SWEN90016 Assignment 1

Figure 1. *Food Store with E-Commerce Applications*

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Table of Contents

Question 1

Identify the business case (need) for the project. (World count: 45)

Due to the wide use of smartphones among Australian consumers, Trisha decides to develop an e-commerce web application and a mobile application app at a low cost to support her e-commerce activities, which could help attract customers, increase profits, boost sales and protect the environment.

Figure 2. *Business Case*

Question 2

Identify and discuss two constraints for the project. (World count: 193)

1) Scope

The scope constraint includes the features' number, complexity and output quality [1]. More specifically, all functional requirements related to the project should be correctly implemented. Customers could register, log in, search items, checkout and review purchase history using the mobile application on their devices supported by Apple or Android Platforms [15]. And Trisha could use the e-commerce system to analyze the customer orders, stocking cost, lead time for increasing profits [15]. She could also use it to automatically send promotion codes and offer exclusive discount events to customers and identify their shopping trends for boosting sales [15]. Furthermore, digital receipts should be available on the mobile app for environmental protection [15].

2) Cost

The cost constraint involves the financial budget, team members and equipment and facilities [1]. More specifically, the expenditure for the company to develop the e-commerce system and the spending on relevant equipment and facilities should be carefully controlled because Trisha has a loan amount of $300,000 and other areas costing much money [15]. The cost of developing the e-commerce system should be low, which is the reason why Trisha chose 'Simple Solutions' known as offering value-for-money solutions. The equipment and facilities should be economical and cost-efficient.

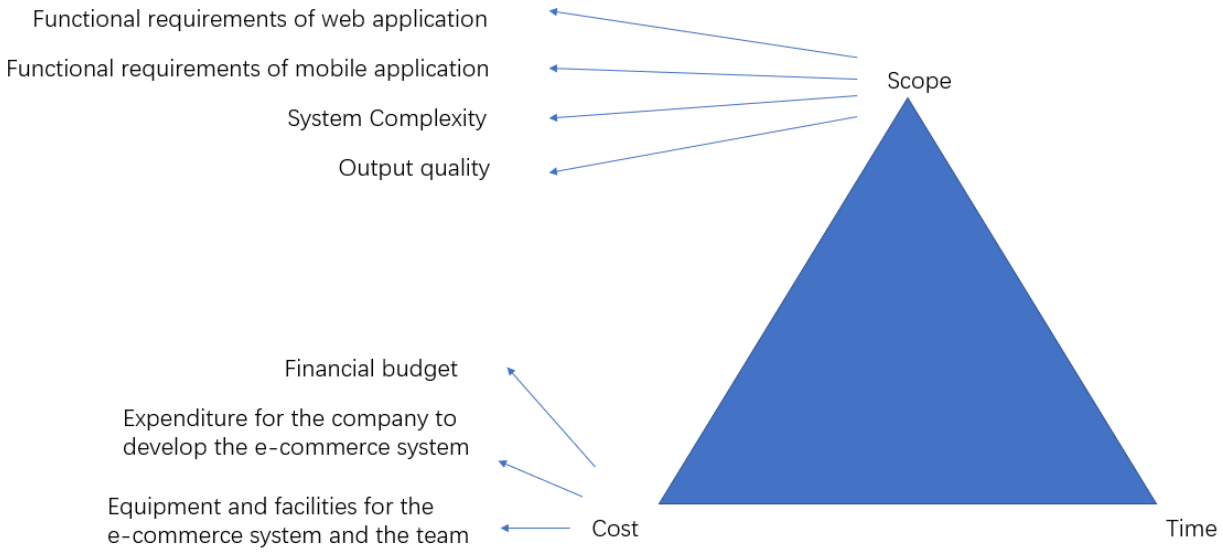

Figure 3. *Scope and Cost constraints*

Question 3

Identify two challenging characteristics that would make the project difficult. Discuss why you consider them challenging. (World count: 200)

1) The implementation of Machine Learning algorithms is challenging:

a) Enough training data

Machine Learning needs huge data sets to train on [2]. It means that Trisha should provide enough data about customers' shopping patterns to the project team.

b) High-quality data

Machine Learning requires high-quality data to train on [3]. It means that the data that Trisha provide to train should strongly relate to customers' shopping trends.

c) Proper Algorithm

Machine Learning algorithm selection is manual [4]. It means that the project team should be experienced and professional so that they could select the proper algorithm to identity data pattern.

If one of these requirements is not met, the results may be inaccurate.

