

INTRANET ADOPTION AND IMPLEMENTATION: A DEVELOPMENT FRAMEWORK

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ABSTRACT

The evolution of corporate intranets has tremendous implications for organization-wide information sharing, communication, collaboration, and application support. While some organizations continue to use intranets primarily for publishing and posting internal documents and corporate policies, a few are unleashing the power of intranets to access knowledge sources, collaborate on projects, and transform work. Despite these organization-wide impacts, there is a scarcity of development frameworks to guide research and practice. Developing intranets is different from traditional system development methodologies. In this paper, we provide a framework that outlines the intranet development life cycle (IDLC) and propose continuing research to study the impact of contextual factors on the adoption and implementation of corporate intranets.

Keywords: Intranets, intranet adoption and implementation, intranet development life cycle, prototyping, antecedents of intranet diffusion

INTRODUCTION

Over the years, there has been a dramatic shift in how organizational members share information, communicate, and collaborate for everyday business operations. The ability to rapidly gather, organize, process, and query information about internal operations is becoming critical in providing service and product offerings. Intranets are an emerging technology platform that are enabling a large number of organizations to better support their employees by speeding up access to information, enhancing communications vertically and horizontally, and providing capabilities to collaborate on projects online. An intranet can be defined as “a corporate network that functions with Internet technologies, such as browsers and search engines, using Internet protocols” (Turban, McLean, Wetherbe, 1999). Intranets are different from local area networks (LANs) in the sense that they can link to other networks via the Internet and the technology used is platform-independent. Connectivity is available through firewalls (software, hardware, or combination of both) to prevent communications from those not authorized to use the intranet (McLeod and Schell, 2001).

The greatest advantages of implementing intranets, as compared to other technologies that support organizational end-users, lie in the fact that they are considerably less expensive to implement than other client/service systems and they can be adapted to any operating system and hardware platform. Several benefits have been proposed for developing and implementing corporate intranets. According to Schneider and Perry (2000), these benefits include: increased, less-expensive, environmentally friendly internal communication, low acquisition and deployment costs, low maintenance costs, increased information accessibility, timely and current

information availability, easy information publication, distribution, and training. Others suggest that organizations develop intranets for several reasons, including: an infrastructure to create extranets for linking suppliers and customers, interactivity (online financial planning, creating task forces, project management), customer service, time-to-market (easy, online access speeds up teamwork in product development), empowerment, software distribution, virtual organization arrangement, etc. (Robinson, 1996). While some have reported high rate of return on investment (1300%) associated with intranets (Korzeniowski, 1997), others note mixed results (for example, Richards (1996) found that only 50% of the organizations surveyed indicated that intranets had saved them money). In fact, some researchers have pointed out that there are some disadvantages associated with developing intranets. It has been suggested that some “intranet tools are immature and not quite ready for wide-scale deployment... [Furthermore], intranets have a way of growing out of hand. They require careful monitoring to ensure that distinct organizational intranets can work seamlessly when needed” (Schneider and Perry, 2000, pg. 100).

Although intranets continue to evolve, and despite their growing popularity amongst US organizations, few development frameworks exist to guide practice and research. The best strategies for developing an intranet are debatable (Horgan, 1997) and traditional approaches to information systems development may not be appropriate for developing and implementing intranets (Turban, et al., 1999).

In this paper, we describe the evolution of corporate intranets. Using IT implementation literature as a theoretical basis, we describe the intranet development life cycle (IDLIC). Tapping innovation theory and our own insights from three case studies, we propose continuing research to study the impact of contextual factors on the adoption and implementation of corporate intranets.

EVOLUTION OF INTRANETS

Intranets have now been around for about seven years. Early intranets focused on providing employee access to corporate policies and procedures, product catalogs and manuals, publication of memos and company news. Such access was mostly available through internal computers located on company premises. The focus was on static information and the benefits were limited to individuals. Today's intranets are more dynamic. Not only do they provide access to customer records, inventory information, sales records, accounts receivable and payable information from any place, at any time, and from any computer, they can also provide access to legacy systems and data warehouses to query online. Content can be changed dynamically with inputs. Pages can collect data from users and record into a database or other file formats using programs such as Microsoft Active Server Pages or CGI and Perl. Table 1 shows the traditional versus evolving/emergent perspective of corporate intranets.

Despite such publicized benefits, most organizations have not been able to successfully unleash the power of intranets. Although 90% of large firms are predicted to have developed intranets, only “a quarter of them are so-called enterprise portals ... sites that perform functions well beyond simple publication of memos and company news” (Stellin, 2001, pg. 4). While several reasons could be forwarded, the lack of frameworks to guide practice can be viewed as a key

contributor towards this effect. In the next section, we draw on IT implementation literature to describe a phase model of the intranet development life cycle (IDLC).

