

# Is Your Hotel MISsing Technology?

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*In order to become more effective and efficient in providing guest services, hotels must avail themselves of information technology. A firm's competitive edge and quality can be the result of the successful implementation of an information system. The authors present in this article the why, who, what, when, where, and how of implementing information systems.*

The hotel industry is being challenged by the need to understand how to effectively utilize the growing power of information technology in their operations. This major sector of the service industry has prided itself in successfully providing guest satisfaction. Hoteliers' resistance to utilizing technology, and especially information technology, may well be a direct result of their fears that technology may interfere with their ability to provide the guest with the personal attention that characterizes their business.

Information systems (IS) have profoundly changed the way organizations are managed. Once employees learn the power they gain from having immediate access to the information they need to make the decisions for which they are responsible, they are never the same again. Although information systems have not yet been widely used in the service sector in general and the hotel industry specifically, some pioneering firms in other industries have discovered how the systematic use of information can help them be more efficient and effective in a rapidly changing economic environment. The highly successful reservation system developed by American Airlines, and the recent cash management system developed by Merrill Lynch, are two examples of the effective utilization of computerized information systems. Information systems can provide a real competitive advantage for those organizations which recognize the additional value that could be provided to their customers through technology.

The American Airlines reservation system forever changed the way in which airlines sold their service. The Merrill Lynch cash man-

agement system dramatically increased the value of financial services to customers and forever changed the structure of the financial service industry. Both firms are excellent examples of how of an effective information system can provide a significant competitive advantage through redefining the standard of service for an entire industry.

For many managers information technology and information systems are a mystery. The effective use of information systems and information technology can improve both the quality of service and the competitive position of hotels. Every area of the hotel can benefit from an increased use of technology.

There are certain critical factors to consider when implementing an information system: who are the system's users, what is the purpose of the system, when is the information needed, where is the information available, and how do all these components come together to create a successful IS implementation. By addressing these critical factors and seeing how these factors pertain to the organization, hotel managers can identify the degree to which they and their property are able to benefit from the implementation of information technology.

### **Assessment Must Begin with "Why?"**

An organization must begin its assessment of an information system by first answering why it should even consider using information technology. Only after thoughtfully answering the why question should the manager consider the other critical questions that must be answered for effective utilization of an information system. The next critical issue to determine is who should be the intended users of the system, followed by defining what the purpose of the system is, when the information required for the users is needed, and where that needed information is stored. Finally, once the decision is made to implement an information system, the last critical factor is how to do it effectively. Information systems are like so much else in competition, one either leads, follows, or gets out of the way.

Perhaps the most critical question to address in considering an IS is "Why?" Why would a service organization want to expend the money, organizational energy, and managerial time to institute an IS? Information systems are not inexpensive. They take much time and employee involvement to design and develop, and most managers are unfamiliar with them and resistant to their implementation. There are, of course, advantages that an IS provides. Perhaps most significant is the competitive edge that is gained through the effective use of an information system. Another advantage is the quality improvements in service that can be realized through the use of an IS. Quinn and Baily<sup>1</sup> found that improved quality is the most common and important result of the successful implementation of an information system.

Industries, especially manufacturing, that have long had totally integrated IS are realizing other advantages beyond achieving a competitive edge. Increasingly they are also using information systems for extending basic technologies and strategic purposes.<sup>2</sup> Service indus-

tries have generally not been as aggressive in implementing information systems as the manufacturing sector. An IS can, therefore, still present an effective opportunity to gain a competitive advantage for service sector companies. For example, key control is currently a major security issue in hotels. Hotels can easily change a guest room door's key combination through an information system. For security reasons, many guests will only stay in hotels with these computerized locks. Hotels using this technology will enjoy higher guest satisfaction and a competitive advantage over others.

### **All Users Must Be Identified**

In designing and developing an IS, it is critical to determine the users, or the "who." There are two aspects of the "who" issue in an information system. The first is deciding who will be using the system once it is in place to identify what each user needs. The second part is deciding who does not need to be using all or part of the system. It is as important to deny access to corporate data to those who do not need it, as it is to guarantee ready access to those who do. Though historically information systems were designed for use by top management only, today's systems are structured to provide information to all levels of workers. For example, while a hotel general manager uses the IS to compare and analyze financial data, a front desk clerk may be using the same system to check room availability.

