***Large Scale Requirement Engineering***

***Reflective Report***

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***Abstract -* This article is the report of Reflective Report assignment in Large Scale Requirement Enigineering course, this Implementation work is done and this report is written by Mingda Chen individually.**

**1. Article Selection**

**1.1 First Article**

First article I selected is "A Method for Early Requirements Triage and Selection Utilizing Product Strategies".[1] And following are the reason why I select it.

1. I am very interested in requirements engineering and after I come to Sweden, I have several course that related to requirements engineering, but to be honest, before the Release Planning Assignment in this course, I have no experience about dealing with lots of requirements. So there are several problems when I am working on the Release Planning Assignment, several problem are answered during it and some still confused me. And in these confused problem, one is about the early activities to the requirements. And this article solve some my problems. That's why I like this article and read it for lots of times.

2. In this article, author mainly describe a new method for early requirements triage and selection and the name is very simple, the MERTS method. In my personal opinion about requirements, I always think that requirements engineering should not just stay at the requirements level, I think that when we deal with large scale of requirements, we need to consider about the company strategy and overall business goals. After read this article and have a better understanding about the MERTS, I think MERTS is a good method that its concept is similar with my idea. That means MERTS is a method that consider about the high level goal.

3. During the search of articles, I also find some method or idea that connect the requirement engineering and overall business goal. For example, some articles divide the requirements into different abstraction level, company level, project level and so on. However lots of article didn't mention the actual activity or some quantized activity to help the manager to deal with the requirement. But MERTS provide a detail and quantized method for us to manage the requirement, in other words, to make early triage and selection of requirements.

4. In the article, when the author talk about the real use of MERTS, author said that company representatives test the method and author ask for some feedback, but in the conclusion part, author think that the feedback is limited in time and scope also, the risk of MERTS is not mentioned. Because in my opinion, I think MERTS is a good method but I still want to try it to show whether it's good or not and what is its limitation and risk.

5. The title of this article is "A Method for Early Requirements Triage and Selection Utilizing Product Strategies", so the MERTS is including requirement triage and requirement selection two part. But in the article, in my opinion, author pay more attention and focus on the requirement triage, and through the read of the article, I think the requirements selection in this article is very common in other release planning method such as theme-based release plan and feature partitioning release plan. But the requirements triage is very special and particular, its quantized way is uncommon in lots of article, so for the implementation, I want to do the requirements triage such as the MERTS for several requirements.

**1.2 Second Article**

Second article I selected is " A Case Study Evaluation of the Guideline-Supported QUPER Model for Elicitation of Quality Requirements".[2] And following are the reason why I select it.

1. As I mentioned before, I am interested in the requirement engineering, and after the release planning assignment, I find some problem in my practice, another problem is about the quality requirement. Following are the problems about the quality assignment about that assignment.

a. There are less quality requirements in the requirement database.

b. The quality requirements in the requirements database are not defined with a or a set of certain functional quality, that means it's very hard to implement the quality requirement.

c. The description of quality requirements are little bit poor so some of them will cause the misunderstanding.

d. It's very hard to triage the quality requirement and priorities the quality requirement.

2. In my opinion, I think lots of quality requirements are little bit abstract so it's very hard to understand it and analyze it or validate it. So in this situation, I think quantized case is better for us to describe the quality requirements, that means we need to find out some different metrics that can be used to judge the quality requirements. That's what QUPER model did. QUPER model try to quantizing the quality requirements and use number to judge the good or bad. That's a good way to understand and implement quality requirements.

3. As I said before, when I find some good method, I also try to compare it with other method, for the QUPER model, the main difference and in my opinion, the most advantages of QUPER model is that it use the data from different concept to help manager to judge the quality requirements, such as Reference Level, Quality Breakpoint, Barrier and Target. Especially in the reference level, it will compare the similar product both from own company and other competitor. These data make the quality requirements of this product gain the market competitiveness, which will directly improve the quality and success rate of the product.

4. QUPER model is a method that easy to learn and use, also it's helpful in practice, which is proved in the articles by author's research and the analysis of the result.

5. In the article, author describe the feedback of QUPER model in practice with case company, and the idea that use questionnaire to gain the feedback is good too, but I have just one thing not very satisfied is that, there is lots of question in the questionnaire, but for some question, for example, "Do you agree that applying QUPER takes too much time to be useful?", I want that the company use data to answer, in this case, data is the time they spend for QUPER, so I think some results of practice feedback maybe not very comprehensive, so I want to try the QUPER in practice to gain the feedback from my own.

