a detailed account of SYSCO's customer orientation programs and resulting organizational structure improvements. Managerial implications and conclusions complete the paper.

2. Company background

SYSCO, which stands for Systems and Services Company, is North America's leading distributor of food products to restaurants, healthcare and educational facilities, lodging establishments, and other customers that prepare meals away from home (Anonymous, 2007) (Table 1).

Table 1
SYSCO fiscal year 2006 customer sales

Customer	% of total
Restaurants	63
Hospitals & nursing homes	10
Hotels & motels	6
Schools & colleges	5
Other	16
Total	100

(Hoovers Business Review, 2007b)

SYSCO also provides a full spectrum of foodservice supplies and equipment to complement its broad food product offerings. Customers can receive everything they need for their operations, from front-of-the-house service ware to back-of-the-house heavy-duty janitorial supplies (Table 2).

Table 2
SYSCO fiscal year 2006 product lines sales

Product	% of total
Fresh & frozen meats	19
Canned & dry products	18
Frozen fruit, vegetables & bakery items	14
Poultry	10
Dairy products	9
Fresh produce	9
Paper & disposables	8
Seafood	5
Beverage products	3
Equipment & smallwares	2
Janitorial products	2
Medical supplies	1
Total	100

(Hoovers Business Review, 2007b)

SYSCO was founded by John Baugh in 1970 when his company, Zero Foods, merged with nine other food product companies. At that time, sales were $115 million. Seven years later, SYSCO became the leading supplier to "meals-prepared-away-from-home." Currently, SYSCO ranks 65th in the 2007 *Fortune* 500 Largest U.S. Corporations and 1st in the Wholesalers: Food and Grocery category with $32.6 billion in annual revenue, more than the combined revenue of its three leading competitors: U.S. Foodservice – $17.6 billion, McLane Foodservice – $7.4 billion, and Performance Food – $5.8 billion (Hoovers Business Review, 2007a). SYSCO has more than 47,500 employees and serves approximately 390,000 customers through 188 locations throughout the US and Canada (Table 3; Figure 1).

Table 3
SYSCO North American operating locations

Location	Quantity	% of total
US	161	86
Canada	27	14
Total	188	100

(Hoovers Business Review, 2007b)



Fig. 1. SYSCO's North American operating locations (SYSCO 2007b)

There are four types of distributors in the food business: broad-line distributor, primary-vendor, systems distributor, and self-distributor (Norkus & Merberg, 1994). A broad-line distributor sells a broad range of food-service products. In a primary-vendor relationship, a customer agrees to purchase most of its products from one vendor in exchange for savings in price and delivery charges. A systems distributor services large chain establishments (i.e. restaurant chains), while a self-distributor is a restaurant company that receives deliveries from vendors and manufacturers at its own warehouses (i.e. Pepsico). SYSCO qualifies for three of the four categories (broad-line, primary-

vendor, and system distributor). In the system distributor category, SYSCO established an independent subsidiary, SYGMA, which specializes in service to restaurant chains.

SYSCO's mission is stated simply as "Helping Our Customers Succeed." Its corporate philosophy is geared towards accomplishing that mission by providing value in its products and services to customers. SYSCO is not a low cost provider, but has positioned itself as a business partner striving to help customers be more profitable. Their business philosophy centers on the five Cs (Cascio, 2005):

1. Common understanding of SYSCO's mission, values, and goals
2. Clear expectations (between employees and management)
3. Compliance (operating within federal and state laws)
4. Commitment (employees are inspired about coming to work)
5. Capability (every employee has the skills and technology he or she needs to do their job)

SYSCO has focused on improvements which allow it to become more efficient in its own operations and integrate supplier and customer information more closely. For example, it has worked to improve its information systems. SYSCO's National Supply Chain Initiative (NSCI) is geared towards inventory consolidation in order to lower inventory investments. The goal is to reduce supplier costs and provide customers a higher level of service through improved logistics efficiencies.

All of SYSCO's operations focus on satisfying customer demands with quality products and services. SYSCO's customer success strategy is based on understanding customers' needs.

