A Model and Sample Case for Teaching the Business Value of Information Technology

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Executive Summary

Because it is a strategic resource that is complex, costly and permeates all functions of the modern organization, information technology (IT) is closely scrutinized for its contributed value, particularly in relation to resources expended. From this perspective, understanding the business value of information technology is a requirement not only for CIO's and CEO's, but also for non-managers working in IT, as well as many others in the organization. It is important that models for learning about IT value are clearly defined, easy to use, and supportive of active learning.

This paper proposes an Information Technology Business Value (ITBV) model for teaching discovery of value as applied to common information technology-enabled organizational processes. The model is comprised of 1) a two-dimensional application matrix, which focuses on *what* business value is and *where* it can be applied in the organization; and 2) a set of action "triggers" that focus on the "how to" of discovering value opportunities. The horizontal axis of the matrix (the *what*) identifies five value parameters: quality, cost, speed, innovation and relationship. The vertical matrix identifies five functional areas where IT-enabled value propositions can be applied. The action triggers, based on principles of process re-engineering, activate the process to guide students through the discovery of meaningful value opportunities.

A recommended process for using the model suggests initial discussions about business value, value added functions in the organization, and the enabling role of IT via process re-engineering. The application of the model follows this and includes case analysis and documentation. A suggested schema for documenting uncovered opportunities includes identification of proposed activities (action items), a description of the value added and where it will be applied, and the appropriate technology for each action. A sample case, with sample completed action items, is included.

As a basic learning tool, the model is not intended as a structure for the thorough, complex analysis of opportunities, although it can appropriately be used as the initial step in that process. Rather, its contribution is in illuminating and strengthening the fundamental connectivity between IT and business value contribution in a simple active-learning approach that is accessible to those learning about the value and organizational impact of information technology.

Keywords: Business value, strategic information, information technology education, process re-engineering.

Introduction

The ways in which computers have been used in organizations have changed significantly since their introduction. Ward and Griffiths (1996) propose a three-era model that highlights those changes over time. The first organizational role for computers was primarily as tools for automat-

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ing labor-intensive processes, with the goals of accelerating those processes and reducing labor costs. In the second era, the emphasis was on the development of management information systems that provided information for operational business decision-making. Today, in the third era, organizations view information technology as a transformation enabler, perhaps the *chief* enabler, of competitive advantage through creation of new products, processes, product delivery methods, market opportunities, and even new organizational forms.

Three characteristics of IT in organizations necessitate an increased effort on teaching the business value of IT among IT managers, other IT workers, business managers and others in the organization. First, changes in the roles of IT over time have necessitated different approaches to the nature of IT management itself. Applegate, McFarlan and McKenney (1999) suggest a three-era approach that parallels the technological one described above. In the first era (1950s to early 1970s) IT operated as a near "regulated monopoly," with the manager of data processing as a kind of "czar" over organization-wide automation-oriented computing. In the second era (early 1970s to early 1980s, characterized by the growth of departmental and individualized computing), in addition to managing organizational systems the IT manager acquired the additional challenge of supporting departmental initiatives and projects. The third era of IT management deals with the realities of ubiquitous computing, netcentric business, and integrated systems and technologies at the enterprise level. Apart from managing technical complexity, managers must manage IT as a strategic resource and a critical asset that must be developed and protected. In this environment, the business value of IT is on center stage in the organization.

A second characteristic of IT organizations that supports increased attention to understanding the value of IT is the continuing problem with IT/business alignment. The full capabilities of IT can only be achieved when IT is applied in harmony with business goals, strategies, and needs. Yet CEOs and CIOs continue to identify alignment as one of the major challenges facing organizations (Luftman and Brier, 1999). An important component in successfully managing alignment is identifying the opportunities where IT can successfully enable transformation toward organizational objectives.

