

WHITE PAPER

An Evaluation of Build Versus Buy for Portal Solutions

Sponsored by: IBM

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IN THIS WHITE PAPER

This IDC white paper presents the results of an IDC study, sponsored by IBM, that quantifies and compares the total cost of ownership (TCO) of in-house portal development with that of portals developed with IBM WebSphere Portal.

Data for the study was collected through 10 in-depth customer interviews with IBM customers that had experience with in-house portal development as well as portal development with WebSphere Portal. The data collected from these customers for both deployment scenarios is presented to show the representative costs associated with the two approaches. Key findings of the study include the following:

- ☑ WebSphere Portal-based solutions had a 29% lower five-year TCO on average compared with in-house-developed portals.
- ☑ Labor costs to deploy portals and applications with WebSphere Portal were 38% lower than with in-house solutions.
- ☑ Every \$1.00 spent on WebSphere Portal software yielded on average \$4.80 in IT labor avoidance.
- ☑ Initial deployments of portals developed on WebSphere Portal were 45% faster to market than in-house-developed counterparts.
- ☑ Portal applications developed on the WebSphere Portal platform had a 78% faster time to market than those built for in-house portals.

SITUATION OVERVIEW

Leveraging the Value of Portal Solutions

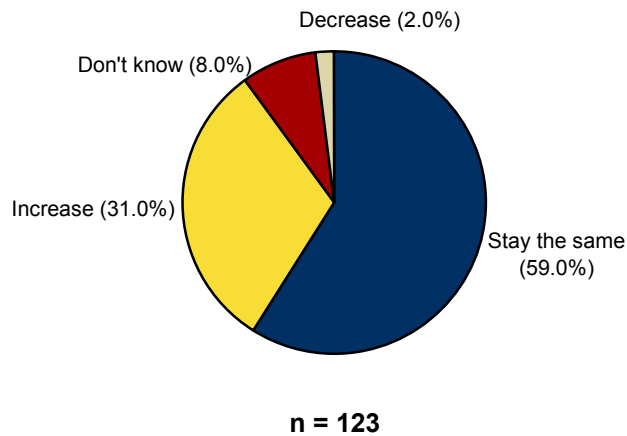
Portals are becoming integral enablers of business and IT innovation for many organizations. From first-generation content aggregation portals to more sophisticated enterprise process portals, organizations have used portal solutions to improve productivity, streamline business processes, enable new Web-based product and service delivery models, and provide IT with a powerful platform for new and composite application development.

A recent IDC survey found that 90% of organizations are planning to either maintain or increase their investments in portal solutions over the next 12 months (see Figure 1). The respondents cited concrete benefits from their portal projects and are now considering expansion of business portal use related to conducting collaborative operations in innovative ways. IDC found that the top business drivers for this ongoing investment center on using the portal infrastructure to automate additional business processes by taking advantage of features such as electronic forms to streamline paper-based processes, incorporating workflow capabilities, and taking advantage of composite applications or enterprise mashups to combine data in compelling new visual displays.

