THE MARGINALIZING DIFFERENCE AMONG CUSTOMER'S NEEDS AND EXPECTATIONS

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ISLAMABAD
SEPTEMBER, 2021

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THESIS TITLE: The Marginalizing difference among customer's needs and expectations

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SADIA GUL

A thesis submitted in fulfillment of the
requirements for the award of the degree of
Master of (Software Engineering)

Department of Software Engineering
National University of Modern Languages

SEPTEMBER 2021

DECLARATION

I declare that this thesis entitled “The marginalizing difference among customer’s needs and expectations” is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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Name : Sadia Gul

Date : September 6th, 2021

This thesis work is dedicated to my parents and my teachers throughout my education career who have not only loved me unconditionally but whose good examples have taught me to work hard for the things that I aspire to achieve.

ACKNOWLEDGEMENT

First of all, I wish to express my gratitude and deep appreciation to Almighty Allah, who made this study possible and successful. This study would not be accomplished unless the honest espousal that was extended from several sources for which I would like to express my sincere thankfulness and gratitude. Yet, there were significant contributors for my attained success and I cannot forget their input, especially my research supervisors, Asst. Prof. Dr.Basit Shahzad, who did not leave any stone unturned to guide me during my research journey.

I shall also acknowledge the extended assistance from the administrations of Department of Software Engineering who supported me all through my research experience and simplified the challenges I faced. For all whom I did not mention but I shall not neglect their significant contribution, thanks for everything.

ABSTRACT

Software engineering is defined as a process of analyzing, understanding the user requirements, and then designing, constructing, and testing the software product according to user requirements. The requirement elicitation is the foundation and first activity of the software development process. During the elicitation phase, we face several issues related to customer needs and wants. Our research aims to marginalize the customer's needs and expectations. To identify the gap,we take an example through a literature review. First, we classify the gaps in the literature with support of a systematic literature review(SLR). We identify all high values possible gaps from literature. After that, we survey different software organizations .basically we used a mixed-method methodology to minimize the gaps. The mixed methodology will be used to minimize the gap between customer's needs and wants. In mixed methodology, we used qualitative analysis and quantitative analysis. The validation takes place under the triangulation process. The triangulation process is based on both qualitative analysis and quantitative analysis. After the triangulation process, we proposed a framework to reduce the gaps between customers' needs and wants. Through framework give all possible high values solutions that are discussed in a different journal paper. We merge all possible high-value solutions in our framework. Our contributions are to minimize the gap between customer's needs and expectations.

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LIST OF ABBREVIATIONS

SLR	-	Systematic Literature Review
FR	-	Functional Requirements
NFR	-	Non-Functional Requirements
SDLC	-	Software Development Life Cycle

LIST OF SYMBOLS

A	-	Normalization symbol or smoothness factor
B	-	Normalization Symbol for link quality estimation
$\mu(i)$	-	Represents membership function for high quality links
Δt	-	Represents high precision time

CHAPTER 1

INTRODUCTION

1.1 Introduction

Software engineering is defined as a process of analyzing, understanding the user requirements and then designing, constructing and testing the software product according to user requirement. In general, Software engineering consists of requirement gathering, planning, designing and testing phases. Similarly, requirement engineering (RE) is most difficult area with in software development process because it depends on user requirement that lead to final software product[1]. Requirement engineering is based on four phases. In requirement elicitation phase, we collect requirements from users, in requirement analysis phase user requirements are analyzed, in specification phase, final list of functional requirements are identified in document known as SRS[2]. In validation phase, requirements are validated against SRS. It is vital to get those requirements from customer to fulfill customer and market needs.

User requirement is directly linked to requirement elicitation technique. Requirement elicitation phase is an essential of software development process. It establishes the foundation of software product between client and development team[3]. A successful software project development is based on true requirements from customer at right time. The meaning of true requirement is to understand the user requirements and develop with in time.

However, there are a lot of difficulties in performing the elicitation activity during requirement collection. There are many ways to get requirements from customer. Few of them are interviews, Brainstorming, prototype, other simple technique for specification of documents and quality function requirement delivery (QFD) and use case approach[4]. Actually data collection from user depends upon nature of software product development procedure. There are main two software development trend followed in software houses and industrial end. First, it is local development of software product and second trend is cross software development of software product. Now a days cross development is getting increasing popularity. Most of software development life cycle is performed by cross development procedure. In development team, team members belong to different countries and perform development process remotely. Through such nature of development, the main challenge faced are requirement gathering and understanding of the requirement from clients to the technical team due to language barrier or communication gap. In local development lifecycle, the main challenge is faced to the development team and customer to requirement gathering and understanding of the requirements due to lack of technical knowledge of the clients.

The failure rate of the software development is increased by the software development activity that develop incorrect functionality. The incorrect software development is just because of lacking of user requirement understanding or irrelevant requirement given from customer. The successful software development is based on gathering right requirements at right time. One of the main gap between user and the development team is communication and language barrier. During cross development, communication gap is the main reason to understand the requirement of users. Second the most of user fail to convey their thoughts or need to the technical team.

The main reason of this research thesis is to highlight those factors that mainly lead to causes of failure software projects. There are so many factor that cause the failure of the projects but the main and very important factor is requirement elicitation activity issues. Basically, it is main and most important factor of software development that cause the failure of software project. There are mainly two reason behind the inconsistent requirement gathering. These two reason are customer is not capable to

convey their requirement in a right way and second is about understanding of the requirement from development team due to communication gap. In short, this study aims to find gap between customers' needs and wants and demonstrates the problems originate because of this gap.

1.2 Literature Review

The literature review is based on those examples that different authors perform in different ways and face difficulties to perform requirement elicitation activity. The requirement elicitation activity is perform while getting right requirement either for mobile application, accurate requirement in agile development, mobile interface for elders, evaluation of different tools, requirement elicitation for non-functional, design thinking technique, the effect of a requirements expert's knowledge related to problem domain.

Prasara Jakkaew etl [5] discuss the requirement elicitation process challenges, it is very common while developing software product. The mobile user interface (UI) is very easy to use for elderly and meet functionality with their requirements. For this, the authors meet different requirement elicitation technique for elderly user. These techniques are cover user centered design, the iterative process, persona, use case, prototype, heuristic evaluation and usability testing. To cover all techniques of requirement elicitation in user centered design activities to meet their needs. The user centered design activities are plan, interview, personas, and prototype. The prototype is based on medication reminder and at the end evaluate it by testing it. Through observation, the authors identify those gap and minimized it. Similarly, in second version, the requirement is more improve then first and so on. This shows that prototyping technique and heuristic techniques is used to improve the usability of mobile application for elder.

