



## ROI on Usability: A Business Perspective



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## 1 Purpose

This document covers extensively the parameters based on which Return On Investment (ROI) on Usability can be calculated during projects. It defines the ROI metrics, lists out the business values and highlights some of the examples of organizations worldwide that have invested in usability during projects and how they have reaped benefits.

## 2 Overview

Usability engineering is a well-defined process that is performed as part of the application development process. It can be part of the development process of any type of electronic information application. Although each development project is different, the approaches, methods, techniques and activities applied to achieve usability do not vary much.

The benefits of usability are many:

- An increase in user acceptance
- An increase in revenue through web presence
- Decrease in training and support
- Decrease in rework time

The million-dollar question that often faces usability practitioners is how to translate usability into hard cash and business sense? There are specific parameters through which ROI on usability can be calculated, but before that, here are a few statistics that make planning ROI on usability a must in every project:

- One [well-known] study 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. (*Pressman, 1992*)

- Martin and McClure found that \$20-30 billion was spent worldwide on maintenance. Studying backlogs of maintenance work shows that an "invisible" backlog is 167% the size of the declared backlog. Anonymous case study data show that internal development organizations are spending the majority of their resources on maintenance activities and thus cannot initiate development of strategic new systems. (*Martin & McClure, 1983*)
- Sun Microsystems has shown how spending about \$20,000 could yield a savings of \$152 million dollars. Each and every dollar invested could return \$7,500 in savings. (*Rhodes, 2000*)
- 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) (Wixon). 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. (*Bias & Mayhew, 1994*)
- 63% of software projects exceeded their estimates with the top four reasons all related to product usability:
  - Frequent request for changes by users
  - Overlooked tasks
  - Users lack of understanding of their own requirements
  - Insufficient user to analyst communication and understanding

### 3 Calculating specific project ROI

A large banking application, with 5000 users across the world and an ability to process loan applications 8 hours a day needs usability evaluation done. The ROI would be calculated in the following ways:

- Assuming that the usability test is done and there are 5 problems discovered.
- If the 5 problems are fixed during the prototype stage, it will save the users an average of 1 minute per problem
- So it will save users 5 minutes for all the problems per day.
- There are 5000 users accessing the software. Which means 5000 users x 5 minutes = 25,000 minutes a day.
- Assuming that the application is used for 5 days a week, which translates into 125,000 minutes a week being saved.

- The bank works 50 weeks a year, which means 6,250,00 minutes a year being saved.
- This is 104,166 hours per year being saved.
- Using a loaded labor rate of \$15/hour that means the savings in \$ from time alone is \$1,562,490
- Expected life of project is 5 years. Even if we take 3 years, it turns up to \$4,687,470
- Then savings costs on training, on development time for not having fixed later, on help desks etc.... the grand total for savings come up to \$11,000,000 over the life of the project for spending less than \$40,000 on the project.

## 4 ROI Metrics

Some of the metrics that can be used for calculating ROI are listed below. Since all products have differentiating factors, the metrics that impact the most should be used while assessing the ROI of a product/project.

ROI Measurement Parameters	
ROI Measurement	Criteria
Conversion rate	# of visitors who buy or % increase
Average order value or net dollar per visitor	\$\$\$
Increase in pages viewed	# or % increase
Decrease in drop-off	# of people or % reduction
Decrease in typical # of calls to help desk	# or %
Reduction in training	# of days/hours reduced
Increase in usage	# of people, 3 times, or % increases
Savings of user's time	# of minutes/hours and /or multiplied by labor rate
Savings of programmer's time	# of minutes/hours and/or multiplied by labor rate
Error reduction	# or % and resulting \$\$ amount if any

### ROI Calculation Examples:

Productivity
<b>(Time Saved) x (Employee Cost) x (# of employees) = Cost Savings</b>
(1 hour a week) x (\$30/hour) x (1000 employees) = \$30,000 per week = \$1,500,000 a year

Errors
<b>(# of errors) x (Average Repair Time) x (Employee Cost) x (# of employees) = Cost Savings</b>
(2 errors/week) x (60 minutes) x (\$30/hour) x (100 employees) = \$60,000 per week = \$3000,000 per year

Cost of Development and Maintenance
<b>(# of changes) x (Avg. hours per change) x (cost of developer) x (4, if change is late) = Cost Savings</b>
(20 changes) x (8 hours each) x (\$40/hour) = \$6,400 if fixed early, or \$25,600 if changed late

## 5 Case study snippets

- **Redesign of an online office supplier retailer's website**

An US based online office supplies retailer had a drop off rate of 55,000 visitors per month from the registration page. After the site was redesigned, the drop off rate got reduced by 73%. They saved 40,000 users and \$6,000,000 per month. In addition, they had a 67% increase in repeat customers.

- **Designing an interface that reduced help support desk calls**

A leading US energy company got an application developed for internal implementation. Typically help support desk calls after a new application is launched internally is normally 300 calls a day for at least the 1<sup>st</sup> month. The new intranet application had 0 calls.

Reduction of 300 calls a day x 20 days for the 1<sup>st</sup> month = reduction of 6000 calls x \$10/call=\$60,000. (Industry estimate is between \$12 and \$225 per call!)

- **Revamping the intranet to improve productivity & reduce operating costs**

Mitre Corporation, launched a collaborative component to their intranet, called Mitre Information Infrastructure. Adding the component required substantial usability expertise

to seamlessly integrate the new component into the pre-existing intranet, yet they have seen a substantial ROI even with such a large investment. To date, Mitre has invested \$7.2 million in the MII, netting an ROI of \$62.1 million in reduced operating costs and improved productivity.

