

An Exploratory Analysis of Intranet Benefits

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Abstract

An exploratory survey of business professionals from a broad range of organizations indicates that potential intranet benefits are both difficult to achieve and highly interrelated. Although many organizations implement intranets in the hope of generating cost savings or improving knowledge sharing across organizational units, this study indicates that the only likely benefit of implementing an intranet is faster access to information. The study also suggests that the most difficult benefit to achieve is generating a more cooperative work environment, and that developing an intranet that improves the quality and relevance of information is foundational to achieving most other intranet benefits.

Keywords: intranet, knowledge sharing, productivity, information quality, information relevance, graphical modeling

Introduction

This study fills a void by identifying the specific kinds of benefits that intranets actually provide to organizations that implement them. Intranets, as defined here, are intra-organizational private network systems based on Internet technologies and designed to facilitate sharing of data within the organization. They may, or may not, be part of a broader knowledge management initiative within the organization. As the literature review section below indicates, only one prior empirical study was identified that specifically aimed at identifying the benefits that intranets bring to organizations. That survey was conducted at 23 Hong Kong organizations in 1996, when Intranets were in their infancy (Lai, 2001). The practitioner press, on the other hand, has suggested numerous types of benefits are possible. For example, some intranets might provide real dollar savings, others improved productivity, others enhanced customer service, and still others, improved sharing of knowledge across organizational units. Given the broad range of potential benefits cited in the practitioner literature, and the relative lack of relevant research, an exploratory study was conducted. Exploratory studies are appropriate when "...the researcher is not looking to 'confirm' any relationships specified prior to the analysis, but instead allows the method and the data to define the nature of the relationships" (Boudreau, Gefen & Straub, 2001). The primary goal of this research was to identify the major categories in which organizations are actually reaping benefits

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from the installation of corporate intranets, establish the relative prevalence of the various types of benefits, and determine the extent to which these benefits are interrelated. By identifying the primary benefit categories and the interrelationships among them, this research is designed to open

the way for future studies quantifying the actual amounts of benefits achieved and exploring the exact nature of the relationships among various intranet benefits.

Background

Little research has been directed at isolating a comprehensive list of potential benefits of intranet systems, however some work has been done, much of it secondary results of studies whose main thrust was directed at other issues. For example, in 1998, Bhattacharjee (1998), in a case study of US West Communications Inc., identified five intranet benefits: increased employee productivity, reduced operational costs, improved customer service, generation of new businesses, and development of an exemplar for new technology use. Also in 1998, Ptak, working to outline a disciplined process for intranet solutions, did touch upon potential intranet benefits, classifying them as dollars saved during the collection or distribution of data, costs avoided through automation of business processes, or time gained. Like Ptak, Bidgoli (1999) addressed system development methodology for intranets, but also suggested some new potential intranet benefits. By viewing intranets as a “pull” technology, Bidgoli recognized the potential ability of an intranet to reduce paperwork and improve employee efficiency and effectiveness by reducing information overload. In a paper primarily directed at quality metrics for intranet applications, Leung (2001) identified a broad range of potential benefits, including cost and time savings, increased productivity, flexibility, open architecture, consistency, reduced work load, timeliness, and removal of departmental boundaries. To this list, he also added managerial considerations, including higher return on investment, low risk, shorter payback time, more business opportunities, lower training costs, technology-enabled employees, and a shorter development life cycle. Baker (2000), writing about intranet strategy, consolidated potential intranet benefits into four categories: internal communication, collaborative / cooperative work, knowledge management, and process redesign. She went on to note “Companies have embraced intranets aggressively because they achieve measurable benefits in cost reductions, enhanced communications, and improved access to intellectual properties.” One prior study has been published wherein business professionals were asked to identify the benefits of their intranets. Writing about a survey conducted in 1996 when intranets were in their infancy, Lai (2001) segmented intranet benefits into four categories: data access, cost savings, improved internal communication of information, and management, and found the first two of these more important than the last two.

While little academic research has been directed specifically at isolating the potential benefits of intranet systems, there have been many practitioner articles detailing organizations’ intranet efforts and resulting benefits. A sampling of these articles provides insights into the types of intranet benefits organizations claim in the practitioner press. One report indicates that US West Communications, Inc. has saved an estimated \$10 million through a Facility Check application run on its Global Village Intranet that provides quicker service at customer sites, reduced time spent on customer order calls, fewer repeat calls, and reduced fines for not meeting pledged installation dates (Sliwa, 1998). Nielsen found in his compilation of the Best Intranet Designs of 2001 that corporations have placed an increased emphasis on a more cooperative work environment through collaboration and communication, noting that knowledge dissemination through increased use of discussion groups and the ability to post news and other information of interest to different groups may result in better and more informed decisions (2001). In the same report, Cisco Systems, Inc. is credited with realizing improved productivity by introducing streamlined intranet applications for its sales force. Ninety-eight percent of Cisco’s employees use their intranet on a regular basis, and Cisco enjoys one of the highest revenues per employee in the industry (Horgan, 2002). In other examples, Lucent Technologies Inc. increased employee productivity by allowing travel expense reports to be submitted through an intranet application that is integrated with Lucent’s SAP R/3 application (Wilder, 1998). Hewlett-Packard’s intranet portal has been