A. Meligy etl [6] discuss about requirement accuracy getting requirement elicitation. It is more important to achieved more accurately requirement elicitation in agile requirement process. For this purpose, to performed analysis between agile

development process and ethnography. There are necessary to introduce a model that works both ethnography techniques and agile process development. Then come up with ethnographic model.it consist of four phases.

A. Shah etl [7] discuss about evaluation of different requirement tools based on functionality, scope and geographical while getting requirement elicitation .The analysis of requirement tools, they follow few key steps. Those steps are research questions, search strategy, search strings, paper selection, paper evaluation, assessment and analysis. Authors draw different tables based upon specification, location, paid, unpaid version, authors and city. At the end, authors evaluate the tools based on functionality, scope and physical background by comparative analysis and consider more efficient tool that fulfill all requirement elicitation phase through evaluation. In this article, authors evaluate reqtify tool is more efficient in order to functionality, scope and location but this tool is paid and only used in France.

Andreia Silva etl [8]discuss about the requirement elicitation is same important for nonfunctional requirement. For this purpose, they evaluated their NFR guides based on experience of use. Author is evaluated ADEG-NFR guides in the software development organization. The study objective goal is based on question metric Approach. For this purpose, they proposed six parts of study definition. These are motivation, purpose, object, elicitation, perspective domain and scope. The study aim is to fulfillment of its defined objectives. To evaluate the elicitation guide that is based upon user experience. Therefore, three analysis report were executed. First, they compared software architecture quality of software product and amount of nonfunctional requirements defined with and without ADEG-NFR on the same organization. Second, the analysis of the guide by requirement engineer of different organization[9]. Third the guide is also evaluated through customer software projects. Actually this study based upon the experience of used for creating the elicitation guide for nonfunctional requirements[10].

B.Shahzad etl [11] and his team are proposed systematic literature review on elicitation techniques and highlight its issues and problems for mobile applicatons development. The study is highlighted the issues regarding requirement gathering in

mobile application development and try to resolve by giving a systematic literature review guidelines.

After study, they have to combine all data in comprehensive set of 22 elicitation techniques. After overall assessment, the authors described that the main challenges is faced during mobile application requirement gathering is related to stakeholder that is 50% and second is requirement of the project that is 33%. This review shows that, if in upcoming mobile application projects to evaluate these most highlighted issues then it can be overcome the requirement elicitation in mobile development.

W. Silva etl [12] discuss as more important to focused on design thinking (DT) technique using personas and to try overcome the limitations that they are faced in requirement elicitation phase. They are explained DT and other techniques that is used to fulfill its requirement. Persona is a technique that is used to support the requirements elicitation by describing user profiles. For this purpose, to conduct an experiment in an academic environment and compare two techniques that are acuna ET al. and pathy technique. They are conduct an experiment based on application and application concept is all about physician and pregnant women checkup schedule.

A. M. Aranda etl [13] highlight experimentally analyses about the influence of a requirements expert's knowledge related to problem domain. The experiment is conducted based on impact of the interview mediated requirements elicitation phase. The research activity is divided in to two elicitation category. One of the elicitation session and the second is report process. During elicitation session,they get requirements from customers as per their needs. They have chosen those analyst and interviewee that they have knowledge about domain (domain aware) and some of those that they don't have enough knowledge about problem (problem ignorant).the difference between baseline experiment and replication of experiment, baseline experiment conducted as domain aware task perform first and ignorant task is performed later and analyzed based on those results. On the other hand in replication of experiment, the first have chosen ignorant of problem domain and then aware of domain knowledge. At the end, the author's finalize the results, the domain knowledge is greatly effect of problem domain Knowledge.

Z. M. Hussain etl [14] discuss in their conference paper about facing issues when they get requirements for web application.There are many challenges faced during requirement gathering from client side and when arrange face to face interview sometime at start interviewee is not ready to elicit your problem rightly . End of the session problem formulation time, they proposed another problem to solution and so many other problem faced by developer while getting requirements. Sometimes, it cause costly activities in software development .for that the reason, authors proposed a tool named as web elicit requirement. The aim of tool is to get requiremnts through interaction. Basically WERT consist of major few steps, first, tool store information from user then developer derive requirements with respect to requirements. Interface module consist of graphic interactive interface for customers.

Miryam Reyes etl [15] discuss requirement elicitation gaps through SLR.in this paper, authors cover studies from 1993 to 2015. Through SLR, authors try to find out the answers of two questions and those questions were are they used mature techniques for elicitation phase. Which technique is better for elicitation phase? For this purpose , authors found a total 140 studies to answer these questions.in this studies , one thing is highlighted that is techniques used to acquires requirement elicitation process from both academia and industry sides. The collecting data about different techniques and made comparison between different techniques. In the evaluation process, compare which technique is best than others[15].It is important to acquire such user requirements that's engage with IT based system functionalities, then it is possible for both business and IT based system align together.

Samaneh Bagheri etl [16] proposes a reference model for user elicitation requirement process lead to align operational business IT . The objective of the study is to contribute to operational business alignment in IT sector improvement in a VN.

Zuoxu Wang etl[17] proposes a frame work for product services.it is based on graph. There are highlighted issues that is face by different compenies to place in the market .

For this purpose, authors prosed a scientific solution that's is based on smart PSS context.

Muhammad Yaseen etl[18] proposes an approach to manage large sized software requirements while do prioritizations. The purpose of the study is to generate less comparisons during prioritizations.so that proposed an approach that is based on analytic hierarchical process and functional requirements.

Zahid Ali etl[19], discuss about challenges in requirement engineering process. Basically, SLR protocol is proposed to list down all challenges that directly affect the stakeholders. The requirement engineering is implemented through SLR in GSD.at the end, author proposed SLR protocol to find out the challenges at the stakeholder ends.

Muhammad Yaseen etl[20] proposes model for requirement elicitations in the perspective of global software development. Purpose of this study, to develop such model that is based requirements elicitations structure. In this model, both positive and native impact are address during gathered the requirements globally.

1.3 Problem Background

Requirement elicitation is foundation of any software development cycle .but still in the requirement elicitation have gaps to gather the requirements. Most of important gaps that's is still have embark in software development due requirement elicitation phase are Prioritization of customers' requirements[18], Domain knowledge [13]communication gap, ambiguity in requirements[6], brainstorming the right requirement from customers software product demands in the market and customers interest.