3. Customers Are Really Everything to SYSCO (CARES)

SYSCO created a formalized process and action plan known as Customers Are Really Everything to SYSCO (CARES) to achieve customer satisfaction objectives. To initiate CARES, SYSCO surveyed customers and analyzed performance information from SYSCO's distribution centers. The surveys helped identify what customers believe to be the most valued aspects of their relationships with SYSCO. The information indicated how SYSCO was performing in those areas. New reports and organizational procedures were designed to address deficiencies. Customer priorities included orders shipped complete, on time, in undamaged condition, and accurately invoiced. This mirrors the concept of the "perfect order."

Customers also provided input on product requirements. Product innovation is a key area. Customers desire different levels of product quality depending on the end use of the item. SYSCO offers core brands tiered in four quality levels (SYSCO, 2007c): Reliance, Classic, Imperial and Supreme. Reliance brands are economy-positioned products that offer consistency and value to the foodservice operator, while Classic products represent SYSCO's broadest array of offerings. Imperial products are produced in prime growing regions and packed to exceedingly high specifications. Supreme is SYSCO's "top of the line" products, similar in quality to Imperial but contain custom formulations and proprietary ingredients. The four brands provide customers a broad product/cost selection to meet their needs.

The CARES initiative emphasizes that outstanding customer service is paramount. Customer service focuses on both external and internal customers. In accordance with SYSCO's mission statement and the bases for CARES, marketing

associates try to exceed external customers' expectations in response to inquiries, order delivery, and quality of items in order to provide the highest possible customer service. Delivery associates interface most often with customers and serve as "the eyes of SYSCO", performing a coordinating role between the customer, the sales staff, and the warehouse. They check to be sure products are undamaged at the point of delivery, and communicate customer concerns through their supervisor to the Director of Customer Development, who is the liaison between operations and sales.

Internal customers include truck loaders, credit associates that correct inaccurate accounts, supervisors who discuss and resolve operational issues with drivers as they return, and a computer support division providing technological tools to support job performance.

4. Business Review and Development

To extend CARES, SYSCO implemented Business Review and more recently Business Development processes. The Business Review process epitomizes SYSCO's focus of helping customers succeed. The Business Review process focuses on helping SYSCO's customers grow their sales and strengthen their relationship with SYSCO. A Business Review includes an intense three-to-four-hour meeting in a non-sales environment to analyze the customer's entire menu, provide suggestions to re-engineer their menu, and offer insights on promotions and other tools to help them increase sales. A Business Review provides an opportunity to get expert guidance on subjects such as menu engineering, menu design, costing, and profit analysis. Business Reviews are accomplished at either the customer's place of business, or at the servicing SYSCO

facility. Participating customers are reimbursed for travel and lodging expenses by SYSCO.

Business Reviews help define the customer's vision and how SYSCO can support that vision. SYSCO associates don't tell the customer what to do; they work to mutually develop the direction the customer should go, identify product and service options, and share what has and has not worked for others. The reviews are tailored to the needs of the customer. However, over time, standard approaches have emerged. The review usually starts with menu development and new food offerings, how to cost items, and calculation of food costs or gross profit on those items. In other situations, customer identified issues are addressed first. SYSCO prefers to conduct reviews at their own facility. A facility tour can provide insight into SYSCO's business, how products are handled, and the most tangible benefit is time to focus on customer concerns without the customer distracted by events at his/her place of business.

The Business Review manager stated that Business Reviews have helped SYSCO better understand customers' needs, while at the same time showing customers how SYSCO can help them with product selection, menu design, customer service training, and profitability. The Business Review process is not a one time benefit. SYSCO has found that customers who come in for a second or third review understand the process better and SYSCO has a greater understanding of their needs. Customer response has been extremely positive, with approximately 20,000 business reviews conducted SYSCO-wide during the first half of FY 2007 (July - December 2006) (Prime Newswire, 2007). Results for SYSCO have been impressive, as well. The customer/distributor relationship has improved and customers consistently purchase more product lines,

generating 15 percent sales increase, on average, in that customer's account. The process recently has been expanded to focus on new potential customers through the Business Development function which provides the same functions for new customers.

5. *i*Care

Through the CARES and Business Review processes, SYSCO identified additional value-added services desired by customers. SYSCO partnered with leading companies in the marketing, financial, human services, and operational sectors to address those requests. The result was the *i*Care initiative.