FIGURE 1

Level of Change in Portal Software Investment in the Next 12 Months

Q. How will your investment in portal software change in the next 12 months?



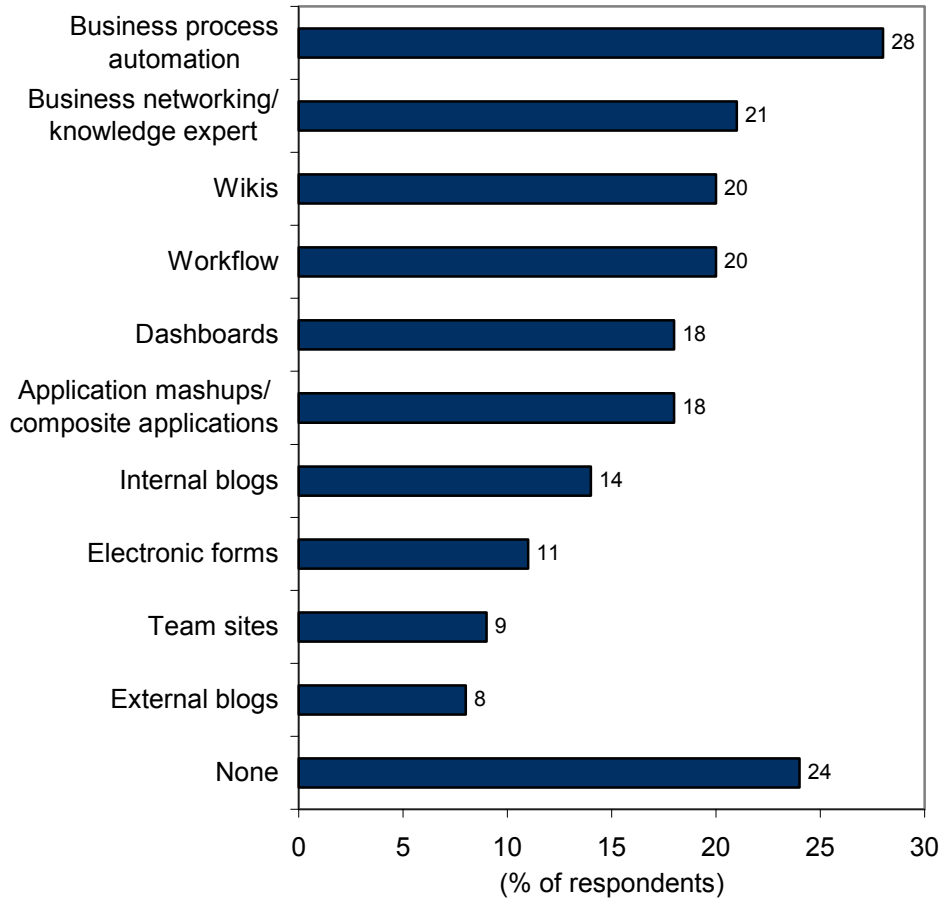
Source: IDC's 1Q07 AppStats Survey

Figure 2 shows that in addition to leveraging the portal's business process automation capabilities, survey respondents plan to take advantage of the portal's ability to deliver self-service information through dashboards, add Web 2.0 collaborative tools such as wikis and blogs, and provide information aggregation services such as business networking applications to make it easier to discover and share expertise with colleagues.

FIGURE 2

Portal Features Important to Add in the Next 24 Months

Q. Which of the following features do you consider will be important to add to your portal(s) in the next 24 months?



n = 111

Base = respondents who identified the packaged portal software products used in their organization

Notes:

Values do not include responses for "don't know."

Multiple responses were allowed.

Source: IDC's 1Q07 AppStats Survey

While the business and IT values of portal solutions are fairly well understood, many organizations are facing the decision of how best to implement a portal. Should they develop their portal solutions in-house or purchase commercial portal solutions?

Early adopters of portals who initially decided to get started by building their own portal solutions might find that trying to keep up with the pace of the technical evolution of portal software and the growing demands of their user communities to

add new services puts a strain on their IT budgets, skills, and resources. In some cases, early adopters may have purchased a portal that works well with a limited set of applications and now desire to expand its use in new ways to satisfy additional business requirements.

Organizations that are contemplating adopting a portal for the first time need to determine where it makes sense to invest their IT budget. This requires an evaluation of the merits of building a portal from scratch versus taking advantage of the core portal engine, with the multitude of out-of-the-box capabilities that leading commercial portal software providers have developed and deployed successfully with hundreds of organizations over the past decade.

While no universal answer to the "build versus buy" decision fits every situation, several trends and patterns strongly favor a "buy" decision:

Faster Time to Market. IBM's *Global CEO Study 2006* revealed that innovation for growth and market differentiation is at the top of the CEO's agenda. As a result of accelerated globalization and technology advances, competition has risen to new heights. CEOs are looking for ways to gain an edge by reconfiguring their business models, optimizing operations, and launching new and better products and services to the market. One implication of this CEO focus is for IT to find ever better ways to accelerate application and content deployment to provide business users with additional services and capabilities to improve decision making or drive new revenue channels. Enterprise portals can now play a key role as a platform for delivering new business initiatives to market at a faster pace. They can be viewed as a platform investment that enables delivery of information, management of processes, and collaboration for an innovative business initiative. This platform capability provides business analysts and portal developers with a wide range of combinations that do not limit business requirements and in fact can speed their deployment to market by a significant time factor.

A services firm that participated in the IDC study uses WebSphere Portal as its standard foundation for developing applications for and deploying applications to its internal users and customers. Using the portal as the single interface for multiple applications has enabled the firm to build out several new services such as an automated accounts payable system and an electronic timesheet for remote workers at a faster clip. Leveraging the underlying platform components enables the firm to focus on the business requirements and design phase of the project, reducing overall deployment time by several months for some projects.

Rich Platform for Innovation. Today's enterprise portals provide users with a rich combination of content, process, and collaboration functions that can be leveraged to deliver unique and compelling business solutions. By integrating business processes, applications, and content and by providing flexible user access and collaboration across internal and external communities, portals can be critical enablers of operational and business model innovation. Organizations are successfully using portals to develop and launch innovative products and services through Web-based delivery channels, reach new markets and customer audiences, and increase operational efficiency by enhancing communication and collaboration for internal and external value chain participants.

An example of this comes from a healthcare organization that participated in this IDC study. It uses WebSphere Portal to integrate numerous clinical systems that are accessed daily by the medical staff. Taking advantage of the integration capabilities of WebSphere Portal provides the first level of benefit in providing single sign-on access to medical records. Innovating on top of the platform, the developers built an application that enables the staff to track data on a particular patient across these newly integrated systems. Knowing the patient the user is interested in, the system immediately brings up the proper patient record when the user switches to the next application. The system not only saves the staff time from logging in and out of several systems to obtain the patient information but also gives doctors and staff a real-time holistic view of all vital patient data.

