CS5363 Project Spring - 23

Lubbock Online Supermarket

Team - 3

Akanksha Devulapally(R11797778)
Sai Charani Arumilli(R11849421)
Veena Posani(R11844472)
Aditya Chundi(R11797338)
HarshaVardhan Chowdary Marineni(R11824154)

Project Part-1:

Suppose your team has been chosen as a consultant to develop a business case for LS. (See Textbook pp. 78 – Q4, Q5, Q6) A business case should be the first project deliverable. It provides an analysis of the business value, several alternatives for achieving the project's MOV, the feasibility of the alternatives, and their costs, benefits, and risks. The business case is not a budget or the project plan; however, it does provide all the information necessary for your client to make a decision on whether a specific project should be undertaken.

The following is a suggested outline for developing your business case. Because this is a fictitious case, you will not be able to meet with your client. Subsequently, you will have to make several assumptions about your project if you need them.

1. Measurable organizational value (MOV):

a. Identify the desired area of impact.

According to our close study of the given scenario, we come to a conclusion that the desired area of impact would be

Strategic:

We can say strategic as, due to the pandemic, the face-to-face market started to get losses and they have decided to make it an Online marketing system, to make more profits which indicates changing of type of market and its strategies such as increasing the shares, as the Lubbock Supermarket will get more Sales, Customers and in turn the loyal customers will be back to them who used to buy from other online stores increasing their competition among different markets.

Financial:

We say Financial, because as the sales increase, the customers will be hiked and the revenue will be more than usual. Hence, it will impact the budget and Return on investments etc.

Operational:

We can say it's Operational as we are using effective process by changing the market to online and also increasing its efficiency over the profits and revenues by generating good returns and getting more customers and increasing business.

Customer=? ✔

We are not considering Customer because we are not doing anything for the customer benefit such as lowering the prices for the products or providing new services. We are only considering changing our market from face-to-face to online, where the services and products remains the same hence there will be no customers.

OR

We can consider Customer as, we can provide some free delivery services which will attract the customers and this can be considered as a new service. The website should also meet the customer requirements as the customer satisfaction also plays very important role in bringing back the loyal customers to the store.

After all the analysis we are moving forward with considering customer as per the reason stated above.

Social=X

We can definitely say it's not Social, as we are not concentrating on any social aspects, like safety, environments, etc.

Customer	Strategic	Financial	Operational	Social
• New products or services • Better quality products or services • Lower priced products or services	• New markets • Increased market share • Changing the terms of competition	• Increased revenue • Lower costs	• More efficient processes • More effective processes	• Dissemination of knowledge • Improved safety • Cleaner environment

b. Identify the desired value of the project.

Do More:

Do More is one of the desired values for the project as this will help the Lubbock Supermarket to increase their sales by selling products online. Here Lubbock Supermarket is looking to expand or grow beyond its current operations by increasing its market share, expanding its product or service offerings, entering new markets and scaling its operations to reach a wider customer base.

Better:

Better is another desired value for the project as Lubbock Supermarket can effectively sell its products online. Here Lubbock Supermarket is looking to improve its effectiveness by enhancing the quality of its services by increasing its operational efficiency, streamlining its supply chain, improving customer satisfaction, or generating more revenue.

c. Develop an appropriate metric.

Metrics are calculated considering the targets for the project, expectations to be reached. It is a means for evaluating a project's success to increase the profits.

1) First metric can be given as:

- **3** months: 45% of the loyal customers enrolled to the Online system.
- 6 months: 80% of the Loyal customers enrolled back and top of that extra new customer gets attracted from loyal customer's recommendation.

2) Second metric can be given as:

- **6** months: In the span of 6 months, only the loss gets covered from the increased online sales as 80% of loyal customers are enrolled back.
- **1** year: In this span, Online sales increases and from the Loyal customers returning, 35% of ROI will be attained on top of loss recovery.
- **1.5** years: In this span, Online sales increases and from the Loyal customers returning, 60% of ROI will be attained on top of loss recovery and back to normal.

d. Set a time frame for achieving the MOV.

Time Frame:

- We can expect 45% loyal customers to shop online within 3 months.
- We can expect 80% loyal customers to shop online within 6 months.
- We can expect 35 % ROI within 1 year.

e. Summarize the MOV in a clear, concise statement or table.

Area of Impact	Value of Impact	Metric	Time Frame
Strategic	Better Sales and good revenue and higher competition and market shares.	45% of the loyal customers getting back because of good sales.	3-6 months
Financial	Do more in terms of profits and the amount of sales and ROI attained.	60% of ROI attained due to good amount of Profits.	18 months
Operational	Better and effective processes and efficient results attained.	35% ROI and loss recovery in a good time with increased sales.	12 months
Customer	Better and Do more in terms of Customer Satisfaction and loyal Customers returning.	80% loyal customers and extra new customers enrolling from recommendations.	6 months

SUMMARY:

This Summary consists of the Areas of impact we've considered will suit our project and the value of impact for these areas and the metrics for them and the time frame it would require to reach the metric. These all are based on the MOV considered and the assumptions made for the project.
We will only use the Areas and values of impact we've selected initially while description to further Summarize our MOV.

2. **A comparison of alternatives** - To keep things simple, you may consider only three alternatives for your client:
   Maintain the status quo (i.e., do nothing).
   Purchase a software package.
   Build a custom system.

a. **Estimate the total cost of ownership (TCO):** Provide your references (e.g., a website) when the cost is estimated. Keep in mind that the total cost of ownership should include the following:
   - All direct or upfront costs
   - Indirect costs
   - Ongoing support and maintenance costs

TOTAL COST OF OWNERSHIP **RESOURCES**		**DESCRIPTION**	**Alternative 1 (Maintain the status quo)**	**Alternative 2 (Purchase a software package)**	**Alternative 3 (Build a custom system)**
Direct Costs	Staffing	**Alternative 1:** 10(wage)*(No of hours per day {8+9}) *(no of days per week) *(No of weeks per month) *for 2 months= 10*(8+9) *7*4*2 {Two employees working 8 and 9 hours a day.} **Alternative 2&3:** One employee who handles packaging and other things. One employee who is trained over computer knowledge who can modify or handle website whenever required. (13*(8{Website}+ 9{Packaging}) *7*4*2) (two employees)	9520.00	12376.00	12376.00
	Hardware	**Alternative 1:** Compatible system to run the software and additional hardware costs such as printer etc. **Alternative 2 and 3:** PC with server@1000$ Printer for all the Alternatives @224$	1024.99	2024.99	2024.99

	Software	**Alternative 1:** (Software requirements needed for tracking the Products sold daily) **Alternative 2:** The subscription for WordPress @ 540$ per year. $650 per month to search engine optimization (SEO) **Alternative 3:** Enter IDE for developers (Visual Studio) @77.90$ per month, 934.80 per year. $650 per month to search engine optimization (SEO) Note: SEO charges= Retainer fees	400.00	8340.00	8734.80
	Development Costs	**Alternative 2:** Software Package @32$ per hour (9-5) per week(5days) {4 weeks} for 2 months. {2 employees} **Alternative 3:** Custom System @30$ per hour (9-5) per week5days) {4 weeks} for 2 months. {3 employees}		20480.00	28800.00
Indirect costs	System &Website Maintenance	**Alternative 1:** When virus attacks, we use antivirus (McAfee) @44.99 per year @3.74 per month **Alternative 2&3:** Website Maintenance @750$ per month.	3.74	750.00	750.00
	Technology	Wi-fi Subscription @55$ /month	55.00	55.00	55.00
Ongoing support and maintenance costs	Training	One day training @ 1200$ 9-5 pm, i.e., 8 hours		1200.00	1200.00
Total			11,003.73	45,425.99	53,940.79

RESULT:

Upon the Close comparison for all the costs for these alternatives based on the categories provided the **Alternative 2 (Purchase a Web Package)** serves as the best option for our project.

