

The Economics of Application Management

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Market research shows that one third of IT budgets is spent on management of applications, and that this part is increasing. It is therefore not surprising that there is growing attention for the economic aspects of both demand management (business responsibility) and application management (technical responsibility). This article describes the dynamics of costs and benefits in this domain and how they can be positively influenced. The subject is approached from an economic perspective. Next the division of roles between the three management domains (demand management, application management and technical management) is discussed. After presentation and explanation of market research figures we go into the key question of how organisations can get more grip on costs and benefits. Professionalisation of demand management and application management using the management models ASL and BiSL can make a significant contribution to getting the economic aspects under control.

Introduction

Application management takes up a substantial and increasing part of available IT budgets. Organisations are concerned about these costs and ask themselves how they can get a grip on both costs and the benefits of application management. This subject has kept us, the authors of this article, intrigued for several years. We have incorporated our insights in a contribution to a four-day postgraduate course on the Economics of IT-management, which has been organised under auspices of the Faculty of Economics of the University of Groningen. In this article the essentials from this course in relation to economical application management are expounded.

Firstly the application management related costs are dealt with, in order to underline the importance of it. Then different economic aspects are discussed, focussing on their relevance to application management. As for financial aspects, these are mainly costs and expenses, whereas the non-financial aspects are categorised as the positive and negative contributions.

Next the three domains of management are discussed: demand management, application management and technical management. Demand management is the delegated representative of the business and contract partner for application management and technical management. An underlying assumption in this article is that the business should bear the costs of IT support and also profit by it. We elaborate on the contents of the three IT-management domains, the way in which they interact and the main economics that play a part.

On the basis of figures from market researchers and our own insights, the costs are allocated to demand management, application management and technical management.

Finally, we give insight into the aspects that influence costs as well as the benefits of IT-management and the way in which professionalisation of IT-management contributes to improved economic management of applications. Examples of professionalisation are the appliance of the ITIL method for technical management, ASL for application management and BiSL for demand management. As this article focuses in particular on application management, more attention is given to demand management and application management than to technical management.

Management costs in the application lifecycle

How high are the costs of application management? In the course of 2003 and the spring of 2004 we put this question to two hundred IT managers mainly working in the Netherlands, both individuals as well as groups. The question consisted of four sub questions:

1a. Which part of your IT costs is related to the realisation of new information systems and which part to the management of the systems?

1b. Is the management part larger than, the same as or smaller than ten years ago?

2a. Which part of your IT costs is related to infrastructure (consisting of technical facilities, hardware, systems software and generic office applications) and which part to applications?

2b. Is the application part larger than, the same as or smaller than ten years ago?

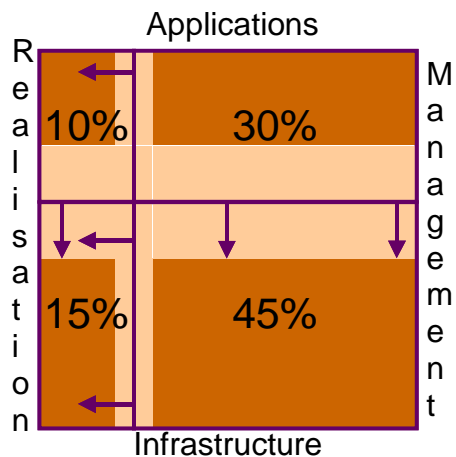


Figure 1 Division of costs during the application lifecycle

The participants usually answered the first question quickly and consistently: between 70% and 80% of their IT costs are spent on management aspects. There is also consensus on the fact that nowadays comparatively more is spent on management than in the past.

The answer to the question how costs are divided between infrastructure and applications seemed to require more thought and also showed a greater scope: between 25% and 55% is ascribed to applications. But there was consensus on the fact that more is spent on applications than in the past. (see figure 1; the arrows indicate in which direction the figures move).

Working on averages of 75% management costs and 40% application costs, this implies that 30% of all IT costs are spent on applications management (40% of 75%); this is more than ten years ago. This justifies the investigation where and how costs in this area can be justified and influenced.

Economics

What are the different economic aspects and which of these are relevant to applications management? The economic science looks at economics from two points of view, on the one hand benefits and costs, on the other hand financial and non-financial aspects (see figure 2). Looking from the financial point of view, it is about revenue and expenses, which determine the result (profit or loss). The change in liquidity is also a relevant aspect (this is equal to receipts minus payments). A contribution is spoken about at the non-financial side, which can be positive or negative.