Resource Optimization. It is rare to find an IT organization that does not face budget, skills, or resource constraints. Improving IT efficiency, productivity, and reusability is a priority for most CIOs. However, the time constraints and costs of maintaining the critical applications that run the business today leave little room in the budget for projects that will advance the business tomorrow. A powerful enterprise portal framework and toolset is an ideal enabler of application integration and development of new composite applications that can bring data forward in new ways to fuel new line-of-business initiatives, improve decision making, or deliver new levels of information discovery and self-service. An open standards-based portal platform provides tools to developers with a variety of skills to rapidly and effectively configure out-of-the box capabilities and to develop customized services when needed.

Aside from the efficiency and productivity benefits that can be gained from leveraging a commercial portal software, organizations can redeploy their scarce technical resources to higher value-add activities. Instead of tying up resources with developing portal capabilities and services that leading portal platform vendors provide already out of the box, organizations can redirect resources to improve process, content, and information architectures and to work with the business community stakeholders to understand their business requirements and goals. Successful portal implementations have shown that ultimate user adoption and realization of the business value potential are directly related to focusing on these aspects.

A healthcare organization in the study cited the advantage of WebSphere Portal's integration capabilities in lowering development time. The portal delivers electronic medical records to a network of 2,000 physicians through an integrated content management system that contains text records and digital x-ray images. By taking advantage of WebSphere Portal's prebuilt integration, the organization estimates a 30% savings in development time for implementing the connection to the content repositories as well as a comparable reduction in time for ongoing maintenance tasks.

Life-Cycle Efficiencies. Enterprise portal projects become fundamental business and IT assets for organizations; as such they evolve and are tuned continuously over multiple years. The life cycle of portal projects typically begins with one objective or target audience. Invariably, after a portal is adopted to solve a particular problem, the IT department or end users identify new opportunities for process improvements and cost reduction. As the value of an investment in portal infrastructure increases by adding new user communities and by reusing foundational capabilities for new portal solutions, the choices made at development time impact the success of portal

implementations. Tactical decisions to take a one-off approach to build a portal to address just one constituency or business need can limit the ability to leverage the portal strategically, reducing the potential of the portal platform to serve as a deployment platform for continual innovation.

An effective portal platform has a core set of characteristics that provide the underpinnings that organizations can exploit to build innovative new solutions. These characteristics include the following:

- ☒ High degree of integration capabilities with multiple business process, content, and application sources
- ☒ Flexible and device-independent presentation services that give users access in online and offline modes through the device of their choice
- ☒ Open standards and inclusive IT architecture that allow companies to leverage existing IT investments and add new value by flexibly combining assets to create new capabilities

Development Choices for Portal Infrastructure

The development options available to organizations to build portal solutions deliver variable degrees of benefit and risk and should be evaluated based on the business objectives for the portal and the impact of the development costs to the organization. The options are as follows:

- ☒ In-house-developed portals provide a great level of control because they are designed from the ground up to meet the requirements of an organization. There are no or only limited licensing and ongoing maintenance fees to factor into the TCO equation, but labor can be the highest component of project costs. The success of a company's portal deployment lies more with the in-house development talents or those who are hired from an outside contractor. Depending upon the composition and complexity of the portal, this approach can make fiscal sense. For example, a company that is building a simple content aggregation portal with relatively static information that is infrequently refreshed could be a good candidate for a homegrown portal. Conversely, if plans include more complex or transaction-rich portals, a company needs to consider how the portal can scale to handle these tasks and factor in the ability of its development team to turn around new applications or services and assess the impact on its time to market.
- ☒ Commercial portal software products provide the baseline portal infrastructure and deliver an architecture and tools for building and deploying new applications. These products offer connectors for integrating applications and data sources, user interface frameworks for addressing numerous audiences, and packaging options that can provide a jumpstart for tackling usage scenarios such as self-service, dashboards, and role-based workspaces. While organizations must factor in the initial and ongoing licensing costs, in-house developers can leverage the portal framework and focus their development work on applications that deliver unique value.

- ☒ Open source portal solutions provide an alternative to building a portal infrastructure from the ground up and a vendor-neutral approach that takes advantage of the contributions from community members to enhance the base framework. Organizations are drawn to the open source route not only because of the absence of license fees but also because of the collaborative development process of open source initiatives. A number of open source portal projects are active today that provide different levels of features and functionality. When evaluating open source portal software, companies should pay attention to the support and customization requirements necessary to meet their needs, as well as the strength of the community resources that are available to draw upon.

