Self-Management Information System for the Service Industry: A Conceptual Model

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ABSTRACT: Research suggests the practice of self-management can be beneficial to service operations. However, the self-management concept has received relatively little use in the service industry. This article discusses the concept of self-management in the service environment, identifies some of the critical information requirements unique to this environment, and proposes a conceptual model of an information system that supports the developmental functions and business activities of the self-managed, working in the service industry. The proposed self-management information system (SMIS) promotes self-managed behavior by facilitating: scanning and analyzing the...
environment, setting and contracting goals, monitoring and evaluating work, rewarding or punishing performance, learning new skills, and system maintenance. The SMIS also mitigates some of the barriers to self-management by providing executive management with a control system and by helping to improve the decision-making process of line workers.

KEY WORDS AND PHRASES: decision support in service industry, organizational decision support systems, self-management, self-management information systems.

1. Introduction

ONE OF THE FIRST BUSINESS COMPUTER APPLICATIONS was the automation of transaction processing. Later, management reporting systems (MRS) were developed to summarize and report data collected by transaction processing systems (TPS). More recently, specialized information systems have been developed to address particular information needs and interests. These systems include, but are not limited to, decision support systems (DSS), group decision support systems (GDSS), and executive information systems (EIS). New types of specialized information systems will be developed to meet future information needs and some of these will be created in response to fundamental changes in business organizations. This article conceptualizes such a system.

A self-management information system (SMIS) is proposed to support the information needs of the self-managed in service organizations. A specialized information system, the SMIS would be designed to promote and sustain the developmental functions and business activities of self-managed groups, individuals, and executives. The SMIS is proposed as an instrument both to support and to facilitate the adoption of self-management practices. A midlevel hotel property is used as an example of a service organization that could benefit from the implementation of a SMIS.

2. Self-Management and Service Organizations

This section examines self-management and its potential benefits in the context of the structure and strategy of service organizations. In a review of service-related periodicals, only a small body of literature was found to exist on the subject of self-management. One reason for this finding is that there are relatively few self-managed service organizations to study [26]. The research findings that do exist suggest self-management would be beneficial to service operations, especially where there is high employee–customer contact. As a foundation for the conceptualization of the SMIS, the term "self-management" is defined, the organization of self-managed firms is depicted, and the use of self-management practices in the service environment is discussed. For a more in-depth discussion on self-management, see [6, 23, 24, 28, 46].

2.1. Self-Management Defined

The term “self-management” was originally used to describe the processes incurred
when nonmanagement employees assumed the authority and responsibility previously held by their managing superiors. It was first applied internationally to organizations where employees assumed management functions, and nationally to employee buyouts [12, 17]. Later, the term was applied to a form of participative management, where the self-managed maintained a significant amount of authority and responsibility over work activities, but less control over strategic decision making [19].

The term has also been applied to the individual, in both personal and organizational settings [23, 48]. In this context, it refers to how an individual controls his or her behavior to achieve a set of predetermined goals. In the organizational setting, this suggests a self-controlling process that involves little, if any, high-level strategic decision making.

Because the term "self-management" has many semantic variations, it must be defined within the context of its intended use. For the present purpose, self-management is defined as the self-regulation of developmental functions and business activities within an organizational framework, by groups or individuals. It may involve strategic, tactical, or simple programmed decision making, depending on the situation and the position of the self-managed within the organization.

Creating a self-managed work force represents a major change that requires the cooperation of all organizational members. Although not a requisite, many firms that change from traditional control to self-management also change to production teams. Top management typically remains responsible for establishing the mission and goals of the organization and for supplying resources. However, many other management responsibilities, especially those of middle management, are assumed by the self-managed. This expanded role can be clarified by considering both the developmental functions and the business activities of self-managed employees.

Self-managed teams and individuals must begin by adopting self-managing behavior (i.e., a self-controlling behavior intended to help achieve organizational goals). The processes that promote and regulate self-managing behavior are called "developmental functions" and are central to self-management. Based on work by Manz and Sims [24], developmental functions are defined as scanning and analyzing the environment, setting and contracting goals, monitoring and evaluating work, rewarding or punishing performance, learning new skills, and system maintenance.

The actual business-related work accomplished by the self-managed is called "business activity." Business activities are actions in which the group (or individual) engages to accomplish objectives, as defined by the goals contracted among and between its members, and sanctioned by the organization. These activities can be production- or management-oriented. Using our hotel property as an example, production-oriented activities would include taking reservations, cleaning rooms, and giving guests directions. Management-oriented activities would include scheduling employees, assigning tasks, tracking performance, and evaluating profitability. Management aspects of business activities can be broadly categorized as equivalent to the traditional management activities of planning, organizing, staffing, directing, and controlling.