1.4 Problem Statement

Software development process is systematic way of developing a software product. The first and main activity in software development process is requirement elicitation to develop a software product. But, it is necessary to understand user needs and expectations .Sometimes, user is not familiar with technical perspective and actual need. User requirement depends different circumstances and they vary from customer to customer. These challenges are language barrier, cross culture, geographical change, time zone difference, terminology difference and not clear about need and expectations. These are issues that are faced by development team. To highlight all the gaps in this context and to minimize those gap is objective of this research thesis.

1.5 Research Questions

First we explore the existing study and find out the all those factors in requirement elicitation phase of software development life cycle. Through systematic literature review highlight all those elicitation factors that impact on whole development process. There are three formulated questions ..

RQ1: How customer's need and expectation differ?

RQ2: What are the consequences of difference in customer's need and expectation?

RQ3: How the gap among the customers need and expectation can be reduce.

1.6 Aim of the Research

Our research aim to contribute in requirement elicitation technique in following way.

1. Identify the difference between customer need and expectation.
2. If customer need and expectation is not same then what are the consequences of it.
3. How to minimize the gap between the customer need and expectation.

1.7 Research Objectives

1. To identify gap between customer's need and expectation
2. To identify the consequences of gaps between customers' needs and expectations.
3. To reduce the gap between customers' expectation and need.

1.8 Scope of Research Work

1. The research solution will based on local market.
2. We will not focused on global software development . GSD has its own set of steps. So that , our research will based on local maket.
3. Identify all possible gaps with in scope but it is possible to not cover all aspect or gaps due to research scope that will medium and small software development process.
4. Our research topic will have one year time frame to complete research thesis and conclude it So, it is not possible to cover over all gaps.

1.9 Research Methodology

The research methodology is based on hybrid method to evaluate the result. Systematic literature review (SLR) is also sort of literature review but it is conducted through systematic way.it is based on systematic method and conduct secondary data through it. The best thing in systematic literature review is evaluated the research studies in a critical way and produce the qualitative and quantitative outcomes. There are capability to provide comprehensive summary of current evidence appropriate to a research issue.

The systematic literature review[21], is very detailed and well defined methodology. In SLR biases chances is very little due to its detailed work. SLR is best in both cases rather for proven some phenomena or combine some data.

The kitchen ham's guidelines have some features. The review protocol is define in Systematic literature review. SLR define protocol that lead to specify the research question and method.it define search strategy either research can be possible or not in certain case and it also lead either data collected completely or not. In SLR focus on primary study.

The main part of kitchen ham's guidelines is the review process, it consists of three further steps. The planning, conducting and reporting the review. First of all, when we conducted a systematic literature review with help of kitchen ham's guideline . it taught us to check the feasibility of research topics. In simple ways either that specific topic needed in SLR or not. So, planning is very necessary before starting review. The pre-review concept is very good in SLR .Through pre review define activities related to research questions that lead to producing a review protocol.

First, we define research procedures and it depends on data and phenomena. For those procedure, we perform some activities, where we need some SLR review. It is important in case of study previous data or existing data or examine the available data. The end of this activity highlight some checklist. Kitchen ham discusses about the research question part. It is a very important part of any SLR review because the whole systematic review depends on questionnaires. For research questionnaires, it is important to identify primary study in the search process then data and extraction process focus on those data objects which needed to describe it. The data analysis part synthesized questions is answerable.

Important part during planning what type of questionnaires is good for related research type. In SLR very important part is to ask right question for right topic. The meaning full questionnaire is to be helpful to generate strength of the research topic during survey. Further population of survey either they belong to Software devlopers, project managers, or research students.Simply specific population targets against specific questionnaires, population can be intervention, comparison and outcomes.

The review protocol, it specifies methods that are used against specific types of systematic review. Review protocol necessary in such cases to reduce biases in

research so, predefined protocol is important for any researcher to overcome the biases in their research. The review protocol contains all important elements of review with additional planning information.

Now come up with second phase of review process that are conducting review. While conducting the review protocol, a preview happened to check the feasibility of research questions. During conducting the review its important to all team member must part of developing review protocol. In conducting a review piloting of research is important and essential. Through piloting researcher can point out the data gathering error and collection procedures.it may cause to change methodology, questionnaires and it can be change some of data extraction form(synthesis method).While conducting review then focus on primary studies related to research question as many as possible about specific questionnaires without biasness. During systematic review avoid publication biases because some researchers focus on only positive results of research .Although during research review can be positive or negative, simple way results can be positive or negative against specific topics.

The research methodology of our study is based on systematic literature review. The methodology is divided in to major four step and those steps are

i. Investigate examples of difference and consequences from literature review
ii. Develop that gap minimization and learnt from examples to proposed guidelines.
iii. The qualitative and quantitative analysis will perform based on gap between customer's need and wants.
iv. Validated the both quantitative and qualitative analysis under triangulation process.

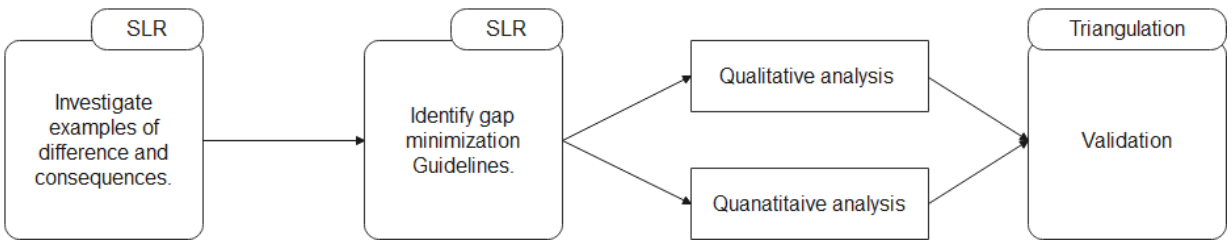


FIGURE 1. Research methodology.

The research methodology is presented related to our target problem statement. Step I, focus on systematic literature review and find out all those examples that create

differences while gathering requirement related to specific software project. All the differences and consequences about requirement elicitation will find out from systematic literature review. SLR will be based on recent journal articles and few conference papers. In step II, highlight all those examples in one table that identify gap of requirement elicitation phase and based on those examples conduct quantitative research. The quantitative study is conducted based on examples which is find out from literature. The gap minimization is develop from examples that is taken from SLR through performing quantitative study. After that, we perform qualitative analysis based on our research problem. In qualitative research, we will take interview from local market. In simple way, try to minimize gap through triangulation method depends on our problem statement. In last step IV, the outcome of triangulation method will discussed through cross check of qualitative study and quantitative study. For all this, it is very necessary to search out right for formulated problem.