QUANTIFYING THE BUILD VERSUS BUY DECISION FOR PORTAL SOLUTIONS

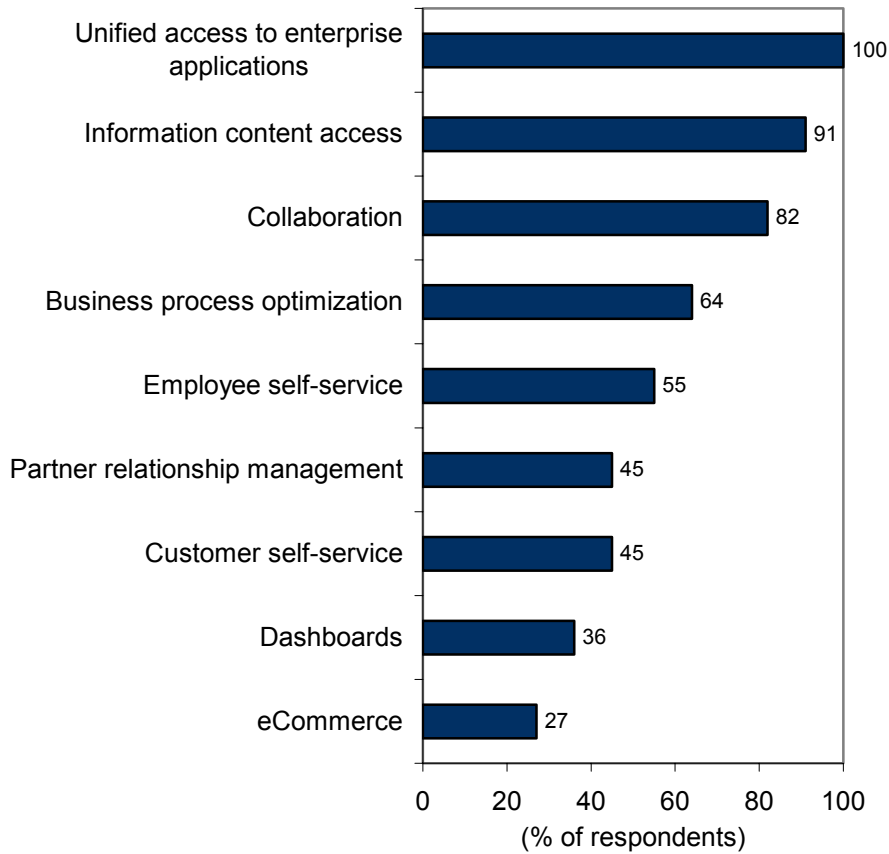
The goal of the study was to compare the relative costs and benefits of portal environments that had been built in-house or using a combination of point solutions, in-house labor, and consulting with solutions based on IBM WebSphere Portal. IDC interviewed 10 companies that had experience with both in-house portal development and portals developed with WebSphere Portal. The quantitative part of the research focused on assessing the build versus buy cost dynamics and comparing the costs and performance of in-house-developed portal solutions and solutions based on WebSphere Portal.

Participant Profile

The organizations and companies interviewed covered a variety of industries, including healthcare, energy, government, manufacturing, and facilities management. The organizations ranged in employee size from 600 to 20,000 and served an average of 10,900 users. Portal types and uses varied but in general were complex. Eight of ten companies had both internal and external portals. Three companies had deployed ecommerce portals. Figure 3 shows an overview of the portal uses.

FIGURE 3

Portal Use Incidence



Source: IDC, 2007

TCO Analysis

The scope of the TCO analysis was based on a five-year assessment of the following cost elements:

- Hardware and software.** Initial hardware license cost and annual maintenance and upgrades
- IT labor.** Initial labor to deploy, ongoing labor to support infrastructure and users, and ongoing development and deployment of new portal applications and capabilities
- Consulting.** Third-party services to supplement internal labor in deployment and ongoing development

- ☒ **Training.** Training fees and productivity costs associated with training IT and business users
- ☒ **Downtime and service desk.** Cost of IT labor to respond to unplanned downtime and support help desk operations

Key TCO findings include the following points:

- ☒ WebSphere Portal–based solutions had a 29% lower five-year TCO on average compared with in-house-developed portals.
- ☒ Labor costs to deploy portals and applications with WebSphere Portal were 38% lower than with in-house solutions.
- ☒ Every \$1.00 spent in WebSphere Portal software yielded on average \$4.80 in IT labor cost avoidance.

