MANAGING INFORMATION TECHNOLOGY
The Capital Budgeting Process

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SISU bedriver ett program för forskning och utveckling inom informationsteknologins tillämpningsområden – Effektiv IT. Grunden till programmet är en förstudie inom detta område som SISU genomfört på uppdrag av Näringsdepartementet och NUTEK. Forskningen koncentreras till områden som har stor ekonomisk relevans för svenskt näringsliv och förvaltning.

Målet med programmet är att svenskt näringsliv och förvaltning ska kunna använda resultaten för att:

- Effektivare styra och utveckla verksamheter
- Minska kostnaderna för informationsförsörjningen
- Bättre utnyttja befintliga informationssystem
- Använda bättre värderings- och kalkyleringsprinciper
- Minska ledtiderna vid införande av nya system
- Förbättra intern och extern kommunikation

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Managing Information Technology: The Capital Budgeting Process

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Abstract

Information systems must now be seen as a natural part of a company's infrastructure. Like other kinds of infrastructure, its benefits are difficult to define and describe, leading to difficulties in managing it. Yet, well-functioning information technology is essential to the well-being of any organization. This makes the entirely cost-oriented approach to IT of most top-level management groups insufficient.

So how could the economics of modern IT be developed? Based on discussions with senior Swedish managers we present some approaches, in particular focussing on the capital budgeting process. Conclusions include the need for:
- a typology for investments in IT
- improved communication between suppliers and end-users
- models for cost responsibility, e.g. IT charges

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Introduction

Today modern information technology is an essential prerequisite for all activities in industry and the public sector. We have become heavily dependent on IT in our everyday work. Information systems must therefore be seen as a natural part of a company's *infrastructure*. The economics of IT have traditionally been markedly cost-oriented. This paper discusses the responsibility of management for developing the necessary holistic economic approach to IT; of particular concern is capital budgeting. Many IT investments are of infrastructural nature and of overall strategic importance. Investments in IT include not only hardware but also systems development and training. Procedures commonly used today for reviewing proposals for investment in IT are inadequate. Difficulties in measuring the benefits of IT may lead to wrong the investments or underutilization of investments already made.

The discussion is based on conclusions reached at seminars mainly with financial managers (departmental managers or company controllers) from a number of large Swedish companies and authorities. The purpose of these seminars was to discuss the *economics of modern IT* and experience gained from viewing IT as a *general management issue* rather than a *technical management issue*. Participants in the discussions included representatives from from a major Swedish bank, a national chain of food stores, one of Sweden's largest insurance companies, a national construction company, SAS, SKF, Volvo, Sweden Post and Telia.

Today, the lack of an economic language for discussing the dimensioning and use of IT leads to a dangerous focus on costs. Ultimately it is a question of developing the economic language for improved communication on IT issues. Only in this way can we lay the necessary foundation for learning to handle them better.

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1. From support function to infrastructure

Over the past quarter of a century, the ability to handle information effectively has become an essential prerequisite of almost all business and public administration activities. Originally just a support tool and a tool for cutting costs by rationalization, information technology (IT) has developed into an integral part of products and services as well as an important competitive weapon. [1],[2]. Most businesses have become heavily dependent on their information systems and this dependence on IT entails both technological vulnerability and commercial risks.

It is only in recent years that IT has been discussed at a managerial level in business and public administration. Managers often indicate that IT within their organizations is a problem rather than a business opportunity: the information that is provided is not relevant, the systems are inflexible and the cost of systems development is greater in terms of money and time than was originally calculated. Above all it is the high cost of IT that is of greatest concern. For a review of this problem, see [3].

We believe that this negative attitude is related to the difficulty of linking the resource requirements of IT to the benefit for the company. Calculations made to support IT investment decisions are perceived as being difficult, incomplete and unreliable.

The main arguments in favor of investing in IT have traditionally been to rationalize activities and reduce costs. Calculations have therefore given a misleading impression of being quite uncomplicated – investments in information systems (IS) have been treated in the same way as any other investment, for example in production machinery. Investments in IT have often been controlled by events and have not followed any long-term strategy.

A major proportion of the resources put into IT go to the maintenance of old systems. Efficient systems are at the same time a fundamental pre-condition of industrial competitiveness and an efficient public sector. The competitiveness of a business can also be jeopardized by the lack of a management perspective on the potential of the technology for the business, since a competitor may very well then be first to take advantage of the competitive edge it offers.

