

Technology Acquisition and Innovation: An Integrative Approach for Organizational Success

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Abstract

This paper presents an integrated organizational model where technology plays a key role. The paper is divided into three parts. The first part introduces background literature on the ETK concept and synchronization. ETK refers to Emotional Intelligence, Technology Awareness and Knowledge Management. Synchronization is defined as the process of linking events and actions so they occur at the same time or in a predetermined sequence. Synchronized organizations are usually successful since they are able to move all their constituent components in concert and in harmony with each other so as to derive maximal synergy with the organization's entirety.

The second part focuses on the formulation of an integrative model for an organization's behavior. Organizations that are successful are the ones that develop strategies, tactics, and operations by synchronizing elements of their external environment—elements such as customers, competition, community, suppliers, and other inputs—with elements of their internal environment such as: emotions, technology, knowledge, information, and finance. Technology acquisition and innovation plays a pivotal role in an organization's successful, competitive behavior. A brief discussion on the ethics of technology use follows.

The third part is devoted to several live examples that illustrate the synchronized behavior. They include both large and small enterprises in manufacturing and service sectors: IBM, Nestles, Levis Strauss, niche airlines, automobiles, etc. The discussions also cover the impact of technology and production on the delicate environment. The practical steps needed to implement this synchronization model in any organization are then outlined in the concluding part.

Part I: Introduction

The concept of “technology” refers to any applied scientific knowledge that has a productive value to society. For example, the steam engine generated the Industrial Revolution; the silicon diode and the transistor produced the electronic and computer era; the satellite motivated the telecommunications explosion; and more recently, the mapping of human DNA is opening a new world for genetics. But not all “technologies” have a worldwide or industry-wide impact; at the organizational level, all leading enterprises have a “certain way” of doing things that make them more competitive than others.

This paper presents an integrated organizational model where technology plays a key role. Market forces drive a business towards innovation that is key to remaining competitive. Discriminating customers expect high quality at a low price. Anyone who can deliver what the customer wants knows how to survive.

We will illustrate, through examples of several successful companies, how technology is intertwined with human emotions and knowledge, how strategies are formulated to serve the customer, how changing customer needs and tastes call for new products and processes. We will also examine why some automobiles are more appealing to certain generations than others and what makes niche airlines thrive through the economic downturn, while the big six struggle to survive.

Recent works by Miguel A Cardenas and Jerome Finnigan (2002d) and Miguel A Cardenas and Stephen Goldstein (2003) have discussed the concepts of ETK and that of Synchronization. We will build upon existing literature and formalize a model that integrates several dimensions of organizational performance, ETK dimensions, and synchronization aspects. In addition, we will synthesize our experiences in applying these models to successful companies by proposing guidelines for implementation of the integrated model.

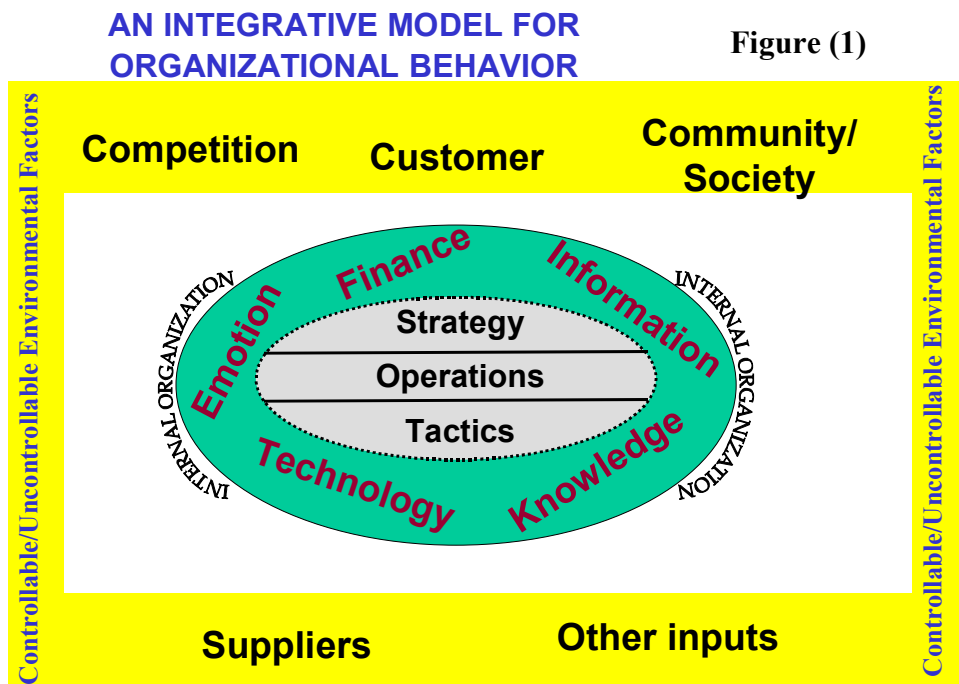
Unraveling and understanding the key to an organization's competitive performance has been a favorite topic for academicians and chief executives alike. What factors determine the trajectory of an organization's success and growth over time? How can organizations ensure success in new ventures such as product, service or promotion launches?

