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Information Processing: Coordination and Control in Large Hotels

Abstract
A number of factors influence the information processing needs of organizations, particularly with respect to the coordination and control mechanisms within a hotel. The authors use a theoretical framework to illustrate alternative mechanisms that can be used to coordinate and control hotel operations.
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by

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and
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Formal hotel organizational structures have long been known for their complexity. These organizational structures are characterized by many levels of organizational hierarchy, complex communication networks, and an often bewildering array of job titles. At the same time, there is an intense need for rapid, reliable information processing in a hotel in order to ensure continual account updating, control over resources, and, ultimately, guest satisfaction. Guests only see, or want to see, the output—high levels of efficient service. One avenue for providing this output is the efficient use of information technology.

The complexities inherent in the formal hotel organization structure may create problems. For example, Gamble\(^1\) has suggested that overuse of the complex, bureaucratic method of hotel organization may be slowing technological innovation within information processing systems.

Galbraith\(^2\) provides a basic framework that can be used to analyze coordination and control structures within a hotel. He explains that organizations make use of information processing systems, along with a variety of alternate mechanisms, to deal with uncertainty and the subsequent need for coordination of the organization's elements. As organizations become too large to permit coordination through face-to-face communication, an initial set of basic mechanisms are employed to ensure an integrated pattern of behavior across interdependent groups. The initial set of mechanisms are those associated

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with the bureaucratic method of organizing—levels of hierarchy and standard operating procedures.

An organizational hierarchy provides individuals with legitimate authority to handle problems and resolve conflicts. In addition, establishment of a hierarchy reduces the number of communication channels necessary to integrate interdependent subunits. Standard operating procedures lessen the need for communication among the organization's members by pre-specifying appropriate actions and behaviors that apply to specific job related situations.

Galbraith explains that these two basic mechanisms are sufficient only to a certain point. As task uncertainty increases, rules and procedures often become inadequate and a firm's hierarchy subsequently becomes overloaded with exceptions to normal operating procedures. Once the basic mechanisms are deemed insufficient, other options become viable. An organization whose rules and hierarchy are no longer adequate can substitute craft or professional training for detailed programs and procedures. Another alternative is to furnish individuals with plans providing targets and goals, which, if met, mesh with the operations of other individuals or subunits. A final option is to increase administrative intensity (the number of managers) in the organization. At this stage, the management of an organization requiring additional information processing capacity can use two basic strategies: They may reduce the need for information processing, or, alternatively, increase the capacity to process information. Each of these strategies can be implemented via various tactics or mechanisms.

The Need for Information Processing Can Be Reduced

There are several tactics available for reduction of an organization's information needs. One tactic is to modify the firm's external environment in order to reduce uncertainty. For example, contact with outside organizations can be minimized by vertically integrating the business. In addition, the firm may try to co-opt external organizations with which it must deal. Second, an organization can reduce information needs by decentralizing, creating some leeway regarding how tasks should be performed, thereby reducing the number of decisions that must be passed up hierarchical communication channels. Finally, an organization can reduce its information needs by creating "slack" or leeway within its boundary. Creation of slack makes it easier to meet targets and plans, once again reducing the number of exceptions that must be passed up communication channels.

Practically, however, each of these potential tactics for reducing information needs has its own limitations. Realistically, managers cannot control all of the outside entities with which they must deal. Excessive decentralization may cause traditional control systems to break down and require compensating investments in new systems for integration and control of operations. Excessive slack may threaten the survival of the organization.
Information Processing Capacity Can Be Increased

An organization may also choose to increase its information processing capacity. Galbraith identifies two tactics for accomplishing this objective. The first is investment in vertical information systems, which provides both a means for providing more information through the use of clerks and computers and a means of increasing the capacity of the decision maker through support systems and assistants. A second method requires the establishment of lateral relations which cut across lines of authority. These relationships may take the form of informal person-to-person meetings or formal structures such as task forces.