credited with giving employees faster access to information, and generating savings on such staples as paper, telephone, and faxing (Alavi & Yoo, 1995). It has also been credited with attracting considerable employee use. According to one source, when the company's executive committee requested a voluntary payroll reduction through a posting on its intranet portal, over 90 percent of HP employees participated in the payroll reduction. The CEO of Schlumberger Ltd., an oil-field services and IT company based in New York and Paris, seeking to improve the management of technical people, authorized intranet-based groupings, reportedly resulting in the formulation of 19 different communities with 5,500 employees participating (Anders, 2002). Such electronic communities can be a source for community memory, the open-ended set of collective knowledge and shared understandings developed and maintained by the group (Marshall, Shipman & McCall, 1995). Houston-based Royce Builders claims substantial monetary benefit from an Intranet that ranks construction managers on their volume and speed (Zurier, 2003). In another example, Johnson & Johnson's intranet links employees in more than 30 countries, providing shared marketing and sales materials, in a brand knowledge network, by acting as brand asset warehouses and enabling brand asset communities (DeLarge, 2003). In summary, there are numerous reports in the practitioner press of intranet benefits, many highlighting knowledge sharing across the organization. There also are some opposing views within the practitioner literature. White (2003) has argued that intranet benefits "are rarely on the anticipated scale," both because of organizational culture and because intranets do not lend themselves to knowledge sharing. Nonetheless, the majority of practitioner press coverage of intranets is positive and much of it stresses improving internal communications.

The positive practitioner press coverage of intranets and its emphasis upon internal communications is also present, although to a lesser degree, in the academic literature. For example, Murgolo-Poore, Pitt, Berthon and Prendegast (2003) noted that "Intranets are proving to be exceptional collaboration, communication and change mechanisms within organizations, achieving rapid transitions when the pace of change is critical. These internal networks facilitate communications and collaboration and can be relatively inexpensive to develop, maintain and use." This analysis was supported by citing corporate examples from Glaxo Wellcome Canada, Boeing Corporation, and Hewlett-Packard. As noted earlier, only one, very early, academic study specifically directed at intranet benefits was uncovered (Lai, 2001). Lai identified four major potential benefits. Of these, it emphasized both data access and cost savings over improved internal communications stressed in the practitioner press. This discrepancy between the practitioner press and the one prior academic study could be, in part, a result of the more recent interest in knowledge sharing and cooperative workflow. However, as the results of this study detailed below indicate, it is also likely that, while organizations seek the greater collaboration through intranets that is reported in the popular press, such benefits are elusive.

Research Design

Development of a survey instrument required identifying a comprehensive list of potential intranet benefits. Because prior academic research was limited and the past studies did not build upon one another, categories in the resultant list overlapped. Adding potential benefits mentioned in the practitioner literature lengthened the list, making it more comprehensive, but also added to the overlap among the various benefits. To eliminate the overlap, each item on the list of potential benefits was broken down into components, and then duplicate items eliminated. In addition, items that more correctly represented intranet functions or processes, rather than benefits, were eliminated. The resultant list of eight potential benefits was clearly concise. A comparison of the list against the prior literature, both academic and practitioner, demonstrated that it also appeared to be comprehensive. At this point, an initial survey instrument was constructed. The survey was semi-structured in format, giving specific choices, and yet allowing participants to select multiple

responses or to write in additional choices. A pilot test was conducted on a small group of IT professionals. Feedback from this group suggested the need to reword some questions, which was done. The final wording of the list of potential benefits used in the survey was as follows: better information quality and relevance; faster access to information; improved customer service / relationships; improved productivity; more cooperative work environment; reduced paperwork; and savings on telephone, faxing, travel, etc.

The survey was presented to a convenience sample of 110 working professionals, and sixty-eight usable surveys were returned, a response rate of approximately 61.8%. Each usable survey was submitted by a user of a corporate intranet. Participants were well distributed across industries. Industries represented included IT consulting, financial services, education, manufacturing, telecommunications, energy, healthcare, retail, and food and beverages, among others. Positions held by the subjects included all levels of management, as well as line and staff positions. Approximately 30 percent of the subjects held positions in Information Technology departments. The subjects may be divided into 5 major categories: executive-level, Information Technology, sales and marketing, financial and accounting, and miscellaneous. Executive-level positions represented included president, executive vice president, and chief financial officer. IT positions included senior vice president of Information Systems, IS director, director of system architecture, IT supervisor, senior consultant, project manager, team leader, Internet consultant, business analyst, programmer/analyst, and webmaster. Sales and marketing positions included director of international marketing, manager of product marketing, sales representative, and marketing specialist. Financial and accounting positions included bank manager, accounting manager, mortgage broker, financial analyst, and financial advisor. Miscellaneous positions included executive assistant, event coordinator, office services coordinator, benefits consultant, procurement coordinator, and quality assurance director. Like the industries, the job titles represented a broad spectrum of responsibilities.

As shown in Figure 1, approximately 81 percent of intranets studied were either national or international in scope. This predominance of international or national intranets is consistent with the large number of employees served by the study intranets, as shown in Table 1.