Assumptions:

A. Direct Costs:

In this section, we are considering Staffing costs, Hardware costs, Software costs and the development costs.

And the assumptions for all these have been taken on the basis of:

I. Staffing:

We are taking these costs for 2 months.

1) **Alternative 1:** We will be taking 2 employees, who will be working 8 hours and 9 hours a day respectively. As the working hours for the face-to-face store from 6 am to 11pm.
   =10(wage)*(No of hours per day {8+9}) *(no of days per week) *
   (No of weeks per month) *for 2 months
   =10*(8+9) *7*4*2= 9520$
2) **Alternative 2&3:** We take 2 employees, one employee who handles packaging and other things and the other one who is trained over computer knowledge who can modify or handle the website whenever required and who will be working 8 hours and 9 hours a day respectively according to their necessity in the store.
   =(13*(8{Website}+9{Packaging}) *7*4*2)
   =13*(8+9) *7*4*2=12376$

II. Hardware:

We should consider a compatible computer system to run the software and additional hardware components such as printer etc.

1) **Alternative 1:** In the first segment, we have in store Business, hence we will just take a system which will be able to keep track of products sold daily and inventory ordered to and received from a wholesale company. And there will be a mandatory printer to print stuff.
   PC + Printer cost: =800$+224.00$=1024$
2) **Alternative 2&3:** We will take a good PC to run an online services website which has server in order to store the data, access the data, updating it. And a mandatory printer is required.
   PC+ Printer cost+ server: =800$+224$+1000$=2024$
   Server Cost:
   https://www.servermania.com/
   System Cost:
   Amazon.com (Dell Inspiron 15 FHD Touchscreen Laptop)
   Printer Cost:
   https://www.hp.com/us-en/shop/pdp/hp-officejet-pro-8025e-all-in-one-printer

III. Software:

We should consider the Software which will be required for our Project development.

1) **Alternative 1:** (Software requirements needed for tracking the Products sold daily)
   We will use a basic Software worth 400$ to keep track or anything which it requires to do.
   https://www.insideselfstorage.com/technology/what-will-your-computer-system-really-cost
2) **Alternative 2:** The software used for a Package will be WordPress from where we will be taking a Template and also it will be used to Publish our Website. The subscription for WordPress @540$ per year. We are considering one year as we can make any alterations and use it for that time
   .https://wordpress.com/

3) **Alternative 3:** The software used for a Custom System will be IDE for developers at (IntelliJ {jet brains}) @77.90$ per month and 934$ per year.We are considering one year as we can make any alterations and use it for that time.
https://www.jetbrains.com/idea/buy/?section=commercial&billing=monthly

SEO Cost:

Also, we will be Paying for SEO till the time we want our Website to keep popping up to different set of Audience. $650 per month to search engine optimization (SEO). We will be paying that amount while getting the package which is said to be the retainer fees
https://www.searchberg.com/seo-packages/?gclid=Cj0KCQjwxYOiBhC9ARIsANiEIfZCeXkodzERQ-W-CP0j2e1mWDcjjp9mYI5fG126yiF1MuHBiUYNrpQaAoOEEALw_wcB

IV. Development:

In this case, we will be considering what all are to be developed in our Project,

1) **Alternative 1:** We need not develop anything in this Alternative hence there's no cost for that.
2) **Alternative 2:** We need to Pay for the developers in this alternative, we are considering 2 employees who will be working (9-5) i.e., 8 hours per week (5 working days) for our development time assumption i.e., 2 months**.** And we have considered 32$ as basic pay for a software Developer and their working hours.

   @32$ per hour (9-5) per week(5days) {4 weeks} for 2 months.
   =32*8*5*4*2*2
   =20480$
   https://www.salary.com/research/salary/benchmark/web-designer-i-hourly-wages
3) **Alternative 3:** We need to Pay for the developers in this alternative, we are considering 3 employees who will be working (9-5) i.e., 8 hours per week (5 working days) for our development time assumption i.e., 2 months**.** And we have considered 30$ as basic pay for a software freelancer and their working hours.

   @30$ per hour (9-5) per week5days) {4 weeks} for 2 months.
   =30*8*5*4*2*3
   =28800$
   https://flexiple.com/software/hourly-rate/

B. Indirect Costs:

In this we are considering the Maintenance of the Website which can include Website maintenance costs or error handling costs, technology etc.

I. System and Website Maintenance:

In this we consider Website And system Maintenance costs.

1) **Alternative 1:** We require anti-virus for the face-to-face service system as it might get affected by some kind of virus in the long run, so it's better that we go for frequent system checks. When virus attacks, we use antivirus (McAfee)
   @44.99 per year @3.74 per month
   https://www.mcafee.com/
2) **Alternative 2&3:** We require frequent Website Maintenance for Online service system as it might have some glitches during the long run, so it's better to get rid of them as soon as we encounter them as that will enhance our website.
   @750$ per month.
   https://www.hostinger.com/tutorials/website-maintenance-cost

II. Technology:

We are considering a Wi-fi service provider i.e., AT&T and costs us @55$ per month.
https://www.highspeedinternet.com

C. Ongoing Support and Maintenance:

Training Costs:

In this section, we are considering training costs, for the employees whom we are considering for handling webpages in Alternative 2 and 3 for any required modifications and the pay for them will be 1200$ for one day which will be enough.
9-5 pm, i.e., 8 hours @1200$.
https://www.knowledgecity.com/blog/employee-training-costs/

b. <u>Develop total benefits of ownership (TBO)</u> - Total benefits of ownership should include all of the direct, indirect, and ongoing benefits for each proposed alternative. Provide your team's justification when you decide on the benefits of ownership. It should focus on the following:

- Increasing high-value work.
- Improving accuracy and efficiency.
- Improved decision making.
- Improving customer service.

TOTAL BENEFITS OF OWNERSHIP (Low-Moderate-High) (0-10)	**Alternative-1 (Maintain a Status quo)**	**Alternative-2 (Purchase a software Package)**	**Alternative-3 (Build a Custom System)**
Increasing High - Value Work	As this is a face-to-face business, it will go on in its regular pace and it will be Regular work, so there will be no high-value work in this as no modification is done also because of reduced sales. **4**	As this is an online web package, it will increase the sales and also the development will take some weightage of workload and also the Sales increase will in turn increase web-interactions and customers so it will be more work comparatively. **8**	As this is an online custom system, it will definitely increase the sales and the development will take most of the weightage of workload & also the Sales increase will in turn increase the web-interactions and customers so it will be the highest work comparatively. **10**

Improving Accuracy and Efficiency	Efficiency and Accuracy will be low depending on the sales which actually became less because of Pandemic and the business being face-to-face. **5**	Efficiency and Accuracy will be depending on the sales increasing because of the business changing online and as it's a built-in package which will take less time to get developed completely and will good sales. **10**	Efficiency and Accuracy will be increasing gradually depending on the sales because of the business changing online but it being a custom system it might take little more time to get developed and any errors to be resolved or to be modified and will get good sales but in a longer time. **8**
Improved Decision Making	In this, the decision making for the customer will be a lot easier but still they have to search everything, where it's located and many other things. **8**	In this, it being a Web package, the decision making for the customer will be still easy according to the website segregation of domains and subdomains of products lined up in that website. **10**	In this, it being a Custom web system, the decision making for the customer will be easy according to the website segregation of products in that website, but in this webpage it will be a little difficult to create so many domains and subdomains as its not built in and requires so much work. **8**
Improving Customer Service	In this Alternative, Customers are not willing to attend the face-to-face market due to Pandemic. Hence the Customer satisfaction is anyway very low, which makes Customer service low as well. **4**	In this Alternative, Customers will be shopping more online due to Pandemic. Hence the Customer satisfaction increases, which improves Customer service and sales will increase and we can provide some delivery services and all to draw customer attention. **10**	In this Alternative, Customers will be shopping more online due to Pandemic. Hence the Customer satisfaction increases, which improves Customer service and sales will increase and we can provide some delivery services and all to draw customer attention. **10**
Total	**21**	**38**	**36**

RESULT: According to the close study of all the categories provided for benefits and comparing them for our Alternatives, the number of Benefits are more for 2nd Alternative i.e., Purchase a Web package.

