

INTRAORGANIZATIONAL COMMUNICATION WITH INTRANETS

Intranets support communication among widely scattered corporate departments, even among individual employees, while enhancing overall corporate performance.

THE TECHNICAL PERFORMANCE AND BUSINESS CONTRIBUTION OF INTRANET APPLICATIONS HAS PROVED TO MANY ORGANIZATIONS WORLDWIDE THAT INTRANET TECHNOLOGY IS A COST-EFFECTIVE AND EFFICIENT APPROACH TO SUPPORTING CORPORATE DISTRIBUTED COMPUTING STRATEGIES [3]. INCREASINGLY, ALL KINDS OF ORGANIZATIONS ARE TAKING ADVANTAGE OF INTRANETS TO DISSEMINATE CORPORATE DOCUMENTS, FORMS, NEWS, POLICIES, PHONE DIRECTORIES, PRODUCT SPECIFICATIONS, AND PRICING INFORMATION. IN ADDITION TO USING THE TECHNOLOGY TO INTEGRATE INDIVIDUAL, GROUP, DEPARTMENTAL, AND CORPORATE COMMUNICATIONS, BUSINESS MANAGERS ARE EXPLORING INTRANETS TO ENHANCE THEIR ORGANIZATIONS' BUSINESS STRATEGIES.

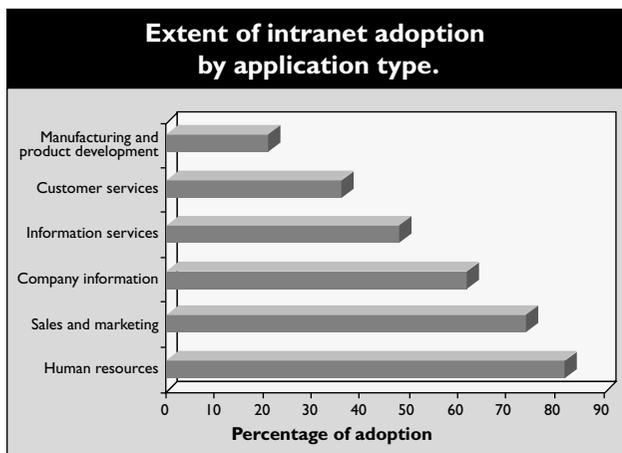
Intranets have been used to unify geographically dispersed work forces. They have been used to empower employees around the world (especially telecommuters and salespeople on the road) through a communication tool supporting collaboration, interaction, and real-time sharing of corporate information across functional boundaries and organizational levels. This form of distributed information infrastructure may even enable some corporate managers to redefine their computing strategies and organizational control to better address competitive business environments.

Most studies of intranet performance have been conceptual or anecdotal; none has sought to collect empirical data from intranet implementers and synthesize their experience in order to guide other organizations to plan, control, implement, and evaluate intranets. That's why I participated in "Intranet Impact and Effectiveness," a study of the

500 largest organizations in Hong Kong, targeting five goals: investigate the reasons for intranet adoption; explore the extent intranets support intraorganizational communications; identify the problems and benefits associated with intranet implementation; evaluate the effect of organization size on intranet use; and analyze the effect of intranets on overall organizational performance, team collaboration, and business process reengineering (see the sidebar "How the Study Was Done").

Intranet adoption and diffusion. In today's dynamic business environment, decisions about adopting technological innovations are influenced by the expectation that they will streamline a business process and improve overall organizational performance. In particular, organizations facing keen market competition have compelling incentives to evaluate innovative technologies to help them maintain or enhance their competitiveness. Intranet

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(1.4%) as non-adopters, in that they had evaluated, but rejected, the implementation of intranets. We classified another 452 (90.4%) as potential adopters, as they were either planning to evaluate (238); planning to implement (15); currently evaluating (20); or not evaluating (179) intranets. For those using intranets at the time of the study, their IS executives reported that the top three reasons for selecting intranets (to support their intraorganizational communication activities) were open standards, ease of use, and multiplatform compatibility (see Table 1). These organizations were apparently taking advantage of the technology's open system architecture to seamlessly integrate their internal communication activities. This advantage is more appealing to smaller organizations less likely to be able to afford significant network and IT investments.

When it comes to intranets, smaller organizations can compete on even terms with their larger counterparts. Intranets allow them to integrate and navigate scattered corporate data to enhance organizational effectiveness at minimal cost but with

Table 1. Top 10 reasons for intranet adoption.

| Reasons | Responses (N=64) | Percentage (%) |
|--|------------------|----------------|
| Open standards, such as TCP/IP, HTTP, and HTML | 61 | 95.3 |
| Ease of use | 59 | 92.2 |
| Multiplatform compatibility and support | 57 | 89.1 |
| Cost effectiveness | 52 | 81.3 |
| Ability to bring data and documents together | 48 | 75.0 |
| Potential to enhance e-commerce | 42 | 65.6 |
| Universal interface, giving systems a common look and feel | 39 | 60.9 |
| Improved performance, such as via bandwidth and multimedia | 37 | 57.8 |
| Ability to support secure transactions | 30 | 46.9 |
| Ability to provide a built-in audit trail | 25 | 39.1 |

technology is an open system with major implications for an organization's IT infrastructure, including strategic business effects. Today, intranet technology is still maturing but is ready to take off—if information users are willing to switch to a revolutionary home-page repository structure.