The third characteristic requiring increased effort on teaching the business value of IT is the rapid pace of change in the IT environment itself. F. Warren McFarlan, of Harvard Business School, suggests that the rate of technology change is progressing at 35 to 50% per year, and it will continue as such through 2025 (McFarlan, 2002). In such an environment, planning is increasingly critical. Yet planning and implementation cycles grow shorter. Because of the need for rapid response to changes that engender opportunity, and because of limited resources, it is important that managers outside the IT area and non-managers within IT as well understand how and where IT value is created and where resources might be successfully or poorly expended.

Currently, teaching the business value of IT is often restricted to courses and texts on the management of information systems and technology from the perspective of strategic information systems (SIS) theory and practice. This approach is focused at the higher leadership levels of the organization. However, the characteristics described above support a broader teaching objective. Because of its strategic role in the organization, the challenges described above, and the fact that the impact of IT is felt across all functions of the organization, *all* IT workers, managers and non-managers alike, need to adopt a more entrepreneurial perspective toward IT activities. In addition, workers outside IT, particularly business managers, need to develop a stronger understanding of IT as transformation agent and value contributor. Thus, simple but effective models for teaching the value of IT can play an important role in the success of the organization.

This paper proposes such a model. The objective of the IT Business Value (ITBV) model is to teach the business value of IT at a basic level, through an active discovery process. Its primary application is its use in introductory IT and basic IT management courses to establish understanding of the connectivity of IT to the organization. It may also be used as a beginning point in more advanced courses for initiat-

ing the complex evaluative process of pursing opportunities and adopting new technologies and information systems. However, it by no means is meant to be exhaustive. The model is intended to be an idea generator and concept builder, not a management tool as such. Toward this end, the emphasis in using the model should *not* be focused on the product (the opportunities identified) as much as on the process of discovery that generates an understanding of value contribution.

The ITVB model consists of two primary components. First, an ITBV matrix defines business value and identifies areas within the organization where it can be applied. This matrix is composed of value parameters (columns that designate the "what" of business value) and function parameters (rows that designate the "where" of business value). The second component is a set of action “triggers” for activating the matrix and guiding the discovery of IT enabling opportunities for business value contribution.

Theoretical Background

The ITBV model is an integration of four theoretical frameworks: two widely used and analyzed methodologies for identifying information systems for competitive advantage (Porter's Competitive Forces model and Wiseman's Strategic Thrusts model); a framework for considering the basic functions performed by organizations (Porter's Value Chain model); and the Business Process Re-engineering concepts developed by Hammer, Champy and others.

The functional models for discovery of business value through IT are anchored in SIS theory and practice. An SIS is one that supports an organization’s competitive strategy—that is, its efforts to develop and gain advantage over its competitors (Ward & Griffiths, 1996). Michael Porter’s Competitive Forces model (Porter, 1980) defines strategic value in terms of five forces that organizations encounter and that affect competition in an industry: the threat of new entrants; the bargaining power of suppliers; the bargaining power of buyers; the threat of substitute products or services; and the general rivalry among existing competitors. Porter and Millar (1985) subsequently focused the concepts specifically on the value delivered by information, and by extension, information technology. Their work introduced IT as an enabler of more than operational significance. The business value of IT, by this approach, is developed via the application of IT against these forces and in favor of the organization. Porter’s model, and SIS theory in general, are primarily externally focused. That is, the scope of IT business value is projected outward into an industry or larger business environment to define and identify competitive advantage.

The Value Chain model (Porter, 1980) brings an internal, functional, perspective to considerations about IT strategy. Porter’s classic model describes the fundamental interdependent activities that add value to a product or service as the organization brings the product or service to the customer. IT can profoundly impact the effectiveness and efficiency of these value-adding processes by altering the activities themselves or the relationships between activities.

Charles Wiseman’s Strategic Thrusts model (Wiseman, 1988) adds an "action" component to the examination of the business value of IT, focusing on processes that directly contribute value across organizational functions. It recognizes that individuals and groups within an organization often have opportunities to contribute competitive value to a business, both major and minor. Business value can be gained through operational changes, for example in improvements that reduce costs significantly or improve product quality to the extent that it changes the behavior of customers or suppliers and has an impact on the competitive environment. The “thrusts” are the following: differentiation, cost, innovation, growth, and alliance.

