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Usability Is Good Business

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T his paper discusses the cost-effectiveness of usability engineering and performing usability cost-benefit analyses in order to acquaint software professionals and other interested parties with these topics.

Summary

Research shows that improving the usability of software systems—including information-technology (IT); e-commerce; "shrink-wrapped" and other commercial software—can be highly cost-effective. The benefits of usability engineering extend beyond improving a system's user interface (UI) and end user productivity; its beneficiaries include not only end users but also system developers and the companies they work for. Usability techniques can reduce software and e-commerce costs (including development, support, training, documentation and maintenance costs), shorten development time and improve marketability.

The rule of thumb in many usability-aware organizations is that the cost-benefit ratio for usability is $1:$10-$100, that is, for every dollar spent implementing usability techniques, the organization will realize a benefit between $10 and $100 [6]. But many organizations may want to perform their own usability cost-benefit analyses. In such analyses, the goal is to estimate the costs and benefits that will result if specific usability activities are conducted and contrast them with the costs of not conducting the activities. Doing so requires identifying the usability technique to be employed, deciding an appropriate unit of measurement, making an assumption about the magnitude of the benefit and translating the anticipated benefit into a monetary figure (as illustrated on pages 4-6.) In a usability cost-benefit analysis it is also essential to focus on the benefits most relevant to the group for which the analysis is conducted.

A usability cost-benefit analysis may be helpful in introducing usability into an organization or into a particular development project within an organization.

Usability is a measure of how well a computer system, such as a software program, corporate Web site, intranet, extranet or e-commerce site, facilitates learning; helps users remember what they've learned; reduces the likelihood of errors; enables them to be efficient; and makes them satisfied with the system. The notion of "end users" or "intended users" is implicit in the definition: Usability must be considered in the context of the system's everyday users. Since a system's developers are rarely its intended users, developers' finding the system easy to use does not mean its end users will have the same experience.

"Usability" is also a shorthand descriptor for the processes and techniques intended to make systems easy to learn, easy to remember, efficient, error-preventive and satisfying, such as user and task analysis, interface prototyping and usability testing. Sometimes "usability engineering" or "user-centered design" are used to distinguish the "techniques and processes" sense of usability from its defining, conceptual sense.

But usability is more than a concept. In many organizations, usability is an important part of software development. And more and more companies are discovering that not only is usability good for users, it's good business.

Quality and usability

Some compare usability to quality assurance. [2; 20] There are important similarities: Both seek to improve system quality; both are cost-effective; both can reduce development time. [6; 19] But they are not identical. Usability focuses on the user interface, on the elements the end user directly interacts with, and the quality-of-use issues she directly encounters: screens, windows, menus, error messages; consistency, navigation, orientation, etc. Usability engineering's purpose is to enhance the quality of the end-user's experience while quality assurance focuses on elements that users do not interact with directly, such as code integrity.

Quality assurance is now familiar to most software professionals, but most software professionals are not as familiar with usability engineering. Understanding its benefits and cost-effectiveness may lead to a wider appreciation of usability engineering.

Usability's many beneficiaries

"The benefits of usable technology include reduced training costs, limited user risk, and enhanced performance.... American industry and government will become even more productive if they take advantage of usability engineering techniques." Vice President Al Gore [7]

As the preceding quotation from the vice president suggests, usability engineering is a sound business and management strategy, offering significant economic benefits to the organizations who apply it. To a company developing IT systems, for example, increased employee efficiency and satisfaction may translate into lower personnel costs. For an e-commerce site, higher end-user efficiency may mean better sales.

Usability engineering can also help companies reduce development costs and shorten development cycles. Of course, users also benefit from usability, whether they're company employees using an internally developed IT system, consumers using commercial software or Internet-surfing shoppers looking to buy from e-commerce sites.