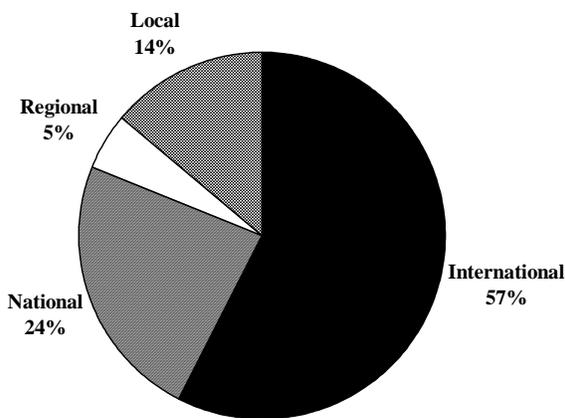


Figure 1: Geographic scope of intranets studied

Table 1: Employees served by study intranets

Number of Employees Served by Intranet	N
0 –5,000	6
5,000 – 25,000	16
25,000-50,000	32
50,000 – 75,000	3
75,000 – 100,000	6
100,000 – 125,000	3
125,000 – 150,000	1
150,000 – 200,000	0
200,000 or more	1

Table 2: Year Intranet Initiated	N	
Pre-1995	6	Taken as a whole, the study organizations were relatively early-adopters of intranets. Most of their intranets were implemented between 1996 and 1998. As shown in Table 2, both the mean and median intranet start year was 1997, while the mode year was 1998. This early-adoption characteristic implies that the intranets studied were relatively mature, and that the organizations involved in the study were relatively technically sophisticated. Notably, two subjects maintained that their organizations' intranets were implemented even before the Mosaic browser was released in November of 1993. This interesting result may be the product of faulty memory, or the organizations simply may have been using earlier, and likely non-Internet based, technology for the first implementations of systems that later evolved into corporate intranets.
1995	10	
1996	14	
1997	6	
1998	16	
1999	10	
2000 or later	4	

The group being surveyed had all enrolled in a professional development program entitled “Web Commerce” being offered through DePaul University’s School of Computer Science, Telecommunications and Information Systems (CTI) in Chicago, a major Midwestern United States city. The Web Commerce program consisted of sixteen evening or Saturday sessions on a variety of e-business related topics. The group was surveyed at about the midpoint of the class, and had already completed class sessions on the following topics: e-commerce environment, HTML and authoring tools, Web technology infrastructure, consumer e-commerce, online marketing, and business-to-business e-commerce. Prior to administration of the survey, all subjects were exposed to a general lecture of approximately one and one half-hours in length about intranets, which included presentation of definitions, examples, and implementation tactics. The survey was administered at the end of this lecture to insure that all participants, regardless of their background, would share a common understanding of the traditional IT meanings of the terms used in the survey itself. Notably, savings in the sense of this survey refers to actual bottom line dollars saved, for example, on items like telephone costs or reduced need to travel. It does not include productivity enhancements that save small amounts of each employee's time, but eliminate no positions.

Results

Intranet Benefits

When asked what the significant benefits of their organizations’ intranets were, respondents were encouraged to select as many choices as applied. They overwhelmingly indicated faster access to information as the greatest single intranet benefit. Faster access was noted as a significant benefit by 85% of those responding, as indicated in Figure 2. This was followed by savings on paper, telephone, faxing, or travel (68%), better information quality and relevance (65%), reduced paperwork (60%), improved productivity (50%), improved customer service / relationships (40%), and a more cooperative work environment (34%). The other category was used by one respondent to note an additional benefit: better organization of information (“one place to go for information”). Two respondents used the other category to indicate that their intranets lacked benefits, saying, “Not many employees are using it,” and “not much (benefit).”

