

Principles for Applying Information Technology

SUNY Maritime Notes on Building a Management System

Principles for Applying Information Technology

- The only legitimate uses of information systems are to improve the performance of the enterprise.
- Information systems are inextricably intertwined with the mission, objectives and structure of the enterprise.
- Disciplined approaches to applying information systems are critical to success.
- Information systems are technology plus process plus tools plus skills plus culture.

1/10/2005 TMGT 7300 Transportation Management 13

Figure 1 Information Technology Principles¹

The principles presented above have emerged from my experience of more than 40 years in the practical application of information technology to business. Appropriate return on the investment in information technology is usually gained when these principles are applied. Appropriate return is usually problematical if any of these principles are not applied.

The first of these principles rests upon mechanism for assessing performance of the firm. One mechanism might, for example, be adapted from the Balanced Scorecard.²

¹ This note is based on J. Drogan, Note on Building a Management System, January 12, 2005.

² Kaplan, R. S. and D. P. Norton (1992). "The Balanced Scorecard - Measures That Drive Performance." Harvard Business Review January-February 1992: 71-79.

Augmented balanced scorecard.

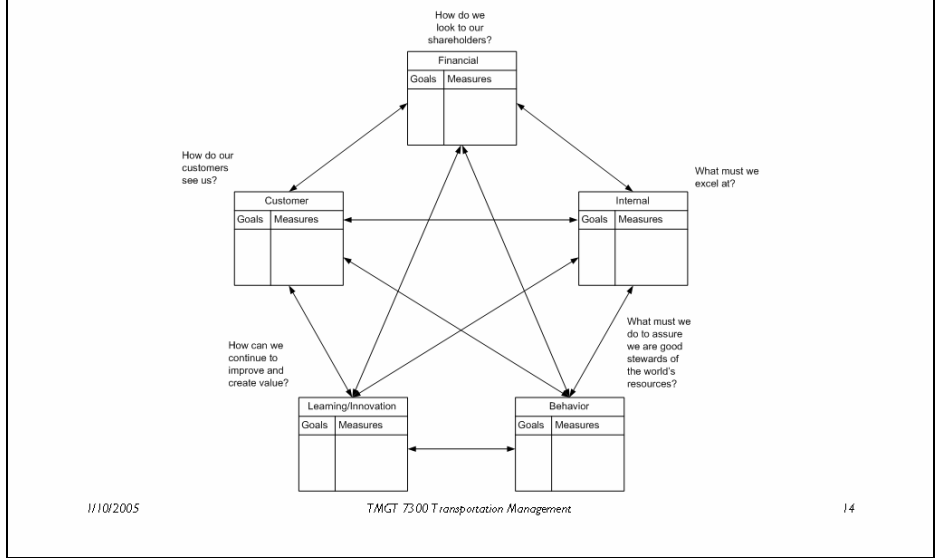


Figure 2 Augmented Balanced Scorecard

Suppose our firm has decided that these are the five major areas by which success will be measured. Any investment in information technology must, therefore, result in an overall improvement in the performance of the organization as measured by the criteria shown above. The implication is that before steps are made to deploy information technology, the criteria for success and the method by which success will be measured need to be understood.

The second principle states that one cannot be assured of effectively applying information technology to improve the performance of the firm unless one knows how the firm works. Essentially, one is trying to answer the question of how the organization makes decisions in order to turn its inputs into its outputs.

Here is an example of the form the answer to the question might take.