## 6 Business Value

The usability landscape is dotted with well-documented examples of cost savings through investment in usability. These statistics serve as benchmarks.

### **Value proposition: High return on savings and product usability**

#### *Some statistics*

“The rule of thumb in many usability-aware organizations is that the cost-benefit ratio for usability is \$1:\$10-\$100. 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.” (Gilb, 1988)

“The average user interface has some 40 flaws. Correcting the easiest 20 of these yields an average improvement in usability of 50%. The big win, however, occurs when usability is factored in from the beginning. This can yield efficiency improvements of over 700%.” (Landauer, 1995)

### **Development: Reduce Costs**

Usability engineering is most effective at the beginning of the product development cycle, especially if it is part of quality functional deployment (QFD), a process used for structuring the development process through a primary focus on customer requirements. Through QFD, reducing development time by one-third to one-half is possible (Scerbo, Bosert, 1991). For example, for new products there is no investment in any particular design, and numerous possibilities can be explored at relatively little cost (Bias & Mayhew, 1994) Applying human factors in the initial design can greatly reduce extensive redesign, maintenance, and customer support, which can substantially eat away profits.

Short-term benefits can accumulate during product development and long-term benefits during product release. Customers directly benefit by usability improvements by increases in ease of use, ease of learning, user satisfaction, and user productivity. At the same time, decreases occur in the number of “user” errors, costs for training and support, and maintenance. Taking proactive measures in usability and quality during the initial production stages can produce a cost saving rippling effect.

## **Value proposition: Save development costs**

### *Some Examples*

“Savings from earlier vs. later changes: Changes cost less when made earlier in the development life cycle. Twenty changes in a project, at 32 hours per change and [a minimal] hourly rate of \$35, would cost \$22,400. Reducing this to 8 hours per change would reduce the cost to \$5,600. Savings = \$16,800.” (Human Factors International, 2001) “A financial services company had to scrap an application it had developed, when, shortly before implementation, developers doing a User Acceptance test found a fatal flaw in their assumptions about how data would be entered. By this time, it was too late to change the underlying structure, and the application never implemented.” (Dray, 1995)

### *Some Statistics*

“When managers were polled regarding the reasons for the inaccurate cost estimates, the top four reasons were issues that could have been addressed by following best practices in usability engineering. These include frequent requests for changes by users, overlooked tasks, users’ lack of understanding of their own requirements, and insufficient communication and understanding between users and analysts.” (Barker, 2000)

“A study of software engineering cost estimates showed that 63% of large software projects significantly overran their estimates (Nielsen, 1993). When asked to explain their inaccurate cost estimates, software managers cited 24 different reasons and, interestingly, the four reasons rated as having the highest responsibility were related to usability engineering. Proper usability engineering methodology will prevent most such problems and thus substantially reduce cost overruns in software projects.” (Nielsen, 1993)

## **Value proposition: Save development time**

### *Some Examples*

“Usability techniques allowed a high-tech company to reduce the time spent on one tedious development task by 40% (Bias & Mayhew, 1994). At another company, usability techniques helped cut development time by 33-50%.” (Bosert, 1991)

### *Some Statistics*

“Conklin (1991) states that speeding up development is a key goal for integrating usability effectively into product development and that a one quarter delay in bringing a product to market may result in the loss of 50% of the product’s profit.” (Bias & Mayhew, 1994) “Increased revenues accrue due to the increased marketability of a product with demonstrated usability, increased end-user productivity, and lower training costs. Conklin (1991) states that another usability goal is speeding up market introduction and acceptance by using usability data to improve marketing literature, reach market influencers and early adopters, and demonstrate the product’s usability and reduced training cost.” (Bias & Mayhew, 1994)

### **Value proposition: Reduce maintenance costs**

#### *An Example*

“[Usability engineering techniques] are quite effective at detecting usability problems early in the development cycle, when they are easiest and least costly to fix. By correcting usability problems in the design phase, American Airlines reduced the cost of those fixes by 60-90%.”

(Bias & Mayhew, 1994)

#### *Some Statistics*

“One [well-known] study 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.” (Pressman, 1992)

### **Sales: Increase Revenue**

Usable products lead to substantial cost savings and sales. Unusable products most often prevent a customer from accomplishing a productivity task or retrieving information necessary to make an ecommerce purchase. Online shoppers spend most of their time and money at Websites with the best usability (Nielsen, 1998). Good navigation and Website design make it easier for users to find what they’re looking for and to buy it once they’ve found it (Donahue, 2001). Because there are so many poorly designed Websites, when customers find one that “works”, they tend to do repeat business and gain trust in the organization. Usable products also lead to good product reviews. Publications devote space just to this one factor, and good reviews lead to increased sales.

### **Value proposition: Increase transactions/purchases**

#### *Some Statistics*

“You can increase sales on your site as much as 225% by providing sufficient product information to your customers at the right time. In our recent research, we found that the design of product lists directly affected sales. On sites that did not require shoppers to bounce back-and-forth between the list and individual product pages, visitors added more products to their shopping cart and had a more positive opinion of the site. By understanding your customer expectations and needs, and designing your product lists accordingly, you can significantly increase your sales.” (User Interface Engineering, 2001)

“One study estimated that improving the customer experience increases the number of buyers by 40% and increase order size by 10%.” (Creative Good, 2000)