

INFORMATION TECHNOLOGY IN SERVICE ORGANIZATIONS

A. SHAHIN, Ph.D.

Department of Management
University of Isfahan, Isfahan, I. R. of Iran
email: arashshahin@hotmail.com

M. JAMSHIDIAN, Ph.D.

Department of Management
University of Isfahan, Isfahan, I. R. of Iran
email: mehdijus@yahoo.com

Abstract - In this paper an attempt has been made to show how information technology (IT) is used as a strategic tool to meet competitive advantages and how it is rapidly becoming a necessary ingredient for achieving quality within the service industry. An in-depth review of information requirements for service sectors has been made and the possible relationships between IT and typology of service organizations, service quality and improving market position have been highlighted. Also, integration of IT and service dimensions has been addressed and some important issues required for a successful integration have been proposed. The findings indicate that different types of service operations require different levels of IT. Authors have also emphasized that IT plays an important role in the service industry, especially in financial and healthcare sectors and it will continue to increase in importance as managers further appreciate the benefits that can be gained, as IT is treated as a strategic issue and as the complexities of a large network, demand increased capabilities in information management.

Keywords - Information Technology, Service, Quality, Integration, Typology, Requirements.

INTRODUCTION

Service firms have followed the lead of manufacturers in making great strides in getting work done with fewer employees mainly because of advances in technology. On the other hand, little attention has been paid in academic and trade literature to using information technology to improve customer service and long-run business effectiveness. Perhaps, this is because the benefits of improved service are often qualitative rather than quantitative. Standard accounting systems can measure labor costs, but not the costs of poor customer service [5].

Information technology (IT) is increasing in importance for companies and its effects on global trading are becoming widely felt [9,26]. It is frequently argued that IT is rapidly becoming the most important factor in increasing productivity and reducing costs [11,23,27,34,46]. Practitioners and researchers agree that IT is a critical component in service sector development, particularly for information-based industries, such as financial services [29].

To remain competitive, service providers are increasingly offering their customers IT-based service options to reduce costs and create value-added services for their customers.

IT systems are expected to help service providers improve service quality, financial performance, customer satisfaction and productivity. IT can help enhance service quality by increasing convenience, providing extra services and collecting service performance information for management use [17]. There are several competitive roles of IT in services, i.e., creation of entry barriers, enhancement of productivity and increase of revenue generation from new services [16]. In many service industries, IT-based service systems are essential for a service provider to remain competitive [7].

Quality programs in technology-dependent industry will need to include IT supported service and product quality improvements [19]. The banking industry, for instance, is information intensive and highly dependent on IT [39]. Thus, quality programs will need to include IT-supported service in the banking industry. IT can assist delivery of superior quality customer service by ensuring a fast, accurate and reliable service, supporting product and service range developments and providing information for decision making and advice [24]. A system, which ensures fastest possible responses to customer requests will provide organizations with a competitive advantage [40,41]. According to Bednar et al., the greatest benefit IT offers may be in its ability to ensure quality customer service by supporting personnel in establishing and maintaining relationships with customers [3]. Customers are individuals and satisfied customers are those who feel they have greater esteem or power as a result of the actions of the service firms. That presents a whole new challenge for organizations and their use of IT. So many investments have been about reducing or removing people from the delivery chain. In this customer- and people-centred world, IT should be used to enable people to spend more time with customers, to understand them better and then to deliver what they need quickly and effectively. This does not mean absorbing more cost, but it also means focusing cost reduction on those activities that the customer does not value.

A review of the literature indicates that the use of IT for improving customer service and customer satisfaction has attracted much recent attention [7,10,18,38]. Most of the research, however, is based on the service provider's perspective. Berkley and Gupta developed a model to describe how IT can be used to improve service performance [4]. Through case studies, they discussed in detail where information technology had been used or could be used to improve specific service quality dimensions including reliability, responsiveness, competence, access, communications, security, understanding and knowing the customers and finally quality control.

The purpose of this paper is to study the role and impact of IT in the service industry, with particular reference to the financial and health care sectors. In the following, information requirements and typology of service organizations are reviewed. The relationship between IT, service quality and improving market position is another concept which is demonstrated. Some approaches are also addressed and suggested for successful integration of IT with service processes. Finally, important conclusions and suggestions are outlined, based on a discussion of the issues studied in the paper.

INFORMATION REQUIREMENTS FOR THE SERVICE ORGANIZATIONS

Before explaining how IT could be used, it seems necessary to know what kind of information is required in service organizations. The service-delivery process is broken into input, process and output stages and the information requirements are specified for each stage. Figure 1 provides an illustration. The top of Figure 1 shows the service-delivery process. Supporting computer systems are given in the middle, databases are at the bottom and the information requirements are on the arrows. As the service-delivery process in Figure 1 suggests, the focus is on high customer-contact services that process people, as opposed to services that process information or paper. Because of the uncertainty and complexity introduced by the "customer", quality assurance is generally more difficult for high contact services than it is for low contact services. Figure 2 provides a summary of information requirements by organization level. Executive managers are concerned with setting broad policies and goals for the organization. They generally require aggregate information obtained from sources external to the organization. On the other hand, service-delivery personnel are concerned with the execution of tasks. They require information that is generally well defined, narrow in scope and arising largely from sources within the organization. The information requirements for service managers fall between the extremes of executive management and service-delivery personnel. Much of the information relevant to service management is obtained through the process of interpersonal interaction [20].

