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specializing in Business Technology

# Content Management Systems – Business effects of an implementation

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IT University of Göteborg
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**ABSTRACT**

This thesis was performed at the business areas of Volvo Group where we evaluated the business effects from an out-of-the-box content management system (CMS) implementation. A CMS helps an organization to collect, support, organize and publish information on the Internet, intranet and extranet. Our purpose with this thesis was to evaluate a CMS implementation and to compile a model for CMS evaluation to be able to show the business effects generated to the organization by the CMS. To compile a model we studied literature on CMS and evaluation of IS/IT-investments. Our model was customized and consisted of Observed CMS business effects, CMS business effects and impact, IS/IT-investment evaluation and Additional IS/IT-investment evaluation. The conclusion provided to us by our evaluation model was that the positive business effects from a CMS implementation are "effective work process", "content policy", "togetherness", "reduced hosting costs", "reuse of content", "increased web presence" and the negative are "low flexibility".

Keywords: Content Management System (CMS), IS/IT evaluation, IS/IT-investment, ex-post evaluation.

The report is written in English.

**ABSTRAKT**

Detta examensarbete utfördes på affärsområdena på Volvo Group där vi utvärderade de verksamhetseffekter som uppstått efter implementationen av ett content management system (CMS). Ett CMS hjälper en organisation att samla, stödja, organisera och publicera information på Internet, intranät och extranät. Syftet med uppsatsen var att utvärdera en CMS implementation och att skapa en modell för utvärdering som kunde visa de effekter som genererats till organisationen av CMS. För att skapa modellen studerade vi litteratur som berörde CMS och utvärdering av IS/IT-investeringar. Vår modell var anpassad och bestod av Observed CMS business effects, CMS business effects and impact, IS/IT-investment evaluation och Additional IS/IT-investment evaluation. Vår utvärderingsmodell gav oss slutsatsen att de positiva effekter som genererades från CMS var ”effektiv arbetsprocess”, ”innehållspolicy”, ”samhörighet”, ”reducerade driftskostnader”, ”återanvändning av innehåll”, ”ökad webbnärvaro” och den negativa var ”låg flexibilitet”.

Nyckelord: Content Management System (CMS), utvärdering av IS/IT, IS/IT-investering, ex-post utvärdering.

Denna rapport är skriven på engelska.

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*Therese Karlsson & Jennie Boije af Gennäs*

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# 1 Introduction

## 1.1 Background

> Content management is a significant business issue for any organization that maintains a website that has a large number of pages or has frequently changing content provided by multiple providers (Goodwin & Vidgen, 2002, pp.70).

Content Management Systems (CMS) are systems that assist in organizations to collect, support, organize and publish information on the Internet, intranet and extranet. CMS are gaining popularity in both large and small businesses due to the increasing need to handle the expanding amount of information on the web today. According to Hallikainen et al (2002) the rising interest in CMS can be traced to timing, cost and quality considerations and numerous problems related to this are e.g. delays in publishing, erroneous or out-of-date content, pressures on staff and infrastructure associated with web environment. Hallikainen et al (2002) also emphasize the potential of CMS to work as a strategic tool that effects the organization on a company wide or even global level. The existing research on CMS is poor and Bergman and Ryman (2004) mean that both the strategical and technological aspects of CMS are unexploited.

In contrast to CMS, evaluation of IS/IT-investments is a highly researched area, many researchers are putting the main emphasis on the justification and selection of IS/IT-investments in the ex ante evaluation phase. However little attention is put on the ex-post evaluation phase although researchers (Hallikainen and Nurmimäki, 2000), point out the importance and potential of ex-post evaluation.

## 1.2 Focal question and purpose

Today there is an increasing need among organizations to see the actual return of an organization's IS/IT-investments and the business effects (Lindberg et al, 2003) . Since Content Management is an area where there has been relatively little research, it is therefore interesting to examine what business effects such an investment generates in an organization. Our focal question will therefore be:

*What are the business effects after implementing a Content Management System?*

To accomplish the task we will compile a model that captures and evaluates the effects an implementation of CMS has generated in forms of both quantitative and qualitative values in an organization. Possible sub questions that will help us answer our focal question are: What expected effects of a CMS implementation are described in literature? What effects can be observed in a real organization? What model is appropriate for describing and analyzing the effects of a Content Management system implementation?

To be able to answer these questions we will perform a case study at Volvo Group who recently implemented a CMS. Since Volvo Group is a global actor and the CMS is used over geographical boundaries the business effects revealed will be generalized. In the study we aim to be concrete and to evaluate the actual effects of a CMS implementation in an ex-post stage. We will thereby contribute to the current research on both CMS and ex-post evaluation of IS/IT-investments.

## 1.3 Delimitation

This study will have an organizational focus where we aim to capture the business effects from an implementation of CMS. We will therefore not bring up technical or user perspectives regarding CMS and evaluation of IS/IT investments. We will also focus on post-implementation and will thereby not bring up issues of the pre parts of the evaluation life-cycle such as justification and selection.

# 2 Method

*In this chapter we will describe the scientific procedure applied during our work. We will motivate our choice of research strategy, data collection and analysis method, and we will describe our literature review. In doing, so we aim to establish credibility to the later presented results.*

## 2.1 Research strategy

We found the case study as the appropriate research strategy for answering our focal question. Backman (1998) means that case studies can be especially suitable when performing an evaluation since the objects of the study often are very complex. A case study is also useful when the investigators' goal is to expand and generalize theories (Yin, 1994), which we wanted to do.

Yin (1994) discusses four types of case study designs: Single-case (holistic), single-case (embedded) multiple-case (holistic) and multiple-case (embedded). The design that fitted our case-study was the single-case (embedded). The single case may be used for confirming, challenging or extending theory. A case study is embedded when it involves more than one unit of analysis and thereby consists of one or more subunits. In our study the subunits was represented by the business areas of Volvo Group. The subunits often add significant opportunities by enhancing insight into the case study. However, there are some pitfalls to be aware of when using embedded design. According to Yin (1994) problems arise if the case study focuses only on the subunit level and thereby fails to return to the larger unit of analysis. It is also problematic if the data collection in organizational studies focus only on individual employees resulting in that the original phenomenon becomes the context instead of the target. Our study was made from a Volvo Group perspective and to minimize the risk of focusing only on the subunit level of our case study our respondents was the global info masters from business areas within the Volvo Group. The global info master is responsible for the web publication in the business area and reports directly to the program manager at Volvo Group. To avoid focusing on individual employees the global info masters answered questions regarding the CMS effects from an organizational perspective.

## 2.2 Literature review

We started our study with a review of the existing research on CMS, primarily from an organizational perspective. As already been noted, the research results were poor. Keywords that we used when we searched for information were "Content Management", and "Web Content Management". We also reviewed literature on IS/IT-evaluation where we used keywords such as "IT investment", "IS investment" "evaluation", "ex poste evaluation", "post evaluation", "intangibles", "tangibles", "benefits", "costs" and "ROI". As sources for our literature review we primary used journal databases available through the library of Chalmers and Gothenburg University e.g. EBSCO Host, ACM, Science Direct, and ProQuest. We also had access to a limited amount of conference material through IT-university e.g. ECITE. We used the Internet search engine "Google" for complementing with relevant information.

## 2.3 Data collection and analysis

According to Backman (1998) the case study is especially appreciated in qualitative research, but Yin (1994) means that the case study can be based on any mix of qualitative and quantitative evidence. However, we chose in our study to use a qualitative method for collecting and analyzing data since its primary focus is an understanding purpose (Holme & Solvagn, 1996).

When performing a qualitative study, Lindgren and Stenmark (2002) mean that data given by informants should not be accepted at face value. Instead they suggest (see Walsham, 1995) that data is subjected to the researcher's interpretation of the respondents' words. The researcher is also required to reflect on their own theoretical assumptions (Lindgren & Stenmark, 2002, see Van Maanen, 1979). It was therefore important that we selected informants that was able to give us useful data and that we asked the right questions in order to be able to answer our focal question. To meet these requirements we explored the existing literature on CMS and when we had an understanding of what effects could be expected we compiled our interview questions.

*Interviews*

The main contribution to our data collection was six in-depth interviews with global info masters of Volvo Group business areas. Other sources of data were also used such as documentation and conversations with other people engaged in the implementation e.g. Program Manager 2004 and 2003, E-business manager in Europe and IT-governance. According to Easterby-Smith et al (2002) the in-depth interview is fundamental in the qualitative method. As suggested by Wallén (1996) the interviews were recorded, transcribed and approved by the respondents. According to Yin (1994) the recording of interviews provides a more accurate rendition than any other method. We have conducted interviews with all the business areas of Volvo Group except from Financial Services due to certain circumstances outside our control. We have included Volvo Trucks North America, even though they are part of Volvo Truck, since they are large enough to be seen as a business area of their own. We were able to record five of six interviews whereof one was made by telephone. On two of the interviews two respondents representing the same business area were present. One interview was made through e-mail. The recorded interviews were between 40 and 80 minutes long.

**Table 1** Interview information

| **Business Area** | **Interview form** | **Respondents** |
|---|---|---|
| Volvo Aero | Face-to-face | 1 |
| Volvo Buses | Face-to-face | 2 |
| Volvo Penta | Face-to-face | 2 |
| Volvo Construction and Equipment | Telephone | 1 |
| Volvo Trucks | Face-to-face | 1 |
| Volvo Trucks North America | Mail | 1 |

*Analysis process*

We chose to use the grounded analysis when analyzing our collected data. The process of grounded analysis is to derive a structure out of the data by systematically searching for themes, patterns and categories (Easterby-Smith et al 2002). The material was sorted in the categories of CMS where effects were expected to appear, which was a contribution from our literature review, and we presented the contribution from each business area. We then generalized the contributions from each CMS-category to a summary and thereby achieved what types of effects that had been generated from each CMS category. After this we visualized the effects. We also determined what impact the effects had on the organization which was a subjective judgment based on how we had interpreted our respondents answers.

# 3 CMS is an IS/IT-investment

*We will in this chapter present the concepts of Content Management Systems and IS/IT-investments. We will present important aspects described in litterateur to give an explanation about CMS and how CMS can fit together with the business. We will also present what the expected outcomes of a CMS are according to theory. In the theory about IS/IT-investment we will have a focus on ex-post evaluation and we will illustrate the potentials and problems of strategic IS/IT-investments. We will also discuss what to evaluate and benefits of IS/IT investments. Finally we discuss considerations needed when compiling an evaluation model and how CMS is aligned with general benefits of IS/IT-investments.*

## 3.1 Content Management Systems (CMS)

Content Management Systems (CMS) is a part of the larger concept Content Management. Some of the literature we found has a focus on Web Content Management (WCM) which is a part of the concept Content Management Systems (CMS) and it is also often described as the same thing both in literature and in organizations (Bergman & Ryman, (2004). We have therefore chosen to use the concept of CMS in our thesis.

CMS are gaining popularity in both large and small businesses due to the increasing need to handle the expanding amount of information on the web today. Bergman and Ryman (2004) describe CMS as a non technical tool that concentrates on coordinating information that will be implemented and maintained in a web based network where end users easily can manage the content on the web without support from experts.

*The CMS lifecycle*

The CMS lifecycle can be described as a living system where new content must be created, updated and destroyed when necessary (Goodwin & Vidgen, 2002). CMS lifecycle is a common concept in litterateur and there are many models that describe it e.g. Gilbert et al (2000), Goodwin and Vidgen (2002), Bergman and Ryman (2004). We have chosen to describe the lifecycle according to Gilbert et al (2000) that presents how the content is moving around the organization and between organizations, partners and customers. The content is also moving in and out of repositories and through some workflow processes, whether defined or ad hoc. It is often integrated with applications other than the origination application and therefore, Gilbert et al (2000) claims that the central elements to consider in building a content management strategy are those of repository, workflow and integration. Goodwin and Vidgen (2002, pp. 66) describe CMS as primarily a process, not a product and define it as '*an organizational process, aided by software tools, for the management of heterogeneous content on the web, encompassing a life cycle that runs from creation to destruction*'.

