

2001

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Recommended Citation

Kung, Mabel T. and Naslund, Dag (2001) "A value-oriented model in technology for business personnel," *Journal of International Information Management*: Vol. 10: Iss. 2, Article 8.

Available at: <http://scholarworks.lib.csusb.edu/jiim/vol10/iss2/8>

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A value-oriented model in technology for business personnel

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ABSTRACT

In this paper a process-based framework is presented for end-user development of software applications. The paper discusses the changes of the education of systems for general users to design their own systems. Guidelines and people issues identify ways to help traditional users in developing systems computing to be successful.

INTRODUCTION

Process Management has been focused in management for over a decade now. While many definitions of processes – or business processes – exist, they are similar in nature and focus. Examples of definitions from some of the more prominent process authors are:

- "a structured, measured set of activities designed to produce a specific output for a specific customer or market" (Davenport, 1993, p. 5).
- "a complete end-to-end set of activities that together create value for a customer" (Hammer, 1996).
- "... a logical, related, sequential (connected) set of activities that takes an input from a supplier, adds value to it, and produces an output to a customer" (Harrington et al., 1997).

Keen and Knapp (1996) mean that two broad movements can be defined. One is those who regard the process as a workflow, a series of activities aimed at producing something of value. The other movement are those more focused on the coordination of work including aspects such as skills and routines. These are focused since they can create a capability that cannot easily be matched by others.

In order to try to clarify the concept of process in greater depth, some authors have identified categories of processes. Biazzo (1998) for example, differentiates between the following types of processes: management processes (through which resources are planned, managed and controlled), core processes (vital for the firm's functioning and which directly affect the external customer) and support processes (which have internal customers and which are, effectively, the back-office of the core processes).

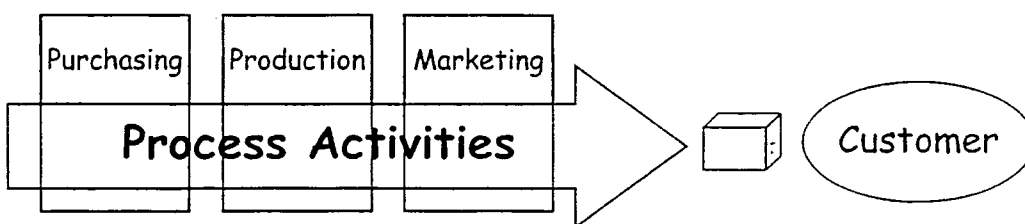
Rentzhog (1998, pp. 31-32) is questioning the value of forcing processes into categories. While it can be useful to improve communication, it can also stress unnecessary differences. In Rentzhog's opinion, there is little value in categorizing processes. It is more valuable to recognize the similar structure of processes, and that process management tends to be similar, regardless of process category. It is the general idea of process orientation – as opposed to function orientation – that is important.

A function is a specified type of activity applied to a product or service moving within an organization. Functions are described in the typical hierarchical organization chart, which in effect breaks down functions from the chief executive officer of the organization through the successive layers of management to the individual worker (or team) who touches the product, or who faces the customer. As work crosses functional boundaries, internal suppliers and internal customers are created, and responsibility for the resources and controls applied to the work changes hands. The functional advantage is that its structure simplifies employee supervision and training as well as managerial control.

However, function oriented organizations tend not to be effective and efficient since they see activities and individual tasks in isolation – not the broad picture. When that happens, the result can be people and functions working for cross-purposes, producing misunderstandings and sub-optimization. Although the processes implicitly exist, they tend to be sub-optimized to fit organizational structure. Thus, it is better to organize work after the processes (Davenport & Short, 1990; Hammer, 1990; Rummler & Brache, 1991).