In Hong Kong, out of the 500 organizations surveyed in our 1996 study, only 41 (8.2%) had already adopted intranets. We classified seven

results comparable to the legacy systems and network applications in larger organizations.

The extent of intranet implementation and use within individual organizations has significant implications for the effectiveness of any individual organization's data- and document-handling systems. With the widespread application and steep diffusion rate of intranets, any organization can more readily achieve a paperless office environment.

How the Study Was Done

The study used a two-stage data collection plan. The first involved identifying target companies. We identified IS administrators from the 500 largest organizations in Hong Kong from the *Guide to Hong Kong Companies* [9]. We contacted these executives directly by phone to determine their organizations' intranet status and their willingness to participate in the study. We found a total of 41 had implemented intranets; 23 agreed to participate in the study.

The second stage involved collecting data from the participating organizations. We mailed five technical and 30 usage questionnaires to each of the IS administrators from the 23 participating organizations. We distributed the technical questionnaires to IS person-

nel involved in intranet design and implementation. The usage instruments were forwarded by IS administrators to managers of functional departments.

We contacted the organizations that didn't return the surveys within three weeks by phone, then mailed a second set of questionnaires to prompt them and boost the response rate. After eight weeks, we had received 470 responses (58.4%), including 64 technical questionnaires from IS personnel and 406 from intranet users. Prior to using these responses for data analysis, we conducted several validity and reliability tests; results indicated that the survey reflected satisfactory reliability, internal consistency, and construct validity. **C**

| Benefits | Mean* | Std. Dev. |
|---|--------------|------------------|
| <i>Data access</i> | | |
| Ability to improve access to up-to-date information | 4.03 | 1.11 |
| Empowerment of employees to control their information | 3.94 | 1.07 |
| Sharing of knowledge | 3.62 | 1.04 |
| <i>Cost savings</i> | | |
| Ability to save costs | 3.84 | 0.92 |
| Ability to save time | 3.70 | 0.94 |
| Improved operational efficiency | 3.66 | 0.88 |
| Improved productivity | 3.45 | 1.13 |
| <i>Communication</i> | | |
| Improved organizational communication | 3.73 | 1.05 |
| Facilitation of organizational learning | 3.58 | 1.24 |
| Improved collaboration opportunity | 3.31 | 0.93 |
| Facilitation of organizational bonding | 2.74 | 1.17 |
| <i>Management</i> | | |
| Improved company ability to be proactive | 3.28 | 1.19 |
| Improved customer service | 3.15 | 1.05 |
| Leverage of intellectual capital | 3.01 | 0.96 |
| Improved decision quality | 2.92 | 1.06 |

* Based on a five-point rating scale: 1=greatly decreased, 5=greatly increased

| Implementation issues | Mean* | Std. Dev. |
|--|--------------|------------------|
| <i>Management</i> | | |
| Management of intranet contents | 3.89 | 1.05 |
| Coordination of different intranet workgroups | 3.69 | 1.04 |
| Planning future growth | 3.45 | 0.87 |
| Ownership of information and environment | 2.73 | 1.06 |
| <i>Network</i> | | |
| Performance of networks | 3.77 | 0.99 |
| Security of intranets | 3.54 | 0.93 |
| Installation of TCP/IP and domain name services | 3.16 | 1.14 |
| Bandwidth of networks | 2.77 | 1.15 |
| Connecton of networks to gateways | 2.52 | 1.04 |
| <i>Software</i> | | |
| Design of intranet pages | 3.82 | 1.16 |
| Identification of appropriate software and hardware | 3.31 | 1.02 |
| Conversion of legacy applications to utilize IP networks | 2.36 | 1.10 |
| <i>IT maturity</i> | | |
| Adequacy of information technology | 3.22 | 0.94 |
| Skill level of intranet installers | 3.05 | 1.06 |
| Inadequate awareness of intranet possibilities | 2.84 | 1.22 |

* Based on a five-point rating scale: 1=not a serious problem, 5=a serious problem

the figure here lists the survey respondents' intranet application areas and the extent of applications within individual organizations. The results indicate that the adoption levels are not uniform for these application areas and that some business domains are more and some less appropriate for intranet applications. To validate such a claim, we performed a t-test of difference to check the relative

equality of the mean adoption level of all application areas. The results reveal that the average of intranet adopters in each application domain are not the same, suggesting that some application areas have a greater extent of intranet adoption than others.

