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A Taxonomy of Intranet Implementation Strategies: To Make or To Buy?

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ABSTRACT

The mid-1990s marked the widespread adoption of intranets by organizations to facilitate communication between geographically dispersed organizational units. Since then the knowledge barriers to adoption have been lowered by the emergence of advanced development tools and later the availability of ready-made "intranet-in-a-box" packages as well as an elevation of the general awareness and knowledge of Internet/intranet technologies among users. Based on an explorative study of intranet implementations in nine Danish and two South African organizations, this article presents a taxonomy of four archetypes of intranet implementation processes. The dimensions of the framework are sourcing (in-house vs. outsourced implementation) and technology (development tools or packaged intranet products). Using the taxonomy, we classify the strategic choices of the case organizations and make recommendations for organizations using or producing intranet technology products.

Keywords: *implementation models, information infrastructure, intranet, intranet development, intranet in-a-box, intranet sourcing, interpretive case studies, open standards, proprietary intranet technology, software sourcing*

INTRODUCTION

Organizations continue to face the communication challenges associated with geographic dispersion. Many have turned towards Internet technologies as a promising avenue to interlink geographically dispersed units with a uniform and rich communication channel.

Organizations with a global presence have been among the first to implement intranets—small versions of the Internet, used purely for communication within the

organization itself or even within a subset of its departments (Lyytinen, Rose et al., 1998; Damsgaard and Scheepers, 1999; Newell, Swan et al., 1999). Historically, in-house personnel have developed these intranets using quite basic development tools. Correspondingly, large organizations with plenty of in-house IT and development resources were the first to implement advanced intranets (Jarvenpaa and Ives, 1996; Moeller, 1996; Bhattacharjee, 1997).

Despite the popularity of intranets, the choice of sourcing strategy remains a com-

plex decision. The ubiquity of intranet technology renders implementation decisions (especially those with large-scale implications), a painful and risky area that frequently produces expensive and poor IT systems in organizations worldwide (George, 2000).

During the early 1990s the intranet phenomenon was in its infancy and intranets were developed from scratch as the basic knowledge about the technology had to be "reinvented" (Attewell, 1992) by each organization. Since these humble beginnings, much innovative activity has occurred on the supply side of the technology (Zmud, 1984; Perez and Soete, 1988). First, tools for intranet development and maintenance have increased in availability, diversity, functionality and usability. This has put intranet implementation well within the reach of even small and medium-sized organizations. Second, ready-made "intranet-in-a-box" packages have emerged, enabling—in principle—any organization to implement an intranet without much in-house technical expertise at all. Third, the rise in the use of the World Wide Web has raised awareness and knowledge about Internet/intranet technologies with rank and file employees in most corporations. As such, the question most corporations are confronting is no longer "should we implement an intranet?" but rather "which kind of intranet should we implement?" We would like to suggest that an additional question be asked, namely "How should we implement an intranet?" We shall argue that the latter consideration is especially crucial in the context of globally dispersed organizations.

Similar to corporate websites that are routinely re-launched with new designs and functionality, existing intranets are redesigned, multiple efforts are consolidated into a single intranet, or intranets are scrapped

in their entirety as organizations roll out new versions of the corporate intranet (Orenstein, 1998; Sliwa, 2000). Our analysis of implementation processes may be of use to both first-time implementers and to organizations with experience from one or several previous versions of intranets in the organization.

In this paper, we propose a framework describing four different intranet implementation strategies based on the choice of implementation process (in-house vs. outsourced) and the intranet architecture (tailor-made using development tools or ready-made using packaged intranet products). We suggest this taxonomy to help implementers contemplate different strategies and we extend recommendations for the implementation of an organizational intranet based on the resources, core competences, and capabilities of the organization.

In the following section, we outline a number of characteristics of intranet technology that are pertinent to conceptualizing the technology's organizational implementation. We then put forth our arguments for the dimensions in our framework—the choice of who implements or customizes the intranet in the organization, and the choice between a tailor-made intranet or ready-made intranet architecture. As such we isolate four different implementation strategies that we explore in detail. We then describe our research methodology, the case organizations we studied, and the data processing and interpretation. Using the taxonomy, we classify the strategic choices of the case organizations, discuss the findings and make recommendations for organizations using or producing intranet technology products. We conclude with perspectives on the application and limitations of the framework.

INTRANET TECHNOLOGY CHARACTERISTICS

In the following section we define and outline a number of characteristics of intranet technology. We do so because intranets are interpreted and integrated in organizations in different ways (Damsgaard and Scheepers 1999; Newell, Swan et al., 1999; Bansler, Damsgaard, et al. 2000; Damsgaard and Scheepers, 2000). We concur with research that argues for specificity about the focal technology in information technology implementation studies (e.g., Kling, 1991; Monteiro and Hanseth, 1995), since the technology's underlying features often significantly impact its implementation.

Intranet Technology

Prior studies have attempted to pinpoint an accurate definition for the term "intranet," but since the technology continues to evolve, such definitions need to be revisited periodically. Here we define an intranet broadly in accordance with our understanding of an evolving technology that is to a large degree socially constructed (Hughes, 1987; Dahlbom and Mathiassen, 1993; Williams and Edge, 1996). At the same time we include a technical definitional component that describes the current protocols, standards and application scope.

Intranets are based on established Internet standards and are often preceded in time by the organization's Internet website. The experiences gained in developing the latter means that the technical barriers of intranet implementation are usually low (Attewell, 1992). In addition, intranets have been described as "glueware" or "middleware," since they have the potential to interconnect hetero-

geneous systems (including legacy applications) through the browser and associated protocols and applications (Lyytinen, Rose et al., 1998). We use the following working definition of an intranet in this paper:

An intranet is an information space that supports exclusive sharing of information among a prescribed community of users (typically members of an organization). The space comprises a number of technical standards and platforms interconnected in a network within well-defined security boundaries. All information exchanges occur via a Web browser using the TCP/IP and HTTP protocols. The intranet integrates text-based information (typically in HTML or XML format), rich multimedia content and dynamic content (e.g., search results, embedded scripts, interactive forums, transactions with other organizational systems). Existing computer-based systems can be integrated with the intranet, with the browser as the primary client interface.