2) The implementation of the smart algorithm to manage the re-ordering of food items is challenging:

a) Different consuming habits throughout the year

Customers may like different food items during different periods of the year. For example, they may prefer Ice Apple Fruit as a coolant in summer but buy it less frequently in winter.

b) Reasonable analysis of customer orders

To avoid saying "item is not available" and wasting, the number of food items to order should be appropriately calculated.

If one of these factors is not dealt with properly, the results may be inaccurate.

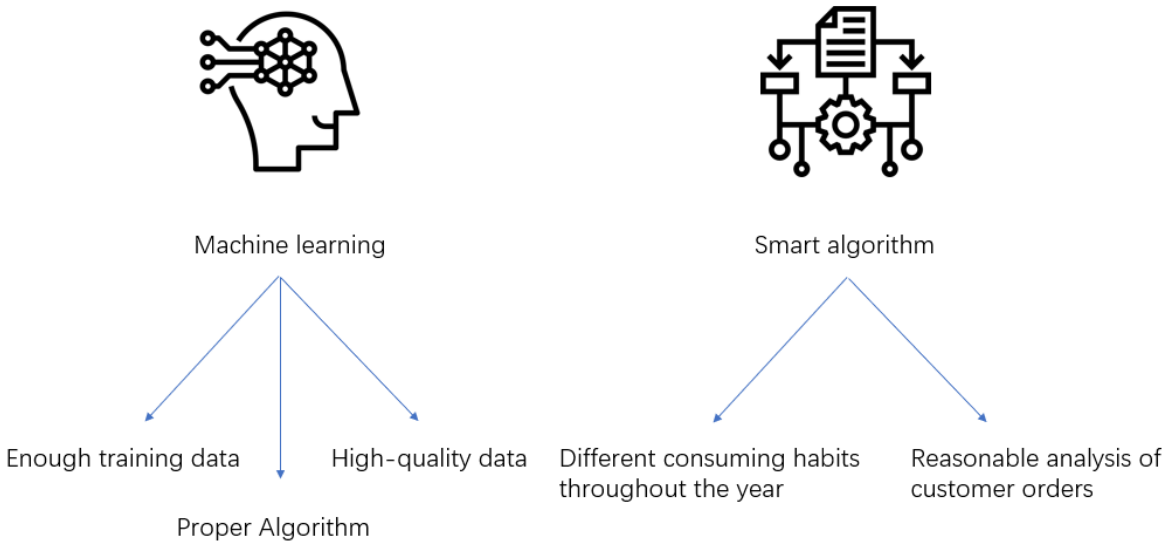

Figure 4. *Two challenging characteristics*

Question 4

Identify four things that could go wrong – Risks, resulting in the project not achieving the intended goal/s. (World count: 247)

1) Information disclosure of the one-time special login mechanism (IT security risk)

The detailed information of one-time special login may be leaked. Pool data security is a critical threat to the project [5]. Identified customers need to use the received login details instead of their normal accounts to participate in the exclusive discount event. Other people are possible to get those login details to gain profits.

2) Being accused of invasion of privacy (Legal risk)

During the implementation of the smart algorithm to send different promotions codes to different customers, the project team may be accused of invasion of privacy. This algorithm will analyse customers' spending patterns, which may be strongly opposed by some people. Legal risk is unpredictable and may arise from privacy issues [6].

3) Lack of clarity on the demands of the machine learning algorithm (Scope creep risk)

The requirements of the machine learning algorithm in this project is ambiguous. Trisha only claimed that the machine learning algorithm will be used to increase sales but does not list specific requirements like the concrete direction of analysis or expected parameters. The ambiguous goal may lead to uncontrolled changes and the extra cost of additional features [5].

4) Excessive cost spent on the implementation of the machine learning algorithm (Budget risk)

The implementation process of smart algorithms like the machine learning algorithm may run out of budget. A project using machine learning can cost the company $51,750 to $136,750 (American dollars) [7]. Training models using Trisha's customers' data could be very expensive.