1.10 Thesis Organization

The next Chapter covers literature review in which entirely details are explained to relavant studies. The bibliometric analysis is also given in this chapter so that it is in the form of table.It helps to understand literature gaps and evaluate our problem statements

The next chapter 3 will present methodology related to our problem statement. In this section , explains research method that is mixed method research .under mixed method research we explain about qualitative and quantivtative research.Basically mixed method research contains both research method.Survey guidelines will followed to do quantitative analysis. The survey guidelines and all survey steps will described.For qualitative analysis Focused group will conducted so, all the steps of focus group are briefly discussed in this section. In chapter 4 ,we will discuss about survey and focused group results . further , these results are evaluated based on high and low significant factors.

Chapter 5 will explain and analysis the results of qualitative and quantitative research method.from both of research method , we will do comparatative analysis of the results and justified both results. In chapter 6 will give summary of results ,contributions, limittaions, futurework and discussion of overall thesis.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In the previous chapter, discuss the introduction of requirement engineering ,problem statement and background of my domain study. I have more specific with my topic which is linked with requirement elicitation. Now, I have to do a literature review of my topic. The requirement elicitation phase is most important for any software development life cycle. During elicitation phase many of gaps is still remained due to this our software development life cycle is become challenged in case of software failure and challenged software end product. For this purpose, we are going to do SLR to identify the gaps and find out the consequences of these gaps. So that we conducting SLR for this purpose.

The literature review is based on those examples that different authors perform in different ways and face difficulties to perform requirement elicitation activity. The requirement elicitation activity is performed while getting the right requirement either for mobile application, an accurate requirement in agile development, mobile interface for elders, evaluation of different tools, and requirement elicitation for non-functional, design thinking technique, domain knowledge, prototype and brainstorming.

2.2 Systematic Literature Review

The literature is conducted through systematically that is based on SLR.It is based on a systematic method and conducts secondary data through it[21]. The

best thing in SLR is to assess research studies critically and produce qualitative and quantitative outcomes. Through SLR , identify gaps and consequences related to customers needs and wants.

The SLR (systematic literature review) [21], is a very detailed and well-defined methodology. In SLR biases chances is very little due to its detailed work. SLR is best in both cases rather than for proven some phenomena or combine some data.

2.2.1 Systematic literature review Protocols

After the initiation of a SLR since 2004, it is most preferable method to adopt for research in software engineering discipline.SLR protocols is basically consist of evaluating and understanding the research related to a problem statement .we are followed Kitchen ham guidelines in our thesis [21].

For conducting SLR is to designed review protocol .The review protocol consists of seven research phases.

(i) Question
(ii) Search String
(iii) Search process
(iv) Study selection
(v) Quality assessment criteria
(vi) Data collection

The research motivation consist of various problem statements related to their own domains. We are focuses on requirements elicitations in software development life cycle to evaluate existings problems. The thesis questionaires is also part of research motivations because whole thesis based on questionairs that is led by problem statements.

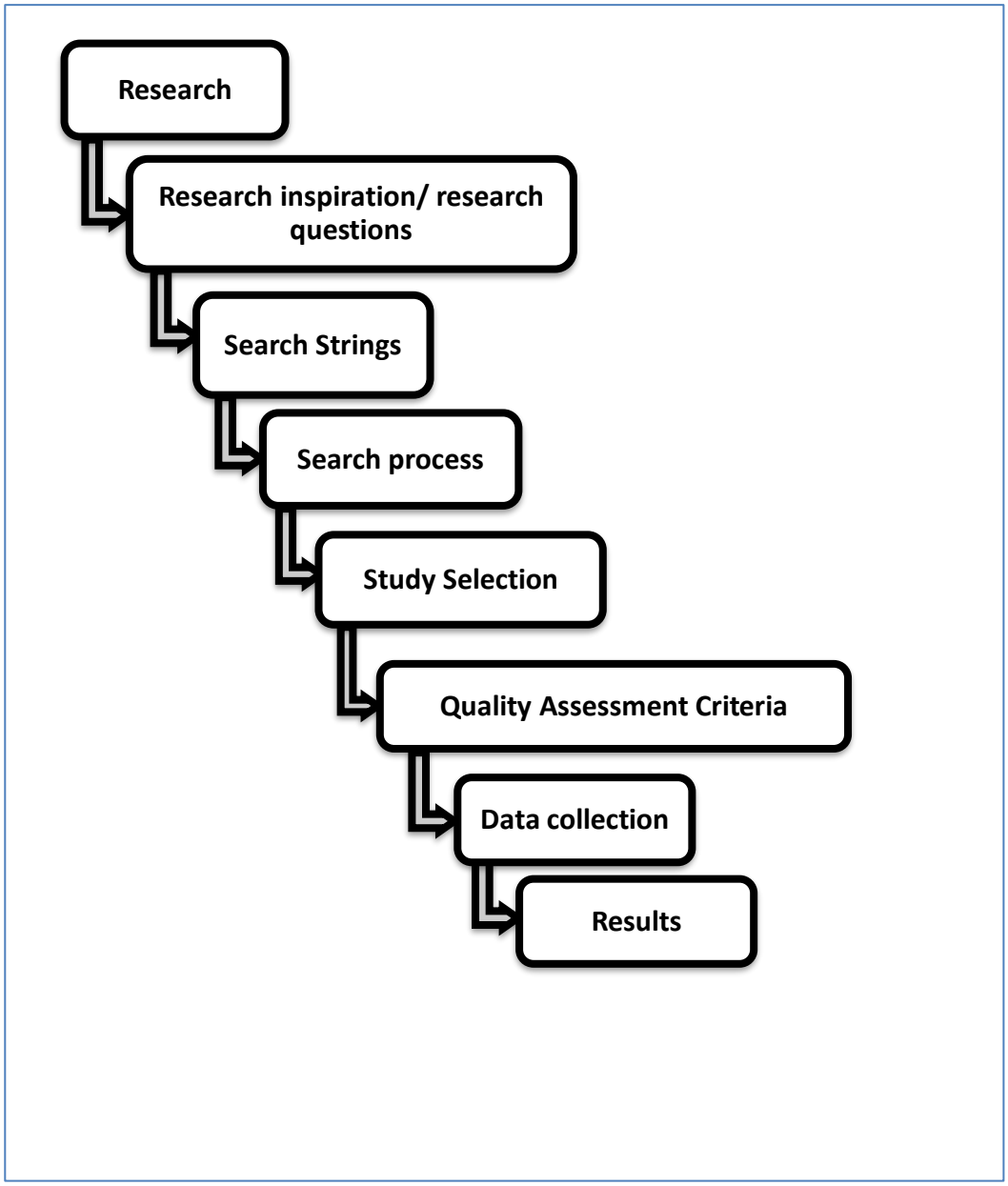


FIGURE 2.Systematic Literature Review Protocols

The questionairs is based on the gap that is stated through problem statement.The formulation of questionairs is also relavant to our domain problems. First of all, we generate search strings related to our problem statements. The search string generate based on strings and specific keywords that is more relevant to our problem statement. These formulated strings are used on different libraries that are IEEE, Springer, ACM, Google Schelor, Wiley inter science and Different electronic databases.to get relevant paper, we applied filtered for this purposed and get relevant quality paper and most recent paper based quality assessment criteria.