Though it's good that usability can benefit both companies and end users, the focus in usability cost-benefit analysis should be on the benefits that are the most relevant to the group for which the analysis is conducted. As Mayhew and Mantei write, "One needs to decide the relevant audience for the analysis and then what the relevant categories of benefits are for that audience, because not all potential benefits are relevant to all audiences." [1] For example, a commercial software company would be more interested in a cost-benefit analysis that focused on usability's potential for reducing development costs and increasing customer satisfaction than on its potential to improve end user productivity.

The following scenario exemplifies a usability cost-benefit analysis that is relevant to the audience and business context. The method is that suggested by Mayhew and Mantei. [1] While in the scenario

the anticipated benefit is a productivity improvement from usability work on an internally developed IT system, the same methodology can be used to perform usability cost-benefit analyses for other benefits and in different organizations, including e-commerce and commercial software companies.

Cost-benefit analysis scenario

Seizing the opportunity

You work at Pretty Good Systems (PGS). You would like PGS to consider integrating usability-engineering techniques into development efforts because you think it could be valuable. You're aware of complaints from the human resource department about the company's internally developed human resource system, Getting In Good (GIG). You're also aware that development on GIG Version 2 will begin shortly. You propose to your boss that you do a usability cost-benefit analysis; she approves.

You interview the HR director and several GIG users. They say GIG is too complicated. They can't understand why there's one screen for entering new applicant data, another for entering data about the applicants who have been interviewed, another if the applicant is hired, etc. "There's not that much applicant data," a GIG user tells you. "I don't see why we need so many different screens. It takes so long to go through them all." You play around with the system a bit; it seems to you that the users may be right about the number of screens.

Identifying the benefit and how to achieve it

Your discussions with the HR staff helps you identify a potential usability technique and benefit: Improving ease of use and productivity via user-centered screen redesign that would take a single applicant/single data-entry-screen approach.

You talk to the GIG development manager and GIG developers. You discuss allowing applicant data to be entered on one screen, as opposed to on several. The developers tell you it was quicker to "modularize" applicant information in GIG on the basis of the applicant's status in the hiring process phase.

"We can do it the way HR likes, but it would take an extra 30 person-hours or so," the development manager says.

Estimating cost

Having identified a potential usability benefit (fewer screens) and a technique to make the benefit possible (redesign), you're ready to begin your cost-benefit analysis. To be on the safe side, you allow 40 hours for the change. To get the cost of making the change, you multiply 40 hours by the loaded average salary of a PGS developer, which is $60 an hour: $2,400.

    40 hours to make change
x $60 avg. hourly loaded salary of developer
$2,400 cost of change

Currently, processing a job application in GIG takes an average of four hours. The average loaded salary of a GIG data-entry person is $25 an hour. You multiply $25 by four to get the current cost of processing a single application: $100.

    4 avg. no. hours to process one job
        application in existing system
x $25 avg. hourly loaded salary of data entry staff
$100 avg. cost of processing one job
       application in existing system

On average, PGS receives about 1,000 job applications a year. Multiplying $100 by 1,000 gives you the average annual cost of processing job applications at PGS: $100,000.

  1000 avg. no. job applications processed
        per year
x $100 avg. cost to process one job application
        in existing system
$100,000 avg annual cost of processing job
        applications

Estimating benefit

On the basis of your discussions with the HR department and your own familiarity with GIG, you believe the one-screen-per-applicant approach could cut application-processing time in half. This is your unit of measurement for usability. But to be on the safe

side, you assume a 25% reduction in processing time of each job applicant. This would reduce the average processing time from four hours to three hours per applicant. You multiply three by $25 to estimate the cost of processing a single employment application if this improvement to GIG is made: $75. (This "translates" the usability measurement of time into a monetary figure.)

3	expected avg. no. hours to process one job application
x $25	avg. hourly loaded salary of data entry staff
$75	expected avg. cost of processing one job application in new system

Multiplying $75 by 1,000 tells you how much you can expect the average annual cost of processing job applications at PGS to be reduced by this single usability enhancement: the result is $75,000, or $25,000 a year less than the current average processing costs.