In high customer-contact services, a firm's ability to deliver quality service depends on its capacity to collect, process and distribute information. The input function in services includes assessing customer expectations, specifying the expected service and setting corresponding service standards. Good service providers have communication processes to facilitate the collection of customer data, suggestions, requests and transactions into customer databases. These databases can then be used to construct detailed customer profiles, eliminate service-specification errors, speed service and improve service consistency. Capacity-constrained firms may use service histories to estimate customer values and give better service to better customers. Once service standards are established, they must be communicated across the service-delivery organization so that everyone knows what is expected.

Process information is the information required by employees or customers while the service is actually being delivered. First, service providers must possess the required knowledge to perform the service. For many service firms, much of this knowledge can be accumulated in databases and distributed using decision support systems. To control service operations, managers need systems to collect, process and distribute information on actual business performance. Customer tracking and order processing systems use transaction data to maintain real-time records of customer and job status while also ensuring customer security. Quality control systems compare process data and service standards to determine if corrective actions are required. The objective is to make corrections before

problems are created and customers' complain.

Output information is used to determine whether customer expectations are met. While customers are the best judges of quality, many service firms lack adequate systems for collecting, and acting on, customer data. Customer complaints provide valuable information on service quality problems. If customers complain, employees need enough information to solve problems and make decisions while the customer is still present. Complaints should be tracked by type, frequency and department to identify recurring problems that otherwise might go undetected. To prevent weak recovery efforts that fail the customer twice, some firms use recovery tracking systems to capture and distribute information pertaining to each instance of recovery service. The greatest risk is that customers will not complain and just take their business elsewhere. If customer service or billing histories are available, defection scanning systems can be used to identify defecting or lost customers and, often, clues as to why customers are no longer buying.

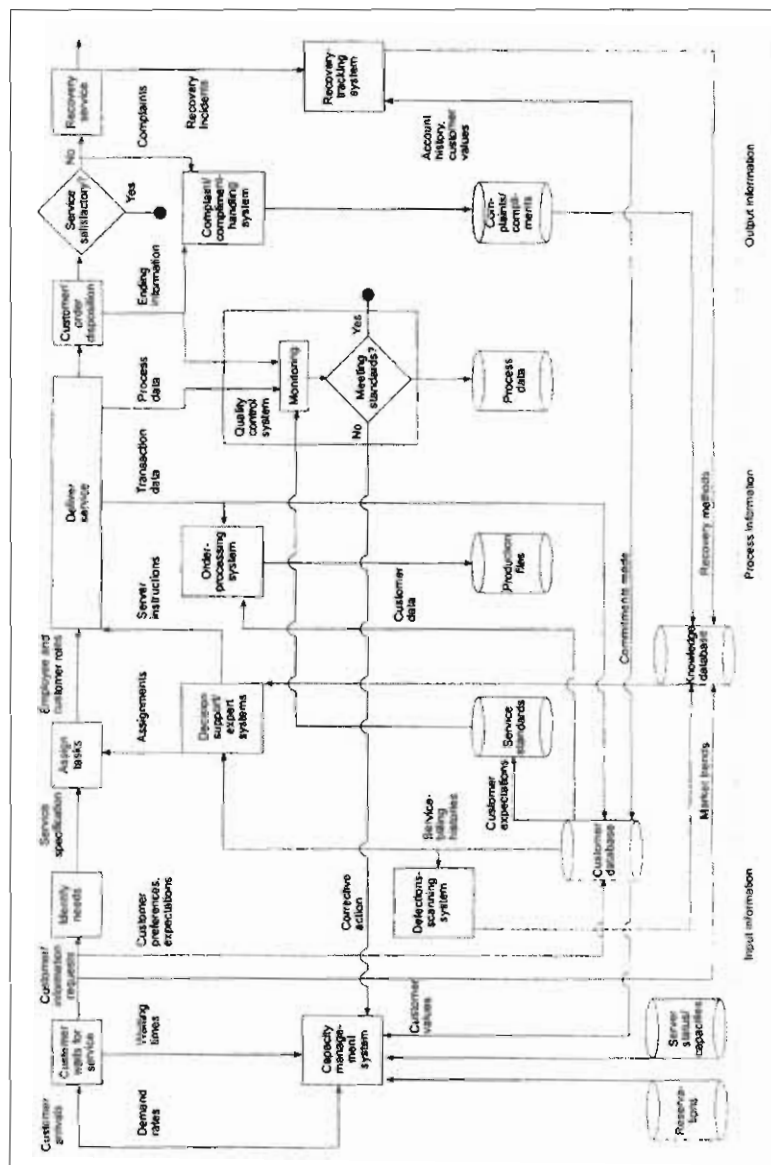


Figure 1: Service quality information requirements [5].

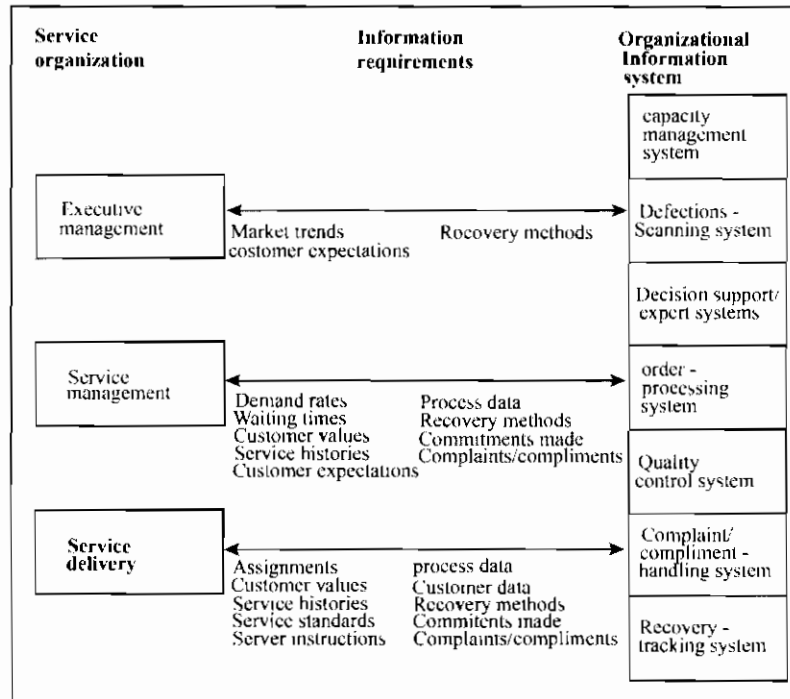


Figure 2: Information requirements for service organizations [5].