Consider an example that combines developmental functions and business activities
using our midlevel hotel property. Based on feedback from a team's analysis of customer surveys, the hotel's current competitive environment, and the advice of some self-managed employees, top management determines that a commitment to faster customer service is required. Although the goal was established without the advice or consent of all employees, it appears to be valid and important enough to be adopted as an organizationwide goal. It is then communicated throughout the company.

Each self-managed group has the subsequent responsibility to create a set of subgoals consistent with this (and other) corporate goals. The self-managed teams formed in our hotel property center on the functional areas they serve, and vary in size. One of our front desk teams might, for example, contract to keep waiting lines shorter than six persons. Another front desk team might ascertain that significant phone call delays occur because they do not communicate well with their Spanish clients. The members of this group contract to learn basic conversational Spanish within six months, with rewards for success and penalties for failure.

The teams would specify rewards and punishments appropriate for different levels of performance and management support. For example, if an employee learned enough Spanish to reduce phone call delays, as stated in the goal contract, he or she might receive a bonus. If not, the employee might be required to repay management the cost of tuition. The goals, rewards, and punishments must be created and internalized by the self-managed to properly engage in, and develop, self-managing behavior. The team is responsible for tracking and rating the progress of each member and, ultimately, the effect on phone call delays must be evaluated.

2.2. Organization of the Self-Managed

Three levels of organizational hierarchy normally exist in the self-managed organization: the self-managed, their supervisors, and executive management. At the highest level, executive management is responsible for establishing the mission and goals of the business. They are also responsible for high-level strategic planning and for heavily monitoring the internal and external organizational environments. In self-managed organizations, executive management is typically interfaced with the self-managed via the supervisors. Goals and resources, therefore, are often negotiated with executive management through supervisors.

The potential for reducing management layers as a company incorporates self-management practices is illustrated by figures 1 and 2, which exhibit the traditional and self-managed structures of the rooms department in our hypothetical hotel. The rooms' manager, assistant manager, and night managers have been replaced by self-managed teams, their leaders, and supervisor.

Besides acting as intermediaries, another principal role of supervisors is to encourage self-managing behavior [25]. For this reason, supervisors require a knowledge of group dynamics, sociotechnical principles, technological and task environments, and the ability to develop a member's capacity for responsible autonomy [6]. As information systems become more “intelligent,” some of these roles could be automated, reducing the need for human supervision. This would further streamline the organi-
zation by helping to reduce overhead.

The role of the team leader is usually rotated among its members. The leader assumes many of the coordination and communication responsibilities, previously performed by line supervisors. Responsibilities for planning, staffing, directing, and controlling are maintained by the group.

By assuming management roles, self-managed teams and individuals remove a burden from the company's information system. Much of the organizational control mechanisms become self-managed. In exchange, SMIS programs must be developed to provide feedback and other informational support.

2.3. Self-Management and Service

Although few service organizations engage in self-management [26], research findings indicate that its use is appropriate in service environments. According to Tansik [44, p. 166], “much of the literature on service management stresses the need for high-contact employees to have significant control over their own operations; that is, they should be empowered to act within certain defined constraints.”

Studies have found that practicing self-management in service organizations increases worker productivity [4, 11, 41] and customer satisfaction [2, 49]. The reported benefits associated with self-managed service employees may be attributed to a variety of factors. Self-management may improve service performance and customer satisfaction because it lends itself to work encounters that are variable, uncertain, and complex. Services are often variable and uncertain because they involve customer participation. The type of information processed and the task activities performed by employees change in response to the interaction with their customers [29]. Regulatory functions are more effective when performed by the service providers themselves, because they
are closest to the source of uncertainty [6]. Services are complex because they are multifunctional. In high-contact service encounters, the customer expects the employee to demonstrate managerial and marketing abilities, in addition to production skills [22]. In the traditional organization, not only does it take time to communicate managerial and marketing information up and down the organization, but the communication process invariably loses information.

Self-management may improve service performance because it accommodates dynamic environments. To operate effectively, service organizations must develop mechanisms that anticipate and facilitate change. According to Mills [28], self-management activities are best suited to organic structures and organic structures are best suited to dynamic environments. Several of Garfield’s [11] strategy recommendations for service organizations also allude to this. He suggested, to remain competitive, employees should: plan for change, possess task knowledge, take risks in support of innovation, utilize feedback, set goals, set objectives, achieve results, receive recognition, follow a mission, use teamwork, self-manage, and align their goals with corporate goals (see [9, 39]).