$75	expected avg. cost of processing one job application
x 1000	avg. no. job applications processed per year
$75,000	expected avg. annual cost of processing job applications in new system

But you have to factor in the cost of making the changes ($2,400), so you subtract that amount from the anticipated first-year savings ($25,000):

$25,000	anticipated first-year savings
-$ 2,400	cost of change
$22,600	expected first-year benefit

The expected first-year benefit is $22,600. But the typical lifespan of a system at PGS is three years. Since the cost of making the changes will be incurred once, you don't need to deduct that cost from the benefit amount for the last two years. Adding the benefit amount for the first year ($22,600) to the benefit for the second and third years ($50,000), you get the total lifetime benefit of the anticipated usability work on GIG: $72,600.

$22,600	expected first-year benefit
$50,000	anticipated second- and third-year benefit combined
$72,600	anticipated total benefit

That's a cost-benefit ratio of 1:30.25:
$72,600 ÷ $2,400 = $30.25

In this example, the benefits to the HR department and the benefits to PGS as a company will be different. Because the data-entry process in HR will be streamlined, GIG2's users should be able to get more work done; better job satisfaction is likely to be their main benefit. To PGS's management and shareholders, the main benefit would be the $72,600 costs savings over GIG2's lifespan. Though management and shareholders may be happy to know that usability engineering will improve job satisfaction in the HR department, your cost-benefit analysis focuses on the cost savings, because you know that's the benefit most relevant to the person you're conducting the cost-benefit analysis for, your boss.

Usability is not necessarily an additional expense

According to your analysis, PGS can expect a $30.25 return on every dollar invested in the many-to-one GIG screen scenario. That's a nice return-on-investment (ROI). But, considering usability solely from an ROI perspective may not give usability its full due. Many "usability costs" are not additional costs; they're costs that would've been incurred whether or not the company proactively "did usability." GIG2 is going to have a user interface of some sort, usability-engineered or not; that UI will take time to build. Time is money. So, even if GIG2's UI were created without any thought to usability, there would be user interface costs (and, lacking usability work, the UI will probably not be optimal.) The system will also have support, documentation, maintenance and other costs which usability engineering could reduce, and which can be seen as usability expenditures. In your analysis it may be helpful to mention that the company is already spending money on usability issues, even though it may not think of them as such.

The benefits of usability: examples

Though usability offers all development organizations a number of benefits, perhaps nowhere is the relationship between usability and profitability as direct as in e-commerce, as this quotation from Forrester Research suggests:

Usability goals are business goals. Web sites that are hard to use frustrate customers, forfeit revenue, and erode brands. Executives can apply a disciplined approach to improve all aspects of ease-of-use. Start with usability reviews to assess specific flaws and understand their causes. Then fix the right problems through action-driven design practices. Finally, maintain usability with changes in business processes. [11]

Another Forrester report stresses that such problems would be avoided if site creators conducted usability testing. [10]

Usability-engineered sites also offer visitors potential improvements in efficiency and productivity, though these terms must be interpreted in the context of online shopping: an enjoyable, rather than frustrating, experience, in which no time is wasted searching for merchandise or figuring out how to buy it; an experience in which the shopper feels confident that his credit-card number and other personal information will be secure; an online shopping experience that leaves no doubt in the shopper's mind that the experience was superior to making the purchase from a brick-and-mortar shop.

Over 44 million people in the U.S. have made online purchases; 37 million expect to do so soon. [22] However, many of these online-shopper-wanna-bes won't succeed in making a web purchase, because e-commerce sites are for the most part too difficult for the average user. And evidently, the experience of some online shoppers has been so bad that they don't want to buy online again. [11; 16; 24; 25]

Of course, users of commercial software and of IT systems can benefit from the increased productivity usability-engineered systems make possible as well. Commercial software users may also recognize a savings from any increased productivity that usability-engineered software makes possible.