In practice, the mix of mechanisms actually in use in a firm, as well as the emphasis placed on each mechanism, will vary depending on the firm's organization structure, industry, history, culture, and even the personal preferences of its owners and managers. In fact, some organizations may not depend exclusively, or even primarily, on formal information systems as methods of coordination or control.

Different organization structures create different needs for coordination and control; consequently, combinations of structures and information processing needs are many and varied. Galbraith's general discussion pre-supposes the basic decisions managers in an organization have made regarding the division of labor necessary to accomplish a task. Similarly, the following discussion pre-supposes a type of bureaucratic organization structure common to many large hotels.

Managers in large, complex hotel operations often employ the concept of division of labor and break large tasks into their simpler component parts. This action allows for standardization and routinization of tasks so that they can be performed by relatively interchangeable individuals who can be trained in a relatively short time.

As the task is divided into its respective parts, there arises a need to either coordinate the individuals performing the tasks, or construct some buffers that allow the tasks to be accomplished relatively independently. In general, a hotel is organized functionally, with the so-called "production departments" being further divided by product, such as food and beverage, and rooms. Within these departments there is much division of labor. The food department contains waitstaff, buspeople, hostesses, and a variety of cooks and chefs, each group with specific tasks that they and they alone perform. The rooms department is staffed with front desk clerks, bellmen, cashiers, and a housekeeping staff, with separate distinguishable duties. The need for coordination within the two basic departments, food and beverage, and rooms, is much greater than the need for coordination between departments.

Various Factors Influence Need for Information Processing

There are conditions that may cause a mismatch between information needs and capacity in a hotel. Galbraith expresses the need for information processing in a functional form:
\[ I = f(U, N, C) \]

Where:
- \( I \) = the amount of information that must be processed to ensure effective performance,
- \( U \) = task uncertainty,
- \( N \) = the number of elements (input, output and structural) relevant for decision making, and
- \( C \) = the connectedness or interdependence among the above elements.

An increase in task uncertainty, the number of elements relevant to decision making, or the interdependence among elements in an organization will increase the need for information processing within the organization. Practical explanations of each of these variables, and their ramifications for use by hotel management, are as follows:

- **Task Uncertainty**: The complicated structure and division of labor of a typical hotel serve to reduce the complexity of tasks performed in the hotel by breaking large tasks into their component parts and training employees to be efficient in performing each component. Such an action, however, often increases the need for coordination within the separate elements of the hotel. Further, in a hotel, while the task itself may be simple, the timing of the performance of the task may, in many cases, be hard to determine.

  Brass\(^7\) and Rousseau\(^8\) both indicate that the ability to identify the steps in performing a simple task is only one dimension of task uncertainty. Uncertainty regarding the input to and output from the task represents a second dimension of task uncertainty. Brass\(^5\) defines input uncertainty as the ability of an employee to predict what the inputs to his/her job will be and when and where those inputs arrive. Input uncertainty in a hotel is everywhere and stems from the inability to predict the exact arrival time of a guest, and the inability to predict the combination, level, and timing of services that will be requested once the guest arrives. For example, guests may check into a hotel with or without a reservation, may stay as long as planned, extend their stay, or check out early. While in the hotel, guests may use only the lodging services offered or may choose to use food and beverage facilities, room service, the parking garage, health club, or any of the other services the hotel has available. How many times have hotel managers and employees wished they could do away with these uncertainties?

  Task uncertainty in a hotel, then, stems not so much from the complexity of the task itself but, instead, from the turnover of guests and the inability to tightly specify the timing and level of the tasks to be performed.

- **Number of Elements**: The number of elements involved in guest services in a hotel has the potential to be quite large. For example, a
guest having dinner in the hotel may be seated by one individual, poured water by another individual, served food by a third individual, and served wine by a fourth. The preparation of the meal itself may be accomplished by several different chefs and assorted kitchen staff. The bill may be posted to his/her room by a front desk employee and the money eventually collected by a cashier during checkout. Thus, there is much division of labor within a hotel, necessitating interaction between the guest and a variety of employees. Similarly, each employee serves a great variety of guests.