Comparision of Financial Models:

Financial Models	Alternative 1	Alternative 2	Alternative 3
Payback	4 years	2 years	2.3 years
Breakeven	11003 units	4542 units	5394 units
ROI	5%	35%	13.68%

Payback Financial model = initial investment / net cash flow

Breakeven Financial model = Initial Investment / Net Profit Margin

Return on Investment = (Expected Benefits - Total Expected Costs)/Total Expected Costs

ALTERNATIVE 1:

Payback Financial model: The initial investment for Alternative 1 from TCO is 11003.73$. Assuming the net cash flow as 2750.93$, it takes 4 years to recover the initial investment.

Payback = initial investment / net cash flow

= 11003.73$ / 2750.93$ => 4 years.

Breakeven Financial model: The initial investment for this alternative from TCO is 11003.73$. Assuming net profit margin of 1%, the supermarket have to sell 11003 products to recover the initial investment. Since alternative 1 is do nothing and Lubbock super market is in loss due to pandemic, we are assuming less net profit margin.

Breakeven Point = Initial Investment / Net Profit Margin

11,003.73$ / 1$ = 11,003 units

Return on Investment: The total expected costs for this alternative from TCO is 11003.73$. Assuming total expected benefits of 11553.91$, the supermarket can expect ROI as low as 5% as sales dropped due to pandemic.

ROI = (Expected Benefits- Total Expected Costs)/Total Expected Costs

= (11,553.91$ – 11,003.73$)/11,003.73$ => 5%

ALTERNATIVE 2:

Payback Financial model: The initial investment for Alternative 2 from TCO is 45,425.99$. Assuming the net cash flow as 22712.99$, it takes 2 years to recover the initial investment.

= 45425.99$ / 22712.99$ => 2 years.

Breakeven Financial model: The initial investment for this alternative from TCO is 45,425.99$. Assuming net profit margin of 10%, the supermarket have to sell 4,542 products to recover the initial investment.

=45425.99$ / 10% = 4,542 units

Return on Investment: The total expected costs for this alternative from TCO is 45,425.99$. Assuming total expected benefits of 61,325.08$, the supermarket can expect ROI of 35%.

= (61,325.08$ – 45,425$)/45,425$ => 35%

ALTERNATIVE 3:

Payback Financial model: The initial investment for Alternative 3 from TCO is 53940.79$. Assuming the net cash flow as 22712.99$, it takes 2 years to recover the initial investment.

= 53940.79$ / 22712.99$ => 2.3 years.

Breakeven Financial model: The initial investment for this alternative from TCO is 53940.79$. Assuming net profit margin of 10%, the supermarket have to sell 5394 products to recover the initial investment.

=53940.79$/ 10% = 5,394 units

Return on Investment: The total expected costs for this alternative from TCO is 53940.79$. Assuming total expected benefits of 61,325.08$, the supermarket can expect ROI of 13.68%.

= (61,325.08$ – 53,940.79$)/53,940.79$ => 13.68%

RESULT: According to the given financial Models, our analysis and Calculation has given Alternate 2 as the best choice for our Project, Payback is Less for Alternative 2 and the ROI is more for Alternative 2.

3. **Decide a recommendation** – Now, you are ready to make a recommendation to your client and support it. Given the limited amount of information and time, you should still be confident that your recommendation provides the best value to the organization and that the benefits outweigh the costs. Be sure that you not only recommend one of the three alternatives but that you also provide support based on your analysis to back it up. The client will make a decision on whether to continue to the next phase of the project.

RECOMMENDATION:

According to all the comparison and analysis we have done among the alternatives till now, based on MOV, TCO, TBO and the cost analysis, we select the best alternative for our project based on these criteria. This would play a major part in our recommendation. In our project, we are considering that the alternative 2 is best recommendation to our client. Based on the MOV, at first **Alternative 2** would be strategic, will have better Customer satisfaction and performs effectively and efficiently than compared to any other alternative provided. While comparing on basis of finances also, as given in the Problem statement converting online services will help in acquiring good profits then compared to other alternatives. When we consider TCO and TBO also after comparing all the direct and indirect costs we can still conclude that our Alternative 2 would give better results. As in the custom system there will be few costs which will be exceeding the estimated results. Hence, we will then cross-evaluate by checking Total benefits depending upon the Accuracy and Efficiency of different Alternative considerations.

After getting the similar kind of results by all of the metrics, TCO and TBO we performed Cost analysis where we found the Alternative 1 was already getting less profit and ROI. But when comparing the remaining Alternatives as well, we could find the least payback was for 2 years and for Alternative 2 with high ROI of 35%, while alternative 3 had 13.5% ROI only.

Hence after close comparison of all alternatives, we could conclude by recommending the **Alternative 2(Purchase a web package)** in order to be efficient with all the results.

Project Part 2:

The owners of LS have decided that building an online shopping system will provide the most value to LS. Your team has been asked to continue with the project and develop this system. (See Textbook pp. 112 – Q4, Q5, Q6)

1. **A list of the resources** needed to complete the project. This should include

   a. People (and their roles)
   b. Technology
   c. Facilities
   d. Other—For example, travel, training, and so on.

   A table to depict the Resources and description of the resources.

RESOURCES	
People	**Team lead:** will coordinate all team activities and guide members. will be responsible in developing the project plan, budget and scope. **Developer:** member who will develop, update, and maintain the software in Lubbock Supermarket. **Client:** will supervise the managers activities and will be giving the project with financial support
Technology	**Software:** WordPress, SEO (search engine optimization), Outlook or Gmail for mails **Hardware:** Workspace: PC with server Printer/Scanner **Technology:** Internet service from AT&T fiber
Facilities	The Lubbock supermarket has a limited budget. We will do the development of this project at our workplace The Office Administrator who will take care of Everything and supervises the work in office.
Other	**Maintenance:** An employee who has been trained for handling and modifying the system will be in charge of website maintenance. **Training:** The team lead will train the employee to maintain and support the system

2. An estimate for the cost of each resource.

People Resource table:

Resource	Cost	Source
Team lead	10240.00$ during project time frame	https://flexiple.com/software/hourly-rate/
Developer	10240.00$ during project time frame	https://www.randstad.co.uk/career-advice/job-profiles/full-stack-developer
Client	45,425.99$ during and after project time frame (payable amount)	TCO

Technology Resource table:

Resource	Cost	Source
Software	WordPress for 540$ per year. Search Engine Optimization (SEO) for $650 per month	https://wordpress.com/ https://www.searchberg.com/
Hardware	Workspace: PC is Dell Workstation laptop for 799$ Server is 1000$ HP Officejet Pro 8025e All-in-One Printer for 224.00$ AT&T fiber service for 50$ per month	https://www.amazon.com/ref=nav_logo https://www.servermania.com/ https://www.hp.com/us-en/shop/pdp/hp-officejet-pro-8025e-all-in-one-printer https://www.highspeedinternet.com

Facilities Resource Table:

Resource	Cost	Source
Facilities	$400 per month (basic rent and salary covered for the admin {Senior Developer})	The source is from TCO (it is based on the expenses of the workspace) and the Office Administrator who will take care of Everything and supervises the work in office.