**2. Implementation Plan**

**2.1 The Plan for First Method**

For the first method MERTS, as I mentioned before, I am interest in the early requirement triage part in MERTS, so in my implementation, I will implement the requirement triage part of MERTS. Since I find some problem in the Release Planning Assignment, so I want to try MERTS in the requirements of online learning platform system. And to show the effective of early requirement triage, I will select one set of requirements for one theme in the requirement database, and implement the MERTS on them and by analyzing the triage result, I can learn more about MERTS and large scale requirement engineering. And following is the detail implementation plan.

Step1: Select several requirements that related to one theme, which is hard to be triage or early prioritization for the implementation, record their title and description.

Step2: Specify, as the first step of early requirement triage, it's very important to specify the directions of the product based on the organization or company's strategy. And the description of specification is very abstract, so in MERTS, author set three strategic questions for each product to answer.

(1) Where we want to go?

To answer this question, we need to have a clear understanding about the organization's goal and plan and moving direction. So my plan is to think about this and document this by both the description of requirement and the description of different viewpoints.

(2) How to get there?

To answer this question, we need to have a clear understanding about the difference or distance between us and competitor, what should be the unique selling point of our product. So my plan is to identify the customer segment targeted. Then I need to think about the competitors' product and compare it with ours. Finally thinking about the different advantages of our product especially some unique advantages.

(3) What will be done?

MERTS focus on the early triage and selection of requirements, so when we talk about the what to do, the answer maybe some abstract activities such as innovation, market pull. So the plan here is to identify some activity with the help of the description of requirements.

Step3: From the step1, we can get several factors the answer for three questions, but only have these factors is not enough to judge the requirements. And as I mentioned before, in my opinion, I think we still need some quantized way to analyze something to judge the importance of requirement. So the step2 of my plan is to assign the weights for each factor, and follow the MERTS, I will assign 100 points for the answer for each question and the total weight of the three questions is 300. From the article, this is a easiest and quickest prioritization methods.

Step4: List systematically the requirement in the requirement database I select from Release Planning Assignment which are related to the same theme, Run these requirement one by one on the result of step1 and step2, judge them, validate them and give points for each requirement, after I get all the points, record them.

Step5: Compare the result of the points with the result of other method I used in the Release Planning Assignment, find the difference and similarity, analyze them to learn more.

**2.2 The Plan for Second Method**

For the second method guideline-supported QUPER model, as I mentioned before, when I am doing the Release Planning Assignment, I met some problem with quality requirement, and the main problem is that the description of quality requirement is too abstract, in other words, the description of quality requirement is very hard to read and understand, and because it is a method for quality requirement, so in my implement plan, I will implement the guideline-supported QUPER model with several quality requirements in the requirements database of online learning platform system.

Step1: Select several quality requirements or add some new quality requirements, which is hard to understand and need some quantized way to analyze. Record their title and description.

Step2: Identify candidate quality requirements. This step is very important, as I mentioned before, quality requirement need to exist with a or several certain features. So after the selection of quality requirement, I plan to find and document the identified feature for each selected quality requirements.

Step3: Define Scale and Unit. For each quality requirements I selected, I need to define the scale for it. Scale and unit means the metric I used to judge it, for example, time is the scale and second is the unit for some quality requirements.

Step4: Identify Reference Levels. After step3, at least, I can get something to judge the quality requirement which is abstract before. But whether it is good or bad we still didn't, so I will identify the reference levels for each selected quality requirements, the reference can be some similar product in own company or some similar product from competitors.

Step5: Elicit Quality Breakpoints. As I always said, quality requirement is something that can help the product to gain the market competitiveness. So we need to set the quality breakpoints which is represent the market expectations. There are three different kinds of breakpoints.

(1) Utility Breakpoint: The utility breakpoint means the lowest acceptable value on the market.

(2) Saturation Breakpoint: The saturation breakpoint means the excessive quality by the market

(3) Differentiation Breakpoint: The differentiation breakpoint means that this level of quality will gain market competitiveness.

Step6: Identify the cost barriers, cost barriers will help us to have better understanding about the cost of each quality requirement, so the plan is I will identify two cost barriers for each selected quality requirements. First cost barriers is mainly related to some software changes, and second cost barriers is mainly related to software architecture.

Step7: Identify the Targets, targets means goal, which is the quantized goal of this quality requirement.

Step8: Run the selected quality requirement on the QUPER model.

Step9: Summary the result of running QUPER model on these quality requirement, gain some more understanding and knowledge and experience from it.

**3. Execution**

**3.1 The Execution for First Method**

Follow the implementation plan, for the MERTS method, I make following execution here, also I will show the result of my execution here.

1. I Select the theme "View Information", that is because some requirements in this theme are very close and to be honest, when I was working on Release Planning, It confused me a lot, so I want to try MERTS on several of them.