- **Interdependence**: Mills and Moberg argue that the necessary contact between the customer and service worker within a service organization results in a reciprocal interdependence between the two parties. This interdependence increases the number of novel situations the worker must face and limits his/her ability to rely on past procedures and ways of doing things. Service people must be masters of adaptability, constantly changing their activities because of input by the guests. The resultant increased need for information is heightened by the fact that the customer may enter or leave the system at many different points and may move through the process in several directions (input uncertainty).

A second cause of increased information processing due to interdependence in a hotel relates to the need for sub-units within the property to adjust their actions to take into account the action of the sub-unit preceding it. In some cases, this aspect of interdependence may be of moderate importance in a hotel. A guest can deal with multiple departments, or multiple individuals within a department, and individuals can perform their task with little or no consideration for the service performed before or after their current task.

On the other hand, many of the operations in a hotel are highly interdependent. The front desk cannot sell a room before it is cleaned by housekeeping. Bills cannot be posted to accounts until the individual departments transmit them to the front desk. How much time do F & B managers spend dealing with conflicts between prep and service people? There are many such instances where interdepartmental cooperation is essential but very often lacking.

**Needs Must Be Matched with Capacity**

Mills and Moberg characterize service organizations as being the recipients of much uncertainty and interdependence. One possible organizational response that could mitigate the need for information processing within a service organization is the routinization of the transaction between customer and service worker. Mills and Moberg seem to have little faith in this approach. Instead, they seem to advocate a more open-systems structure, where role routinization is held to a minimum and workers possess high levels of expertise.

Schaffer agrees with Mills and Moberg. He comments that simple roadside motels may have simple technologies, but that deluxe
hotels catering to a highly differentiated and demanding clientele are examples of organizations that have non-routine technologies whose work requires the handling of many exceptions to normal practices.

In practice, however, the level of expertise of workers within a hotel is relatively low and many roles are quite routine. Hall\textsuperscript{14} found a large hotel to be the most bureaucratic of 10 organizations studied, ranking first or second on dimensions of hierarchy, division of labor, rules and procedures, and seventh on the dimension of technical qualifications. Some interesting issues are raised by this apparent contradiction between practice and theory. Are the control systems of hotels overly bureaucratic as suggested by Gamble?\textsuperscript{13} Would coordination and control be improved if informal mechanisms of control were employed? Would performance be improved?

Before any conclusions are drawn for what the appropriate information processing and control system for a hotel is, consideration must be given to the wide variety of mechanisms that can be used to coordinate and control hotel operations. These mechanisms can either serve to reduce the information processing needs or to increase the information processing capabilities of the hotel. The following six points illustrate options available to hotel managers, and are displayed in Figure 1.

There is little doubt that bureaucratic mechanisms are used in hotels, or that they can have some positive effect. Hall\textsuperscript{14} research provides evidence of the use of standard procedures and levels of hierarchy. Shamir\textsuperscript{15} and Gamble\textsuperscript{16} describe the bureaucratic workings of hotels; a simple examination of a traditional hotel organization chart invariably reveals a very hierarchical organizational structure. In addition, standard operating procedures are often used in the industry. These procedures are often evidenced in training manuals, operating manuals, and checklists, which are quite detailed and designed to handle some types of exceptions, as well as routine operations.

**Technology Grows in Popularity**

Daft and Macintosh\textsuperscript{17} speak of control through technology, a mechanism becoming increasingly more popular in the hospitality industry. With modern property management systems (PMS) and point-of-sale terminals (POS), organizations no longer have to worry about some employees either remembering standard procedures or failing to use them. An employee using a PMS or POS system is prompted as to the appropriate action during each step of the process, and the machine refuses to complete a transaction unless all required steps are performed. On-line help screens are also available to help the employee in the case of exceptions and, in some cases, the use of the hierarchy is enforced because the resolution of certain exceptions requires a key or password that is only possessed by a superior. Current and future use of technology in hotels is also described by Gamble,\textsuperscript{18} who notes the common use of computers as electronic clerks, and the emerging use of computer systems for decision support. As well as enforcing conformity

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to procedure, these systems also have the important role of providing data to the formal information systems of the organization.