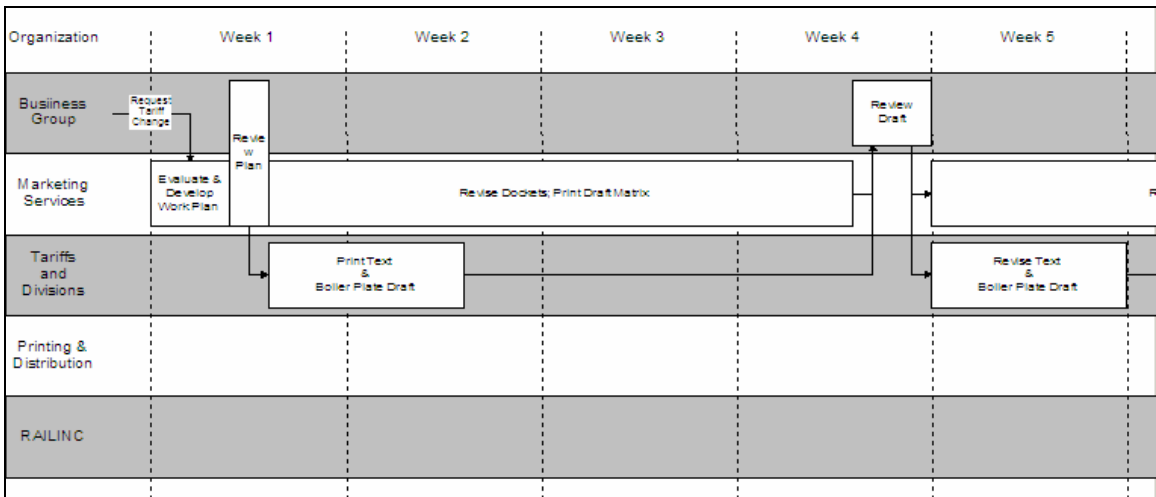


Figure 3 How an Organization Works

The departments involved in a portion of the way this organization works are shown as bands across the diagram. The processes executed by these departments are shown as blocks connected by arrows.

Time, weeks in this case, is added to the diagram. Hence, one can see how the organization works, who is responsible for the processes, and the amount of time it takes to get something done.

The third principle says that a systematic approach for the application of information technology needs to be brought to bear.

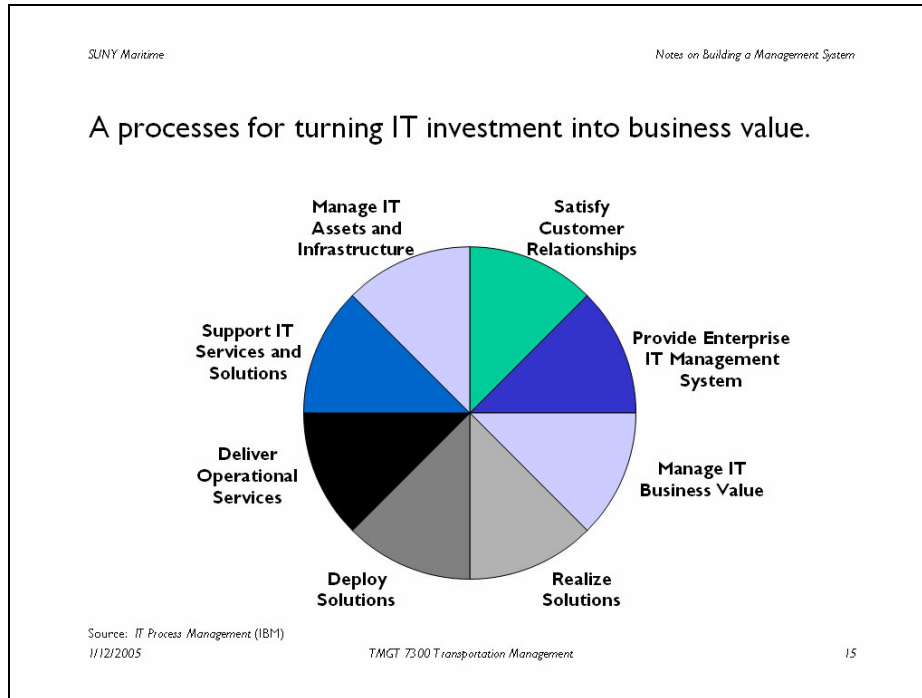


Figure 4 IT Process Management

Just as we need to know how we will measure success before we begin an information system project, we also want to have in hand a mechanism for managing the information technology investment process.

The final principle is that information technology is increasingly less about the technology and more about process, skills, tools, and, most interesting and important of all, culture.

There is a real need to understand the impact of global cultures on our businesses.

Project GLOBE provokes us to understand how cultural differences affect what we do as a business

| <i>Dimensions of Culture</i> | <i>Cultural Groups</i> |
|------------------------------|------------------------|
| • Assertiveness | • Anglo |
| • Future Orientation | • Arab |
| • Gender Differentiation | • Confucian |
| • Uncertainty Avoidance | • East Europe |
| • Power Distance | • Germanic |
| • In-Group Collectivism | • Indigenous Africa |
| • Performance Orientation | • Latin America |
| • Humane Orientation | • Latin Europe |
| | • Nordic |
| | • South Asia |

Project GLOBE http://www.ucalgary.ca/mgt/GLOBE/Public/Link/Lessons_project_globe.pdf

11/10/2005

T.MGT 7300 Transportation Management

16

Figure 5 Consideration of Culture

I'm reminded here of the statement that "Systems aligned with human motivational factors will sometimes work. Systems opposing such vectors will work poorly or not at all."³ Business systems are all about alignment. It seems prudent, therefore, to consider how the dimensions of culture affect our business and hence our business design and hence our use of information technology.

Consider, for example, the Power Distance dimension of culture.