Consequence	Positive	Negative	Total
Financial	Revenue Receipts	Expenses Payments	Result (profit/loss) Mutation in liquidity
Non-financial	Positive contribution	Negative contribution	Contribution
Total	Benefits	Costs	Value

In order to determine the economic aspects that are important for applications management, it should first be decided from which perspective this should be looked at. We emphasize that this is not from an IT-department point of view, but from the business that is supported by information systems and related services. It is the business that benefits from IT and also bears the costs. It is impossible and senseless to try to translate the benefits to for example application management in terms of "these benefits are for 23% the merit of application management". It can however be said that costs are incurred while executing application

management, that actual expenses are made and that application management to a certain degree contributes to the business processes.

Positive contributions to the bottom-line that can be expected from professional application management are for example: reduced risks to the productivity of the business and a contribution to the improvement of either the efficiency, the effectiveness, the innovative ability or the flexibility of the business [Drift 2002]. Within a company that has chosen efficiency as dominant market approach (that presents itself as specialist in products and services that are the economical choice in terms of consumers' organisations), there will be a maximum support of the business when IT helps to reduce costs. A company that is successful as 'best buy' supplier, will benefit from IT support that contributes delivering better products and services. In addition to this contribution, cost reduction is possible as well, no one will complain, but this is not the company's strategic success factor. Comparable examples can be imagined for companies that depend on their innovative capabilities and therefore constantly supplying new or renewed products and services. Or for companies that are successful by adapting decisively to a dynamic external environment (flexibility).

A drawback of professional IT management can manifest itself when there is a large difference between the level of maturity of IT management in relation to the business' level of maturity. This shows itself in the perception that the information provision can be tailored to their requirements less quickly. This is because the information provision function gains a better view of these requirements and confronts the business with all kinds of 'tricky' questions. A good support of the business can minimise this effect.

IT-management paradox

A short comment on the extent to which a contribution from management is possible, is called for [Berghout 2001]. As became clear earlier on, most expenses of information systems occur during the management phase. Furthermore all benefits are realised in this stage. From an economical perspective the management stage seems of great importance. This proposition should however be differentiated when we consider the extent to which the benefits and expenses can be influenced in this stage. A study at the University of Delft shows that only about 10% of the costs and benefits can be influenced in the management stage. The general conclusion is therefore justified that principles of economical management should be applied early in the lifecycle of an information system. Thus, there is some kind of IT management paradox, as Berghout puts it. During the design stage it is still possible to adjust an information system, but there is great uncertainty about the desirability of the different possibilities. During the management stage the wishes with regard to the information system are much more clear, but there are only limited possibilities to change these characteristics of the information system. Put another way, by the time one knows where one stands, the design can hardly be adjusted. Only intensive sharing of knowledge between design and management can reduce the negative consequences of the management paradox. Although these disciplines are generally separated, as regards content they are sentenced to each other.

Division of roles between demand management and application management

To provide a better insight in where most money is spent on IT, we will first elaborate on the domains of management of information systems. In The Netherlands Delen and Looijen divided the IT management domain into three sub domains: demand management, application management and technical management [Delen 1992]. These three domains are described as follows:

Demand management (DM) is responsible for maintaining the functionality of the information system. Demand management supports the use of functionality, evaluates the use and responds to inadequacies and new wishes that can lead to changes. The direct relationship with the use of the system determines that demand management is a responsibility of the business.

Application management (AM) is responsible for maintaining the application software and the databases, in accordance with the requirements as supplied by demand management. Application software means all software except operating systems, database management software and programming tools.

Technical management (TM) is responsible for keeping the operational information systems run-and-running; this also covers hardware, (systems) software and data that has to be continuously available to the business and is usually referred to as the technical infrastructure.

Delen and Looijen distinguish three levels of operation for management domains: strategic, tactical and operational. Most tasks distinguished and described, are operational tasks. The strategic level determines which IT management functions are needed, their place within the organisation and the relationships with other IT functions inside and outside the organisation. On the tactical level this policy is translated to technical and human resources on the operational level and the support functions.

There is a wealth of models and methods for controlling and executing management activities. ITIL (IT Infrastructure Library) is the best-known approach for managing technical infrastructures. ASL (Application Services Library) is the 'ITIL for application management' [Pols 2001] and recently a method for the professionalisation of demand management has been introduced: BiSL (Business Information Systems Management Library) [Dolder 2004].