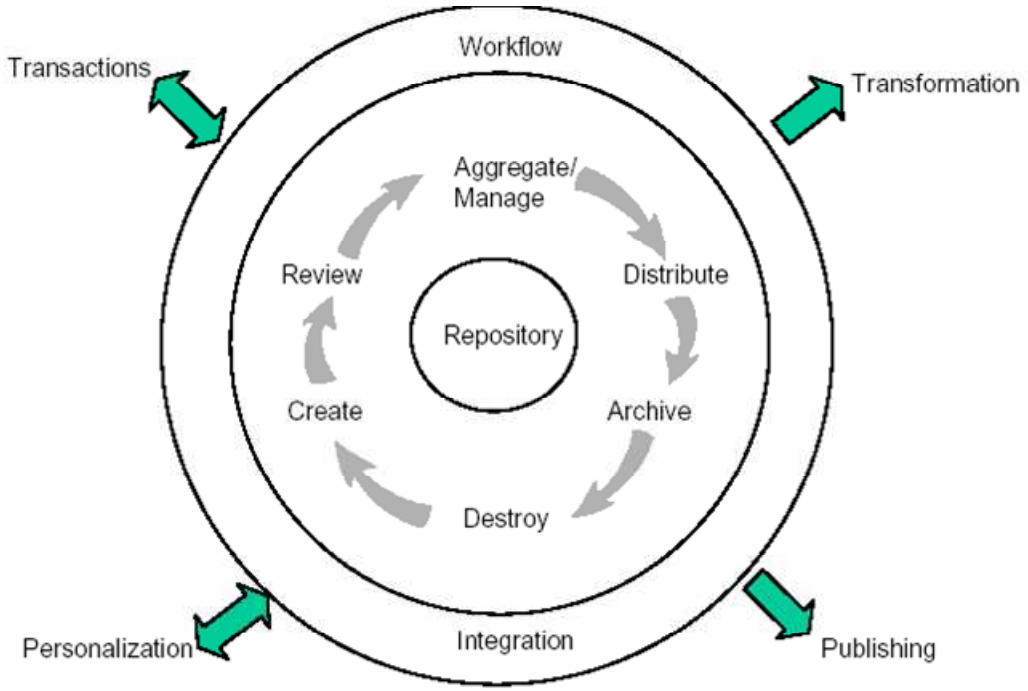


**Figure 1 The Content Management Life Cycle (Gilbert et al, 2000)**

The central elements of the lifecycle presented by Gilbert et al (2000) are described in literature as follows:

The *repository* preserves the content and enables reliable persistent use of the content and integrated repositories will add the functionality required not only to manage the information but also to understand the information content and its structure (Gilbert et al, 2000).

*Workflow* enables the business processes in which the content exists. Workflow is described as the engine that moves and tracks content as it interacts with, and is modified by, processes (Gilbert et al, 2000). Addey et al (2002) describes workflow as the "glue" between the human processes and the CM system. Workflow is, according to Nakano (2002), involved in improving productivity and in facilitating a smooth relationship among people, projects and the business environment. In a CMS, Gilbert et al (2000) emphasize that workflow may automate the routing and approval of content created by a non-technical business person for editing and authorization prior to publication to the Web site.

There are two aspects of *integration*; mobility and portability. Mobility is the movement of content between back-end systems as well as between trading partners. Portability refers to the formatting of content so that it can be transported and processed easily by receiving applications (Gilbert et al, 2000).

The items outside the lifecycle circle, transformation, publishing and transactions are in varying degree outside our focus area of the CMS as they are technical issues. We will yet describe them as they are a part of the lifecycle but they will not be a part of our analysis. Personalization is also outside the circle but is of more interest to us as it contains of roles and is therefore going to be included in the analysis.

*Transformation*

Content transformation occurs whenever existing content is modified by an automated process. For example, a typical case is where it must be integrated with business partners or other processes. There are two ways to transform content between back-end systems and trading partners. Content can be transformed and stored: 1) in a normalized form, in some form of content repository, for ready access and distribution; and 2) on an on-demand basis as it moves between applications (Gilbert et al, 2000).

*Publishing*

Content components must be rendered and delivered via a suitable medium and channel. Systems will be multi-channeled, enabling both web-centric and other delivery media. To achieve this, content must contain rich mark-up identifying the semantic relationship of components. Publishing systems must be able to render and present content for each targeted channel, being aware of the capabilities of each channel. Channel awareness is an important consideration since next generation CM systems will require additional sophistication. For example, information may contain information extracted from a wire service news feed, a graph or a short streaming video (ibid). Goodwin and Vidgen (2002) point out the need for CMS solutions to be capable of handling different degrees of structure. Some content have a high degree of structure as employee records and other content like a video clip has a low degree of structure and in between there are a range of content which will display greater or lesser degrees of structure.

*Personalization*

Content can be personalized based on user profiles controlled via a log-in process, cookies or user behavior on the site. Business roles can all be presented customized information related to their roles in the organization and given access to appropriate files and resources (Gilbert et al, 2000). Goodwin and Vidgen (2002) points out that personalization relates to the ability to present different users with different views and different data depending on preferences, access profiles, role, previous accesses etc.

*Transactions*

Content can influence transaction processing, and the transaction context can influence content generation. Aspects of the context can include the identity, group and security credentials of a user or process, as well as cookies and other variables (Gilbert et al, 2000).

### 3.1.1 CMS in a business context

Implementing a CMS is a high-level strategic activity that affects many people in an organization and the impact on the organization is not often widely understood (Addey et al 2002). Gupta et al (2001) mean that an implementation of CMS provides the opportunity to evaluate and refine existing processes and to formulate new business rules for managing information. Nakano (2002) means that building a CMS requires changes that concerns people, processes, assets and tools since many parts of the organization contribute to the daily operations and set the directions for web

initiatives.

Gupta et al (2001) present three basic approaches to the integration of business rules and processes associated with Content Management solutions:

1. Centralized approach – in this approach all content is canalized through one group who act as the 'web police' that defines business rules and procedures and ensures everyone abides by the rules. The advantage is the resulting process control and the disadvantage is that all content must pass through this group which can result in a bottleneck.

2. Distributed approach – here small individual workgroups are responsible for the content of their areas. Each group may have one or more lead approvers but there still exist one central group who defines business rules and procedures. The advantage is that the responsibility and the workload are distributed and the disadvantage is that individual groups can interpret and enforce the business rules and procedures differently than created by the central group.

3. Hybrid approach – combines the features of both a centralized and a distributed approach. The combination uses a two-tiered approach where the top-tiered content represents official documents that require well-defined and specific procedures that are strictly enforced. The lower-tiered content represents unofficial documents created and published by local workgroups.

To gain full advantage of a CMS implementation, Addey et al (2002) mean that different roles must be assigned to workflow. The larger organization or site, the more important workflow and roles becomes. The ideal situation for a CMS is according to Addey et al (2002) to support a full user/role access control system, allowing access to be limited by user, by site area and/or by template. In a large site with many users it is preferable to structure the user permissions so that they spread the administration workload. A CMS needs to be flexible enough to define users and groups of users, with different permission and suggest that some users may take a "superuser" role, with permissions to create, modify and delete other users' permissions (Addey et al, 2002). An example of different user roles and rights groups that can be applied to the publishing and managing process surrounding a CMS is given by Microsoft (2003), see Table 2:

**Table 2** Microsoft user roles, Microsoft (2003).

| User Role | Tasks Performed |
|---|---|
| Subscriber | Browses the site |
| Editor | Approves or declines content. |
| Moderator | Edits, approves, or declines content. |
| Resource Manager | Deletes, replaces, and creates shared resources. |
| Template Designer | Creates channels, resource galleries, template galleries and templates. |
| Channel Manager | Creates channels, resource galleries, and template galleries. |
| Administrator | Have rights to perform all of the above tasks, and can create rights groups and assign users to them. |

Bergman and Ryman (2004) emphasize that CMS is based on roles. However their study of the intranet at Volvo IT showed that the "superuser" role was almost the only role used and also assigned to few persons. Bergman and Ryman (2004) argue that this is against the foundations of CM and that more users should have the authority to create content in order to achieve a smother and more efficient process.

### 3.1.2 CMS outcomes

We have discovered that there is a lack of research pointing out the benefits of CMS. In our literature study we only found two articles and one book that discussed the subject. Below we have categorized the benefits we found. The categorization is complemented with information from Microsoft CMS (Microsoft 2001, see Table 3 ) which is representative for the available information from vendors.

**Table 3** Description of CMS benefits.

| **CMS benefits** | **Effects** |
|---|---|
| Collaboration/ Information sharing | Workflow functions and a common repository enable users across divisional and geographical boundaries to contribute to a project. Project managers can efficiently monitor location and status of any assignment (Gupta et al, 2001). |
| Content security | Content must complete a defined approval chain before it can be published. Users with appropriate access and authority can publish content, while users with less authority only can view the content (Gupta et al, 2001). Placing responsibility for content in the hands of the business user and providing appropriate tools ensure content is up-to-date and responsive to current customer needs (Microsoft, 2001). |
| Standardization | CM promotes a uniform approach to managing information resources. Standardized training, administration, and support can be applied corporate wide with few exceptions (Gupta et al, 2001). Standardize content structures (Microsoft, 2001). |
| Scalability | The exploitation of intranet technology in corporations allows opportunity to every employee to potentially contribute content to the corporate, divisional or departmental intranet (Gupta et al 2001). |
| Cost efficiency | Reduce content update costs and improve frequency of information publication. Reduce site creation, maintenance, and enterprise rollout costs by creating automated processes (Microsoft, 2001). |
| Reusability | Utilization of the same content for multiple media. Style sheets render content to multiple output media resulting in reduced need for intervention by technical experts. Site-wide changes like updating a disclaimer notice or a logo become relatively simple (Gupta et al 2001). Ideally, data will not be stored redundantly in the organization. There will be one source accessed by all business applications, whether internal or external (Goodwin & Vidgen 2002). |
| Effectiveness | Maximize effectiveness of team skills by enabling business users to publish their own content and technical staff to work on site infrastructure (Microsoft, 2001). Infrastructure for navigation, content presentation, and metadata simplifies and speeds up information retrieval (Microsoft, 2001). Several CM systems have tools that allow non-technical staff to easily create and modify site content without having to learn the technical aspects (Gupta et al, 2001). Saving time, increasing throughput by eliminating waiting and allowing greater ability to undertake web initiatives (Nakano 2002). |
| Consistency | CM allows various corporate websites and intranets to have a consistent look-and-feel (Gupta et al 2001). Centralized control of design and branding ensures that the message and site design are consistent with a company's brand and values, and a professional face is displayed to the world (Microsoft 2001). |

*Problems*

Although there are many potential benefits generated by a CMS there are a number of issues presented by Goodwin and Vidgen (2002) that can cause problems if they are not properly managed:

*Bottlenecks*: The web management function can become a bottleneck for content revision. Content arrives in different forms and has to be edited, usually manually, into a form suitable for publishing on the web. Funneling content through a web manager resource can lead to delays in publishing on the web.

*Consistency*: Where web editing is transferred to departments there can be inconsistencies in the look and feel of the site and variable quality of layout and content.

*Navigation*: Where structure and content are not closely controlled, there is a danger that navigation and search capabilities will suffer. This is of major importance as, without these, it becomes hard for the user to find the required information, thus degrading the value of the entire intranet.

*Data duplication*: In many cases, the content on the web is a copy of data held in a departmental or institutional system; changes to one system are manually replicated in the other system. Where data needs to be copied then replication should be automated and controlled.

*Content audit and control*: Unauthorized content may appear on the website. Material published on the web should be subject to a review and authorization process to ensure that it is acceptable from a marketing and legal viewpoint. Procedures and controls need to be defined to manage the web publishing process.

*Tracking*: To use content effectively it is necessary to know things about the content, such as who created it, when was it created and when it was last updated. The ability to track and reconstruct the changes that have occurred to content is an important part of content management.

*Business process:* Content is often tied tightly to business processes. For example, the production of a market intelligence report is a complex business process, involving data collection, data analysis and the generation of commentaries and forecasts. Not only is the ‘final’ report published on the web, but also updates and revisions are likely to be needed on a regular basis. The business process and web content management need to be integrated, allowing content to be published internally for inspection and review and only released once it has been approved. Furthermore, the process itself may need to be redesigned to take account of differences between paper and web publishing.

*Challenges*

In addition to the above problems the literature also identifies challenges. Gupta et al (2001) emphasize that the greatest challenge to implement a CM solution is not in the technology but in the adoption of business policies and rules that are necessary for the technology to be effective. Other important challenges pointed out by Gupta et al (2001) are:

*Defining standards* – In the absence of policies, individual groups will be free to develop technical, design, and content solutions in different directions.

*Communicating new policies* – While a CM system can provide a mechanism to collaborate and share data, the existence of the system will not change the business practices that inhibit data sharing. Users must be familiar with the new policies. Communication of new processes, rules, and workflow is the first step in gaining universal compliance.

*Assigning roles and responsibilities* – Formulating procedures and policies to define the boundaries of the different phases of the content life cycle and how to pass form one to another will require judicious assignment of roles and responsibilities. Bottlenecks between any two phases could result in performance degradation.

*Selecting a best-fit tool* – There is no industry consensus on standard CM features and there exists no single vendor or tool that resolves or will resolve all CM issues. In order to choose a best-fit solution or tool, a clear understanding of corporate need is required, which can be daunting task. There are very few (if any) vendors selling CM systems that are useful out-of-the-box with painless integration into an existing site development/production/workflow environment, as a result, justifying the initial (and ongoing) expense for pricey commercial CM tools can be a big challenge (Gupta et al 2001 see Mathews 2001).