Project GLOBE defines Power Distance as:

*"Power Distance is defined as the degree to which members of a society expect power to be unequally shared. It represents the extent to which a community maintains inequality amongst its members by stratification of individuals and groups with respect to power, authority prestige, status, wealth, and material possessions. It also reflects the establishment and maintenance of dominance and control of the less powerful by the more powerful."*⁴

Lowest power distance countries included Denmark and the Netherlands; highest power distance countries included Russia and Spain.

To what extent would you implement information sharing if one were operating in a high power distance country?

With the principles in mind we can decide on the aspects of the business system that should be automated (i.e., to which portions of the business system information technology can be applied.)?

Two points seem evident.

- I. Automation must improve the performance of a process. Thus, the question becomes one of seeing how automation affects process metrics, then translating this effect into statements of financial and strategic impact.

³ John Gall, author of *Systemantics: How Systems Work and Especially How They Fail* (Fontana, 1979) as noted in *Railroad Business Information and Control Systems* (January 1980), IBM, published in draft form.

⁴ Javidan, M. and R. J. House (2001). "Cultural Acumen for the Global Manager: Lessons from Project GLOBE." *Organizational Dynamics* 29(4): 295-296.

- Automation must allow us to do something of significance that we would otherwise be unable to do. By significance, we mean in terms of affect on financial statements and strategic positioning.

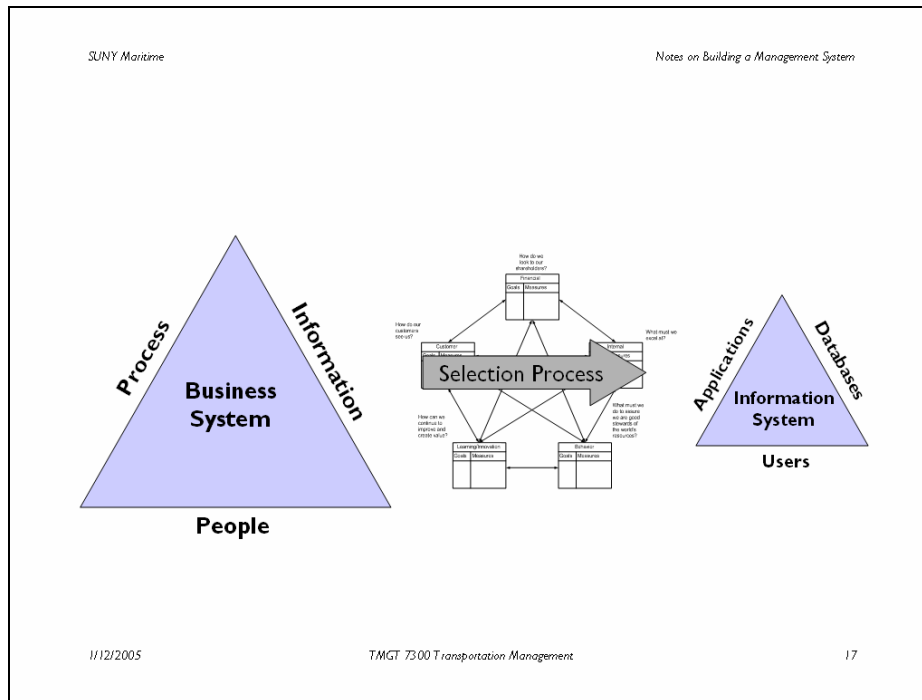


Figure 6 Automation Selection Process

It should be clear that the process of selecting aspects of the business system to be automated needs to be conducted in the context whereby the firm is measuring its success. The arrow (Selection Process) against the backdrop of the augmented balanced scorecard (see p 2) is to remind us of this.

The selection process itself can take place in one of two ways.

- One could take a look at what processes have been automated by similar companies and decide that those processes are candidates for automation in one's firm.
- One could select processes in one's firm to be automated by inspection.

I tend to favor the second approach. It requires that one have an understanding of the business and of technology, and I think it more rational than saying "because so-in-so has automated this application we should also."