2.4.1 Research Motivation

There is a lot of work has been done related to the requirement elicitation in literature but in the differentiation of customer needs and wants a lot of areas needs to be discussed. Identifying the gaps and highlight high value factors during marginalizing customers needs and wants.

The gap will identified through literature and distribute the exisiting high value problems related to customers needs and wants in to factors . The gap is distributed in three phases of elicitaions that's user requirement,product and business requirements.

2.4.2. Research Questions

The identifying the gap from literature , we are highlighted the high values factors from literature . after that , we dentify the consequesces related to customer needs and wants.This research is also used to find out the existing challenges that is being faced when applying the marginalizing difference among customer needs and wants.There are the questions

RQ1. How do customer's needs and expectations differ?
RQ2. What are the consequences of the difference in customer's needs and expectations?
RQ3: How the gap between the customer's needs and expectations can be reduced**.**

2.4.3 Search Process

Search procedure is precisely performed for the retrieve relevant Studies of research.There are different elcctronic databases used to collect research papers. The most used of electronic databases are IEEE, Springer ,Wiley ,Science Direct ,ACM and google Schelor.the search strings is generated based on problem statements.

To acquire the data, a search of internet database keywords is used. Through search keywords , we are enable to searched relavant research data in vast varirties and pssiblities .Kitchen ham's principles to helps in the formation of search strings.Advanced search techniques are applied for vigorous search process , using Boolean search option.the search strings formulated through that's guidelines are taken from Kitchen ham[21].

- Requirement gathering
- Requirement acquisition method
- Problems during requirement elicitation
- Challenges of user need and wants

(Elicitation OR Requirement Gathering OR Requirement Elicitation
OR Requirement Acquisition)
AND
(Method OR Technique OR Way)
(Problems OR Challenges OR Issues)
AND
(User need OR expectation OR wants)

2.4.4. Study Selection

The aim of study to findout the gaps related to customers needs and wants.

2.2.4.1 Inclusion Criteria:

The inclusion Criteria of research is based on title of the paper , abstracts ,keyword and research gap.

- The journal and conference papers are written in the English language.
- The papers discussing the challenges of the requirement elicitation phase.

- Papers discussing the challenges of customer needs and wants.
- Papers published is relavant to Requirement engineering field from the year 2010 to 2021.
- The articles published is able to answers more than one gaps or questions.

2.2.4.2 Exclusion Criteria:

The exclusion criteria is based on following important points .

- The research studies is not considered in an other languages except English.
- Simple papers is not considered that is published on Web.
- Research which is redundant
- There will be not considered any paper that is published in year 2000.
- Papers that are not relavant to our research topic

2.4.5. Quality Assessment Criteria

To evaluate the quality of primary study investigations, QAC are established. The QAC is defined as a set of research questions used for evaluation of the research study'sworth. [21].

The standard checklist is provided by Dyba etl for QAC.the primary goal is to identify most relavant research studies through SLR.the evaluation process is consider through research articles based on search keywords and revalant to problem statements.

2.4.6. Data Collection

The conclusions of the data collection section are brief and most relavant data are gathered from primary research. The quantitative and qualitative data

analysis methodologies are employed for data collection. Data identified gaps between customers' needs and wants through literature with help of empirical support.Preliminary investigation is based on set of steps and respond all the questions in the context of research topic.

RQ1: How customer's need and expectation differ?
RQ2: What are the consequences of difference in customer's need and expectation?
RQ3: How the gap among the customers need and expectation can be reduce.

Requirement elicitation phase in the software development is very basic and foundation of any software product.it is play key role to develop a successful software or challenge software development. So, it is vital to get right requirements from the right person at the right time. For this purpose we conduct of research thesis topic that is based on marginalizing the customer needs and wants. Basically we divide the requirement elicitation phase in to three sub phases. These phases are the following.

a) Business requirement engineering. (Direct with revenue and economy boost up).
b) User requirement engineering (what, How user describe about their requirements).
c) Product engineering (functional and nonfunctional requirements relate to end user side).

Here, the question is arises Why we divide the requirements in three phases?

The answer is we all know, any of software product development cycle these three phases are most important. Because these three phases directly or indirectly gives great impact on software success and failure or can say that it is based on customer acceptance and rejection. First phase is business requirement that is most important for software product, organization and marketing purpose. It is directly linked with revenue of the company and customer engagements.

The second phase is User requirements, it is another very important phase because any of software product development by customer requirements. If

requirement engineer collect the right requirements from the customer automatically it saves the time, budget and effort. At most important, it saves their clients and customer as well. The third phase is based on Product requirements, it is relevant to customer. If customer like the product or we can say that if software product satisfy the customer needs and wants automatically its pay of the above two phases. In business requirement engineering, we are focuses on business performance requirements, Business Tolerance Requirements and Requirements Methodology Compliance.

2.4.7. Search Result

Add the results of search queries that you have generated for gathering literature review. Also write search queries and keywords.

2.4.7.1. Describe Literature about Business RE.

Table 2. 1: Add Bibliometric Analysis of studies

Paper#	Title	Author	Key Factors	Advantages	Limitations	Year
1	"A reference model-based user requirements elicitation process: Toward operational business-IT alignment in a co-creation value network"	Samaneh Bagheri [16]	Proposed user requirement based model for communication gap in business IT alignments.	overcome communication gap	Lack of effective model is used	2019
2.	"Hypothesis-driven Adaptation of Business Models based on Product Line Engineering"	Sebastian Gottschalk [22]	Proposed Novelty business model	Using design research approach for innovated business model.		2020