Other Resource Table:

Resource	Cost	Source
Maintenance	750$ per month for website maintenance	https://www.hostinger.com/tutorials/website-maintenance-cost
Training	1200$ per a day for training	https://www.knowledgecity.com/blog/employee-training-costs/

RESULT: We described all the Resources we have taken for our Recommended Alternative (Purchase a Webpage) and its costs in the above-mentioned tables with all the sources taken**.**

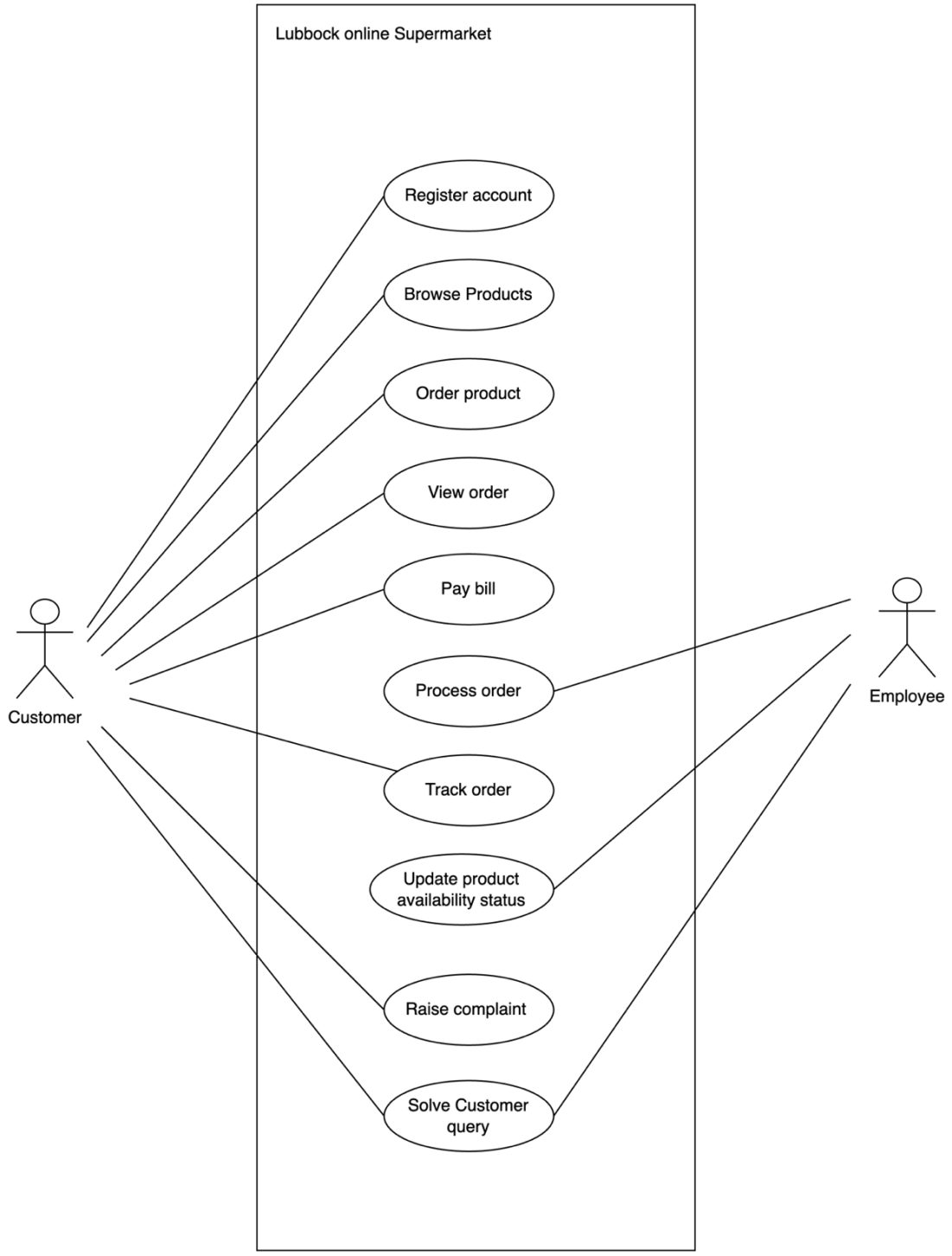
3. Since you will be paid for your work with LS, decide **which contract** makes the most sense for you and your client.

Contract Type:

In our project, Alternative 2 has been chosen as the best Alternative and the most efficient one, and the software packages and services are already provided and are fixed in the project, hence the **fixed – price or lump - sum contracts** can be considered as the contract type. The project scope can also be easily determined as the project requirements are stable with no major changes but as we are using reuse-oriented model, we might have tiny changes. The scope of small modifications in the budget and schedule can be inculcated as in this kind of contract because the chance of slight change is given. In this contract there's a flexibility in terms of salaries based on performance, the incentives are given for better performance and penalties for not reaching the milestone. Also, the Consultant firm will set a fixed price based on the project requirements, and all the analysis which has been done in terms of TCO, TBO etc.

Project Part 3:

1. Develop the use cases proposed for the project and draw the use case diagram. The use case model needs to provide at least 8 use cases, which include Browse product use case, Order product use case, View order use case, and Process order.



Use Case Description:

Use case 1: Register Account

In this use case, the customer registers to new account by giving their details.

Use case 2: Browse Products

This use case allows users to search for the products they want to purchase. If the product is not available, system shows it as sold out and recommends similar products.

Use case 3: Order Product

After browsing required product, user can click on purchase product and give required details.

Use case 4: View Order

After completing all the initial steps of Purchasing, the customer will get a chance to view their order before paying for the order. Here, details like product name, quantity, price etc will be displayed.

Use case 5: Pay bill

After reviewing order, customer can select payment method and proceed for order payment. In this use case, it allows customer to choose different payment methods to select options like pay with credit card, debit card, etc.

Use case 6: Process Order

This use case is handled by the employee from Lubbock online super market. In this use case, the order from customer will be processed by the employee after the order is placed.

Use case 7: Track order

Customer can track the shipping status of their order in this use case by proving the tracking number and other details.

Use case 8: Update product availability status

This is handled by the employee from Lubbock online super market. In this use case, the employee monitors the availability of the product and update it in the online system accordingly.

Use case 9: Raise Complaint

If customer have any issue with the online store, he will raise a compliant in this use case and this will be solved by the employees by interacting with customers.

Use case 10: Solve Customer Query

Like mentioned in above use case description, after customer raise any compliant, the employee of Lubbock online supermarket will be in contact with customer and resolve the issue online.

2. **Modify the deliverable structure chart (DSC)** for your development lifecycle. Your team can select a development lifecycle, such as the waterfall, reuse-oriented, incremental, or agile (See lecture 3). For example, the waterfall model (or methodology) can have requirements specification, requirements analysis, software architectural design, detailed design, coding, unit testing, integration testing, and system testing.
   To implement our project, we have considered **reuse-oriented architecture.**
   Why reuse oriented architecture?
   Reuse Oriented Model (ROM) refers to phases of software development that take place over a fixed period of time and involve redesigning software by building a series of prototypes known as models. Each system is built on top of the one before it using a set of consistent rules.
   It mainly concentrates on the 4 things:
   - Finding the old system's components that can be reused the most.
   - To understand all components of the system.
   - To modify outdated system components to meet new requirements.
   - In order to integrate all updated components into the new system.