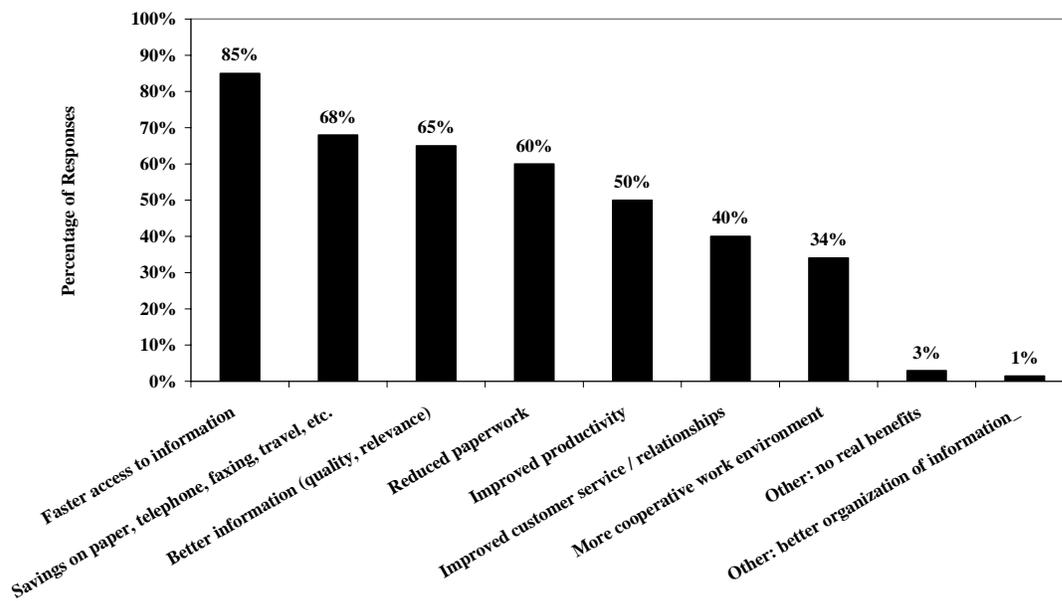


Figure 2: Intranet benefits

Relationships among Benefits

As is appropriate for an exploratory study, multivariate techniques were used to estimate relationships (Boudreau et al., 2001). In particular, data was analyzed using graphical modeling, a class of multivariate statistical methods (Lauritzen, 1996). Graphical models are very useful to examine the interrelationships among a large number of variables. One of the main advantages of such a class of models is the availability of fast and efficient algorithms to estimate the model parameters. Graphical models also provide a pictorial representation of the relationships among the variables through a graph that facilitates interpretation and communication of the results. This statistical approach was applied to identify relationships among the seven major intranet benefits listed in Figure 2 (Settimi, Knight, Steinbach & White, 2005). The variable other was not considered in this analysis because of the small number of participants choosing this option. Several statistically significant relationships were identified among various combinations of the remaining seven variables. These are listed in descending order of significance in Table 3.

The most significant relationships were between savings and reduced paperwork; savings and improved customer service; and cooperative work environment and improved productivity, with all three relationships generating p-values less than .001. Also significant at the .01 level were the associations between cooperative work environment and improved customer service; better information and improved productivity; better information and improved customer service; and better information and faster access. At the .05 level were the associations between improved customer service and improved productivity, and between faster access and reduced paperwork. These results are noteworthy both because so many pairings are significant at such low p-values, and also because so many seemingly logical pairings are not directly related. For example, faster access to information and reduced paperwork do not directly affect improved productivity (although their association is mediated by better quality of information and increased savings). Instead, improved productivity is most closely associated with intranets offering a more cooperative work environment.

Table 3. Significant relationships between pairs of intranet benefits

		p < .05
Savings	Reduced paperwork	<.001
Savings	Improved customer service	<.001
Cooperative work environment	Improved productivity	<.001
Cooperative work environment	Improved customer service	.003
Better information	Improved productivity	.006
Better information	Improved customer service	.007
Better information	Faster access	.008
Improved customer service	Improved productivity	.014
Faster access	Reduced paperwork	.023

Discussion

Likelihood of Desired Intranet Benefits

Although many organizations implement intranets in the hopes of generating cost savings or improving the sharing of knowledge across organizational units, this study demonstrates that such benefits are anything but certain. In fact, the only likely benefit of implementing an intranet is faster access to information, a goal that, while desirable, would hardly in itself prompt an average organization to fund a major intranet development effort. Further, although implementing an intranet may ease or even make possible the achievement of such goals as better information quality and relevance, reduced paperwork, improved productivity, improved customer service or a more cooperative work environment, it does not guarantee achieving these goals, or even make such achievement probable. Although the literature review demonstrated that organizations often seek sharing of information across organizational units, improving the cooperative work environment was the least cited intranet benefit, noted by just 34% of study participants. This finding is consistent with Lai's 1996 study of intranet benefits (Lai, 2001). It is also consistent with the work of those studying the use of collaborative technology. As Newell, Pan, Galliers and Huang (2001a) have noted, collaborative intranet technologies alone will not bring down existing boundaries within an organization, and may in fact simply strengthen these boundaries, unless the organization actively works to facilitate increased sharing of information. "A paradox is that knowledge-sharing via intranet technologies may be most difficult to achieve in contexts where knowledge management is the key objective" (Newell, Scarborough & Swan, 2001b). Further, as Stenmark (2004) has argued, a clash may exist between an organization's information management culture and Web technology. Finally, not all knowledge can be codified, as Begbie and Chudry noted (2002).

Relationships among Intranet Benefits

Relationships among intranet benefits are not always intuitive. In order to better understand these relationships, they were diagramed using the techniques of graphical statistical analysis, as is shown in Figure 3. Graphical models are a multivariate statistical technique that is often applied to complex problems involving a large number of variables. These models are both computation-

ally efficient, and an effective means of visually representing potential relationships, thus facilitating interpretation of results.

In Figure 3, the p-value, indicating the strength of the relationship, is shown between each pair of benefits. While it is impossible to infer the nature of relationships using statistical techniques, knowledge of business principles was applied to arrive at the direction of arrows in the figure. For example, in the highly significant relationship between savings and reduced paperwork, it is simply logical to imagine that savings are more likely to be a result of reduced paperwork, and not vice versa. Directions for all of the dependencies were hypothesized in this way, with the exception of one pair, faster access to information and reduced paperwork. In this case, it is possible that reducing paperwork leads to faster access to information, but at the same time, it is also possible that faster access to information leads to reduced paperwork. This pair of intranet benefits is thus termed potentially mutually supportive, and a dotted line is shown in Figure 3 in place of an arrow.