*i*Care offers customers access to a variety of services to assist them in operating their businesses more efficiently and profitably. *i*CARE delivers practical, real-world training solutions on a variety of subjects, ranging from profit and loss management to food safety. Through *i*Care, customers have access to such tools as menu development, design, and printing as well as advertising, marketing strategies, and promotional materials that increase customer traffic. SYSCO provides its customers with initial contact to lending institutions to expand or remodel their locations, payroll solution providers, health insurance companies, and host of other programs that may not be readily available to the customer otherwise.

SYSCO has proactively identified customers' needs and requirements through CARES, Business Reviews, Business Development, and *i*Cares programs. By meeting with customers and listening to their demands, SYSCO has implemented organizational improvements that create efficiencies for SYSCO and, more importantly, allow them to meet customer demands.

6. Organizational structure improvements

SYSCO has implemented numerous organizational improvements to better respond to customer demand. Improvement areas include information technology, warehouse management, delivery routing, and fold-outs. Each will be discussed briefly.

6.1. Information technology

SYSCO's information technology systems are continually being upgraded and enhanced to make it easier for the customer to place orders via web portals and customer call centers. **SYSCO.com** allows customers to view detailed product information and photographs, and obtain recipes and business building tips. **eSYSCO** is SYSCO's internet ordering and reporting system which allows customers access to products, pricing and inventory data. Through **eSYSCO** immediate feedback on order status is provided which allows customers to plan for product deliveries and contingencies if products are unavailable.

6.2. Warehouse management

Product selection from inventory, loading, and distribution becomes critical following order placement. SYSCO constantly updates its warehouse management systems for total asset visibility in its distribution centers as well as continually improving their material handling equipment. Accurate identification of product location, less wasted space in product storage, and quicker product retrieval systems has created substantial savings by delaying the need to expand or construct facilities.

6.2.1. SYSCO Warehouse Management System

The SYSCO Warehouse Management System (SWMS) tracks products from the time they arrive and continuing throughout the entire receiving, storage, selection and delivery processes. Merchandisers, marketing associates, district sales managers, as well as SYSCO employees at the local distribution center, neighboring facilities and corporate headquarters are able to view product on-hand quantity, pending deliveries, and inbound quantities.

6.2.2. Mini Load

SYSCO has installed a warehouse automated storage system called a Mini Load. Mini-Load replaces the need for forklifts or individuals to put away or replenish product and is safer than the older machines that raised a person off the ground to pick the product by hand. Mini Loads greatly increase storage capabilities and allows product selectors (SYSCO's term for individuals who pick products from inventory to fill orders) to increase their productivity, since the system reduces the product pick path and the handling of small quantity pallets. A Mini Load automatic storage and retrieval system (Figure 2) handles loads comprised of small containers or totes, with load weights typically of 100 to 500 pounds.

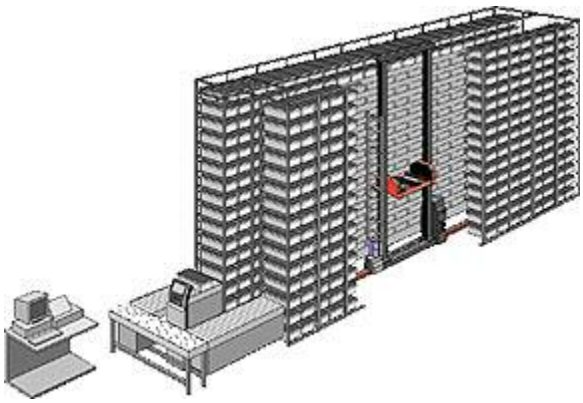

Fig. 2. Mini Load Storage System (Cisco-Eagle Storage Systems, 2007)

6.2.3. SYSCO Order Selector

Order fulfillment is another area that is critical to SYSCO's ability to meet customer demand. Each evening when product selectors arrive to "pick" products for the next day's orders, they position a bar code scanner to their wrist. The scanner, connected to a small printing device worn on the belt, has an attachment to the index finger that allows the selector to touch the bar code on a carton to verify that the correct product has been chosen (SYSCO, 2007a). The system, called the SYSCO Order Selector (SOS), has significantly reduced product mispicks in operations where it has been adopted improving efficiency and trimming restocking costs while improving service to customers (Business Wire, 2002).