Application Scope

Intranet technology is highly malleable and the application potential of the technology has a very wide scope. Intranets tend to evolve in sophistication over time (Coleman, 1997; Romm and Wong, 1998). Initially the technology tends to be used mainly for publication of static information, but as the organization becomes more familiar with the technology, it may be applied for the more advanced application possibilities. Typical applications include corporate, departmental and staff home pages, group calendars, product and employee directories, knowledge bases and news services (from internal or external sources). Further intranet applications can include the reservation of shared resources such as conference rooms, communication

facilities such as embedded email and instant messaging within the organization, and workflow features such as ordering products from suppliers subject to the approval of the employees' supervisors, to name but a few. Personalized to each employee, and with interfaces to the organization's customer databases, product information, etc., the intranet can become an enterprise information portal addressing many employees' information needs (Markus, 2000).

Intranet Implementation

Since the early days of computerization, much has become known about the organizational implementation of computer-based information systems and technologies. This knowledge is rooted in studies of centralized computing systems (e.g., Nolan, 1973; Gibson and Nolan, 1974; Nolan, 1979; Tornatzky and Klein, 1982; Markus, 1983; Kwon and Zmud, 1987; Markus, 1987; Srinivasan and Davis, 1987) and more decentralized information technologies such as office automation, e-mail, groupware (e.g., Hirschheim, 1986; Orlikowski and Gash, 1994; Grudin and Palen, 1995; Orlikowski, Yates et al., 1995; Ciborra, 1996; Dennis, 1996; Karsten, 1996). The advent of the organizational application of Internet-based technologies marks the ubiquitous computing paradigm (Lyytinen, Rose et al., 1998). As an example of this class of technologies, intranet implementation suggests a departure from the traditional IT implementation wisdom. Here we condense the most relevant differences from a number of literature sources.

Intranets may be implemented centrally in the organization as the "corporate" intranet, but units (such as divisions, departments or functional groups) and even individual employees often play an active role in establishing "child intranets"

(Bhattacharjee, 1998; Lamb and Davidson, 2000). Thus in terms of scope, various "levels" of intranets can coexist (Ciborra and Hanseth, 1998) and the technology can involve a wide range of organizational actors. Furthermore the different intranet efforts may only be loosely coupled (e.g., by a single hyperlink). In this respect, the notion of an intranet is interpretively flexible (Orlikowski, 1992a) and different users may ascribe very different meanings to what they may perceive to be "the" intranet.

Quite often a "grassroots" intranet implementation effort precedes a formal organizational decision to implement an intranet (Bhattacharjee, 1998; Lamb and Davidson, 2000). In this respect, the starting point of an organizational intranet is often difficult to pinpoint, and the process emerges through a series of implementation initiatives that combine existing initiatives with novel ones. Likewise the implementation seems to be ongoing, since new functionality and possibilities evolve over time as the intranet itself and the supporting technologies mature (Damsgaard and Scheepers, 2000). This is quite different from traditional software implementation processes that Lyytinen et al. (1998) and many others characterize as a rational lifecycle process that proceeds from determining systems requirements, analysis, design, and technical implementation to systems maintenance. In the following section we describe four different approaches to intranet implementation.

FORMULATING AN IMPLEMENTATION STRATEGY

Implementation of an intranet is an activity that has both technical and organizational aspects. On the technical side, network protocols, Web servers and other

server applications must be in place, while on the organizational side users' interest and involvement must be obtained and quality control mechanisms must be established to ensure the value and reliability of the content on the intranet (Markus, 1994; Damsgaard and Scheepers, 1999).

The IS literature abounds with cases of implementation process difficulties caused by misalignment of system goals and the applied means, and organizational power struggles enacted through information systems projects (Markus, 1983, 1994; Orlikowski, 1992b; Hanseth and Braa, 1999; Bansler, Damsgaard et al., 2000). Unlike many other information systems, the use of the organizational intranet is essentially voluntary for the individual user. The quality of the information content often depends solely on the voluntary contributions of individual users and groups of users such as project teams. Along with the technological characteristics of intranets, this makes intranet implementations very sensitive to the circumstances of the implementation process. Thus, extra care should be taken in deciding upon the implementation strategy for an organizational intranet.

We now examine two central facets in the formulation of an implementation strategy. First we examine the issues of whether to outsource the implementation of the intranet or to implement it in-house. Second we examine two intranet architecture choices; one tailor-made from scratch (using development tools) to the organization's specifications; the other a customized version of a standard intranet product (known as "intranet-in-a-box" packages).

These issues lead us to propose a 2-by-2 framework consisting of four implementation strategies. Reflecting on the experiences of the case organizations we studied, we offer advice regarding the strat-

egy to choose given an organization's needs, core competences and available resources.

Implementation Process: In-House or Outsourced

Due to the relative simplicity of intranet technology, many organizations have sufficient in-house competences to address the technical challenges in the implementation of an intranet (see e.g., Jarvenpaa and Ives, 1996; Moeller, 1996; Bhattacharjee, 1997). Exclusive use of internal resources, however, will not readily allow the organization to benefit from the experience, expertise and economies of scale inherent to existing intranet products on the market or vendors specializing in intranet development (Attewell, 1992).

Software make-or-buy decisions need to encompass both the strategic and the tactical level as recommended in the framework suggested by Rands (1993). At the strategic level the organization makes decisions about investment or divestment in capacity. At the tactical level the organization attempts to optimize the allocation of the current capacity by applying internal resources to the projects where internal expertise is most needed, and by purchasing software projects from the outside sources identified in the strategic level.