IT AND TYPOLOGY OF SERVICE ORGANIZATIONS

Early service industry research suggests that generic typologies of organizations do not fully succeed in identifying and classifying the special characteristics of service industries [25,28]. Mills and Margulies developed a typology based on seven broad dimensions of the service delivery process [28]. The Mills and Margulies framework utilized the customer contact component common to many other service taxonomies but extended the concept by further incorporating other vital elements of the customer-provider interaction. These elements included the type, source and complexity of information exchanged during the service delivery process and the nature of the customer-provider relationship. The nature of the information exchange impacts power relationships between customer and provider, substitutability of the provider and the level of problem awareness that exists at the inception of the service. Using these characteristics as a guide, Mills and Margulies developed a composite model that encompasses multiple dimensions of the customer-provider interaction (Table 1). The resulting framework classifies service organizations as either maintenance interactive, task interactive or personal interactive. This typology placed a greater emphasis on information content, method of information exchange and the roles assumed by employee than earlier contact-specific frameworks.

Table 1: Typology of service organizations [28].

	Maintenance interactive	Task interactive	Personal interactive
<i>Information</i>			
Quantity/confidentiality	Low	Moderate	High
Quality	High	Moderate	Low
<i>Nature of decisions</i>			
Provider decisions	Simple	Complex	Complex
Decision importance	Low	Moderate	High
Feedback (customer to provider)	Immediate	Slow	Slow
<i>Time</i>			
Total duration of interface	Brief	Moderate	High
Total direct contact time	Low	Moderate	High
<i>Problem awareness</i>			
Customer knowledge of problem	High	Moderate	Low
Customer ability to evaluate service	High	Moderate	Low
<i>Transferability</i>			
Substitutability of provider	High	Moderate	Low
<i>Power</i>			
Perceived power of provider	Low	Moderate	High
Provider status and authority	Low	High	High
<i>Attachment</i>			
Relationship strength and conflict	Low	Moderate	High
Potential	Low	Moderate	High

Schmenner provided another industry level 2/2 classification model [42]. Schmenner used high-low degrees of interaction and customization on one axis and high-low levels of labor intensity on the other. He identified the resulting four quadrants as service factories, service shops, mass services and professional services (Table 2). The different types of customer contact included direct or face-to-face interaction, indirect interaction, in which the customer and provider communicate remotely via technology such as a telephone, and non-contact interactions, in which customers independently utilize the service system technology, as with ATM utilization.

Table 2. A framework for service classification [42].

	Low interaction and customization	High interaction and customization
Low labor intensity	Service factory	Service shop
High labor intensity	Mass services	Professional services

IT, SERVICE QUALITY SYSTEMS AND IMPROVING MARKET POSITION

Olaisen and Revang proposed a model for three levels of service quality management: the

standard service system, the complex service system and the sensitive service system [33]. In the following, the relevance and the content of different service systems as well as the role which information technology plays at each system level are discussed:

-THE STANDARD SERVICE SYSTEM

A company that wishes to build up a standard service management system can simply replace a system which is based on a system ideology with a service ideology. A system ideology will often be built on the function of the production system with an emphasis on manufacturing-based quality (i.e. conformance to requirements) or a product-based quality, i.e., quality as a precise and measurable concrete variable. In the service ideology the quality will be customer-based (i.e. how well the quality of a product or service fits patterns of consumer preferences). This requires that the market segment for each service be identified and that a service package be designed according to the values the customers will be paying for (i.e. affordable quality) and a service delivery system be created to deliver the prescribed service. How to evaluate the quality at the moment of truth, when the customer consumes the service, will be a central question.

-THE STANDARD SERVICE PROGRAM AND INFORMATION TECHNOLOGY

A company in the process of automating its current procedures can simply replace a manual system with a more efficient system that can handle larger quantities of information in a shorter period of time. The introduction of an information system in the organization is the first step. The second step is integrating information technology into strategic planning. The standard service management system demands an integrated information system. The information system works in an assistant role to achieve higher efficiency through processing information in the organization. The assistant system involves the automation of existing procedures and routines.

-THE COMPLEX SERVICE SYSTEM

The second strategy, developed from the first strategy, is to expand the core services, the supporting services and the facilitating services. The key to success is not only the design quality, the product quality and the service delivery quality, but the relational quality between the core services, the supporting services and the facilitating services. To achieve this, the mix between service information systems and alliance partners has to be compatible. The main question is how to improve the quality offered in the service management program. The focus is still what gives the affluent customer value: The whole point of the global system is to give customers what they want by means of the most efficient service on the market; a service that covers the world and is consistently reliable. In practice, this means a highly complex service package preferably offered at a high price.

-THE COMPLEX SERVICE SYSTEM AND INFORMATION TECHNOLOGY

The complex service system involves the challenge of remaining a leader in effectively using technology in order to avoid the temptation of concentrating on just finding ways of doing the same thing better. Instead, a corporation must focus on using information technology tools as they come along to create new applications that link the latest technology to corporate goals in an ever more effective way. An information diversification strategy involves, including the information system, a complex system of core, supporting and facilitating services. At this stage, information technology is used to expand people's capacity to handle a complex service organization in a smooth and effective way. The information system demands professional handling from both front-line and back-office staff. The information system works now in an adviser role. The adviser system involves integrating the information system in the organization and giving the system the possibility to create new business opportunities [31].