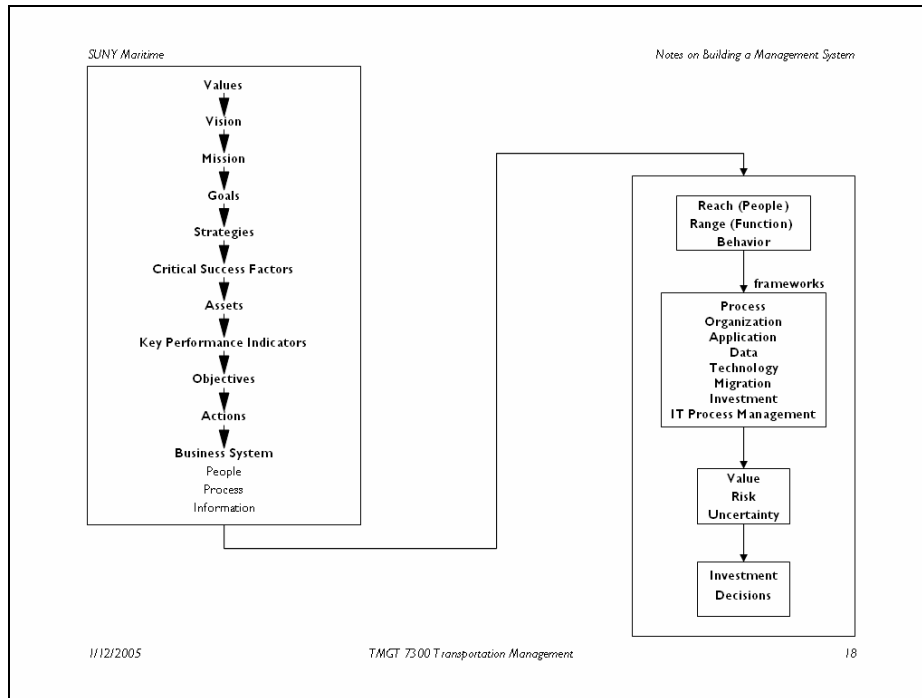


Figure 7 Connecting Business and Technology

The selection process I described above is one of the key linkages between the business system and the application of technology.

In Figure 7 Connecting Business and Technology the large rectangle to the left is the configuration of the business. It starts with the values the firm stands for and ends with the business system that actually gets the work of the business done.

The rectangle on the right represents the process of arriving at information technology investment decisions. Sometimes this rectangle is described as information technology strategy.

The selection process described in Figure 6 Automation Selection Process on p 5 results in statements of reach (people), range (business processes supported), and behavior (how the complete system should generally behave) that the business people desire from the application of information technology to the business.

This is about as far as I want to go on this point at the moment.

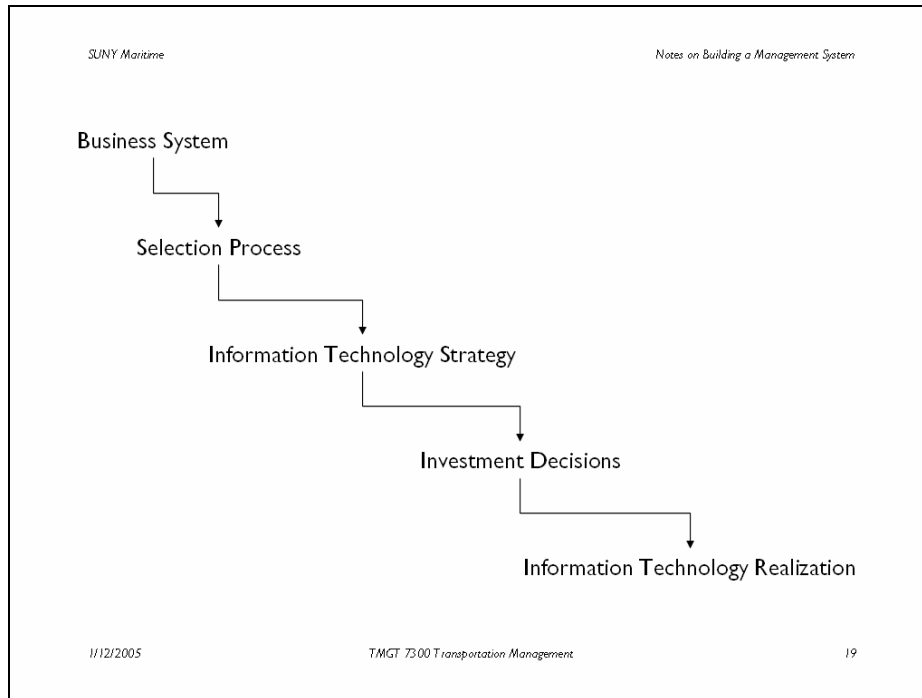


Figure 8 Summary

I've described herein four principles for applying technology that summarize my long experience in the field. I'm reminded here of a line attributed to the Nobel Laureate, Paul Samuelson; "There is no substitute for paying attention to the empirical facts of life, and no substitute for systematic reasoning about them."

What I have laid out is, I think, in accord with Samuelson's wisdom.

The final note of caution comes from Michael Scott-Morton.

“Success takes a balance of forces, but technology is not always necessary and is almost never sufficient.”

Source: Michael Scott Morton, MIT, Inventing the Organization of the 21st Century Project, Co-Director, The MIT Report, December/January 2000, p. 5.

Figure 9 Apt Advice

James Drogan
Maritime College
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