We believe that innovation in technology and optimal usage of technology provides answers to these questions. Organizations that innovate and acquire the right technology and harness that technology's power will enjoy sustained competitive performance.

Acquisition and innovation of technology, however, is intertwined with several other dimensions of organizational behavior that are necessary to achieve successful competitive performance. For example, organizations have to closely analyze their customers' needs and then evaluate the right technology to acquire in order to best support the identified customer requirements and relationships. Another example would relate to the emotions and cultures present within an organization. It would make no

sense to acquire technology to support customer needs if that technology were not in synch with the emotions and culture of the organization and its employees. The technology innovated or acquired would, under these circumstances not be appropriate and this could lead to consequences ranging from sub-optimal usage to sabotage.

Accordingly, we describe an integrated model for organizational behavior, (Figure 1) where technology plays a key role in successful performance.



Although the model includes technology as only one dimension, we illustrate through several examples, how competitive and successful organizations acquire and innovate technology within the context of several other dimensions such as customer needs, organizational emotions, knowledge, external community, and so on. The model is designed to prescribe steps and guidelines to help organizations in developing and implementing continuously successful technology-based strategies. Our model proposes

to help organizations decide on their focus regarding technology acquisition and innovation with the goal of ensuring sustained competitive performance.

Synchronization

Miguel A Cardenas and Stephen Goldstein (2003) defined “Synchronization” as the process of linking events and actions so they occur at the same time or in a predetermined sequence. The claim made was that synchronized organizations are successful and non-synchronized ones are unsuccessful. Synchronized organizations are able to move all their constituent components in concert and in harmony with each other so as to derive maximal synergy with the organization’s entirety. This leads to organizational behavior where all actions and policies are synchronized with each other; all actions and policies are building upon each other in the same direction; and all actions and policies are reinforcing each other’s impacts in order to increase chances of success.

Goldstein described this process as working “outside in” by looking outside the organization to see how it needs to synchronize itself and then re-shaping the organization internally to serve those outside needs. Extending these concepts, our model describes organizational synchronization as a two pronged process: (i) synchronizing the organization’s actions and moves with the external environment, and (ii) synchronizing internal organizational elements to capitalize on the organization's external environmental elements.

Part II: The Integrative Model

Let's first work with a practical conceptualization of what an organization is. We cannot talk about an organization's performance without sharing a definition of an organization. There are several definitions of organizations as rational systems, as irrational systems, as task achievers, as input-process-output systems. Since our model is a functional one, let's take a functional description of an organization. In very basic terms, an organization formulates strategies as means for achieving competitive growth and success. It formulates tactics to help implement these strategies. And it performs operations to actually execute the strategy. So, this is the workable, basic definition of an organization we will use

2.1 External Environment

Now let's look at the organization's external environment and the factors that need synchronization when acquiring technology for organizational performance. It comprises all elements that are not internal or owned by the organization, and yet they impact the workings and success of the organization critically.

- (i) ***Clients and Customers:*** Clients and customers of the organization is one such very critical environmental factor. Customer satisfaction with the organization's products and services is critical to the organization's continued success.

(ii) Community: The needs of the larger population, the community segment that the organization serves, is a second component that determines the growth and trend of an organization's future offerings.

(iii) Competitors: A third component is the competition that the organization faces in its actions and moves. Competitors, their actions, their moves, and their stance critically impact an organization's opportunities and chances of success. The technology that an organization acquires or innovates should take into account what the competitors are using either as a baseline or benchmark to either acquire a better competitive advantage or to acquire a minimum for competitive survival.

(iv) Suppliers and other inputs: Next we add some external environment components that impact the logistics of moving products and services from the organization to external stakeholders or factors. These factors include suppliers and other inputs, such as recruitment, subcontractors, distributors, etc. Of late, technology-supported supply chain management has taken a forefront in implementing cutting edge strategies and in cost-cutting endeavors. These components are sometimes controllable by organizations and sometimes uncontrollable to varying extents

2.2 Internal Dimensions

Let's now turn our attention to the internal dimensions of an organization's focus.