   How does it help our System?
   Here we are working on an online website where we are considering the pre-existing software components including a Computer Based System, whose components can be reused and integrated in our new Online system. We evaluate the components and check for compatibility and functionality, modify the website's requirements to make room for the designs, and creates the website by integrating the components and putting the application logic into place. It reduces the total cost of software development compared to the other models. In addition to that reuse-oriented architecture saves a lot of time and effort. Reuse oriented model saves development time of the project. It gives us a lot of flexibility in requirement modification which can turn out to be a pro in some cases as well as con as too much scope of requirements getting compromised. But that flexibility would play very crucial role in our Project.
   So reasons to select this model:
   - Requirements can be modified.
   - Can reuse same components.
   - Integration of components towards the end.
   - To change and reuse same components according to the need.

   Here, we have considered two Diagram flows for the reuse-oriented model which we have incorporated in our DSC (Deliverable Structure Chart) supporting our model. Below are the two figures used to depict the flow.
   In the first and second depictions, a slight change has been shown by just combining two parallel phases, which actually helps us understand better what the phases are for. We have inculcated the knowledge derived from both of them into our DSC and WBS. By taking the deliverables and milestones it needs to achieve in order to complete the project.

Reuse-Oriented Model:

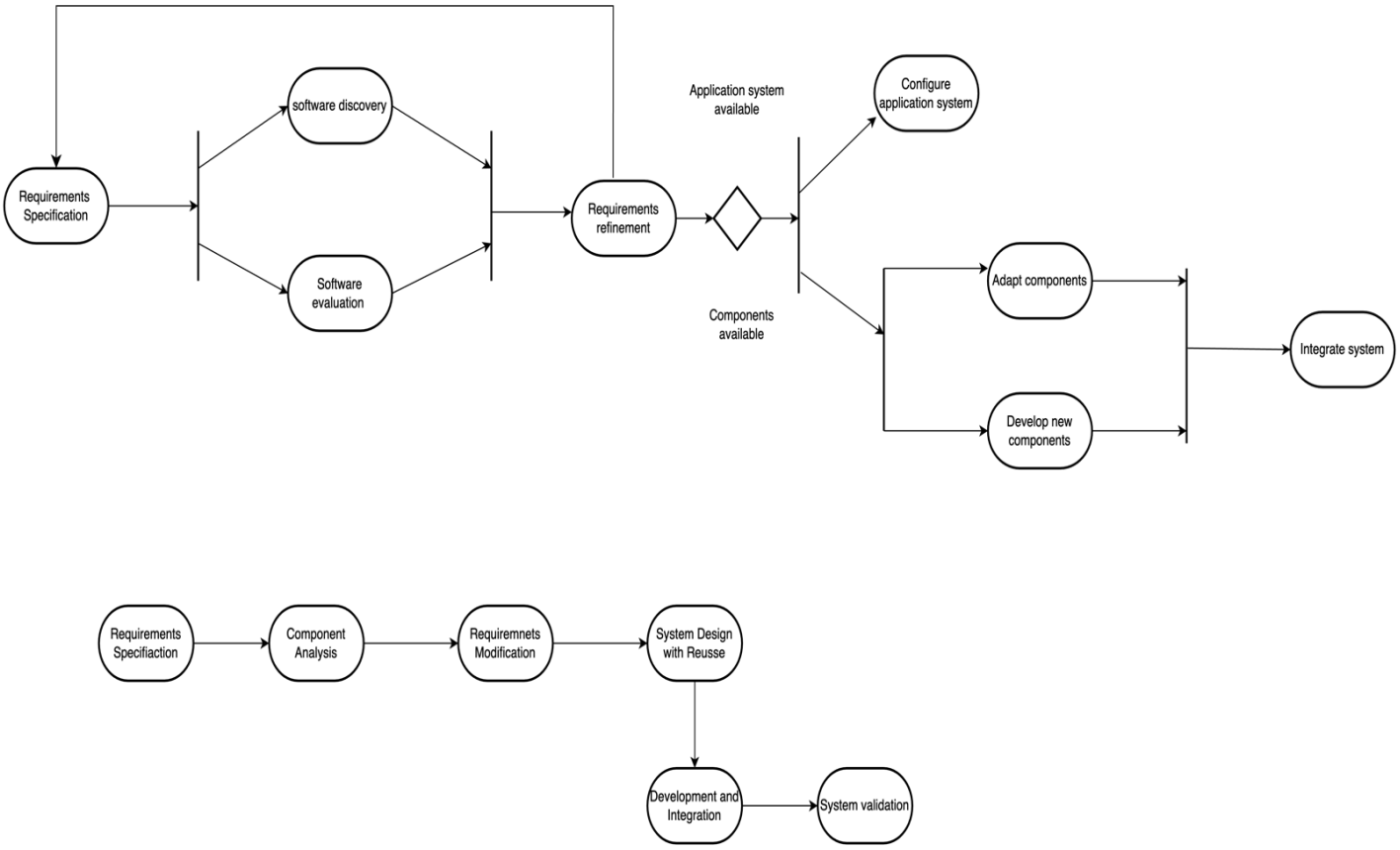


Fig 1 shows, the parallel phases approach
Fig 2 shows, the integrated version for the whole Model.

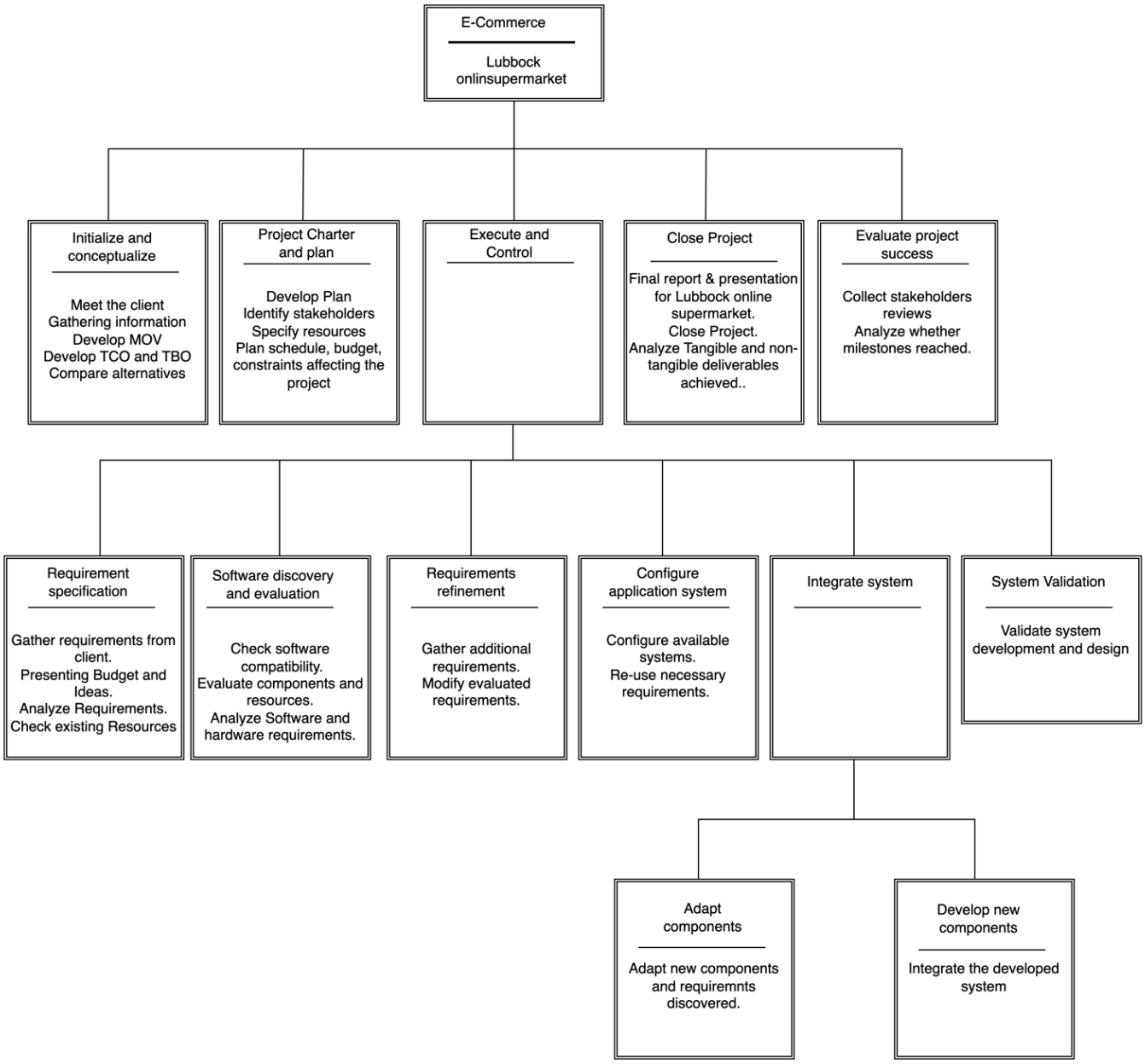
Referenced from:

Fig 1: Leture Slides
Fig 2: Internet

Deliverable structure chart (DSC):

This chart provides evidence of project progress.

- It Consists of Business case, project charter, project plan etc.
- It helps in current systems study, requirements definition, document design etc.
- Shows deliverables and milestones for the considered of Software Development Lifecycle.
- Defines Scope and helps in getting a clear picture of the overall progress of the project.



3. . Convert your deliverable structure chart (DSC) to a WBS.

WBS is a work breakdown structure which will be created on basis of the Lifecycle we have considered for our project which is Reuse-oriented model and for that first we are depicting that in a sequential form. Where we will be listing all the deliverables and Milestones.
It's divided into specific deliverables and defines the activities or tasks for deliverable requirements
Links the project scope to the schedule and budget based on the initial plan.

Work Breakdown structure

1. Lubbock online shopping

1.1. Initialize & Conceptualize Phase

- **1.1.1.** Meet the client
- **1.1.2.** Gathering information
- **1.1.3.** Develop MOV
- **1.1.4.** Develop TCO and TBO
- **1.1.5.** Compare alternatives
- **1.1.6.** **Milestone:** Initialize and Conceptualize Phase completed

1.2. Project Charter & Plan Phase

- **1.2.1.** Develop Plan
- **1.2.2.** Identify stakeholders
- **1.2.3.** Specify Resources
- **1.2.4.** Plan Schedule, budget and constraints affecting the project.
- **1.2.5.** **Milestone:** Planning Completion

1.3. Execute & Control Phase

- **1.3.1. Requirement specification**
  - **1.3.1.1.** Gather requirements from client
  - **1.3.1.2.** Presenting Budget and Ideas
  - **1.3.1.3.** Analyze Requirements
  - **1.3.1.4.** Check existing Resources
  - **1.3.1.5.** **Milestone:** Gathered Requirements
- **1.3.2. Software discovery and evaluation**
  - **1.3.2.1.** Check Software compatibility
  - **1.3.2.2.** Evaluate Components and Resources
  - **1.3.2.3.** Analyze Software and Hardware requirements
  - **1.3.2.4.** **Milestone:** Software discovery and evaluation complete
- **1.3.3. Requirements refinement**
  - **1.3.3.1.** Gather additional requirements
  - **1.3.3.2.** Modify Evaluated Requirements
  - **1.3.3.3.** **Milestone:** Modified and Refined requirements gathered
- **1.3.4. Configure application system**
  - **1.3.4.1.** Configure available systems
  - **1.3.4.2.** Re-use necessary requirements.
  - **1.3.4.3.** **Milestone:** System Configuration completed.
- **1.3.5. Integrate System**
  - **1.3.5.1.** Adapt new Components and requirements discovered.
  - **1.3.5.2.** Integrate the developed System.

1.3.5.3. Milestone: System Integration done.

1.3.6. System Validation

1.3.6.1. Validate System Development and design.

1.3.7. Milestone: System Validation Completed

1.4. Close Project

1.4.1. Final Report & Presentation for Lubbock Online supermarket

1.4.2. Close Project

1.4.3. Analyze Tangible and non-tangible Deliverables achieved.

1.4.4. Milestone: Lubbock Online Supermarket Closure

1.5. Evaluate Project Success Phase

1.5.1. Collect Stakeholders reviews

1.5.2. Analyze whether Milestones Reached

1.5.3. Milestone: Project Successful

1.6. Milestone: Project Complete

Now, we will write the WBS, in more detailed tabular form covering the deliverables, phases, duration, and milestones for the activities/tasks.

Task Name	Duration	Start	Finish	Resource Names
LUBBOCK ONLINE SUPERMARKET	60 days	Mon 05/01/23	Fri 6/28/23	Consultant or Developers
Initialize & Conceptualize Phase 1	1 day	Mon 5/01/23	Mon 5/01/23	Team Manager
Meeting with client	1 day	Mon 5/01/23	Mon 5/01/23	Team Manager
Gathering information	1 day	Mon 5/01/23	Mon 5/01/23	Team Manager
Develop MOV	1 day	Mon 5/01/23	Mon 5/01/23	Team Manager
Develop TCO and TBO	1 day	Mon 5/01/23	Mon 5/01/23	Team Manager

Compare alternatives	1 day	Mon 5/01/23	Mon 5/01/23	Team Manager
Milestone: Initialize and conceptualize phase completed.	0 day	Mon 5/01/23	Mon 5/01/23	
Project Charter and Plan	1 day	Tue 5/02/23	Tue 5/02/23	Team Manager
Develop Plan	1 day	Tue 5/02/23	Tue 5/02/23	Team Manager
Identify stakeholders	1 day	Tue 5/02/23	Tue 5/02/23	Team Manager
Specify resources	1 day	Tue 5/02/23	Tue 5/02/23	Team Manager
Plan budget, constraints effecting the project	1 day	Tue 5/02/23	Tue 5/02/23	Team Manager
Milestone: Planning completion.	0 day	Tue 5/02/23	Tue 5/02/23	
Execute and control	46 days	Wed 5/03/23	Mon 7/03/23	Team Manager, Developer
Requirement specification	2 days	Wed 5/03/23	Thu 5/04/23	Team Manager, Developer
Gather requirements from client	1 days	Wed 5/03/23	Wed 5/03/23	Team manager, Developer
Presenting Budget and Ideas.	1 days	Wed 5/03/23	Wed 5/03/23	Team Manager, Developer
Analyze Requirements	1 days	Thu 5/04/23	Thu 5/04/23	Team Manager, Developer