3	"Customer expectation from Industrial Internet of Things (IIOT)"	Nitin Patwa [23]	IIOT adoption in manufacturing.	Customer expectation	Generalized the IIot adoption using other factors	2019
4	"The Difference Between Shopping Online Using Mobile Apps and Website Shopping: A Case Study of Service Convenience"	Anmar Abuhamdah [24]	The proposed method based on services and behavioral convinces.	Investigate statistical difference in these four factors.	Gap between expectation and perception .	2019
5	"A model of requirements engineering in software startups"	Jorge Melegati [25]	Customer engagement and feed back	software startups limitations about B2B and B2C.	Validated through systematic manner	2019
6	"What industry wants from requirements engineers in China? An exploratory and comparative study on RE job ads"	Chong wang [26]	RE engineer demand in software industry.	Only requirement engineer are involved	Include more jobs ads and web portal.	2020
7.	"On the Use of C# Partial Classes for the Implementation of Software Product Lines"	ALEJANDRO PÉREZ [27]	Proposed approach about software product line using C# approach.	Implement this approach	Product line RE	2017
8.	"Understanding Customer Experience Throughout the Customer Journey"	K. N. Lemon [28]	Customer experience and journey for an organizations. Customer is more active now-a-days, they interact with organizations through numerous ways like media channels so	Customer service and feedback	Improved customers services	2016

			customer experience are more social in nature.			
9	"Design principles for a hybrid intelligence decision support system for business model validation"	Dominik Dellermann[29]	The hybrid decision support system is based on design principles	Customer feedback	Less involvement of artificial intelligence	2019
10	"Business Models, Business Strategy and Innovation"	D. J. Teece [30]	The business model is actually to provide values to the customer to give incentives through a business model.	Business innovation model and strategic are discussed for the betterment of the business outcome.	Limited scope	2010
11	"A Study on the Impact of Service Quality on Customer Satisfaction and Customer Loyalty With Reference To Service Marketing Context: Theoretical Approach"	pritam chattopadhyay[31]	Discuss about customer satisfaction and relationship	Customer services	Limited scope to implemented practically	2019
12	"Nexus between customer preference and operation of conventional banks Islamic windows in Pakistan"	Malik Shahzad Shabbir [32]	Comparative analysis on Islamic windows of conventional banks and Islamic conventional banks.	Customer satisfaction	Limited scope	2019
13	"Feedback Gathering from an Industrial Point of View"	Melanie Stade[33]	Case study about customers feedback	User feedback	Constraint	2017
14	"Impact of Elicitation Techniques on Requirement Validation in Software	Samiullah Hunzai [34]	Prototyping is the most effective elicitation technique for mobile	User requirement validation to success the product	Best elicitation techniques for web and application	2021

	Industry in Pakistan"		development, whereas interviews are preferred in case of Web & Desktop applications.		software product.	
15	"Customer requirement-driven design method and computer-aided design system for supporting service innovation conceptualization handling"	Ching-Hung Lee atl [35]	To overcome service design using customer centric and adductive reasons design method.	Meet Customer service requirements	There is no competing financial gain.	2020
16	"Reimagining customer service through journey mapping and measurement"	Charles H. Patti [36]	Measure customer services measures.	Customer service experience	Constraint	2020
17	"Requirements Elicitation in Data Mining for Business Intelligence Projects"	Paola Britos [37]	Used data mining techniques for business intelligence	Business intelligence	Implemented the business intelligence in future	2008
18	"A Framework for Modeling Non-Functional Requirements for Business-Critical Systems"	Sameer S Paradkar [38]	Proposed framework related to nonfunctional model	Focused on nonfunctional or user wants	Limited scope	2021

2. Describe Literature about User RE.

Paper#	Title	Author	Key Factor	Advantages	Limitations	Year
1	"Requirements elicitation to develop mobile application for elderly."	Prasara Jakkaew [5]	Applied RE techniques for betterment use of UI for elders.	Use of RE technique	Number of responses is less	2017

2.	"The role of ethnography in agile requirements analysis"	Ali Meligy [6]	Analysis of ethnography using agile process development and combine all approaches to run coherent.	Ethnographic technique for evaluating elicitation gaps in software development.	Industrial experiment is missing	2018
3.	"A systematic study on software requirements elicitation techniques and its challenges in mobile application development"	Hafsa Dar [11]	review on requirement elicitation techniques and its challenges	Performed SLR and find challenges.	Does not proposed framework	2018
4	"A systematic study on software requirements elicitation techniques and its challenges in mobile application development"	Bruna [12]	Design thinking technique using personas.	Two techniques are used to identifying characteristics that contribute to application design.	Incomplete information and sample size is not enough.	2018
5	"Effect of Domain Knowledge on Elicitation Effectiveness: An Internally Replicated Controlled Experiment"	Alejandrina etl [13]	The effects of problem domain Knowledge on the use of requirements elicitation.	To find effective ness of the elicitation process.	industry level (experienced based) knowledge to understand these gap	2016
6	"Reducing Excess Requirements Through Orthogonal	Alejandro Salado	Highlight issues regarding additional elicitation	To contribute and fill these gap by requirements categorization	Lack of other industrial experiments	2016

	Categorizations During Problem Formulation: Results of a Factorial Experiment"	[39]	requirement and face problem related to problem formulation.	through space industry.	To formulate exact problem formulation	
7.	"Categorizations During Problem Formulation : Results of a Factorial Experiment"	Roshanak Nilchiani [39]	Get more and requirement elicitations and formulated at the end.	Formulate the excess requirements through categorizations.	Issues is exact problem formulation	2016
8.	"Critical Challenges for Requirement Implementation in Global Software Development: A Systematic Literature Review Protocol with Preliminary Results"	Zahid Ali, Muhammad Yaseen [19]	Find and analyze the requirement engineering process challenges at GSD level.	Proposed SLR protocol to list down challenges	challenges is not listed	2019
9.	"Requirements prioritization and using iteration model for successful implementation of requirements"	Muhammad Yaseen1, Noraini Ibrahim2, Aida Mustapha3 [18]	Prioritization about large scale requirements	RE prioritizations		2019
10	"Advanced search system for IT support services"	K. El Maghraoui [40]	Customer's problems solving techniques used through IBM.	Limited scope	Investigate additional cognitive techniques	2017

11	“An Overview of Automotive Service-Oriented Architectures and Implications for Security Counter Measures “	M. Rumez [41]	Get new requirements based on software product functions	Vehicles security issues is unpin	context-aware security methods	2020
12	“Empirical Research in Software Engineering A Literature Survey”	Li Zhang[42]	Evaluate software artifacts and technologies in software engineering	Limited scope	Enlarge the scope of the survey	2018
	“Detecting Requirements Smells With Deep Learning: Experiences, Challenges and Future Work”	Mohammad Kasra Habib [43]	to improve the previous work by creating a manually labeled dataset and using ensemble learning, Deep Learning (DL), and techniques such as word embedding’s and transfer learning to overcome the generalization problem that is tied with classical NLP and improve precision and recall metrics using a manually labeled dataset	Classical nlp implication	Limited scope	2021