The self-management process may support high achievement by individual service employees. This process tends to assure the self-managed will have access to goals that are clear and relevant. Self-managed employees are more likely to understand the performance standards against which they are to be measured and more likely to understand how these measures relate to goals. Engaging in self-management functions tends to motivate employees and reduce functional ambiguity, leading to higher performance. In addition, the broader responsibilities of the self-managed make their positions more interesting. Self-managed employees often self-select: creating a better match between themselves and their adopted organizations.

Finally, many service industry operations suffer from a lack of knowledge on the part of their front-line employees. To some extent this is due to the heavy reliance on part-time help and high rates of absenteeism and turnover. Frayne and Latham [10] found the adoption of self-management practices reduces employee absenteeism and
tumover. Changing to a self-management style could, therefore, provide a cost-effective means of reducing this lack-of-knowledge problem by increasing employee commitment and participation.

Based on these factors, service operations would seemingly benefit from organic structures with knowledgeable employees operating under a policy of self-management. Research indicates that many service-related problems, such as worker motivation, adaptiveness to customer needs, worker burnout, and quality control, can be resolved by establishing self-management practices. Further, the use of self-management can reduce, or eliminate, the number of people involved in middle management, improve communication, raise service quality, and offer a platform for more creativity and better problem solving [37, 44].

2.4. Adapting Service Organizations to Self-Management

Even though research demonstrates that services would provide fertile grounds for self-management, most service organizations have not adopted it, and many of them would find it difficult to implement. The organizational structure of most service companies is not supportive of self-management practices, employees lack self-management skills and task knowledge, and there is a perceived need by management for firm control.

Of these, the biggest obstacle to the adoption of self-management is management’s perceived loss of control. Service literature abounds with information justifying organizational control over employees and service quality. The primary objective of a control system is to increase the predictability of behavior in pursuit of some desired state [20]. This element provides an impetus for the maintenance of multilayered organizational hierarchies.

The lack of self-management skills and task knowledge on the part of service employees is also a problem. Self-management cannot work properly unless employees possess the skills and knowledge required to perform their developmental functions and business activities.

These barriers are not insurmountable. Addressing service organization barriers to the practice of self-management forms the premises for the proposal of the self-management information system (SMIS). This system would meet the information needs of the self-managed and still provide management with a satisfactory level of employee and service quality control. It would also facilitate the introduction of self-management practices into the organization. The system would make job-specific knowledge more accessible to both part-time and full-time employees. And it would provide a medium to communicate corporate standards while allowing employees the latitude to explore service improvements.

3. The Role of Information Technology in Self-Managed Service Organizations

THE POTENTIAL FOR INFORMATION TECHNOLOGY TO DRAMATICALLY AFFECT SERVICE
activities exists because information processing is frequently an essential component of the service product. Roach [38] estimated that the amount of capital invested in computing and communication equipment for the service industry tripled between 1970 and 1986, and now exceeds that of the manufacturing industry, on a per-worker basis. The complex information needs of service personnel have limited the application of traditional information technology, but new technologies, when used creatively, can provide them with information to make decisions on matters that would have previously been handled by their superiors [50].

Self-managed service employees have particularly high information needs for several reasons. First, information is required to produce the service product [18]. The better, and more complete, the information, the better the product. Second, information is required to negotiate for resources, and the self-managed require resources to complete their business activities. And third, information is required to perform the self-management developmental functions. Carlzon [5] eloquently summed up the role of information when he stated, “An individual without information cannot take responsibility, and an individual with information cannot help but to take responsibility” (quoted in [39], p. 78).

To understand the role of current information system technology and to appreciate the special capabilities of the proposed SMIS, it is useful to compare the information flows and processes of a traditional organization with that of a self-managed one. A diagram of the information flows in a traditional organization is presented in figure 3. This diagram, adapted from Mintzberg [30], decomposes an organization into five parts: the operating core, middle-line management, strategic management, technostructure, and support staff. Arrows flowing horizontally across the operating core represent traditional transaction-processing data supported by TPS (e.g., a checkout is transmitted to housekeeping). Arrows flowing upward from the operating core represent feedback from operations (e.g., number of reservations for the month). When automated, these arrows may represent data flows in an MRS or EIS [27, 42, 45]. Arrows flowing downward from management correspond to instructions, decisions, plans, and goals communicated to those lower in the organization (e.g., budget information). Arrows from management to the technostructure and support staff correspond to inquiries and recommendations. These inquiries help management make informed decisions and play a role similar to a DSS [3, 21, 42]. Finally, arrows crossing the borders of the organization represent communication with the external environment, possibly supported by an EIS.