Both the Porter and Wiseman approaches to planning methodologies are well known, have been widely discussed and have been found to be effective (Bergeron, 1991, and others). In a study comparing the effectiveness of the two methodologies, Bergeron concluded that in results the "methodologies did not differ significantly," although the Value Chain approach was found to generate more opportunities for innovation, but fewer opportunities for growth.

The fourth major theoretical basis of the ITBV model is the concept of Business Process Reengineering (BPR), a management paradigm popularized by Hammer and Champy (1993). It was a shining star of the business environment in the early '90s, but had faded somewhat by the end of that decade. Garland (2001) makes a case for the survival of the basic concepts as it applies to IT, especially as a critical element in development of enterprise wide strategic systems such as Enterprise Resource Planning, Supply Chain Management and Customer Relationship Management systems. The term "process redesign" used here is meant to include the elimination of unnecessary processes, incremental change to processes (most often associated with Total Quality Management concepts), as well as fundamental radical change implied by the term "reengineering."

Regardless of the current business status of BPR, process redesign through IT remains the basis for achieving IT-enabled business value. That is, cumulative increases in benefits to the organization can be achieved through using IT to improve the core processes that add value. It is used in the model as a paradigm for suggesting actions that create ("trigger") value.

The Matrix: Defining Value

The matrix portion of the ITBV model (see Figure 1) focuses on defining business value and on identifying functional domains within the organization where IT can be activated to contribute value. The horizontal axis of the matrix represents the "what" (what is the value that can be contributed?) and the vertical axis represents the "where" (where can it be applied?).

The Matrix: What is Business Value?

Generally "business value" can be viewed as a cumulative increase in one or more of the following: direct benefits, such as increased revenue or reduced costs; indirect benefits, such as customer relationships; flexibility increases, such as increased agility in response to market changes; and risk reduction (Gliedman, 2000). Using this definition, and incorporating and expanding on the theoretical frameworks introduced above, the matrix proposes a set of five columns that represent basic organizational value parameters.

WHAT is the Business Value added?

↓ ↓ ↓ ↓ ↓

	Quality	Cost	Speed	Innovation	Relationship
Inbound Logistics					
Operations					
Outbound Logistics					
Marketing/Sales					
Customer Service					

↑

WHERE is the Value Added?

Figure 1: The ITBV Matrix

The selected parameters are a synthesis of concepts noted above and are intended to be representative, rather than exhaustive, of the possibilities for IT valuation. The parameters selected tend toward a simplification of the issues, but they are easy to explain and understand and can readily contribute to a comprehension of IT as contributor of business value. These interrelated and codependent parameters together address the question: What is Business Value? The matrix value parameters are: Quality, Cost, Speed, Innovation, and Relationship.

Increased quality refers to both quality of process and quality of product and contributes value both directly and indirectly. For example, value is gained when improvements in processes reduce errors and lower costs associated with error correction during production or fabrication. The reduction of errors in end products adds indirect value by increasing customer satisfaction.

Cost reduction results in direct benefits to the organization through increased profitability. Economic conditions in the past year have brought increased attention to cost control within the organization. IT projects, because of their cost and expected return on investment, are being particularly scrutinized (Wexler, 2001).

Speed refers to the value gained via rapid response to changing market conditions or by supplying a more timely flow in product supply. Rapid response contributes value through first-to-market advantages for new products. It can also contribute value through rapid response to changing needs, such as changing product features or, even, the timely elimination of products that no longer command a sufficient market. Speed and flexibility in response to supply and demand can add value through a just-in-time production approach that reduces inventory costs.

Innovation in products and product features rewards businesses through differentiation and with significant first-to-market competitive advantages. IT enables new products (such as PDAs), new IT-enhanced product features (using microchips) and new ways to deliver products (such as the downloading of software).