The customer can also benefit by not having to take training, call support, consult and/or purchase "[Application Name Here] for Idiots" books or other third-party manuals. Such customers may also be able to market themselves more effectively; for example, a contract technical writer may be able to take on additional clients because the enhanced usability of a new release lets her get twice as much work done than she could in the previous release in the same amount of time.

Increased sales and customer satisfaction

When systems match user needs, satisfaction often improves dramatically. In a 1992 Gartner Group study, usability methods raised user satisfaction ratings for a system by 40% [1]. Better user satisfaction can lead to better sales for e-commerce sites and commercial software applications alike.

On the web, users can quickly become frustrated and leave the site. Usable sites enhance user experiences, making them likely to stay on site longer and to return to the usable sites. Online shoppers spend most of their time and money at sites with the best usability, according to Jakob Nielsen. [16] Good navigation and site design make it easier for users to find what they're looking for and to buy it. The potential for usability affecting the e-commerce bottom line positively are quite favorable, according to Nielsen: "It is common for usability efforts to result in a hundred percent or more increase in traffic or sales." [17]

Similar conclusions can be drawn about the connection between improved usability and better commercial software sales. Given two commercial software products with the same functions at the same price, customers prefer the product that's easier to use. Wixon & Jones did a case study of a usability-engineered software product that increased revenue by more than 80% over the first release of the product (built without usability work). [23] The revenues of the usability-enhanced system were 60% higher than projected. Many customers cited usability as a key factor in buying the new system [1].

A competitive edge

Ease of use is always high on customers' lists of what they most want in a hardware or software system [1]. Giving customers what they want would seem to mean giving them usability. Users appreciate software that doesn't waste their time or try their patience with complicated user interfaces; building usability into software tells users that the manufacturer values their time and doesn't take their patronage for granted.

Usability can help differentiate commercial software systems from competing systems. For example, Microsoft Office and Lotus SmartSuite have used usability in advertising to distinguish their products from each other. [21]

The importance of having a competitive edge in usability may be even more pronounced for e-commerce sites. Such sites commonly drive away nearly half of repeat traffic by not making it easy for visitors to find the information they need. [10] And it is the repeat customers who are most valuable: New users at one e-commerce site studied spent an average of $127 per purchase, while repeat users spent nearly twice that. [15]

Usable e-commerce sites build goodwill. Users recognize the effort put into making their e-commerce experience easy and efficient by returning to usable sites. Moreover, one of the biggest obstacles to e-commerce is trust. Consumers must trust a site before they will disclose the personal and financial information often required to make an online purchase. An e-commerce trust study found that "navigation" and "presentation"—both usability concerns—were essential to creating trust. [3]

Advertising advantages

Stressing usability can help distinguish an e-commerce site from other sites and to differentiate commercial software applications from one another. Compaq and Borland have made usability part of their advertising campaigns, for example, as have Microsoft and Lotus. [21]

The advertising value of usability remains largely unexploited, despite its great potential. This seems especially so in e-commerce/e-business, where the customers are increasingly non-technical consumers who won't suffer technical difficulties gladly.

Better notices in the media

The media have discovered the connections among usability, productivity and cost-effectiveness, especially on the Internet. Companies are nowadays taken to task about usability regularly in the hard copy of business publications and on the electronic pages of e-business sites. *Business Week* recently asserted, "Companies have paid lip service to ease of use.... But... [t]o get wider dispersion, manufacturers have to make PCs and their software as user-friendly as toasters." [22] *CIO Business Web Magazine* pointed out recently, "On a corporate intranet, poor usability means poor employee productivity; investments in making an intranet easier to use can pay off by a factor of 10 or more, especially at large companies." [9] If the media are aware, can the shareholders be far behind?

In 1993, Nielsen studied the attention devoted to usability issues in the trade press reviews of new software products and found approximately 18-30% of the accounts in press reviews were usability-related. Another study found an average of 11.2 usability-related comments per review. [1]

A good review in an industry publication can be worth millions in advertising. [13] Such reviews are increasingly including usability as a criterion in their reviews. One of *Internet Week*'s most popular columns, for example, features user interface design and usability specialists discussing the relative usability of various e-commerce and e-business sites.