6.2.4. SYSCO Loader System

The SYSCO Loader System (SLS) uses a bar code scanner attached to the forklift, which is programmed to confirm product accuracy prior to loading, and then produces a map of the order's location in the truck. This allows the driver to be more efficient as the

products are delivered to customers, since he or she may go directly to the order without unnecessary searching through the trailer.

6.3. Delivery routing

With nearly 9,000 vehicles on the road, SYSCO operates the largest private tractor fleet in the United States (Bearth, 2006). SYSCO's triple-compartmented vehicles are temperature-controlled as needed for dry, refrigerated, and frozen foods such as dry commodities, fresh produce, frozen bakery items, and ice cream. The SYSCO Transportation System (STS) determines the most efficient routing and tracks the vehicles. If a customer calls to verify when the order will arrive, the truck's location can be pinpointed through GPS and the customer can be given an estimated time of arrival.

6.4. Fold-outs

Along with an increase in products to customers, SYSCO is constantly expanding its distribution service to increase its customer base. New distribution centers are being built near older ones which have reached capacity while fold-outs are built in new market areas. A fold-out is SYSCO's term for a new distribution center in an established SYSCO marketing area that was previously served from a distant location.

In fiscal 1996, SYSCO introduced a program of building fold-outs where SYSCO had established a presence with a threshold of approximately $100 million to $125 million in sales, but was serving customers from a distant SYSCO operation. To date, 16 broad-line fold-out facilities have been completed across the United States to better service customers.

One on the primary benefits of expanding in such a manner is to position operations as close to the customer base as possible, so that customers' needs may be addressed quickly (Harrington, 2007). This increases efficiencies through shorter driving distances, increases speed to the customer and improves customer service. Shorter driving distances also means reduced fuel usage.

Fold-outs are easier to develop than acquisitions, since many of the associates at a new fold-out are transferred from other SYSCO companies and are thus familiar with the company's culture. In addition, the technology systems have already been used in the SYSCO system, and the facility is built or modified to SYSCO's specifications.

Information technology, warehouse automation, delivery routing, and fold-outs have allowed SYSCO to continue to create efficiencies to meet customer demand. Even with improvements in these areas SYSCO is continually looking to enhance customer service. The National Supply Chain Initiative, discussed next, is its most recent effort.

7. National Supply Chain Initiative

SYSCO implemented the National Supply Chain Initiative (NSCI) to improve their ability to respond to customer demand. Three projects comprise NSCI: (1) a network of seven to nine planned Redistribution Centers, (2) Demand Planning and Replenishment System to manage inventory, and (3) Transportation Planning and Execution System which handles all inbound transportation planning and execution throughout the organization.

7.1. Redistribution Centers

Redistribution Centers (RDC) are large warehouses used to stock slower moving items such as bags of ketchup used to refill dispensers in restaurants. In the past, the slower moving items were shipped to SYSCO front-line distribution centers (DC) in less-than-truckload (LTL) quantities. Now they are shipped to the RDC in truckload (TL) quantity, stored, and repacked with other LTL items resulting in TL shipments to the front-line DCs. This allows SYSCO to buy in bulk, reduce inventories at the local level, and reduce costs. The first RDC opened in Front Royal, Virginia in 2005. The Front Royal RDC receives products from vendors and in turn ships full TLs of products to front-line SYSCO DCs located in the eastern United States. RDCs provide benefits for SYSCO in terms of reduction in safety stock, inbound transportation, product handling (due to consolidated shipments), transaction processing costs, and capital expenditures. Customers receive improved service levels, wider product selection, and shorter lead times for redistributed products. SYSCO is building a second RDC in Northern Florida and has purchased land for a third RDC in Northern Indiana.