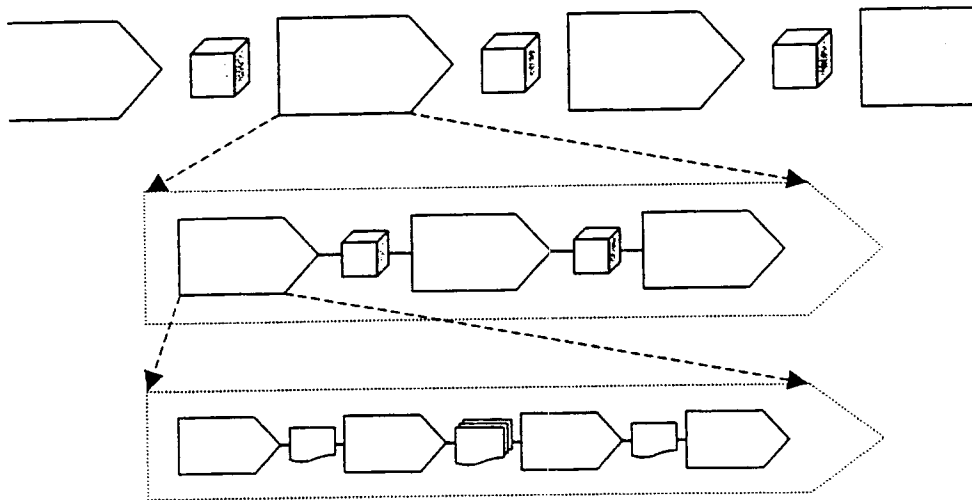
A process refers to the flow of work through an organization's activities. Along the flow, value is added at each activity through a series of transformations involving the consumption of resources. The main components that are included are input, the activities in the process (activities aimed at producing something of value), output/product¹ and the customer. The activities are designed to produce an output – a physical product and/or service – for a customer, as illustrated in Figures 1 and 2.

Figure 1. A Traditional (Operational) Process Perspective



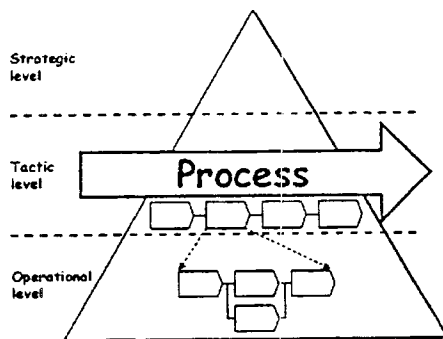
¹ Product should be understood in a broad sense including physical product and/or service.

Figure 2. A Traditional Perspective -- Process at Different Levels
 (e.g., sub-processes, activities, tasks)



This relatively traditional perspective on processes has a clearly operational focus. However, strategy and processes are connected (Näslund, 1999). Thus, process management (e.g., coordination of skills and routines and the sequence of activities in a flowchart) can create a competitive advantage. A second perspective on processes is therefore a hierarchical perspective (or top-down and bottom-up perspective). In this perspective, the role is to bridge the gap between strategy and operations at the tactical level of organizations by facilitating the translation of strategic goals into process goals and then operational goals, as illustrated by Näslund (1999) in Figure 3.

Figure 3. A Hierarchical Process Perspective
 (or top-down and bottom-up perspective)



The essence of strategy is to define the organizational role and to define the strategic direction. In this perspective strategies are visions and not detailed plans. To facilitate the translation of strategic vision into meaningful operational language, the most important processes can function as bridge. Within each process the visions can be specified to the desired level of detail. Using processes as the tactical level, strategy provides direction for operational activities, direction for efforts to change and improve. Process goals guide operational activities. Process goals are also needed to establish a basis for prioritizing. Thus, at this level, sub-optimization may be avoided by relating operational activities to process goals. This can give employees the opportunity to refine routines and activities.

Using this model from a systems perspective, the end user is typically working with some sort of task. Ideally this task is adding value to an activity. This activity should add value to a process output, and the process should be vital to the organizational strategy.

However, while the end user tend to have excellent knowledge of day-to-day operations and what is needed in these operations, he/she may not have full understanding of the process goals and how different activities together add value to the process output. On the other hand, management tend to be withdrawn from day-to-day operations and may not fully understand the details at each task level.

The problem arise when the end-user recognizes a clear need for some sort of improvement or development, yet since he/she may not have knowledge of the bigger picture, this improvement may cause sub-optimization of the system. In other words, the improvement may help at task level but not at process level.

However, and this is our point, if end-users understand the systemic picture and the connection between strategy, processes and operation, then end-user development of systems can be a valuable tool for organizational improvement and efficiency. Then, this form of development will not cause sub-optimization of processes. On the contrary, organization can use standard forms of software, and still create unique solutions at end-use/task level.