-THE SENSITIVE SERVICE SYSTEM

The sensitive service system must entail a high level of tolerance for individual needs and individual utility. The information system supplies the company with information about what each customer has bought earlier (i.e. all earlier experiences with the company). This information enables the company to define the needs and wants of a smaller customer group more precisely. At the same time, the information system gives the company the possibility of designing an individual service package from the complex list of core, supporting and facilitating services. For instance, the information system might also be used to calculate the profit for each package. With this information, it is possible to reduce the profit margins relating to the core service in order to increase it where the supporting services are concerned. Furthermore, the information system also gives the company the possibility of following the movements of a service cluster and to take charge if the service is unreliable. This demands a higher level of tolerance in the design than before and demands more sensitive service concepts suited to the individual customer or to much smaller market segments than we have earlier been able to think about. One should define a holistic quality dimension based on how sensitive the service concept is to the customer's individual needs.

-THE SENSITIVE SERVICE SYSTEM AND INFORMATION TECHNOLOGY

The last step is creating an information culture. This means that organizations use information technology to create new forms of organization, work conditions and economic systems. The key to becoming a player in these new arenas will be rooted in the ability to establish corporate alliances through the use of information technology. Within the corporation,

information and knowledge-based work will take on a new importance [32]. The core task in an information culture is information processing – moving information among individuals and groups in order to co-ordinate work tasks. The basic structure for co-ordinating information processing has traditionally been hierarchical. Hierarchical organizations were built by grouping jobs/roles into work units and linking these via common reporting relationships and successive levels of management control [44,45]. Information systems, common architectures, shared databases, decision support tools and expert systems all create the capacity to co-ordinate behavior without hierarchical control. Such technology allows the creation of autonomous work units, linked together via information. It also allows for looser coupling, without sacrificing the capacity to overview and co-ordinate. The sensitive information system demands that the company create a service culture that is integrated with an information culture. Information then works in the role of the communicator. The communication system means that the company builds up an information culture around an electronic infrastructure.

In conclusion, the service systems, information systems and strategic alliances will influence the market position where we will have three options:

- changing the market structure
- product differentiation, and
- changing the market rules

Each of them will be dependent on success or failure in service strategy. It is also important to draw a distinction between attempts to enhance existing competitive advantage and initiatives intended to create new competitive advantage where none had existed before. A company might create a new competitive advantage and by this be able to enhance better existing competitive advantages and vice versa.

The above explanations are developed into a theoretical model that starts with the market positions of the services (Figure 3).

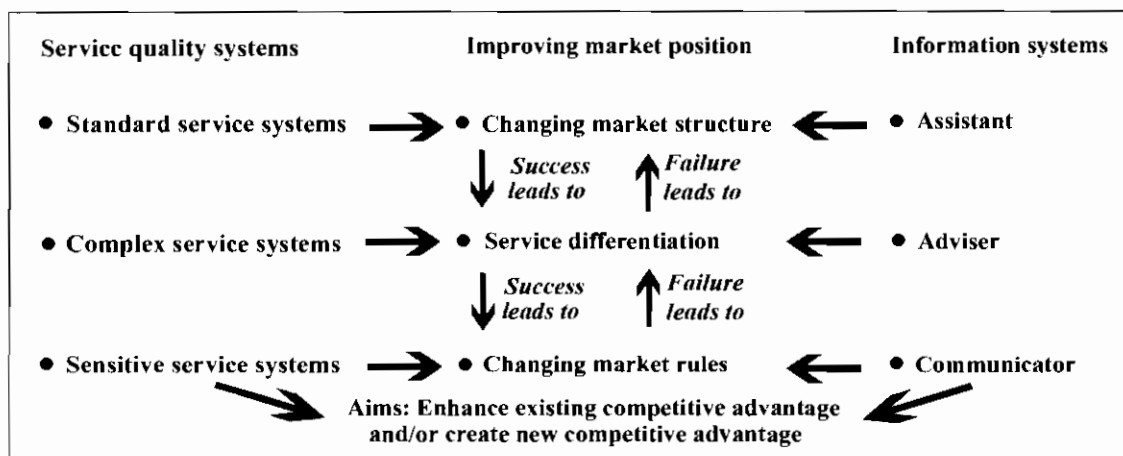


Figure 3: Gaining market position from information technology in service organizations [33].

In the following, by explaining the role of IT in two of the most important sectors in the service industry, i.e. financial and healthcare industries, its influences on service quality and improving market position are highlighted.

-IT AND THE FINANCIAL SERVICE INDUSTRY

Financial services account for nearly 50 percent of the service economy in the USA and have a similar importance in most industrialized nations. Financial service companies were also among the earliest commercial users of IT [14]. Electronic business among companies providing financial services should be attractive, as physical assets typically need not be exchanged. Yet, electronic business in the financial services has evolved slowly for a variety of reasons, including security concerns, regulation, lack of standards, complexity of inter-organizational relationships and conservative principles.

