

## SOFTWARE METRICS- USABILITY AND EVALUATION OF SOFTWARE QUALITY

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### Abstract:

This research explains the results of a conducted study at consultancy of “usability”. This research about usability provides that the performance of the usability activities is very much profitable within a software development life cycle (SDLC). It is needs to be done due to the cost sowings from the better usability may not always directly. The first goal of the science was to find which are good to measure benefit and cost in visible for a development organization. During the research it is investigated what kind of method for cost benefit calculations can be used for qualifying usability activities in a software development process (SDLS). This research is using most suitable calculation methods found during study. In software engineering, Baan this usability qualification activities within the process of development process can be presented, the sound scientific goal was to make and abstract like usability which is “Suitable” in dollars for a Consort qualification. It is find out if usability activities one beneficial on software products to perform. The purpose of first goal was to find out which methods of cost benefit calculations can be best used to quantity there usability activities. The purpose of second goal was to quantity usability Consultants activities in terms of calculation of cost and there benefits. The purpose of third goal was to give them advises for the bitterness of the usability activities when taking our benefit of Cost in Consideration. The purpose of a goal was to make a description of which beneficial used model for this research. Key factors: methods of cost benefit calculation; Usability Cost Justification, Usability.

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## **INTRODUCTION:**

Usability is qualitative attributes that define how much easy the use of user interfaces is. This word “usability refers the method for the improvement of easy-of-use during the process of the design professor of the computer Séance and usability Consultants have written (Separately) above a system acceptability from work , where it is the part of the “usefulness” Usability is associated often with functionalities of the product. For usability when evaluating user interfaces, the definition can be very simple as “the Perception of target of efficiencies effectiveness of the interface”. Measurement of each component may be measured subjectively against criteria e.g. User interface design, to provide a metric often expressing as a percentage usability engineering and usability testing. Testing of usability measurement of ease of use of a piece of software or a product. Usability Engineering is a design or a basic research that ensures a software or product with good usability. Usability is example of non-functional requirement, Usability cannot measure directly. (Briand et.al., 2006)

## **METHODOLOGY:**

We present Inventory of usability activities within Baan. Firstly we give overview bean organization by which the means of charts of the organization within the bean organizations within the Baan development empathize then Baan Development follows, when and where theirs Baan methodology. Method plays a cry important role. Here we will discuss about what exactly is done in which stage or phase of the process development in which phase usability or performed Baan usability with in the development process of Baan ore highlighted in the next section. After this we will make Classification of all these usability’s activities. Then attitude toward these usability activities Baan organization Investigated. Finally, I will explain how project management loud, works, since this is the level at which usability activities are assigned to the project. (Folmer et.al., 2005),

## **D Method:**

Baan Consultant of usability Consultant is performing these usability activities, which are all based on several methods within the Baan development process. Demethod is a methodology

which consist of activities and methods that can (should) be performed in product development process. These usability activities are performed on some products in development process. Introduction of the main important conceptual figure 1, provides an overview of terminology roles and terminology which are used in Demethod (Keenan, 2006).

From this figure it can be resulted that a project model within Baan contains work products. These work products exactly define results or outcomes of the development process that are expected by the work supported by the tutorials.

Work products used by roles are the very important process description.

The phases represent a waterfall model. Most of the line project teams are not remaining to the previous stages due to the role of lack of time, but it is possible.

The requirement stage, in the requirement to main questions must be answered.