13	"Optimizing Cloud-Service Performance: Efficient Resource Provisioning Via Optimal Workload Allocation"	Zhuoyao Wang [44]	In the business, the use of cloud computing makes differ to meet customer requirements for achieving service level objectives.it is challenging to optimize and characterize cloud service performance accurately.	Customers requirements	Limitation in getting customers' requirements	2016
14	"Focusing requirements elicitation by using a UX measurement method"	[45] Joerg Doerr	Proposed two approaches for UX design during requirement gathering stage.	User friendly UX	Approach scope is limited	2018
15	"Approach to Define a Non-Functional Requirements Elicitation Guide Using a Customer Language"	Jonatas Barroso [9]	Proposed an approach for nonfunctional requirements	Customer requirement	Constraint	2016
16	"Exploring Design Principles of Task Elicitation Systems for Unrestricted Natural Language Documents"	Hendrik Meth [46]	Proposed design principal using natural language documents	User requirement automation	Small size evaluation	2012
17	"Participatory User Requirements Elicitation for Personal Menopause App"	Maria Claudia Buzz [47]	Get direct input and integrated with in systems such modules	User require ments	Project is at early stage.	2016
18	"Experiencing the Elicitation of User Requirements and Recording	[48] Gay Costain	Get user requirements using use case diagrams	Better way to get more RE	Educate the team and customers	2011

	them in Use Case Diagrams through Role-play"				about the systems.	
19	"Multiattribute Framework for Requirements Elicitation in Phased Array Radar Systems"	Matthew Tompkins [49]	Multiattribute Framework for Requirements Elicitation. The proposed framework is based on improving project outcome of the system requirements to validate and verified against project objectives	Getting Customer requirement	Limitation practical and meaningful implementation versus academic innovations	2020
20	"Applications of ontologies in requirements engineering: a systematic review of the literature"	D. Dermeval [50]	Used ontology approach is used to get user requirements	Ontologies techniques is used for user requirements.	Research direction is limited between requirement and software architecture	2016

3. Describe Literature about software product RE.

Paper #	Title	Author	Key Factors	Advantages	Limitations	Year
1	"An evaluation of software requirements tools"	Atif Shah	Evaluation of different requirement tools .	Evaluate different tools	Focused on one tool that is reqtify and it is paid and	2018

		[7]			specific used in France.	
2.	"Approach to Define a Non-Functional Requirements Elicitation Guide Using a Customer Language"	[9] Andreia Silva	User experience create through nonfunctional requirements.	Proposed an approach that define the guide for the NFR named as ADEG-NFR.	The lack of realization of new experiences.	2016
3.	"Evaluation of an approach to define elicitation guides of nonfunctional requirements"	Andreia Silva [8]	To evaluate the elicitation guide with help of user experience.	Proper Evaluate elicitation guide.	Lack of elicitation guidelines used in software organizations.	2017
4	"WERT technique in requirements elicitation for web applications"	Zaiyana Mohamed Hussain [14]	Derived tool named as WERT(Web Elicit Requirement tool)	Requirement get from tool directly.	Limited feature of tool	2016
5.	"Requirements elicitation Techniques: A systematic literature review based on the maturity of the techniques"	[15] Carla Pacheco	Systematic literature is proposed based on maturity of techniques	To find out mature techniques among many of RE techniques	Lack of RE guidelines	2018
6	"graph-based context-aware requirement elicitation approach in smart product-service systems"	[51] Zuoxu Wang	Smart product services approached is proposed	Customer requirements	Constraint	2019
7	"an Approach for Selecting the Suitable Requirement Elicitation Technique"	Ibrahim Hassan Hussein[52]	Proposed method to choose suitable technique to gather the requirement from customer.	Elicitation techniques	Consider only few factors	2021
8	"Using Combined Techniques for Requirements	Naiara C. Alflen[53]	FR and NFR techniques improved the RE	Functional and non functional	future research the analysis of RE techniques	2021

	Elicitation: A Brazilian Case Study"		completeness and consistency when compared to every single technique isolatedly	requirements	that have complementarity in terms of source or method of data collection.	
9	"An Approach to Elicit Trustworthiness Requirements in Blockchain technology"	S Alzahari, M Kamalrudin [54]	Automated elicitation approach is defined to classify.	User trust on software applications	Constraint in used	2019
10	"The impacts of software product management"	Christof Ebert [55]	Discuss about concrete guidelines about success of product management factors	Product management	Enhanced the data	2007
11	"Improved Requirement Elicitation Process for Tactical Modules: A Case Study"	Sonika Pandey[56]	This paper aims at achieving reduced number of defects by use of subject matter expert (SME) as concluded in case study in which QFD is used	Collect Quality based User requirement	Constraint	2021
12	"A novel data-driven graph-based requirement elicitation framework in the smart product-service system context"	Zuoxu Wang [17]	Proposed smart connected environment to get right customers' requirements	Observation	Lack of smart connected environment	2019
13	"Semantic Clustering of Functional Requirements Using Agglomerative Hierarchical Clustering"	Hamzeh Eyal Salman [57]	Prosed cluster automated functional requirement	Functional requirement	Limited scope	2018
14	"Semantic Clustering of Functional Requirements Using Agglomerative Hierarchical Clustering"	Hamzeh Eyal Salman [57]	Prosed cluster automated functional requirement	Functional requirement	Limited scope	2018

15	"Experiences of using a game for improving learning in software requirements elicitation"	Ivan Garcia1 [58]	Evaluate RE using the user experience technique.	Proper use of RE technique	Improve the quality of the requirements.	2018
16	"A novel data-driven graph-based requirement elicitation framework in the smart product-service system context"	Zuoxu Wanga [17]	Novel data driven graph for smart design in requirement elicitation process.	Increase competitiveness and new value in use	Limited scope	2019
17	"Requirement Elicitation Model (REM) in the Context of Global Software Development"	Muhammad Yaseen & Umar Farooq [20]	Development of RE model in GSD.	Identify those challenging factors that is not work same in different circumstances.	Compatibility	2018
18	"Strategic customer foresight: From research to strategic decision-making using the example of highly automated vehicles"	Nicola [20]Schweitzer	strategic customer foresight	Understand customer future prefernces based on feedback and interest	Customer need and feedback in the context of premium highly AVs.	2019
19	"A Novel Framework to Automatically Generate IFML Models From Plain Text Requirements"	[59] MARYUM HAMDANI	Discuss about model about plain text requirements	Proposed framework for plain text requirement.	Consider only textual requirement	2019

20	"Framework and Architecture of an Interactive Multi-User Meeting Tabletop Based On Intuitive Gesture Recognition"	[60] Haleema Sadia	Multi-touch technology used for interactive the things in different ways.	Limited scope	Enhanced feature and technology.	2018

Requirement elicitation phase in the software development is very basic and foundation of any software product.it is play key role to develop a successful software or challenge software development. So, it is vital to get right requirements from the right person at the right time. For this purpose we conduct of research thesis topic that is based on marginalizing the customer needs and wants. Basically we divide the requirement elicitation phase in to three sub phases. These phases are the following

I. Business requirement engineering. (Direct with revenue and economy boost up).
II. User requirement engineering (what, How user describe about their requirements).
III. Product engineering (functional and nonfunctional requirements relate to end user side).