Modern information systems must be regarded as an integrated and natural part of a company's infrastructure: a common resource used by everyone but with varying benefits to the individual user. This demands a holistic economic approach to investments, systems development, maintenance and operations.

Infrastructure resources present two specific economic problems: decisions relating to investment and maintenance costs on the one hand, and decisions on how the resource should be paid for once it is in operation on the other.

Once an investment has been made in a road network or a telecommunications system, it costs very little to accommodate an additional user. Indeed, in the case of the telephone, the usefulness of the system increases as more and more people join the system.

It is this kind of difficulty that companies are now encountering in relation to IT investments.

Consequently the following four observations can be made:
- It is important to differentiate between what is essentially the common infrastructure and what are more localized utilities.

- We need procedures for decision-making about investments in infrastructure that bring together an assessment of the benefits for many users and an analysis of the cost of different solutions. Internal market mechanisms may not operate since the principle of exclusion will not work – if potential users assume that investment in the project will go ahead anyway, they will try to avoid paying for it.

- A vision is needed at the time of investment of what the effects of the investment will be together with a realistic examination of the feasibility of the vision.

- The charges for using the infrastructure must be carefully adjusted to encourage proper use. Often, subscribers pay not only for using the infrastructure, but also for the latent availability of the utility. A combination of a charge based on actual usage and a standing willing subscribers are to use the service. It is important, therefore, to decide at the time of planning the investment who is going to be paying for its use – different users will place different demands on the service and it might be desirable to differentiate fees and charges to reflect this.

All of these points need to be considered when a particular IT design is selected. Many people will need to be involved in assessing the future business utility of the project, as well as which technical solutions can make it possible. (For an extensive descussion of the business value of IT, see [4].) There must be some form of representative democracy, collective decision-making or enlightened despotism! This is always a difficult balancing act. If the project is to be (partly) financed through user charges, it is a very delicate matter to set them properly.

The overall responsibility for the strategy, economy and organization of IT lies with senior management, but they often lack both experience and the language to talk about infrastructure investments. As a result management tries to turn discussions towards more tangible matters with the result that technical solutions are often over-emphasized, albeit unintentionally.

In many cases, management will feel unsettled by what they perceive to be uncertainty. A rapid rate of technological change will lead to feelings of insecurity and uncertainty. Management often passes the issue on to IS experts. IS-managers may very well take the bit between their teeth without realizing that the overall intention – the usefulness of the infrastructure – is not something for them alone to judge!

We believe that this abdication of responsibility is unacceptable. IT decisions may seem difficult for the management group or the board to handle since they are unaccustomed to them. However, they are fundamentally not different from decisions relating to future business or the core competence of the firm.

2. Cost, revenue or profitability

Traditionally IS has been regarded as a support function to the business and as such just one more cost item.

Today a growing proportion of IT investments are not designed to offer improved productivity. Instead, they are designed to achieve improved *quality* in decision-making and performance.

The argument that IT costs are too high cannot be accepted if no attempt is made to estimate their effect on revenues. If we introduce electronic mail for example, and find that not only do users save time but that the the quality of internal communication also improves, management must exploit such improvements and benefits by redefining and extending individual tasks and goals. Through this, intangible benefits should be converted into tangible cost savings and additional revenues.

Detailed costing is a misdirected effort in many investments for the simple reason that they are investments in infrastructure. Consider the telephone. Today nobody would dream of costing the benefits before investing in more telephones for an organization. It is moreover very difficult both in theory and in practice to measure the contribution of the telephone to a business in financial terms. However, if we removed all the telephones from an organization, normal work patterns would be severely disrupted very quickly and productivity in administration would drop dramatically.

Applied to IT, this approach means that management must have a *vision* and handle IT investments as they would handle (and cost) new business concepts. This is just the type of decision that management should have competence to deal with – "political questions" where vision, conviction, uncertainty and a willingness to take risks, are all merged into one decision.

This does not, however, imply that management should take over all decision-making with regard to IT investment. Far from it. But in the same way that management draws up the overall production strategy, it must also devise an overall strategy for IT and goals in line with the company's business goals must be set and followed up. IT must become part of the everyday agenda of the executive management team, and the overall area of responsibility must be represented on the team.

When it comes to the company's production strategy, it is the responsibility of the executive management to assure the overall strategy by deciding a materials supply policy, where to locate production facilities etc. The actual technical decisions are up to the production staff, who choose solutions and technologies appropriate to the strategy.