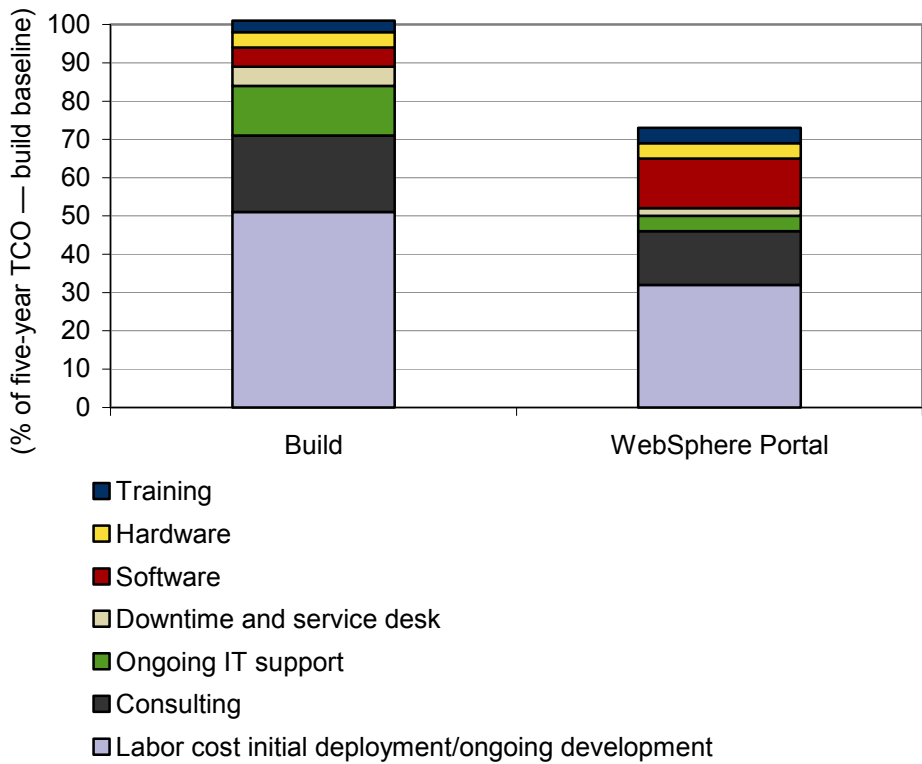
Overall costs to develop and maintain the portal environment over five years were 29% lower for a WebSphere Portal solution than an in-house solution. Figure 4 compares the relative costs for each cost element of a WebSphere Portal solution and a "build" portal solution over a five-year period.

As Figure 4 shows, WebSphere Portal's cost advantages are largely driven by significantly lower IT labor and consulting costs to deploy, maintain, and add functionality and applications over the lifetime of the portal platform. These cost avoidance and savings opportunities offset higher software licensing costs. For the study participants, every \$1.00 spent on WebSphere Portal software yielded on average \$4.80 in IT labor avoidance. The key drivers of IT cost savings are:

- ☒ **Initial deployment.** The cost differential was driven by use of out-of-the box functionality and portal development and configuration tools that lowered labor costs between 23% and 93%.
- ☒ **Ongoing applications and portal development.** The cost differential was driven by use of prebuilt extensions and integration builders that leverage data and processes from multiple back-end systems while minimizing the need to hard-code back-end integrations to the portal, contributing to 23% to 67% lower labor costs.
- ☒ **Ongoing IT support.** The cost differential was driven by the integrated portal platform that consolidates end-user administration, portal operations management, and portal release cycle management tasks, requiring fewer add-on tools and increasing the productivity of IT support resources.
- ☒ **Consulting.** The cost differential was driven by leveraging the functional depth of the portal infrastructure and application templates, as well as access to flexible development tools that reduce the need for outside support to supplement internal development talent.

FIGURE 4

Comparison of Five-Year TCO



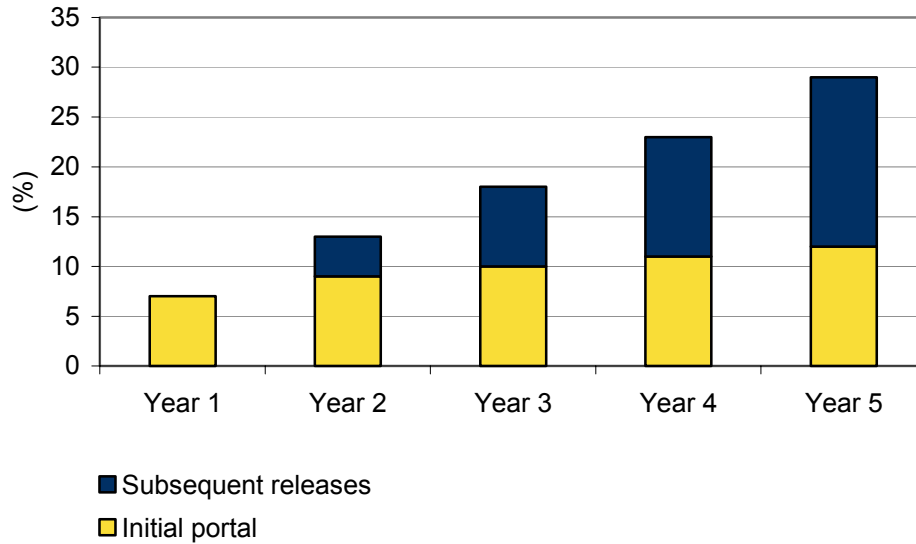
Source: IDC, 2007

Because the portal is fast becoming the platform for innovation, the build versus buy decision has long-term consequences. If we compare only the costs of the initial portal solution over the five-year period, WebSphere Portal was 12% less expensive than an in-house solution. But the companies interviewed for this study, like most businesses, did not stop with their initial portal solution deployment. They continued to build on the platform, driving the cost differential to 29% over five years.