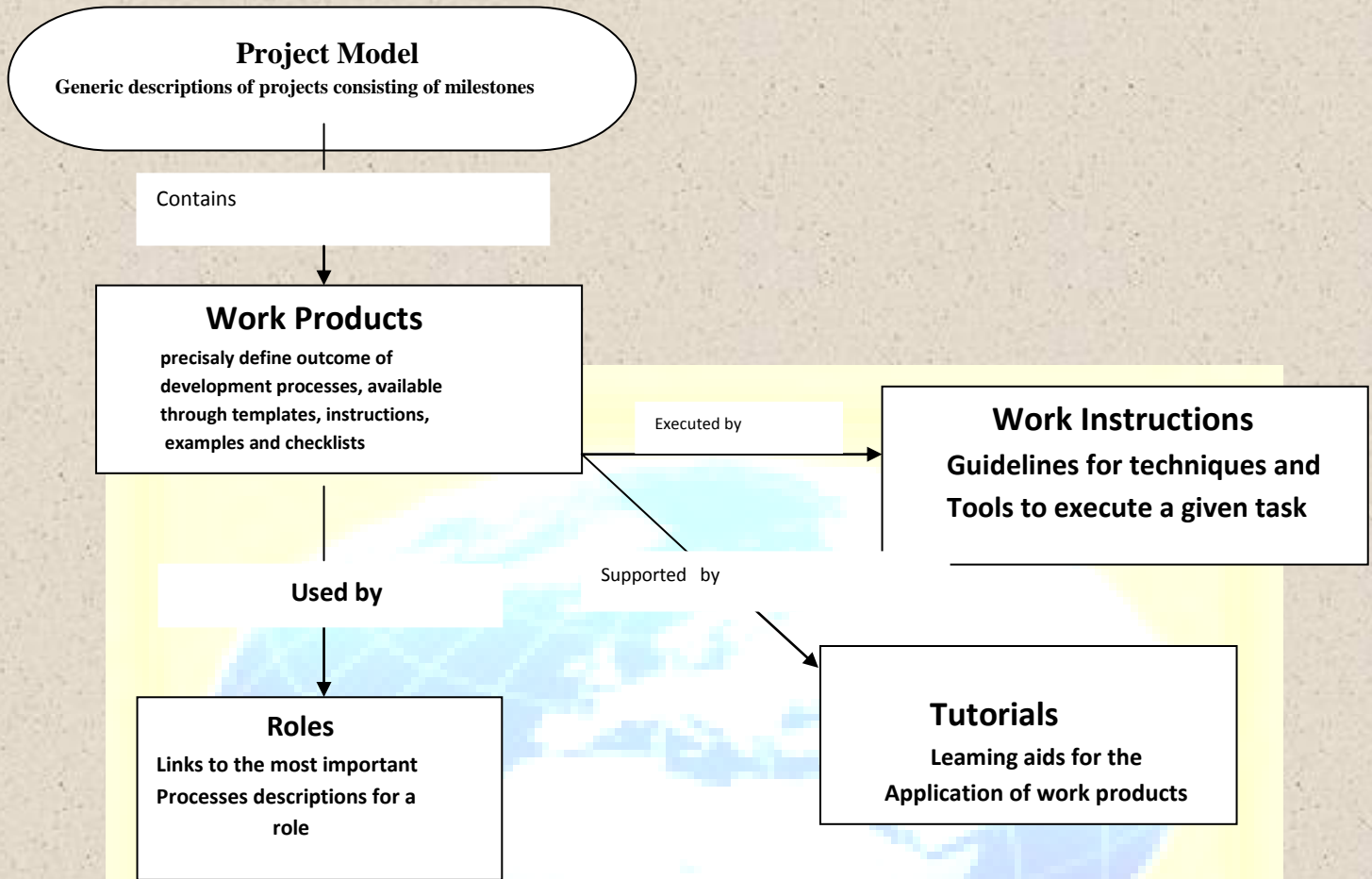
What Baan development is going to make?

When should Baan development have their products available?

The following activities have to take place?

- Version Definition composed.
- Beginning of project plan created.
- Written Conceptual Solutions.
- Do edited documents, reviewed approval.
- Work products.
- Versions Definition (VD): Define explain the new functionality for a new Version are product.
- Conceptual section (C.S.) a deleted explained of the functionality by a business perspective.
- Project plan defines the objective.