Miguel A Cardenas and Jerome Finnigan (2002d) introduced the concepts of ETK, Emotional Intelligence, Technological Awareness and Knowledge Management, as three areas that must be embraced if an organization is to be successful in doing continued

business. Our model proposes that in order to be successful, technology acquisition and innovation should be synchronized with these dimensions as well.

- (i) ***Emotional Intelligence:*** When technology innovation decisions are made, focusing on the emotions present within the organization leads to an emphatic decisions and helps to build rapport with employees and people. It motivates people to work with heart and to contribute in synergistic ways towards the common good of the organization and effect a quantum change in the purpose and strategies of the organization. Emotional awareness also inspires the organization to synchronize its internal strategies, tactics and operations with the customer and community thereby building rapport and empathy.
- (ii) ***Technological Awareness:*** Technology is of course the dimension we are trying to understand in this model. Technology helps provide the organization the competence and the tools to achieve the proper execution and implementation of its strategies, its operations, and its tactics. In today's economy, proper utilization of appropriate technology is crucial for an organization to achieve results in any sphere of its chosen activities.
- (iii) ***Knowledge Management:*** Knowledge management is essential to capturing meaning from the vast amount of data that technology makes accessible to the organization. Only then can an organization capture trends and attempt proper decision-making.
- (iv) ***Finance and Information:*** Our model adds two other internal dimensions for an organization's focus: finance and information. Finance refers to the proper

acquisition and utilization of funds in the performance of the organization's activities. This would be critical to the efficient performance and success of any organization in general, and of successful technology acquisition and innovation in particular. Information refers to data about the organization's operations, its functioning, its actions. Information is critical for monitoring, controlling, and correcting the progress of an organization as a whole and its components as integral pieces. And technology is a crucial provider of this information.

So, now we have an integrative model for an organization's behavior. Organizations that are successful are the ones that develop strategies, tactics, and operations by synchronizing elements of their external environment—elements such as customers, competition, community, suppliers, and other inputs--with elements of their internal environment such as: emotions, technology, knowledge, information, and finance. And therein lies our understanding of the role technology acquisition and innovation plays in an organization's successful, competitive behavior.

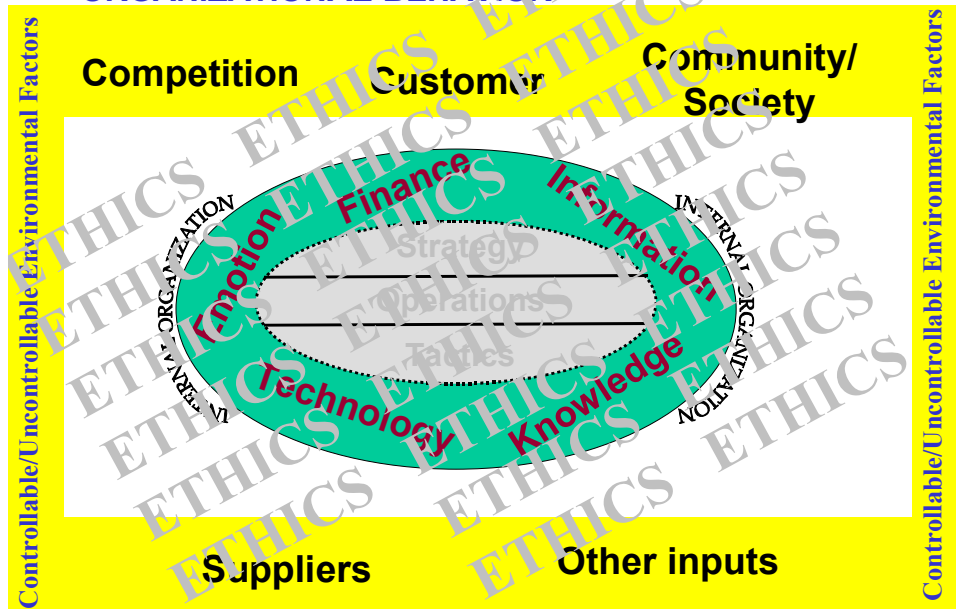
2.3 Ethics of Technology Usage

Our study of organizational behavior in the context of recent events in the business world has led us to include one other very important dimension to the model. And that is the "ethics of technology usage." Every element in the model should be synchronized with this "ethics" element. (Figure 2) Webster defines ethics as "*a discipline dealing with*

good and evil and with moral duty”. Alternatively, ethics is concerned with moral principles or practice.