Once the initial portal platform is built, companies tend to add functionality and applications each successive year. In our study, most companies began with a portal solution scope that was limited to one or two key functions and then continued to add functionality so that, on average, each company had 5.6 of the nine portal functions shown in Figure 3 deployed on their portals. Because the WebSphere Portal solutions were built on a flexible framework, adding functionality or new applications is easier and less labor intensive. Figure 5 shows the five-year TCO advantage of "buy" versus "build."

FIGURE 5

Five-Year TCO Advantage (Cumulative)



Source: IDC, 2007

Business Benefits

This study primarily focused on assessing the TCO of the build versus buy decision. However, the participants in this study also reported significant business benefits related to the build versus buy decision.

WebSphere Portal solutions not only were less expensive but also delivered better performance to the business. The three key performance advantages over in-house solutions found in the study were as follows:

Faster Time to Market

WebSphere Portal solutions were 45% faster to market: 8.1 months versus 14.7 months for in-house-built portals. Applications could be developed and launched on WebSphere Portal solutions on average in 2.5 months, which is 78% faster than the average application time to market for build solutions of 11.5 months. In one case, having the portal available three to six months faster saved a company over \$29 million.

Higher User Productivity

Study participants also reported lower portal downtime and fewer user calls to the help desk with WebSphere-based portals. On average, internal users gained about two hours per year of availability to the portal applications. In addition to reducing downtime, study participants estimated a 25% greater increase in user productivity with WebSphere-based portals. One company valued the difference between WebSphere Portal's impact on user productivity and the company's previous build solution at \$3.6 million annually. The productivity gains were driven by benefits such as delivering data from multiple enterprise applications through the portal, replacing paper-based processes with automated workflow and data collection on the portal, and enabling customer self-service, which reduced the volume of requests coming into the call center.