2. I Select following requirements as the target for my implementation

#28-List Courses for User, The product shall be able to list which course(s) a user is participator in.

#35-Extra Contents of Personal Profile, The personal profile shall have the following text fields: address, zipcode, city, e-mail address, ICQ UIN, home, mobile, and office phone number, fax number, age, interests, "about me", link to personal homepage.

#51-Discussion Forum message overview, The product shall be able to present an overview of the messages in a course's discussion forum.

#56-Access to View Course News, Only participators of a course shall be able to view course news.

#90-New/Extra curricular activities, As a user, data about extra curricular activities that are happening in and around the campus should be provided.

#97-Teacher timetable and meeting, It provides user to access the timetable of teacher and book an appointment with teacher/lecturer.

#123-Comment section for lecture streams, Student can be able to access to the video stream shall be able to write on it

#143-Reading PDF files support, There shall be support for reading PDF files on the website without downloading them.

#191-Grade checking, As an old engineer student, I would like to check my grade for each assignment and each course at one place.

#195-Login information representation, As an old engineer student, I would like to see how much time I spent on the system and how many times I logged in the system.

3. Follow the plan, set different factor and assign weight for them.

4. Here is the result of my implementation about MERTS.

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| **Questions** | **Factors** | **Weight** | **Sub** | **Sub Weight** | **Normalized Weight** | **RQ #28** | **Normalized** |
| Where | Market growth | 50 |  |  | 50 | 70 | 35 |
|  | Market share | 20 |  |  | 20 | 50 | 10 |
|  | Customer number | 30 |  |  | 30 | 50 | 15 |
|  |  | 100 |  |  | 100 |  |  |
| How | Customer segments | 40 | Sweden market | 70 | 28 | 100 | 28 |
|  |  |  | Northern Europe market | 30 | 12 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Competitor | 30 | It'slearning | 80 | 24 | 100 | 24 |
|  |  |  | others | 20 | 6 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Differential advantage | 30 | Innovation | 60 | 18 | 0 | 0 |
|  |  |  | Pricing | 10 | 3 | 0 | 0 |
|  |  |  | Quality Requirement | 30 | 9 | 70 | 6.3 |
|  |  |  |  | 100 |  |  |  |
| What | New Technology | 40 |  |  | 40 | 60 | 24 |
|  | Use of core assets | 10 |  |  | 10 | 0 | 0 |
|  | Architecture stability | 20 |  |  | 20 | 0 | 0 |
|  | Market pull | 15 |  |  | 15 | 60 | 9 |
|  | Technology push | 15 |  |  | 15 | 60 | 9 |
|  |  | 100 |  |  | 100 | Total | 160.3 |

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| **Questions** | **Factors** | **Weight** | **Sub** | **Sub Weight** | **Normalized Weight** | **RQ #35** | **Normalized** |
| Where | Market growth | 50 |  |  | 50 | 60 | 30 |
|  | Market share | 20 |  |  | 20 | 40 | 8 |
|  | Customer number | 30 |  |  | 30 | 70 | 21 |
|  |  | 100 |  |  | 100 |  |  |
| How | Customer segments | 40 | Sweden market | 70 | 28 | 100 | 28 |
|  |  |  | Northern Europe market | 30 | 12 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Competitor | 30 | It'slearning | 80 | 24 | 100 | 24 |
|  |  |  | others | 20 | 6 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Differential advantage | 30 | Innovation | 60 | 18 | 0 | 0 |
|  |  |  | Pricing | 10 | 3 | 0 | 0 |
|  |  |  | Quality Requirement | 30 | 9 | 60 | 5.4 |
|  |  |  |  | 100 |  |  |  |
| What | New Technology | 40 |  |  | 40 | 0 | 0 |
|  | Use of core assets | 10 |  |  | 10 | 30 | 3 |
|  | Architecture stability | 20 |  |  | 20 | 0 | 0 |
|  | Market pull | 15 |  |  | 15 | 70 | 10.5 |
|  | Technology push | 15 |  |  | 15 | 50 | 7.5 |
|  |  | 100 |  |  | 100 | Total | 137.4 |