AN INTEGRATIVE MODEL FOR ORGANIZATIONAL BEHAVIOR

Figure (2)



So why do we propose that ethics is an all-encompassing important element in the technology context? Because technology changes business processes. And is key to an organization’s handling of complex problems. And why is it important to exercise ethics in the use of technology? Not just because it is a timeless principle of good living...but there is, in fact, a self serving reason: it increases the chances of success for our organizations.

Let’s look at how the ethics of technology interfaces with the other synchronized elements in our model. Take the following question, for example: should technology journalists own stocks in companies they report on? Plants spiked with extra genes are being harvested—could harmful ones end up in our food? Questions like this make it

imperative that in our efforts towards technology innovation we keep the interests of the larger community and society in mind. Here are three ethically sound practices that relate to technology:

- (i) Analyze and utilize knowledge obtained from technological innovations ethically and with conscience. For example, organizations should not sell the personal buying profiles of their customers to other organizations.
- (ii) Exhibit organizational conscience in using technology-based analyses to capitalize on and influence customer needs and employee sentiments, that is, their emotions. Synchronize every internal and external organizational dimension with the ethics of technology usage. The ethics of technology usage should be woven throughout the fabric of our organizational behavior model.

Part III: Application of the Model to Case Studies

So how does this play out in the real world? We have studied several successful organizations and have found that successful organizations exhibit behaviors that utilize technology-based initiatives that tightly synchronize different sets of the model's dimensions. The dimensions are synchronized to varying extents, and, the dimensions they choose to be maximally synchronized vary, depending on their organizational priorities and strengths. We have several examples of such synchronized organizations in manufacturing and service sectors of the U.S. economy. We give below a few illustrations.

3.1 Levi Strauss

Levi Strauss jeans were once synonymous with the jean product category. But now Levi Strauss Company has had falling sales and market share. From peak sales of 7.1 billion dollars in 1996, the company sales fell to 4.1 billion dollars in 2002, which represents a mere 12% market share.

Levi's has developed a new strategy to increase sales and market share. The company has recently started selling its jeans on a mass-market retailer's shelves: Wal-Mart's shelves in 3,422 stores. This is a mighty leap for the organization, because in the past they have stocked smaller department stores such as Macy's with 243 stores and J.C. Penney with 1,049 stores. The giant retailer Wal-Mart not only requires intense price control from its vendors, but also requires scrupulous on-time and just-in-time deliveries and micro-level catering to customer preferences by constant product replenishment.

Let's look at some details of how this technology-reliant strategy synchronizes between the different dimensions of our model.

In order to respond to Wal-Mart's rigorous challenge, Levi's has launched an Information Technology-based transformation of its supply chain and of its demand replenishment systems. In addition, Levi's has upgraded its knowledge database containing information about its existing customers and in-store sales in stores and has fed that information into advanced forecasting systems.

Levi Strauss Company has made its product and sales information accessible to its salesmen in the field, its supply chain employees and its employees in the financial

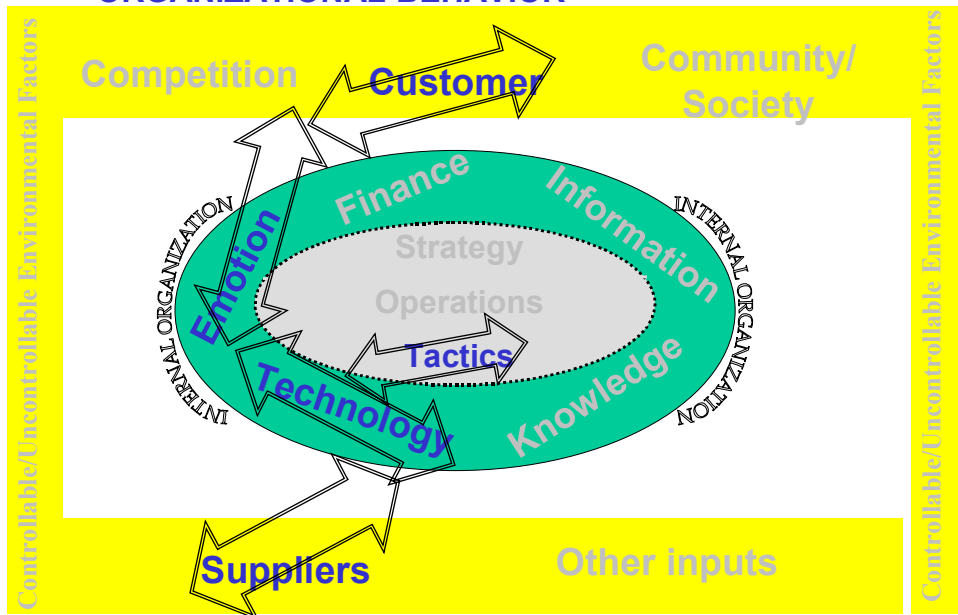
departments. Having this information at hand has allowed employees to feel more empowered to make decisions and the company has thus engaged its employees' emotions in harnessing the power of new, more dynamic information systems.