Concerning IT however, the position is often the reverse. Even at board level discussions sometimes center more around computer technology than how business strategy is impacted by various types of IT investment and what profits can be made.

3. The Investment Decision

As managers we have excellent administrative tools and long experience of issues to do with production, marketing and financial strategies etc. But there is no comparable approach for dealing with IT. Traditionally, decisions relating to the strategic direction of IT have been delegated to the IS department.

Rarely do companies or organizations have an articulated IS strategy in line with their overall business strategy. Many companies may well have a strategy for their IS department, but this is in reality something quite different; such a strategy concerns choices of technology, suppliers, etc, but not the alignment of IT and business strategy.

Therefore, many decisions within IS departments are taken in isolation from other investment decisions. IS-department managers often desire systems with a high level of technical sophistication. Management has not had a long-term strategic plan for the extension of information systems and consequently additions have been made on an ad hoc basis with no strategic direction or control. IT has become an important part of the infrastructure of many organizations without any great involvement from executive management!

We have argued above that conventional costing methods for infrastructure investments in IT are inadequate. That is not to say that no cost estimates should be made. A *process* needs to be designed for assessing investments, so that we focus the visions, translate them into realistic forecasts and assess the often intangible benefits, all the while considering how we would manage without making the investment.

One way is to classify IT investments:

A   Obviously essential systems, e.g. accounting: only cost estimates.

B   Systems to improve efficiency and productivity, e.g. Material Resource
        Planning (MRP) : traditional capital budgeting comparing the discounted
        values of cash inflows and outflows.

C   Systems for improving quality in decision-making and performance, e.g.
        electronic mail: cost benefit analysis where non-monetary advantages and
        resource commitments also are assessed.

D   Systems for competitive advantage. In such cases, investment decisions are
        based on business considerations.

Despite the temptation to regard all IT investments as being "obviously essential", we feel that category A should really be restricted to systems devoted to essential functions such as basic accounting. Most IT investments, however, also contain elements of both B and C and a complete evaluation requires that the B and C portions of the investment cost can be distinguished.

One of the main questions is then how to design the appraisal. The distribution of tasks needs careful consideration. A person who commits himself to the vision can not be expected to be an impartial assessor, nor succeed without supporters of the idea on the management team. Calculations made as part of an investment proposal should not be regarded as objective – they are often just another means of sifting ideas or of describing consequences in a language management can understand.

B and C are often related to organizational level. C is more definitely a question for the management whilst B can be delegated. It is rarely possible to classify them clearly.

There is a risk that efforts to decentralize may lead to an abdication of responsibility: the management group may delegate authority to lower levels when they should be dealing with the questions themselves. Even placing limits on the size of investments which can be authorized by lower management levels does not guarantee that the problems and pitfalls will be investigated in the proper way.

Infrastructure investments require a different kind of costing, which functions more as a communication tool than an unambiguous measure. The economic consequences of, for example, different lengths of life and varying degrees of usage need to be clearly highlighted. Commonly, this kind of investment relies on a traditional investment calculation (as in category B) based on uncertain assumptions. This is quite clearly not good enough. Some things, such as systems capacity or availability, are much better described in plain English.

The design of the costing model as a communication tool reflects the current debate on how costs occur and how they are impacted or controlled. Overhead costs constitute a growing proportion of value added in most companies and organizations. This growth is sometimes regarded as non-controllable and therefore no-one's responsibility. However, overheads often have their origins in an intention to handle a particular product, serve a particular customer, or gain a particular competitive advantage. Focusing such intentions should be an important part of reviewing the investment. The decisions made here will affect the company's overheads for years to come. It is not only the cost of investing in the system that needs to be considered, but also its long-term impact on maintenance and operation. Different alternatives may give drastically different results in this respect.

Various ways have been tried of making better decisions with regard to those activities and operations, including IT, whose costs are recorded as overheads. Twenty years ago, the idea of zero-base budgeting was introduced. Different levels of ambition were listed in a similar fashion to the A-D list presented above. In reality it proved difficult to demonstrate clearly what benefits could be achieved at a certain cost level, and to define performance measures to distinguish between the basic level (A) and the more desirable higher levels (B-D).