The authors of ASL and BiSL also apply a tripartite management. But within ITIL, ASL and BiSL a slightly different meaning is given to the strategic functions, namely thinking about the future (with two to three year horizon) of the information provision and not only about the policy and goals of IT management. The tactical level within ITIL, ASL and BiSL looks one to two years ahead and plans the necessary activities and means to let the information services perform during this period. On this level the 'short-term' control of costs takes place, whereas the strategic level deals with investment decisions. Furthermore on the operational level application management is not only seen as maintaining applications, but also keeping applications up-to-date, performance management, version management of software and documentation, service levels management etc.

From this last perspective, application management and demand management make most of the costs for specific applications. The costs of infrastructure (technical management) can often be assigned less directly on the level of individual applications.

The starting point for acquiring and using an application is that the business processes of an organisation operate faster and/or cheaper and/or better. Thus the benefits always fall on the side of the business, represented by demand management. Demand management assesses which applications should support which processes, which changes should be made in the application portfolio and which suppliers can supply the necessary software and application services. Demand management is the customer of application development, application management and technical management.

The challenge for application management is to carry out their services effectively, efficiently and in a customer-oriented manner. They have to fulfil service level agreements and comply with natural expectations and above all, simply ensure that the products and the changes to the products are good. What application management can do is keep the costs for the information provision that are caused by the software, as low as possible. By organising the processes of application management professionally, the costs for the application can decrease and the quality can increase. Methods like ASL and ITIL support this professionalisation. Further on in this article this is elaborated on.

Demand management is responsible for IT costs and the performance of IT suppliers. Within demand management we will therefore see roles like demand manager, smart buyer and contract manager. The quality of processes like financial management, contract management and supply management is of great importance for the effectiveness of managing IT costs and IT supplier performance. Models like BiSL support the correct organisation of these processes. Acquisition and management are however not the only factors that determine the costs of the applications, these are also influenced by the actual usage of the applications. Demand management also has a large influence on costs because the responsibilities include activities like user support, training of end users, and – on behalf of the business – deciding on which changes are to be carried out, to name just some aspects.

Costs of demand management, application management and technical management

As was mentioned before, the costs of individual applications are especially influenced by the costs of these applications themselves, application management and demand management. The total IT costs are of course also determined by the costs of hardware, such as servers, mainframes, pc's, the network, printers and the costs of maintaining this infrastructure. This is the responsibility of the technical management domain.

But how do these costs relate to each other? What does the business spend most money on or thinks it spends it on? In 2003 Gartner researched more than 400 companies with an average of more than 4000 staff [Gartner 2003]. This provided insight into the IT expenditure for 2004 expected by the companies. As Gartner did not make a subdivision of these costs according to the three management domains, we have added this specification.

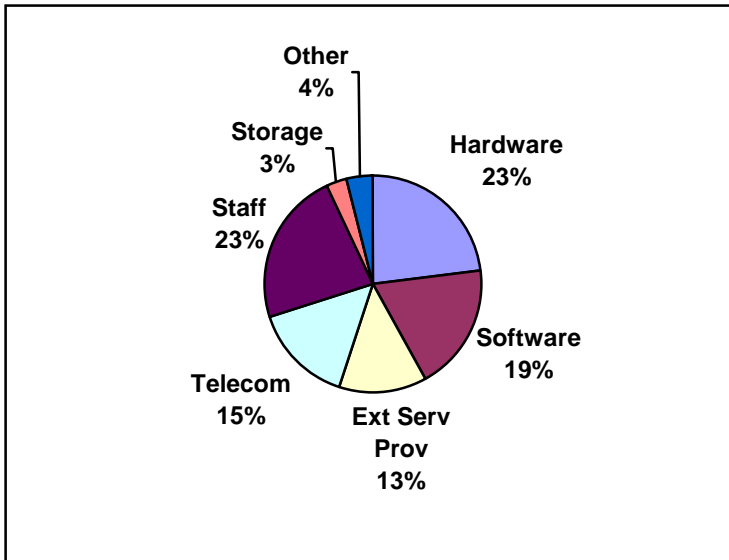


Figure 3 IT costs [Gartner 2003]

Gartner distinguishes a number of main categories: hardware, software, own staff, etcetera (see figure 3). These are divided into a number of sub categories. These sub categories made it possible for us to estimate how many costs can be assigned to the various management domains.