Relationship benefits add business value that is, in the short term, usually indirect and intangible. Customer relationships and supplier relationships, however, are valuable assets to an organization and lead to long-term direct benefits such as increased market share and cost reduction. Alliances, attained through agreements and joint ventures, add value via enabling the sharing of expertise and development risk, for example with new technologies, and in complementary marketing. In the E-business arena, relationship benefits may even be gained through alliance with competitors, such as in the development of mutually beneficial E-marketplaces.

The Matrix: Where Do We Create Business Value?

The Value Chain model is the basis for the identification of the function parameters in the ITBV matrix that form the vertical axis. As noted previously, the functions address the question: Where Do We Create Business Value? The five functions are: Inbound Logistics; Operations; Outbound Logistics; Marketing and Sales; and Customer Service.

Inbound Logistics encompasses the procurement and capture of input resources required for manufacturing, assembling, and/or creating the output product. This concept includes much more than raw materials for manufacturing environments. In most organizations, data is a major input resource and data collection is an IT intensive activity. In information organizations, IT can enable procurement efficiencies such as in just-in-time approaches to manufacturing, electronic data interchange, E-procurement, and Supply Chain Management. It can also contribute cost reduction value through enabling an organization's participation in competitive E-marketplaces.

Operations focuses on organizational processes. IT enabled process reengineering has the potential to have a major impact on several of the value parameters. Redesign of processes can significantly improve quality, it can reduce costs, and it can speed up processes. All contribute directly in increased value.

Outbound Logistics refers to the way products and services are delivered to customers. IT enabled revolutionary changes in outbound logistics have included online flight and hotel reservation systems, automatic teller machines, and a host of E-commerce services. IT has been the essential component in separating content from medium in information rich products (for example, as with digital photography) and delivering those products through the Internet.

Marketing and Sales functional areas focus on how companies promote and sell their products and services. IT has contributed business value through cost reduction in marketing and sales via information distributed on the Internet. The Internet has also increased the speed at which customers can learn about products and gather information. Through real-time inventory control systems, companies can keep current about how their products are selling. IT has also enabled mass customization of products.

Customer Service as a function parameter focuses primarily on building the customer relationship through after-sales services. IT enabled customer relationship management systems add value through increased knowledge of a particular customer's purchases, behaviors, and contacts with the company. IT enabled online customer service adds the value of speed via providing companies and customers with more expedient ways to communicate in addition to giving customers access to "24/7" service. Disintermediation, the practice of allowing the customer to access information directly, has contributed to improved customer service quality as well.

Uncovering Value Opportunities

The second major component of the ITVB is a set of action triggers that guide users through the process of activating the model and is based on the principles of BPR. The matrix provides the "what" and "where" of IT value. Action triggers suggest "how" processes can be altered (re-engineered) to gain value. A list of ways to change processes to achieve value includes elimination of processes, reduction in the number of non value-added processes, simplification, integration of activities, and automation. A list of these triggers, with additional detail, is presented in Table 1. The application of the model, then, moves from the "what" of business value, to "where" it can be applied, to "how" it can be uncovered.

The Process

A general preliminary discussion about enabling information technologies will be productive and should precede the model application. The level of discussion detail will vary based on audience knowledge, experience, and need. Although it is designed for focusing on a particular case, the model could be used for considering IT more generally—for example, considering contributory value of a particular technology or a group of technologies. Both hardware and software technologies may be appropriate for consideration. All information technologies considered will deliver some benefit to the user, and simpler or older technologies should not be overlooked. A short list of sample technologies that could be evaluated within the model would include, for example, the Internet, intranets and extranets; shared data, such as in enterprise databases; and wireless access. The model could also be used to evaluate a new system in regards to expected impact and value contribution—for example a Customer Relationship Management system. For such a system, assessing what value will be contributed, where in the organization value will be contributed, and how it will be achieved, can increase the understanding of the expected impact.