## 3.2 Ex-post evaluation of IS/IT-investments

There are various recommendations in literature on what phases should be evaluated (e.g. Bednar & Adams (2003), Hallikainen (2003), Deschoolmeester & Braet (2001), Simmons (1994), Farbey et al (1992)) but generally evaluations should be performed before, during and after the implementation of the system. Hallikainen (2003) suggest that evaluations can and should be done in practically all phases of the system's life cycle. In comparison with investment preparations, especially in form of feasibility studies, Hallikainen and Nurmimäki (2000) emphasize that relatively little attention has been devoted to evaluation of the investment outcome. Such an inquiry would focus on the expected functioning of the system and the scope of this inquiry would involve evaluating the realization of a wide spectrum of expectations and divergent levels of analysis.

Farbey et al (1992) see Hawgood and Land (1988) say that the evaluation process must provide the organization with a good estimation of the outcome of the investment and later actually evaluate the outcomes in terms of the organizational interest. They emphasize that without an evaluation of benefits of a new system it is not possible to control and harvest its benefits. Mende et al (1994) emphasizes that the evaluation of an existing system should not be limited to the system itself but must include the business context and the way it is used within the organization. Users and business managers are assumed to have an insight to the business context and therefore they should take an active role in the assessment process. The significance of evaluating in the production phase is according to Hallikainen and Nurmimäki (2000) intrinsic of the nature of information systems since they evolve over time both in structure and in behavior. The underlying reasons are first that they are used in ways not anticipated by design, and second, that they adopt attributes from informal information systems (ibid).

The discussion above has given us a comprehension of the importance to consider what the expected effects is before the IS/IT-investment is done to be able to see what has been realized when you make an ex-post evaluation. Davern and Kauffman (2000) who are inspired by methods created by information economics together with subjective expectations and existing business process level performance data agree saying that an explicit consideration of realized value relative to potential value in ex-post evaluation of an IS/IT project can help management learn why potentials may have been left unrealized. They also say that it is important to assess potential value to see what complementary investments need to be made to ensure that potential value can be obtained. Davern and Kauffman (2000) stress that one can discover potential value either through a technology push or through a business pull. When a technology push occurs, a technology solution is discovered that can address a previously undiscovered business problem or opportunity. In contrast, when a business pull occurs, a business problem or opportunity is the first thing to be identified, and only then is the drive provided for the development of a technology-based solution. While the technology push or business pull-driven potential value of an IS/IT solution may exist at multiple levels of analysis, each of which must be measured, measuring potential value always requires a consideration of the business process context in which the IS/IT is to be deployed. Davern and Kauffman (2000) say that it is through an understanding of business process that useful context specific data and methods for measuring potential value may be identified and the accuracy of the data properly determined. They also say that managers often underestimate the expected return from an IS/IT project, in part because their assessments are anchored so heavily on cost issues and in part because they fail to recognize the alternative value inherent in most IS/IT projects.

However, in a study of a sample of the largest firms in Finland, representing a variety of industries Hallikainen and Nurminäki (2000) see Hallikainen et al (1997) reported that they were able to conclude that companies seldom evaluate IS/IT investments after the initial project proposal. The study also showed that if an evaluation is performed during the production phase, it focuses on operational measures, like efficiencies as opposed to effectiveness. According to Simmons (1994) post-implementation reviews usually focus on the development process, the functionality of the system and occasionally whether business benefits have been achieved. In her study she found that by obtaining feedback of agreed business parameters, business managers could be encouraged to implement the organizational changes that were necessary to achieve the full business benefits.

### 3.2.1 Strategic IS/IT-investments

According to Pearlson (2001), IS strategy has from 1960s to 1990s been driven by internal organizational needs; from lowering existing transaction costs to redesign business processes. She also means that new technology is a driving force for organizations to get a competitive advantage, which has led us into Era IV where value creation and collaborative partnership takes a central role of IT. Pearlson (2001) presents an overview of the evaluation of IS/IT from an organizational perspective, see Table 4.

**Table 4** Eras of information usage in organizations, Pearlson (2001)

| | Era I, 1960s | Era II, 1970s | Era III, 1980s | Era IV, 2000 |
|---|---|---|---|---|
| Primary role of IT | Efficiency Automate existing paper-based processes | Effectiveness Increase individual and group effectiveness | Strategic Industry/ Organizational transformation | Value creation Collaborative partnership |
| Justify IT expenditures | ROI | Increasing individual and group effectiveness | Competitive position | Adding value |
| Target of systems | Organization | Individual manager/group | Business processes | Customer, supplier, ecosystem |
| Information model | Application specific | Data-driven | Business driven | Knowledge-driven |
| Dominate technology | Mainframe "centralized intelligence" | Microcomputer "decentralized intelligence" | Client Server "distribution intelligence" | Internet "ubiquitous intelligence" |

According to Hallikainen (2003), IS/IT projects are often a part of a larger strategic development program that sometimes includes significant changes in business processes. Hallikainen et al (2002) mean that an information system has strategic power if it helps an organization to gain competitive advantage, to improve productivity and performance, to enable new ways of managing and organizing, or to develop business. Hallikainen (2003) points out that the output of the strategic investment process may have wide organizational effects and that the success finally is measured by the same measures as business success in general. Andresen et al (2000) emphasize that the nature of IT is such that the development of IS/IT infrastructure cannot be regarded as another capital investment but as an inseparable part of business processes and design. Ashurst and Doherty (2003) mean that IS/IT provides a variety of impacts upon the design of business, its economic performance and the working conditions of members of staff. Technical change is according to them a catalyst of organizational change. Andresen et al (2000) say that the benefits of IS/IT are only fully realized when systems and available technology are applied to specific and relevant tasks and aligned with the organization business strategy. The ultimate criterion for success is an overall improvement in the business position of the organization. Therefore, the alignment of the business and technology strategy is of paramount importance. However, Dos Santos & Sussman (2000) mean that organizations typically focus on improving the efficiency of current activities instead of thinking how applications may help them reengineer and/or redefine the organization. A case study made by Suwardy et al (2003) showed that although most businesses had achieved operational benefits from their IT investments, very few translated these into strategic business benefits.

### 3.2.2 Benefits of IS/IT-investments

It is today commonly believed that IS/IT will generate various kinds of benefits (Hallikainen, 2003) but for several years there has been an ongoing debate about

whether or not IS/IT pay off, the so called IS/IT paradox. A number of issues are discussed by Willcocks and Lester (1996) that contribute to the IS/IT paradox e.g. poor evaluation methods and management practice. Berghout and Remenyi (2003) see Remenyi (1999) agrees and identifies four major problems with IS/IT benefits measurement and management:

*Benefits such as intangible performance improvements*. Unlike cost, such benefits primarily impact processes inside an organization and seldom associated to goods or services sold on an outside market. Their value is, therefore, predominantly dependent on individual judgment and not on market prices.

*The issue of information reach*. Even for the most straightforward application it is never simple to understand exactly what the results will be of bringing together information about different business issues. There will nearly always be knock-on effects, especially when such a system results in integrating business processes.

*Tangible and intangible benefits*. Some aspects of an information system may produce hard or tangible benefits which will directly improve the performance on the firm, such as reducing cost and will therefore be seen in the accounting numbers of the organization as an improvement in profit and perhaps in return on investment. However, other aspects will only create soft or intangible benefits, which will make life easier in the organization, but will not directly lead to identifiable performance improvements. In a competitive market cost reductions are primarily transferred to customers and the associated prevented competitive loss ma also not show up in the accounting numbers of the firm.

*Benefit evaluation*. Many information systems will have some easy to identify or obvious benefits which will be sustainable over a period of time. However, as the development of the project proceeds and the ramifications of the system more fully understood, new ideas about potential benefits will also become apparent. This will have been due to the process of creative dialogue between the principal stakeholders, which will bring to light new business processes and practices. In short, potential benefits should not be seen as being static, but rather evolve as a greater understanding in gained of the organization and the role which the system will play in this.

Evaluation methods considering only financial perspectives are considered insufficient by many researchers (e.g. Deschoolmeester & Braet (2001) Andresen et al (2000) see Semich (1994) and Ballantine & Stray (1998), Remenyi (1999), Simmons (1994), Farbey et al (1992)), and they all emphasize the need for considering both tangible and intangible benefits and values when evaluating IS/IT-investments. They argue that traditional return on investment (ROI) in most part ignores all that companies are trying to achieve with IS/IT. Dos Santos and Sussman (2000) address the issue of management practice and mean that organizations invest in the latest technology to increase efficiencies and profits, but their failure to redesign and reorganize causes delays of the return on that investment. According to them the underlying causes can be subsumed under two broad categories: failure in strategic thinking and failure of senior management to overcome resistance to change. Farbey et al (1999) mean that instead of measurement, judgment has to be used to ascribe a value and Willcocks and Lester (1996) suggest that the way out of the IS/IT paradox is to move away from a ‘control through numbers’ assessment culture and instead

focus on quality improvements. This discussion is the foundation of our approach when compiling the model and making the case study evaluation.

To summarize the benefits found in literature we have compiled Table 5 containing categorizations of benefits from IS/IT investments with different emphasis.

**Table 5** IS/IT benefits

| **Benefits of IS/IT-investment** | |
|---|---|
| Efficiency | Saving time (or avoid spending time), manpower and money (Farbey et al, 1992). Automate existing processes (Pearlson, 2001). |
| Effectiveness | Being able to carry out either new activities or existing ones at a high quality level (Farbey et al 1992). Improved productivity and performance (Michael J. Earl quoted by Powell, 1992). |
| Management | Improving the quality of management and enhancing individual jobs (Farbey et al, 1992). Enhanced management information, more focused decision support (Michael J. Earl quoted by Powell, 1992 see Hallikainen & Nurmimäki, 2000). |
| Communication | Linking different systems and exchanging information (Farbey et al, 1992). |
| Strategy | Enabling corporate objectives to be met or gaining competitive advantage (Farbey et al, 1992). Strengthening of competitive position and enable new ways of organizing (Michael J. Earl quoted by Powell, 1992). Competitive position, organizational transformation (Pearlson, 2001). |
| Value creation | New innovative systems with the target of being customer supplier and ecosystem oriented that is adding value and provides collaborative partnership. (Pearlson, 2001). |

Hallikainen and Nurmimäki (2000) feel safe to state that any single benefit aimed at may alone represent the sole purpose of the investment. Alternatively, benefits may be sought after in various combinations. Farbey et al (1999) say that some of the anticipated benefits in an IS/IT-investment have a clear cause and effect relationship but many are only indirectly related through a chain of consequences, or jointly the consequence of a host of related or even unrelated concurrent changes. Further Farbey et al (1999) say that benefits will not only come from changes in IS/IT but from the organizational change implied of which IS/IT is only a part. They mean that it is hard, and sometimes even wrong to attribute benefits solely to the investment in IS/IT, no matter how direct the benefits appear on the surface. In a contemporary, conceptual view Hallikainen and Nurmimäki (2000) stress that IS/IT are recognized to comprise not only software like user-and database applications at the core – but also hardware, use processes, use procedures, user roles together with the organization and its structural instances, not forgetting the data either. These components singly or in combination enable a company to actively pursue gains in competitiveness.

In addition to the commonly established IS/IT benefits we have found that there is now a strive to incorporate something very intangible into the established financial framework which concerns the debate concerning trademarks and brands. A number of researchers and organizations have for several years argued that trademarks and brands should be recognized as assets on the balance sheet even if they for example

are internally generated or hard to separate from the organizational goodwill (Johansson et al see Power, 1992). Johanson et al, 2002 see Aaker, 1996 pp. 8 visualize the 'separability' problem and define brand equity by noting that it is 'a set of assets (and liabilities) linked to a brand's name and symbol that adds to (or subtracts from) the value provided by a product or service to a firm and/or that firm's customers'. Maybe the strive to incorporate the increasingly more important trademarks and brands of organizations into the historic definition of assets is hampering the process of actually being able to understand and communicate its true value.

It is also important for organizations to pick up unexpected benefits or costs - something that according to Farbey et al (1999) organizations lack procedures for. In an environment where structures and values are changing, a process is required that includes a proactive search for unexpected benefits. Well proven methodologies are said to often be designed to give one effect which is acceptance of the project and therefore they may distort or hide features of the project. Farbey et al (1999) also mean that unplanned benefits may include for example the development of a common perspective, new skills and roles, new possibilities and forms of relationships between the organization and its customers. The major benefits can come from the recognition of possibilities far beyond those originally sought. They also say that in practice many of the most spectacular benefits obtained from the implementation of new information systems were unplanned.

## 3.3 CMS and IS/IT evaluation

When evaluating an IS/IT-investment it is natural to consider whether to use an existing model or to compile your own. Renkema and Berghout (1997) found over 60 models described in literature in their study (Gammelgård & Lindström, 2003), so it is easy to argue that there is no need of more models for evaluation of IS/IT-investments. However, in a case study of 11 companies in various business areas done by Johanson et al (2001) it has been shown that model-concepts proposed in literature or by the consultant firm, e.g. Balanced Scorecard and Intelligent Capital, were not even mentioned by the respondents in the case study. The firms practiced their own concepts and tended to mix different 'original' concepts thoughts in the process of making them their own (Johanson et al, 2001). Farbey et al (1992) mean that it is pointless to search for one single technique since the range of circumstances is so wide that no technique can manage to provide answers to all situations. Mirani and Lederer (1994) agree and stress that no single theory or measuring instrument should be expected to capture all aspects and dimensions of IS benefits in every circumstance. Hallikainen (2003) points out the importance of taking the context where the evaluation takes place into account when determining what evaluation criteria and methods that should be applied for an IS/IT-investment and suggests that evaluation procedures must be specifically tailored to the IS/IT project at hand. After reviewing existing models (Lindberg et al, 2003) and participating in the discussion about whether or not to compile a model of our own we have come to the conclusion that in our case it is favorable to compile a business specific model. This will be made in the analysis.