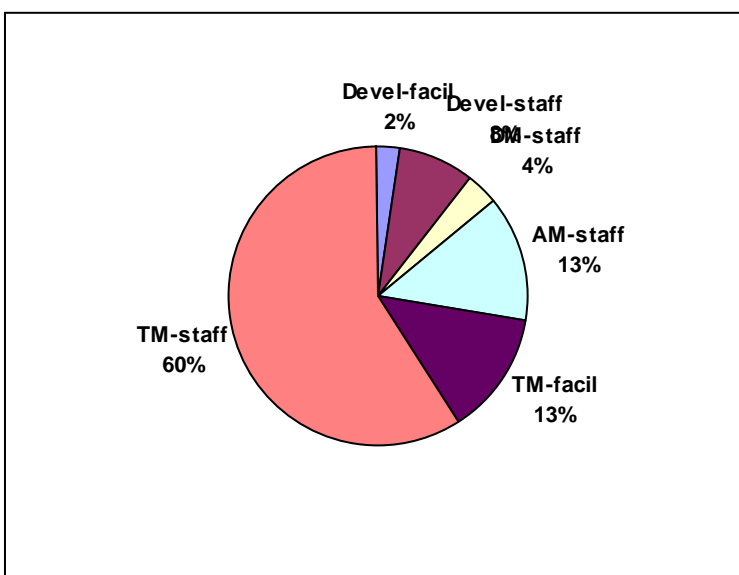


Figure 4 IT costs by management domain.

The total hardware costs versus the total costs of staffing (internal and external) are shown in figure 5, specified by domain. Staffing costs within licence costs are not included in the staffing costs but in the hard costs, where they are equally ascribed to application management and technical management; all hardware costs are ascribed to technical management.

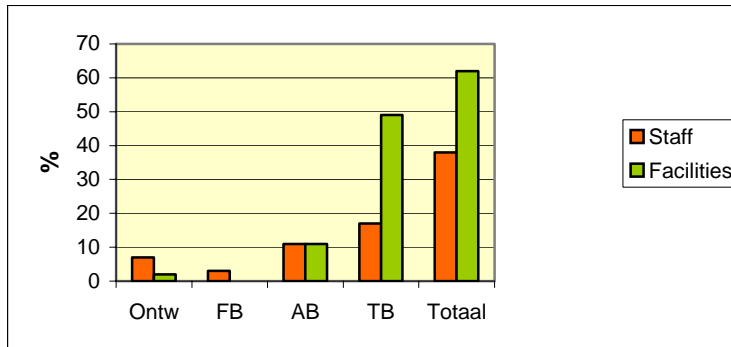


Figure 5 Hardware costs versus staff costs

Figures 4 and 5 show that the largest cost-items are hardware + (data) communication. Because almost half of the costs can be ascribed to this, we have divided the costs further, based on the proportions reported in the same Gartner publication, as shown in figure 6. Roughly one third can be ascribed to (data) communication, one third to software use and one third to hardware.

For staff costs too, of which the estimated costs of internal and external staff both have been taken into consideration, most costs are made in the technical management domain.