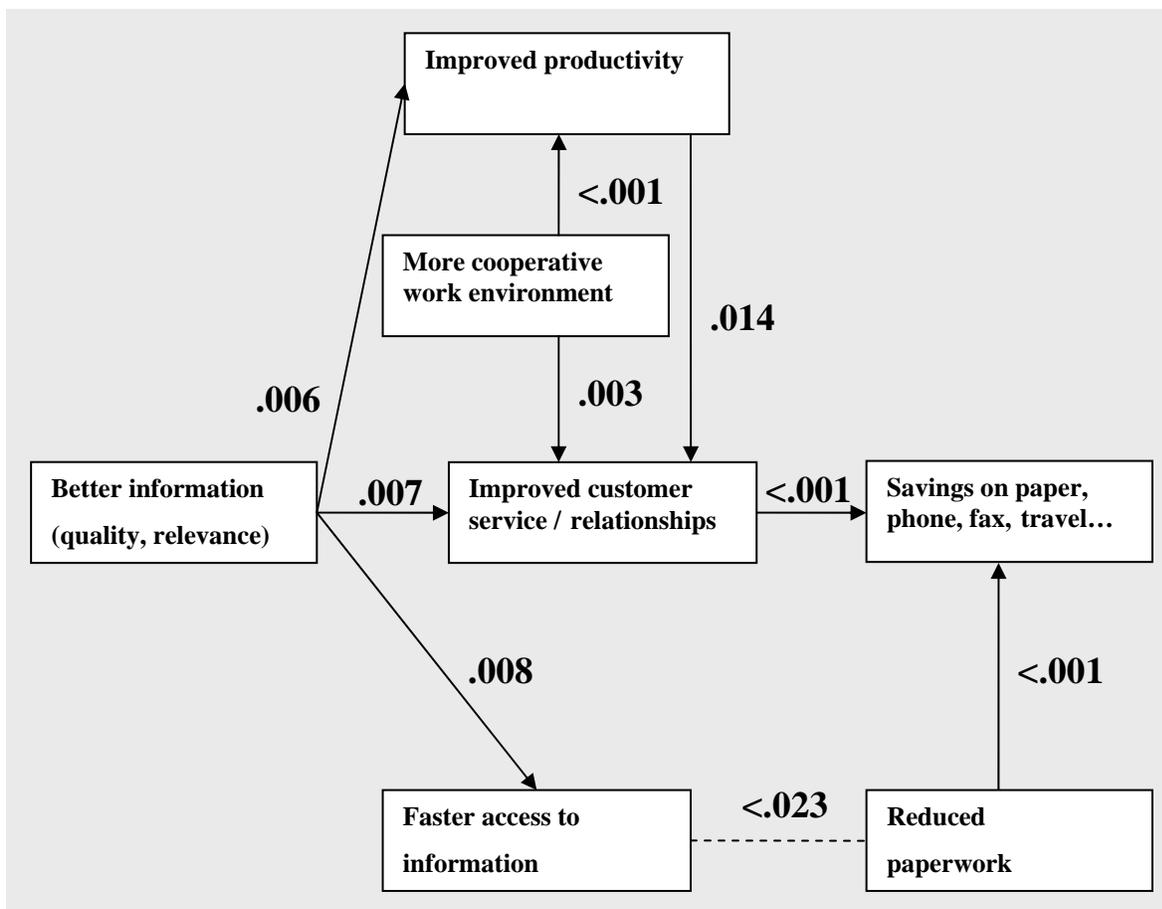


Figure 3. Significant interrelationships among intranet benefits

A general examination of Figure 3 leads to three specific conclusions. First, substantial intranet-related savings appears likely to be the most elusive intranet benefit, since they are dependent, either directly or indirectly, on all other benefits. Second, improved customer service / relationships lies at the heart of garnering intranet benefits. Improving customer service has more direct ties to other benefits than any other intranet benefit. There is some foundation for this in the literature. Karimi, Somers & Gupta (2001) reported that improving customer service is one IT-

enabled initiative that organizations have credited with keeping them at the top of their industries despite tremendous competition. In addition to Karimi's research, this study is also consistent with a study reported in 1999 quantifying the relationship between customer service and market value. For every 1-point rise in an organization's customer satisfaction index, there was an average \$240 million increase in market value (Sweat & Hibbard, 1999). Third, improving the quality and relevance of information is a foundational element in terms of the generation of other intranet benefits, tied directly or indirectly to all other benefits with the exception of generating a more cooperative work environment. Beyond these three conclusions, the diagram in Figure 3 can be viewed from four additional perspectives, each of which centers on a different intranet benefit.

Maximizing intranet-generated cost savings

As Figure 3 shows, cost savings are most often associated with better customer service and reduced paperwork. The odds that an intranet will lead to savings are about ten times higher if the intranet provides improved customer service than if it does not (see conditional probabilities in Table 4). Further, the odds of savings are almost as high if the intranet provides reduced paperwork.

Table 4. Savings given improved customer service and reduced paperwork

Conditional Probabilities	Reduced Paper work		Improved Customer Service	
	No	Yes	No	Yes
Savings				
No	0.737	0.218	0.239	0.030
Yes	0.263	0.782	0.761	0.970

While the association between the reduction in paperwork and savings is intuitive, the slightly stronger relationship between improved customer service / relationships and savings is less readily apparent. This result may be seen as supportive of the wisdom of the Customer Relationship Management (CRM) movement, or it may simply reflect a belief in CRM, a general acceptance by business professionals that in better manage customer relationships, they save real dollars. The literature lends some support to the likelihood of a link between CRM and real savings. In particular, prior research has noted that CRM applications can automate customer service operations to cut costs of sales, boost revenue, and collect better customer data to improve support and increase selling opportunities (Karimi et al., 2001).