In contrast to figure 3, figure 4 represents the information flows within a self-managed organization. In a self-managed organization, much of the decision-making responsibility is pushed down the organization to the self-managed, resulting in information flows that differ from traditional organizations. For instance, as depicted in figure 4, most of the feedback information is circulated and evaluated by the team. Although some information is passed to management, the team uses most of the information for its own decision making. A second difference is an increased emphasis on decisions, goals, plans, and self-evaluations flowing up the organizational hierarchy. Information supporting team decision making (e.g., company policy and past
decision-making practices) flows down. A third difference is that the team must have access to the types of information formally associated with management (e.g., external and staff information) [14, 21]. A fourth difference results from the decreased reliance on middle management. Other means of coordinating team decisions and storing decision histories are required. This difference is diagramed in figure 4 by arrows showing coordination information passing from one team to another.

To some degree, the automated information systems that support traditional organizations can be adapted to self-management business activities (e.g., planning, directing, organizing, staffing, and controlling) because these activities are performed by every manager. For instance, MRS can be adjusted to provide feedback to self-managed teams rather than individual managers. This adaptation requires the
Figure 4. Information Flows in a Self-Managed Service Organizational Structure

MRS to provide aggregate information at the team level. It also requires information to be displayed to multiple team members at appropriate times. Similarly, the models and knowledge used in DSS can be employed to support decision making at the team level rather than at the management level. However, none of these systems are designed to satisfy fully the needs of the self-managed and the encompassing organization. As demonstrated in figure 4, information about team decisions must flow up the organization, team goals must be negotiated, additional decision-making support needs to be provided from executive management and corporate staff, information must flow from team to team to coordinate decisions, and information must be available to support the self-management developmental functions.

Generally, the developmental functions are not well supported by traditional computerized information systems. Instead, self-managed employees accomplish these tasks through verbal exchanges, paper journals, and mental notes. This type of support appears to be adequate when individuals are assigned to a small number of roles, but
it is more problematic within the service sector where the self-managed are required to fulfill many roles, often dependent upon the particular customer being served. Support for the self-management developmental functions is also likely to be an important issue in manufacturing organizations, since many manufacturing subsytems have a service orientation [35]. Self-management could be more easily achieved if an information system were designed to support these functions specifically.

4. Self-Management Information Systems (SMIS)

The SMIS would support the developmental functions and business activities of the self-managed, and provide executive management with an acceptable level of control. It would integrate relevant and pertinent data from employees, existing information systems, and the external environment, and interactively present them to the self-managed, in a user-friendly format.

The SMIS would attempt to align the goals of the self-managed with the goals of the organization and then provide the support required to meet those goals. By providing support for developmental functions, an SMIS would encourage good self-managing behavior. Through the negotiation of goals and resources, and the documentation of information associated with functions and activities, executive management can maintain control. The SMIS would initially facilitate the transition from traditional management to self-management, and later fully support the established self-managed organization.

Defining characteristic of a SMIS include:

1. Supports the self-management developmental functions of scanning and analyzing the environment, setting and contracting goals, monitoring and evaluating work, rewarding or punishing performance, learning new skills, and system maintenance.
2. Supports the self-management business activities of planning, organizing, staffing, directing, and controlling.
3. Aligns the goals of the self-managed to the goals and missions of the organization.
4. Provides executive management with control over self-managed teams and individuals.

Desirable properties of a SMIS include:

1. Facilitates the transition to self-management and adapts to support the changing needs of the organization and its employees.
2. Forms an information interface between the self-managed and the rest of the organization, and the organization's environment.
3. Can be readily accessed by all users and is easy to operate and understand.
4. It is used by self-managed employees, supervisors, staff, and executive management.
5. SMIS Technology

A generalized model of an SMIS is shown in figure 5. Self-managed groups, individuals, supervisors, and executive management would have access to the system. The system would be distributed, but served by a central processor/file-server.

The information storage and application software should exist at three levels: the corporate level (e.g., national and regional levels of a multiunit hotel organization), the organizational team level (e.g., the self-managed rooms team for all hotel properties in the chain), and the specific team level (e.g., the self-managed rooms team of the downtown Dallas property). The organizational database should contain both internal and external information. The system would provide access to business planning documents and maintain an organizational bulletin board. In addition to information storage, the SMIS should make programs available as support tools that can be accessed from the corporate, organizational team, and specific team levels.

