

# ORGANIZATION STRUCTURE, INFORMATION FLOWS AND DECISION MAKING

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## ABSTRACT

The author looks at defining the management process as an open system of information flows and decision making. An organization, through its planning and budgeting processes, establishes a certain capacity for making decisions at different levels. This capacity is affected by both errors in the information flows and decision making, as well as the time and frequency of the processing. In this article, the author chose to focus on the time and frequency risks of the organization's capacity to make decisions. A hypothetical example was used to see if simulation analysis techniques were useful in assessing such risk. The example demonstrated the usefulness of such techniques in the example and the identification of actions to reduce the risk of exceeding the organization's decision capacity.

## INTRODUCTION

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The subjects of management and organization theories have consumed academics and business leaders for nearly a century. As companies have grown in size, complexity and geographic reach, the search for answers for "how to....." has spawned consulting industries, ideas and solutions filling libraries, and uncountable hours of training. The fact that the topic continues to attract prolific works of art and science is a testimonial to the complexity of the problem. In some ways, it may be analogous to wondering how the Universe works; a topic discussed from the philosophical to subatomic levels. In a similar way, perhaps, approaching the subject under the belief that less is more may be helpful. Physicists have developed a "Standard Model" to unify the theories of Relativity and Quantum Mechanics that may explain

how the Universe works at the most fundamental level. Maybe it's time to try a similar approach to management and organization.

What do managers do? For a long time, we have said they plan, organize, control motivate, etc. We have studied how to manage knowledge, how to manage technology, how to manage information, how to manage customers' expectations, and almost every order of macro-management thinking. What is management at the nuclear level? Will addressing this issue help us in any way? Why have the developments in Information Technology had such a dramatic effect on management practices over the past two decades? In Rayburn (1), I proposed a new definition of management. Management is simply:

Getting Information    ■ ■ ■    Making Decisions    ■ ■ ■    Giving Information

We can look at management as a process of discovering the truth. In a perfect world, we have enough information to discover the truth and the decision is self-evident. While the truth may not change, the path to discover it is always being altered as the world is changing. If the truth were easy to discover, we would all be rich, self-fulfilled, etc. and the world would be living in peace and harmony. Why do we fail?

1. Wrong information
2. Incomplete information
3. Incorrect analysis of information
4. Inability to analyze information

Obviously, we will also fail because of someone's evil or selfish intentions and direct subversion of the management process. There is also a cost/benefit trade-off to gaining more information (which is also part of the info/decision process). Errors in this process abound. Also, if it is not already obvious, let me state that my view of management is that it is fundamentally a communications process. The decision part of the process is generally an internal function (except for customers and regulators), whether that is taking place inside a person or a machine. Also, the management process is an open system; getting information is part of the feedback loop. The feedback loop is perhaps where Information Technology has had its greatest impact (coupled with decentralization). The system is scalar: it operates from the individual to the entity level. Today, connectivity and software give individual investors access to on-line and near-real-time information and tools to manage their investment portfolio that was only available to corporations and the rich a decade ago. Connectivity, software and remote sensing technologies give corporations the ability to manage in real-time geographically distributed assets.

People are geographically distributed assets in organizational space. Organization structure establishes the decision making nodes and information flows necessary to make and execute decisions. Traditional

views of organization structure focus on decision authority (the old line job), a little on information gathering (the old staff job), and the reporting relationships of people who make or advise on decisions. The early views of organization structure took a functional perspective. As products became more complex, time-to-market cycles shorter, geographic reach broader, and the cost of failure greater, teams evolved to improve the communications processes. However, the view of organization structure as people reporting relationships ignores the information flows outside the boundaries of the organization and the informal information flows inside the organization necessary to make better decisions. Many times, it is these information flows that are the most critical to success (customer wants, regulatory restrictions, supplier shortages, etc.). It is interesting to note that formal job evaluation processes do make a distinction between internal and external contacts on behalf of the organization. They also look at decision making complexity in some descriptive way, as well as knowledge and skills. However, the organization structure is still defined in terms of reporting relationships.

This means the capacity of the organization to make decisions is defined in terms of reporting relationships. Perhaps this would not be a problem if the real world were a stable environment. However, we know events such as September 11<sup>th</sup> and E1 Nino can introduce incredible instability and tax an organization's information flows and decision making ability beyond its capacity limit. Help in terms of technology (e.g. information databases) and people (e.g. experts) resources are then frantically sought to cope with the situation. What is the risk?

Let's look at a hypothetical situation. But first, let's try to classify decisions and the related information flows into four categories:

1. Data — measured or observed points in information space

2. Information interpretation or understanding of the data
3. Knowledge — integration of information into a reliable/replicable pattern
4. Wisdom integration of knowledge into broader paradigms

As you can imagine, the process gathering data, deciding if it is relevant or not, and passing it on to someone else is rather short in many cases. It is in this area, perhaps, that technology has made the greatest productivity gains. To format the data in a trend or some pattern and decide what that pattern is saying requires more time, and so on. Let's look at an illustration:

- Gathering weekly product sales figures is a data process
- Deciding whether sales are going up or down and at what rate is an information process
- Deciding how the trend in sales relates to market and economic cycles is a knowledge process

- Deciding whether the knowledge gathered represents a fundamental paradigm shift in purchasing behavior is a wisdom process.