Some practical examples are presented from work with quality and process improvement from public sector organizations in Sweden. In the first organization, quality improvement initiatives were started at central level within one municipality. However, after some initial pilot projects and training, they could not decide on formal format for the continued project at central level. On the other hand, within one department, the quality ideas were rooted and several individuals (end-users) wanted to continue the project. They were aware of the importance of a common approach for the entire organization, yet they wanted to further analyze and solve some local problem on the very operational level. The solution here was that they created their own quality circle, their own application for analysis and clearance from management before any actual implementation of changes in routine. They understood the conceptual bigger picture, and thus also the limits for their own project.

Similarly, in the organization, the project leader for process mapping and analysis moved a lot faster that top management of the organization in terms of understanding needs for the next steps in the project. In this case, top management could not decide on the suitable software for a

structured approach to process mapping, analysis and then improvement. The project leader felt a most struck since without proper mapping of the processes it would be difficult to show the flow of activities and thus also some of the main problem areas. His solution here was to develop his own Excel application to map processes. He understood that his was a temporary solution, yet needed at this particular point. In our opinion, this is a classic example of successful end-user development within a process based framework.

END USER VALUE-ORIENTED MODEL

The value of the end user computing depends largely on the quality of the use to which it is put. Most managers focus on the personal computer or word processing workstation itself, wringing their hands and wincing, if only internally, when they witness the equipment sitting idle. Operations have been changing, pressure to decrease costs has led to downsizing of data centers, reductions in programming staff for development, fewer resources for maintenance and an overall push to move computing power out to the users. Instead, these managers should be asking: "How much more value can the organization create, in a given period of time, with the end user computing as opposed to without it?"

What follows is a framework, or a value-oriented model which addresses interrelated problems through the value of information technology. This model is designed to address questions such as, "Does the business strategy exploit end user computing?"; "Does the end user computing promote the business objectives?"; "What are the benefits?"; "At what cost?"; "Does the end user computing work?"; and "Can the business operate without the end user computing?" The assessment starts with Level I as the lowest stage with each level dependent on all lower levels.

<u>Level</u>	<u>Issues</u>
IV Transformation	New Business Doing Business Differently Sustainable Advantage
III Business Linkage	Alignment/Organization Service Level/Support Flexibility/Responsiveness Benefits Measurement
II Economic	Applications Development Production Support/Maintenance Overheads
I Mechanical/Physical	Functionality/Capability Reliability Connectivity

Level I: Mechanical/Physical

Naturally, the first, and most elementary question is: Do the hardware, software, and communications do what they are supposed to? With respect to personal computers and word processing equipment, at least, this is not a major concern today, at least for stand-alone systems. The significant problems at this level today have to do not so much with individual systems, but more with integrating multiple systems from a variety of vendors.

Software vendors have responded to this dilemma by aggressively developing products and services to meet the demands of both the systems personnel and end users. They have embraced new technologies such as distributed processing, client/server architectures and relational database technology. But more importantly, they have developed new systems that provide end users with the ability to maintain, enhance and run their own systems without constant involvement and assistance from the systems department.

Level II: Economic

Once the end user computing works as it is intended, it must do so at an acceptable cost. Most companies -- even most of the best companies -- have absolutely no idea how much their end user computing costs. Of course, end user computing managers and purchasing managers do have good, up-to-the-minute information on how much the next system will cost to acquire. The problem is, once the systems have been acquired, nobody keeps track of the end user computing assets as a separate category, aside from office equipment or sometimes, furniture. This often has to do with the structure of the company's chart of accountants. In the scheme of things, these technologies are still relatively new, and accountants absolutely hate to change the chart of accounts.

Even where all the hardware and software costs are tracked regularly and carefully, companies often stumble on the scope of costs associated with the end user computing. Most important, training and support costs are almost always underestimated or, worse still, ignored. These costs, combined with the cost of the users' own time, turn out to be much larger than the initial cost of the hardware and software.

Level III: Business Linkage

The third layer addresses whether the end user computing is being used in ways which promote the company's objectives. The chief question here is whether the end user computing is deployed most intensively, where it can best leverage the organization's ability to create value. Too frequently, end user computing gets deployed strictly along organizational lines, without much regard for the fact that end user computing, like any other tool, has more value in the hands of certain groups or individuals.