The same information systems are employed to provide every Levi's executive with the latest information regarding sales patterns trends in order to analyze and better understand customers.

Levi's has been successful in its strategy of launching its products in Wal-Mart stores by synchronizing the use of appropriate technology with the customer, his emotions, and knowledge management to improve its supply chain. (Figure 3)

LEVI'S INTEGRATIVE MODEL FOR ORGANIZATIONAL BEHAVIOR

Figure (3)



3.2 Nestle

Nestlé provides another example. Nestlé has been a stable and internationally successful company for many years. However, it has a very complex business landscape because competition in retail consumables, such as chocolates and other food items, is intense. It sells 8,000 products in almost every country of the world—it is a truly global organization. With such global-scale operations, Nestlé's organizational priority is operational efficiency in global growth.

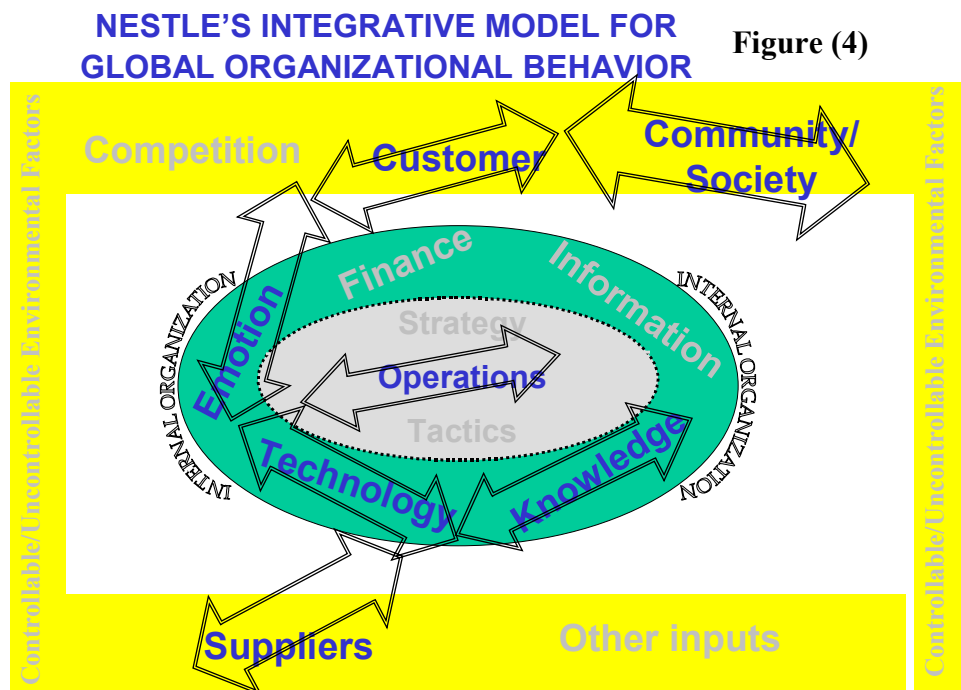
In order to stay closely synchronized with its global customers and with its diverse global communities, Nestlé's Board of Directors consists of executives from several nations. Moreover, given that the company values tradition and culture, the organization is very slow to court growth by introducing new products. Instead, they grow by increasing market share in familiar markets with familiar products and push for operational efficiency to increase profits.

The organization strives to stay very well synchronized with its customer's needs in its vastly different global markets. Unlike Coca-Cola, Nestlé products often have different formulas in different global markets, based on customer preferences. Kit Kat chocolate snacks come in different sizes and flavors, in different geographical regions of the world.

Nestlé values the use of technology to leverage its production efficiencies. The organization installed 11 million dollars' worth of robotic technology in one production line and achieved a 40% reduction in production time per ton of chocolate production. After this success, this model will now be extended to other plants.

In order to stay well-synchronized with its customers and suppliers at the global level, Nestlé has 2,000 people worldwide working on a technology-based, global excellence project called GLOBE. It aims to do data scrubbing, leading to better knowledge management and claims, to eventually achieve 4 billion dollars in cost cuts by 2006, based on better knowledge about its customers and suppliers.

So, Nestlé is achieving optimal success in its operations through synchronizing all of the elements we have discussed: customers, community, technology, suppliers, knowledge, and emotions. (Figure 4)



3.3 IBM

Our next example involves the well-known company, IBM. IBM was considered the leader in computer hardware and software sales for many years. But its competitors

slowly ate away at IBM's superiority in this area, and IBM became known as the hardware dinosaur, headed for extinction.