As a summary of this section we will try to position CMS in an IS/IT-investment context. How aligned are expected benefits of CMS with general benefits of an IS/IT-investment? To accomplish this we compare how well the CMS benefits fit into the

categories of IS/IT-investment benefits. The general benefits from IS/IT-investments in the CMS alignment model (see Table 6) are a summary from the authors in the above section about benefits and are benefits often seen in literature. In CMS benefits and in IS/IT benefits both efficiency and effectiveness occur, this is natural as CMS is a part of IS/IT and benefits from IS/IT can not be hindered from occurring as an expected effect from an IS/IT-investments such as a CMS. When they are matched in the CMS alignment below the result is a yes as expected. This does not affect the result appreciably as they are only a part of the bigger picture. The discussion about the additional benefits unrealized potential value and unexpected benefits are not included in the table as they are undefined and can occur under each CMS benefit. Trademark and brand are falling under Value as it adds value to an organization in a very intangible way. The positioning is made after reviewing explanations of both CMS effects and benefits of IS/IT-investments. If the CMS effects can be subordinated to the IS/IT benefit it gets a yes in the table, if not it gets a no.

**Table 6** Aligning CMS with IS/IT-investment model

| | **IS/IT** | | | | | |
|---|---|---|---|---|---|---|
| **CMS** | *Efficiency* | *Effectiveness* | *Management* | *Communication* | *Strategy* | *Value* |
| *Collaboration/ Information Sharing* | YES | YES | NO | YES | YES | YES |
| *Content security* | NO | YES | YES | NO | NO | YES |
| *Standardization* | YES | YES | NO | NO | YES | YES |
| *Reusability* | YES | YES | NO | YES | YES | YES |
| *Cost efficiency* | YES | NO | NO | YES | YES | NO |
| *Scalability* | YES | YES | NO | NO | NO | YES |
| *Effectiveness* | YES | YES | YES | NO | YES | YES |
| *Consistency* | YES | YES | NO | YES | YES | YES |

A review of the table shows that the effects from CMS in most part are aligned with IS/IT benefits. This implies that a CMS implementation has a possibility to have a positive impact on an organization. We will discuss this further in the analysis and discussion sections.

# 4 Results and Findings

*In this chapter we will account for the results and findings of the empirical material. First there will be a short presentation of Volvo Group[1], where our case study was conducted. We will also present the business areas[2] and give a short description of the case study background. After this we will account for the results of the interviews conducted at the organization.*

## 4.1 Research site

The Volvo Group was founded in 1927 and is one of the world's leading manufacturers of trucks, buses and construction equipment, drive systems for marine and industrial applications, aerospace components and services. The Group also provides complete solutions for financing and service and has today, 2004, approximately 76.000 employees, production in 25 countries and operates on more than 130 markets. Their business areas are – Volvo Trucks, Mack Trucks, Renault Trucks, Volvo Buses, Volvo Construction Equipment, Volvo Penta, Volvo Aero and Volvo Financial Services. In addition several business units provide additional manufacturing development or logistical support.

### 4.1.1 Business Areas

Here we present the business areas that are a part of our case study. We have included Volvo Trucks North America as a business area, even though they are part of Volvo Trucks, because of their large size in the Group. Financial Services have been excluded from our case study due to circumstances outside our control.

*Volvo Trucks and Volvo Trucks North America (NA)*

Volvo Trucks are sold and serviced in more than 130 countries over the world, through over 700 dealerships and 1,500 workshops. More than 95% of the trucks they build are in heavy weight class over 16 tons, which makes Volvo Truck Corporation the third largest heavy-duty truck manufacturer in the world. Development and production take place in Sweden, Belgium, Brazil and the USA, with truck assembly operations in a number of countries, both at their own plants and in collaboration with locally-owned industrial concerns. They have nine assembly plants and eight factories owned by local interests.

Volvo Trucks North America (NA) is affiliated with Volvo Truck Corporation, one of the leading heavy truck and engine manufacturers in the world. Today, Volvo Trucks NA manufactures a broad line of Class 8 trucks and under the Volvo brand.

*Volvo Buses*

Volvo is the world's second largest bus manufacturer, with a complete range of heavy buses for passenger transport solutions. The product range includes complete buses and coaches as well as chassis combined with a comprehensive range of services. They also offer complete system solutions in co-operation with Volvo Mobility

[1] AB Volvo (2004). Volvo website Available: www.volvo.com

[2] Ibid

Systems. Volvo's bus operation has a global presence, with production in Europe, North and South America and Asia.

*Volvo Construction Equipment (CE)*

Volvo Construction Equipment offers a broad range of adapted products, worldwide service and a range of solutions in financing, used equipment and leasing. Within the business area, a total of more than 150 different models of excavators, wheel loaders, motor graders and articulated haulers are produced. Production plants are located in Sweden, Germany, France, the U.S, Canada, Brazil and Korea.

*Volvo Penta*

Volvo Penta is a global manufacturer of engines and complete power systems for both marine and industrial applications. They have a global presence with more than 5.000 dealers in about 130 countries and the production plants are located in Sweden, USA and China.

*Volvo Aero*

Volvo Aero is a wholly owned subsidiary of AB Volvo. They develop and manufacture components for aircraft and rocket engines with high technology content. Service and maintenance are an increasing proportion of their business. They offer an extensive range of productivity-boosting services, including sales of spare parts for aircraft engines and aircraft, overhaul and repair of aircraft engines and the sales and leasing of aircraft engines and aircrafts.

## 4.2 The Volvo.com project

In 2001, the need to change and unify Volvo Group's web presence was identified. The main reason for change was that the various business areas and business units web sites were fragmented using diverse design languages, content management tools hosted on different platforms. Several different suppliers were used for the same services across the Volvo Group meaning that the same item was paid for multiple times to different contractors.

The main objectives with the Volvo.com project were to focus on business support by create business driven websites, owned and driven by the business areas themselves, yet identifying Group synergies. To make development and maintenance more cost efficient by using one common platform for all business areas and Volvo.com and by providing guidance to all business areas on a common look and feel.

The common Volvo.com platform was deployed during 2003, built on Microsoft.NET technology "out-of-the-box" solution. It includes one hosting solution and one system for content management (Microsoft Content Management Server). The approach when implementing the new system was to think big, start small and scale fast. All Volvo branded business areas and business units as well as Volvo Group headquarters are now, 2004, using the common platform for the different Internet initiatives, it is launched on more than 50 markets around the world and supports approximately 30 different languages.

In this thesis we will focus on the Volvo.com solution, thus the Internet, but it can be

mentioned that the CMS solution is a part of a greater business strategy that also contains the Volvo Group intranet and extranet.

## 4.3 Empirical findings

Here we present the findings of our case study. The findings are sorted under the different expected effects from literature regarding a CMS implementation.

*Collaboration/Information Sharing*

Volvo Trucks declared that the collaboration is for good and bad. They said that in some cases general development can give positive effects to all business areas but the risk may be that it becomes a too unwieldy process and that the development is going slowly when everyone does not have the same demands and priorities.

Volvo Trucks NA stated that the collaboration between the different departments has changed very little. They have always shared information and ideas and they reuse a lot of information and images across the platforms (Internet, intranet, extranet).

Volvo Buses said that the collaboration between the business areas is conducted by for example, development of templates, but because they have common customers with Volvo Trucks they mostly collaborate with them. Volvo Buses stated that they benefit from other business areas developed templates, for example survey- and splash sites. Three business areas have conducted surveys on how the customer experience for instance structure on the web and it is possible to compare the results due to the use of the same platform. Volvo Buses said that when all business areas have the same platform and system for the intranet and extranet as well it will be smooth to collaborate when needed.

Before the CMS implementation Volvo CE had a small collaboration with Volvo Trucks but none with the other areas. Now everybody knows who does what within the Volvo Group and they have a common forum for the business areas where they have discussions about design, content, templates, costs for development and hosting. Volvo CE stated that the advantages outweigh the disadvantages concerning the collaboration. The disadvantages surround the relations that respectively Volvo Company has. Volvo Trucks are using one external supplier while Volvo CE uses others which they think brings consequences when they do common things because the track is not always straight forward. From a customer perspective Volvo CE said that it is now easier to recognize the Volvo Group than it was earlier.

Volvo Penta said that they call to the other business areas and discusses different solutions. If they want something special they join together with the other business areas. They declared that the collaboration is going well and that it is good for them to be able to join together with the bigger areas since they are relatively small. The global info master and the editors at Volvo Penta has a network and they meet twice a year and discusses e.g. statistics, new templates and surveys. This network has made the editors engaged and the global info master feels that this has lead to that they have improved their work with the website. When Volvo Penta’s business in North America joined the common platform they experienced the biggest effect with a greater focus from their side. Volvo Penta stated that the disadvantage with the collaboration is that when they want a change in a template, every other area has to

give their ok before the change is in place. Right now they have lost the conception on all the changes they like to have because of the long waiting time.

Volvo Aero stated that it has been an increased collaboration and exchange of experience between the business areas by means of a unified system. On account of that they now have the same platform they can now also compare costs of different suppliers for different additional services. There is also a network where all the global info masters are a part of. In the network the participants receive information about for example updates and the business units can also together carry through demands on a Change Request List that later on are carried through by the Program Manager.

*Content security*

Volvo Trucks stated that they do not work according to roles developed for the system but has clear and stated roles for responsibilities which often lie on marketing managers or marketing communication managers. They are in their turn working towards WIM (Web Information Managers) and WIP (Web Information Providers). There are about 100 persons within the network with at least 1 to 2 persons per market. On big markets they have chosen to have external suppliers that work with the CMS. They have some default areas that always have to be on a site but they do not have the same demands on a dealer. Volvo Trucks said that it is important to have a consistent customer offer and therefore they create the product presentations centrally and then the different markets adjust these regarding language and content depending how they use the product on that market.

At Volvo Trucks NA no individuals other than the Web communications manager and department personnel publish content on the Internet in order to prevent unauthorized content, ensure that language and grammar are correct, and prevent trademark violations. Volvo Trucks NA said that it is their responsibility to ensure that message content is accurate and reliable. The guidelines established in the Volvo.com environment define the look and menu structuring.

Volvo Buses has about 30 editors that works in the system in different degrees. For practical reasons like avoidance of bottlenecks everybody has full rights in the system. Volvo Buses said that they have a policy where it says how to handle web information and the editors are selected in the way that they are suitable for their function on the marketing sites. They know the markets and they know which information that should be put out.

At Volvo CE there are between 50-60 persons registered as users in the system. Volvo CE said that they try to make the use of roles as simple as possible since the experience is that the system is too slow. Is has not been justifiable to have a large administration around the roles. Volvo CE delegates the responsibilities to maintain their sites to different regions. Every site shall have a Volvo representative that coordinates, receives and supplies information to the global info master with news and what is happening on their site. Since some regions have only a few Volvo-employed distributors, Volvo-owned or independent distributors are engaged. All content concerning Volvo is created centrally by Volvo CE that informs about what authority responsible persons have and trust their judgment. These persons are, in their turn, delegating responsibility to for example product specialists who are writing, validating and publishing content on the site. Thereafter the content that is

interesting for each site is translated. Utterly the global info master is responsible for all new content that is created but the owner of a market site is responsible for validating the translations of the content. When it comes to the selection of which people should work with the sites, Volvo CE searches for persons who want to take the responsibility. The ideal is that the person belonging to a marketing department and knows the local language but if there only is one person to chose they take him/her.

Volvo Penta said that they have no global roles; everybody that has access to the system can publish information directly. On marketing level they are allowed to publish what they want on their sites and that is what Volvo Penta considers as what makes the system easy. On the other hand there is one dedicated person on each market who decides who are suitable to publish in the system. No one is receiving any rights to the system without having the education provided by CMS services. The education is given on demand and is provided by the support organization who also gives out IDs. The global content is determined centrally and then the local markets have the possibility to adapt the material that is relevant for them. There are no processes to secure that the right things are published and they trust the different markets to handle it. When they publish new products Volvo Penta stated that they usually send out e-mail to the editors so they know that updates are needed. They also send out a reminder if no updates are done but more often than not the editors are doing what they are asked.

Within Volvo Aero there are 10 persons who publish on the web and they are not using any roles and everyone has all rights in the system. CMS Services has wishes regarding Volvo Aero overlooking their roles but Volvo Aero stated that it has not been any need for it since they generally think that people has a good judgment about what they publish for. When new information is put out the editors often ask the info master about a second opinion and not for approval. Volvo Aero also said that the system is easy to update but that it is easy to make mistakes, for example by pressing the wrong button. They have received education for CMS and they also have rules for how to write for the web.