Galbraith\(^{19}\) suggests craft and professional training as a means of reducing the need for information processing. Ouchi\(^{20}\) and others have suggested more informal methods of control, often termed “corporate culture,” whereby the values and goals of the organization are internalized by the employee through a socialization process. Mills and Moberg\(^{21}\) and Schaffer\(^{22}\) seem to regard this type of control as highly appropriate to the hospitality industry, and Gamble proposes that hotel schools encourage a new cultural perspective for management in order to “…shape the attitudes, perceptions and biases of prospective and practicing managers in the hotel industry so they can relate to the environment more effectively.”\(^{23}\)

In practice there seems to be some attempt to instill the company spirit in hotel employees. Certain socialization processes are apparent in hotel operations. Employees wear uniforms that identify their job position within the organization and are sometimes subject to rather strict appearance codes. Emphasis is placed on quality and service and on maintaining “X Company’s” helpful, friendly, courteous reputation. Whether these tactics are effective in coordinating and controlling operations is debatable. Although there are some employees who...
are considered professionals, such as chefs and engineers, a host of
other employees do not seem likely candidates for socialization. At the
operational level, many employees are relatively less educated and
are often of a different ethnic/racial and economic status than those
who manage them. There can be language problems. Turnover is high
among line employees. To date, it seems that the industry has been
more concerned with simplifying and routinizing tasks so that these
individuals can be easily replaced than with truly socializing them
into the operations of the organization.

Planning Is Found on Many Levels

Although some operational employees are given plans and goals,
for example, maids may be given a standard time in which to clean a
room, this technique may be less useful for reducing information
needs in a hotel than some of the other methods suggested by
Galbraith. The input uncertainty surrounding the operations of a
hotel makes it difficult to plan when a particular room must be
cleaned or when a meal must be served. Broad plans may be generat-
ed daily by looking at the level of reservations, which is one of the
functions of the reservation system that makes it important to the
organization. More specific plans often need to be made on a minute-
to-minute basis.

Is it therefore possible that planning and goal setting could be
counterproductive?

Galbraith notes that two additional methods of reducing the need
for information processing involve the creation of buffers and the alter-
ation of the environment in which the firm operates. Hotels reduce
input uncertainty by encouraging guests to make reservations for
rooms and meals. Guests are also conditioned to expect certain ser-

vices at certain times and places and not at others. Some hotels cater
to particular types of guests such as business people or tourists, which
further reduces their input uncertainty by ensuring a more homoge-
nous type of guest with predictable demands. Although Mills and
Moberg do not consider selection and socialization of the guest a
workable solution in the service industry, it does seem to be a process
evident to some extent in the hospitality industry. If guests can be con-
tioned to expect the services that hotel managers wish to provide,
everyone's job is made easier. Should guests be treated like cattle? No.
Should they be manipulated or conditioned in certain ways? Yes.

The point is often made that hotel rooms and perishable meals
cannot be inventoried, thus depriving a hotel of one of the most widely
used buffers available to organizations. Even without the presence of
large amounts of inventory, it is possible for buffers to be created in a
hotel. On busy days extra employees can be scheduled. Part-time
employees can fill emergency needs. Seating arrangements in restau-

rants can be altered to increase seating capacity. Suites can be split
into two separately sold rooms. In fact, there are a number of ways in
which “inventory” in a hotel can be modified to satisfy demand.
Management desiring to increase the information processing capabilities of a hotel can also invest in either vertical or lateral information systems. The vertical information system of a hotel contains several commonly used reports and operating procedures that are fairly standard across the industry. These procedures include preparation of the night audit, daily reports, and departmental profit or cost statements. Monthly a profit and loss statement is prepared for the hotel. This statement is often prepared according to the *Uniform System of Accounts for Hotels*, which is a chart of accounts and financial statement formats that has been in use in the industry since 1926.