IBM's new strategy, however, involves offering its customers more than just computer hardware and software. It involves persuading its customers to let IBM provide a holistic solution to their technology needs, from support staff to data storage. This new IBM strategy is technology-based. Its long working relationship with customers and its knowledge of customer needs is being exploited to efficiently provide technology solutions and consulting.

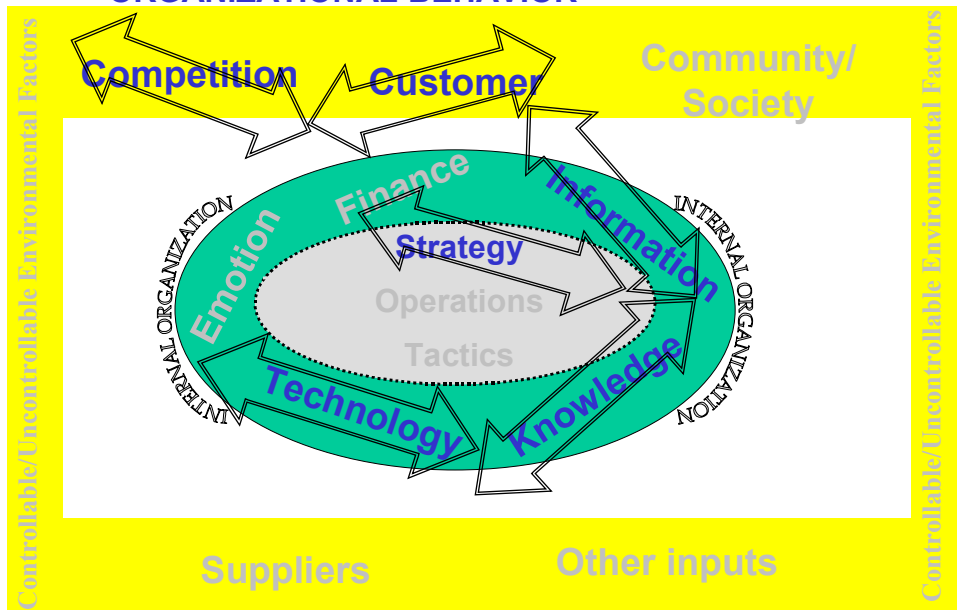
The company's consulting and system services business has been increasing steadily while its business from hardware sales has been decreasing. IBM is using its extensive information technology base to harvest customer relationship knowledge and to better understand the needs of its current customers, with the goal of fostering continuing relationships with them and proposing solutions for their technology needs. Working towards this strategy has required vastly different technology skills and employee profiles. Towards this end, IBM purchased the consulting arm of Price Waterhouse Coopers for an impressive 3.5 billion dollars. The company also bought a systems development tool called Rational Software for 2 billion dollars.

As we can see, IBM is achieving success with its new strategy of moving into systems consulting and solutions by synchronizing the internal elements of knowledge, information, and technology with the external elements of customer and competition.

(Figure 5)

IBM'S INTEGRATIVE MODEL FOR ORGANIZATIONAL BEHAVIOR

Figure (5)



3.4 Niche Airlines

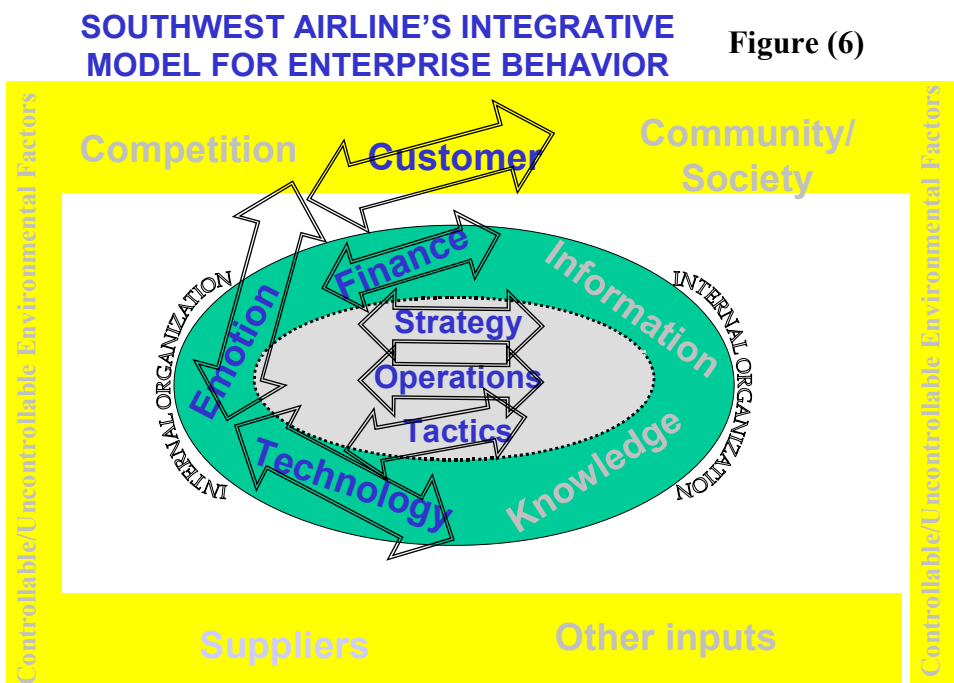
Let's look at an example dealing with the airline industry. As is the case with many other sectors of the U.S. economy, the 9-11 phenomenon has severely affected the travel industry. Major airline companies, such as American, Continental, Delta, Northwest, United and U.S. Airways have cut back on flights and services. Economic recovery may be around the corner, but it's not readily visible. Fears of terrorism still linger. Consequently, the big six are turning over their uneconomical, smaller markets to the adventuresome few.