As indicated in the figure, corporate human resource departments represent the primary beneficiary of intranets. They make the most use of corporate documents and are responsible for maintaining and updating corporate manuals, policies, and other forms of information normally distributed as printed media, in some cases to every single employee in the organization. Using intranets, they can rely on this network architecture to store, distribute, dispose, maintain, and print corporate documents electronically. With time saved creating and distributing documents, manuals, and announcements, human resource departments can focus better on enriching the work lives of their organizations' employees while helping them be more productive.

Benefits. Intranets have generated much interest among IT managers as a means of easing internal corporate communication bottlenecks. To date, however, the picture regarding their contribution is incomplete, particularly concerning productivity and collaboration gains. The study listed intranet benefits and requested all respondents evaluate them based on their personal experience. As the list consisted of many benefit items, we per-

formed factor analysis to reduce the problem dimension for analysis, using only those items with factor loadings greater than 0.5. The results suggest that intranet benefits can be factored into four categories: data access; cost savings; communication; and management (see Table 2).

Major benefits generally involve data access and cost savings, although intranets also help dissolve

Table 4. Regression analysis results (significance level at 0.05).

| Independent variables | Regression 1: Organization size | Regression 2: Intranet extent | Regression 3: Collaboration |
|--|------------------------------------|----------------------------------|--------------------------------|
| Extent of implementation and use | Not significant | | |
| Employee performance | Significant | Significant | Significant |
| Organization performance | Significant | Significant | Significant |
| Extent of business process reengineering | | Significant | |
| Extent of collaboration | | Not significant | |

barriers in communication and management. With an intranet's ability to provide corporate data access and intraorganizational communication at reduced cost, employees can distribute and communicate their ideas more readily, enabling them to be more involved in the decision-making process. Surveyed executives expected that cross-functional teams, staffed by IT-empowered employees, will be the most productive and efficient way of organizing business activities over the next five years in their companies. These evolving relationships will help break down functional walls between corporate departments and create more communication among areas geographically dispersed corporate departments. Perhaps the increased use of intranets will permit the flattening of the hierarchical structures of most traditional organizations worldwide within the next five years.

When introduced, intranets are considered unique networks providing different new data communication services from those already in use. Thus, when devising the study questions, we expected that IS professionals would be deficient in some of the technical skills needed to implement and make the most of the technology (see Table 3). We again applied factor analysis to reduce the problem dimension for analysis and interpretation; the results indicate that effective intranet implementation depends on four factors:

Management. Represents challenges of network management, including intranet growth, data ownership, data content, and intranet-workgroup coordination.

Network. Focuses on resolving issues related to establishing an efficient network infrastructure to support intranet operations.

Software. Deals with conversion of legacy software, coordination of home-page development, and identification of hardware and software for building Web sites.

IT maturity. Represents the limitations of an organization's architecture with regard to its technological resources, network staff's experi-

ence, and knowledge of intranet capabilities.

Organization size and intranet use. Research on how organization size influences intranet use has produced inconclusive results [7]. The IS literature does, however, suggest that organization size indirectly

affects innovation adoption and diffusion. Size is likely to lead directly to economies of scale, enhancing the feasibility of innovation adoption. In addition, because larger organizations interact more frequently with their external environments, they are more likely to have greater exposure to innovations for infusion and opportunity for widespread diffusion. But do these larger organizations really have a special edge needed to take advantage of new technology? In the intranet context, organizations do not need to make significant investments in this open network, as long as they already have Internet access. In this sense, the size advantage of larger organizations may not be that useful when it comes to realizing the benefits of intranets.

To explore this issue, we performed multiple regression analysis to test the effect of organization size on intranet use. The results, as indicated in regression 1 in Table 4, show that larger organizations do not implement intranets to a greater extent than smaller organizations. However, the intranet contribution to employee and organizational performance of larger organizations is significantly greater than in smaller organizations. These findings are noteworthy; intranet data access and collaborative decision support mean the technology is a viable option for both large and small organizations. Affordability and ease of use have also made intranets more available to smaller organizations. However, the extent of intranet use in a particular organization does not necessarily imply an equivalent extent of optimal intranet use. Larger organizations have the resources and infrastructure to facilitate intranet adoption, implementation, and use; they also have larger numbers of competent and experienced IT professionals able to control, manage, and plan the technology's use and growth, presumably achieving more effective use in a business context.