The issue of business linkage also involves hardware and software selection, as well as training and support. In particular, there is a strong, natural tendency for central information systems organizations to limit the end user computing choices from which user organizations can

make selections and receive support. While this approach helps the information/systems managers hold down their budgets, if taken too far it can seriously reduce the end user computing leverage for a particular business or unit.

Level IV: Transformation

The final layer focuses on whether the business strategy has been conceived and implemented in ways that take advantage of the opportunities provided by the end user computing. Doing things the same old way is comfortable, and often seems to entail less risk. But just as fundamental changes in the corporate environment have given rise to the wave of restructuring, dramatic advances in end user computing technologies are enabling fundamental changes in the ways work is structured. Because some managers are unwilling to embrace substantial change to the internal culture, many of these companies are overlooking opportunities to eliminate vast amounts of paper-shuffling, along with the associated costs and risks to quality. In retrospect, end user computing enables new organizational reporting relationships. In this age of restructuring, end user computing supports the need to move away from conventional hierarchical structures to more relational organizations, with fewer management filter.

SYNTHESIS

Business linkage and transformation are the most crucial levels. As the most successful deployers of end user computing have found, not moving up from the lower two levels of the model is analogous to manufacturing a product, shipping it to a warehouse, and then waiting for potential customers to notice it is there. Put simply, products alone do not deliver value; customers do.

In any business, it is the customer who eventually determines the product value, sets a reasonable price and establishes marketplace demand. It is the customer who controls cash flow into the organization and, thereby, drives shareholder value.

For information systems management, the customer is the end user, and the marketplace may be the business divisions or functional groups within the enterprise. It is the organization's end users who will, therefore, ultimately determine the value and return on the end user computing investments.

Consequently, the focus of management must shift from the traditional comfort zones of Level I and II – technical standards and acquisition control – toward the end user and the organization's business strategy. Of course, Level I and II issues must also be addressed appropriate if the benefits of Level II and IV are to be realized. A key element for evaluation process has been working session with end users to get their input on how well the current computing environment meets the real needs of their businesses. End users may hold the technical expertise of their information systems organizations in high esteem, but consider it of limited value when that expertise is not applied to their business in ways that not only work technically, but add significant value.

Today's dynamic environment has no place for the drawn-out, form-driven, bureaucratic planning process and thick planning documents. Instead, the alignment process is based on frequent, structured dialogues between the information systems management and end users, and great care is taken to ensure that the discussion gets beyond the "gripe session" level. Findings from these meetings and subsequent surveys have been somewhat surprising and enlightening for the information systems management. As a direct result of these efforts, some businesses can be identified as "under-served" and others as "over-served."

Adjustments can be made to both resource allocation and support levels, resulting in both cost saving and revenue enhancement. Further, emerging opportunities for high-value applications of the end user computing can be uncovered, particularly in the areas of marketing and sales.

This approach enables the information systems organization to enter into a partnership with the end users. Equally important, by focusing on Business Linkage (Level III) and Transformation (Level IV) issues, the connection between the end user computing and shareholders value has been clearly established. Finally, end user managers now have responsibility for both their business unit's performance and shared responsibility for the end users who support it. For their part of the partnership, the information systems managers play a supportive role with respect to end user computing applications, and serve as the keepers of the corporate standards.

CONCLUSION

There has been enough experience with end user computing to know that there are not general solutions to all the problems. End user computing is one more way to get information to the people who need it. When considered with application packages and prototyping, end user computing provides another option for management to break the systems development bottleneck.

Users still must be actively involved in identifying needs and in taking responsibility for many aspects of implementation and ongoing maintenance. The price of user ownership is hands-on involvement in all aspects of its operations. Machine implementation falls to systems professionals, who are best able to address technical issues of platform conversion and systems modifications.

The management of the new information based company is the entrepreneurial spirit through end user computing. Exchanging and distributing knowledge allow people at the line levels more aggressively setting their own direction and objectives. Individual managers feel more control and satisfaction with the end product to resolve issues on their own. Mentoring opens wider communications between the systems personnel and levels of employees closest to operations, customers, and their associated problems. Such strategy continues to encourage the creativity and team cooperation in the business functions of the company and ultimately the systems achieve usability from the people who design and develop themselves -- the end users.

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