Economic forces and technological advances, especially with the Internet, have driven, merging the investment across international boundaries and across types of financial services. The prime example is the creation of Citigroup by the merger of Citibank and Travelers Group in October 1998. Citigroup provides financial services in 100 countries through the following businesses: Citibank, Commercial Credit, Primerica, Salomon Smith Barney, SSB Citi Asset Management Group, Travelers Life & Annuity, and Travelers Property Casualty. Such consolidation is likely to become commonplace as customers increasingly demand one-stop shopping for their financial services and as companies seek to accrue advantages from economies of scale and opportunities for cross-selling. Financial service companies are relatively unique in regard to their value chains in that they typically can add value to the end product without physically possessing any intermediate product. In fact, ownership and the ability to use financial assets rarely require their physical possession. Although ownership is sometimes confirmed with a physical certificate, only an electronic record is necessary, whether the asset is a stock, bond, mutual fund, derivative, gold bullion, futures contract, insurance contract or any form of money other than cash.

The financial services industry has been doing business electronically for many years. Retail and institutional customers have been trading online, paying bills online and accessing their accounts online. However, many business-to-customer information transfers continue to be executed via traditional, paper-based formats. These include such functions as prospectus delivery, statement reporting and transaction confirmation. The reasons for the continued adherence to traditional, physical information delivery methods are many. Tradition and the aversion of some consumers to adopt new technology dictate that firms continue to provide paper-based transaction audit trails. Regulatory statutes also demand the use of paper reporting for many types of transactions. However, as noted below, there is evidence that industry leaders will continue to pressure both customers and regulatory agencies to adopt electronic distribution and information management methods. The

banking industry, for example, is moving rapidly to increase the ability of its customers to transact business online. The International Data Corporation estimated that the number of US banks offering online banking services would increase from 1,150 in 1998 to 15,845 by 2003. They estimated that the number of US households banking online would increase from 6.6 million in 1998 to more than 32 million in 2003 [22]. Similar trends emerge in Europe. BlueSky International Marketing reported that the number of Internet banking sites increased from 863 in November 1998 to 1,845 in June 1999. The number of sites that permit customers to perform transactions increased from 448 to 1,245 in the same period. BlueSky President Suzan Nolan noted that, "In many cases, the bar for minimum functionality has been raised and simply offering online transactions is no longer a point of differentiation" [6]. The National Association of Securities Dealers (NASD) has recently allowed brokerage firms to begin archiving data with laser-disk technology instead of traditional, acetate-based microfilm and microfiche. Cost containment is again a major motivating factor for firms adopting the new technology, although they also expect to improve customer service levels by providing faster, more accurate access to historical transaction records. An insurance industry report [1] proposed the emergence of a virtual channel that removes constraints of time, place and form from the transaction universe that currently defines the insurance industry. A report compiled by Ernst & Young International indicates that many financial institutions believe that electronic business will significantly reshape their customer relationships [13]. These same institutions feel an increased need to focus on electronic connectivity, alliances and partnerships. Nowadays many financial firms believe that e-commerce will alter their distribution strategy in the near future, particularly in the area of customer connection. It seems, however, that service organizations concern that there is a lack of understanding of and available insight into the emerging role of e-business as a delivery channel and customer connection mechanism [6].

-IT AND THE HEALTHCARE INDUSTRY

The potential benefits IT can provide for the health care industry is similar to other businesses: competitive advantage through quality of information processing, process efficiencies, improved productivity and performance, superior quality of service, greater responsiveness to customer needs and greater organizational flexibility. However, health care lags behind other fields when it comes to IT. To catch up, health care organizations need to incorporate clinical data repositories, electronic data interchange, intranets, clinical pathways and wireless computers, supported by investment in technologies that will enable this transformational change. Soliman and Soar argued that IT is increasingly being adopted by community and hospital-based providers of health care services, because IT is now available not only to improve the communication of patient clinical data, but also to

expedite communication of myriad other information across health care organizations [43]. Appleby stated that the realization by health care executives that IT is the linchpin for an organization's success resulted in a plethora of effort to ensure that the integration of IT with health care strategy would work successfully [2]. Furthermore, Diedling and Welfeld identified the IT department as the architect of the hospital strategic information plan which must be the blueprint for organizing patient care, research, financial and administrative data [12].

Callanan and Hughes stated that, due to the rapidly changing health care environment and IT advances, a health care organization needs to engage in strategic, planned change in order to allocate limited resources, achieve the organization's goals and fulfill its mission [8]. The IT strategy for health care will not only provide direction and purpose, but will guide managers in identifying the kinds of IT needed, assist in timely implementation of a system that supports staff and will enable identification of desired outcomes and benefits. The IT plan needs to build on and support the organization's mission and business plan and be integrated into the over-all strategic plans.

However, with a good IT strategy, health organizations will be better prepared to make timelier and better informed decisions related to applying IT with the end result of improved utilization of technology to support the health service vision and mission [8]. Competitive advantage can be achieved through the use of IT in health care organizations as the sharing of patient medical information across hospitals and health care stakeholders will support better quality and more cost-effective health care [15]. Appleby suggested that incorporating IT into the health care industry with its unpredictable, turbulent environment and decentralized organizations would be so difficult that "even IBM or Microsoft would have a hard time" in achieving an effective outcome [2]. This is the challenge to all managers and leaders in today's health care industry.

HOW TO INTEGRATE IT WITH SERVICE PROCESSES

For the IT manager looking to change, new and proven concepts from the field of service management provide a useful starting point and prompt a few simple questions:

- Who are our customers?
- What do they want from us?
- How are their needs changing?
- How do we find out what their needs are?
- How do we provide for those needs most effectively?

These key questions are then used as the basis for an analysis of the product or service in terms of how it meets the needs of the customers – the only meaningful assessors of performance. But remember, in the new world, customers have choice; you have competitors.

Improvement is important but it has to deliver a level of performance better than the competition. These changes also highlight the need to innovate both products and methods of delivery constantly.