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| **Questions** | **Factors** | **Weight** | **Sub** | **Sub Weight** | **Normalized Weight** | **RQ #51** | **Normalized** |
| Where | Market growth | 50 |  |  | 50 | 60 | 30 |
|  | Market share | 20 |  |  | 20 | 40 | 8 |
|  | Customer number | 30 |  |  | 30 | 50 | 15 |
|  |  | 100 |  |  | 100 |  |  |
| How | Customer segments | 40 | Sweden market | 70 | 28 | 100 | 28 |
|  |  |  | Northern Europe market | 30 | 12 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Competitor | 30 | It'slearning | 80 | 24 | 100 | 24 |
|  |  |  | others | 20 | 6 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Differential advantage | 30 | Innovation | 60 | 18 | 50 | 9 |
|  |  |  | Pricing | 10 | 3 | 0 | 0 |
|  |  |  | Quality Requirement | 30 | 9 | 50 | 4.5 |
|  |  |  |  | 100 |  |  |  |
| What | New Technology | 40 |  |  | 40 | 40 | 16 |
|  | Use of core assets | 10 |  |  | 10 | 0 | 0 |
|  | Architecture stability | 20 |  |  | 20 | 20 | 4 |
|  | Market pull | 15 |  |  | 15 | 50 | 7.5 |
|  | Technology push | 15 |  |  | 15 | 40 | 6 |
|  |  | 100 |  |  | 100 | Total | 152 |
| **Questions** | **Factors** | **Weight** | **Sub** | **Sub Weight** | **Normalized Weight** | **RQ #56** | **Normalized** |
| Where | Market growth | 50 |  |  | 50 | 60 | 30 |
|  | Market share | 20 |  |  | 20 | 20 | 4 |
|  | Customer number | 30 |  |  | 30 | 60 | 18 |
|  |  | 100 |  |  | 100 |  |  |
| How | Customer segments | 40 | Sweden market | 70 | 28 | 100 | 28 |
|  |  |  | Northern Europe market | 30 | 12 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Competitor | 30 | It'slearning | 80 | 24 | 100 | 24 |
|  |  |  | others | 20 | 6 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Differential advantage | 30 | Innovation | 60 | 18 | 30 | 5.4 |
|  |  |  | Pricing | 10 | 3 | 0 | 0 |
|  |  |  | Quality Requirement | 30 | 9 | 30 | 2.7 |
|  |  |  |  | 100 |  |  |  |
| What | New Technology | 40 |  |  | 40 | 40 | 16 |
|  | Use of core assets | 10 |  |  | 10 | 10 | 1 |
|  | Architecture stability | 20 |  |  | 20 | 30 | 6 |
|  | Market pull | 15 |  |  | 15 | 80 | 12 |
|  | Technology push | 15 |  |  | 15 | 50 | 7.5 |
|  |  | 100 |  |  | 100 | Total | 154.6 |

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| **Questions** | **Factors** | **Weight** | **Sub** | **Sub Weight** | **Normalized Weight** | **RQ #90** | **Normalized** |
| Where | Market growth | 50 |  |  | 50 | 80 | 40 |
|  | Market share | 20 |  |  | 20 | 60 | 12 |
|  | Customer number | 30 |  |  | 30 | 70 | 21 |
|  |  | 100 |  |  | 100 |  |  |
| How | Customer segments | 40 | Sweden market | 70 | 28 | 100 | 28 |
|  |  |  | Northern Europe market | 30 | 12 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Competitor | 30 | It'slearning | 80 | 24 | 100 | 24 |
|  |  |  | others | 20 | 6 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Differential advantage | 30 | Innovation | 60 | 18 | 70 | 12.6 |
|  |  |  | Pricing | 10 | 3 | 0 | 0 |
|  |  |  | Quality Requirement | 30 | 9 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
| What | New Technology | 40 |  |  | 40 | 60 | 24 |
|  | Use of core assets | 10 |  |  | 10 | 40 | 4 |
|  | Architecture stability | 20 |  |  | 20 | 0 | 0 |
|  | Market pull | 15 |  |  | 15 | 80 | 12 |
|  | Technology push | 15 |  |  | 15 | 30 | 4.5 |
|  |  | 100 |  |  | 100 | Total | 182.1 |
| **Questions** | **Factors** | **Weight** | **Sub** | **Sub Weight** | **Normalized Weight** | **RQ #97** | **Normalized** |
| Where | Market growth | 50 |  |  | 50 | 50 | 25 |
|  | Market share | 20 |  |  | 20 | 40 | 8 |
|  | Customer number | 30 |  |  | 30 | 70 | 21 |
|  |  | 100 |  |  | 100 |  |  |
| How | Customer segments | 40 | Sweden market | 70 | 28 | 100 | 28 |
|  |  |  | Northern Europe market | 30 | 12 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Competitor | 30 | It'slearning | 80 | 24 | 100 | 24 |
|  |  |  | others | 20 | 6 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Differential advantage | 30 | Innovation | 60 | 18 | 60 | 10.8 |
|  |  |  | Pricing | 10 | 3 | 0 | 0 |
|  |  |  | Quality Requirement | 30 | 9 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
| What | New Technology | 40 |  |  | 40 | 40 | 16 |
|  | Use of core assets | 10 |  |  | 10 | 0 | 0 |
|  | Architecture stability | 20 |  |  | 20 | 40 | 8 |
|  | Market pull | 15 |  |  | 15 | 70 | 10.5 |
|  | Technology push | 15 |  |  | 15 | 60 | 9 |
|  |  | 100 |  |  | 100 | Total | 160.3 |