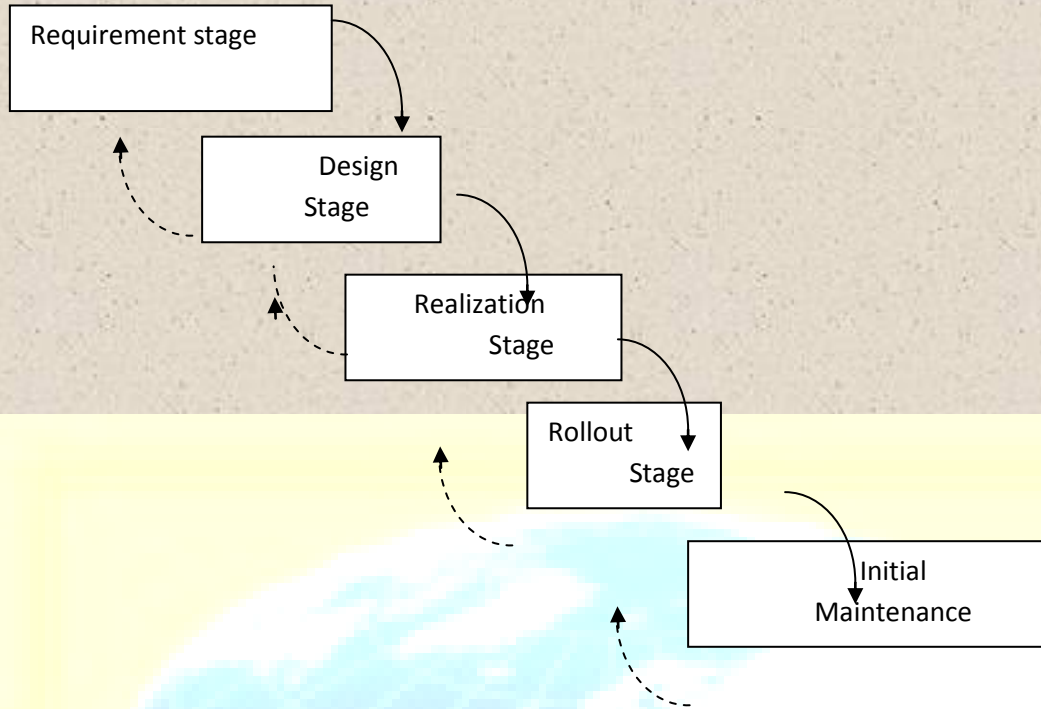
Scope time schedule Organization and so on.



**Figure 1: D Method**

**Stages in the development process:**

The main stages of a standard project are presented in figure 2. The stages represent a waterfall model. Most of the time the development teams are not returning to previous stages, due to lack of time, but it is possible.



**Figure 2: The stages of a standard project**

**The Design stage:-**

During this phase the how” like work will be answered. Technical and functional description of the product are soften will be mode the following activities have to take place.

- Design written.
- Project plan updated.
- Designs to edited and expected.

**Work products:-**

Definition study: is based on VD and gives are outline of the functionality of the product.

- Functional design-a deleted elaboration of design of the functionality is designed in DS and es.

**The realization stage:-**

- Code is to written, testing and documented in this phase or stage.

**Work products:-**

- Software is projects.
- Testing of the Date (TDA)
- User Documentation (VD) Documents written in English for a release development process.
- Project plan

**The Testing stage:**

Two different kinds of test is to exacted Integration and system test activities are to perform. Integration between unit testing, user written documents, documentation and software translation.