From a knowledge management perspective, an important issue is whether the organization itself should take on the burden but also reap the potential benefits of the required learning. Scarbrough (1995) outlines such choices as a continuum of tradeoffs between social control over the technical knowledge and economic exchange with other organizations.

Our research shows that the in-house implementation process is the default choice in most cases. Often the option of outsourcing the intranet implementation is

not even considered, resulting in a *de facto* insourcing approach (Lacity, Willcocks et al., 1996). Successful implementation using an insourcing process requires in-house competences in computer networks, Web technology and programming languages used to interlink applications to the intranet. In order to avoid bottleneck situations, staff with the required competencies must be able to dedicate sufficient person-hours, and the organization must take on the project management of the implementation. The in-house implementation process facilitates freedom in the structure and content of the intranet, and the organization reaps the benefit of organizational learning about intranet technology.

Due to the explicitness of the costs, outsourced implementations have a high degree of management ownership. The organization bears the costs of market research in order to find the right contractor, as well as contract negotiation and monitoring before and during the implementation. The technical quality of outsourced intranet implementation projects is often very high as the organization benefits from the experience and economies of scale from the outside contractors. As outsiders, the contractors may offer alternative views of the organization's processes, acting as process consultants. The organization may consider this an advantage, but also an unwelcome interference.

The organization must weigh these factors against each other in the choice of whether to conduct an in-house implementation or to outsource the implementation.

Intranet Architecture: Tailor-Made or Ready-Made

In our research we observed two fundamentally different architectures of intranets, differing in the degree to which

they are tailored to the adopting organization. We term an architecture that describes an intranet developed from scratch to suit the organization at hand, the *tailor-made intranet*. The other architecture describes a commercially available intranet product implemented in—and then customized to—the organization; we call this architecture the *ready-made or instant intranet*.

Since ready-made intranets support mainly generic and uncomplicated work processes, adapting a ready-made intranet to the organization is much less problematic than the adaptation processes for large standard information systems such as Enterprise Resource Planning systems (Markus, 2000). For many organizations, however, some level of adaptation and alteration will be required, increasing both the initial cost of implementation as well as subsequent maintenance and upgrade costs.

Tailor-made intranets are implemented using a wide range of tools and technologies, and they are usually expensive because the development costs are amortized on a single organization. This intranet architecture requires a high level of technical knowledge and training of the implementers. In most implementations a considerable level of technical knowledge and training is also required of the content providers, as they must use technical writing tools to edit and publish content to the intranet. The tailor-made intranet architecture lends itself well to integration with applications that are already implemented in the organization—the intranet becomes a portal or gateway to existing applications.

The ready-made intranet architecture delivers a collection of well-tested applications with proven functionality. The typical price model is a low system purchase price and additional licenses paid per-user on a bi-annual or annual basis. The licenses then

Table 1: Four Different Intranet Implementation Strategies

	In-house implementation	Outsourced implementation
Tailor-made architecture	Homemade intranet (The do-it-yourself builder) Type I	Tailor-made intranet implemented by consultants (The Craftsman) Type II
Ready-made architecture	Intranet-in-a-box customized by in-house personnel (The Engineer) Type III	Intranet-in-a-box customized by outside contractor (The Traveling Fitter) Type IV

cover incremental upgrades to the standard applications and functionalities. The organization must weigh the benefits of the applications with the fact that it will tie its processes to an inherently proprietary format, and that the organizational learning from the use of the system will not be easily transferable to other information systems. With this architecture it is especially important that the organization has performed an analysis of technical and organizational requirements as well as market research of available products in order to ensure that the intranet package suits the requirements. Ready-made intranets provide an integrated product with a simple form-based user interface for handling the tasks of both intranet administration as well as the content updating, thus reducing the technical skills demands placed on in-house staff.

A Taxonomy of Four Types of Intranets

The two dimensions outlined above can be combined, i.e., for intranets implemented either in-house or outsourced, the organization can choose to implement either a tailor-made or a ready-made intranet. This leads us to suggest the framework of four archetypes of intranet implementation strategies depicted in Table 1.

As nicknames for the four implementation strategies, we chose four analogies to real-world house maintenance tasks such as carpentry or electrical work. The homemade intranet (Type I) resembles the do-it-yourself homebuilder who starts from scratch and builds everything herself. The outside contractor tailoring an intranet to the organization (Type II) resembles the craftsman or the professional builder who draws on professional knowledge, experience and tools to solve the problems *in situ*. The intranet-in-a-box customized by in-house sources (Type III) resembles the engineer who buys a product as an assembly set and carries out the assembling herself. The intranet-in-a-box with outsourced customization (Type IV) resembles the traveling fitter who installs and adapts prefabricated components at customers' locations. In subsequent sections we present the four different strategies for implementing an intranet. The characteristics of the models can be seen as a basis for intranet make-or-buy decisions.

We conducted a field study to learn which of the four strategies was being used. We were also interested in observing any differences between the companies and the strategies they employ. We will first describe our field study and its research design.

Table 2: The Organizations, Dates, and the Number of Interviewees in Each Organization

Organization		Line of business (base country)	Country	Dates of interviews	Number of interviewees
1	User	Telecommunications	South Africa	Dec. 1997-Jan. 1998; Nov. 1998	9
2	User	Research and development	South Africa, various international offices	Dec. 1997-Jan. 1998; Nov. 1998	19
3	User	Manufacturing	Globally dispersed, Head office in Denmark	Aug. - Oct. 1998	8
4	User	Software development	Denmark	Dec. 1998	6
5	User	Cellular phone service provider	Denmark	Dec. 1998	5
6	User	Public sector administration	Denmark	Feb. 1999	1
7	User	Software development	Denmark	Feb. 1999	3
8	Provider	Advertising and web	Denmark	Feb. 1999	1
9	Provider	Consulting, web, and intranet	Denmark	Mar. 1999	2
10	User	Software and facility management of large systems	Denmark	Mar. 1999	1
11	Provider	Intranet-in-a-box	Denmark	Apr. 1999	1

