Budget Plan

Enterprise Software Selection supporting new Supply Management Strategy at Harley-Davidson

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1. Effort estimation

Effort estimation is based on COSYSMO[1] and calculated as follows. An in-depth analysis of person-hours and labor costs is done in section 2 breaking down the effort expected for each activity.

Project system complexity and size is determined as shown in table 1.1.

The majority of the system requirements are *nominal* procurement process' features and do not cause exceptional development costs. Only processes concerning the integration of Harley-Davidson's suppliers require bigger efforts and are therefore expected as being *difficult*.

The resulting system needs to be integrated into Harley-Davidson's existing infrastructure. It must provide suitable interfaces. Among those is an interface for integrating legacy supplier systems, which is rated as *difficult*.

Only standard algorithms are required. No special work is needed here.

Basic process to be integrated are: *procurement management*, *supplier integration*, *warehouse optimization*. None of those is considered as being notably complex.

System size	Easy	Nominal	Difficult
# of System Requirements		5	2
# of System Interfaces	2		1
# of Algorithms			
# of Operational Scenarios	1	2	

Table 1.1: System size according COSYSMO

The project estimation is configured based on the following scale factors.

System Cost Drivers	Level
Requirements Understanding	High
Architecture Understanding	Nominal
Level of Service Requirements	Nominal
Migration Complexity	Very high
Technology Risk	Low

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[1] COSYSMO is part of **Co**nstructive **Co**st **Mo**del II (COCOMO II) and is designed for effort estimation in software projects, http://csse.usc.edu/csse/research/COCOMOII/ and http://diana.nps.edu/~madachy/tools/COSYSMO.php

Documentation	Low
# and Diversity of Installations/Platforms	Nominal
# of Recursive Levels in the Design	Low
Stakeholder Team Cohesion	Very high
Personnel/Team Capability	High
Personnel Experience/Continuity	Nominal
Process Capability	Nominal
Multisite Coordination	Nominal
Tool Support	Nominal

Table 1.2: System cost driver according COSYSMO

Based on those numbers and the COSYS model is an effort of 8 person-month estimated to run the project. Table 1.3 illustrates the effort distribution among the project lifetime.

Estimated effort: **8 person-months**
Estimated cost: **92 004 EUR**   based on average 11 264 EUR per person-month / 64 EUR per person-hour

Phase / Activity	Conceptualize	Develop	Operational Test and Evaluation	Transition to Operation
Acquisition and Supply	0.2	0.3	0.1	0.0
Technical Management	0.3	0.5	0.3	0.2
System Design	0.8	1.0	0.4	0.2
Product Realization	0.2	0.4	0.4	0.3
Product Evaluation	0.5	0.7	1.0	0.4

Table 2.3: Effort distribution (person-month) according COSYSMO

2.   Workforce costs

Based on current salary rates, which are introduced in section 2.2, and the projected activity durations

defined in the Organizational Plan[2] and allocated in section 2.1 are the labor costs calculated and elaborated on in section 2.3. Additional costs are covered later in part 3.

2.1. Working hours

Table 2.1 projects the expected activity duration to the assigned roles and allocates working hours for them based on the calculated efforts from previous chapter.

Activity	Dur.	Project manager	Process analyst	System designer	Legal dept.	Finance dept.	Stake-holders	Executive board
1. Create expert groups	24	24						
2. Perform survey with stakeholders	80	80	80				80	
3. Prepare checklists	40	40	10	40			40	
4. Feedback from internal stakeholders	40	40	40					
5. Develop project specification	160	120		160				
6. Create potential vendor list	24	24						
7. Send invitations to tender	16	16						
8. Organize provider software conference and presentation	72	64	72				40*3[3]	
9. Select top four vendors	80	80	80					
10. Invite potential vendors for interview	24	18	16	24				
11. Prepare product demo test cases	48	8	48					
12. Invite potential vendors for product demo	8	6	8				8	

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[2] Organizational Plan: *Enterprise Software Selection supporting new Supply Management Strategy at Harley-Davidson*, Viktor Karabut and Jan Rehwaldt, March 2012

[3] Stakeholders also participate at providers conference

13. Discuss details and prepare decision	24	24	24	24			20*3[4]	
14. Select final vendor	16	16	16	16				
15. Negotiate contract	24	24			24	24		
16. Sign up contract	4				4			4
Total:	700	600	394	264	28	24	300	4

Table 2.1: Person-hour estimation

2.2. Salary rates

All prices includes taxes and insurance. Costs for workspaces, office equipment and additional resources including illness costs and project-related travel requirements are not considered within salary rates and will be further elaborated on in section 3.