When focusing on a particular case, a critical element in the use of the model is to identify processes that add value and then match them to a particular enabling technology. Suggested steps in the application of the model are the following:

1) Define business value. How do the value parameters (quality, cost, speed, innovation, and relationship) contribute direct and indirect benefits to the organization?
2) Identify the major value-added functions of the organization. What are these functions and how do they add value to products and processes?
3) Discuss process redesign, specifically the activities in the Table 1: Action Triggers.
4) Co-relate the triggers with the matrix value parameters. Two examples: 1) How does simplification of forms contribute to quality or speed? 2) How does the integration of suppliers improve speed or quality?
5) Identify and discuss various information technologies and what their enabling roles might be in the organization. (Several technologies were identified in the Process section. The number and kinds of technologies will appropriately vary depending on the audience and objectives of the course.).
6) Read the case.
7) Using the Action Triggers list as a guide, identify redesign activities applicable to the case (and assign an identification number).
8) Match the redesign activity with an enabling technology. What information technology software or hardware will enable accomplishing the activity?
9) Using the number assigned to an activity, post the activity to the ITVB matrix in all cells where it is applicable.

ACTION:	TARGET:
Eliminate non-value added processes	Wait time (perform parallel processing) Transporting documents/data Inventory Duplication Inspection Reformatting
Minimize non value-added processes: (reduce number of activities)	Handling Checks Controls Verifications
Simplify	Forms Procedures Communications Technology Work flows Customer contact
Integrate	Jobs Teams Customers Suppliers
Automate	Difficult tasks Data capture and transfer Error checking

Table 1: Action Triggers

10) Document the activity.

There will be two products from this multi-step process. First, there will be a numbered list of identified activities that can deliver business value. For documentation, it is suggested that each identified activity include a description of the process change, what benefits (opportunities for increased value) are expected, what value-added functions will be affected, and the proposed enabling technology or technologies (see the Sample Action Items below for a possible schema). Second, there will be a graphic representation (the updated matrix) showing what value is expected and where, by identification number, it will be manifested.

A Sample Case

The Midwest Homebuilders case (see Appendix) is a sample composite case that is rich in opportunities for applying IT to increase direct and indirect benefits throughout the organization. Applying the model to the case will result in a set of Action Items and an updated matrix (as shown in Figure 2). The following set of three typical Action Items (documented here and posted in Figure 2) help to illustrate the process.

Sample Action Item #1:

Redesign Activity: Eliminate the wait time between product information updates by building an online customer catalog.

Value Added: Customers and representatives can see samples of products and more current product information. This would improve the quality of marketing/sales by making product information updates easier and more timely and delivering that information to the customer more quickly. It would eliminate the costs associated with printing and manually distributing information updates. It would improve the operations function by reducing errors caused by outdated product information.

Enabling Technology: the Internet

Sample Action Item #2:

Redesign Activity: Automate data capture and transfer through online order entry by sales representatives.

Value Added: Online editing of order data will improve the quality and collection speed of that data (inbound logistics) and make it more quickly available for operations decisions, such as financing and planning.

Enabling Technology: A virtual private network (VPN) over the Internet and a shared enterprise wide database.

Sample Action Item #3:

Redesign Activity: Minimize paper handling and transport by building an order fulfillment tracking system.

Value Added: This will assist operations in controlling costs through workload planning. It will enhance the quality of customer service by giving customer representatives accurate current information about the status of an order. It will help reduce delivery (outbound logistics) costs through planning.

Enabling Technology: Shared enterprise wide database.

	Quality	Cost	Speed	Innovation	Relationship
Inbound Logistics	2		2		
Operations	1	3	2		
Outbound Logistics		3			
Marketing/Sales	1	1	1		
Customer Service	3				1,3

Figure 2: The ITBV Matrix Applied

Conclusion

As an idea generator, the scope of the model is limited. It is only the beginning step in a complex set of processes for evaluating and choosing which possible opportunities to pursue. Among the major challenges for IT managers is the difficulty of identifying evaluation metrics for proposed projects. Traditional methods of financial measurement are inadequate, for example, in assessing the expected impact of improved quality and long-term relationship building. It is difficult enough to assess comparative value for similar activities, let alone evaluating projects across the spectrum of IT business opportunities. An introduction and explanation of a schema for analyzing relative quantitative value including, for example, risk assessment, is certainly beyond the scope of this model. This premise should be acknowledged and further discussion on this engaged as appropriate to the audience and their learning objectives.