Because users of the system have different needs and information requirements, it is essential to specifically identify all the users and their individual needs. Designing and developing an effective and efficient information system must involve consultation with the system's users to ensure that their needs are met in the information system design. For example, the sales and catering department of a hotel needs a system that manages advance deposits, luggage tracking, and recreational activities. Housekeeping can benefit from a system that identifies rooms as vacant, on change, on repair, out of order, or clean. If the system does not provide the right information to all its users at the right time for them to use, it becomes an expensive toy.

### **User Participation Is Critical**

Users must not only participate in the information system design, but also its implementation. User participation in a system's implementation fosters more favorable attitudes toward its later use. Research shows that when users actively participate in designing and developing the information system, they are more likely to work at making it a success.<sup>3</sup> Further, user involvement leads to a better designed system, higher levels of user satisfaction with the system, and fosters greater acceptance of the end product.<sup>4</sup>

The who factor allows us to identify the individual system user so we can address informational needs. One useful approach to identifying these needs is suggested by Rockart<sup>5</sup> in his Critical Success Factor (CSF) method. This CSF approach focuses on an individual manager's

critical information requirements. These requirements are then used to develop the company's information system in a way that fully integrates the information requirements of individual managers with the overall business strategy. Identification of these informational needs comes through individual interviews with the managers.<sup>6</sup> For example, interviewing the front desk and reservations people may identify a need to have access to guest histories. This information access can be used to enhance the personal contact with the guest as the person talking to the guest can personalize the encounter by knowing the frequency of prior visits and even guest preferences. Since the guest encounter is so important to guest satisfaction in a hotel experience, using the Information System to help front desk employees personalize this experience can significantly add to guest satisfaction.

Using the CSF approach requires a series of individual interviews with all users to determine each CSF.<sup>7</sup> Once each manager defines these as components or objectives of his or her job, the Information System can be specifically designed to include the provision of the information which directly focuses on those factors.<sup>8</sup>

Though both Jenster and Rockart specify that the critical success factors should be developed through interviews with the managers who will use the system, getting this information can require a significant effort. In fact, this is one of the more difficult tasks in a system's development. Articulating information requirements is difficult for all but the most experienced users; creating motivation to participate is a job in itself; and ensuring effective communications between the user and the analyst is a major challenge, except where there have been previously successful experiences or where the two make a conscious effort to communicate.<sup>9</sup> Indeed, users are often likely to ask for more information than they really require to effectively perform their job. Users unaccustomed to thinking about what types and volume of information they need for making decisions tend to ask for far more data than they actually use. They feel that it is more desirable to have too much information than to be caught with not enough. Disentangling what the users really need from what they think they need requires considerable skill of the system designer.

Because of the threat of overuse of the system, an analyst must be able to judge what is necessary. This is made difficult by the differences between the background and training of the system's designer and the users.<sup>10</sup> What an analyst may consider extraneous information may actually be vital to the user. Or a manager may decide certain information is necessary in the system when it really has no practical purpose. Ensuring the smooth and effective communication between these two partners in the IS design process is vital to producing a useful and efficient information system.

### **Not Everyone Needs Access to System**

The second part of the who factor is determining not only who needs access to what information but also who doesn't need access to

the system once implemented. Not everyone needs access to all the information within the system. For example, the food and beverage department may not need complete access to the reservations system, or all departments may be prevented from accessing sensitive personnel or competitive information. Therefore, the system should be designed to allow users access to only those areas necessary for them to do their jobs. This too is a challenge for the systems designer. What the user's information needs really are may be surprising and unexpected.

An even greater challenge is when people external to the organization require access to the corporate database. Ensuring such users have access to what they need while denying them access to what they do not need may mean the difference between success and failure in a competitive market.

Two methods are commonly used to restrict user access. One method is to assign passwords to users, allowing access to just those parts of the database that the password holder needs. The password determines the security level. A second method is to limit accessible information at the terminal site. With this method, the terminal itself is designed to only access specific areas of the entire organizational database.