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| **Questions** | **Factors** | **Weight** | **Sub** | **Sub Weight** | **Normalized Weight** | **RQ #123** | **Normalized** |
| Where | Market growth | 50 |  |  | 50 | 80 | 40 |
|  | Market share | 20 |  |  | 20 | 50 | 10 |
|  | Customer number | 30 |  |  | 30 | 70 | 21 |
|  |  | 100 |  |  | 100 |  |  |
| How | Customer segments | 40 | Sweden market | 70 | 28 | 100 | 28 |
|  |  |  | Northern Europe market | 30 | 12 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Competitor | 30 | It'slearning | 80 | 24 | 100 | 24 |
|  |  |  | others | 20 | 6 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Differential advantage | 30 | Innovation | 60 | 18 | 80 | 14.4 |
|  |  |  | Pricing | 10 | 3 | 0 | 0 |
|  |  |  | Quality Requirement | 30 | 9 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
| What | New Technology | 40 |  |  | 40 | 70 | 28 |
|  | Use of core assets | 10 |  |  | 10 | 40 | 4 |
|  | Architecture stability | 20 |  |  | 20 | 0 | 0 |
|  | Market pull | 15 |  |  | 15 | 70 | 10.5 |
|  | Technology push | 15 |  |  | 15 | 50 | 7.5 |
|  |  | 100 |  |  | 100 | Total | 187.4 |
| **Questions** | **Factors** | **Weight** | **Sub** | **Sub Weight** | **Normalized Weight** | **RQ #143** | **Normalized** |
| Where | Market growth | 50 |  |  | 50 | 60 | 30 |
|  | Market share | 20 |  |  | 20 | 20 | 4 |
|  | Customer number | 30 |  |  | 30 | 60 | 18 |
|  |  | 100 |  |  | 100 |  |  |
| How | Customer segments | 40 | Sweden market | 70 | 28 | 100 | 28 |
|  |  |  | Northern Europe market | 30 | 12 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Competitor | 30 | It'slearning | 80 | 24 | 100 | 24 |
|  |  |  | others | 20 | 6 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Differential advantage | 30 | Innovation | 60 | 18 | 0 | 0 |
|  |  |  | Pricing | 10 | 3 | 0 | 0 |
|  |  |  | Quality Requirement | 30 | 9 | 90 | 8.1 |
|  |  |  |  | 100 |  |  |  |
| What | New Technology | 40 |  |  | 40 | 40 | 16 |
|  | Use of core assets | 10 |  |  | 10 | 0 | 0 |
|  | Architecture stability | 20 |  |  | 20 | 60 | 12 |
|  | Market pull | 15 |  |  | 15 | 70 | 10.5 |
|  | Technology push | 15 |  |  | 15 | 60 | 9 |
|  |  | 100 |  |  | 100 | Total | 159.6 |

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| **Questions** | **Factors** | **Weight** | **Sub** | **Sub Weight** | **Normalized Weight** | **RQ #191** | **Normalized** |
| Where | Market growth | 50 |  |  | 50 | 60 | 30 |
|  | Market share | 20 |  |  | 20 | 40 | 8 |
|  | Customer number | 30 |  |  | 30 | 30 | 9 |
|  |  | 100 |  |  | 100 |  |  |
| How | Customer segments | 40 | Sweden market | 70 | 28 | 100 | 28 |
|  |  |  | Northern Europe market | 30 | 12 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Competitor | 30 | It'slearning | 80 | 24 | 100 | 24 |
|  |  |  | others | 20 | 6 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Differential advantage | 30 | Innovation | 60 | 18 | 0 | 0 |
|  |  |  | Pricing | 10 | 3 | 0 | 0 |
|  |  |  | Quality Requirement | 30 | 9 | 90 | 8.1 |
|  |  |  |  | 100 |  |  |  |
| What | New Technology | 40 |  |  | 40 | 30 | 12 |
|  | Use of core assets | 10 |  |  | 10 | 50 | 5 |
|  | Architecture stability | 20 |  |  | 20 | 60 | 12 |
|  | Market pull | 15 |  |  | 15 | 70 | 10.5 |
|  | Technology push | 15 |  |  | 15 | 70 | 10.5 |
|  |  | 100 |  |  | 100 | Total | 157.1 |
| **Questions** | **Factors** | **Weight** | **Sub** | **Sub Weight** | **Normalized Weight** | **RQ #195** | **Normalized** |
| Where | Market growth | 50 |  |  | 50 | 20 | 10 |
|  | Market share | 20 |  |  | 20 | 20 | 4 |
|  | Customer number | 30 |  |  | 30 | 20 | 6 |
|  |  | 100 |  |  | 100 |  |  |
| How | Customer segments | 40 | Sweden market | 70 | 28 | 100 | 28 |
|  |  |  | Northern Europe market | 30 | 12 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Competitor | 30 | It'slearning | 80 | 24 | 100 | 24 |
|  |  |  | others | 20 | 6 | 0 | 0 |
|  |  |  |  | 100 |  |  |  |
|  | Differential advantage | 30 | Innovation | 60 | 18 | 20 | 0 |
|  |  |  | Pricing | 10 | 3 | 0 | 0 |
|  |  |  | Quality Requirement | 30 | 9 | 30 | 2.7 |
|  |  |  |  | 100 |  |  |  |
| What | New Technology | 40 |  |  | 40 | 20 | 8 |
|  | Use of core assets | 10 |  |  | 10 | 0 | 0 |
|  | Architecture stability | 20 |  |  | 20 | 0 | 0 |
|  | Market pull | 15 |  |  | 15 | 50 | 7.5 |
|  | Technology push | 15 |  |  | 15 | 50 | 7.5 |
|  |  | 100 |  |  | 100 | Total | 97.7 |