**Roll Out Stage**

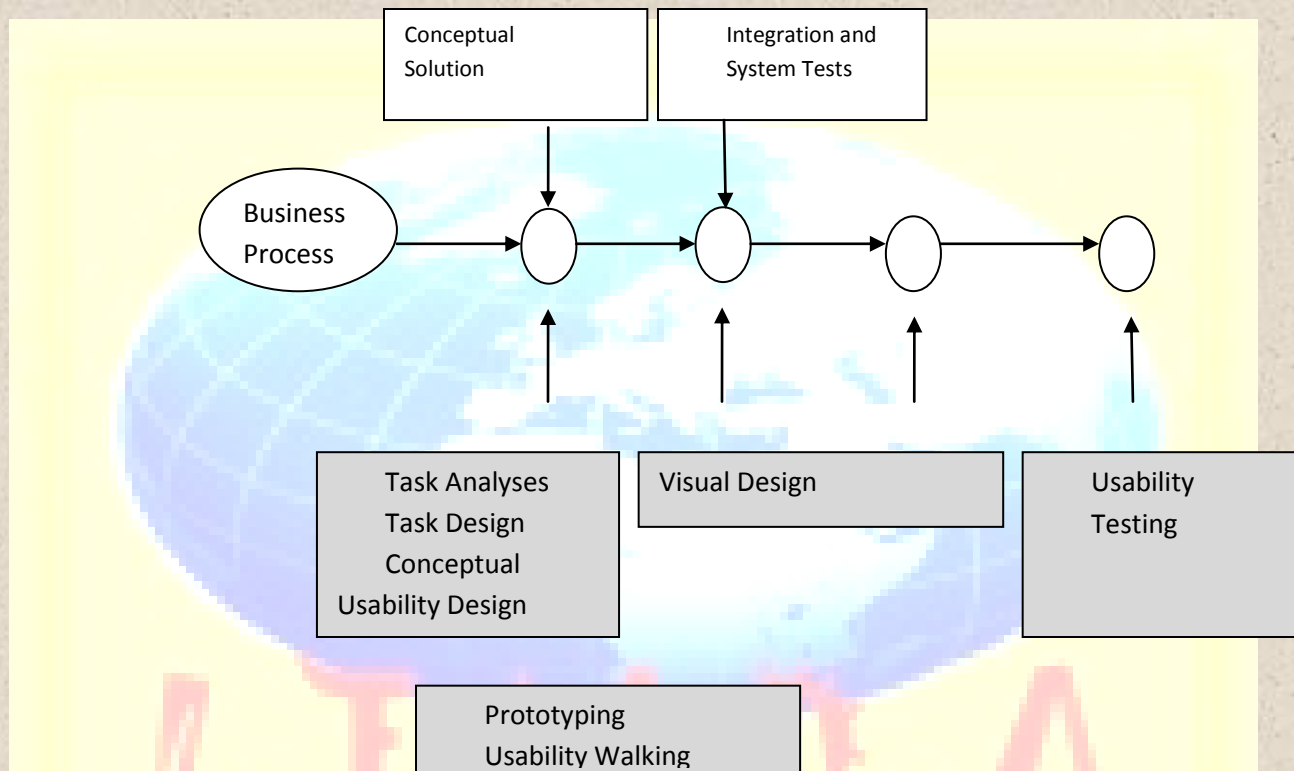
This stage Contains acceptance of the new Version, exchange of knowledge, creating the tapes and, CDs contains the new package activities to perform

- Support Center.
- Creation of media.
- Support Centre.
- Work products.
- Trained people.
- Material for training.
- Release Acceptance.
- New Release tape/CD

**Initial Maintenance stage.**

In this phase during the initial part the answered of questions of the customers, response to the customer support and fixing of bug is done and in the next part of this phase e.g Baan development (BD) is not involved. The project engineers (PEG) group Can do this.

*DMethod >*



Usability activities positioning within Baan. We have a closes look of usability tasks by means of questionnaire four on usability activities. We also have to take a look as position for usability within entire organization by this way can say what attitude of employs at Baan organization regarding Usability.

