

Dalton Scharff
CS 1631
Prof. S. K. Chang
8 February 2018

Exercise 3 - Business Case and Use Case Points

Business Case

When estimating whether we would like to design this University Information System application in-house, farm it out to a developer, or come up with a hybrid approach, the following is the information we must consider:

- \$50/hr in-house OR \$30/hr outsource
- Each GUI component takes 300 dev hours and 50 hours to test @ \$40/hr
- Each service component takes 500 dev hours
- Each domain component takes 800 dev hours
- Maintenance over 5 years is double the total dev hours
- 10,000 users
- 50 applications over 5 year period
- Complexity cost of \$20,000 per component
- No application framework cost

For this application, according to my deployment diagram from Exercise 2, we can see that this application has 1 GUI, 2 service components (access to two databases), and 1 domain component. Since it is cheaper to outsource the development of this application, we should outsource as many components as possible. However, the domain component may contain information that we want to keep in-house. Therefore, we should outsource the GUI and 2 service components while developing the domain component in house.

GUI

Build Component Cost: $(300\text{hr} * \$50/\text{hr to develop}) + (50\text{hr} * \$40/\text{hr to test}) + (300\text{hr} * \$50/\text{hr to maintain}) = \$32,000$

Purchase Component Cost: $(300\text{hr} * \$30/\text{hr to develop}) + (50\text{hr} * \$40/\text{hr to test}) + (300\text{hr} * \$30/\text{hr to maintain}) = \$20,000$

Application Reuse Savings: $(.4 * \$20,000) * (50 \text{ applications} - 1) = \$392,000$

Cost per User: $\$20,000 / 10,000 \text{ users} = \$2/\text{user}$

Service Component (each)

Complexity Cost: \$20,000 (given by instructions)

Application Reuse Savings: $((1.5 * ((500\text{hr} * \$30/\text{hr to develop}) + (500\text{hr} * \$30/\text{hr to maintain}))) * (50 \text{ applications} - 1)) - \$20,000 = \$2,185,000$

Cost per User: $((500\text{hr} * \$30/\text{hr to develop}) + (500\text{hr} * \$30/\text{hr to maintain}) + \$20,000) / 10,000 \text{ users} = \$5/\text{user}$

Domain Component

Build Cost: $(800\text{hr} * \$50/\text{hr to develop}) + (800\text{hr} * \$50/\text{hr to maintain}) + \$0 \text{ application framework costs} = \$80,000$

Application Reuse Savings: $(10 * ((800\text{hr} * \$50/\text{hr to develop}) + (800\text{hr} * \$50/\text{hr to maintain})) * (50 \text{ applications} - 1)) - \$20,000 = \$39,180,000$

Cost per User: $((800\text{hr} * \$50/\text{hr to develop}) + (800\text{hr} * \$50/\text{hr to maintain}) + \$20,000) / 10,000 = \$10/\text{user}$

In summary, we can see that this program will cost approximately \$22 per user over its 5 year lifecycle. Outsourcing the entire program would cost \$18.80 per user but may require that some sensitive data be given to an out-of-house developer. Keeping the entire program development in-house would cost \$27.20 per use and would not really add anything to the project.

Use Case Points

UUCW

Actor	Type	Weight
Administrator	Complex	3
Instructor	Average	2
Student	Complex	3
Secretary	Simple	1

UAW

Use Case	Interactions	Weight
Update course to be taught by instructors	1	5
Enter the list of students taking a course	1	5
Approve add/drop form	1	5
Enter and update grades of the courses this instructor is teaching	1	5
Request a grade report	1	5
Fill out online add/drop form	1	5
Request add/drop form approval	1	5
Enter add/drop information into database	1	5

TF

Factor	Weight	Assigned Value	Weight * Assigned Value
T1	2	0	0
T2	1	2	2
T3	1	4	4
T4	1	2	2
T5	1	2	2

T6	.5	5	2.5
T7	.5	5	2.5
T8	2	4	8
T9	1	3	3
T10	1	1	1
T11	1	4	4
T12	1	2	2
T13	1	2	2
TOTAL			35

EF

Factor	Weight	Assigned Value	Weight * Assigned Value
E1	1.5	5	7.5
E2	.5	4	2
E3	1	3	3
E4	.5	3	1.5
E5	1	3	3
E6	2	4	8
E7	-1	1	-1
E8	-1	1	-1
E9	1	3	3
TOTAL			26

UCP:	$(UUCW + UAW) * TCF * ECF$	$= (40 + 9) * .95 * .62$	$= 28.861$
UUCW:		$= 8 * 5$	$= 40$
UAW:		$= 1 * 1 + 1 * 2 + 2 * 3$	$= 9$
TCF:	$0.6 + (TF/100)$	$= 0.6 + (35/100)$	$= 0.95$
ECF:	$1.4 + (-.03 * EF)$	$= 1.4 + (-0.03 * 26)$	$= 0.62$
EFFORT:	$UCP * PH_{perUCP}$	$= 28.861 * 20$	$= 577.22$
TOTAL COST:		$= 577.22 * 100$	$= \\$57,722$

According to the above calculations, the total project will cost \$57,722.