### **System Assists Decision Makers**

The next critical factor to address is the purpose, or the "what" of the IS. This refers to the purpose it serves in the organization. Specifically, an Information System is a computer system that serves the functions of planning, controlling, and decision making.<sup>11</sup> Information systems take raw data already available in the organization and make them usable information to decision makers. This could be in the form of a yield management system in a hotel which maximizes revenue per available room, or an inventory management system that controls the purchasing, storing, distributing, and production of products.

Depending on its design, the system can be structured to perform any one of several major roles. Two of the more common roles in industry today are Decision Support Systems and Executive Support Systems. A decision support system, or DSS, is an advanced form of an information system that not only provides information to managers, but also uses analytical models to combine data in new ways and interpret the meaning of the available information.<sup>12</sup> It adds decision making and controlling aspects to an information system.

A DSS can support decision making for all managers. Data are organized through the use of sophisticated, analytical models. These mathematical models are designed to use the information available in the system through user friendly software so that managers can easily utilize these analytical tools. Decision support systems allow managers to use sophisticated quantitative models to test different scenarios in a way that allows them to assess the possible impact of different

assumptions about what might happen.<sup>13</sup> This allows decisions to be made that provide the best possible outcome, given the available choices. Food and beverage point-of-sale devices, for example, provide management with valuable information based on a sophisticated analysis of individual items sold, their theoretical costs, and inventory used.

A DSS also expedites the solution of complex problems. With the immense analytical capabilities of computers, managers who have access to a DSS can dramatically improve the quality of their decisions.<sup>14</sup> When problems arise requiring extensive analytical analysis, the computer can perform them quickly and accurately. For example, a hotel sales staff using a decision support system can conduct an analysis of different yield possibilities for a potential convention group that will allow it to optimally price rooms in a few minutes rather than the hours it would take to analyze the business without a DSS.

Not only does a DSS improve the quality and speed of analytical analysis, it also improves objectivity.<sup>15</sup> A successful DSS provides and interprets the same information to all users in the same way, every time. Therefore, managers are working with comparable and consistent data when making decisions. Though the results can be interpreted differently, at least all managers are starting at the same point with the same data, and the same analytical tools.

### **System Can Make Routine Decision Automatically**

A DSS can also be used to make routine decisions automatically, such as maintenance schedules in a hotel, employee scheduling, or even the compilation of the hotel's daily report. When decision criteria can be specified in advance and the information is available in the database, the DSS can make the decision without managers spending their time. Inventory control is a common illustration of this type of a DSS application. When the information system tells the inventory model that inventory levels have reached a predetermined level, the DSS can automatically place an order. This ordering may be even accomplished through a vendor automated purchasing system. This allows managers to perform other functions, leaving simple decision making to the computer.

An expert system can be added to the DSS to greatly improve its decision making power and capabilities. Expert systems add qualitative information to the quantitative models in the DSS. It works by capturing the decision rules used by experts and putting them into the decision routine. It then becomes possible for the computer to apply those rules and make decisions in their place. The experts essentially teach a computer how to make decisions based on the criteria they themselves use. Expert systems can even learn from their mistakes. If a decision made using the expert criteria failed, the program would review the logic and learn that when that particular situation arises again, it will do something different. Decision rules on when and how much to adjust room rates could be developed to allow front desk employees to make real time decisions based on accessing the expert

advice available in the system. As a rule, however, expert systems can be expensive to develop.

### **Strategic Level Managers Can Benefit**

Another enhancement of an IS is an Executive Support System, or ESS. An ESS is an information system designed to be used by strategic level managers. In a very user friendly computing environment, these managers can easily access the organization's financial history and records, compare available information on competitors, communicate to others through electronic mail, and maintain personal schedules.<sup>16</sup>

A well designed ESS should allow managers to easily answer questions like the following: What are our major competitors doing? What strategy should we adopt, and what impact will it have on us and our competitors? Are the strategies that we used last year still working?<sup>17</sup> This system emphasizes the reduction of time and effort required to obtain information useful to executives.<sup>18</sup>