**Questionnaire positioning of activities Usability within Baan organization.**

Questionnaires” Usability activities positioning within Baan” and results can be found and filled one consultant of Usability. This consultant had very high level knowledge that was the need to fill the questionnaire like this of the Usability within Baan. The outcomes and result was

this usability Consultancy at organization is in stage 2” Curiosity. During this stage it can be classify organization that are beyond uncertainty.

The result or Consolation that can be drawn by this question is “grass roots effort” is the levee which is according within the Baan organization regards usability. It means that only individual and some middle support of management user design centered within Baan (Hong et.al., 2008).

## **Results and Discussion:**

### **Overview**

There are different advantage and disadvantage in different research option for our research at Baan. It’s possible that by the theatrical point of view selection of one research is better than the rest. Because there is few available data is at Baan Carryout particular options that and so that another option must have to take to perform this analysis.

### **Usability activities**

Firstly I have to answers questions of our research. About Usability activities which performed by the Consultants of Usability within Baan. The questions are” what are methods which are use apply Usability activities within in Baan development process?” and what usability activities which are used by the consultants of Usability perform in the development process of Baan?”

### **Answer of methods using results**

Secondly, I will answered questions of our research regarding to the methods that are used. The questions which we asked by us regarding calculation methods were” what methods are available for the measurement of Cost of the Usability engineering? Which methods available for the measurement of the benefits of Usability engineering? How much easy to use these methods?” Calculations, methods Reception Cost were not used by the consultant of Usability at Baan. From point view three categories of methods can apply to calculate the cost and to Calculate the benefit of the Usability engraining. All the methods in theory found were very easy to use. However in practice in a lot of methods could not be applied due to the lock of all the



kinds of hands data which available at Baan organization which was very needed for the methods for use, and important of this is the methods “cash flow” which was not in use within project at Baan and could thus not be calculated by me.

**Distributing benefits by percentage of total worked hours for an activity on Thin Baan**

For each activity a percentage is calculated which reflected what it contributes to the total hours mad for Thin Baan. That percentage is used to calculate the percentage benefits that the task will get from the total benefits.

**Table 1: Distributing benefits by percentage total worked hours for an activity**

Activity Performed On Thin Baan	% Activity cost Of total cost	Total benefits Defensive Scenario (in US \$)	Total benefits Average scenario (in US \$)
Task Analysis	3.18	9,038.20	10,346.45
Task design	3.18	9,038.20	10,346.45
Prototyping	17.12	48,658.46	55,701.63
Usability Testing	0.98	2,785.36	3,188.53
Visual Design	14.67	41,695.07	47,730.3
Icon Design	3.67	10,430.87	11,940.71
Assisting in Realization : Logging change Request	19.55	55,565.01	63,607.88

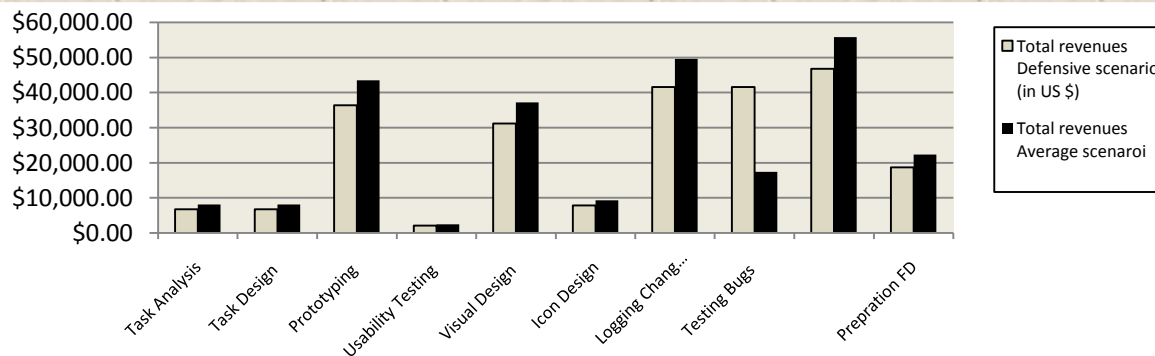
Assisting in Realization: Testing bugs	16.85	19,469.07	22,287.16
Assisting in Realization: Ad hoc Consultancy	22	62,528.40	71,579.20
Assisting in Realization Preparation FD	8.8	25,011.40	28,631.68
<b>Total</b>	<b>100</b>	<b>284,220.00</b>	<b>325,360.00</b>

Subtracting the cost from the benefit of activity revenue for that activity is calculated.