Recent years have seen experiments with alternative approaches. One way is to convert "overhead activities", IS departments for example, into internal profit centers selling their services to the rest of the organization. These departments are then forced to become more customer oriented. Quite often, though, management has to provide subsidies. Even when the provision of services and the maintenance of competence are both strategically vital to the company, it is not obvious that users are prepared to pay.

Another alternative way of identifying what the various costs are and what benefits each cost is supposed to provide, is to use ABC (Activity Based Costing) principles [5] and [6]. This involves studying the cost drivers behind each activity, i.e. the factors which cause, influence and explain the cost [7]. Cost drivers could be demands for availability, response times, or the level of staff competence, as well as more conventional factors such as volume handled, the age of the plant etc. In businesses where there are periods of high workload, there will always be certain users of a system who cause peak loads; some may demand specific solutions to be built into the system while others will be quite satisfied with less expensive solutions. Special routines may be introduced in the belief that a customer has them, but without passing on the extra costs involved to this customer. Sometimes the routines are left in place even though they are no longer needed. Insights gained from ABC studies can form a basis for much more accurate budgeting and internal pricing.

It will often be found that the major factors which contribute to costs can only be affected in the long term. This brings us back to the idea that decisions which influence costs over several years must be equated with investment decisions. Writers on the subject point to the need for better cost management and for decisions which involve a "commitment of future costs" to be based on ABC. Otherwise we will never understand what caused our rising overheads. How these costs develop may not have any direct impact on the results shown by those units which are assumed to demand the activities and services that give rise to the costs. There is thus no incentive for a critical examination of what can be changed.

This is what we would like to correct by focusing on the tools that could improve the *process* of communication before an IT investment is made. In spite of the difficulties which will be encountered, it is essential that users understand, as concretely as possible, the difference in cost of putting different demands with regard to what they want IT to do. Even strategic investments should be subjected to the process of examination we have described. For example, a comparison can be made between the financial results which a particular project is expected to produce, and the strategic importance of the project. How important is it to the various lines of business? How much should they pay for it in the future? Should part of the cost be treated as a group expense, since the investment may make it possible to develop completely new businesses alongside existing ones?

Ideally, every large scale investment in IT should be the subject of an agreement between the profit center managers, including the executive management, detailing the benefits each expects to gain and what portion of the cost each is prepared to pay. It would then very often be evident that expectations regarding performance, service levels etc are different for different people – and these expectations should of course be reflected in the charges for the service. Only then can the costs be charged to those customers for whom the service was designed and the costs weighed against the revenues they may generate.

Making such agreements can be difficult because of the very nature of IT as part of the infrastructure and therefore collective property. It is easy to get involved in a game of tactics where the aim is to have someone else pay for IT but still be able to have access to it oneself. As we pointed out earlier, management must not abdicate their responsibilities in this area. It is their job to handle this kind of decision.

4. Project economics

There is a certain amount of defeatism in handling the project economics of IT investments. It is common to find cost overruns and projects which seem to go on indefinitely – neither of which would be tolerated in other types of investment projects.

An important explanation is the difficulty of specifying requirements – systems analysts frequently point out that the people who order systems cannot tell what they want. It is then very tempting for the system producer to include features that he thinks the purchaser will want when he knows more.

There is a definite need for a common language in the dialogue between the IS department and the rest of the organization. A recurring complaint is that "computer projects always cost more than was budgeted for, they always take longer to implement than was planned and we don't get the information we thought we would anyway."

Companies have long experience and a well-developed set of concepts for investing in production equipment. However, in the case of IT investments, their abilities are less well honed. The lack of a proper economic approach in combination with limited experience of system requirements specification means that IT investments do not produce the results expected.

In many cases this limited experience also leads to an inability to visualize in detail what the final result should look like. The difficulty of specifying exact requirements for new systems is a considerable problem. The overruns in terms of cost and time that accompany many IT projects are in many cases simply due to deviations from plan during the course of development.

We would like at this point to return to our previous discussion on cost drivers. Investments which have been given the green light are often modified or redesigned during the time of the project. These changes should, of course, be subjected to the same sort of financial scrutiny as the original cost estimates. Quite regularly, systems are altered to fit the wishes of certain users and these changes may affect the operating costs for years to come. These extra costs should be passed on to the users or, more accurately, to those customers who gave rise to the changes in the first place.