Check existing resources	1 days	Thu 5/04/23	Thu 5/04/23	Team Manager, Developer
Milestone: Gathered requirements	0 days	Thu 5/04/23	Thu 5/04/23	
Software discovery and evaluation	4 days	Fri 5/05/23	Wed 5/10/23	Team manager, Developer
Check software compatibility	1 day	Fri 5/05/23	Fri 5/05/23	Developer
Evaluate components and resources	2 days	Mon 5/08/23	Tue 5/09/23	Developer
Analyze software and hardware requirements	1 day	Wed 5/10/23	Wed 5/10/23	Developer
Milestone: Software discovery and evaluation complete.	0 days	Wed 5/10/23	Wed 5/10/23	
Requirements refinement	2 days	Thu 5/11/23	Fri 5/12/23	
Gather additional requirements	1 day	Thu 5/11/23	Thu 5/11/23	Developer
Modify evaluated requirements.	1 day	Fri 5/12/23	Fri 5/12/23	Developer
Milestone: Modified and refined requirements gathered.	0 days	Fri 5/12/23	Fri 5/12/23	

Configure application system	20 days	Mon 5/15/23	Fri 6/9/23	
Configure available systems	10 days	Mon 5/15/23	Fri 5/26/23	Developer
Re-use necessary requirements	10 days	Mon 5/29/23	Fri 6/9/23	Developer
Milestone: System configuration complete.	0 days	Fri 6/9/23	Fri 6/9/23	
Integrate the developed system	12 days	Mon 6/12/23	Tue 6/27/23	Developer
Adapt components	5 days	Mon 6/12/23	Fri 6/16/23	
Adapt new components and requirements discovered	5 days	Mon 6/12/23	Fri 6/16/23	Developer
Develop new components	7 days	Mon 6/19/23	Tue 6/27/23	
Integrate the developed system	7 days	Mon 6/19/23	Tue 6/27/23	Developer
Milestone: System integration complete.	0 days	Tue 6/27/23	Tue 6/27/23	
System Validation	6 days	Wed 6/28/23	Wed 6/05/23	
Validate system development and design	6 days	Wed 6/28/23	Wed 6/05/23	Developer
Milestone: System validation complete	0 days	Wed 6/05/23	Wed 6/05/23	
Close Project	7 days	Thu 6/06/23	Fri 6/14/23	

Final report & presentation for Lubbock online supermarket.	1 day	Thu 6/06/23	Thu 6/06/23	Team manager, Developer
Close project	1 day	Fri 6/07/23	Fri 6/07/23	Team manager
Analyze tangible and non-tangible deliverables achieved	5 days	Mon 6/10/23	Fri 6/14/23	Developer
Milestone: Lubbock online supermarket closure.	0 days	Fri 6/14/23	Fri 6/14/23	
Evaluate project success	5 days	Mon 6/17/23	Fri 6/21/23	Team manager
Collect stakeholders' reviews	2 days	Mon 6/24/23	Tue 6/25/23	Team manager
Analyze whether milestones reached	3 days	Wed 6/26/23	Fri 6/28/23	Team manager
Milestone: Project successful.	0 days	Fri 6/28/23	Fri 6/28/23	

RESULT: Some of the Deliverables, milestones, and resources of all phases of our model, based on the Duration etc has been recorded for the further study of our project and it's progress.

- In the Resources column, we have considered the admin responsible for that task/activity.
- In the Deliverables column, we consider the tasks need to be completed.
- In the Duration column, we will be documenting the number of days required to complete that task.

Project Part 4:

1. Define a table for activities for AON (See Table 6.1).

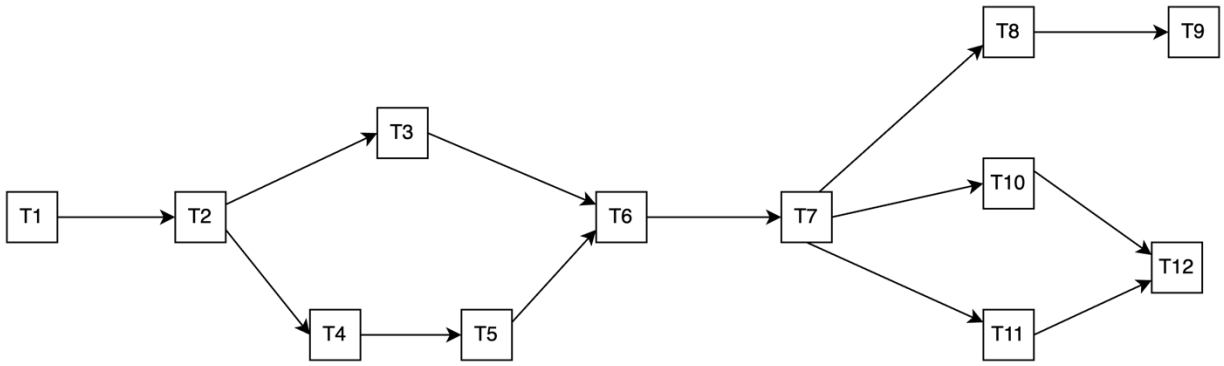
Activities/Tasks	Description	Estimated duration (Days)	Predecessor
T1	Gather requirements from client, Presenting Budget and Ideas	1	None
T2	Analyze Requirements and Check existing resources	1	T1
T3	Check software compatibility	1	T2
T4	Evaluate components and resources	2	T2
T5	Analyze software and hardware requirements	1	T4
T6	Gather additional requirements	1	T3, T5
T7	Modify evaluated requirements.	1	T6
T8	Configure available systems	10	T7
T9	Re-use necessary requirements	10	T8
T10	Adapt new components and requirements discovered	5	T7
T11	Integrate the developed system	7	T7
T12	Validate system development and design	6	T10, T11

Assumptions:

The tasks we took in AON are from the execute and control phase. Based on the execute and control phase we estimate the durations of tasks and determine predecessors of the tasks.

- The duration is said to be the time taken to complete that particular tasks.
- The tasks/ activities section has been taken from the
- The predecessors for each task will be responsible and dependent on some previous tasks and all of them will be considered in a sequential form according to the SDLC selected and AON diagram will be acquired.
-

2. Draw AON Network Diagram (See Fig. 6.4).



Assumptions:

We represent the AON network diagram of the tasks based on the reuse – oriented model and the tasks are taken the nodes of our AON diagram. Here the base would be the SDLC model and the deliverables obtained from each phase of Execute and Control in that model.
Here is the depiction for the same.

3. Find a critical path(s) for your project.

Possible Paths	Path	Total
Path 1	T1 + T2 + T3 + T6 + T7 + T8 + T9	25
	1 + 1 + 1 + 1 + 1 + 10 + 10	
Path 2	T1 + T2 + T4 + T5 + T6 + T7 + T8 + T9	28 *
	1 + 1 + 2 + 1 + 1 + 1 + 1 + 10 + 10	
Path 3	T1 + T2 + T3 + T6 + T7 + T10 + T12	16
	1 + 1 + 1 + 1 + 1 + 5 + 6	
Path 4	T1 + T2 + T3 + T6 + T7 + T11 + T12	18
	1 + 1 + 1 + 1 + 1 + 7 + 6	
Path 5	T1 + T2 + T4 + T5 + T6 + T7 + T10 + T12	18
	1 + 1 + 2 + 1 + 1 + 1 + 5 + 6	
Path 6	T1 + T2 + T4 + T5 + T6 + T7 + T11 + T12	20
	1 + 1 + 2 + 1 + 1 + 1 + 7 + 6	

The critical path of our project is path 2.
We acquire this according to the tasks and days required to complete it. That being said we calculate the critical path by calculating the longest path, i.e., the most no. of days required to complete the project. In this scenario, we can't add any slack/float further to the critical path as it is the shortest span of time we have in our hands to finish the project. But the developer (senior consultant) can add slack to other paths to experiment and see if they get any better outcomes.