Speeding intranet access to information

Table 5. Improved access to information given better information (quality, relevance)

Conditional Probabilities	Better Information Quality & Relevance	
	No	Yes
Improved Access to Information		
No	0.318	0.050
Yes	0.682	0.950

As Table 5 shows, the odds of faster access to information are about 8.85 times higher if the quality and relevance of that information is improved. Thus organizations seeking faster access should key, not just upon such areas as database design, network tuning, and hardware selection, but also upon improving the quality and relevance of the information provided by the system. There is a sense in which this is intuitively obvious, and yet many organizations spend heavily to tune their systems technically without adequately considering information quality and relevance. The importance of high quality, relevant information has been recognized in the literature. As Wang and Strong noted, high quality data is intrinsically good, contextually appropriate for the task, clearly represented and accessible (1996). Accord-

ing to their framework, quality data has accuracy, objectivity, believability, reputation, completeness, timeliness, value, appropriate quantity, relevancy, conciseness, consistent representation, interpretability, ease of understanding, accessibility, and security. Under Barrett and Maglio's view of information, the utility and power of an information stream depends on the quality of the information, availability when the information is needed, the breadth of information, ease-of-use, reliability, and relevance of the information, and ordinary information streams can be enhanced by intermediaries to become smart streams (Barrett & Maglio, 1999).

Improving productivity

As the conditional probabilities in Table 6 indicate, the odds of improved productivity are 8.11 times higher when an intranet provides a more cooperative work environment, than when an intranet does not. The literature provides support for this conclusion. According to Mack et al., an intranet with a knowledge portal can provide a single point of access to distributed on-line information, coupled with advanced search capabilities and organizing schemes. This allows knowledge workers to then gather information relevant to the task, organize it, search it, analyze it, synthesize solutions with respect to specific task goals, and then share and distribute what has been learned with other knowledge workers (Mack, Ravin & Byrd, 2001). In this type of environment, productivity is increased by reducing the difficulty of the search for quality information, reducing duplication of effort, and identifying community members who either know information or can help in locating it. In addition to a cooperative work environment, the current study supports the idea that improving the quality and relevance of available information is also vital in improving productivity. The odds of improved productivity are 6.27 times higher when an intranet provides better information than when it does not.

Table 6. Improved productivity given better information and a more cooperative work environment

Conditional Probabilities	Cooperative Work Environment			
	No		Yes	
	Better Information			
Improved Productivity	No	Yes	No	Yes
No	0.870	0.493	0.333	0.157
Yes	0.130	0.507	0.667	0.843

Productivity improvements are most likely to be associated with intranets that make fundamental changes in an organization’s way of working. Figure 4 displays the distribution of the answers to the question “On a scale from 1 (low) to 5 (high), to what extent has your intranet changed your organization’s ways of working?” The darker bars represent the responses to the question for the group of people that stated that improved productivity is a significant benefit of the intranet. The checkered bars display the distribution of the responses for the group of people that did not believe that improved productivity was a significant intranet benefit.