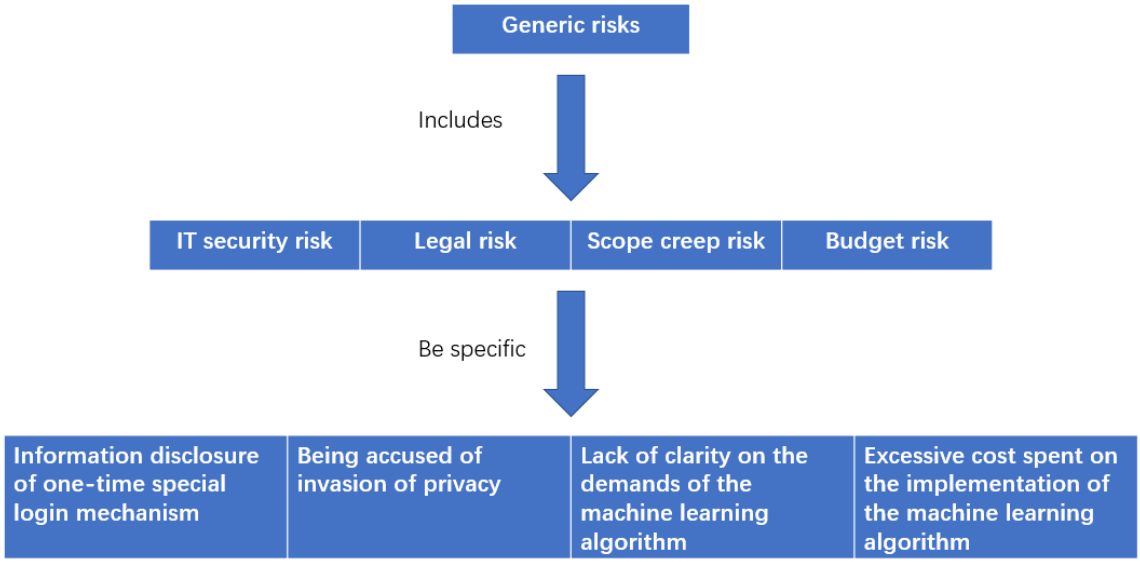

Figure 5. *Four Specific Risks*

Question 5

Discuss two possible lifecycle models (SDLCs) you would consider for the project. (World count: 709)

Waterfall

Pros

1) Waterfall is the best when the project should be correct at the beginning [8].

The data acquisition issue is usually the first step of smart algorithms and should be tackled correctly at the very beginning of the project. Measures will be taken in this period to avoid the risk of being accused of invasion of privacy **(risk 2)**. Without getting the approval of customers, the project team should never start to use their personal data which may directly break the law of privacy rights. Another similar case study is that the satellite should be arranged correctly at the start of the project, otherwise, there could be serious consequences [8]. The legal issues about privacy in this project are also the first thing to consider and deal with.

2) Waterfall allows the developers to evaluate the expense of the project correctly in the first step of the project [9].

If Waterfall Model is adopted, the cost spent on the implementation of the smart algorithm like machine learning algorithm **(risk 4)** will be evaluated at the start of the project. Besides, the volume and quality of data **(challenging characteristic 1)** will also be assessed during this period. If the cost is over budget **(risk 4)** or the data from Trisha do not meet the requirements **(challenging characteristic 1)**, the machine learning algorithm could be replaced by an economical and equally effective algorithm that does not have high requirements for the data.

Cons

1) Waterfall makes change difficult and is not suitable for the project whose requirements may often change [10].

The demands of the machine learning algorithm are not specifically claimed by Trisha **(risk 3)**. Therefore, its requirements may change according to the mind of Trisha during the development of the project. Besides, the requirements of the smart algorithm to manage the re-ordering of food items may also change along with the research progress of customers' different consuming habits **(challenging characteristic 2)**. These factors do not support the use of the Waterfall Model.

Scrum

Pros

1) Continuous attention to technical excellence, good design and quality [11]

Due to the continuous quality inspection during the progress of the Scrum Model, the IT security issues are constantly reviewed and tested, which reduces the probability of the risk of information disclosure of the one-time special login mechanism **(risk 1)**. The possible information leakage is easier to be found in the Scrum Model and could be solved by the

implementation of multi-factor authentication. Besides, continuous attention to quality improvement could promote the implementation of smart algorithms by repeatedly analyzing customers orders **(challenging characteristic 2)**. This method helps avoid a possible considerable margin of error in one implementation and makes the analysis more reasonable.

2) Smooth adaptation to the changes of the project [12]

Due to the lack of clarity on the demands of the machine learning algorithm **(risk 3)**, the requirements related to the smart algorithm may constantly change. Scrum models could adapt smoothly to the project changes because it makes the whole development process happen in short iterations [12]. Every time Trisha comes up with a new requirement, the project team using the Scrum Model could quickly start to implement it in the next iteration. This kind of model is very likely to make Trisha feel satisfied. Another similar case is that Google usually uses the Scrum model to develop their applications, which is also based on its excellent adaptation [13].