The effectiveness of the model should be measured not so much in the *number* of "good" strategic opportunities uncovered (that is the objective of the Porter and Wiseman models), but rather how much the process contributes to an understanding of IT as a resource capable of contributing significant value through organization transformation. The model has been developed over time and has been used in several lower division undergraduate general introductory IT courses and upper division IT management courses as well. Although response has been consistently positive, no formal quantitative evaluation has been conducted to date.

Because of the critical role of IT, and the characteristics of the contemporary IT environment, IT workers who are not managers, and even workers outside of the IT area, must better understand how IT can serve as a transformation enabler and value contributor to the organization. The IT Business Value model integrates established strategic IT theories with a process approach. It engages the user through active discovery within a structured and easily understood framework that clarifies *what* added value means and *where* in the organization it can be applied. The model uses process re-engineering concepts as action triggers that motivate the user to think about *how* processes can be established and modified to provide benefits. It provides a framework for documenting the impact of identified opportunities and identifying the required enabling technologies. In addition to the discovery of opportunities, the model can be used as a general framework for assessing the value of a system, a set of technologies, or as a first step in the complex process of assessing and prioritizing among identified opportunities.

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Biography

John Mendonca is an Assistant Professor in Computer Technology, Purdue University, where he teaches graduate and undergraduate courses in IT management and database design and implementation. His research interests include the organizational impact of IT, IT strategic value, technology transfer management and software engineering. His professional experience has included consulting and management work in both hardware and software for Electronic Data Systems and Wells Fargo Bank, among others.

Appendix

Case: Midwest Homebuilders, Inc.

Midwest Homebuilders, Inc., headquartered in Elkhart, Indiana, builds and sells manufactured homes. In addition to its headquarters site, it has five manufacturing/assembly/distribution plants. It sells homes through 40 independent dealer/distributors throughout the U.S. The dealers, who normally also sell for other competing manufacturers, serve as "agents" for Midwest, doing "front office" sales and some minor post sales customer service. Although Midwest has inventories of standard components (some purchased and some manufactured), each home is custom assembled--usually composed of standard and made-to-order components. The company is the largest privately owned company of its type in the U.S. and has the second largest market share. It has approximately 2500 employees.

Marketing/Sales: The Marketing Department mails catalogs with pictures of basic homes and available custom features to dealers annually. The catalog includes base prices. Product change information and a Price Adjustment Sheet (PAS) are mailed to each dealer approximately every 12 weeks. Dealers use the base price list and the PAS to determine a preliminary price for delivering the completed home to the customer site. The actual price for the ordered home is determined by Midwest after the order is submitted.

Order/Pricing: Dealers sit with customers and fill out the paper order forms, which are then mailed or faxed to Midwest. The Order Department (a sub-department of Customer Service) enters the order into its order control system and verifies that the order is filled out correctly (it requests corrected forms from the agent if needed). It processes 100 to 130 new orders per week.

The Order Department checks the credit history and worthiness of the customer. If everything checks out (5 to 10 work days; 97% of orders have no problem), a printed copy of the order form is sent to the Pricing Department (a sub-department of Finance and Accounting). That department enters the order data into its own system of spreadsheets to determine the specific price for the home and the interest charges for financing. It then returns the order form to the Order Department.

The Order Department fills in the updated information in its system, and then prints a confirmation order form (contract) and mails it to the agent. After the agent gets the customer signature--currently, 90% of the time, though the customer acceptance rate has been slowly dropping--the final contract is mailed to the Order Department. When it is received, the order is given "active" status and a copy of the order is delivered to the Accounting Department for setting up a receivables file. Another copy is sent to the Production Planning Department. It takes 15 to 20 workdays between the time the agent first submits the order and the order is set up for "active" status.