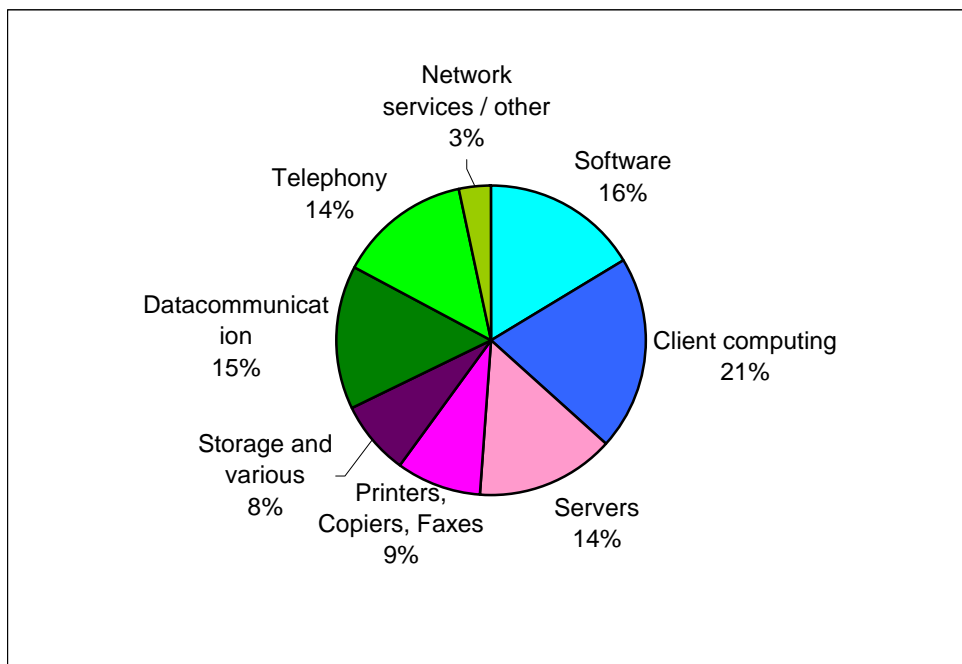


Figure 6 Division non-staff costs in the technical management domain [Gartner 2003]

Also for staff costs, where the estimated costs for internal and external staff both have been taken into consideration, most costs appear in the technical management domain (see figure 7).

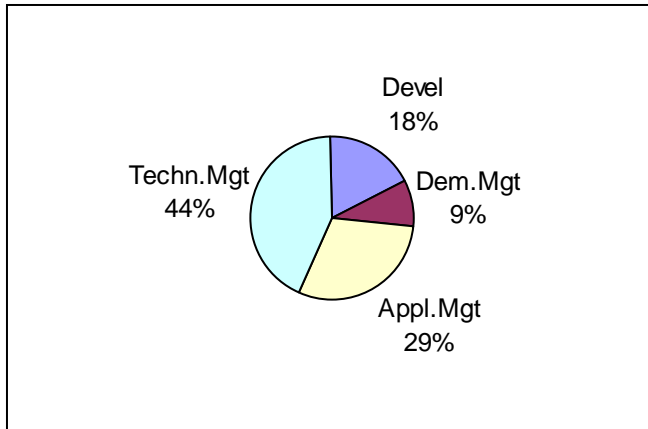


Figure 7 Division of staff costs to IT domain

All costs mentioned must be clear to and, where possible, determined by demand management. In case of staff costs this is easiest for internal staff. The figures show that most companies from the group studied have internal staff for all domains (see figure 8) and certainly not only demand managers.

Costs could be reduced by outsourcing the more technical IT activities, because their size external suppliers might be able to work cheaper.

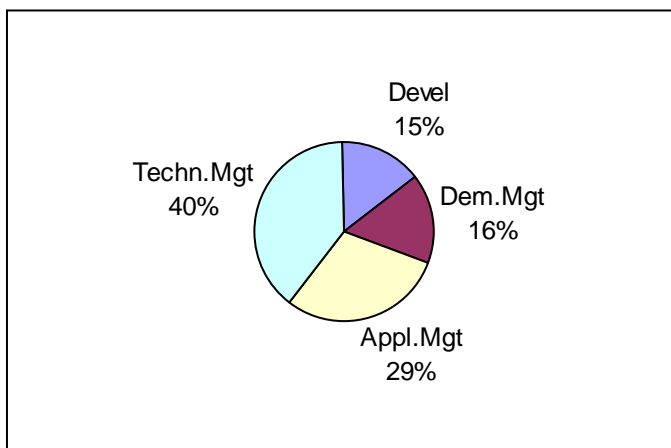


Figure 8 Division of internal staff costs to domains

The hardware, telecommunication and external staff costs can be influenced less easily by the demand management organisation. But demand management can of course (also) decide which suppliers are selected for business. Taking the amounts of money involved into consideration, the introduction of a smart purchase department seems a good idea.

Influencing costs

Specifically for application management the costs can be influenced by paying attention to the quality of the product and the quality of the processes, and by timely anticipating the gap between system and business process [Drift 2003]. These factors have a strong influence on the most important cost drivers of application management:

- the quantity of knowledge and capacity of resources needed for the realisation of application management;
- the number of failures in (the immediate vicinity of) the application;
- the number of change requests, particularly as a result of changes in the business processes;
- the degree of support application management should provide to demand management and technical management.

The influential factors are specified in table 1.