One possible approach to implement the features illustrated in figure 5 is to construct the system using an object-oriented architecture. Programs and data supporting general developmental functions and business activities could be represented as objects at the corporate and organizational team levels. These objects could then be applied directly or inherited for use at the specific team level. The inheritance feature allows teams to access, combine, and modify these generalized objects according to their specific needs.

6. SMIS Support Roles

To further understand the purpose of an SMIS, it is useful to consider the ideal SMIS from three perspectives. From the perspective of the self-managed, an SMIS should support their newly acquired management roles. The system should help the self-managed develop and record useful goals and their relationships, determine measures for monitoring progress toward goals, and gather information so progress can be evaluated. Once the SMIS helps formulate goals, the system should act as a team’s virtual MRS, DSS, and EIS to support the performance of the team’s business activities. The system should also encourage teams to perform their self-management developmental functions.

From executive management’s perspective, the SMIS should facilitate control. The system should provide documentation to executive management on a team’s specific developmental functions and business activities. The system should help coordinate decisions between teams and across time periods, and provide a medium for negotiating goals.

From the perspective of a self-management advocate, the system should help move the organization from a traditional organizational form to a self-managed organizational form.

Clearly, neither an MRS, DSS, nor an EIS performs these functions. Group DSS (GDSS), organizational DSS (ODSS), and negotiation support systems (NSS) incorporate some of the features demonstrated in figure 4, but the primary emphases of these systems are on collaborative decision making, decision coordination, and
Figure 5. A Generalized Model of the Self-Management Information System
conflict resolution, respectively [7, 13, 15, 31, 43]. An SMIS may incorporate GDSS, ODSS, and NSS features, however, the primary emphasis of an SMIS is to facilitate self-managing behavior. In terms of a classification proposed by Fedorowicz and Konkynski [8], the SMIS could be classified initially as a transformational organizational support system (i.e., a system that helps change traditional organizational structures). SMIS support for self-management developmental functions and business activities is reviewed in the following sections.

6.1. Support for Self-Management Developmental Functions

Self-management developmental functions, as defined earlier, include scanning and analyzing the environment, setting and contracting goals, monitoring and evaluating work, rewarding or punishing performance, learning new skills, and system maintenance. In a traditional organization, most of the developmental functions are performed by one party and directed toward a group or individual working at a lower hierarchical level. In the self-managed organization, the developmental functions are performed by, and directed at, oneself. As previously mentioned, it is primarily the support of the self-management developmental functions that creates the need for a new class of information systems. Some of the developmental functions are discussed with respect to the conceptualized SMIS in the following sections.

6.1.1. Contractual Goal Setting Developmental Functions

Goals of the self-managed must be aligned with goals of the organization. Subgoals are developed internally and controlled by the self-managed, and executive management is not normally involved, except when and where their support is required. These subgoals may relate directly to operational performance or may relate to the development of the self-managed (e.g., learning a new skill useful to the operation). Because goals establish boundaries that influence and control employee behavior, executives will feel more comfortable with self-management when they can be assured that valid, consistent, relevant, and complete sets of goals and subgoals are created.

Setting goals involves the negotiation of resources between the self-managed and executive management, and should result in the development of a goal-based contract by, and for, the self-managed. Communication, the vehicle of negotiation, may or may not be carried out through the SMIS.

One way to support the goal-setting function is by storing goal contracts. Electronic, computer-based, storage has several benefits. First, it provides easy access to goals. Teams and individuals can access organizational goals as a framework to develop their subgoals. Supervisors and executive management can monitor goal setting to determine the type and amount of support the self-managed need. By monitoring goal contracts, supervisors, executive management, and other self-managed teams can facilitate goal consistency. The self-managed can also access past goals from successful teams. Accessing these goals may inspire goal ideas. A second reason for storing goal contracts is to monitor and evaluate progress toward goal achievement. A third reason for goal storage is to support negotiation. The goal contract, subgoals, and
success in achieving them provides important information for setting future contracts. A final reason for computer-based goal storage is formalization. The SMIS would provide a formal mechanism for writing and sharing. The system would help motivate the self-managed to set goals and then facilitate the process. The SMIS, combined with appropriate organizational policy, would also help to assure executive management that goal setting is taking place.