*Standardization*

Volvo Trucks already had a common system within their own business area for 50 different markets before the CMS implementation. Volvo Trucks stated that their whole web presence is built on templates and that the templates that exist are working on a general level but that they need to meet specific demands for each business segment, respectively. Otherwise they mean you get something very co-ordinated that is good to have but not important to anyone. Volvo Trucks said that they are satisfied with the support they get from their external supplier that is their number one support, CMS Services is the second. CMS Services has entailed one additional step in Volvo Trucks' process of support and they are in some routines are forced to use CMS Services and this is not appreciated. When Microsoft CMS was implemented, Volvo Trucks saw an opportunity in gaining a fast and advanced development since many large global actors are working with the system but this has not been the case. They have received high values form the customers in their survey when they measured it one year ago about structure, graphic and information and they say that these values are even better today.

Volvo Trucks NA has been in a content management environment for several years and they stated that there are tremendous benefits of using the same platform for publishing information across multiple portals as the Internet, Intranet and Extranet since one publication can hit multiple sites simultaneously but at the moment this is not feasible. When SharePoint (a program that enables sharing of information) is added to the Volvo.com platform sharing content will be possible. At Volvo Trucks NA they do not have the same CMS for all three platforms but if they had that, they believe that they would achieve significantly greater synergies, provide for greater flexibility and likely save money as enhancements developed for one area could automatically be available to all areas.

Volvo Buses said that they are generally satisfied with how the project has unfolded but feel that the headings could have been more adapted to them. The marketing department wants to do relatively small changes. Volvo Buses stated that CMS is a good tool that is easy for everyone to learn and that there are many templates to choose from. The templates are static but it is resulting in a unified attractive design and Volvo Buses think that there is a space to move within. Because of the many employee transfers between Volvo Buses and Volvo Trucks and because they think that the same person in the future can become the one who updates the market sites for both Volvo Buses and Volvo Trucks, Volvo Buses stated that it simplifies to have the same system.

Volvo CE's web presence has been stream lined radically the past 3-4 years, but it has rather been by an organizational power than through CMS itself. Within Volvo CE there were earlier business lines that rolled out their own websites and these were first to be shut down. Volvo CE stated that it is now easier to control the design when using templates and through this the site receives a more homogenous structure and look.

Volvo Penta said that the changes they want directly need to wait because of different priorities. There also are many advantages e.g. that you put information in the template which makes it look exactly right. The earlier design and structure was not attractive and needed a change and to support the Volvo Group branding they saw advantages to agree to the common solution. A measuring device for statistics was also a part of the common agreement for the platform solution. They also stated that it is nice to have templates so that they do not have to bother about the final look. There are two different templates made specifically for Volvo Penta today but these are available for the other business areas as well.

Volvo Aero said the common platform facilitates for the business areas since they are working with the same system, everyone knows the terms in use. Volvo Aero also said that it is easier to make common investments.

*Cost efficiency*

Volvo Trucks have not experienced any major changes in costs except that they now pay for support both to their external supplier and the group-common CMS Services. They are now about to sort the costs so that they do not pay for support they do not use. The costs for ineffective support have increased due to unnecessary channels which make every errand take longer.

Volvo Trucks NA claims to have made significant cost savings by migrating into the Volvo.com platform for the Internet sites.

Volvo Buses felt forced to migrate as soon as possible since they had very high Internet costs. Since they migrated to the common platform they have decreased the costs from 1.2 million to 350.000 SEK a year.

For Volvo CE the translations of the websites represent a large cost since they translate to many languages. They pay for the platform according to a key ratio and they have reduced their host suppliers to almost only CMS Services. Only when they have experienced that CMS Services has been too slow in deliveries they engaged other suppliers and it has then only been a one week work. Volvo CE stated that the costs have decreased from a Volvo Group perspective but can not say if the same has happened for Volvo CE.

Volvo Aero has done cost savings through reduced duplication of work. Earlier they sent the content they wanted to publish and update to a bureau. To correct a misspelling or put out a PDF file could take up to a week and now they can do it themselves within minutes. Being dependent of the bureau also had the consequent that they felt they did not have control over the process them selves.

*Reusability*

Volvo Trucks stated that they try to reuse all content within the organization but they do not think that there is much reusability between the business areas. Volvo Trucks said they create a master site where all content exists and the different markets fetch the content that is relevant for them. They also stated that this chain of content should be unbroken so that e.g. product information can be inherited. Templates that are developed by Volvo Trucks can now be reused by all business areas due to the common CMS

Volvo Trucks NA reuses lots of information and images across the platforms thanks to the CMS implementation.

Volvo Buses declared having limited resources and since the same persons are working with the Internet, intranet and extranet, they wish they had a common platform for all web initiative so that the information they put out on the web could be mirrored where it is appropriate. Today they said they mirror content only within the Volvo.com solution. Volvo Buses want to reuse the platform and the CMS for the intranet but said that it is today not included in the project goals of the intranet project.

Volvo CE declared that the possibility with the new platform of reusing content on several different sites has had the effect that they have better control on the online message. They find it easy to create new channels and product groups but they said that it is hard to reuse them.

Volvo Penta said that it is possible that with CMS they will be able to update and store information in one place. At the end of next year Volvo Penta will have Microsoft CMS for their entire web presence and thereby they will be able to link information between the Internet, intranet and extranet and share pictures and

documents. They especially wish that documents can be updated at one place and hit the Internet, intranet and extranet.

Volvo Aero differs from the other business areas since they operate in the aircraft sector and they stated that it is therefore difficult for them to reuse material from the other business areas. Up until now they have not borrowed any material.

*Effectiveness*

Volvo Trucks were pleased with the usability and functions of the new CMS and stated that it is easier to use than their former system but that they have problems with fonts in Asian languages. Volvo Trucks declared that the reusability from the resource gallery is messy. They also said that the processes involving the support has failed since it now involves two support organizations with several unnecessary steps and long waiting times. Volvo Trucks stated that when it takes weeks instead of hours to get support they loose interest. Volvo Trucks also stated that the support regarding the launch of new updated content worked better before the implementation. They said that they today are insecure about both the process and the support.

Volvo Trucks NA stated that CMS has enhanced business processes in terms of time-to-delivery regarding publishing and also enabled them to share information in a timelier manner. They also stated that there are certain clear benefits with the implemented CMS such as the ability to upload or modify content easily and quickly. They declared having reduced expenses in hosting costs and workload has increased for individual publishers but deceased for the info master. There are also fewer bottlenecks after the CMS implementation since publishers do not have to wait for a third party to upload content anymore. Volvo Trucks NA has had positive feedback from customers about the increased amount of content provided on the Volvo Truck NA web site. One negative aspect of the CMS is that there are limited numbers of templates available and Volvo Trucks NA declared that they need to either work around or pay to have new templates designed. They would like to move into an environment where it is easier to share content across all platforms.

Volvo Buses stated that it is easier to update content after the implementation since every department now is responsible for their own part. They also stated that it is now easier to create new market sites. Before the implementation the work needed to go through the global info master and their external supplier, which took a much longer. Before the implementation they had one entrance for e-mail that was sorted by the global info master. Now they have 11 functional mailboxes where visitors on the website select which mailbox is the appropriate to send questions and requests to, which has facilitating the work for the global info master. Before the implementation their external supplier managed the web publication and Volvo Buses said that the publication was slow and that they could not reach their external support. After the implementation Volvo Buses controls the web publication and they declared that it is easy to build web pages and publish them on the Internet. They also stated that the contact with support, CMS services, is fast and smooth. The global info master at Volvo Buses declared that it has been positive that they have been released from the responsibility of giving support since they are not in the position of taking care of technical issues. Volvo Buses said that they want to be able to update information in one place on the Internet, intranet and extranet since this would reduce the costs of double work and since it is easy to forget to update the information in all three places.

Volvo Buses said that the Internet traffic increased dramatically after the implementation of the CMS.

Volvo CE declared that CMS has made it possible to expand the number of web pages. Before the implementation they only had one site and now they have about 20 sites in 14 languages. They said that it is easier to create new sites and to keep structures together. Volvo CE also said that it is not always easy to manage the web publication. They declared that the system is quite complex to use, e.g. it requires many steps from creating to publishing, the manual is 200-300 pages, there are 30 templates with similar names, and they feel that the CMS may be difficult for people who do not work daily in the system. Volvo CE stated that it would be positive if there were more shortcuts in the system so that the users can avoid having to dig into deep structures to get to every page. They also stated that it is very time consuming and frustrating to create new content but that when it is done it is easy to spread and update the content. Volvo CE has outsourced all maintenance to CMS services so they can focus on what is important for them and therefore they do not bother that the system is complicated.

At Volvo Penta there were about 20 persons using the system and they had tens of thousands of web pages. Before the implementation they had a customized system that was “not as sophisticated as Microsoft CMS”. They declared that the new CMS is easier to understand and work with and all functions they need. However they forget how to use the system if they do not work with it regularly. In the future Volvo Penta wants more editors so the different parts of the organization become more active. Today the co-workers mostly call CMS Services for support which has relieved pressure from the global info master who before the new CMS implementation was responsible for the support. Volvo Penta said that the new CMS encourages use since it is fun to work with and all the different CMS templates make the co-workers more productive. Volvo Penta stated that CMS Services give fast and good support but they are a bit frustrated over the fact CMS Services do not know everything about the functions of the system. Together with the Volvo.com project the interest from management and editors has changed and Volvo Penta said that this is due to their North America business joining the platform. The North America business pushes a lot and they said that the reason for that is that they have a person there now who understands the value of the CMS and this has spread across the organization.

Volvo Aero stated that they have not changed their routines since the implementation but they think it is now easier to update content. Before the implementation every transaction cost money and therefore they waited with correcting e.g. misspellings. They also said that the site is more alive now since they can laborite with how the site should look. With the use of the new function “connecting page” they can publish a webpage on the global site and later connect it to sites in other countries sites where it is translated in their languages. Before the implementation this required an order of a complete new page from their external supplier. Volvo Aero declared that they usually are in contact with CMS services every week and stated that the response time of the support is working great and that it is good that the site is never down. The number of sites has increased with the simplicity to publish but it is the individual publisher’s responsibility to only put out what is important.

*Consistency*

Before the implementation the Volvo Trucks site was consistent with the Volvo layout but Volvo Trucks said that the positioning of Volvo Group is clearer when all business areas use the same layout.

Volvo Trucks NA stated that one clearly knows that the VTNA site is a Volvo Group web site since all sites after the CMS implementation look the same.

Before the CMS implementation, Volvo Buses had market sites that were built separately where some market sites had the Volvo design and some had not. Before the CMS implementation Volvo Buses had problems with information not being updated but now all information on the site is current. The global site has all products and the market sites mirror the products they have. Volvo Buses do not know how the visitors experience the new site and are waiting for the results from the survey. They stated that CMS has affected the positioning of Volvos brand since all business areas now have the same design and the same tone of voice.

The platform has given Volvo CE the opportunity to ensure that the Volvo content is updated and see how the brand name is presented on their dealer sites. They feel that they can protect the core values of Volvo Group by making sure that the sites are updated and they declared that the sites give the impression of being designed in a more professional way than earlier.

Volvo Penta has had an improved web presence regarding the number of sites and quality of the sites since they have much more information on the sites today and they also have a more unified web presence. Before the implementation the North America market did not support the web initiative and had a completely different design which was bad from a branding perspective but now they have joined the platform. Volvo Penta stated that the Volvo.com project has been positive with the unified impression of Volvo Group and that people who are interested in all different business areas can see that they have a common look and feel.

Volvo Aero stated that they are involved in building the Volvo brand and said that when you visit the different business areas on the Internet you should be able to see that they have togetherness.