5. The total score of requirements which comes from the MERTS show the importance of different requirement. In some level, It can be seen as the high or lower for the early requirement triage.

And I compare the result of this implementation with MERTS with the method I used in Release Planning Assignment, and the finding is they are very similar, but still little bit different, which is also show that different method will lead to different result, but important things are still important. So in my personal opinion, I think this implementation is success.

**3.2 The Execution for Second Method**

Follow the implementation plan, for the QUPER model, I make following execution here, also I will show the result of my execution here.

1. I Select some quality requirement in the Online learning platform system, and my condition of selection is:

a. The quality requirement is abstract, hard to understand, need more deeper description.

b. The quality requirement need some quantized description.

c. The quality requirement which confused me in Release Planning Assignment.

2. Based on the condition, I select four quality requirements from the requirements database, and put one new quality requirements for the Online learning platform system. Following are the requirements.

#7, Heterogeneous System Access, The product shall be accessible from common computer- and operating system platforms.

#13, Quick and Easy Overview of Relevant Information, It shall be easy to find relevant information.

#93, Recovery Email validity, How long will the user be able to recover his/her account with this email.  
#128, File compatibility, The file compatibility need to support different kinds of file types.   
#None, Size of the upload file, How large of the file size will the user be able to upload.

3. Follow the plan, use QUPER model on these selected quality requirement, following are the results.

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| **Feature:** The system run in different system  **ID:** #7  **QUALITY REQUIREMENT:** Heterogeneous System Access |
| **DEDINITION:** The system that our product supported |
| **REFERENCE LEVELS**  **PRODUCT:** Itslearning, support WINDOWS, IOS, UNIX, LINUX |
| **QUALITY BREAKPOINTS**  **UTILITY:** Windows, IOS **RATIONALE:** Most popular system  **SATURATION:** WINDOWS, IOS, UNIX, LINUX **RATIONALE:** Regular System  **DIFFERENTIATION:** ALL **RATIONALE:** All the system is accepted |
| **BARRIER**  **OUR PRODUCT:** WINDOWS, IOS, UNIX, LINUX  **Q1:** All the system **RATIONALE:** Accept other minority systems **C1:** 6 weeks  **Q2:** None |
| **TARGET**  **GOOD:** All the system **RATIONALE:** Will beat most  **STRETCH:** None |

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| **Feature:** Basic view information operation of the system  **ID:** #13  **QUALITY REQUIREMENT:** Quick and Easy Overview of Relevant Information |
| **DEDINITION:** The average time that new users need to implement all the basic view information operation successfully without instructions. |
| **REFERENCE LEVELS**  **PRODUCT:** Itslearning, 60 minutes |
| **QUALITY BREAKPOINTS**  **UTILITY:** 120 minutes **RATIONALE:** the acceptable for common products  **SATURATION:** 50 minutes **RATIONALE:** Satisfaction point  **DIFFERENTIATION:** 60 minutes **RATIONALE:** Will get market share |
| **BARRIER**  **OUR PRODUCT:** 50 minutes  **Q1:** 60 minutes **RATIONALE:** New features come in **C1:** 5 weeks  **Q2:** 80 minutes **RATIONALE:** Support a new system **C1:** 20 weeks |
| **TARGET**  **GOOD:** 50 minutes **RATIONALE:** Will beat most  **STRETCH:** 45 minutes **RATIONALE:** The optimization of operation |