**Table 2. Distributing revenues by percentage of total worked hours for an activity.**

<b>Activity performed On thin Baan</b>	<b>Total Cost Activities (in US \$)</b>	<b>Total revenues Defensive scenario (in US \$)</b>	<b>Total revenues average scenario</b>
Task Analysis	2,275.00	67,63.20	80,71.45
Task Design	2,275.00	67,63.20	80,71.45
Prototyping	12,250.00	36,408.46	43,451.63
Usability Testing	700.00	2,085.36	2,488.53
Visual Design	10,500.00	31,195.07	37,230.31
Icon Design	26,25.00	7,805.87	9,315.71
Logging change Request	14000.00	41,565.01	49,607.88
Testing Bugs	4,900.00	41,569.07	17,387.16

Ad Consultancy	Hoc	15,750.00	46,778.40	55,829.20
Preparation		6,300.00	18,711.36	22,331.68
Total		71,575.00	212,645.00	253,785.00



The benefits can also be distributed via the framework. The difference with the other benefit description model is that only the Usability tasks performed on Thin Baan are taken into concern, but all Usability tasks are taken into consideration.

I have taken the results of the questionnaire which can found and recalculated the number of filled in heuristics in to percentages. So it becomes clear which usability tasks scored the most remarks. Thus for each specific task a “weight” is being calculated. I can assume that the more filled in heuristics a task will score the more effective this Usability task is because it refers to many different (Kinds of) heuristics that one is intending to cover by conducting this Usability task. Identification of Usability task that more effective a task is the larger the part of the benefit and so the revenues it gets assigned to. So this framework serves as a benefit distribution model and a revenues distribution model. The advantage of using this benefit distribution model over the benefit distribution model that uses the percentage of total worked hours for an activity on Thin Baan is that it does not make the assumption that the present situation in the correct one. This is the case when you look that worked hours on a product (Beytepe, 2010). This weight does not show any relation to specific product such as Thin Baan.

**Table: Distributing benefits via the framework**

Activity Performed on thin Baan	# of field in Heuristics	%Heuristics of total field in Heuristics	Total benefits Defensive Scenario(in US\$)	Total benefits Average Scenario (in US\$)
Task Analysis	37	4.790	13,613.59	15,584.12
Task Design	37	4.787	13,605.07	15,574.63
Conceptual Usability design	37	4.787	13,605.07	15,574.36
Prototyping	49	4.339	18,015.99	20,623.75
Usability Walkthrough	101	13.066	37,134.70	42,509.84
Usability Testing	124	16.041	45,589.91	52,188.91
Visual Design	28	3.622	10,294.04	11,784.07
Icon Design	29	3.752	10,663.51	12,207.02
Promoting Usability in General	2	0.295	736.10	8,42.65
Further Embedding of Usability In Demethod	0	0.00		
Usability Reviews	74	9.573	27,207.29	31,145.47
Usability audits	94	12.160	34,559.77	39,562.19
Usability style Guide Usability Audits	47	6.080	17,279.88	19,781.10

Assisting in Realizations	88	11.384	32,354.31	37,037.50
Usability cheek List	26	3.364	9,560.78	10,944.67
Total	773	100	284,220.00	325,360.00