<u>Intranet Dimensions</u>	<u>Traditional View</u>	<u>Evolving View</u>
Access	Localized/internal computers	Any place, time, and computer
Page Status	Static	Dynamic
Firm Size	Predominantly Large	All Sizes
Focus	Data and information sources: Corporate policies, catalogs, etc.	Knowledge sources: Data warehouse access, queries, and update
Benefits	Individual: easy browsing, searching, and information access	Organizational: collaboration, work transformation/reengineering

Table 1: Traditional and Emergent Intranet Perspectives

PHASES OF THE INTRANET DEVELOPMENT LIFE CYCLE (IDLC)

The concept of a “life cycle” for information systems has been a part of the IS profession for many years, from original articles in the late sixties to modern-day texts. The traditional “waterfall” model of systems development requires careful and thorough specification of requirements before the inception of systems building. However, that model has been less useful as a guide to intranet development because many requirements are discovered as a result of the development process. A model is needed that allows the incorporation of user feedback in conjunction with systems building processes.

Based on our experience and observations, we have adopted a model that parallels the one found in modern analysis and design textbooks (e.g., Whitten et al., 2001). This model combines rapid application development (RAD) techniques with more traditional planning and implementation techniques to mirror current practice. Our model consists of four phases: Specification, Prototype Development, Production System Development, and Operation, Maintenance, and Enhancement. In addition, we recognize an important precursor phase “zero,” the situation of an organization that does not yet have an intranet or a project to develop one. The proposed model is illustrated in Figure 1.

Phase 0 - No Intranet

An organization in Phase 0 will have some means of information access and internal communication other than intranet technology. A decision to investigate the potential of an intranet will move the organization from Phase 0 to Phase 1. In other words, this indicates a movement from non-adoption to adoption.

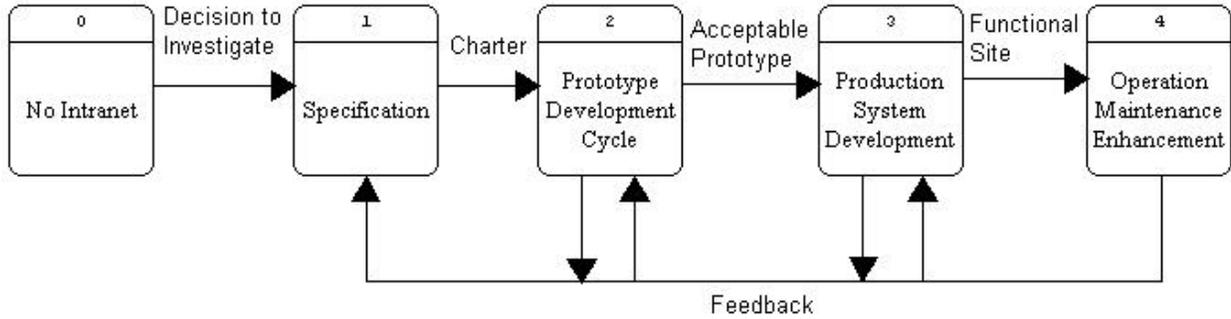


Figure 1: Intranet Development Life Cycle

Phase 1 - Specification

In this phase, a small group of participants perform a preliminary investigation of the technology, the problems it might solve, and the opportunities it might create. The injunction to “avoid technology in search of a problem” is important here. Traditional techniques such as cause and effect analysis can be used to pinpoint areas where improved internal communication would have a positive impact on organizational effectiveness. Once a clear statement of the problem is achieved, the scope of the project can be defined and a charter written. A rough model of the finished system can be developed and approved. A team will be assembled and tasks can be scheduled (the PERT technique can be used for complex projects). This phase ends when a plan for the next phase of the project is written and approved. In preparation for the next phase, development tools (such as Microsoft’s Visual Interdev and its many competitors) are often purchased at this point.

Phase 2 - Prototype Development Cycle

This phase consists of several iterations of a design-construct-critique-analyze cycle (Figure 2). The purpose is to refine understanding of the situation and to test various approaches to implementation.

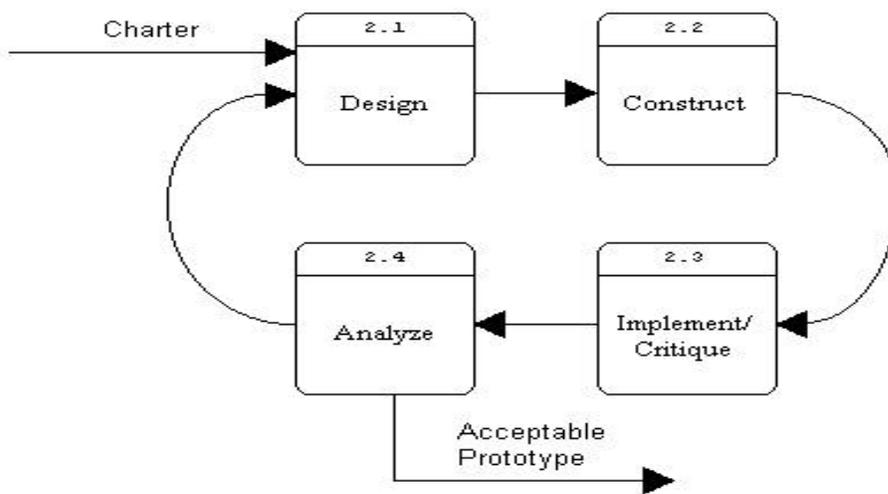


Figure 2: Prototype Development Cycle Phase of IDLC

If the development tools are not already available, this phase will begin with research and acquisition of appropriate software. In early cycles, static pages will be developed illustrating the proposed design. As this phase concludes, the system will normally incorporate content drawn from simple databases (e.g., Microsoft Access). Managers and the ultimate users of the system must be involved in this phase to critique each cycle and perfect the requirements statements. Additional requirements may surface in this phase, but the development team must be cognizant of the perils of “feature creep.”