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| **Feature:** Recovery a account with Email  **ID:** #93  **QUALITY REQUIREMENT:** Recovery Email Validity |
| **DEDINITION:** The time that use be able to recover account with the Email |
| **REFERENCE LEVELS**  **PRODUCT:** Itslearning, 7 days |
| **QUALITY BREAKPOINTS**  **UTILITY:** 5 days **RATIONALE:** Cannot less than  **SATURATION:** 7 days **RATIONALE:** Regular System  **DIFFERENTIATION:** 14 days **RATIONALE:** Huge database server |
| **BARRIER**  **OUR PRODUCT:** 7 days  **Q1:** None  **Q2:** 14 days **RATIONALE:** New hardware of database server **C1:** 52 weeks |
| **TARGET**  **GOOD:** 7 days **RATIONALE:** Will beat most  **STRETCH:** 14 days **RATIONALE:** New hardware of database server is feasible |
| **Feature:** Upload file  **ID:** #128  **QUALITY REQUIREMENT:** File Compatibility |
| **DEDINITION:** The file types that system accept. |
| **REFERENCE LEVELS**  **PRODUCT:** Itslearning, support pdf, html/htm, doc/docx, sxw/odt, rtf, txt |
| **QUALITY BREAKPOINTS**  **UTILITY:** pdf, doc/docx, txt **RATIONALE:** Most popular system  **SATURATION:** support pdf, html/htm, doc/docx, sxw/odt, rtf, txt **RATIONALE:** Regular System  **DIFFERENTIATION:** ALL **RATIONALE:** All the file type is accepted |
| **BARRIER**  **OUR PRODUCT:** support pdf, doc/docx, txt  **Q1:** support pdf, html/htm, doc/docx, sxw/odt, rtf, txt **RATIONALE:** New code make it feasible **C1:** 7 weeks  **Q2:** None |
| **TARGET**  **GOOD:** All the file type **RATIONALE:** New code is feasible  **STRETCH:** None |

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| --- |
| **Feature:** The upload of file  **ID:** #none  **QUALITY REQUIREMENT:** Size of the uploaded file |
| **DEDINITION:** The size of file that the system accept for uploading |
| **REFERENCE LEVELS**  **PRODUCT:** Itslearning, 25MB |
| **QUALITY BREAKPOINTS**  **UTILITY:** 10MB **RATIONALE:** The least level  **SATURATION:** 25MB **RATIONALE:** Regular System  **DIFFERENTIATION:** 50MB **RATIONALE:** For some particular customer target |
| **BARRIER**  **OUR PRODUCT:** 25MB  **Q1:** 25MB **RATIONALE:** New code add in **C1:** 6 weeks  **Q2:** 50MB **RATIONALE:** New hardware for database and the optimization of architecture **C1:** 52 weeks |
| **TARGET**  **GOOD:** 25MB **RATIONALE:** Enough for the market  **STRETCH:** 50MB **RATIONALE:** Feasible new hardware for database and the optimization of architecture |

4. And from the result of my implementation, there is no doubt that the abstract quality level become understandable, readable and can be judged. Compare with the simple description, QUPER model actually show its effective that help company or manager to understand the quality requirement more, and also, after understanding them, QUPER model can help the company or manager to gain the market competitiveness from quality of a product, which is also increase the success rate and reduce the risk of project.

**4. Lessons Learned**

From the seminar lecture and recommended literatures and the actual implementation(Including the activities in Release Planning Assignment and Reflective Report Assignment), especially these articles we read and the discussion about these articles and the actual implementation I done in two assignment, I have learned some new knowledge and idea about large-scale requirement engineering and market-driven requirement engineering, especially the LSRE, by the way, I think the seminar style of lecture can help us learn more just show us the slide on the lecture. Following are the things I learned, there are lots of thing, but following are something that influence me lot.

1. Requirement engineering is not a knowledge, it should be a actual activity, just like that the best way to learn language is to use it, in my opinion, the best way to learn requirement engineering is to implement it. So in the Release Planning Assignment, I met problems, I solved them, at least, I have deal with the requirements and I learn lot.

2. Large-Scale requirement engineering is not just means to deal with lots of requirements, in my opinion, large-scale means first of all, we have a huge requirements database to deal with. And during the requirement engineering, driven by market, there will be lots of new incoming requirements, and also will be lots of obsolete software requirements, our task is to ensure the quality of process and also the quality of product by identify, specify and prioritize these requirements.

3. Since market-driven requirements engineering will lead more risk and challenge, so the task in MDRE is more important and serious, so in my opinion, from lots of articles I read, I think the most important thing in MDRE is to find out Alfa requirements. And the division of Alfa requirements or Beta requirements should put overall goal into consideration.