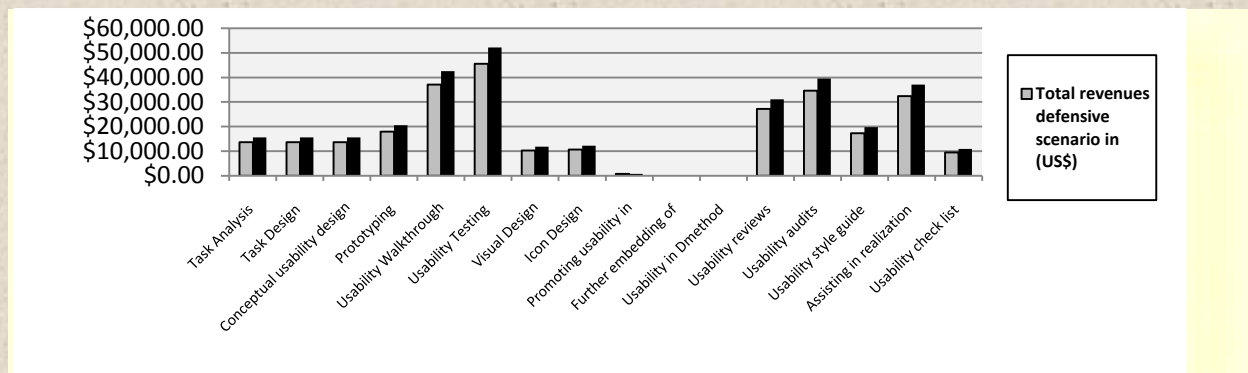
I did not subtract the cost from the benefits in order to arrive at the total revenue for that activity. We did not do this because some usability was not performed on Thin Baan and thus had no costs; therefore we left the total cost activity (TCA) column blank. In this way we can compare each usability activity with another usability activity and not only the activities that had been performed on a product and generated costs. Again no explicit relation with Thin Baan is shown here.

**Table: Distributing benefits via the framework**

	Total revenues defensive Scenario in (US\$)	Total revenues defensive Scenario in (US\$)
Task Analysis	13,613.59	15,584.12
Task Design	13,605.07	15,574.36
Conceptual design Usability	13,605.07	15,574.36
Prototyping	18,015.99	20,623.075
Usability Walkthrough	37,134.70	42,509.84
Usability Testing	45,589.91	52188.91
Visual Design	10,294.04	11,784.07
Icon Design	10,663.51	12,207.02
Promoting usability in General	736.10	842.65
Further embedding of Usability in Demethod		
Usability reviews	27,207.29	31,145.47
Usability audits	34,559.77	39,562.19

Usability Style guide	17,279.88	19,781.10
Assisting in realizations	32,354.31	37,037.50
Usability cheek list	9,560.78	10,944.67
Total	284,220.00	325,360.00

In a more graphical form revenues via the framework of for Ambriola an activity look like this.



**Figure: Revenues via the framework**

All restrictions and comments that we found as a result of distributing our questions on the framework of Keble and are also applicable to this calculation. The most sticking is that due to the fact that there were relatively few people that filled in the tasks “visual design” and “icon design”, these tasks thus scored few remarks which results in a relative low percentage of benefits and thus revenues attributed to these tasks.

The same goes for “Promoting usability in general” and “Further embedding of usability in DMethod.” The usability tasks out here are usability walkthrough, usability testing, usability reviews and usability audits. Also assisting in realization is quite important here.

Our calculation on usability showed positive revenues for Usability Consultancy at Baan. To be precise a revenues of \$ 284,220 for the conservative scenario was reached a revenues of \$ 352,360 for the average scenario was noted. These were gained from activities performed by usability consultant on Thin Baan. It is also interesting look at how these revenues are spilt up over the usability activities. I can conclude that the traditional tasks in a software development life cycle consume the main part of the revenues in the model that distributes the revenues by percentage of total work our for an activity these task are prototyping visual design assisting in

realization. This assumption is not present when revenues are distributed via the framework of Embroil et al. Usability consultant themselves filled in “weight” for each usability activity that can be performed on a product.

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