RESEARCH METHODOLOGY

A multiple interpretive case study design forms the basis for the findings in this paper (Walsham, 1995). We chose nine organizations in Denmark and two organizations in South Africa. The study was conducted between 1997 and 1999 with informal follow-up studies in some of the case organizations. Because of our intention to study not only the implementation strategy but also the relationship between company characteristics and intranet implementation strategy, the participating organizations in the study varied from medium-sized organizations to large globally dispersed organizations (more than 70,000 employees) with very different core competences. To concentrate our efforts we selected in each organization a single department or geographical location (between 20 and 700 employees) as our locus. We focused on the department/location within the organization that had the most significant influence on the organization's overall intranet strategy. The organizations were selected because they spanned the

lines of businesses that were considered to have the potential to be "first-movers" and since they represented diversity in size and geographical scope. The two South African organizations were chosen since they exhibited two of the most advanced intranets in the country at the time of the commencement of this study (1997-1998). Additionally the participating organizations represented both users and providers of technology.

Table 2 outlines the specifics of the interviews that we conducted in the organizations. Depending on the organization (intranet technology user/provider) we interviewed managers and developers in the IT departments as well as end-users where applicable. The inclusion of three intranet provider companies added data regarding development of both consultant-produced intranets and an intranet-in-a-box product. At the time of the interviews, the producers had implementation experiences from approximately 50 customer organizations combined. We conducted the most thorough interview series during the early stages of our research (1997-1998). As we fine-tuned our interview approach, we became

more aware of the pertinent research issues (Star and Gerson, 1987), and in the final six organizations we focused our interviews on employees who were the person or persons responsible for the organizational or departmental intranet. By doing so we were able to include a greater number of organizations in the study.

Data Processing and Interpretation

The theoretical reference we drew on for the construction of our data collection instruments was Leavitt's well-known "diamond" model of organizations that presents organizational task, structure, technology and actors as highly interlinked organizational variables that must be addressed in any organizational change process (Leavitt, 1964). If only one or two of these variables are addressed, the results are often unanticipated changes in remaining areas as they compensate for the changes. For example management may introduce new structures in an effort to make production more efficient, but unless the people aspects are addressed, the change may result in human resistance.

For the purpose of this study, we have mapped Leavitt's dimensions as follows. The variable of task is examined according to Porter's organizational processes (Porter, 1985), the variable of structure is examined using Mintzberg's concepts of organizational structure (Mintzberg, 1983), the variable of actors is examined using Schein's work on organizational culture (Schein, 1989), and for the variable of technology we have applied the literature on intranets, specifically intranet characteristics and use modes (Damsgaard and Scheepers, 1999) and the stages of intranet maturity (Damsgaard and Scheepers, 2000). Based on the theoretical concepts from this literature, we designed an inter-

view agenda to capture the intranet implementation process (see Appendix A). All questions were open-ended to allow for a rich and interactive discussion of the topics. The interview agenda was also aligned with other tested interview agendas designed for similar purposes (cf. Scheepers, 1999; Bansler, Damsgaard et al., 2000).

A few pilot interviews were held with practitioners in order to test the interview guide, and as a result minor clarifications were made to a few questions, and the order of two blocks of questions was changed. In the original agenda the questions about the intranet applications came in the chronological order: past, present, future. However, it turned out that the interviewees were usually keener to talk about the current systems first even when asked about the past, so the order of these questions was changed to: present, past, future.

All interviews were tape recorded and transcribed by the authors. Subsequently the transcripts were coded according to a coding scheme developed from the theoretical concepts of intranet and organizations that formed the basis for the interview agenda. The coding process was necessary due to the semi-structured form of the interview (Eisenhardt 1989; Silverman 1993). As the interview progressed, the interviewees often backtracked and clarified issues that had been covered earlier in the interview, or the interviewee's answer to a question prompted the interviewers to ask questions outside of the interview guide, or to encourage the interviewee to elaborate on tangential answers.

During the coding phase a number of measures were taken in order to increase the validity of the findings of the study. Two coders working independently coded each interview transcript. Each coder marked all the sentences or paragraphs in the tran-

script that contained information relating to one or more of the codes defined in Table 3. Upon completion of this phase, the two coded versions of the transcript were compared, and any differences discussed among the coders until agreement was reached on the final coded version of the transcript. The paragraphs pertaining to the individual codes and sub-codes were then extracted into temporary documents describing in raw form all the findings for each organization according to the final coding scheme. These documents were the foundation of the final case descriptions and were shared with the individual organizations for feedback and validation. Minor corrections were needed in a few cases.

The cross-case comparisons and extraction of overall results were based on the case write-ups. The gathering, transcribing, coding, and analysis of the interviews comprised a workload of approximately 24 person-hours per interview.

The technology component (code 4, see Table 3) had two sub-codes to encompass the two different concepts of intranet use-modes (Damsgaard and Scheepers, 1999) and the roles various actors play in the implementation of the intranet (Scheepers, 1999). The sub-codes for code number 5 were created during the coding process, as a considerable amount of information was available on the initiatives taken by the organizations that could be in-