Another way the SMIS could support the goal setting functions is by suggesting general goal categories. For instance, the rooms team at our hotel property might have goal categories corresponding to each activity listed in figure 2. General categories concerning efficiency, customer satisfaction, and employee training might be recommended, and an expert system could be used to enhance these goal suggestion features. The system might further guide the self-managed to create monitorable subgoals that incorporate timetables and performance measurements. The SMIS would store and display potential organizational and team-level goals on a bulletin board, allowing other teams to access them and make comments.

The ways an SMIS would be used to manage the goal setting developmental functions are likely to change over time. Initially, most goals would be set by executive management. Teams and individuals would simply voice their opinions concerning the nature of the goals. Later, the self-managed could set their own goals, guided extensively by the SMIS and monitored by their supervisors and executive management [40]. A mature self-managed team would receive less goal-setting guidance, but still use the SMIS as a means to record and communicate them.

6.1.2. Monitoring and Evaluating Developmental Functions

Progress toward contracted goals must be monitored and evaluated. Both internal standards (e.g., time per transaction, production quality) and external standards (e.g., market reaction) may be required to evaluate progress. Successes and failures are compiled and analyzed by the teams (or individuals) and their supervisors. Evaluations must include the effort, level of success, and the availability of resources agreed upon in the goal contract. The lessons learned would be used to adjust behavior on the part of the self-managed and their supervisors.

SMIS support for evaluating and monitoring would likely include quantitative analysis, qualitative analysis, communication, and storage components. The SMIS would support the self-managed and provide evidence to executive management that the monitoring and evaluating functions are being performed properly. It would also facilitate customizing the monitoring and evaluating components to meet any unique self-management needs. If the SMIS were based on an object-oriented design, these components could be customized by inheriting and modifying the generalized monitoring and evaluating programs from the corporate or organizational team levels.

When the goals, assumptions, and resources of a goal contract are specified in measurable terms, a computer can quantitatively monitor, analyze, and evaluate progress. To perform these functions, an SMIS would access transaction processing data and interact with the control system that supports management activities [1]. Feedback would be provided to the self-managed, their supervisors, and executive
management. Feedback to the self-managed would allow them to evaluate the situation (assumptions and resources) and their own performance. Feedback to the supervisors and executive management would provide control. A major difference between an SMIS and an MRS is that traditional MRS do not provide feedback directly to the employees performing the function.

In cases where goals, resources, and assumptions cannot be quantitatively monitored, analyzed, and evaluated, the system must use other means. One technique is to prompt self-managed teams or individuals for their own qualitative characterization of the situation. These prompts could form a questionnaire that would be summarized and communicated to the appropriate people. One recently developed system automates a questionnaire based upon criteria for the Malcolm Baldridge and President's quality awards [34]. The system automatically generates tabular and graphical reports that help identify areas of strengths and weaknesses. A similar system could provide important input to the evaluating process of the self-managed.

An automated questionnaire could also prompt customers. For example, most hotels provide customers with a questionnaire that surveys service quality. The results are then summarized and sent to upper management. In a self-managed environment, questionnaire results must be sent to the appropriate team or individual. In our hotel example, an automated system tied into each room's television could provide the self-managed with the information electronically. Ultimately, the SMIS would allow each team or individual to form their own questionnaires. When several teams are involved, the SMIS could facilitate the creation of an interteam questionnaire. One way this function could be programmed is by integrating group collaboration software with an expert system specializing in questionnaire development.

Another qualitative tool is the "performance evaluation screen." The purpose of this screen is to prompt the self-managed to evaluate themselves and to support the process. The system would require the evaluator to identify relevant goal(s), identify evidence toward the achievement of the goal(s), and monitor and assess the adequacy of goal progress. This would help document a team’s or an individual’s performance. In addition, the system would provide a historical record to support future planning.

Finally, an SMIS would support monitoring and evaluating through electronic communication and storage. Results from monitoring and evaluating work performance are communicated to team members, their supervisors, executive management, and other teams, and then stored for future reference.

Like the goal-setting developmental functions, monitoring and evaluating are likely to change over time. Initially, executive management would take an active role by monitoring a team’s self-evaluations and by adding evaluations of their own. As they become more confident in the self-managed, less intervention would be required.

6.1.3. Reward/Punishment Developmental Functions

Ultimate responsibility for employee behavior lies with executive management. Self-management works when the authority and responsibility for rewards and punishments are pushed down to, and assumed by, the self-managed. An SMIS should
help the self-managed determine suitable rewards and punishments for their performance, and help document them once they have been contracted. A fundamental element of the self-management process is to include rewards and punishments in the goal contract, for respective successes and failures.