However, to succeed in this people-focused world, we need to look at new ways of harnessing IT and running IT projects. Jackson and Humble proposed a seven step plan, with the emphasis on action, which could be used as a generic implementation pattern for integrating IT and processes in service organizations [21]. The goal is to improve the two key factors rapidly: service as perceived by the customer and cost effectiveness. The seven steps are as follows:

1. get people involved
2. define your purpose
3. understand your customers and their needs
4. study the competition
5. define the key capabilities needed
6. review with customers, and
7. develop and implement action programs.

As it was mentioned previously, it is important to note that implementing such programs is not easy in all cases. For instance, in a research done by Orr et al., a number of barriers were identified to successful IT implementation in the southern health care network (SHCN) in Australia [44]. These included:

1. a lack of understanding of IT investments and potential outcomes;
2. little or no awareness by managers of competitive advantage to be gained by IT; and
3. the economic constraints of the SHCN which made it difficult to justify the cost of IT investments.

Consequently, to have an effective integration of IT and service processes, a causal model of service quality, which centers on causal linkages among some key variables along with customers' perceptions of IT-based services and service quality is needed. Zhu et al. proposed a hypothesized model for service quality as mentioned in Figure 4 [47]. It focuses on the causal linkages among the service dimensions as measured by SERVQUAL [35,36], the constructs representing the IT-based service quality, preferences towards traditional services, experiences in using IT-based services and perceived IT policies.

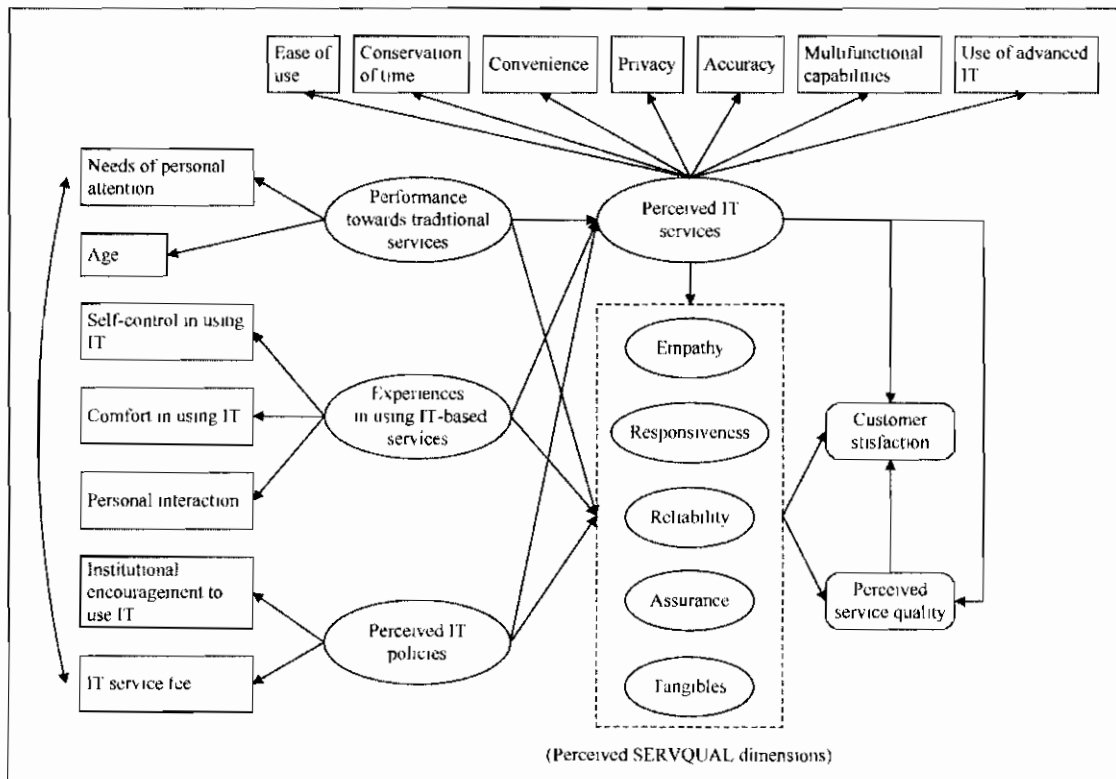


Figure 4: A proposed model for the integration of IT and service dimensions [47].

DISCUSSION AND CONCLUSIONS

It seems that development of technology-enabled services is a concept, which is being demanded by service firms. This will include some form of mass-customization and/or account segmentation in order to personalize the delivery of services. A vital component of the service level expansion and customization will include the linkage of inquiry and advice functionality to available tools such as online response, wealth accumulation strategies, tax preparation services and asset allocation modeling. Among the newer technologies most anticipated are voice recognition units and wireless communication. Implementation plans and schedules varied among sectors of the industry, but most managers believe that initial applications would continue to address improvement of customer service functionality and service expansion through integration of multiple technology forms, including IT.

The need to integrate newer technologies and services with existing systems, and the anticipated transition to mobile services are motivating these firms to pursue more alliances with both software and hardware suppliers. For example, one respondent reported plans to leverage such alliances to support its customer acquisition process by allowing customers to open accounts via the "click-through" from public information services. Another reported immediate plans for a hardware-based alliance that will place the brokers' reporting and account access functionality in the base-level product offering of one of the major personal

digital assistant (PDA) products.

The trend toward expanded delivery of advice and education services mirrors the oft-cited transition from data to information and ultimately to knowledge. Delivering this form of knowledge-enriched services requires formation of new alliances with both software and hardware vendors, as well as alliances with other financial service providers. These alliances allow firms to combine client data with diagnostic software in order to establish client financial goals, assess current financial health and suggest strategies to fill gaps uncovered by the analysis. Firms also plan to use alliances with browsers, search engines, Internet Service Providers (ISP) and PDA vendors as a means to increase their electronic visibility.