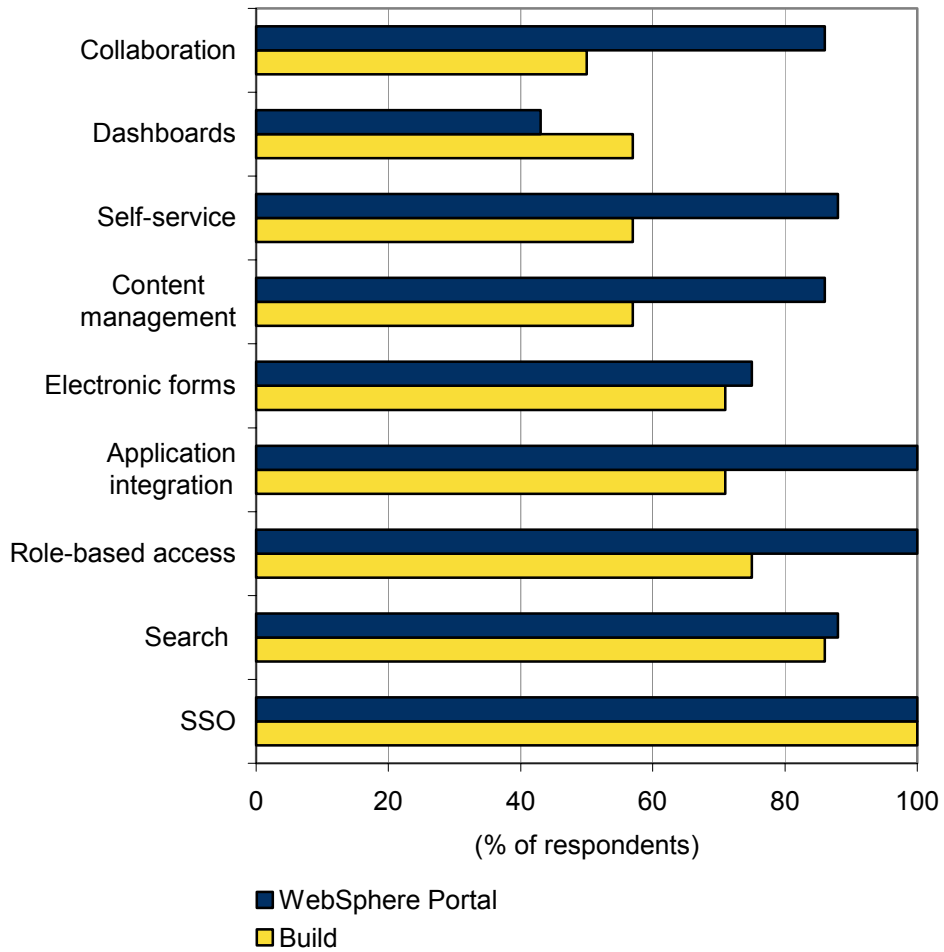
Greater Ease of Use

By taking advantage of themes and skins to deliver an engaging design model, some companies felt that the WebSphere-based portals were more inviting to users. The improved user experience led to greater leverage of portal functionality among a wider number of people, which in turn optimized the benefits achieved. For example, the ease of use and efficiency that physicians gained by using a hospital's extranet to access patient records drew more doctors to use the site, which in turn drew their patients to the facility and increased overall revenue by 3–5%.

Portals developed with IBM WebSphere also showed a greater breadth of functionality. Figure 6 shows a comparison of portal features deployed on WebSphere Portal and in-house-developed portals. With the exception of dashboards, the WebSphere-built portals contain a higher percentage of advanced functionality, suggesting that the development teams were able to add a greater level of sophistication and advanced functionality by taking advantage of the out-of-the box capabilities, development, and integration tools offered by the WebSphere Portal platform.

FIGURE 6

Comparison of Portal Capabilities Deployed



Source: IDC, 2007

Build Versus Buy Decision Points

Once organizations have made the decision to implement a portal, they must evaluate whether to build their own environment or leverage the value of a commercial portal software product. This decision must balance the need of IT to find a solution that fits with the existing application and infrastructure requirements of the organization and the process and usability requirements of the business users.

In customer interviews for this research study, IDC found that the decision revolves around three key decision points:

- ☒ **Business requirements.** How will the portal be used? What are the user interface requirements? What are the content requirements?
- ☒ **Infrastructure dependencies and requirements.** What pieces of existing infrastructure need to connect with the portal? What APIs are needed to make those connections? How will the connections be built and maintained? Who will be accessing the portal? How will that access be provided and maintained?
- ☒ **Development effort.** Once the first two points have been determined with documented requirements, an assessment can be made on the development skills, time, and tools required to build the portal.

Establishing an Assessment Framework

Building from these key decision points, organizations can create a framework to outline the impact of building a portal infrastructure versus purchasing commercial software. This assessment looks beyond the licensing costs to outline the full costs associated with a portal project. As IDC found in its study results, labor costs are the largest element of the five-year TCO model. Breaking down the development tasks by category (taking into account the business objectives planned for the portal) helps to provide an assessment framework that can be used to provide guidance to quantify the build versus buy decision.

Business Requirements

The process begins by outlining the business objectives for the portal to determine the functional requirements and the user community needs and creating an assessment of the costs associated with building integration points for enterprise data, unstructured data sources such as content management systems, and collaborative tools that are needed to connect to the portal.

To flesh out all the variables, companies should consider the type of portal they are planning to deploy:

- ☒ **Simple versus complex.** Is the requirement for a simple content aggregation portal or a complex portal requiring multiple integration points, multiple user interfaces, and the ability to handle frequent transactions or provide forms-based integration to deliver data to back-end systems?

- ☒ **Internal-facing versus external-facing.** Who will access the portal, and what are the usability requirements for these people?
- ☒ **Static versus active.** What is the expected frequency of change to portal content and applications?
- ☒ **Informational versus conversational.** What functionality is needed to enable collaboration in the portal?
- ☒ **Interface to existing applications versus a platform for deploying new Web applications.** What are the requirements from an architecture and tools perspective to build new applications for deployment on the portal?

Infrastructure Dependencies and Requirements

One of the key value points of an enterprise portal is its ability to integrate multiple applications, data sources, and services. After assessing the desired integration points that the portal will deliver, such as ERP systems, legacy systems, and content management systems, companies can evaluate the technical requirements to enable these connections. One of the participants in the IDC study made the point that portal technology cannot be implemented in isolation from other technical components. The portal must provide the right architectural fit with a company's existing infrastructure and provide the flexibility, through APIs or standards-based support, to incorporate new components as business needs inevitably will change.

Development Implications

Once the business and infrastructure requirements are established, companies must conduct the vital assessment of the time and effort for development tasks related to initial portal deployment, future projects, and ongoing care and feeding of the portal. This assessment requires taking a look at the different categories of future development tasks based on portal objectives and determining the resources necessary to complete them. Some common development task categories include the following:

- ☒ **User interface.** Development of the overall look and feel of the portal, which provides a unified presentation layer, as well as role-based or function-based personalization to deliver customized views
- ☒ **Integration.** Building and maintaining interfaces between back-end systems and portal applications
- ☒ **Business process automation.** Incorporation of workflow engines and building the necessary connections to business management systems and coding the business process workflows
- ☒ **Security.** Enabling the appropriate authentication and access management safeguards based on the user community
- ☒ **Deployment.** Testing, staging, and releasing new applications into production on the portal

All of the dimensions within the assessment framework need to be considered within the context of the usability requirements of the ultimate user community for the portal. A portal project, whether the portal is built in-house or with commercial software, will not deliver the desired business benefits if it is not designed to meet their requirements.