One explanation for the many deviations during development is the lack of a *learning organization*. Translated, this means that experience gained from previous development projects is not sufficiently brought to bear on new projects. There is frequently a considerable time gap between development projects within an organization. Line managers will probably implement only one large-scale computer project during their careers. When the time comes to invest in a similar system they will have moved on and the same mistakes will be repeated – this time by someone else!

Projects are normally based on co-operation between the staff of the IS department, suppliers, other consultants and the intended users. In many cases, responsibility for deliveries could be made clearer as well as responsibility for errors of judgement and any problems which arise. Lessons should be learned from the experiments with clearer internal purchasing etc that were tried in earlier projects.

A further reason for IT projects becoming more expensive than budgeted for can be found in the system development process itself. An information system is an *intellectual product*. The people working with system development know that the solution they come up with will be a reflection of their intellectual capacity and will accept good advice during the development of the project and make changes and adjustments along the way. Nobody wants to be accused of building a system that was not properly thought through. It is argued that to add a few days here or there to ensure that no criticism will be forthcoming later is, after all, worth it – who wants to look stupid!

The dialogue between system developers and those who order the system needs to be improved – all of the alternatives need to be clearly visualized in advance. This is what we try to do with system sketches, prototypes etc. But is it possible for the purchaser to foresee what might be required of the system in a few years time? This is especially complicated when the purchaser will not be the only user of the system, but is acting as a representative for many other users.

This criticism is not only levelled at system purchasers. It is often suggested that computer department staff set up protective walls around their activities and large sums of money are spent on "maintenance", which in reality consists of new investments.

Also in this case it seems to be a better dialogue that is needed, together with greater clarity when describing consequences. Investment appraisal should specify which are part of the infrastructure and which are of a more immediate use to the subscribers. When it is the users who will be most affected, they should be involved at an early stage in order to gauge the level of ambition they are willing to pay for.

The infrastructure portion should also be controlled by clearer lines of responsibility, targets and continuous assessment of various levels of ambition. What risks and opportunities do the system developers and purchasers see in project delays, cost increases or divergence from agreed plans? Is the project team rewarded for making simplifications during development? Will they be criticized if they keep within their cost ranges but, ultimately, produce a system which could have been more ambitious in design?

What we are calling for are cost-performance evaluations of the IT investments already made. Such reviews are rare even for traditional investments. System evaluations made after a couple of years or when different stages have been completed should be a natural precondition for learning from experience in a more systematic fashion. The very knowledge that there will be an evaluation will often have a disciplining effect.

Ultimately, this discussion centers around the distribution of roles between those responsible for the system and the management of the organization. Once the IS manager has accepted responsibility for developing the company's infrastructure, he will very often try to build-in the ability to handle probable future needs. It is all too easy for management to feel powerless in the face of mounting costs for IT they have not asked for.

On the other hand, if management accepts its responsibility for IT investments, the reasons for their complaining is removed. It is impossible to predict whether IT investments will be smaller or just different, but companies will at least be forced to find a clearer order for decision-making and clearer lines for project team management.

Management's greatest responsibilities in relation to IT investment and associated system development are two-fold: they must establish a learning organization and insist on a common language for business administration.

5. Fees and charges

As we said earlier, one of the classic economic questions is how to charge for using infrastructure. When the principle of exclusion does not work, everyone hopes for a free ride.

Normally, when companies decentralize, department managers are deliberately given limited responsibility. Operational responsibility is delegated, strategic responsibility is not. Performance targets are set accordingly. IT investments often include a strategic dimension, but even departments which could benefit from investment in IT might show better numbers in the short term by trying to prevent investments which they would have to pay for. (On this classical debate in management control, see e.g.[8] and [9].