In this paper, the development of IT in two of the most important sectors in the service economy, i.e. financial services and healthcare, were reviewed. It was found that IT does have an important role to play in the service industry. The study also determined that the role of IT will continue to increase in importance as managers further appreciate the benefits that can be gained, as IT is treated as a strategic issue and as the complexities of a large network demand increased capabilities in information management. We reviewed the information requirements for service organizations and emphasized the differences of typology of service sectors affecting the IT applicability. The relationship between IT, service quality and market position improvement was highlighted and the integration of IT with service processes was addressed.

It is important to note that while many expect IT to make a positive contribution to improving service, it should be remembered that IT is a tool people use, not a strategy. People are emotional and select the logic they want to apply based on their feelings. When it comes to service, people do it all. They design it, they deliver it and they buy it. The potential for improving business performance through IT supporting satisfied staff satisfying customers is untapped by most organizations and it seems that they will continue to neglect it at their peril.

Overall, the review of the literature suggests that more research on the impact of IT-based services on customer perceived service quality is needed. An opportunity to go beyond the current state of knowledge presents itself in developing and testing a conceptual framework, which links the attributes of IT-based services, the variables affecting customers' evaluations of such services and the dimensions of service quality.

IT can help service providers achieve higher levels of customer service. The technology alone, however, does not guarantee success. Service providers, while providing IT-based service channels to their customers, need to understand better where technology will or will not enhance customer service. By understanding how customers evaluate IT-based service options and which factors affect their evaluations, service providers will be in a better position to develop and promote IT-based services for the sake of achieving a higher

level of service quality and customer satisfaction.

As it was emphasized, many different types of information can be used to improve service quality (Figures 1 and 2). Moreover, typology of service organizations implies the fact that different types of service areas require different levels of IT. However, it remains to develop methods for either prioritizing information needs or actually identifying information requirements: that is, for a given service business, what information is actually required? Future researchers should address the relations between service quality and such information quality dimensions as timeliness, currency, accuracy and completeness. Also, more research is needed to investigate the impact of IT-based services on customer perceptions of service quality. Once information requirements are known, researchers may begin formulating guidelines for hardware and software selection.

The outcomes of this research will help managers in the service industry to realize the potential opportunities provided by IT. With a better understanding of what was presented and discussed, service managers can implement strategies that will allow them to serve their customers more rapidly, accurately and cheaply. However, the struggle among companies to bring customers into their own network and keep them away from their competitors' networks will be won by companies in which, managers have a better grasp of the alternatives and their associated risks and rewards.

REFERENCES

- [1] Altiero, S. F., "Virtuality Posits a Dramatic Future for Life Companies." *National Underwriter*, Vol.17, pp. 32-33, March 1997.
- [2] Appleby, C., "Remote Control." *Hospitals and Health Networks*, May 1997.
- [3] Bednar, D. A., Reeves, C. A. and Lawrence, R. C., "The Role of Technology in Banking: Listen to the Customer." *Journal of Retail Banking Services*, Vol. XVII, No. 3, pp. 35-41, 1996.
- [4] Berkley, B. and Gupta, A., "Improving Service Quality with Information Technology." *International Journal of Information Management*, Vol.14, pp. 109-121,1994.
- [5] Berkley, B. and Gupta, A., "Identifying the Information Requirements to Deliver Quality Service." *International Journal of Service Industry Management*, Vol. 6, No. 5, pp. 16-35, 1995.
- [6] BlueSky International Marketing, "The Number of Retail Internet Banks in Europe Doubles in 6 Months." Available: at www.blueskyinc.com/pressrelease_june99.htm (Accessed 25 May 2000), Press Release, July 1999.
- [7] Bonfield, P., "IT Helps Satisfy Customer Needs, Management Today." December 1996.
- [8] Callanan, K. and Hughes, S., "Developing an Information System for Nursing."

Tempe, Emtek Health Care System, 1995.

- [9] Chandler, K., "Quality in the Age of the Networked Society." *Quality Progress*, Vol. 31, No. 2, pp. 49-52, 1998.
- [10] Dabholkar, P. A., "Consumer Evaluations of New Technology-Based Self-Service Options: An Investigation of Alternative Models of Service Quality." *International Journal of Research in Marketing*, Vol. 13, No. 1, pp. 29-51, 1996.
- [11] Dewhurst, F., Martinez Lorente, A. R., and Dale, B. G., "Total Quality Management and Information Technologies, An Exploration of the Issues." *International Journal of Quality & Reliability Management*, Vol. 16, No. 4, pp. 392-405, 1999.
- [12] Diedling, L. and Welfeld, J., *The Rise of the CIO, Hospitals and Health Networks*. February 1995.
- [13] Ernst and Young, "E-commerce and Connection to the Customer: Technology in Banking and Financial Services." New York, NY, *Technical Report*, Ernst & Young, LLP, 1998.
- [14] "How Computers Are Used in a Bank." Technical Note, Federal Reserve Board, April 14, 1998, Available at: <www.bog.frb.fed.us/y2k/howcompu.htm> (Accessed May 25, 2000).
- [15] Ferratt, T., Lederer, A., Hall, S. and Krella, J., "Surmounting Health Information Network Barriers: the Greater Drayton Area Experience." *Health Care Management Review*, Vol. 23, No. 1, pp. 70-76, 1998.
- [16] Fitzsimmons, J. A. and Fitzsimmons, M. J., *Service Management: Operations Strategy, and Information Technology*. 2nd ed., New York, NY, Irwin and McGraw-Hill, 1997.
- [17] Furey, T. R., "How Information Power Can Improve Service Quality." *Planning Review*, Vol. 19, No. 3, pp. 24-26, 1991.
- [18] Galbreath, J., "Web-Based Banking: Creating a Technology Road Map." *Credit World*, Vol. 86, No. 5, pp. 24-28, 1998.
- [19] Goodman, R. A. and Lawless, M. W., *Technology and Strategy Conceptual Models and Diagnostics*. New York, NY, Oxford University Press, 1994.
- [20] Gorry, G. A. and Scott Morton, M. S., "A Framework for Management Information Systems." *Sloan Management Review*, Vol. 13, No. 1, pp. 55-70, 1971.
- [21] Jackson, D. and Humble, J., "Service Excellence – The Role of Information Technology." *Managing Service Quality*, Vol. 4, No. 4, pp. 36-40, 1992.
- [22] Johnson, P., *Online Banking Forecast, 1998-2003: On the Money*. Bulletin w19193, IDC. KPMG (1999), *Haz Clic Aqui: Speaking E-Customers' Language*, KPMG Insurance Insiders, July 29, 1999.
- [23] Kagan, A. "Information Technology Seen as Key to Productivity." *Chemical Week*, Vol. 155, No. 2, pp. 20-22, 1994.