An ESS combines data from various internal and external sources. These data can be filtered, compressed, and tracked based on the manager's requirements. An ESS can provide a general overview of a company's financial condition, performance indicators such as profit margins, or average time customers wait for service. These are communicated by means such as signals or alarms to delineate whether performance measures are improving, staying the same, or declining. A contemporary ESS can even interact with spreadsheet programs to quickly develop reports with more details. Also, users can incorporate the data into forecasting formulas to see the financial impact of different operating assumptions.<sup>19</sup>

### **System Can Meet Corporate Goals**

An excellent example of an effective executive support system is shown in an application at Quaker Oats. They instituted an ESS for senior managers that proved quite successful. Their system is extremely user friendly, allowing even those who are computer illiterate easy access to any information needed. They found that their executives could now find information in two minutes that used to take several days.<sup>20</sup> Further, these managers could also obtain information at their desk terminals that had been completely unavailable to them in the past. Because of their ESS, Quaker Oats felt their managers were making better, quicker, and more informed decisions.

What type of system the organization should use is dependent upon the strategic plan for its information system. Strategic planning focuses on the decisions and actions of managers that result in the formulation and implementation of plans designed to achieve a company's objectives.<sup>21</sup> Such strategic planning is often overlooked, yet is quite crucial in designing and developing an effective information system. To be most effective, strategic use of an information system must be closely aligned with the strategic plan of the organization.<sup>22</sup> In a sur-

vey by Niederman and colleagues of critical information system issues, effective strategic planning for their systems rated as the third most important issue facing service managers in the 1990s.<sup>23</sup>

The information system should be a direct result of the strategic plan and the corporate strategy that the plan details. An IS design that is consonant with the strategy, structure, and style of an organization's administrative system will contribute to more effective management.<sup>24</sup> Without question, the effective integration of information systems into the overall strategy of the company greatly adds to its competitive advantage.<sup>25</sup> A corporate IS plan should clearly show how the information system technology will be used to meet corporate goals.<sup>26</sup>

### **Stress Is Placed on Timeliness**

The fourth key factor in considering an information system is the timeliness requirement for information. If a system is unable to provide its users with timely information, all strategic purposes are lost. The system's designer must ensure that the system addresses the timeliness of information that each user needs. Some users will require immediate information about an area, such as hotel occupancy, while other users of the information, such as long-term planners, can wait several days without affecting the quality of the decision process.<sup>27</sup>

If information is needed on an immediate basis, it should be available in an on-line, real-time system or network. Here the information can be accessed immediately, without difficulty. Such immediate access is necessary for functions such as credit card transactions or account status information. In areas that information is not needed in such a timely manner, such as payroll, general ledger, accounts receivable, or payable, information can be stored using various methods at off line storage. CD-ROM, floppy disks, or a dedicated computer are all examples of such storage options.

There are two major components of the "where" of an information system. First, where the information system itself exists must be decided, including the level of technology already existing. The most accessible method is a client/server system, with terminals in various locations as needed. This system is supported by a server computer that processes and stores information. The clients are then able to access the information as needed. These terminals have immediate access to whatever is in the system.

Another method similar to a client/server is that of a Local Area Network or LAN, a telecommunications network requiring dedicated computers and encompassing only a limited distance, usually one or two buildings<sup>28</sup>. This is another method that could be very useful in a hotel application. This system can connect telephones, computers, printers, copiers, and fax machines through the use of a Private Branch Exchange (PBX). For instance, the computer can control the voice mail system, while sending valuable information to the front desk via the PBX.

A third option is to have a centralized computer operation consisting of a central computer with someone managing the data. Any information used must be received through this person. For the hotel environment where information is usually needed immediately, this system is not as desirable as the primary information system. However, it may be used to provide information that does not have an immediate need for the basic operations. A monthly report on historical sales comparisons with data on other properties in the system may be more efficiently provided through a centralized operation.

### **Technology Needs Are Varied**

The extent to which technology is used varies for each hotel. One hotel's information system may consist of only two computers that are restricted in use to the general manager and other specified top management. While another hotel the same size may have an extensive on-line IS with a terminal in each department, and access to real-time information that completely integrates and constantly updates every part of the organization's database.

The amount of technology in the system depends on the extent to which management believes that the benefits of having fast and ready access to information outweighs the costs. While this is partly an economic issue, it is also equally a value judgment. Indeed, in this era of empowering employees, the most effective tool for implementing empowerment strategies is to give these employees quick and easy access to the necessary information to make good decisions about their job responsibilities.