Reduced development and maintenance costs

Focusing on real user needs and knowing what you're designing, and for whom, can mean fewer design arguments and fewer iterations. Usability techniques allowed a high-tech company to reduce the time spent on one tedious development task by 40%. [1] At another company, usability techniques helped cut development time by 33-50%. [2]

Companies that develop information-technology systems for internal use (like PGS in the scenario) can often reduce development, support, training, documentation and maintenance costs by applying usability engineering techniques.

These techniques are quite effective at detecting usability problems early in the development cycle, when they're easiest and least costly to fix. By correcting usability problems in design phase, American Airlines reduced the cost of those fixes by 60-90%. [1] One rather famous study found that once a system is in development, correcting a problem costs 10 times as much as fixing the same problem in design. If the system has been released, it costs 100 times as much relative to fixing in design. This study also found that 80 percent of software life-cycle costs occur during the maintenance phase. Most maintenance costs are associated with "unmet or unforeseen" user requirements and other usability problems. [18]

Software development projects in both IT and commercial software environments often overrun their budgets and schedules. [1] Such overruns are often caused by overlooked tasks and similar problems, issues that usability techniques like user analysis and task analysis are eminently capable of addressing. Usability work has even enabled the release of a product ahead of schedule. [8]

Developers of commercial software also stand to benefit greatly from usability. Whether a company does usability testing or not, its customers will, in effect, usability test the system. However, correcting problems after a system has been released can be 100 times more costly than correcting them prior to release. [14; 19]

A certain printer manufacturer, for example, released a printer driver that many users had difficulty installing. Over 50,000 users called support for assistance, at a cost to the company of nearly $500,000 a month. To correct the situation, the manufacturer sent out letters of apology and patch diskettes (at a cost of $3 each) to users; they ended up spending $900,000 on the problem. No user testing of the driver was conducted before its release.

"[T]he problem could have been identified and corrected at a fraction of the cost if the product had been subjected to even the simplest of usability testing," wrote the researcher. [1]

Improved productivity and operational efficiency

People tend to be more productive using usability-engineered systems. One company showed a 25% increase in throughput and a 25% reduction in user errors after screens were redesigned according to usability principles. [1]

With its origins in human factors, usability engineering has had considerable success improving productivity in IT organizations. For instance, a major computer company spent $20,700 on usability work to improve the sign-on procedure in a system used by several thousand people. The resulting productivity improvement saved the company $41,700 the first day the system was used. On a system used by over 100,000 people, for a usability outlay of $68,000, the same company recognized a benefit of $6,800,000 within the first year of the system's implementation. This is a cost-benefit ratio of $1:$100. [1]

Increased productivity may also mean that it's possible to do as much, or more, with fewer people. One company saw its data-entry staff decrease by a third after usability improvements to the system. [1]

Difficult systems can also be stressful to use. Alan Cooper, the "father of Visual Basic," worked on a project to improve the usability of an airline in-flight entertainment (IFE) system. IFEs are essentially computers connected via a local area network that provide seatback movies and music to travelers on transoceanic routes.

One airline's IFE was so frustrating for the flight attendants to use that many of them were bidding to fly shorter, local routes to avoid having to learn and use the difficult systems.... [T]he time-honored airline route-bidding process is based on seniority....[T]hose same long-distance routes have always been considered the most desirable....For flight attendants to bid for flights from Denver to Dallas just to avoid the IFE indicated a serious morale problem. [5]

People try to avoid using stressful systems; if they must use them, stress tends to undermine their productivity. As Cooper's anecdote illustrates, poor usability may undermine morale. It can lead to turnover. Employee turnover costs can be significant; they equal one-and-a-half times the employee's salary, according to one study. [1]