Phase 3 - Production Systems Development

Although the delineation between this phase and the preceding will never be distinct, there will be a point at which the organization begins to move from static pages and low-capacity databases to dynamic pages that draw from high-capacity databases, legacy systems, or a data warehouse. One of the motivators for this change will be the expansion of the intended user base from the development group to the organization as a whole. Recall and transmission of the underlying data, as well as the pages themselves, requires systems designed for the task. If the work of phase 2 has been done well, then the task of converting should be straightforward. Traditional activities such as detailed design – conversion of the prototypes to production-quality systems – construction – including performance tuning – and implementation are a part of this phase. Inherent in these, especially the last, is the development of structures for ongoing operation of the system. Training and support mechanisms must be developed and a procedure for updating the information must be formulated.

Phase 4 - Operation, Maintenance, and Enhancement

As before, it is difficult to draw the line of demarcation between phase 4 and its predecessor. As soon as a site’s location is known and useful information is present, interested parties will find it and begin to make use of it. This phase officially begins when the site is prepared to accept incoming data – for instance, an employee benefits site that allows personnel to make changes to their “cafeteria” benefits plan. The focus of IS activity shifts from building to maintaining and support. The critical issue of content updating must be addressed and managed. A system for enhancing the site (procedure for suggesting/requesting changes and expansion and responsibility for review and implementation of requests) is necessary. This phase is also where plans for expansion of the audience, for instance to an extranet, are first formulated.

Feedback

As illustrated in Figure 1, feedback can occur from any phase to any preceding phase. Until there is a “standard formula” for corporate intranets, the systems will be idiosyncratic and must be developed to serve the needs of the managers and other users. The prime function of Phase 2 is to cycle through several iterations of the product until consensus is reached as to the form. Even the result of phase 2 cannot be considered “final” however – in fact, the system will continue to evolve throughout its life.

Impact on Development Activities

Systems development processes typically require three general activities: Specification, Building, and Refinement. In traditional systems development projects, the bulk of the specification occurs before building begins, and the refinement of the system (e.g., to use efficient query strategies and processing technologies) overlaps the building process (Figure 3a).

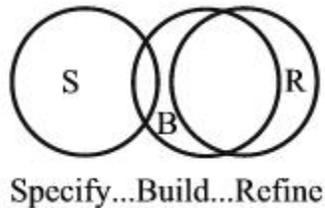


Figure 3a. Overlap of Activities in SDLC

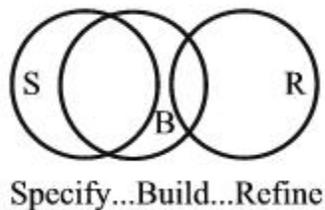


Figure 3b. Overlap of Activities in IDLC

In the Intranet Development Life Cycle, however, there is a great deal of overlap between specifying and building – each cycle of the build process leads to more discovery of requirements (Figure 3b). Refinement waits until the specifications are well understood; then the prototype system is converted to an efficient operational system. This shift in the activities of builders (e.g., programmers) is but one of the differences between traditional practice and emerging practice that argue for further study of the factors that might impact the development process. Accordingly, in the next section, we focus on the influence of contextual variables on IDLC phases.

IMPACT OF CONTEXTUAL FACTORS ON INTRANET ADOPTION AND IMPLEMENTATION

Organization innovation theory can be a useful source to build a theoretical framework for Intranet adoption and implementation. Innovation literature is rich in empirical studies and provides a strong theoretical basis for investigating IT innovations. As Fichman (1992) emphasizes: “Innovation diffusion theory provides a useful perspective on one of the most persistent challenging topics in the IT field, namely, how to improve technology assessment, adoption, and implementation” (pg. 195). Five variable classes are believed to have an impact on innovation adoption and implementation. These include external environmental characteristics, organizational characteristics, user characteristics, task characteristics, and technology characteristics (Kwon and Zmud, 1987). While the discussion of these variable categories is beyond the scope of this paper, future research efforts should focus on identifying specific variables in these categories and explore their impact on intranet adoption and implementation.

CONCLUSIONS

Intranets are popular in a large number of organizations. However, few organizations have been able to successfully deploy them to gain a competitive advantage. While some are attempting to use such corporate information portals to share knowledge, collaborate, reengineer work, most of them continue to have a limited view of intranet as a source to post and publish general information, corporate policies, employee resumes, and possibly to communicate. Furthermore, from research standpoint, we know very little about adoption and implementation of corporate intranets. There could be several causes, including the lack of frameworks to guide practice and research. In this paper, we have attempted to fill that void by providing a development framework.

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