Production Planning: The Production Planning Department examines such factors as where the home is to be delivered, and the labor resources that are available, and assigns one of Midwest's five manufacturing/assembly plants (in Southern Indiana; New Mexico, Alabama, Missouri, and Juarez, Mexico) to fill the order. Planning also acts as project manager for the order, keeping the order "active" until delivery signoff. After the order is entered in the tracking system, a specifications form is generated and faxed to the Planning Department of the assigned plant.

Manufacturing: Each plant is responsible for its own inventory management, and uses its own systems. Because the lead time is small, they all follow a "make to stock" approach for the items that Midwest manufactures--even trying to guess on the best demand-supply balance for customized items. When a supply hits the order-threshold, an order for replacement (internal manufacture or external purchase) is generated. Re-supply orders are batched and mailed to suppliers bi-weekly. All plants deal individually with Midwest's three major suppliers and numerous smaller (some local) ones. Each plant's Planning Department collects the materials, schedules the work, and oversees the order to completion. The average time from when the plant receives the order specifications to when the home is ready for delivery is 75 days.

Delivery and Setup: When the home is complete, the Production Planning Department is notified. Headquarters manually tracks where Midwest's own trucks are and their availability. When available, it dispatches a driver and a truck to pick up the home from the assigned plant and deliver it to the customer site. The selling agent oversees placement of the home at the customer site. If there are problems or questions, the agent may need to deal with any one of the departments described previously.

Customer Service: In addition to managing the order process, the Customer Service department answers inquiries from agents during the order fulfillment process. Questions may be referred to individual plants or the Production Planning Department as needed.

Orders for Replacement Parts: Orders for replacement parts for existing homes have never interested Midwest. Agents don't want to be bothered. Customer Service sees it as a minor annoyance and most often refer customers to original suppliers or tell them that the part is not available. A Purdue MBA student who did a study two years ago concluded that in 90% of the cases these parts were available somewhere in Midwest's inventory, and that buyers were willing to buy parts at a significant markup over cost. The company is just not set up for direct business-to-customer sales.

Information Technology: Growth of IT has followed a strict distributed systems model. Functional department managers "own" their systems and are responsible for investment and operations. Headquarters and the plants each have their own Information Systems managers. LAN's support departmental work functions only.

CEO/CFO Complaints:

- The company is losing market share in a growing market.
- The profit margin has shrunk the past four years.
- The market is growing in Northern Canada, but Midwest has not been able to take advantage of that (the two large Canadian companies don't have the investment resources or capacity to fill demand).
- Inventories at the plants have increased though sales have not.

Agent Complaints:

- It takes too long to make a sale.
- It's difficult to find out about the status of an order.
- Agents don't have the information or the expertise to do post sales customer support.
- The "gap" between the expected price and the "final" price is increasing and (after all that work) sales are being lost because of that.
- Midwest pricing is too slow and inflexible to compete.
- Customers don't have a good idea of how a custom feature will look on a basic model.
- Some other manufacturers are selling fully furnished homes as a package, why can't Midwest do that too?

Customer Service (Order Department) Complaints:

- The errors on submitted order forms are increasing. More staff is needed.
- Customer service representatives don't have "status" information either about original orders or post sales maintenance orders.

Customer Service (Pricing Department) Complaints:

- Errors on submitted order forms are not being caught by the Order Department.
- Pricing has to be redone too often.

Headquarters Planning Department Complaints:

- The plants are not completing orders on schedule.
- The fleet of company trucks is old and needs to be replaced.

Plant Complaints:

- The Planning Department has out-of-date data about labor supply.
- The Planning Department has no data about inventory levels. A plant might take days trying to find another plant that has a standard part in stock if it is not immediately available from the supplier.
- To keep on schedule, inventory levels will need to rise further for standard components and more time will be needed for made-to-order components.