Project Part 5:

A project risk analysis and plan:

1. Using the **Risk Identification Framework** in Figure 7.2 as a basis, identify a total of five risks to your project. More specifically, identify one risk for each of the five phases of the project methodology depicted in the outer ring of the framework. Then, use the framework for analyzing each risk by moving from the outer ring to the center.
Applying the project risk identification framework:

1. **Conceptualize and initialize Phase:**
Assumed Risk: In the starting phase of the project, the consultants/developers meet the client and discuss about the requirements specification of the project scope. While gathering these requirements, there might be a chance of compromising in requirements. And this can be one of the risk in this phase. By Applying risk identification factor,
1) This risk occurred in conceptualization and initialize phase of the project while gathering requirements.
2) It was known-unknown risks because while gathering
3) It was an internal risk, and the project team should be held responsible.
4) The sources of risk to the project include organization – because the project team is responsible for this risk, people because the management was responsible for gathering incorrect requirements.
5) The impact on the project is significant because it affects the project's quality, schedule.
6) Because the project team would not finish the scope as originally anticipated, it is possible that the project's MOV would also alter. The project's altered scope, timing, and budget would be determined by a revised MOV.

2. Develop Project Charter and Plan:
Assumed Risk: Budget Conflicts
1) This risk occurred in Develop project Charter and Plan phase of the project while gathering requirements.
2) It was known risks because it was known that budget requirements that was gathered from client and estimated budget may vary.
3) It was an internal risk, and the project manager should be held responsible.
4) The sources of risk to the project include organization – because the project manager is responsible to tally both client's budget requirements and estimated budget.
5) The impact on the project is significant because it affects the project's Budget.
6) Because the project team would not finish the scope as originally anticipated, it is possible that the project's MOV would also alter. The project's altered scope, timing, and budget would be determined by a revised MOV.

3. Execute and Control:
Assumed Risk: During the development phase, there is a chance of risk where a system might fail, and work stops abruptly at critical phase of development. By applying risk identification factor,
1) This risk occurred in execute and control phase of the project while gathering requirements.
2) It was known-unknown risks. Known because system crashes are expected while developing a project, unknown because did not expect the crash would happen at that critical phase of development which cause delay.

3) It was an internal risk, and the project team should be held responsible.
4) The sources of risk to the project include technology – because of the system crash.
5) The impact on the project is significant because it affects the project's budget, schedule. Budget because -requires additional costs to fix the system issue and schedule because the development stopped for some time, so the planned schedule have to be changed.
6) Because the project team would not finish the scope as originally anticipated because of change in schedule and budget, it is possible that the project's MOV would also alter. The project's altered schedule and budget would be determined by a revised MOV.

4. Close Project:

Assumed Risk: During the close project phase, there is a chance of raising conflicts between stakeholder and developers if the stakeholder is not satisfied with the outcomes. By applying risk identification factor,
1) This risk occurred in close phase of the project while gathering requirements.
2) It was known-unknown risks. Known because system crashes are expected while developing a project, unknown because did not expect the crash would happen at that critical phase of development which cause delay.
3) It was an internal risk, and the project team should be held responsible because it was a problem from team side of not understanding the stakeholder's view properly.
4) The sources of risk to the project include people, legal.
5) The impact on the project is significant because it affects the project's scope, budget, schedule. Scope because of new requirements, budget and schedule because scope has changed.
6) Because the project team would not finish the scope as originally anticipated because of change in scope, schedule and budget, it is possible that the project's MOV would also alter. The project's altered scope, schedule and budget would be determined by a revised MOV.

5. Evaluate Project Success:

Assumed Risk: During the Evaluate project phase, there is a chance of missing some milestones which might lead to not meeting scope of the project. By applying risk identification factor,
1) This risk occurred in Evaluate project success phase of the project while evaluating the scope of the project.
2) It was known-unknown risks. Known because system crashes are expected while developing a project, unknown because did not expect the crash would happen at that critical phase of development which cause delay.
3) It was an internal risk, and the project team should be held responsible because it was a problem from team side for missing milestones.
4) The sources of risk to the project include organization, people.
5) The impact on the project is significant because it affects the project's schedule, budget. New budget and schedule must be calculated to achieve missed milestones.
6) Because the project team would not finish the scope as originally anticipated because of change in scope, schedule and budget, it is possible that the project's MOV would also alter. The project's altered scope, schedule and budget would be determined by a revised MOV.

2. For each of the **five risks identified, assign an owner** to each risk and describe a strategy for managing each particular risk.

1) **Risk: Requirement specification compromise**
Phase: Conceptualize and initialize phase
Owner: Project Manager

Strategy: To manage this risk, the project manager will ensure that all the requirements from stakeholders are gathered and analyzed. Any changes made to the requirement specifications will be communicated and approved by all stakeholders by setting up meetings before being implemented. To minimize the risk of requirement specification, the project manager have to make sure that the updated requirement specifications are properly evaluated, approved, and implemented, minimizing the risk of requirement specification compromise.

2) **Risk: Budget conflicts**
Phase: Develop project charter and plan
Owner: Project Manager

Strategy: To manage this risk, the Project manager will work closely with the stakeholders to estimate realistic budget for the project. The Project manager will also identify potential areas of budget conflict and develop plans to avoid conflicts. The Project manager will regularly monitor the project budget and communicate with the stakeholders. Additionally, to minimize the risk of budget conflicts, the project manager has to make sure that any change in budget estimates are properly evaluated, approved, to minimize the risk of budget conflicts.

3) **Risk: System crash while developing**
Phase: Execute and control
Owner: Project Manager and Team

Strategy: To manage this risk, the project manager will work closely with the development team to ensure that appropriate testing measures are taken to minimize the risk of system crashes. The project manager will also monitor the system regularly to identify any potential issues and work with the development team to address them regularly. If there is any system crash, the project manager will make sure that there is appropriate backup and crash recovery methods are in place to minimize downtime and data loss.

4) **Risk: Conflicts between stakeholders and developers**
Phase: Close Project
Owner: Project Manager

Strategy: To manage this risk, the project manager will make sure that proper meetings are established between stakeholders and developers from the start. The project manager will work with both developer and stakeholders in order to identify main conflicts and setup discussions between them mutually agreeable solutions. The project manager will also make sure that all stakeholders are kept informed of the project's progress and that any

changes to project scope or requirements are communicated to all stakeholder's time to time. Additionally, the project manager will establish clear lines of responsibility and accountability for all stakeholders and developers to minimize the risk of conflicts arising due to misunderstandings or miscommunication.

5) **Risk: Missing milestones**
Phase: Evaluate Project Success
Owner: Project Manager

Strategy: To manage this risk, the project manager will establish a detailed project schedule with clear milestones and deadlines for each phase of the project. The project manager will work with the developer's team to identify any delays that could prevent the team from meeting these milestones and will develop plans to address these delays. The project manager will also regularly monitor the progress of the project and provide status updates to stakeholders to ensure that everyone is aware of any potential risks or delays. If there is any milestone missed, the project manager will work with the development team to identify suitable solutions, such as reallocating resources or adjusting the project schedule, in order to keep the project on track. Additionally, the project manager will ensure that all team members are held accountable for meeting their individual milestones and that any issues that arise are correctly addressed.

References:

1. Lecture notes 1 to 9
2. Jack T. Marchewka, Information Technology Project, Wiley, 2015 Chapter 1 – The Nature of Information Technology Projects
3. https://www.slideshare.net/IngridSalgado4/husky-air-project-charter-95717794
4. https://sites.google.com/site/huskyairdeliverables/home/teamrules