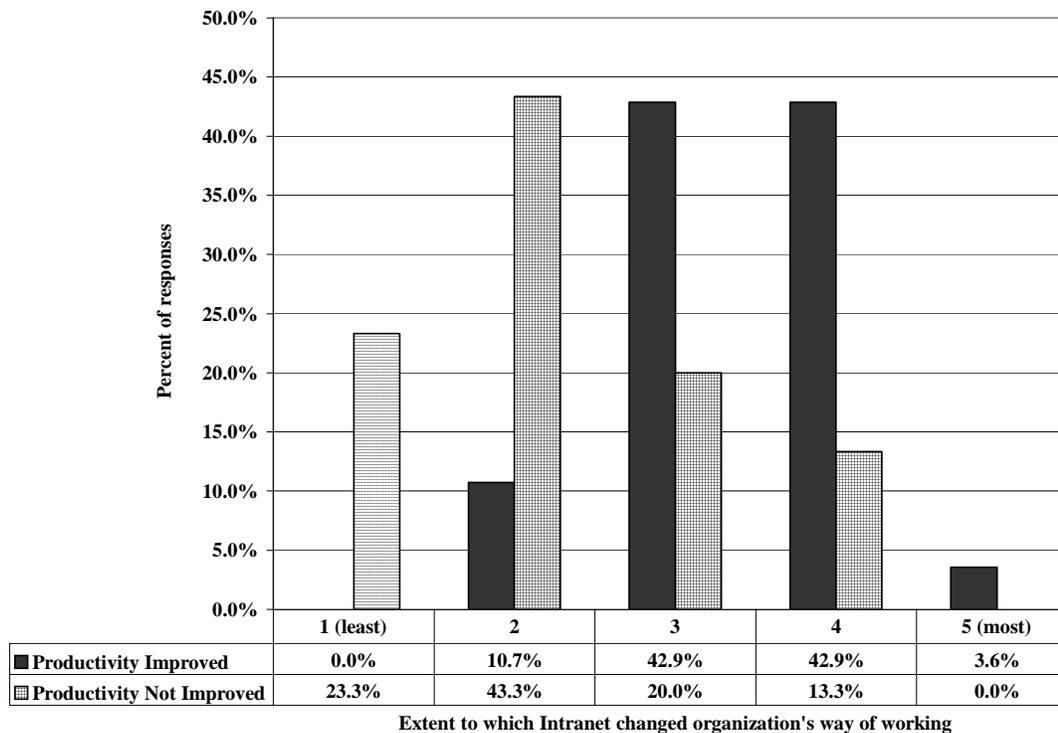


Figure 4. Relationship between productivity and intranet-induced changes in processing

Clearly this study indicates that productivity gains are most likely to be associated with intranets that change the organization's way of working, intranets that offer greater degrees of business process reengineering (BPR). This conclusion is supported by the literature. Alavi and Yoo (1995) maintain that IT-induced BPR offers dramatic (five to ten fold) performance improve-

ments in productivity and quality, noting that combining BPR with current and emerging IT capabilities leads to significant opportunities for process reengineering. The current study may be viewed as refocusing Alavi and Yoo’s theory, narrowing the context from emerging IT in general to intranets in particular. Both studies support the proposition that to reap real productivity benefits, intranet developers should concentrate less upon improving the processes of individual workers, and more upon facilitating the organization’s overall workflow.

Improving customer service / relationships

Of all of the variables considered, the single most important in improving customer service / relationships is improving the quality and relevance of information. The odds of improved customer service / relationships is 7.76 times higher in intranet systems that have improved information quality and relevance than in intranet systems that do not offer this benefit (see the conditional probabilities in Table 7). Thus again, the importance of building an intranet that improves the quality and relevance of information emerges. As Figure 3 shows, this is a foundational element for reaping almost all other intranet benefits.

Table 7. Improved customer service

Conditional Probabilities	Cooperative Work Environment							
	No				Yes			
	Improved Productivity							
	No	Yes	No	Yes	No	Yes	No	Yes
	Better Information							
Customer Service	No	Yes	No	Yes	No	Yes	No	Yes
No	0.894	0.706	1.000	0.400	0.000	0.000	1.000	0.372
Yes	0.106	0.294	0.000	0.600	1.000	1.000	0.000	0.628

Future Research

This research distilled a comprehensive yet concise list of potential intranet benefits. This list can provide a basis for future research aimed at quantifying the extent to which these specific variables are actually realized by specific intranets. In addition, this study established the fact that intranet benefits are closely interrelated, thus opening another future avenue for exploration, examining the nature of these relationships. In addition to future confirmatory studies, additional research questions generated by this work include identifying specific actions that organizations should take to achieve various combinations of potential benefits, and identifying variations in realized benefits with organization size, intranet size, or industry.

If this research were to be conducted again, it might be useful to include the single write-in potential benefit mentioned by one respondent to the current work: better organization of information. While the fact that just one person added this item to the list of potential intranet benefits makes its significance likely to be relatively small, it is nonetheless a point worth considering in future research on the topic. A second type of benefit that might be worth considering is that of improved employee satisfaction as a result of B2E intranets (Huang & Bih-Huang, 2004). This potential benefit was not written in by any respondent and is certainly of less interest to most employers than improved customer satisfaction, yet it would be an appropriate addition to future surveys. A second limitation is the fact that the data collected represents employee opinions about intranet benefits received. Although these opinions are those of knowledgeable employees who

generally hold positions where they would be likely to be able to assess such benefits accurately, the current study should be supplemented by future in-depth research that would further quantify the benefits identified here. A third limitation is the fact that participants in this study, many enrolled by their companies in an e-commerce certificate program, may represent organizations that are more advanced in their use of intranets than the business world as a whole. This possibility is supported by the demographics of the study group. As noted earlier, most of the organizations involved were relatively large, technically sophisticated, and had implemented their intranets comparatively early. This level of technical sophistication on the part of the subject organizations could affect some conclusions. In particular, intranet benefits may be even more difficult to achieve for the average company than these results indicate.

Conclusions

Two major principles arise from this study. (1) Potential intranet benefits, including highly sought-after cost-savings and knowledge sharing across the organization, cannot be presumed to be automatic or even likely. In fact, the only likely benefit of an intranet is faster access to information. Further, although the practitioner literature indicates that a goal of many intranets is sharing of information across organizational units, improving the cooperative work environment was cited as an actual benefit by only about one-third of the organizations studied. (2) The results presented here indicate that in order to maximize a particular benefit, organizations also need to target other related benefits at the same time. For organizations seeking to maximize Internet-generated cost savings, addressing improvements to customer service is actually more important than keying on reducing paperwork. For organizations seeking improved productivity, intranets should target building a cooperative work environment, and, to a lesser extent, improving the quality and relevance of their information. For organizations seeking to speed access to information, emphasis should be placed upon improving the quality and relevance of that information. Finally, for organizations seeking improved customer service / relationships, improving the quality and relevance of information is again vital. In fact, of all potential intranet benefits, improving information quality and relevance appears to be most critical, since it is associated with almost all other intranet benefits, either directly or indirectly. One reason why intranets' potential benefits are not achieved more easily undoubtedly rests with the underlying interrelatedness of their benefits. While traditional IT systems may have relatively independent potential benefits, the benefits of intranets are tightly integrated. As a result, organizations that simply target improving productivity and reducing paperwork, for example, without addressing both generation of a cooperative work environment and improved information quality and relevance, are unlikely to reap significant rewards. Another reason why intranets potential benefits are not achieved easily rests with their very nature. The fact that successful intranets, unlike most other systems, must both permeate the organization and change the way it functions, places intranets among the most difficult systems to implement successfully.