7.2. Demand Planning and Replenishment System

Demand Planning and Replenishment (DPR) System provides SYSCO improved capability in predicting customer and consumer demand, allowing SYSCO to more effectively manage and replenish inventory. DPR calculates the most economic replenishment orders by considering a comprehensive set of factors, including carrying costs, handling costs, opportunity buys, and truckload requirements. DPR also matches customers with the products they order to determine if immediate replenishment is

required. Key accounts and products are highlighted for expedited service while cost tradeoffs are analyzed for secondary accounts and products when inventory falls below required levels. Order and demand information is automatically presented to merchandisers and marketing associates in order to make final decisions instead of each individual having to look at multiple screens to obtain the same information. Decision time is reduced and all divisions have the same information.

7.3. Transportation Planning and Execution System

The Transportation Planning and Execution (TP&E) System has been implemented at 50 SYSCO operating locations. The system is designed to enable SYSCO to control cost through freight purchasing power, balance lanes of freight from one area of the country to another, and increase visibility of the entire transportation network which provides SYSCO with tighter transportation control. This gives SYSCO the opportunity to reduce the number of inbound carriers.

The National Supply Chain Initiative provides benefits to SYSCO and its customers. Customers are able to access a greater variety of products and experience improved service levels, as well as cost reductions due to consolidated shipments. SYSCO's benefits include consolidated forecasts and orders to suppliers, full-pallet and full-truckload shipments, fewer ship-to destinations to manage, and fewer invoices and payments to process. SYSCO is able to maintain a smaller inventory "cushion," and gain more cost-efficient transportation.

8. Managerial implications

In today's competitive business environment, customers have more information, more choices, and are more sophisticated. As a result, they have higher expectations than ever before. For suppliers, the end result of this highly competitive environment is a need for greater product and service differentiation (McQuiston, 2004). SYSCO concentrates on gaining in-depth knowledge of their customers and translating that knowledge into a total solution for their customers. A review of SYSCO's operations provides key points that may provide guidance for industrial market managers.

Suppliers need to determine exactly what customers need. It sounds simple, but it's no easy task and many suppliers overlook or make unfounded assumptions about customer needs. Suppliers need to ask questions: What is the customer using our products for? Do we have products that would better suit the customer's needs? Do the products and services we provide to customers add value to their operations? Are there opportunities in the customer's operations where improvements can be made? Are we able to help the customer make those improvements or at least provide avenues for improvement? Suppliers need to question, probe, and most importantly listen to what customers are looking for in products and services. Business reviews provide such an opportunity without the customer feeling pressured to buy additional products, and can help to create partnership-type relationships.

Additionally, by listening to customers, suppliers can create value-added networks. This is especially important for small businesses which usually have limited knowledge of available services. For example, SYSCO's *i*Care program provides small businesses contact with large customer, financial, human resource, and operational

service organizations that small businesses may not otherwise know about. Through *i*Care, SYSCO's small business customers have access to marketing, menu design, printing, credit card processing, business and health insurance, payroll, safety audit, education and training, and legal services.

Customer needs constantly change, and suppliers need to consistently review customer demands and update their operations to meet those demands. The required close contact can provide a further benefit in terms of forging closer relationships. Additionally, a distribution system that was optimal today may not be most efficient tomorrow. Network design should be periodically reviewed.

9. Conclusion

A review of SYSCO's operations shows the benefits of customer orientation by understanding what customers want. SYSCO uses in-depth knowledge of customer needs to provide products and services in-tune with customer requirements. Suppliers who endeavor to understand and effectively manage customer demand stand to gain both market share and profits. When customer requirements are known and articulated across the organization, managers have justification to dedicate resources to meet those demands. Internally, understanding customer requirements helps individuals from various functions work together to meet customer demand. Externally, understanding customer demand helps build a strong relationship between the supplier and the customer. This is increasingly important in today's environment where customers have ample opportunity to choose between suppliers. Suppliers must stand out among their competitors. One such way is to understand customer demand and dedicate resources to

meet that demand. At SYSCO, a customer oriented strategy drives every phase of their business from Business Development and Business Review to building fold-outs to better service customers. SYSCO continually evolves its information technology, warehouse management, and operating systems to exceed customer expectations and reduce operating costs. Lots of companies talk about being customer oriented. SYSCO's mission, "Helping Our Customers Succeed," is based on the decisions and actions of their employees on a daily basis.

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