On one hand, competitive forces and technology are accelerating the reduction in time frames in which these processes occur. On the other hand, our understanding and sophistication expand the complexity of the processes. As we move up the traditional organization hierarchy, we expect to see a shift away from data gathering to information processing to knowledge management to wisdom in the organization's strategies from a time management perspective.

We can look at any logically integrated organizational decision making process (e.g. what are our compensation strategies or what are our product and market strategies). We can break down the process into activities that fall into one of the four classes of decisions described above, and we can measure or estimate mean times and standard deviations for each decision point. This is what happens in a classical project management context. In our simple hypothetical case, let's suppose the following:

	Decisions Mean time in hours	Standard Decisions	Decisions per Month Average	Standard Deviation
Data	0.05	0.05	20000	5000
Information	0.5	0.5	500	100
Knowledge	4	4	150	50
Wisdom	12	6	20	5

From the data above, we see there is considerable variability in both decision making time and the number decisions that are made during the monthly period. However, on average the process requires 2090 man-hours per month, as follows:

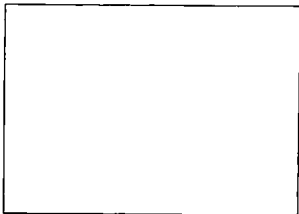
Data gatherers	1000	hours
Information assemblers	250	hours
Knowledge interpreters	600	hours
Wisdom developers	<u>240</u>	hours
<b>Total</b>	<b>2090</b>	

The question is whether there are enough resources with the right knowledge and experience to make all these decisions. Resources are both human and technological. Managers are always focusing attention on improving efficiency, but tend to focus at the man, machine or physical unit of resource level. Is something or someone fully utilized or not. Capacity at the manufacturing level is carefully measured. Capacity at the management decision making process level may only be talked about in some general way as it relates to the manpower planning part of the budget making process. What then is the risk that management will run out of decision making capacity.

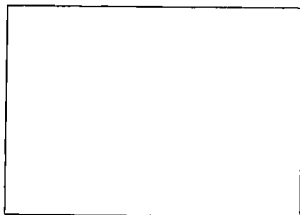
stressing the organization and increasing errors because the quality control process over decisions deteriorates? We can use simulation technology to get some idea. Without specific consideration of error rates, we can run a simulation to see the potential variability just in terms of time demanded from the organization to complete a decision making process as described above.

In our example, we will assume the distributions for mean time to complete a decision and the number of decisions to be normal. Our simulation will be run with 500 iterations. Using @Risk, the distribution of our input variables looked like:

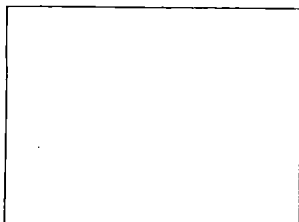
**Data – Time to Acquire**



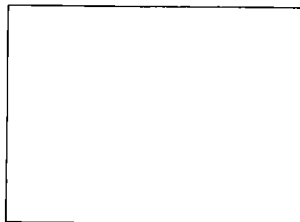
**Data Acquisitions per Month**



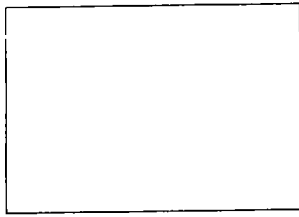
**Information – Time to Complete**



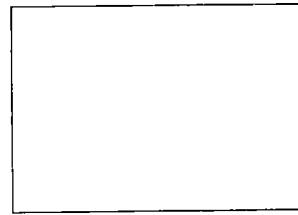
**Information – Frequency per Month**



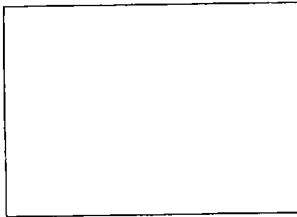
**Knowledge – Time to Complete**



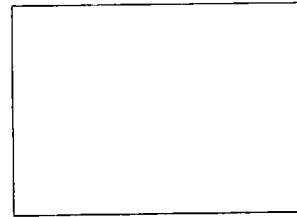
**Knowledge – Frequency per Month**



**Wisdom – Time to Complete**



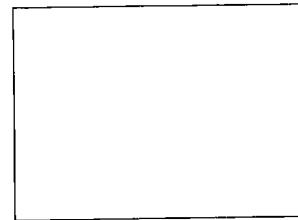
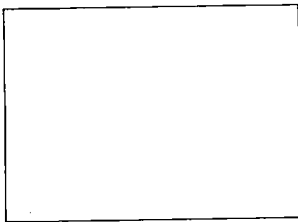
**Wisdom – Frequency per Month**



The distribution for the output of total time appears as follows:

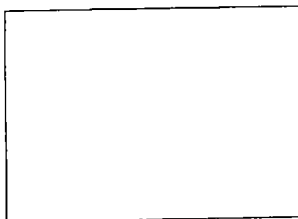
**Data**

**Total Processing Time (in hours)**



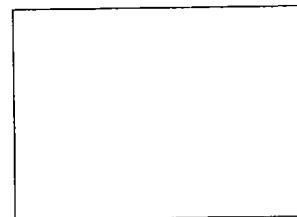
**Information**

**Total Processing Time (in hours)**



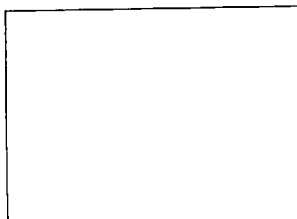
**Knowledge**

**Total Processing Time (in hours)**



**Wisdom**

**Total Processing Time (in hours)**

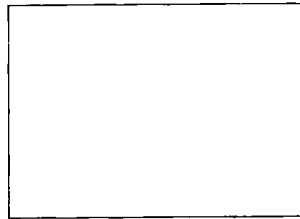


**All Decisions**

**Total Processing Time (in hours)**

Summarizing all four outputs and the total hours, we can see the following:

**Total Time**  
**Data, Information, Knowledge, Wisdom, And Grand Total (left to right)**



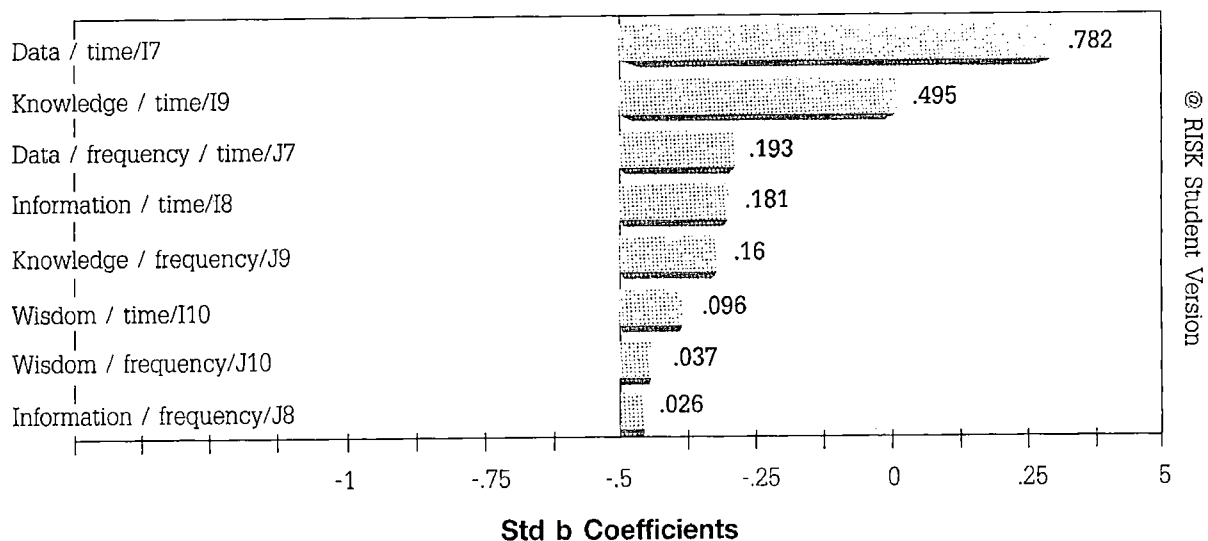
Obviously, we are less concerned about the downside risk (more time for golf) than the upside. In our hypothetical example, if the company wanted to be confident that in 90% of the time it would be able to assemble all data, interpret all information, integrate all knowledge, and make the wise strategic decisions in a manner consistent with its normal quality control processing patterns; then, it would need to be able to double its decision making capacity in terms of hours very quickly. This may not be feasible.

In our hypothetical example and as we look to minimize risk, we would like to know which of our input variables have the biggest influence over the output of

total time. @RISK creates a beta coefficient for each input variable. This measures the number of standard deviations the input variable increases when the output variable increases by one standard deviation. From the chart below, we see that increasing the time it takes to gather data per unit by one standard deviation would increase the grand total decision time by .782 standard deviation. We can also see that by increasing the knowledge integration time by one standard deviation, we increase the grand total time by .495 standard deviation. We would choose to focus our priorities on how to reduce the data gathering time and the knowledge integration time.

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**Regression Sensitivity for Total organization**  
**time/Dev...**



We might look at accessing more databases, capturing more information, knowledge management and knowledge mining technologies. We might also look at training our managers to increase their skills in analyzing and interpreting information. We might acquire decision support software to reduce decision cycle time and errors.

In summary, we have looked at management as a process of getting information, making decisions (even what data should be gathered), and giving information. We ignored the qualitative aspects of decisions (error rates) and focused on unit time and frequency to assess risk in an organization's capacity to make decisions. In a hypothetical example, we demonstrated the ability to measure the risk, identify and develop strategies to reduce it. The next step is to apply the techniques to a real company and explore more sophisticated models incorporating the qualitative aspects of information flows and decision making.

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## REFERENCE

Rayburn, Ernest W., "The Next Definition of Management". *Journal of Global Business Review*, vol. 1, January, 2002, page 56, Graduate School of Commerce, Burapha University.