Extent of intranet implementation and application performance. The extent of intranet diffusion within an organization can be considered a significant factor in determining the success of an application's implementation. Although intranets

provide many tangible and intangible benefits [2], they are feasible only when an adopter manages to integrate intranets with most of its existing internal business and IS applications and get its employees to use them. An implementation cannot be considered successful if it is not used willingly by its intended users, especially when it is discretionary and other system choices are available. A greater extent of intranet implementation can motivate the organization to exert more effort exploiting the technology, and thus realize some competitive advantage. Such an advantage might include business process reengineering to streamline the organization, employee collaboration to enhance intraorganizational communication, and organizational performance to sustain organizational competitiveness [8].

To validate whether or not the extent of intranet

mance by providing a technology infrastructure that increases employee reach for decision support and interaction, possibly improving their work performance and decision quality.

Interestingly, we did not find that the extent of intranet implementation fosters collaborative efforts in organizations. This relative lack of contribution to collaboration could be due to either users' lack of understanding of the technology's functional capabilities or an absence of incentives for learning and using information technologies. Are intranets ever an appropriate technology for collaboration? In addition to their contribution to chatrooms, newsgroups, email, and laboratories facilitating direct exchanges of information among group members, intranets are considered inadequate when compared to legacy groupware products, such as Lotus Notes [10]. In the context of supporting collaborative

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implementation affects reengineering, collaboration, and performance, we performed a multiple regression analysis on how intranet implementation affects these areas. The regression results (see regression 2 in Table 4) support our expectation that a greater extent of intranet implementation yields a greater extent of business process reengineering, better organizational performance, and better employee performance. Widespread intranet use can significantly change an organization's information collection and dissemination strategy, thus enabling process reengineering.

At the very least, intranets allow users to take responsibility for creating and maintaining their own data. Implementing intranets requires major changes in employee skills, ownership of organizational data, design of IT architecture, and organizational culture of sharing and collaboration [5, 6].

To investigate the extent of reengineering caused by intranets, we selected the five aspects of business and IS processes described earlier. Overall, respondents rated intranets as producing their most critical effect on the document-management process, trailed by data management, distributed processing, business, and communication processes. Similarly, a greater extent of intranet implementation enables employees and organizations to perform better. The study found that intranets could enhance perfor-

computing, intranets still have significant limitations, including a lack of integrated databases, few integrated applications, and lax security.

Collaboration with intranets and overall business performance. In order to reap the full benefit of intranets, organizations implement this network service to support team-oriented collaboration activities, including file sharing, information exchange, document publishing, and group discussion [1]. But these applications compete directly with conventional groupware products, such as Lotus Notes. Recent integration of groupware functions into Webware (and vice versa) suggest that Webware and groupware technologies are beginning to merge [4]. Thus, employees working with intranets receive more effective support for team collaboration and more efficient database access in the corporate distributed environment, improving their individual and organizational performance. However, intranet collaboration features have never been tested empirically in organizational settings.

The study performed multiple regression analysis to validate the effectiveness of intranet collaboration effect on performance factors. The results (see regression 3 in Table 4) indicate that organizations with a greater extent of intranet-based collaboration have significantly better employee performance and organizational performance. Collaboration is not

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really about technology but how the technology is used to improve employee performance. Successful collaboration requires positive input from employees, as well as a good fit between task and technology. After all, a collaboration system is useful only if it enables employees to approach their work in a way that benefits business performance. For a technology like intranets, the most fundamental benefit is a set of standardized communication capabilities sufficient for daily business collaboration activities—at reduced cost for the organization and an easy learning curve for employees.

For collaboration, survey respondents reported being more fond of intranets than sophisticated tools like Lotus Notes. Many reported they had tried to convince non-intranet users to design their home pages to enhance collaboration. This philosophy of Web page redesign could lead to more widespread use of intranets in their organizations. However, unlike some other collaboration systems, intranets are a network technology, so their benefits can be realized only when a critical mass of users and connected devices is achieved. For organizations with a greater extent of intranet implementation, their number of intranet users is already closer to this critical mass than organizations with a lesser extent of intranet implementation. In other words, they more readily realize the promised benefits of intranets to improve their employees' individual work performance, as well as their overall organizational business performance.

Conclusion

Our study of the largest 500 organizations in Hong Kong represents significant progress toward explaining intranet implementation performance and the corporate effects of intranet implementation. Its findings provide theoretical and practical insights into the role of intranets in supporting communication among widely scattered corporate departments, as well as among individual employees, while enhancing performance and collaboration among widely scattered corporate departments, as well as among individual employees. We found intranets found to be emerging as an alternate technology for corporate communication and information management. However, the adop-

tion rate is the same for organizations of all sizes, though larger organizations reap proportionally greater benefits from the technology, as reflected in their reported significant improvement in corporate and employee performance after implementation. The extent of intranet implementation was also found to correlate significantly with overall business performance and business process reengineering.

These findings support the call for directing more corporate resources toward intranet implementation for the sake of achieving strategic benefits in practically any competitive business environment. ■

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