In addition to managing goal contracts, there are several other ways an SMIS could support the reward/punishment function. For example, the SMIS might contain lists of alternatives to help team members make the appropriate reward and punishment selections. The SMIS could automatically adjust the resulting reward or punishment using a sliding scale, based on performance. The function could be supported with budgetary information to help management, teams, and individuals determine feasible rewards. This also enhances executive management’s control.

6.1.4. Instruction/Learning Developmental Functions

The self-managed develop by learning new skills related to the efficient and effective performance of their jobs. In fact, many self-management systems utilized in manufacturing operations use learning new skills as a partial basis of their pay scales. Highly skilled employees are capable of making decisions on their own, while lesser skilled employees may require direction. Training typically includes technical training (e.g., how to make a reservation), management business activity training (e.g., scheduling), developmental function training (e.g., setting goals, quality control) and interpersonal training (e.g., conflict resolution) [47].

Most training instruction is not supported by the organization’s primary information system, although stand-alone computer-aided instruction (CAI) systems are sometimes used. The ability of an SMIS to support some type of learning is likely to be beneficial, especially if its instructional capabilities are tied to an automated evaluation and reward system. While reward systems based on a “pay for knowledge” concept are currently in use, no integrated computer system is known to exist that supports and integrates all elements of self-management CAI into the daily work environment.

6.2. Support for Business Activities

Support for the business activities of planning, organizing, staffing, directing, and controlling must be tailored to meet the needs of each self-managed group and individual. Information is needed to support the service employee’s particular task activity. A hotel’s front desk employee, for instance, requires access to city maps and up-to-date information on local attractions. Hotel marketing employees need access to software to help design convention room layouts. Support for task activities is particularly important in a self-managed service environment because employees perform a variety of roles and may not be specialized in any given area.

Besides task-related support, the self-managed need access to software that supports decision making formerly assigned to middle-management [36]. Scheduling and decision support software, for instance, should be made available. Since many
self-managed are not trained in middle-management skills, this type of software should be geared toward novice users.

Another need concerns support for decision consistency. Decisions normally made by one person, or determined by corporate policy, may be pushed into the hands of several people in a self-managed organization. Consistent customer service is a goal common to service organizations. As a simple example, consider a hotel guest trying to use a weekday special-rate coupon on a weekend. If the hotel is not full, should the front desk employee honor the coupon? In self-managed organizations, the employee and his or her team have the power to make the decision.

Inconsistent decisions, however, can lead to dissatisfied customers. An SMIS might facilitate decision consistency by providing access to organizational policy and historical decisions. In addition, a lodging yield management system (an IS specific to hotels) that recommends room types and rates based on revenue analysis and organizational goals could be tied into an SMIS to promote decision consistency.

It should be evident that the self-managed require some information that was formerly the domain of the company’s executives. For the self-managed to determine how best to support the organization’s goals, they need access to strategic and performance data. Ouchi and Maguire [33] proposed that where uncertainty is high and the cause–effect relationships are not clear, an organization should use output controls, such as customer satisfaction, repeat sales, and organizational profitability to evaluate performance [44]. This information should be presented through the SMIS.

The self-managed environment itself has some special support needs. One is team-to-team communication. In a self-managed organization, strategic business decisions made by one team need to be communicated to and coordinated with others. Because the supervisor’s coordination and communication roles are limited, the use of information sharing systems, such as ODSS and electronic bulletin boards, would facilitate this activity.

If support for business activities is available from another type of information system, there is no need to duplicate it. Since the SMIS design is guided by the needs of the self-managed (who may find it more convenient to include this type of support in a single system), access to other systems could be provided through the SMIS using linking software.

7. SMIS Procedures

In addition to the usual operational, backup, recovery, training, and security procedures, an SMIS would require additional processes to facilitate its usefulness. For instance, procedures must be developed to govern when and how the SMIS should be used. In the early phases of establishing a self-managed organization, when the self-managed are still developing their skills, the use of training modules would be required on a regular basis. Later, when executive management becomes confident that employees possess adequate training, the modules would be used on an "as-
needed" basis.

Other procedures would govern access to data and software. While these decisions are ultimately left to executive management's judgment, an SMIS implementation should follow general practices concerning information access typically found at self-managed firms. Data relating to corporate health, such as financial, production, operations, and strategic information, should be made available to the employees who need it, in a timely manner [46]. Access to information of a more general nature, whether from supervisors, executive management, other teams, or external sources, would be posted on an organizational bulletin board system. Data relating to specific employees, such as stored goal contracts and self-evaluations, should be available to executive management but not to individuals other than those who "own" the data. Wherever relevant information is stored, employees should be made aware of its availability, and given instructions on how to access it. In some cases, the system could automatically alert employees about newly available data.