Reduced training costs

Usability-engineered systems frequently require less training. When user interface design is informed by usability data and expertise, the resulting user interfaces often facilitate and reinforce learning and retention, thereby reducing training time. As usability expert Jakob Nielsen has pointed out, "Every hour you can cut off user training is one hour more for productive work and one hour less to pay an instructor." [13]

At one company, end-user training for a usability-engineered internal system was one hour compared to a full week of training for a similar system that had no usability work. Usability engineering allowed another company to eliminate training and save $140,000. As result of usability improvements at AT&T, the company saved $2,500,000 in training expenses. [1]

Lower support costs

The cost of providing telephone support for computer software has been estimated between $12 and $250 per call, depending on the organization. [21] Support costs can add significantly to an internal IT system's total cost of ownership. Usability engineering can help keep support costs in line as well. For example, after spending $70,000 to build a usability lab (a one-time cost) and usability test an accounting system used by car dealerships, Ford Motor Company got support calls down to zero. The initial saving was estimated to be worth $100,000. [1] Presumably, the benefits of the reduction in calls continued to be realized in subsequent years.

When a software product is understandable and easy to learn, users don't need to call support as often. This means that commercial software companies need fewer people to work the support lines. (And perhaps fewer DJs to entertain those on hold.) At Microsoft

several years ago, Word for Windows's print merge feature was generating a lot of lengthy (average = 45 minutes) support calls As a result of usability testing and other techniques, the user interface for the feature was adjusted. In the next release, support calls "dropped dramatically"; Microsoft recognized "a significant cost savings." [1]

Reduced documentation costs

Because their user interfaces tend to be predictable, consistent and coherent, usability-engineered systems are often easier to create user documentation for than other systems. Documentation that's easier to create is written more quickly and is less liable to inaccuracies. Usability-engineered systems often require less documentation. This means that usability-engineered systems can be less costly to document than systems developed without usability. Usability work eliminated the need to reprint and distribute a manual, saving one company $40,000 in one year. [1]

Litigation deterrence

Although software makers don't seem liable to the same sorts of litigation as, for example, a manufacturer of medical equipment may be, there is some risk of poor usability being an element in lawsuits and other actions.* For example, the Standish Group reported that American Airlines sued Budget Rent-A-Car, Marriott Corp. and Hilton Hotels after the failure of a $165 million car rental and hotel reservation system project. Among the major causes of the project's disintegration were "an incomplete statement of requirements, lack of user involvement, and constant changing of requirements and specifications," all issues directly within usability's purview. [20]

Though applying usability techniques in a software development project is no guarantee against lawsuits, as consultant Charles L. Mauro remarked, "It is hard to imagine that a plaintiff's attorney would push to trial knowing that a corporation had employed professional usability engineering methods in the design of their products .... usability [is] a litigation deterrent." [1]

How to benefit from usability

Benefiting from usability requires a company to develop or acquire usability expertise. Training existing staff in usability can be helpful, although it's often more effective to hire usability professionals as regular staff or consultants. The following usability engineering techniques may be regarded as "the basics" of usability work:

• User and task analysis
• Usability testing
• Adopting a development process that can incorporate usability engineering

Conclusion

The evidence for usability's cost-effectiveness is strong. Moreover, the likely beneficiaries of usability are not just end-users; organizations that develop software and Internet applications may benefit significantly from usability engineering. Performing usability cost-benefit analyses within one's own company may be a first step toward introducing usability engineering techniques into a company.

Usability is good business. Working to improve usability via the techniques of usability engineering, such as user analysis, prototyping and usability testing, can result in significant economic benefits to companies that develop IT applications, e-commerce sites and commercial software. Users of these systems benefit as well.

Appendix A—Usability Beneficiaries and Benefits

The following table lists a number of potential benefits of usability engineering. The tables are organized by type of development organization and the benefits most likely to accrue to the various parties associated with the respective organization.