Table 3: The Coding Scheme Based on Leavitt's Diamond and Intranet Literature

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|--|
| <p>1) Structure: Statements concerning the organizational structure as per Mintzberg (1983), i.e., concepts such as the way work was coordinated, degree of decentralization, formalization of work, organizational environment, etc.</p> <p>2) Processes: Statements concerning the organizational processes as per Porter (1985), i.e., concepts such as interdepartmental communication, functional division of work, etc.</p> <p>3) Culture: Statements concerning the organizational culture as per Schein (1989), i.e., concepts such as basic values, working environment, etc.</p> <p>4) Technology: Statements concerning the organization's intranet implementation and other information infrastructure. Functionality that is implemented now, and functionality projected or desired for the future:</p> <p> 4a. Intranet use-modes (Damsgaard and Scheepers, 1999)</p> <p> 4b. Roles in relation to the intranet implementation (Scheepers, 1999)</p> <p>5) Intranet implementation stages: Statements concerning the organization's level of intranet implementation (Damsgaard and Scheepers, 2000):</p> <p> 5a. Initiation</p> <p> 5b. Contagion</p> <p> 5c. Control</p> <p> 5d. Institutionalization</p> <p>6) Implementation model: Did the organization employ own personnel and/or outside contractors to implement the intranet?</p> <p>7) Methods: Did the work with the intranet technologies follow a predefined method, or were working methods derived from the experiences with the intranet implementation?</p> <p>8) Individual opinions and perceptions: Did the interviewees express their own personal perceptions of, or attitudes towards the intranet specifically or intranet technology in general?</p> <p>9) Experiences and observations from other organizations: Did the interviewee have experiences from observation of, participation in, or communication with other organizations employing intranet technologies?</p> <p>10) Miscellaneous: Passages in the interview which seem important to the coding researcher, but which do not fit any of the other categories.</p> |
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interpreted using concepts from an intranet stage model (Damsgaard and Scheepers, 2000) that became available during the coding process. Code number 9 was originally conceived as a way to capture the work experiences of employees from intranet developing companies, but it turned out to be used in the coding of many of the interviews in general. Many interviewees had prior work experience in other organizations that used intranets, or they participated in professional or social networks with people from other organizations to exchange intranet experiences. When coding for this category, we attempted to filter out hearsay and anecdotal observations based on the context of the statement and the use of language (vague or specific). Code number 10 was crucial in determining whether the codes had captured all vital information, and to flag the odd insightful statement that did not warrant the creation of a whole new category.

Throughout the study there were periods of reflection and interpretation of the evidence (Klein and Myers, 1999). This often meant a number of circular passes of working through the evidence in the light of extant theory, revising the initial interpretations until the final interpretation left

no remaining "anomalies" in the case data (Sarker and Lee, 1999). An overview of the field study is depicted in Table 4.

THE FOUR INTRANET IMPLEMENTATION STRATEGIES

Type I—Homemade Intranet (The Do-it-yourself Builder)

We found the "homemade" intranet to be the most common of the implementation strategies by far; this was true across the two countries, and across company size and line of business. If the organization chooses to develop a "homemade" intranet, the employees must have certain technical skills and expertise in areas such as web-server technology, web development tools and programming languages. The cost of getting started is often opaque or hidden for this strategy, typically due to a lack of an official budget. The amount of time spent on the project is hard to estimate, and it increases as new ideas and functionality requirements emerge. On the other hand the "homemade" intranet provides a good opportunity to tailor the intranet to specific local requirements, and the organization

Table 4: Overview of Implementation Strategies in the 11 Case Organizations

Organization	Line of business	Implementation strategy
1 User	Telecommunications	Type I, local Type II implementations
2 User	Research and development	Type I, local Type II implementations
3 User	Manufacturing	Experimented with type III, but chose a Type I implementation
4 User	Software development	Type I
5 User	Telecommunication	Type I
6 User	Public administration	Type I
7 User	Software development	Type I
8 Provider	Advertising and web	Type I, vendor of Type II
9 Provider	Consulting, web, and intranet	Type I, vendor of Type II
10 User	Software and facility management of large systems	Type I, local Type II implementations
11 Provider	Intranet in-a-box development	Type III, developer and vendor of Type III and Type IV

does not have to accept approximations in terms of adapted standard intranet solutions.

A potential problem we observed with this implementation strategy is that the internal implementers and technically skilled employees focus on their own ideas and perceptions of the organization's intranet needs and tend to lack a holistic view. A countermeasure against this problem is to perform a formalized requirements analysis for the intranet and to assemble an interdisciplinary steering committee as recommended by Damsgaard and Scheepers (2000).

In the larger organizations, we observed a variant of this problem. When the intranet becomes a manifestation of special interest groups in the organization, the result is multiple, often unauthorized intranets used by geographically, functionally or operationally separated groups of employees. The literature also has numerous examples of this phenomenon, for example in pharmaceutical companies (Bansler, Damsgaard et al., 2000; Ciborra, Braa et al., 2000; Damsgaard and Scheepers, 2000).

The homemade intranet strategy seems very inexpensive in the beginning of the implementation process, easing the de-

cision to start the implementation. However the hidden costs from use of internal competences and resources can be high. If the organization holds the required competencies, this strategy provides the highest potential for tailoring the intranet to the organization's requirements. However due to the novelty of the technology, it is unlikely that the internal staff has experience from prior intranet implementation projects. Hence, the resulting intranet functionality does not have the benefit of being tested in other organizations and the implementers are prone to making mistakes that otherwise could have been avoided.

We recommend this implementation strategy for organizations with generic technical competences that wish to develop specific intranet/Internet technology competences, provided that the organization has ample person-hours available for the task. Organizations with non-standard requirements and work-processes may also find this strategy a good choice, as will first-generation implementers who wish to gain first-hand experience with the technology before venturing into a large-scale implementation of intranet technology.

Our findings and recommendations for intranet implementation type I are sum-

Table 5: Intranet Implementation Strategy Type I – Homemade Intranet

Advantages:	<ul style="list-style-type: none"> • Inexpensive in the beginning of the implementation process • Potential high degree of tailoring to the organization
Disadvantages:	<ul style="list-style-type: none"> • High hidden costs of use of internal competences • Experience from similar intranets unlikely • The functionality of the intranet has not been widely tested • Often results in a poor technical design
Organizations that can benefit from choosing type I intranet implementation:	<ul style="list-style-type: none"> • Organizations with technical competence, that wish to develop their own intranet technology competence • Organizations with non-standard requirements and work-processes • Organizations with high IT-expertise and/or large IT-departments • First-generation implementers who wish to gain first-hand experience with the technology before venturing into a large-scale implementation

marized in Table 5.