# 5 Analysis

*Here we will present our customized CMS evaluation model. First we have the observed CMS business effects (see Table 7) where we have gathered the business areas and present the generalized result from all the CMS effects occurred. The number after each effect in the result represents how many business areas the effect has occurred in. Then the generalized effects are presented in the CMS business effects and impact (see Figure 2) where we visualized all the positive and negative effects and how many business areas that was affected in completeness. The impacts of the effects are also presented through 3 different sizes of circles that represent low, medium and large impact. When we analysis the different CMS effects we will present the effects with a figure for each CMS measure. In the end we evaluate the CMS implementation with basis of IS/IT-investment benefits.*

## 5.1 CMS evaluation model

**Table 7** Observed CMS business effects

| | **Business areas** | | | | | | **Result** |
|---|---|---|---|---|---|---|---|
| **CMS measures** | *Volvo Trucks* | *Trucks N.A* | *Volvo Buses* | *Volvo CE* | *Volvo Penta* | *Volvo Aero* | |
| *Collaboration/ Information Sharing* | Slow development, synergies | No increased collaboration | Synergies | Increased collaboration, slow development | Increased collaboration, slow development, Synergies | Increased collaboration | Increased collaboration 3, Synergies 3, Slow development 3 |
| *Content Security* | Content policy, centralized content | Content policy | Content policy | Content policy, centralized Volvo content | Content policy, global centralized content | Content policy, easy mistakes | Content policy 6, Easy mistakes 1, Centralized content 3, |
| *Standardization* | Complicated double support, low flexibility, | Low flexibility | Low flexibility, unified design, facilitates collaboration | Easier control, unified design | Low flexibility, unified design, facilitates collaboration | Facilitates collaboration | Facilitates collaboration 3, Unified design 3, Low flexibility 4, Double support 1, |
| *Scalability* | | | | | | | |
| *Cost efficiency* | Increased hosting costs | Reduced hosting costs | Reduced hosting costs | Reduced hosting costs, large translation costs | Increased hosting costs, lower development costs | Reduced hosting costs, lower development costs | Reduced hosing costs 4, Increased hosting costs 2, Lower development costs 2, Large translation costs 1 |
| *Reusability* | Reuse of content | Reuse of content | Reuse of content | Reuse of content | | Reuse of content | Reuse of content 5 |
| *Effectiveness* | Slow support, effective work process, ineffective gallery | Effective work process | Effective work process, fast support, increased web presence | Increased web presence, effective work process, complex system | Effective work process, fast support, network, increased web presence | Increased web presence, effective work process, fast support | Effective work process 6, Increased web presence 4, Fast support 3, Slow support 1, Complex system 1, Ineffective gallery 1 |
| *Consistency* | Togetherness | Togetherness | Togetherness, increased quality | Togetherness, increased quality | Togetherness, increased quality, | Togetherness | Togetherness 6, Increased quality 3 |

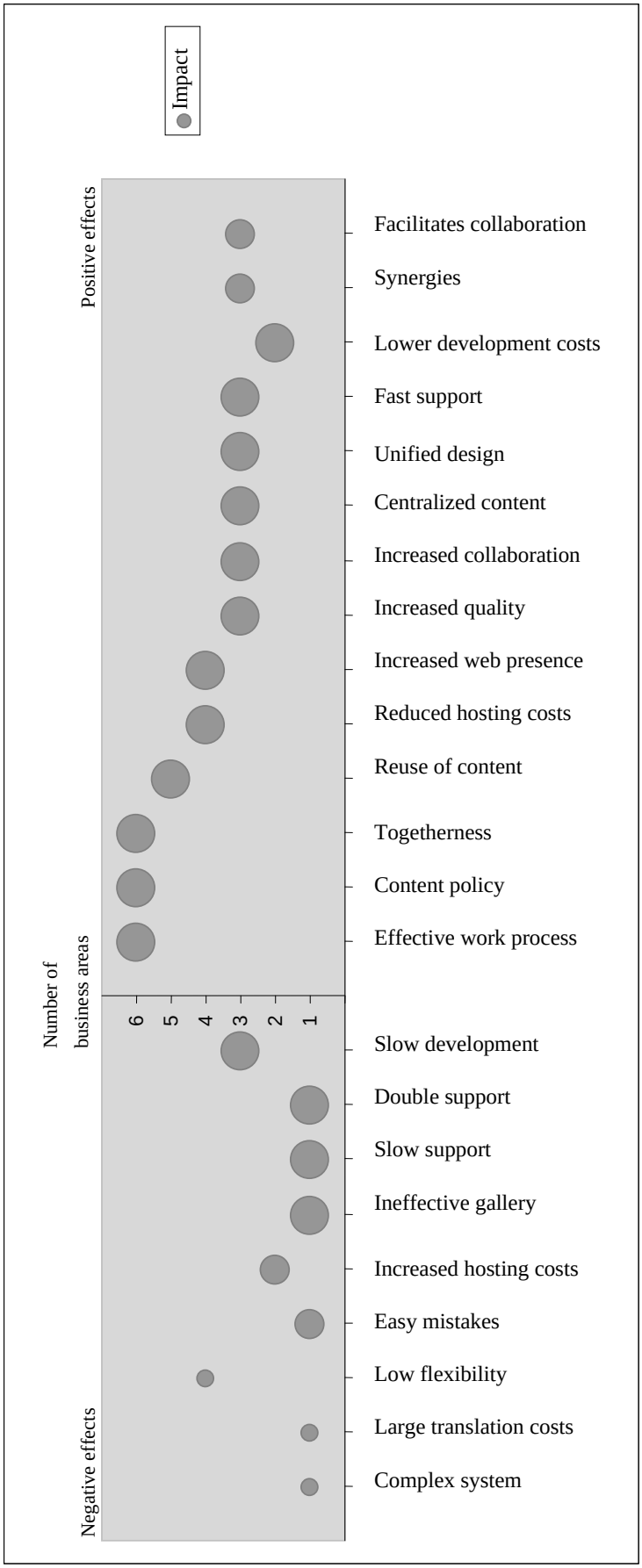


**Figure 2** CMS business effects and impact

## 5.2 Analysis of the result based on the CMS measures

We are going to analysis the result with basis from the CMS measures. Scalability will not be included in our analysis since we have not found any result from this measure in our case study and we will discuss this further in the discussion. In the CMS evaluation model we can see that there are fourteen positive effects and nine negative effects. The difference between the number of positive and negative effects is not large but the negative effects mostly only effects one business area and the positive effects affect three or more business areas. The impact from the positive effects is also judged as greater.

*Collaboration/Information sharing*

In this measure we searched for effects that derive from the CMS due to workflows and a common repository that enables collaboration and information sharing across boundaries. In our evaluation we have found three effects from collaboration/information sharing. The positive effects were “increased collaboration” that was shown in the organization through comparing costs, exchange of experience, network and “synergies” that was revealed in the organization through advantage from each others development. The CMS collaboration and information sharing benefits described has also enabled for employees globally across the organization to contribute and update content at the sites There were three business areas that had experienced “increased collaboration” and “synergies”, and the impact on the organization was high on “increased collaboration” and medium on “synergies”. The negative effect was “slow development” as all business areas had to agree before investments and changes could be made. Three business areas experienced “slow development” and the impact on the organization was high. All the effects from Collaboration/Information sharing are presented in Figure 3 below.

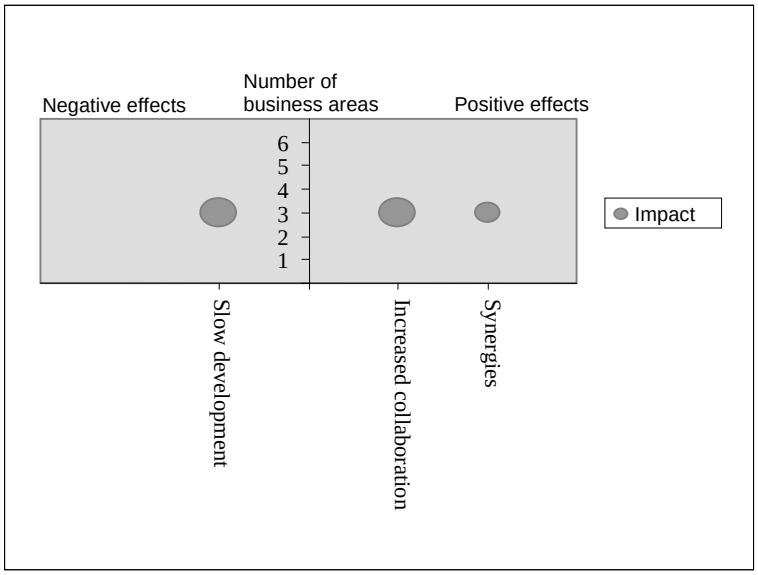


**Figure 3** Collaboration/Information sharing

*Content security*

Here we searched for effects that concerns responsibility, approval chain, access and up-to-date content in the CMS. We have found three effects from this measure. The positive effects are “content policy” and “centralized content”. “Content policy” derives from responsibility and access which the organization applies instead of roles in the system. There were six business areas that had “content policy” and they experienced the organizational impact as high. The effect “centralized content” comes from ensuring that content is up-to-date and is represented in the organization due to creation and publishing of content is made centrally and then distributed. Three business areas had their content centrally and the organizational impact is high. The negative effect “easy mistakes” comes from placing the responsibility in the hands of the business user and can be done by pushing the wrong button. Only one business area had the effect “easy mistakes” and it was experienced to give medium impact in the organization. The effects are presented in Figure 4 below.

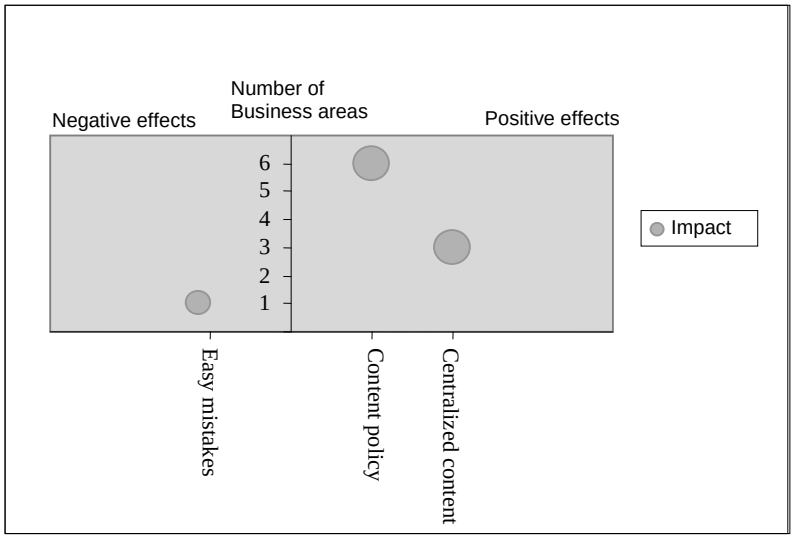


**Figure 4** Content Security

*Standardization*

When we searched for effects in standardized approach we looked for standardized training, administration, content structures and support. We found two positive and two negative effects in this measure. The positive effect “unified design” derived from standardized content structures and is in the organization represented through common templates. “Facilitates collaboration” is another positive effect which is due to the common CMS and administration in the organization. This is represented through common investments, training, support and a unified language. Both positive effects occurred in three business areas where the impact from “unified design” was experienced as high and the impact from “facilitates collaboration” was medium in the organization. The negative effects are “low flexibility” due to static templates and double support due to using external support alongside CMS Services. “Low flexibility” was experienced by four business areas but the impact was low due to that

the advantages were bigger than the disadvantages. Only one business area had "double support" but the impact on the organization was high. The effects are presented in Figure 5 below.

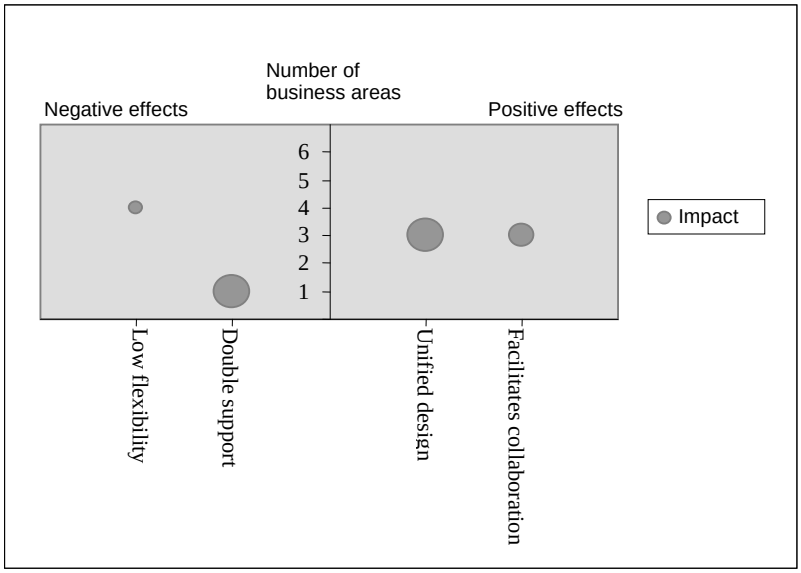


**Figure 5** Standardization

*Cost efficiency*

In this measure we searched for costs savings related to update, publication, maintenance, time and automated processes. We found four effects in the cost efficiency measure, two positive and two negative. "Reduced hosting cost" was one of the positive effects and is related to maintenance costs and comes from standardized support and common platform in the organization. The effect was experienced by four business areas and the impact was high in the organization. "Lower development cost" is another positive effect that derives from cost savings and is experienced in the organization in form of common investments. We found "lower development cost" in two business areas and that the impact was experienced as high in the organization. The negative effects came from "large translation costs" and "increased hosting costs". Only one business was experiencing "large translation costs" and the impact in the organization was low. "Increased hosting cost" was experienced by two business areas and the impact was medium in the organization. The effects are presented in Figure 6 below.