Economists can refer to at least 150 years of literature about user fees (for example bridge and turnpike tolls) and internal pricing. For an internal user to act correctly, from the point of view of the organization, he must relate the benefits of a particular resource to the cost of using it.
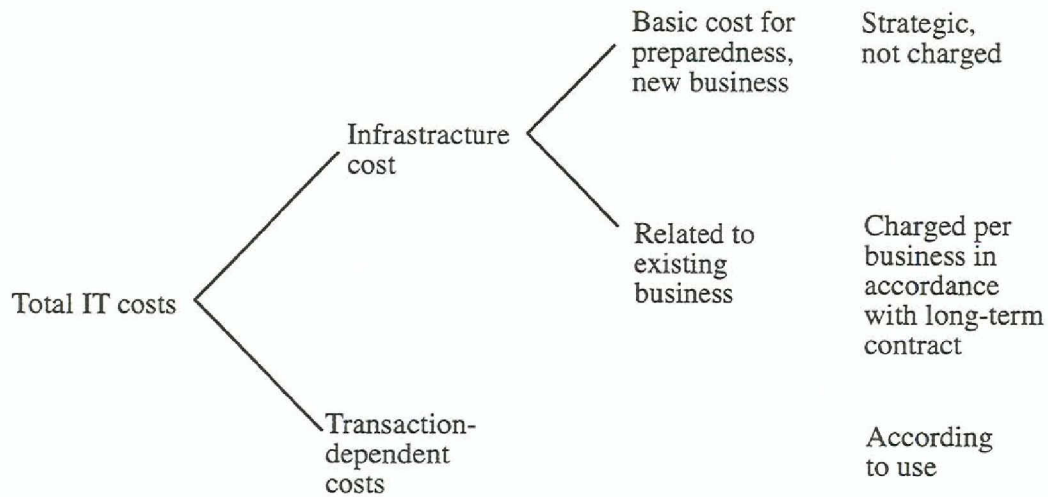
The most common method is to base charges on some measurable factor which reflects the benefits accrued to the users. The fundamental distinction between service fees, cost allocation and the profitability required is often hazy. Literature on internal pricing makes it quite clear that there are a variety of combinations [10]. A bold approach would be to charge according to the *value of the information* for different categories of user, a kind of *internal pricing of information.*

The idea behind all of these principles is that the department using the system should be charged for its use on a continuous basis, which will often mean that people are not sufficiently encouraged to take advantage of the investment and achieve the results that were hoped for. Another principle that has been suggested is to base prices more clearly on the intended benefit; i.e. who the resource was designed for and why. This was the thrust of the argument underlying our earlier discussion of cost management. When it comes to decisions which create costs, it is important to define more clearly which organizations and customers are planned to pay for those costs. Even if the investment is common, as was discussed earlier, a profit-making organization must have intended to recoup the money out of existing or future business. The component of the investment which refers to business development must be management's concern (perhaps financed through higher profit demands or internal loans); but that part of the investment which is supposed to be paid for through existing business should be allocated by subscription fee. The fee should not be dependent on usage of the system, at least not until the model is re-negotiated when circumstances change.

Fees, cost allocation and earning requirements should stimulate the use of IT in a strategically appropriate fashion, and be designed with this aim. Knowledge of how and when investments will be paid for will affect the willingness of parties to support investments. As we pointed out earlier, decentralization in many companies stresses a short term of responsibility; this could lead to a reduced willingness to get involved in new investments which will only give benefits in the long term.

Inappropriate charges and cost allocation may have treated subscribers unfairly. *For reasons of internal control, it might be preferable for a company to maintain a central "infrastructure capital", for which the company would not charge internal customers until they receive the benefit, and accept that this might take longer than is the cases with routine investments.*

To sum up, costs should be separated into a number of different groups. Even investments of a mainly infrastructural character can contain the different elements illustrated below:

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                                    Basic cost for        Strategic,
                                  / preparedness,         not charged
                                 /  new business
                  Infrastracture <
                /  cost          \
               /                  \  Related to          Charged per
              /                    \ existing            business in
Total IT costs<                      business            accordance
              \                                          with long-term
               \                                         contract
                \
                 \Transaction-                           According
                  dependent                              to use
                  costs
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The long-term contracts in the middle category should be based on cost driver reasoning: what kind of connection is there between the reasons why we have the cost and those customers which gain from using it?

6. Managerial responsibility

IT investments should always be regarded as a managerial responsibility, often with infrastructure elements. We have already pointed out that this is not an area just for computer experts; it is therefore crucial where in the organization IT investments are handled and how the responsibility and the order of decision is shaped.

This touches upon an issue that has long been the subject of debate; the relationship between company strategy and company structure [11] and [12]. A proposed strategy can be helped forward by the choice of a relevant structure but the structure might also give birth to the strategy. If important strategic decisions are not to be made centrally, there must be an interaction between the strategy and the structure.

We pointed out earlier that decentralization is often short-sighted and that large-scale IT investments that impact company infrastructure need to be decided and paid for at a more central level. There is no general rule as to what the correct forum is for different kinds of decisions. It is possible, however, to follow a more or less democratic route. As an example, one large commercial bank in Sweden operates a form of council where users of IT can discuss what kinds of investment need to be made and what level of service should be maintained. In another bank, such decisions are taken centrally. Investments in new systems are probably larger at the second bank, but it is not easy to say which is best.