**Type II—Tailor-made Intranet
Implemented by Consultants
(*The Craftsman*)**

We observed this strategy mostly in some of the larger organizations both in Denmark and South Africa. Typically this strategy was followed when the organization needed specialized skills that it did not possess in its current IT department, for example artistic or journalistic skills. This strategy allows the organization to benefit from the consultants' experiences from similar projects aiding in the requirement specification and development of an intranet tailored to the organization's specific needs. The expertise of the craftsman may "rub off" while she works in the organization, whether organized as formal training sessions or through informal interaction, making knowledge transfer a part of the product transfer process (Attewell, 1992). We recommend that organizations that do not have available human resources or in-house skills to develop an in-house solution consider outside consultants. Another reason for contacting expertise from outside contractors may be low availability or high costs of a knowledgeable workforce on the market (King, Gurbaxani et al., 1994).

We believe that a downside to this solution is the potential for lock-in, i.e., becoming too dependent on a single supplier (Shapiro and Varian, 1999b). Most of the organizations we talked to are aware of this risk and seek to maintain control of the project through such measures as ensuring that open standards are used and that the organization has ownership of the source code of the delivered applications, thus making it possible to continue the development either in-house or using different outside consultants. For large implementation projects, the organization may employ a dual sourcing strategy to keep costs down by having at least two consultant companies compete for implementation and maintenance contracts.

We found that the tailor-made intranet strategy is likely to result in a technically well-designed intranet suited for the organization's expressed requirements. Due to the one-off nature of the implementation process, this strategy is best suited for organizations that require specialized intranet applications that are not available in ready-made intranet products.

Our findings and recommendations for intranet implementation type II are summarized in Table 6.

Table 6: Intranet Implementation Strategy Type II—Tailor-Made Intranet Implemented by Consultants

Advantages:	<ul style="list-style-type: none"> • Little internal expertise is required • Benefits from the consultants' experience and expertise • Likely to be technically well designed • An opportunity to improve the internal competence through education
Disadvantages:	<ul style="list-style-type: none"> • A risk of becoming too dependent on one supplier • Often an expensive solution
Organizations that can benefit from choosing type II intranet implementation:	<ul style="list-style-type: none"> • Organizations with insufficient technical competence • Organizations with non-standard requirements • Organizations with no time to develop internal expertise

Type III—Intranet in-a-Box Customized by In-House Personnel (The Engineer)

Many of the companies indicated that they were or had been considering buying an intranet-in-a-box and letting in-house personnel customize it (type III strategy). Especially the smaller companies saw this as a promising possibility in the future when replacing their first-generation intranet, though they were concerned with the annual license costs per employee. An intranet-in-a-box solution offers several benefits. The high level of functionality means that the organization's requirements may be met by standard functionality or by simple parameter adjustment of an intranet product, requiring little application development knowledge on the part of the organization. The organization must estimate the extent of adjustments and alterations necessary before the organization's requirements are met, and the result must be weighed against the availability of internal resources.

We observed a danger by committing to a particular intranet-in-a-box solution in that the organization will become dependent on the supplier's proprietary product. This means that the organization can become locked-in and must endure high costs if it later chooses to replace the product (Shapiro and Varian, 1999b). A good example of lock-in for a type III intranet implementation is the training of users and system administrators. Such sedimentation of knowledge (Scarborough, 1995) about the intranet product reduces the knowledge threshold to intranet adoption and increases the likelihood of success. But brand-specific training also leads to a lock-in to the product's user interface, functions, and features (David, 1985). The investment in build-

ing up skills to use the specific intranet represents sunk costs that make a future switch to another intranet product more expensive. Shapiro and Varian (1999a) recommend that this fact be used as bargaining power in the contract negotiations with vendors, since the future switching costs of the customer represents an immediate value to the vendor.

This implementation strategy lends itself to organizations with organizational processes similar to the standard processes supported by the intranet product, provided that the organization has sufficient resources of skilled personnel to conduct the customization and implementation in-house. Most organizations with a nominal complement of IT staff would fall in this category. Because of the users-based pricing model currently associated with most intranet-in-a-box products, this intranet strategy can be quite expensive for larger organizations with many users.

Our findings and recommendations for intranet implementation type III are summarized in Table 7.

Type IV—Intranet in-a-Box Customized by Outside Contractor (The Traveling Fitter)

We observed an intranet technology vendor tailoring its intranet product and expertise to address the needs of customer organizations that purchase both a standard intranet product and outside expertise to perform the installation and implementation. Not surprisingly, for the customer organization this implementation strategy combines many of the advantages and disadvantages from the "tailor-made intranet" (type II) and "intranet-in-a-box" (type III). Due to the architecture choice, the intranet product will be based on thoroughly tested advanced applications, and due to the

Table 7: Intranet Implementation Strategy Type III – Intranet-in-a-Box Customized by In-House Personnel

Advantages:	<ul style="list-style-type: none"> • Standard, thoroughly tested functionality • A chance of sedimentation of knowledge (Scarborough 1995) about the product and its implementation
Disadvantages:	<ul style="list-style-type: none"> • Not tailored to specific requirements • A risk of becoming too dependent on the vendor product • Can be a relatively expensive solution for large organizations due to licenses • Some internal expertise is required for the implementation process
Organizations that can benefit from choosing type III intranet implementation:	<ul style="list-style-type: none"> • Organizations with well-defined requirements • Organizations with sufficient internal expertise to install and implement the intranet product • Organizations with standard requirements and work processes that are modeled in the intranet products

choice of implementation sourcing, the implementation effort will benefit from the experience of the consultants. This implementation strategy is thus a quick route to advanced, thoroughly tested intranet functionality customized for the organization's requirements.