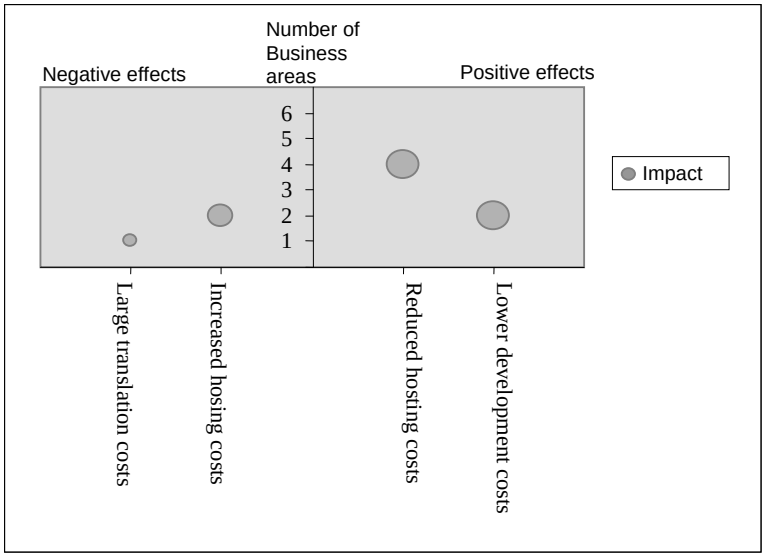


**Figure 6** Cost efficiency

*Reusability*

Here we searched for utilization of the same content represented on different places in the CMS and content as one source accessed by all business applications. We found that five business areas experienced the effect “reuse of content” and that the impact in the organization was experienced as high. The effect is presented in CMS Business evaluation Figure 7 below.


**Figure 7** Reusability

*Effectiveness*

When searching for effects in effectiveness we looked for; maximizing effectiveness of team skills by enabling users to publish their own content and technical staff to work on site infrastructure; easily create and modify site content; issues that speed up information retrieval such as infrastructure for navigation, content presentation and metadata; allowing greater ability to undertake web initiatives. We found six effects in the measure whereof three where positive and three where negative. The positive effect “effective work process” derived from enabling business users to publish their own content and through easy to create and modify site content and was achieved by all business areas. In the organization the effect “effective work process” was represented through that it is easy to create content, easy to distribute content, good usability in the system, and good functions. The second positive effect was “increased web presence” and derived from allowing greater ability to undertake web initiatives and was shown through an increased number of web pages and it was experienced by four business areas. The third effect was “fast support” and derived from enabling business users to publish their own content and allowing technical staff to work on site infrastructure. Three business areas experienced the effect and it was represented in the organization through CMS Services that support users and maintain the system. The impact on the business areas was high on all positive effects. The first negative effect is slow support in contrast to the effect fast support that is described above. The effect was expressed by one business area and the impact is high. The second negative effect was ineffective gallery and derives from speeding up information retrieval through infrastructure for metadata and navigation structure. In the organization this is shown through an ineffective navigation structure and metadata in the picture gallery. One business area has experienced the negative effect and the impact is high. The third effect is complex system and derived from allowing non technical staff to create and modify sites without having to learn technical aspects. One business area is experiencing the effect and the impact is low. The effects are displayed in Figure 8 below.

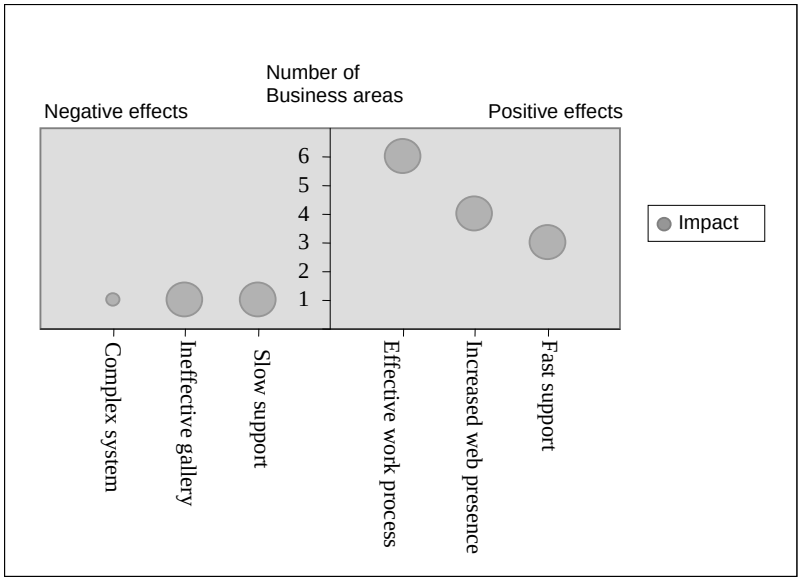


**Figure 8** Effectiveness

*Consistency*

Here we looked for centralized control of design, branding and professional face towards the world. We found two positive effects from the consistency measure; “togetherness” and “increased quality”. “Togetherness” was experienced in the organization through centralized control of design and branding. All business areas expressed the effect and the organization experienced the impact as high. The effect “increased quality” was expressed in the organization through better design and professional impression. Three business areas expressed this effect and the organization experienced the impact to be high. The effects are presented by Figure 9 below.

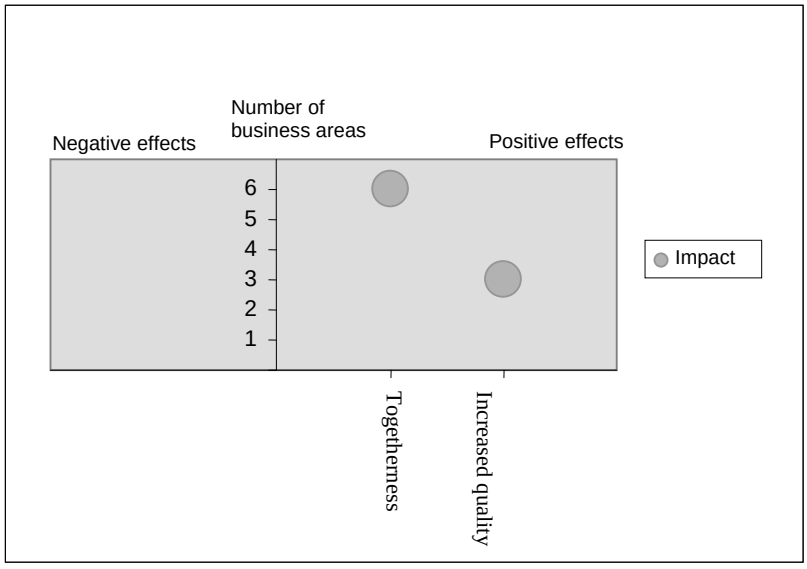


**Figure 9** Consistency

## 5.3 Analysis of the result based on the IS/IT benefits

In Table 8 we will analyze the result with basis from the CMS alignment in Table 6 and the IS/IT benefits discovered in literature. We have included the additional benefit, trademark and branding, in the "value" measure. In Table 9 we will analyze the result with basis from the additional benefit and the realized value of the investment, described in the theory section.

**Table 8** IS/IT-investment evaluation

| **Measures** | **Volvo Group** |
|---|---|
| **Efficiency** | |
| *Cost savings* | In the CMS alignment we found that efficiency corresponded very well to the benefits expected from a CMS implementation. In our case study we found that The organization has received cost savings in form of lower hosting costs which includes a common platform, common support and training. |
| **Effectiveness** | |
| *Improvements* | In the CMS alignment we found that effectiveness corresponded very well to the benefits expected from a CMS implementation. At The organization this is shown through a more effective work process regarding publishing, updating and distribution of content. The organization has also received an increased web presence and an increased quality on the websites. Increased improvements enabled by the CMS outside the CMS itself are content policy which ensures a high content quality. |
| **Management** | |
| *Decision support* | In the CMS alignment we can see that management correspond poor with the CMS benefits. This is reflected at The organization as they have received enhanced decision support through the ability to compare development and content on the different business areas websites. But the enhanced decision support has nothing to do with the CMS itself since it is an effect from the business areas network. |
| **Communication** | |
| *Information exchange* | In the CMS alignment we can see that communication correspond to half of the CMS benefits. The ability for The organization to exchange information has been enhanced through reuse of content which is mostly done by connecting page within the business areas. The business areas also have network meetings because of the common CMS where they are exchanging experience but this is not done through the CMS itself. |
| **Strategy** | |
| *Competitive advantage and organizational transformation* | In the CMS alignment we found that strategy correspond well to the benefits expected from a CMS implementation. The organization has strengthened their competitive position through an increased web presence. |
| **Value** | |
| *Added value* | In the CMS alignment we found that value corresponded very well to the benefits expected from a CMS implementation. The CMS has given The organization added value through a consistent look and feel across their entire web presence which gives the organization a feeling of togetherness. |

**Table 9** Additional IS/IT-investment evaluation

| **Measures** | **Volvo Group** |
|---|---|
| **Realized potential value** | |
| *Potential value* | The implementation was expected to lower the development and maintenance costs of Volvo Group's web initiatives and to ensure a consistent look and feel across the group and to achieve synergies between the business areas. |
| *Realized value* | Our case study has given us the impression that the organization has received an overall lower development and maintenance cost for their web initiatives. The case study also clearly showed that the organization has received a consistent look and feel and that they have gained some synergies between business areas. |
| **Unexpected benefits** | |
| *Received unexpected benefits* | Our case study has showed that the organization has received benefits outside the project goals and expectations. They have today an increased web presence due to an increased number of websites in different languages. They have also received an increased collaboration between the business areas due to the common network where they exchange information and experience, but unfortunately the collaboration has also entailed a slow development process. Half of the business areas are also experiencing the support as faster than before. |

# 6 Discussion

*Here we will connect the theory, results and findings and the analysis. First we will have a discussion about our customized model and the observed business effects. We will then relate the observed business effects to the problems and challenges of CMS. We will also discuss the suggested approaches in theory about how the business processes are organized and how this is done in the organization observed. The CMS alignment are discussed with basis from Table 8 where we compared the CMS alignment and IS/IT benefits with the result from the case study. In the end we discuss the CMS implementation strategic impact and what improvements can be made by the organization. We will also suggest future research.*

*Customized model*

We have chosen to compile a customized model, taking consideration to the importance of taking the context where the evaluation takes place into account, that it is pointless searching for one single technique since the range of circumstances is so wide and since there is no single theory of measuring instrument that can be expected to capture everything (Hallikainen 2003, Farbey et al, 1992, Mirani and Lederer, 1994). With our evaluation model we have been able to point out the business effects generated to the organization by the CMS implementation since our model is CMS specific. We have compiled a framework for evaluating CMS investments that also can be applied on intranet and extranet solutions. There will probably be different CMS measures in focus when applying the model on intranet and extranet solutions since criteria's differ between different web solutions. The evaluation will also be characterized by specific project objectives and its part of the organizations larger strategies and is in that way context situated as Hallikainen (2003) suggest. In our model we have tried to apply Farbey et al (1999) and Willcocks and Lesters (1996) thoughts that judgment and improvement, instead of numbers, should be a foundation for how to value an investment. We believe that our evaluation model has been able to provide us with the answers to our focal question: *What are the business effects after implementing a Content Management System?* The answer to our question is provided by the business effects that are in part described below. We feel that these business effects are general and not organizational specific and can be expected when implementing a CMS in other organizations as well.

*CMS Business Effects*

In our case study we found that many of the CMS benefits described in Table 3 are aligned with the business effects generated in the organization by the CMS implementation. Since the study is made on a global organization and the system is used across the organization we believe that these business effects are common enough to appear in other large organizations as well. The overall largest positive business effects, that effected over half of the business areas (see Figure 2), were "effective work process", "content policy", "togetherness", "reduced hosting costs", "reuse of content" and "increased web presence" and they all had a large impact on the organization.

- The business effect "effective work process" derives from the possibility for the organization to publish, update and distribute content without help from technical experts. This has given the organization the opportunity to have

accurate content since they can respond quickly to changes.

- CMS responsibilities and access are managed through “content policy” that ensures a unified view on the business process surrounding the website content management within each business area.

- Through a centralized control of design and branding the organization has achieved “togetherness” which has given them a unified face towards the world. Branding is today seen as increasingly important, Johanson et al, 2002 see Aaker, 1996, even though it is internally generated or hard to separate from the organizational goodwill it is also hard to understand and communicate its true value.

- The organization has achieved “reduced hosting costs” through the standardized common platform and CMS. The reduced costs derive from common support, training, maintenance and development.

- CMS has given the organization the possibility to “reuse of content” mostly because of the “connecting page” function. This has fastened the production of sites across the organization in different languages. They also reuse pictures through a common repository. The business effect “reuse of content” has a great potential in the organization when they implement the CMS solution in the intranet and extranet as well. The CMS will then facilitate content publishing, distribution and updating across the web solutions.

- Through CMS the organization has received “increased web presence” since the CMS has facilitated the ability to undertake web initiatives. The web sites are now also business driven which makes it easier to create and distribute sites.

The overall largest negative effects, that affected over half of the business areas, were “low flexibility”.