Actors	Influential factors	Consequences for cost aspects of application management	Possibilities for improvement
(Initial) application development	Complexity application	Effort to keep knowledge available in continuity	Consultation with application management on choices for architecture and construction principles
(Initial) application development	Quality of application, including documentation and complying with demands of maintenance etcetera	Number of incidents and extent of effort to correct these Effort to realise changes	Effective testing
(Initial) application development	Degree of connection information provision to business	Number of changes as result of badly fitting specifications	Good initial design and possibility of interim adjustment
Technical management	Quality of technical infrastructure	Number of application related incidents as result of failing technical infrastructure	Organisation of technical management
Technical management	Extent and frequency of changes of technical infrastructure	Number of changes in the application as a result of changes in technical infrastructure	Consultation with application management on policy with regard to changes
Demand management	Degree of connection information provision to business	Number of consequential changes as a result of badly considered specifications	Quality of consultation between business and demand management plus quality process of analysis and design
Demand management	Composition of application portfolio	Quantity of application software to be maintained	Explicit attention for application portfolio management
Demand management	Organisation of demand management	Effort to support demand management	Ample knowledge and/or capacity of demand management
Business	Dynamics of need for information	Number of changes as a result of changing need for information from business	Conscious assessment of benefits and expenses
Business	Service levels to be met	Effort to keep knowledge available in continuity (for example outside business hours)	Conscious assessment of benefits and expenses
Business	Number of users and their organisational and geographical distribution	Number of incidents as a result of intensity and diversity in use of applications	Conscious assessment of benefits and expenses
All	Quality of cooperation between application development, application management, technical management, demand management and the business	Unnecessary communication and corrections	Continuous professionalisation of all people involved, with explicit attention for the effect of choices for other parties*

Table 1 Influential factors for application costs

As becomes clear from Berghout's management paradox that was discussed earlier on, there are, as soon as an information system ends up in the management phase, relatively few possibilities to reduce costs. It is therefore important to invest in improvement of knowledge exchange between design and management. It sounds natural that this should happen, but in practice it is still a difficult problem. There are still too many situations where designers and developers are insufficiently willing or prepared to listen carefully and application managers cannot or will not say which the specifications of a system are.

Possibilities to influence application management

As the first column of table 1 shows, actors outside application management influence the costs of application management. Of course there are also factors within application management that determine the efficiency of executing application management. Most of the costs related to application management are staff costs (internal or external staff). Other costs are for the (computer) facilities necessary for carrying out the work. Beside this direct work there are also indirect activities. One of the most important activities in this category is acquiring and maintaining the required knowledge of the application. The amount of knowledge required is considered as a given (for this is mainly determined during application development): what is important now is how efficiently application management is executed. Of all efforts for application management, 15% to 50% or even more is spent on acquiring enough knowledge to carry out the work. The most important factor that determines the extent of the costs, is the frequency of the replacement of staff. Often replacement happens at an employee's request, as part of his or her career. Knowledge should be prevented from residing with just a few employees: this leads to unacceptable risks for continuity when the employees involved drop out or abuse the created dependence.

Experience tells us that when employees consciously choose for application management as a profession, this is beneficial to staff retention. This argues for organising application management as a separate activity instead of something that should be executed along with development. Another way to promote retention is creating varied work.

Another aspect of the costs of application management concerns the efficiency by which calamities and peaks in the workload are dealt with. A recommended strategy is to make staff versatile. This means organising the work in such a way that it is possible to involve other colleagues outside a permanent core team for management of a certain application, without it taking much time. This demands instilling a cooperative attitude into the team leaders so they are prepared to share their 'own' team members with other teams.

This versatility can be integrated in different dimensions:

- being competent on different technical platforms, e.g. being able to program both in Delphi and .NET;
- being able to perform a wide range of tasks (selecting and training staff with an all round profile);
- being able to serving different client environments.

This approach has the added advantage that this kind of work is varied, which helps employee satisfaction and retention of staff.

Influencing benefits

An organisation benefits most from having its' primary business processes supported optimally. IT plays a growing part in this: at e-commerce companies the complete primary process depends directly on the quality of IT support. Imagine what could happen when IT fails. Business projects are slowed down when IT does not finish on time, and the market share can be lost when a competitor is able to launch or deliver first; failing of IT leads to production losses; errors in IT lead to loss of company image and as a result of this, loss of customers. Benefits in the management phase of the applications' lifecycle can therefore mainly be found in preventing or reducing losses by improving both the alignment of IT with the business and the quality of IT support both within the organisation and by external suppliers. So benefits can be achieved by investing in:

- alignment of information provision with the business processes;
- motivation and competence of users, who are after all trained and supported by demand management;
- usability of the application (attractive, user-friendliness – especially for e-business), so it can be used effectively and efficiently;
- qualified demand managers; demand managers and information managers who are pro-active and in tune with the business, together with business managers, recognise new possibilities for improving the system;
- effective justification (business cases) of investments in the applications.