CHALLENGES AND OPPORTUNITIES

IBM has been making a concerted effort to simplify its WebSphere Portal product line and make it easier for customers to select their initial portal solutions. IBM WebSphere Portal Server serves as the core offering and contains portal services such as role-based information and application delivery, search, integration, personalization, policy-based administration, and portlet development tools to build composite applications.

In 2007, IBM began rolling out portal "Accelerator" packages geared to specific portal business usages that integrate with the core WebSphere Portal Server. These packages contain capabilities and preassembled components that are designed to shorten implementation cycles for the most common portal usage types. At time of print, these packages included:

- ☒ **IBM Dashboard Accelerator** provides a framework for building dashboards and scorecards and a repository of industry-specific KPI portlets that can be used to speed development of dashboard applications.
- ☒ **IBM Self-Service Accelerator** provides a self-service HR framework with front-end interfaces, connectors to enterprise HR systems, and portlets for activities such as managing personal information, tax management and employee onboarding.
- ☒ **IBM Content Accelerator** provides Web content management, advanced search, and document management capabilities.
- ☒ **IBM Collaboration Accelerator** provides collaborative document management, real-time communications, and social networking capabilities.
- ☒ **IBM Enterprise Suite Accelerator** includes the Dashboard, Content, and Collaboration Accelerator pages as well as electronic forms capabilities.

IBM has been a leader in IDC's enterprise portal software (EPS) market share ranking for the past five years and has continually improved its portal product to broaden its appeal to a wider audience. WebSphere Portal has a wealth of functionality, integration capabilities, and user interface options for building portals that can be used by a wide set of users. The breadth of functionality, plus the complexity of deploying such a rich product, has proved daunting to some pockets of the market. This is the impetus behind the Accelerator packages, which build on the components IBM has developed over the years to enable rich portal environments for its customers. With its new packaging strategy, IBM has the opportunity to make inroads with organizations that are attracted to WebSphere Portal's technical capabilities but concerned about implementation time and costs to get the first portal project in production.

By focusing on usability improvements and rolling out new jumpstart solutions that combine the portal with collaborative technology and aggregate existing data assets to improve specific line-of-business processes, IBM is making strides to reduce the complexity of getting portal projects from the IT drawing board to delivering true business value for users.

IBM's technology is facilitating a growing trend to view the portal more for its application development, information aggregation, and delivery capabilities than simply as a unified user interface for business applications or Web sites. Composite applications play a key role in enabling portals to evolve from a central hub for accessing multiple applications to serve as a process automation point that integrates technology to address specific business tasks and constituencies.

IBM reflects market and customer requirements for portal software in the following ways:

- ☒ By enhancing usability and building out solution packages tailored for role-based or functional business processes, IBM is addressing the key issue that hampers an organization's ability to realize solid business benefits from its portal technology investment: poor utilization rates.
- ☒ Product packaging delivers a baseline product that enables organizations to get up and running on a portal project to address current needs and provides an upgrade path to expand to a full enterprise deployment with additional functionality when business requirements dictate.
- ☒ IBM has been at the forefront of delivering Web 2.0 collaboration tools to the enterprise. While interest in Web 2.0 is high, and some organizations view it as an inevitable requirement from business users, IT people are concerned about the security and governance aspects of unleashing these new technologies in the organization. IBM's efforts to integrate these capabilities within the safe confines of the portal are a welcome alternative.

CONCLUSION

Data from the research study shows that labor costs are the greatest cost component of portal implementations. A comparison of the percentage of labor costs devoted to the build option and the percentage of labor costs devoted to the WebSphere option shows a 20% differential in favor of IBM for tasks related to initial deployment and ongoing development of the portal. When the ongoing IT support labor costs are factored in, WebSphere has an additional 10% advantage. Customers interviewed for the study cited the benefits of the WebSphere Portal as a platform for continual innovation. Leveraging the product's ability to integrate with multiple systems, manage the security and access aspects of applications, and flexible user access and interface options reduces the overall development and deployment time for new applications and services that advance the business.

Drawing from the experiences of the customers interviewed for the study, IDC found that the best candidates for deploying a commercial portal product have the following set of business and IT characteristics:

- ☒ Multiple integration points to build and maintain in the portal (applications, collaborative tools, devices)
- ☒ Complex deployment environment requiring strong administrative tools
- ☒ High frequency of change to portal applications and content
- ☒ Multiple user interface requirements (dashboards, self-service transactions, internal audiences, external audiences)
- ☒ Need for flexibility to innovate as business requirements change

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