References

- Alavi, M. & Yoo Y. (1995). Productivity gains of BPR. *Information Systems Management*, 12 (4), 43-47.
- Anders, G. (2002). Who owns your intranet? Retrieved August 19, 2002 from <http://fastcompany.com/online/50/untangle.html>
- Baker, S. (2000). Getting the most from your intranet and extranet strategies. *Journal of Business Strategy*, 21 (4), 40-43.
- Barrett, R. & Maglio, P.P (1999). Intermediaries: An approach to manipulating information streams. *IBM Systems Journal*, 38 (4), 629-641.

- Begbie, R. & Chudry, F. (2002). The intranet chaos matrix: A conceptual framework for designing an effective knowledge management intranet. *Journal of Database Marketing*, 9 (4), 325-338.
- Bhattacharjee, A. (1998). Management of emerging technologies: Experiences and lessons learned at US West. *Information & Management*, 33 (5), 263-272.
- Bidgoli, H. (1999). An integrated model for introducing intranets. *Information Systems Management*, 16 (3), 78-87.
- Boudreau, M., Gefen, D. & Straub, D. (2001). Validation in information systems research: A state-of-the-art assessment. *MIS Quarterly*, 25 (1), 1-16.
- DeLarge, C.A. (2003). The role of the intranet in brand knowledge management. *Design Management Journal*, Winter, 55-61.
- Horgan, T. (2002). 10 major intranet trends and what we can learn from them. Retrieved August 19, 2002 from http://www.cio.com/intranet/edit/intranet_trends.html
- Huang, J., Jin, B-H. & Yang, C. (2004). Satisfaction with business-to-employee benefit systems and organizational citizenship behavior. *International Journal of Manpower*, 25 (2), 195-210.
- Karimi, J., Somers, T.M. & Gupta, Y.P (2001). Impact of information technology management practices on customer service. *Journal of Management Information Systems*, 17 (4), 125-158.
- Lai, V. (2001). Intraorganizational communication with intranets. *Communications of the ACM*, 44 (7), 95-100.
- Lauritzen, S. L. (1996). *Graphical Models*. New York: Oxford University Press.
- Leung, H. K. N. (2001). Quality metrics for intranet applications. *Information & Management*, 38 (3), 137-152.
- Mack, R., Ravin, Y. & Byrd, R. J. (2001). Knowledge portals and the emerging digital knowledge workplace. *IBM Systems Journal*, 40 (4), 925-955.
- Marshall, C.C., Shipman III, F.M. & McCall, R.J. (1995). Making large-scale information resources serve communities of practice. *Journal of Management Information Systems*, 11 (4), 65-86.
- Murgolo-Poore, M.E., Pitt, L.F., Berthon, P.R. & Prendegast, G. (2003). Corporate intelligence dissemination as a consequence of intranet effectiveness: an empirical study. *Public Relations Review*, 29, 171-184.
- Newell, S., Pan, S., Galliers, R.D. & Huang, J.C. (2001a). The myth of the boundaryless organization. *Communications of the ACM*, 44 (12), 74-76.
- Newell, S., Scarbrough, H. & Swan, J. (2001b). From global knowledge management to internal electronic fences: Contradictory outcomes of intranet development. *British Journal of Management*, 12 (2), 97-111.
- Nielsen, J. (2002). The 10 best intranet designs of 2001. Retrieved August 19, 2002 from <http://www.useit.com/alertbox/20011125.html>
- Ptak, R. (1998). Designing a business-justified intranet project. *Information Systems Management*, 15 (2), 13-19.
- Settimi, R., Knight, L.V., Steinbach, T.A. & White, J.D. (2005). An application of graphical modeling to the analysis of intranet benefits and applications. *Journal of Data Science*, 3 (1), 1-17.
- Sliwa, C. (1998). Intranet apps applauded. *Computerworld*, 32 (12), 47-48.
- Stenmark, D. (2004). Intranets and organizational culture. *Proceedings of IRIS-27*, Falkenberg, Sweden, August 14-17.
- Sweat, J., Hibbard, J. (1999). Customer disservice. *Information Week*, 21 June, 65-78.

- Wang, R.Y. & Strong, D.M. (1996). Beyond accuracy: What data quality means to data consumers. *Journal of Management Information Systems*, 12 (4), 5-33.
- White, M. (2003). Bringing people together – it takes more than an intranet. *EContent*, August/September, 43.
- Wilder, C. (1998). Intranet-based expensing. *Information Week*, 16 November, 28.
- Zurier, S. (2003). Do the right thing: Internet applications. *Builder*, 26 (10), 118.

Biographies



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