The consultants can deliver services ranging from minor alterations to the standard intranet product to fairly complex development of new functionality for the intranet. By using this implementation strategy, the organization can adjust its intranet to more demanding requirements without bearing the burden of the required learning. The ultimate manifestation of a type IV implementation strategy is to outsource the maintenance and facility management of the resulting intranet as well, thus further reducing the demands on in-house intranet technology competences. The intranet server can physically be placed at the organization's premises or at a vendor's location, i.e., an application service provider (ASP) setup.

The level of functionality and the speed of implementation make this implementation strategy seem very useful and

accessible to many organizations, especially organizations with low levels of technical competence. The strategy can however be very expensive, especially for large organizations with many users. In addition, it holds the double danger of lock-in both to the product and to the consultant company (which may be the same or maintain close ties for mutual benefit) (Shapiro and Varian, 1999a). The intranet-in-a-box provider in our study reported that customers entered into this commitment with open eyes, since for the sake of continuity they would rather be dependent on commercial companies than on the training and retention of in-house technical staff.

Our findings and recommendations for intranet implementation type IV are summarized in Table 8.

DISCUSSION AND RECOMMENDATIONS

For the majority of the case organizations we studied, the "homemade intranet" was espoused as the de facto implementation strategy (see Table 4). We believe this to be a result of several fac-

Table 8: Intranet Implementation Strategy Type IV – Intranet-in-a-Box Customized by Outside Contractor

Advantages:	<ul style="list-style-type: none"> • Advanced standard functionality can be achieved quickly • Thoroughly tested functionality • A chance to either increase the internal competence (professionalism of workers) through education (Scarbrough 1995) or alternatively to outsource all the technical competence • Benefits from the consultants' experience with similar projects • Likely to be technically well designed and implemented
Disadvantages:	<ul style="list-style-type: none"> • A risk of becoming doubly locked-in to the product and to the supplier (Shapiro and Varian, 1999b) • Can be an expensive solution due to initial purchase costs, product licenses, and consultant fees
Organizations that can benefit from choosing type IV intranet implementation:	<ul style="list-style-type: none"> • Organizations with demanding requirements regarding quality and functionality • Organizations with low levels of technical competence

tors. First, the high-tech line of business of most of our case organizations lends itself well to homemade intranets. Second, standard-intranets have only recently become available while the user organizations in our investigation were indeed chosen because they have had intranets for several years. As intranets lose their novelty and the intranet users' functionality expectations increase, we expect that the choice of intranet implementation strategy will become more explicit and deliberate, leading to greater diversity in implementation processes actually applied. Anecdotal evidence suggests that this has not happened yet (Chu, 2002).

The ubiquitous nature (and loose coupling between child intranets) associated with intranet technology means that it is quite feasible for different strategies to be combined within the same organization. Compared with much of the extant literature on information technology implementation, this is an interesting observation. We found such a combination of strategies in four of the case organizations. We attribute this finding to the fact that in global (and

even decentralized pockets of the same regional organization), different social contexts apply and hence different intranet strategies may be (and possibly should be) pursued concurrently (cognizant of the advantages/disadvantages as outlined). Although there may be a central espoused approach along the lines of one of the four strategies, due to the ubiquity of intranet technology and the flexibility in meaning attributed to "the" intranet by the various decentralized intranet role players, different strategies can co-exist at different unit levels. One base cause for a multitude of intranets in a single organization is mergers between existing entities, each of which bring in their existing intranet. Other causes are "drift" from the official, espoused strategy as the technology is used in the organization (Cordella and Simon, 1998; Ciborra, Braa et al., 2000), or the simple fact that the enterprise information resources themselves become fragmented (McMahon, 2000). These developments are especially likely in larger, geographically dispersed organizations.

We thus position the four implementation strategies as archetypes. Organizations could use these as a basis to formulate either a dominant or a combined strategy, dependent on contextual considerations. We argue that larger and geographically dispersed organizations would need to factor in a variety of contextual considerations such as available internal technical expertise, core competence, the maturity of the technology and cultural climate in their choice of strategy/strategies.

Some of the intranet implementation projects we encountered were built using the existing information infrastructures. In other cases, however, the intranet projects were implemented in part for reasons other than the intranet itself. In several cases the intranet implementation served to force through infrastructure changes such as unification of network protocols from a heterogeneous environment to a consolidated TCP/IP environment or elimination of legacy applications, or the intranet served as a unifying project to roll out technology training and awareness to all employees. Both of these findings have been reaffirmed in other intranet implementation projects unrelated to our study (see e.g., Zmud and Sambamurthy, 1997; Bhattacharjee, 1998; Cope, 2001).

We did not notice much difference between the large South African companies and the large Danish companies. They all followed the homemade strategy with some assistance of external consultants in some critical areas. One observation worth noticing in the South African companies was the boycott of IT technology during apartheid. We therefore expected that the South African companies had to put a lot of effort in catching up to, for example, Danish companies. To our surprise we found the opposite to be true. The Danish companies had to abandon Lotus Notes in

favor of an intranet, whereas the South African companies did not have a large installed base of existing systems and support structures that blocked the way of the intranet. The lower knowledge barrier of the intranet compared to older IT technologies also favors a speedy adoption of intranet technology. This leads us to propose that for many organizations it is more demanding to manage an existing information infrastructure than it is to build a new one from scratch.

Large and small companies initially all followed the homemade strategy, but for different reasons. The small companies follow the homemade strategy because it poses the smallest initial demand on local resources, whereas the large companies follow the homemade strategy because they believe they have the necessary skills and resources to successfully implement a homemade intranet. We expect that the paths of small and large companies will separate later due to the following rationale. All evidence shows that the size and complexity of the intranets grow over time, increasing the resources required for maintenance efforts. In order to curb the complexity and preserve uniformity despite local initiatives, most organizations initiate major upgrade or replacement projects for their intranet. Scheepers et al. (2002) support the observation that periodic intranet replacement/re-launch projects are quite common. The small companies hope for the intranet technology to become a commoditized part of an office suite as the technology matures and the market for intranets grows. In the large companies the continued maintenance of the intranet, including development of applications, will likely require a staff of developers, and thus the costs of maintaining the development in-house will be visible. At some point the intranet will lose its status as a novel tech-

nology that is perceived to be easily manageable. Instead the intranet will be viewed as an information system just like any other in the organization's information systems portfolio. The organization will then reconsider whether maintaining intranet development capabilities in-house serves the company best, or if an intranet product should be purchased from an outside vendor. The wide diffusion of intranet technologies has decreased or eliminated the competitive advantage of having intranet implementation knowledge in-house. We suspect that the larger organizations will therefore gravitate towards type III intranet implementations, as they will prefer ready-made intranet suites and utilize in-house expertise to adapt the intranet to the local requirements, and to handle the continued maintenance tasks of the intranet.