Beneficiaries	Benefits

Organizations developing IT systems for internal use	Better productivity
	    Reduced development, support, training, documentation and maintenance costs
	    Reduced development time
	    Fewer maintenance releases
	    Better operational efficiency
	    Enhanced capability to develop strategic new systems
	Increased employee job satisfaction
	    Lower turnover rates
	    Reduced personnel costs

Internal development teams within such organizations	Better productivity
	    Early detection and prevention of usability problems
	    Reduced development time
	    Less rework
	    Fewer maintenance releases
	Increased job satisfaction

Support staff within such organizations	Better productivity
	    Fewer callers
	    Fewer or no training classes
	    Better documentation
	    Less need to consult documentation
	    Time to focus on other productive tasks
	Increased job satisfaction

Documentation developers within such organizations	Better productivity
	    Less documentation to create
	    Reduced document development time
	    Fewer or no training classes
	    Time to focus on other productive tasks
	Increased job satisfaction

Users of such systems within these organizations	Better productivity
	    Fewer errors
	    Fewer support calls to make
	    Fewer or no training classes
	    Better documentation
	    Less need to consult documentation
	Increased job satisfaction
	    Reduced frustration
	Satisfaction with system

Organizations developing their own web sites, intranets and extranets	**Benefits applying to all such usability-engineered development efforts**
	Better productivity (both from developers and internal intranet users)
	Reduced development, support, training, documentation and maintenance costs
	Reduced development time for web site, intranets, extranets
	Fewer updates required
	Better operational efficiency
	Increased capability to pursue other profitable ventures
	Increased employee job satisfaction
	Lower turnover rates
	Reduced personnel costs
	Satisfaction with respective sites
	Advertising value
	Decreased litigation risk
	Additional benefits specific to corporate web site
	Enhanced marketing value from site visitors' satisfaction with site
	Increased potential for new business from potential clients
	Enhanced public image
	Additional benefits specific to corporate extranet
	Better relations with clients accessing extranet from their satisfaction with site
	Increased potential for further business with these clients
	Increased potential for new business via referrals from clients
Development teams of web sites, intranets and extranets within such organizations	Better productivity
	Early detection and prevention of usability problems
	Reduced development time
	Less rework required
	Fewer updates
	Increased job satisfaction
Documentation developers within such organizations	Better productivity
	Less documentation to create
	Reduced document development time
	Fewer or no training classes
	Time to focus on other productive tasks
	Increased job satisfaction
Internal users of the web site and intranets within such organizations	Better productivity
	Rapid location of information
	Reduced need to phone for information
	More efficient use of time
	Increased job satisfaction

External client organizations having extranet access	Reduced frustration
	Satisfaction with sites
	Satisfaction with site and service provided by development organization
	Better operational efficiency
	    Increased capability to pursue other profitable ventures
	Increased employee job satisfaction
	    Lower turnover rates
	    Reduced personnel costs

Users within the external client organization having extranet access	Better productivity
	    Rapid location of information
	    Reduced need to phone for information
	    More efficient use of time
	Increased job satisfaction
	    Reduced frustration
	Satisfaction with site

External users of the web site, among the general public and within external client companies	Better productivity
	    Rapid location of information
	    Reduced need to phone for information
	    More efficient use of time
	Increased job satisfaction
	    Reduced frustration
	Satisfaction with site

Organizations developing e-commerce sites, intranets and extranets for external client organizations	Better productivity
	    Reduced development, support, documentation and maintenance costs
	    Reduced development time
	    Fewer updates required
	    Better operational efficiency
	    Increased capability to pursue other profitable ventures
	Increased employee job satisfaction
	    Lower turnover rates
	    Reduced personnel costs
	Client satisfaction
	    Improved client relations
	    Increased potential for doing new business via referrals from clients
	Marketing advantage over non-usability-aware competitors
	Advertising value
	Decreased litigation risk

Development teams within organizations doing such development	Better productivity
	    Early detection and prevention of usability problems
	    Reduced development time
	    Less rework required