- [24] Lloyd-Walker, B. and Cheung, Y. P., "IT to Support Service Quality Excellence in the Australian Banking Industry." *Managing Service Quality*, Vol. 8, No. 5, pp. 350-358, 1998.
- [25] Lovelock, C., "Classifying Services to Gain Strategic Marketing Insights." *Journal of Marketing*, Vol. 47, pp. 9-20, Summer 1983.
- [26] Mahan, M. and Gotlieb, L., "An Automated Path to Quality, Quality Comes to the Information Systems Function." *CMA Magazine*, Vol. 66, No. 7, pp. 13-15, 1992.
- [27] McFarlan, F. W., "Information Technology Changes the Way You Compete." *Harvard Business Review*, Vol. 62, No. 3, pp. 98-103, 1984.
- [28] Mills, P. K. and Margulies, N., "Toward a Core Typology of Service Organizations." *Academy of Management Review*, Vol. 5, No. 2, pp. 255-265, 1980.
- [29] Mulligan, P., "Differentiating Service Tasks for IT Application: An Exploratory Analysis in Financial Services." *International Journal of Service Industry Management*, Vol. 10, No. 2, pp. 190-210, 1999.
- [30] Mulligan, P. and Gordon, S. R., "The Impact of Information Technology on Customer and Supplier Relationships in the Financial Services." *International Journal of Service Industry Management*, Vol.13, No. 1, pp. 29-46, 2002.
- [31] Olaisen, J., "Information Versus Information Technology as a Strategic Resource." *International Journal of Information Management*, 1991.
- [32] Olaisen, J. and Larsen, T., *Innovation Theory Applied on Library and Information Services*. LIBRI, 1992.
- [33] Olaisen, J. and Revang, O., "The significance of Information Technology for Service Quality: From Market Segmentation to Individual Service." *International Journal of Service Industry Management*, Vol. 2, No. 3, pp. 26-46, 1991.
- [34] Orr, S., Sohal, A. S., Gray, K., Harbrow, J., Harrison, D. and Mennen, A., "The Impact of Information Technology on a Section of the Australian Health Care Industry, Benchmarking." *An International Journal*, Vol. 8, No. 2, pp. 108-119, 2001.
- [35] Parasuraman, A., Zeithaml, V. A. and Berry, L. L., SERVQUAL: "A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality." *Journal of Retailing*, Vol. 64, pp. 12-40, Spring 1988.
- [36] Parasuraman, A., Zeithaml, V. A. and Berry, L. L., "Refinement and Reassessment of the SERVQUAL Scale." *Journal of Retailing*, Vol. 67, No. 4, pp. 420-450, 1991.
- [37] Parsons, G. L., "Information Technology: A New Competitive Weapon." *Sloan Management Review*. Vol. 25, No. 1, pp. 3-14, 1983.
- [38] Pease, J., "Using Technology to Move Beyond Customer Satisfaction." *Health Management Technology*, pp. 39-41, March 1998.
- [39] Porter, M. E. and Millar, V. E., "How Information Gives You Competitive Advantage."

Harvard Business Review, Vol. 63, No. 4, pp. 149-60, July-August 1985.

- [40] Roth, A.V. and van der Velde, M., "Customer Perceived Quality Drives Retail Banking in the '90s." *Bank Management*, pp. 29-35, November 1991a.
- [41] Roth, A.V. and van der Velde, M., "The Retail Technology Advantage." *Bank Management*, pp. 14-19, December, 1991b.
- [42] Schmenner, R., "How Can Service Businesses Survive and Prosper?" *Sloan Management Review*, Spring 1986.
- [43] Soliman and Soar, "Physical Clinical Communication Systems: an Australian Perspective." *Journal of Medical Systems*, Vol. 21, No. 2, pp. 99-106, 1997.
- [44] Synnott. W., *The Information Weapon: Winning Customers and Markets with Technology*, New York, NY, John Wiley, 1987.
- [45] Vincent, D. R., *The Information Based Corporation*. Homewood, IL, Irwin, 1990.
- [46] Weston, F. C. Jr. "Weighing 'Soft' and 'Hard' Benefits of Information Technology." *Manufacturing Systems*, Vol. 11, No. 7, pp. 120-121, 1993.
- [47] Zhu, F.X., Wymer Jr, W., and Chen, I., "IT-Based Services and Service Quality in Consumer Banking." *International Journal of Service Industry Management*, Vol. 13, No. 1, pp. 69-90, 2002.