An observation that is worth noticing is that the providers we interviewed all explained that their intranet platforms were built upon open standards to satisfy their customers. However the open standards only guarantee that data *in theory* can be extracted from the intranet in its simplest text form, whereby the relationship between data elements will be lost. In reality it may take considerable (down)time and excessive efforts to move the contents from one supposedly "open platform" to another. In further support of this observation, none of the providers we interviewed reported about any customers that had successfully switched from their platform to a competing platform. We also did not encounter any of the user companies expressing the need for an ASP setup. The user companies unanimously stated that the data should be kept on the organizations' own servers. The strong link between the application and the data suggests that companies may think that they control the data, while in actual fact they do not. We therefore caution that a

relationship with an intranet-in-a-box provider is "more like a marriage and less like a date."

In terms of cultural differences between the companies, our case studies show that some of the organizations that had the best prerequisites in terms of skills and expertise developed intranets with a poor technical design. This was quite puzzling and at first contradictory to what we expected. A plausible explanation is that the main factor was a relatively low knowledge threshold, which led the implementers to believe they were able to develop an intranet solution without careful analysis and planning. As a consequence, the actual implementation of the intranet often occurred in spare time between scheduled tasks, which led to a poor overall technical design and project management.

Technologies offer limited windows of opportunity where different role players can influence the technology and profit from it (Perez and Soete, 1988). For intranets the time of innovation has long passed, but the technology has not yet become a commodity, and the need for mediating companies has not yet disappeared (Attewell, 1992). Indeed presently, intranet technology appears deceptively simple. However the required expertise (in technology and usability design), implementation experience and the actual person-hours required for a successful intranet implementation are substantial. We therefore recommend that user organizations, which currently face a choice of implementation processes, avoid homemade intranet implementations unless the organization has already built up extensive, successful experience through earlier homemade intranet implementations.

We believe that the commodification of intranets will occur as the evolution of intranet technology continues, resulting in the advent of large, commercial intranet

products analogous to the commercial office software suites and Enterprise Resource Planning systems. If these products are complex (similar to ERP systems), their customization to user organizations will be a thriving enterprise for implementation consultants and specialists, whereas the knowledge threshold for user organizations will be all but eliminated if the products get commodified to something similar to office application suites.

Software houses that produce intranet in-a-box solutions have until recently enjoyed a market with only very few participants on the supplier side. This situation has changed, and competition has increased. We believe that conventional market strategies can readily be extended to apply to the intranet market, and accordingly the suppliers should diversify their products with regard to product features and market segments. This way they can seek to avoid commodification and instead achieve customer lock-in (Shapiro and Varian, 1999b).

CONCLUSION

In this paper, we have developed a framework that distinguishes four different intranet implementation strategies. The taxonomy encompasses the architecture of the intranet (standard product or custom built) and the personnel implementing the intranet into the organization (in-house or outsourced). The framework consequently depicts four types of intranet implementation strategies: 1) homemade intranet, 2) tailor-made intranet implemented by consultants, 3) intranet-in-a-box customized by in-house personnel, and 4) intranet-in-a-box customized by outside contractor. In a multiple explorative case study of 11 organizations supported by a literature review, we have found the homemade intranet to be

by far the most common.

On a practical level the four intranet implementation strategies have different qualities that make them suited and attractive for different types of organizations. By using our framework, organizations can readily consider which implementation process or strategy is better suited to their situation. Organizations may benefit from alternating between the implementation strategies, and even by pursuing different strategies concurrently in accordance with the available internal technical expertise, core competence, maturity of the technology and contextual considerations. However, we warn organizations of the risk of lock-in inherent in all strategies except the home-made intranet.

We hope to extend the results of this investigation to other areas of emergent Internet technologies. Most modern organizations will be faced with a number of similar choices in the near future as more new communication technologies become available and popular. For example organizations will be faced with sourcing decisions for implementation of the organization's extranet, WAP and/or i-mode services, as well as the question of timing, i.e., if these applications should be bought on the market only when the technology is sufficiently mature or if they should be implemented early in order to achieve a (temporary) competitive advantage over non-adopters.

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APPENDIX A – INTERVIEW AGENDA

Below is the abridged guide we used for the interviews. The interviewees were given an abbreviated version of the interview agenda well in advance of the interview. The full version of the interview guide is available upon request from the authors.

a) Information about the interviewee:

Name, age, title, organization, department, and contact information (phone and email)

b) Information about the interview:

Date, place, duration, and interviewer

c) The intranet in the organization

Purpose: To collect information about the current organizational intranet and the interviewee's use of the intranet

d) The intranet in the past

Purpose: To collect information about the inception of the organizational intranet and the interviewee's first use of the intranet

e) The intranet in the future

Purpose: To collect information about the perception of the organizational intranet in the future and the interviewee's vision of intranet use

f) Organizational structure

Purpose: To identify a number of characteristics of the organizational structure and to determine the function and role of the interviewee in the organization

g) Organizational processes

Purpose: To gather the interviewee's views and opinions on the processes which exist in the organization, i.e., the workflows which lead to the organization's products

h) Organizational culture

Purpose: To gather information about the organizational culture, values, and basic assumptions on which this culture is based

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