After deciding where the computers are going to be, the second issue is to decide where the information will be located within these computers. This refers to how information is structured within the IS. This structural issue refers to the information architecture.

Information Architecture (IA) is essentially a high level map of the information requirements of an organization.<sup>29</sup> An effective architecture provides a method of mapping out the information needs of an organization, relates them to specific business functions, and documents their interrelationships. Information architecture has several functions. It can guide decisions about which applications should be built. In addition, an IA can suggest the required scope of each application and how those data will fit into the overall IS strategy.<sup>30</sup>

Systems in hotels are frequently added in an incremental way without always being integrated with existing information system software or hardware. This affects the where. For example, a new engineering system may be added that includes computerized environmental control. While the ideal integration of this system would have it interface with the front desk in order to turn on and off heating and cooling when the guest checks in and out, many existing front desk systems are unable to find or access the location of where those data are. Another example of the where issue is the expanding use of satellite receivers in hotels for both the provision of in-room movies and the

management of reservations. Locating where each system is and where it interrelates to other systems is a critical task in ensuring that all parts of the IS are working together.

### **Support Must Come from the Top**

A final issue to address by those managers considering the implementation of an IS is to determine how it can be used effectively in their organization. To determine where an IS is most likely to be effective, a manager should start by thoughtfully and thoroughly addressing the following questions: Why is this system being implemented? Who is going to use this system once in place? What purpose will the system serve for the organization? When does this information need to be provided? Where will the information be stored, maintained, and delivered to the user?

There are also several other areas to address, the first of which is management participation. Not only must the operational managers or users support the implementation of an IS, top management participation is also essential to ensure its effectiveness. If top managers don't support the design and use of an IS, the likelihood is that no one else will either. Top managers define the culture of the organization, and what they believe in and actively support will typically be emulated throughout all levels of the organization. Their direction and support is, therefore, crucial to the strategic use of information technology.<sup>31</sup>

As management's support of an information system increases, so does the support of its end users. If employees are able to see that managers will reward time and effort spent in learning a system, then they are more apt to learn it. If a manager considers a new system to be a priority, the system will now likely be treated that way by his or her subordinates.<sup>32</sup>

Training is another crucial element in the implementation process. No matter how complete and comprehensive the information system is, if the training for its use has been inadequate, then the benefits expected will never be realized. Not only must initial training be done, but it is necessary to have follow-up sessions to train new employees.

Another area to address is that of the design of the system. This is a problem that can easily occur in an operating environment as complex as a hotel. If the analyst or system designer gathers incomplete or inadequate information about the system requirements or user needs, the final system will not do what is expected. Further, if the managers overseeing the system design don't really know what they want included in the system or have not comprehensively addressed the why, who, what, when, and where, the system performance will not meet expectations. This often occurs because of a lack of complete information gathered by the analyst in regard to user expectations, needs, and decision criteria. Or, as another problem to address, the system may be complete, but not user friendly.<sup>33</sup> If a system is too complex for the intended users, it might as well not be in place.

A final limitation is the analyst in charge of developing the system. Identifying information needs can be difficult because of its many dimensions. Information needs may not be provided in an efficient manner because computer systems may be inadequate or too slow. Response time must be quick enough to be useful. The analyst's primary task is to clearly and competently define the users' needs and then provide a system and equipment that meets those needs.<sup>35</sup>

Information technology use is increasing in hotel environments as management recognizes how it can gain a competitive edge from the use of information systems. Typically, systems have been added incrementally, leading to the problems of having a patchwork of different computers and different systems that are unable to communicate with each other. Everyone knows the data are somewhere, but it is difficult or impossible to ensure that the right information is at the right place at the right time to help managers make effective and informed decisions. However, by thoughtfully and comprehensively reviewing the basics of why, who, what, when, where, and how, managers contemplating the advantages that their organization can gain with Information Systems can better assess the value that IS might have for them. There are important issues to be addressed before undertaking the effort and expense of developing an IS. Answering the questions suggested through this framework can be a helpful guide in determining the degree to which a particular hotel can use an IS to become a leader, not a follower in the industry.

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