Documentation developers within such organizations	Fewer updates
	Increased job satisfaction
	Better productivity
	    Less documentation to create
	    Reduced document development time
	    Fewer or no training classes
	    Time to focus on other productive tasks
	Increased job satisfaction

Sales, marketing and advertising groups within such organizations	Increased system marketability Additional "feature" to mention in product literature Increased job satisfaction

Client organizations for which these sites/systems were created	**Corporate web sites**
	Satisfaction with site and service provided
	Enhanced marketing value
	    Increased potential for new business
	    Enhanced public image
	Increased capability to pursue other profitable ventures
	Advertising value
	Decreased litigation risk
	Intranets
	Better productivity
	Better operational efficiency
	Increased capability to pursue other profitable ventures
	Increased employee job satisfaction
	    Lower turnover rates
	    Reduced personnel costs
	e-commerce sites and extranets
	    Client/customer satisfaction
	    Better client/customer relations
	    Increased potential for further business with existing clients/customers
	    Increased potential for new business via client/customer referrals
	    Increased potential for new business via potential new clients/customers
	Advertising value
	Decreased litigation risk

Users within the client organization (of intranets and company web sites, for example)	Satisfaction with site
	Better productivity
	    Rapid location of information
	    Fewer calls for information
	    More efficient use of time

External users of the sites/systems (of e-commerce sites, for example)	Increased job satisfaction Reduced frustration Satisfaction with site Rapid location of items and information Efficient use of time Reduced frustration Convenience

Organizations developing commercial software systems	Better productivity
	    Reduced development, support, documentation and maintenance costs
	    Reduced development time
	    Fewer maintenance releases
	    Better operational efficiency
	    Increased capability to pursue other profitable ventures
	    Increased employee job satisfaction
	    Lower turnover rates
	    Reduced personnel costs
	Customer satisfaction
	    Better customer relations
	    Increased potential for further sales to same customers
	    Increased potential for new sales via customer referrals
	    Increased potential for new sales from new customers
	Marketing advantage over non-usability-aware competitors
	Advertising value
	Decreased litigation risk

Development teams within such organizations	Better productivity
	    Early detection and prevention of usability problems
	    Reduced development time
	    Less rework required
	    Fewer updates
	Increased job satisfaction

Support staff within such development organizations	Better productivity
	    Fewer callers
	    Fewer or no training classes
	    Better documentation
	    Less need to consult documentation
	    Time to focus on other productive tasks
	Increased job satisfaction

Documentation developers within such organizations	Better productivity
	    Less documentation to create
	    Reduced document development time
	    Fewer or no training classes

Sales, marketing and advertising groups within such organizations	Time to focus on other productive tasks Increased job satisfaction Increased system marketability Additional "feature" to mention in product literature Increased job satisfaction

Organizations purchasing the commercial software for internal use	Better productivity
	    Reduced support and training costs
	    Better operational efficiency
	    Increased capability to pursue other profitable ventures
	    Increased employee job satisfaction
	    Lower turnover rates
	    Reduced personnel costs

Internal support staff within such purchasing organizations	Better productivity
	    Fewer callers
	    Fewer support calls to make
	    Fewer or no training classes
	    Better documentation
	    Less need to consult documentation
	    Time to focus on other productive tasks
	Increased job satisfaction

Internal documentation developers within such organizations	Better productivity
	    Less documentation to create
	    Reduced document development time
	    Fewer or no training classes
	    Time to focus on other productive tasks
	Increased job satisfaction

Users of the commercial software within the purchasing organization	Better productivity
	    Fewer errors
	    Fewer support calls to make
	    Fewer or no training classes
	    Better documentation
	    Less need to consult documentation
	Increased job satisfaction
	Reduced frustration
	Satisfaction with system

Users of the commercial software purchasing it for personal use	Better productivity
	    Fewer errors
	    Fewer support calls to make
	    Fewer or no training classes
	    Better documentation (Fewer "Dummy" books to buy)
	    Less need to consult documentation
	Reduced frustration
	Satisfaction with system

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