4. Before the prioritization of requirements, we need to understand that what level of scale we want or we need for these requirement, the selection for method of prioritization need to based on the understanding of scale, and in my implementation, I think that we need to combine two or several methods to increase the quality and reduce the risk of prioritization work.

5. Since for the Release Planning Assignment, I read lots of article to find some useful method for release plan, and the things I learned from here is that there is no one-fit-for-all method for every project. We need to put requirements and different company strategy into consideration when we are selecting method. And once we choose some method, we need adjust it for our own product to make it more suitable.

6. In Release Planning Assignment, I set the roadmap for the product, this is the first time I try the roadmap, before this practice, I have no idea about the differences of roadmap and release plan. But through the practice, I learn what is roadmap actually, product roadmap is something that show the future or this product, and guide the company to produce it in a correct way(correct means gain more benefit in market and so on). Also roadmap is a reference for product managers when they are planning release.

7. From the implementation of MERTS, I learned a new method that is MERTS of course, I learned not just this method, but also the author's way to think about the requirement and deal with requirement, author put overall goal into consideration, deal with the requirements in a high level thinking. That's what I should to gain for future study or work.

8. Before the implementation of MERTS, sometimes, for some requirements, it's very hard for me to judge them, in other words, because of some characteristics for different requirements. It's hard to connect them with some high level overall goals. But from the MERTS, especially three basic questions. It help me lot when I deal with different requirements. That's a good way for me to judge requirements by these three questions.

9. In quality requirement engineering, to understand the abstract description of quality requirement is very difficult, so in my opinion now, I think some quantized technique is needed. For example, the QUPER model which I used.

10. One thing I learn from the QUPER model and my personal implementation of QUPER is that we need to always think about the market competitiveness brought by quality requirement, and there should be some activities to ensure it. In QUPER, for every quality requirements, we need to consider the reference level which is to compare it with other product, also we need to consider the quality breakpoints, which is to put this quality requirement into market to find out the satisfaction level of these quality requirement for market.

**5. Reflection**

For the implementation of MERTS methods, to be honest, I didn't find other research article that talking about the MERTS. But I find one article that is very similar with this one, whose title is "Software Requirements Triage and Selection: State-of-the-Art and State-of-Practice"[3], and the first author is same with the MERTS article. Some idea in this article is very similar with the result of my implementation. Following are the ideas.

1. In this article, author think that requirement triage is an early activity to help the company to avoid the requirements overload problem in the development. And triage can help to decide which feature should be put into product. And in my Release Planning Assignment, the problem of requirements overloading actually influence me a lot , It increase the workload of course. And in my implementation, MERTS help me to identify the importance of different requirements when we compare them with the overall goal of my products and company, It will directly triage my attention and reduce the influence of requirements overload. Even My implementation is limited by time, but actually this is a great way to triage the requirements before development.

2. In this article, discuss the challenge of early requirement triage and selection, the first challenge it that the difficulty in alignment of requirements with long-term business goals. Which is also a huge problem I met in my implementation, it's easy to think about the business goals, but it's very hard to connect the requirements with them, it need a very clear and detail understanding of the product and company's future plan.

3. Another challenge is about the requirement dependencies. In my opinion, the requirement dependencies is a huge hindrance for the selection of requirements but my personal problem is that the dependencies is wrong and hard to understand in my implementation and Release Planning Assignment.

For the implementation of QUPER model, I find two articles, "Setting quality targets for coming releases with QUPER: an industrial case study" [4]and "Aligning Quality Requirements and Test Results with QUPER's Roadmap View for Improved High-Level Decision-Making"[5]. And some idea in these two article is same with my implementation and the QUPER model article. Following are the ideas.

1. For quality requirements, we need to deal with them in the view of market side, which means when we set the quality targets, we need to consider about the future market demands and competitive products. That is also what I learned from the implementation of QUPER model.

2. For quality requirement, when we are trying to describe them, abstraction is a huge problem, as these two article said, we must answer three questions, "When is the quality level good enough?", "When is the quality level a competitive?", "How to judge the quality level?", and there is no doubt, QUPER model is a good model to help us answer these questions. And this idea is come from my personal implementation, at least, I think these questions for the five target quality requirements have been answered.

3. Last idea is that quality is the continuous and non-linear, especially that the idea of non-linear, it's important in my implementation, non-linear means when we consider about the cost and benefit for the quality requirement, we need to think about the change of quality will lead to non-linear changes. In my implementation, when I write the cost barrier, I think lot about it. It should be accurate so it will not cause problem in the development.

**6. Reference**

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