If the financial position of an organization demands that industrial investments be delayed or cut down, management can see and judge the consequences relatively easily. A cut in IT investment is often more difficult to explain and judge. How can something that was once deemed to be essential now be unnecessary or achieved at lower cost? An important question is how to create interaction between management and experts, where the dialogue is characterized by complementary knowledge on both sides and not by a game of tactics.

The answer is not, of course, to teach management how to understand what kind of computers they will get for their money. The main interest of management is the *function* that can be achieved. In turn, this demands that IS departments are familiar with the business visions of management.

Discussion of these issues inspires comparisons to building houses and the interaction between purchaser, architect, builder and sub-contractors. It might help in visualizing the construction of a computer system if the process was put in these terms. A complete project plan for the whole system should be drawn up at the same time as the first stage is given the go-ahead.

In conclusion, most management teams feel less comfortable discussing IT investments than they do making corresponding decisions about factory construction or investments in machinery which might have to be postponed or downsized. When they have to make investments in computer systems they feel that they have to rely on what the IS department says is necessary, or be obliged to have opinions of their own as to what hardware and software should be chosen. We need a developed *language*, clearer *goals for the various stages,* and clear *alternatives* for what we can get from a larger or smaller investment of resources.

Summary

There are a number of areas in which a well-run company should have well-reasoned solutions and approaches to IT spending. These will, of course, vary between companies and will sometimes be difficult to point to. We believe that much of today's uncertainty is most probably a consequence of not thinking them through well enough:

– A clear method of dividing IT investments (systems and maintenance) into groups (infrastructure, common business conditions, productivity projects for individual users etc) with different principles for appraisal criteria and order of decisions.

– A common language for communication between system developer and purchaser with reference to the system functions, clear principles for dividing projects into stages and contact patterns during the course of the development project. It is especially important to guarantee the ability of the organization to learn.

– A clear picture of the role of IT in business development.

– Principles for how IT investments and operating costs should be passed on to users, which part should be picked up centrally and how this is related to evaluation and financial responsibility for the people responsible for a particular line of business and computer unit.

– A financial control that forms a basis for business areas and customers to pay for using the IS. This should lead to a more differentiated way of charging and not, as today, a standard overhead charge. Cost management and ABC calculations can suggest many good ideas here.

– A management principle that issues that concern IT in general must appear on the everyday agenda of the executive management team.

Today, the lack of an economic language for discussing the dimensioning and use of IT leads to a dangerous focus on costs. To make it possible for an essential management perspective to be created, we believe that efforts to develop within these six areas are urgently needed.

Ultimately it is a question of developing the economic language for improved communication on IT issues. Only in this way can we lay the necessary foundation for learning to handle them better.

References

[1]   MacFarlan, Warren F.: *Information Technology Changes the Way You Compete.* Harvard Business Review, Revolution in Real Time, 1990.

[2]   Porter, Michael E. and Millar, Victor E.: *How Information Gives You Competitive Advantage.* Harvard Business Review, Revolution in Real Time, 1990.

[3]   Keen, P.G.W.: *Shaping the Future. Business Design through Information Technology.* Boston: Harvard Business School Press, 1991.

[4]   Strassman, P.A.: *The Business Value of Computers. An Executive's Guide.* New Canaan, Connecticut: The Information Economic Press, 1990.

[5]   Turney, Peter B.B., *Common Cents.* Hillsboro, OR, 1991.

[6]   Cooper, Robin & Kaplan, Robert S., *Profit Priorities from Activity-Based Costing.* Harvard Business Review, May – June 1991, pp 130 – 135.

[7]   Porter, Michael E., *Competitive Advantage.* Free Press, 1985.

[8]   Hayes, Robert & Abernathy, William, *Managing Our Way to Economic Decline.* Harvard Business Review, July – August, 1980.

[9]   Johnson, H. Thomas, *Relevance Regained.* Free Press, 1992.

[10] Eccles, Robert, *Control with Fairness in Transfer Pricing.* Harvard Business Review, Nov – Dec, 1983.

[11] Chandler, Alfred, *Strategy and Structure.* MIT Press, 1962.

[12] Mintzberg, Henry, *The Structuring of Organizations.* Prentice-Hall, 1979.

Effektiv IT-rapporter

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