Cons

1) Difficult to assess the effort required at the beginning [11]

The cost spent on the implementation of the smart algorithm like machine learning algorithm **(risk 4)** or the volume and quality of data **(challenging characteristic 1)** is difficult to evaluate accurately at the start of the project in the Scrum Model. If the cost may run out of the budget **(risk 4)** or the data acquired from Trisha does not meet the expectations **(challenging characteristic 1)**, the project team should find an economical and equally effective algorithm to replace the machine learning algorithm. However, it is hard to realize in the Scrum Model. Moreover, the effort to avoid being accused of invasion of privacy **(risk 2)** may not appear in the initial operations of the project, but it should appear. Legal issues should always be the first thing to consider and deal with because they may lead to the collapse of a company.

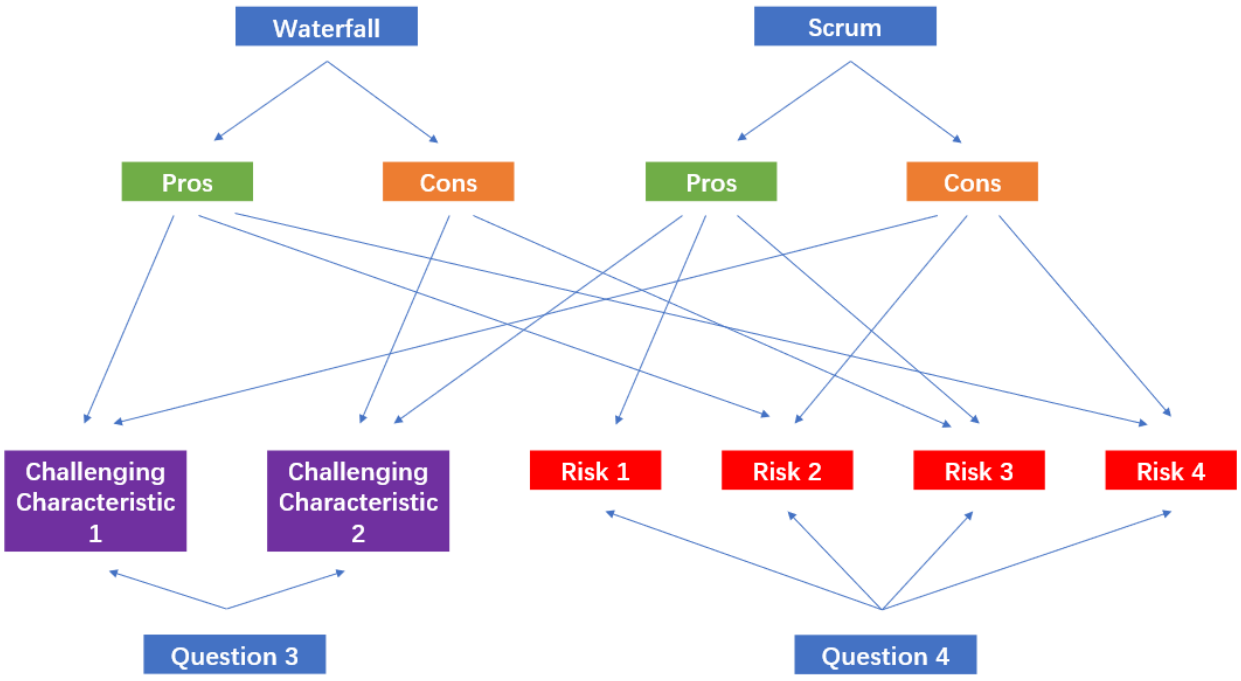

Figure 6. *Relevance between SDLCs, specific project Characteristics and Risks*

Question 6

From the 2 possible choices in Q5, choose the most suitable SDLC and justify your choice referring to specific project characteristics and risks you have identified. (World count: 199)

Scrum

Although Scrum and Waterfall both have their advantages and disadvantages in this project, Scrum is more suitable than Waterfall because smart algorithms whose requirements may often change are the most important components of the system to attract customers, increase profits and boost sales. Due to the possible influence of unexpected conditions and the lack of clarity on the demands of the machine learning algorithm **(risk 3)**, the requirements of smart algorithms may constantly change. The Scrum Model could realise changes at a low cost at any stage during project development but the Waterfall Model is difficult to accommodate change at later stages [14]. Besides, the constant attention to the quality and security of the project in the Scrum Model reduces the probability of information disclosure of the one-time special login mechanism **(risk 1)** and help promote the implementation of the smart algorithm to manage the re-ordering of food items **(challenging characteristic 2)**. But Waterfall Model is not beneficial to these aspects. In addition, the Scrum Model may use the features of the Waterfall Model in this project to assess the effort required at the beginning to properly deal with **challenging characteristic 1** and avoid **risk 2 and risk 4**.

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