This will lead to:

- an improvement of efficiency, effectiveness, innovative capability or flexibility of the business processes;
- more certainty with regard to the productivity of the business.

The above enumeration shows that the influencing of benefits is especially granted to demand management. We have therefore focussed on the question when demand management is economically successful and have formulated the statements below, which a good demand manager should be able to pronounce without blushing:

"I know what the information provisioning costs and whether that is normal."

"I know what users think of it."

"I know what users want."

"I know what business wants, today and tomorrow."

"I know what budget is available."

"I purchase at a competitive price."

"I have an answer to most user questions."

"I act as the owner of the system."

"I have clear agreements with my IT partners and suppliers."

"I work efficiently."

The question is of course how to reach all this ideal state. The remainder of this article attempts to answer this question.

Professionalisation of IT-management

As was said before, during the lifecycle of an information system, most costs are made in the management phase. Developing better manageable products as well as professionalising the management contributes to a cheaper management of applications. For the professionalisation of IT-management several methods and models are available on the market. There are methods for organising management, such as ITIL for technical management, ASL for application management and BiSL for demand management. There are approaches to determine how professionally the management is carried out, such as the maturity models of BiSL and ASL, both supported by self-evaluation, and the WCIT growing phase model [Delen 1999]. Finally, there are models to assess the quality of processes of application maintenance (CMMI) and IT management (IT Service CMM).

Using these 'tools' can lead to improvement of the effectiveness, efficiency and quality of the management. ASL and BiSL recommend the following approach: make a self-evaluation or perform a scan on all or part of the processes. After that, see where the weak spots are in relation to the criteria in the self-evaluation, list the main difficulties in those areas and start to improve from there. In the application management domain that is often the process of incident management, but it could also be service level management, software control & distribution, testing or planning & control. With this approach, ASL and BiSL always link directly to the actual business case, because they can focus on difficulties or goals of the organisation involved.

Delen [Delen 1999] describes how important it is that the maturity of the demand side (demand management) and the supply side (IT suppliers) are in balance. It makes little sense wanting to improve application management when demand management does not grow as well. The fact is that a number of processes are interwoven in such a manner that the total is as strong as the weakest link. Wiggers [Wiggers 2003] pays attention to this too.

So 'good management' requires attention from demand management, application management as well as technical management. Often there are three organisations in place for these three IT-management domains. These can be internal organisation units as well as external suppliers. For optimal support it is essential that a number of relevant processes in these three management domains are well connected and that there is frequent reporting and reflection on the services provided.

Important activities in these three domains that in particular require good cooperation are:

- keeping the information systems up-and-running (daily management, exploitation, use) on a daily basis;
- dealing with service calls;
- carrying out changes (from identifying needs, impact analysis and drawing up specifications to the implementation of tested applications and hardware);
- monitoring of all management activities according to service level agreements;
- working out a longer term strategy for the applications, in alignment with business needs.

This inter-dependent IT-management demands co-operation of managers. Co-operation of employees from the different IT-management domains will however not necessarily arise spontaneously: often the different specialists have never worked with each other before. Past experience with implementation of process-oriented work (which requires extensive co-operation) in IT management organisations shows that even co-operation *within* a domain does not occur naturally. In other words: co-operation between IT-management domains will have to be organised [Meijer 2002].

There are different levels of co-operation:

Operational co-operation consists of a flexible transfer of activities and work from one person or department to another. This form of co-operation can be reached when there is a uniform method of working and a univocal frame of reference: everyone does his own work, but in the same manner. Everyone knows for example what is meant by an 'incident' and in which way

an incident should be dealt with. Employees who's output is input for the work of others (for example the service desk routing an incident to a second-line team) see to it that their output meets the demands of the receiver.

Multifunctional co-operation has the form of an inter-organisational team that puts up a joint performance. An example is project team that draws up the specifications for an application (demand management domain), develops the application (application development domain) in such a way that it can be managed properly (application and technical management domain) and taken into production (application and technical management domain). This form of co-operation asks for a lot more than a standardised working method. There are also certain demands in the social/psychological area, such as: the will to co-operate, listening to each other and respecting each other alongside good working agreements on the results desired and the planning.