- Due to the out-of-the-box CMS, “low flexibility” has been experienced by most of the business areas. This is because the CMS is not adjusted to each business area and the system can not be changed. However the impact is low since most of the business areas agree that the advantages from the common platform and CMS are higher than the disadvantages.

From this we can draw the conclusions that the overall impact from the CMS implementation was positive and has led to improvements concerning the websites. We think that all the large positive effects can be achieved in organizations in general and are possible to generalize in a wider context. However, the business effect “increased web presence” is not obviously general but if the organization is striving to have an “increased web presence” this is supported by CMS. There were no business effects in the organization generated from the CMS scalability benefit but this is due to that it is relatively few users in the CMS. When the CMS is implemented in the intranet, a large amount of employees will have the possibility to contribute with content and then there will most probably be business effects generated by the scalability benefit.

*Problems and challenges*

Goodwin and Vidgen (2002) says that a CMS can cause bottlenecks but this has not been the case in The organization since they do not use the centralized approach where there is a function where all content must pass through before publishing in the way suggested by Gupta et al (2001). Addey et al (2002), Gupta et al (2001) and Microsoft (2003), see Table 2, are recommending functions or different roles that handle the content but since there are few CMS users in the organization studied we can not see any reason to apply roles since they will only be an disadvantage when it is few users. We have also discovered that the organization studied have content policies, strong confidence in their co-workers and trust them to work within their responsibilities on the sites. We feel that the content policies are replacing the roles suggested in literature and that the responsibilities applied on the organization co-workers also gives the organization a business process that work. However, we are confident that roles may be more important when using CMS in intranet solutions since an intranet requires more users to be fruitful. Goodwin and Vidgen (2002) also suggest that there might appear problems with consistency and navigation when web editing are transferred to departments and are not closely controlled. At the organization studied we found that this problem has been avoided through recommendations about which templates to use where and when. We also feel that the navigation problem should be more looked over when using CMS in an intranet solution; this also applies to the potential problem with tracking and content audit and control. Today the organization have some problem with data duplication since content that need to be published and updated on the Internet, intranet and extranet now need to be published and updated three times. We believe that when the organization implements CMS on all web solutions as planed and they can share information across the solutions this problem will decrease.

*CMS in a business context*

Gupta el al (2001) has presented three different approaches for business rules and processes associated with CM solutions and we have found that the business areas are represented in all of the categories presented. Volvo Aero are practicing the centralized approach where all content is channeled through one group who is described by Gupta el al (2001) as the web police. However, the publishing group at Volvo Aero can not be described as the web police as described by Gupta et al (2001) since the publishing group only exist because their small website do not require more employee resources. Even though Gupta et al (2001) suggest that the centralized approach may result in bottlenecks this is not a problem at Volvo Aero as their website is small. Volvo Penta and Volvo Buses use the distributed approach. They have a central group that publish content e.g. product information on the global site but individual work groups, i.e. the market sites, have the possibility to change and adapt the information to suite their local markets, which have different needs. At Volvo Trucks, Volvo Trucks NA and Volvo CE the hybrid approach is practiced, e.g. product information is published by the top-tier and is strictly controlled. The lower tiers, the market sites, then have the responsibility to enforce this and contribute with local content.

We think that the dividing between the business areas on the approaches seems natural. Volvo Aero is the smallest of the business areas in the case study and uses the centralized approach only to their advantage. Volvo Penta and Volvo Buses are also

relatively small and have chosen the distributed approach since their market sites need to adjust more to the local markets. Volvo CE and Volvo Trucks which includes Volvo NA are the largest business areas and have therefore chosen the hybrid approach since they need a more controlled process for handling content.

*Aligning CMS with IS/IT-investment*

To get an impression about how well an CMS implementation corresponds to benefits of an IS/IT-investments in general we compiled a model that showed the alignment between CMS and IS/IT benefits. In our IS/IT-investment evaluation we compared our CMS alignment, see Table 6 with the IS/IT benefits in our evaluation model, see Table 8, and the results from our case study showed us that it corresponded well to the CMS alignment. Our case study showed no benefits from management and communication from the system itself which was indicated to us by the CMS alignment since they had the weakest indications of being able to generate benefits. All the other measures had strong correspondence and our case study has shown that a CMS implementation is able to generate benefits of efficiency, effectiveness, strategy and value.

*Strategic impact*

Many authors have discussed the importance of strategic alignment of IS/IT-investments with overall business goals. Strategic power is gained when the organization is investing in IS/IT for other reasons than seeking efficiency effects. We have gained the impression that organizations seldom do their IS/IT-investments from their strategic business objectives but rather focus on achieving operational benefits and reducing costs. The organization in our study has focused on typical efficiency improvements but it has also been important for the organization to gain a unified design and branding displayed to the world. It is important for the organization to evaluate what the actual outcomes from the IS/IT-investment (Farbey et al (1992) see Hawgood and Land (1988)) to be able to control and harvest its benefits. In our IS/IT evaluation model, Table 8 and

Table 9, we can see the benefits generated to the organization. Farbey et al (1999) say that benefits will not only come from changes in IS/IT but from the organizational change implied of which IS/IT is only a part. As we can see in Table 8,

Table 9 and Figure 2 we have found effects that can not be subscribed to the system itself but to the context of its use e.g. the collaboration outside the system and content policy.

*Improvements*

Half of the business areas evaluated claims to experience “slow development” but this is not an effect from the CMS itself but rather a consequence from the collaboration between the business areas. For a change to occur all business areas have to agree before the change is implemented and this process is today experienced as to slow. We feel that the speed of development is a process that the organization is able to improve in near future. The case study showed that the organization has a “content policy” but that many business areas do not have the policy in writing. We think that a written content policy distributed to all web editors would be able to improve the

quality of content even further. The organization is striving to reuse as much content as possible but today information can not be distributed between the Internet, intranet and extranet. This can be accomplished with a common web solution which is also planed for in the near future. We have identified a few synergies between the business areas such as exchange of experience, shared templates and pursue price-reducing measures against suppliers. We believe that more effort can be made to identify and exploit synergies within the organization. Half of the business areas has experienced that the support is fast and one business area the support as slow. The business area that experienced the support as slow was also the business area that had double support. We feel that this problem should be noticed.

*Suggested continued research*

We have claimed that our customized CMS evaluation model can be applied not only on Internet but also on intranet and extranet solutions. We therefore suggest continued research on CMS using our evaluation model concerning Internet, intranet and extranet CMS solutions. It would be particularly interesting to see our evaluation model applied on intranet solutions. An intranet has the ability to affect an organization in a more thorough way and will perhaps deliver another set of business effects distributed in another way.

# 7 Conclusions

With our customized CMS specific evaluation model we have been able to point out the business effects generated to the organization in our case study. We have come to the conclusion that the business effects discovered are general and possible to generalize in a wider context. The compiled framework for evaluating a CMS implementation can also be applied on intranet and extranet solutions. Our CMS specific evaluation model has been able to provide us with the answers to our focal question: *What are the business effects after implementing a Content Management System?* The most apparent positive business effects found from our case study are:

- More effective work process
- A unified business process view through content policy
- Increased “togetherness” via centralized control of design and branding
- Reduced hosting costs
- Increased opportunities to reuse of content
- Increased web presence

The most apparent negative business effects found in our case study are:

- Low flexibility through out-of-the-box CMS

The overall business effect from the CMS implementation is positive and has led to improvements concerning the websites.

## References


Addey, D, Ellis, J, Suh, P & Thiemacke, D, (2002), *Content Management System*, Birmingham, Glasshaus Ltd.

Andresen et al (2000). A framework for measuring IT innovation benefits. *ITcon*, Vol. 5, pp.57-72.

Ashurst, Colin & Doherty, Neil (2003). *Establishing an organisational capability to succeed in realising benefits from IT investments: An exploratory analysis.* Papers presented at the 10th European Conference on Information Technology Evaluation, 25-26 September, Madrid, Spain. pp. 1-10.

Backman, Jarl (1998). *Rapporter och uppsatser*. Lund: Studentlitteratur.

Bednar, Peter & Adams, Carl (2003). *Evaluation processes: Lessons from Bateson´s second order learning*. Papers presented at the 10th European Conference on Information Technology Evaluation, 25-26 September, Madrid, Spain. pp. 21-27.

Berghout, E & Remenyi, D (2003). The ten years of the European Conference on IT Evaluation: Retrospectives and perspectives for possible future research. *ECITE*, 2003.

Bergman, M, Ryman, M (2004). Content Management – En fallstudie om en organisations förväntningar på moderna innehållshanteringssystem. Master thesis.

Davern, M, Kauffman, R (2000). Discovering Potential and Realizing Value from Information Technology Investments. *Journal of Management Information Systems*, Vol 16:4, pp. 121-143.

Dos Santos, B, Sussman, L (2000). Improving the return on IT investment: the productivity paradox. *International Journal of Information Management*, vol. 20, pp.429-440.

Deschoolmeester, Dirk & Braet, Oliver (2001). *On the five mechanisms for Strategic IS Alignment*. Papers presented at the Eighth European Conference on Information Technology Evaluation, 17-18 September, Oriel Collage, Oxford, United Kingdom. pp. 303-315.

Easterby-Smith, Mark, Thorpe, Richard, Lowe, Andy (2002). *Management Research: An Introduction*. Sage Publication: Wiltshire, Great Britain.

Farbey, B, Land, F & Targett, D (1999). The moving staircase – Problems of appraisal and evaluation in a turbulent environment. *Information, Technology & People*, Vol. 12:3, pp.238-252.

Farbey, B, Land, F & Targett, D (1992). Evaluating investments in IT. *Journal of Information Technology*, Vol. 7, pp. 109-122.

Gammelgård, M & Lindström, Å (2003). Towards a View for Evaluating Investement in the Enterprise Software Architecture, *IEEE*, pp.101-105.

Gilbert, M. et al. (2000). The measures of a Content Management Strategy. *GartnerGroup*, Feb 25th.

Godwin, S & Vidgen, R (2002). Content, content, everywhere…time to stop and think? The process of web content management. *Computing & control engineering journal*, Vol. 13:2, pp. 66-70.

Gupta, V, Govindarajan, S & Johnson, T (2001). Overview of content management approaches and strategies. *Electronic Markets*, Vol. 11:4, pp. 281-288.

Hallikainen, Petri (2003). *Evaluation of information system investments*. Diss., Helsinki School of Economics. Helsinki.

Hallikainen, P, Kivijärvi, H & Nurmimäki, K (2002). *Evaluating Strategic IT Investments: An Assessment of Investment Alternatives for a Web Content Management System.* Proceedings of the 35th Annual Hawaii International Conference on System Sciences (HICSS-35'02), 2002, Hawaii.

Hallikainen, P & Nurmimäki, K (2000). *Post-Impementation Evaluation of Information Systems*. Proceedings of IRIS 23. Laboratorium for Interaction Technology, University of Trollhättan Uddevalla.

Holme, Idar & Solvang Bernt (1997). Forskningsmetodik: Om kvalitativa och kvantitativa metoder. Lund: Studentlitteratur.

Johanson, U, Mårtensson, M & Skoog, M (2000). Measuring to understand intangible performance drivers. *The European Accounting Review*, Vol. 10:3, pp. 407-437.

Lindgren, R & Stenmark, D (2002). Designing Competence Systems: Towards Interest-activated Technology. *Scandinavian Journal of Information Systems*, Vol. 14, pp. 19-35.

Mende, M, Brecht, L & Österle, H (1994). *Evaluating Existing information systems from a business process perspective*. Proceedings of the 1994 computer personnel research conference on Reinventing IS: managing information technology in changing organizations: managing information technology in changing organizations, 1994, United States.

Microsoft (2003). Microsoft Content Management Server 2002 Evaluation Guide. Available: http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnmscms02/html/cms_2002TechOverview.asp

Microsoft (2001). *The Business Case for a Web Content Management System*. Available:http://members.microsoft.com/partner/products/Servers/ContentManagementServer/cmsbizvalueWP.aspx [2004 September 24th].

Nakano, R (2002), Web Content Management: A Collaborative Approach. Boston: Addison-Wesley.

Pearlson, Keri.E (2001). Managing and using information systems: a strategic approach. New York: John Wiley & Sons, Inc.

Powell, P (1992). Information technology evaluation: is it different? Journal of the Operational Research Society, Vol 43:1, pp. 29-42.

Remenyi, D & Scherwood-Smith, M (1999). Maximise information systems value by continuous participative evaluation. *Logistics Information Management.* Vol 12:1/2, pp. 14-31

Suwardy, T, Ratnatunga, J, Sohal, A & Speight, G (2003). IT projects: evaluation, outcomes and impediments. *Benchmarking: An International* Journal. Vol. 10:4, pp. 325-342.

Wallén, Göran (1996). Vetenskapsteori och forskningsmetodik. Lund: Studentlitteratur.

Willcocks, L & Lester, S (1996). Beyond the IT Productivity Paradox. *European Management Journal*, Vol. 14:3, pp. 279-290.

Yin, Robert (1994). *Case study research: design and methods*. Sage Publications: Thousand Oaks, United States.