A flock of niche carriers has taken up the slack rather quickly. These small carriers styles of operation vary widely, appealing to different types of customers. The routes they have chosen follow are quite different. Some are trendsetters,

while others copy. Some appeal to very exclusive groups. Some are discounters. Apparently there is room for every one in this free market.

A good example of a trendsetter is Southwest Airlines, based in Dallas, Texas. Other International Training Center speakers have given you detailed insight into Southwest's operations and how they have managed to post their 48th consecutive quarterly profit, in spite of the airline industry's current financial crisis and the adverse effects world events continue to have on the demand for air travel.

(Figure 6).



While Southwest has been a trendsetter, five other airlines today – Airtran, ATA, Frontier Airlines, JetBlue, and Spirit Airlines – aspire to be the next Southwest. And at least two major carriers, Delta Airlines and United have launched or announced plans for low-fare, me-too subsidiaries. This is a second try for both

these last two airlines. Followers too have been focusing on treating their customers well, keeping their employees happy, and, most importantly, keeping costs down through providing direct flights to secondary airports.

The combined effect of these strategies on the customer is to provide a feeling of safety, comfort and friendly care. The Internet has, in a big way, leveled the playing ground for the big and small alike, shifting the power to the consumer and a cost advantage to technologically-adept newcomers. The Internet, with its global reach, provides an opportunity for many developing economies to operate in this leveled playing ground, making it easier for an effective negotiation of appropriate technologies that would be relevant to their respective settings.

3.5 Automobiles for Generation Y.

We have thus far discussed niche airlines' attempts at winning new customers.

Let us now turn our attention to automobile manufacturers who are trying to draw the attention of specific groups of customers. The unique group under consideration is Generation Y. To quote from an article in the February 15, 1999 issue of Business Week, "Today's teens ... the biggest bulge since the boomers may force marketers to toss their old tricks." Things are very different among this crowd.

Synchronizing one's organizational purpose with the external environment is easier said than done when targeting this market. In an article from the June 30, 2003 issue of Time Magazine, Daren Fonda states that youth's tastes are so whimsical, that nobody knows what will be a hit. The 68 million Americans born between 1977 and 1995 represent the largest demographic bulge since that of their boomer parents. Automakers want to sell hip vehicles to this "under-25" set, since this group will drive car sales over the next two decades. About 3.5 million Gen Y drivers get their licenses each year. The general philosophy is to catch them young, even if the vehicle you sell is relatively cheap. The thinking behind this strategy is that brand loyalty will lead this market of consumers to purchase their subsequent automobiles from the same company. Therefore, these young consumers are seen as potential buyers of much more expensive vehicles in the future.

3.6 Technology and Environment.

Technology has made a lasting impact on the automobile industry. Consider, for example some of the latest developments: road-condition sensors, night vision systems, smart seats that tailor airbag inflation to the passenger's weight, and automated traffic management systems. These technologies have come to stay as more and more manufacturers are embracing these technologies. The prudent manufacturers are the ones that are aware of the fact that commercial hybrid gas-

electric models will be rapidly gaining market share between 2005 and 2010..and the market leaders in this field are gearing up to face these challenges.