Process improvements are preferably carried out in consultation between customer and supplier. Everyone can start improving, using whatever 'tools' are available. A number of starting points that are adhered to for the implementation of ASL and BiSL, are:

- Evolution, not revolution; improvement in small steps and do not try to change the whole world at once.
- Each IT-management organisation is different and has different needs, therefore the implementation will vary accordingly.
- There is no fixed order by which the processes should be improved.
- When a supplier improves his processes, it is important to consult the customer and vice versa.
- Improvement by self-evaluation is always possible: whether there are small or large changes and whether the organisation operates at a low or high level of maturity, a growth path can always be defined.

The next steps are advised for a route for improvement:

- Write an awareness plan, and ensure that all people involved are aware of the necessity and goals of the change.
- Start with a base-line measurement, with the bottlenecks assigned to the appropriate IT-management processes.
- Improve step by step and start, if possible, with a number of quick wins.
- Train staff.
- Assign process management roles (moderately).

Get started.

Keep an eye on progress and adjust accordingly.

Summary

30% of IT budgets is spent on applications management. As a consequence of awareness of this fact, organisations have increased their attention to adequate economical management of applications. However, as soon as an information system has been put into use, there are considerably fewer possibilities to influence benefits and costs than during the design and development phase. Unfortunately it also appears that during the design phase there is little attention for (economical) management aspects. There are also few publications about this shortcoming.

Apart from co-operation between development and IT-management, a good division of roles and co-operation between the three IT-management domains is also of great importance: demand management, application management and technical management. Although the costs directly associated with demand management are low, this function has the highest influence on the total costs and almost exclusive influence on the benefits of IT systems. As far as costs are concerned, a rule of thumb is that the staff costs for development, demand management, application management and technical management are proportioned as 4:2:6:9.

The benefits of applications management are mainly an increased certainty with regard to the productivity of the business and a contribution to the improvement of the efficiency, the effectiveness, the innovative ability or flexibility of the business.

Methods like ASL and BiSL are used to increase the maturity of IT-management organisations in order to, within the inherent limitations of influencing costs and benefits during the IT-management phase, reach a better economical management of applications.

References

- [Berghout 2001] Berghout, Egon, "Van beheerparadigma tot beheerparadox", in: Wouter de Jong en Marcel Spruit (red.), *Complexiteit van beheer, beheer van complexiteit*, DUP Satellite, 2001
- [Delen 1992] Delen, Guus en Maarten Looijen, *Beheer van informatievoorziening*; Cap Gemini Publishing, 1992
- [Delen 1999] Delen, Guus en Hans Luijendijk, "Outsourcing, insourcing en cosourcing: de sourcing-cyclus", in: Jan van Bon (red.), *IT beheer Jaarboek 1999*, ten Hagen & Stam, 1999
- [Dolder 2004] Dolder, Caroline van, "Perspectief: functioneel beheer, hoe sterker de schakels hoe beter de ketting" in: *IT Beheer Magazine 2/2004*, ten Hagen & Stam, 2004
- [Drift 2002] Drift, Wil van der en Mark Smalley, "Application Lifecycle Management", in: Jan van Bon (red.) *IT Beheer Jaarboek 2002*, ten Hagen & Stam, 2002
- [Drift 2003] Drift, Wil van der en Mark Smalley, "Kosten van applicatiebeheer onder de loep", in: Jan van Bon (red.), *IT Beheer Jaarboek 2003*, ten Hagen en Stam, 2003
- [Gartner 2003] Gartner, *IT Spending and Staffing Survey, September 2003*, Gartner, 2003
- [Meijer 2002] Meijer, Machteld en Jolanda Meijers, "Effectief IT-beheer: samenwerken waar nodig, zelfstandig opereren waar mogelijk", in: Jan van Bon (red.) *IT Beheer Jaarboek 2002*, ten Hagen & Stam, 2002
- [OGC 2002] Office of Government Commerce, *ITIL Application Management*. TSO, 2002
- [Pols 2001] Pols, Remko van der, *ASL, een framework voor applicatiebeheer*, ten Hagen & Stam, 2001
- [Wiggers 2003] Wiggers, Peter, Marja de Boer-de Wit en Henk Kok, *IT Performance management*, Elsevier Butterworth Heineman, 2003.

Internet: www.asbisfoundation.org

¹There are few publications known to the authors which explicitly deal with this subject. The ITIL book *ITIL Application Management* [OGC 2002] does pay attention to this.

² Of course an application supplier (take Bill Gates) can also have benefits by, for example, selling many packages with an attractive margin, but that is not what it is about in this article.

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