The lateral information systems of a hotel are often informal, with waitstaff or housekeeping employees conferring as to the needs of a guest. This type of communication is easy when all involved parties are employees of the same department working in the same general physical space. Special requests that involve more than one department may be facilitated by the concierge, who plays an integrating role in the organization, or may be resolved by communication between departmental managers.

**Technology Influences Information Flow**

Both the vertical and horizontal information flows in a hotel have been affected by the use of the latest computer technology. Vertical reports are in general much more detailed, with sales amounts broken out by specific product and/or employee. Some cost reports are now issued more frequently. For example, the hotel management used to rely on periodic monthly inventories to generate food and beverage costs. Modern systems are able to record the standard quantities of ingredients for a particular item when the item is sold. These amounts are then compared to actual quantities issued from the storeroom. Since inventories are on-line and perpetual, food cost percentages can be calculated on a daily basis. Direct labor costs can be accumulated in a similar fashion.

In the area of lateral information flows, some face-to-face communications have been eliminated by technology. With many POS terminals, food orders are electronically transmitted to the kitchen and either printed or displayed on a terminal. This procedure eliminates much of the personal contact between the waitstaff and kitchen employees. In some cases the system automatically times the placing of parts of the order so the soup, salad, and entree will arrive at appropriate intervals. In a similar fashion, charges from food and beverage outlets are transmitted via a local area network to the front desk where they are automatically posted to the guest's folio.

This discussion has not been a blueprint for success in the development and maintenance of these systems so much as an attempt to define a number of areas that managers should consider when analyzing their properties. Increased expertise in the management of information systems industry-wide will create an increased need for managers to understand and deal with their own company's systems.
Managers Must Make Choices

Practically, managers must make informed tradeoffs when they alter the set of coordination and control mechanisms used in their property. Typically, when managers are confronted with a deficiency in information processing, proposed solutions focus on increasing information processing capacity—often through formal, computerized information systems. Several authors have argued that computerized information systems often restrict understanding, limit organizational learning, restrict innovation, and blind managers to changing environmental conditions.

Galbraith's work suggests managers have flexibility in meeting information needs. Options are available other than increasing computerized information processing capacity—options that may be cheaper, or may fit better with the hotel's image and/or strategy. In addition, Galbraith's discussion forces recognition of the interrelationships among various elements. A structural reorganization may require changes (increases or decreases) in formal information processing; the creation of slack may decrease the need for formal planning. The installation of a property management system may increase the exceptions that need to be dealt with by mid-management.

There are several research issues that the above analysis generates. Managers have options, but it is to be determined why managers pick the particular set of mechanisms that they do, or what determines the optimal set of coordination and control mechanisms. Unanswered questions include the following:

- What effect do history, culture (both organizational and national) and the idiosyncratic characteristics of management all have on the information processing mechanisms actually used in hotels?
- How does (or should) the type of property, the age of the property, or any corporate affiliation affect the choice of information processing mechanisms?
- How does the economic condition of the property affect the choice of information processing mechanisms? Should a hotel in sound financial condition organize its information processing differently than a hotel in financial trouble?
- What effect does the choice of information processing mechanisms have on employee satisfaction? Are some methods more 'employee friendly' than others?
- What effect does the choice of information processing mechanisms have on guest satisfaction? Are some methods more 'guest friendly' than others?
- What about the interaction between the mechanisms used for coordination and control? Not only might the operation of one of these mechanisms effect the operation of the other, but how does choice of one type of mechanism effect the probability of adoption of other mechanisms? This is perhaps the most difficult topic of all.
The exploration of the differences between the coordination and control systems of hotels could be a productive area for research. An examination of the differences in coordination and control systems in organizations based on such variables as the stability of the workforce, the nature of the firm's competition, or its business strategy could also be productive. In any event, there seems to be ample room for theoretical and empirical research in the area of how managers deal with the question of information processing.

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