Technology is great. We admire all that enterprising innovators are able to accomplish. All the same, we cannot overlook the impact of technology and production on the delicate environment. Have we reached a point of no return? Do we have to be overtly concerned about the pollution effect? When do we turn again to technology and innovation to regain the balance, and redress the consequences of over-population. We are not referring to people. We are referring to the automobile glut. There are more than 500 million cars in the world today, and the number is growing quickly, with the average life of a car in the U.S. approaching 22 years. What is the impact of all these trends and innovations? We anticipate a whole new generation of technologies enabling us to tackle this issue. The disposal industry may well be the key! We come back full circle with the ongoing need for balanced development, and for harmony between the internal and external factors that shape business strategy and operations.

Part IV: Guidelines for Successful Implementation of the Model

We would like to conclude by discussing six practical guidelines for implementing this synchronization model in your organizations. (Figure 7)

- (i) Step 1 starts by looking at the organization and identifying the functional aspects that are seen as either a weakness of the organization or as needing a boost and renewed energizing. You may decide that your strategy needs a boost (as in IBM's case) or your organization's operations need a boost (as was the case with Nestlé) or that your tactics needs re-thinking.

- (ii) Next, put together an upper management team to analyze which element of the integrative model would best support the functional aspect identified in Step 1. Let's call this the "priority element." The reason for putting an upper management team together in this step is that all organizational projects need an upper management champion if their chances of success are to be increased.

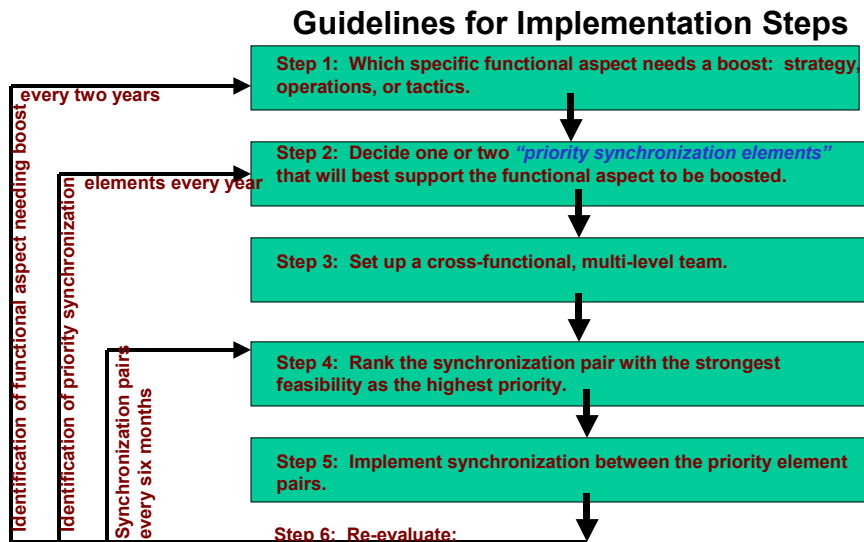
- (iii) However, the actual buy-in by the organization will happen only when this initiative is owned and supported by the entire organization. The emotions of the employees at all levels and in all functional departments can be positively engaged by utilizing a cross-functional, multi-level team as the group in-charge of this program.

- (iv) In step 4, ask this cross-functional, multi-level team to conduct a pairwise synchronization analysis of every element in the model with the priority element identified in step 2. The idea is to identify

- organizational strengths by discovering the model elements with which the priority element can best be synchronized. These pairs will be the first priority in the synchronization process.
- (v) You are now ready to write the blueprint for synchronization. Assess how these two elements can work in harmony with each other so as to mutually further the needs and strengths of each other. For example, if technology is the priority element, and synchronization with customer has been identified as the most feasible, then maybe your organization can use technology to monitor customer satisfactions with sales. Or, your organization can cement its customer relationships by sending their clients promotional coupons every month using their buyer profile trends from your technology systems.
- (vi) The last step is a feedback loop. You should re-evaluate your decisions and progress in steps 2 to 5 at an appropriate frequency. This is best illustrated by a flowchart. depicting the entire implementation process. As shown, we recommend that the pair-wise synchronization elements be re-evaluated every six months; the identification of priority elements to support the functional aspect being boosted should be re-evaluated once every year; and the identification of the functional aspect to be boosted itself be re-evaluated every two years.

Figure (7)

AN INTEGRATIVE MODEL FOR ORGANIZATIONAL BEHAVIOR



In conclusion, technology will continue to be a leading factor for the success of all organizations, whether they are in education, business or government. This is true because technology is driven by knowledge. A mammoth organization such as IBM remained flexible enough to shift its focus to the knowledge industry. A successful organization would anticipate market changes and be prepared for the same. There has been a knowledge revolution during the last few years. Those that don't become competent in knowledge acquisition, will be doomed to fail. Those that do, will flourish...

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