Access to some types of data and programs would be company-specific and appropriate controls need to be developed at the local business level. For example, political consequences could arise when the self-managed are forced to share information, particularly if they are placed in competitive situations. Another concern that must be dealt with at the local level is job rotation. Because many self-managed systems employ this job enrichment technique, the SMIS would need to rotate software access to support an employee's current role.

Finally, the self-management concept is consistent with an environment where employees would develop some of their own software. Procedures need to be developed to support and document end-user software development to empower employees, while protecting sensitive data.

8. Implementation Issues

The SMIS is a conceptual proposal of an information system designed to facilitate and support the adoption of self-management practices. There is no guarantee that a self-managed organization will be successful even with a full SMIS implementation. Due to the high cost of system development, especially for an untested and unproven system, few businesses would be willing to assume such a risk.

Fortunately, an SMIS does not have to be installed across the organization to be functional. It is possible for one self-managed group or individual, or one set of system modules, to be brought into the operation at a time. For instance, the monitoring and evaluating module could be implemented first to provide performance feedback. This incremental approach would allow the SMIS experiment to proceed at a cautious pace. Performance results could be measured and compared with the equivalent nonself-managed entity. In this fashion, the SMIS could be developed, tested, and tuned for optimal performance, at a minimum risk to the organization.
9. Directions for Future Research

BECAUSE A CONCEPTUAL MODEL HAS BEEN PROPOSED, all areas of design and development are open to research. Many different approaches may be used to research the proposed SMIS. Two major areas of interest include information needs analysis and system design.

Case studies documenting the information system needs requirements of actual self-managed organizations would significantly benefit SMIS development. The requirements analysis should be longitudinal because the nature of self-managed groups and individuals changes over time [32].

After analyzing the information needs of a self-managed organization, systems must actually be developed to support developmental functions and business activities, align the goals of the self-managed with those of the organization, and provide executive management with control. While constructing and implementing an SMIS, many research questions can be proposed. For example, how can a system be constructed to support goal development simultaneously within and across teams? What is the best architecture for a system that allows each team to build individualized monitoring components? Who will manage the SMIS? Who will decide what data to collect? How will the special security needs of the SMIS be handled?

Research also needs to be performed on the implementation and testing phases of the software developmental life cycle. Once SMIS have been implemented, they should be compared with self-managed firms that use traditional information systems.

10. Conclusions

SELF-MANAGEMENT PRACTICES PROVIDE AN ALTERNATIVE METHOD for service organizations to deal with the uncertainty, variability, and complexity often found in their business environments. To integrate the self-management concept into the service organization, structures and strategies must be altered to provide support and control. An information system that supports the developmental functions and business activities of the self-managed, and aligns their goals to the organization's goals, could help the organization move toward self-management.

The potential for the development and application of a self-management information system currently exists. Hypothetically, the SMIS would be attractive to the organization because it has the potential to increase performance, reduce overhead, and unify the way members perceive their organizations. It would be the intent of the SMIS to empower the self-managed and allow them to tap into their CEO's mindset to maintain an alignment with the organization's goals.

Table 1 summarizes the elements that distinguish an SMIS.

The use of intelligent system designs allows service organizations to create information systems that "humanize" the transference of knowledge to the front-line employee. Employees who are empowered by the organization, and its information systems, will be better able to satisfy the customer, and satisfying the customer is what service organizations are all about.
Table 1  A Summary of SMIS Characteristics

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary purposes</td>
<td>Support self-management developmental functions.</td>
</tr>
<tr>
<td></td>
<td>Support self-management business activities.</td>
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<tr>
<td></td>
<td>Align goals of the self-managed with those of the organization.</td>
</tr>
<tr>
<td></td>
<td>Provide a control system for management.</td>
</tr>
<tr>
<td>Primary users</td>
<td>Self-managed. Supervisors. Staff. Executive management.</td>
</tr>
<tr>
<td>Primary output</td>
<td>Suggestions. Graphical presentations. Reports. Communications.</td>
</tr>
<tr>
<td>User interface</td>
<td>Easy to use and graphical.</td>
</tr>
<tr>
<td>examples</td>
<td></td>
</tr>
<tr>
<td>examples</td>
<td></td>
</tr>
</tbody>
</table>

Dimensions adapted from Millet and Mawhinney [27] and Turban and Schaeffer [45].

REFERENCES


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