Project manager:	**70 EUR/hour**	This is Bill Moyles's current salary.
Process analyst:	**50 EUR/hour**	This is Joh Gazianos's current salary.
System designer:	**60 EUR/hour**	Average salary on this position.
Bookkeeper:	**45 EUR/hour**	Average salary on this position.
Lawyer:	**62 EUR/hour**	This is Bin Anderson's current salary.
Stakeholders:	**45 EUR/hour**	Average salary of engineers at Harley-Davidson.
Executive board:	**100 EUR/hour**	Average salary of executive board members.

2.3. Total cost of labor

In the following table 2.2 are the expected labor costs broken down per activity and participating resources. All values are in EUR.

Activity	Project manager	Process analyst	System designer	Legal dept.	Finance dept.	Stake-holders	Executive board
1. Create expert groups	1680						
2. Perform survey with stakeholders	5600	4000				3600	

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[4] During finalist selection we will hold a meeting within stakeholders

3. Prepare checklists	2800	500	2400			1800	
4. Feedback from internal stakeholders	2800	2000					
5. Develop project specification	840		9600				
6. Create potential vendor list	1680						
7. Send invitations to tender	1680						
8. Organize provider software conference and presentation	4480	3600				5400	
9. Select top four vendors	5600	4000					
10. Invite potential vendors for interview	1260	800	1440				
11. Prepare product demo test cases	560	2400					
12. Invite potential vendors for product demo	420	400				360	
13. Discuss details and prepare decision	1680	120	1440			2700	
14. Select final vendor	1120	800	96				
15. Negotiate contract	1680			1488	24		
16. Sign up contract				248			400
Total:	42000	19700	15840	1736	1080	13500	400

Table 2.2: Total cost of labor, all costs in euro

Total workforce costs: **94 256 EUR**

Only a small difference to the estimated effort based on COSYSMO calculated in section 1 (92 004 EUR) could be recognized. This is most likely due to rounding issues, because COSYSMO works with average salaries, whereas this detailed plan takes the current Harley-Davidson salaries into account.

Based o those two numbers a relatively accurate estimation **between 92 0000 to 94 000 EUR** may be

given.

3. Additional costs

This section covers additional costs for workspace, office equipment as well as illness cost predictions and project-related travel requirements. Salary rates and workforce costs are not included.

For some costs a probability is given, which indicates how likely it is that those costs may be necessary. This is due to unpredictable events like illness or group members from different company's sites, which need to get a hotel as well as travel cost refunds.

Other costs, such as workspace or office costs, will be incurred for employees anyway and are only included for completeness.

Type of cost	Probability	Cost in EUR	Amount	Total in EUR
Travel[5]	High	600	x 30[6]	= 18 000
Vacation	Low	3 000	x 2	= 6 000
Illness	Medium	900	x 15[7]	= 13 500
Workspace[8]	-	8	x 2.314	= 18 512
Conference room rental	-	2 400	x 1	= 2 400
Office equipment	-	1 200	x 6	= 7 200
Communication	-	70	x 30	= 2 100
Management	-	9 000	x 1	= 9 000

Table 3.1: Non-labor costs estimated for the project

Total additional costs: 76 712 EUR

4. Profit margins

Total workforce costs: 94 256 EUR
Total additional costs: 76 712 EUR

Total costs: 170 968 EUR

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[5] Costs for employees working at different company's locations during this project

[6] expected number of trips

[7] expected number of illness days

[8] Accumulated person-hours as introduced in section 2.1