Here, the question is arises Why we divide the requirements in three phases?

The answer is we all know, any of software product development cycle these three phases are most important. Because these three phases directly or indirectly gives great impact on software success and failure or can say that it is based on customer acceptance and rejection. First phase is business requirement that is most important for software product, organization and marketing purpose. It is directly linked with revenue of the company and customer engagements.

The second phase is User requirements, it is another very important phase because any of software product development by customer requirements. If requirement engineer collect the right requirements from the customer automatically it saves the time, budget and effort. At most important, it saves their clients and customer as well. The third phase is based on Product requirements, it is relevant to customer. If customer like the product or we can say that if software product satisfy the customer needs and wants automatically its pay of the above two phases. In

business requirement engineering, we are focuses on business performance requirements, Business Tolerance Requirements and Requirements Methodology Compliance.

Sebastian Gottschalk etl[22] discuss about innovation business model, it is based on various hypotheses by taking unclear and changing customer needs effectively and efficiently. The word continuous business model is defined by Osterwalder as organization creates, delivers and capture values[61]. In the paper, first we discuss about foundation of the software product lines and business model. Second, the research approach is based on research design search that is demonstrated through expanded example of business models for to do app.at the end. It take critically analysis and conclude the hypotheses results.

The explicit modeling is used in the business model in recent years frequently, basically business model based on architecture and delivery values [30]. The purpose of developing business model to provide customers ease.For example e3 value model that's defines actors which are connected through value interfaces to each other.

Geometric based approaches describe the business model as a visual template. For example business model canvas that's is widely used in business model. The hybrid decision support system is based on design principles derived by Dellermann[29].

Dominik Dellermann etl [29]discuss about design principles for mix intelligence decision support system .it is based on combine abilities of human and machine intelligence. Author mentioned in your paper, we are faced many issues regarding decision making in the business models for new startups.it is require various and quick decision about business model .

Katherine N. Lemon etl[28] discuss about customer experience and journey for an organizations. Customer is more active now-a-days, they interact with organizations through numerous ways like media channels so customer experience are more social in nature.

Zhuoyao Wang etl [44]discuss about optimizing cloud service performance. Cloud computing is extensively used in business world. In the business, the use of cloud computing makes differ to meet customer requirements for achieving service level objectives.it is challenging to optimize and characterize cloud service performance accurately. In this paper authors proposed stochastic multi-tenant framework. In this framework an experiment is performed based on max min algorithm with help of MC simulation.

Matthew Tompkins etl [49]discuss about Multiattribute Framework for Requirements Elicitation. The proposed framework is based on improving project outcome of the system requirements to validate and verified project objectives. It will helps to overcome the existing errors and shortcomings.

Diego Dermeval etl [50]discuss about ontology driven approach used for requirement engineering activities. The activities based on elicitation, analysis, specification, validation and requirements management. Further authors discuss all phase of requirement engineering like elicitation phase in RE is concern with understanding of the problem domain. Requirement analysis and negotiation phase is concerned with agreed set of requirements.

Li Zhang ,Jia-Hao Tian [42] discuss about empirical research in software engineering field . As we know, empirical research is play an important role in software engineering field.

Marcel Rumez etl[41] discuss about new requirements from the customers'. These requirements based on manufacturer point of view. Through this purposed adding new function software through product life cycle.

K. El Maghraoui etl etl[48] discuss about IBM's for customer technical problems. Our search system uses a range of techniques to identify the best solution document(s) for a reported customer problem. Such techniques include feedback learning-based result ranking, system log analytics, domain knowledge-based query expansion, and so on.

Haleema Sadia etl[60] discuss to used multi touch rapid technology to get user requirement through implemented interactive devices. Through this, authors describe can be improved user interface and screen attraction towards customers.

Alejandro Pérez etl[27] discuss about Software product lines engineering using C# partial classes. As we know that, in this paper,a case study is to explore the c# partial classes for SPL .it studied about a case study that is based on smart home [11].

Maryum Hamdani etl [59]discuss about user interface to get more significant results from web and mobile applications .For this purposes, authors explains , it needs expertise and several domain model concepts.

Muhammad Yaseen etl[19] proposes requirement elicitation model (rem) for global software development .in this paper , authors describe both positive and negative factors that's effect the global software development.

Zahid Ali etl[19], discuss about challenges in requirement engineering process. Basically, SLR protocol is proposed to list down all challenges that directly affect the stakeholders. The requirement engineering is implemented through SLR in GSD.at the end, author proposed SLR protocol to find out the challenges at the stakeholder ends.

Muhammad Yaseen[18] etl proposes an approach to manage large sized software requirements . Authors discuss about large scale requirement, to handle this requirements through prioritizations.

Zuoxu Wang etl[17] proposes a framework that is based on graph form in the smart services systems.to understand the graph based system to used data driven approach.

Samaneh Bagheri etl [16] proposes a model thats work as reference model.The model is also used user requirements elicitation process while performing it. this model is proposed for business to align with in IT and technology

Prasara Jakkaew etl [5] discuss the requirement elicitation process challenges, it is very common while developing software product. The mobile user interface (UI) is very easy to use for elderly and meet functionality with their requirements. For this, the authors meet different requirement elicitation technique for elderly user. These techniques are cover user centered design, the iterative process, persona, use case, prototype, heuristic evaluation and usability testing. To cover all techniques of requirement elicitation in user centered design activities to meet their needs. The user centered design activities are plan, interview, personas, prototype, Heuristic Evaluation and meet requirements. Identify the specific context to design prototype and select different personas to test prototype. The prototype is based on medication reminder and at the end evaluate it by testing it. Through observation, the authors identify those gap and minimized it. Similarly, in second version, the requirement is more improve then first and so on. This shows that prototyping technique and heuristic techniques is used to improve the usability of mobile application for elders.

A. Meligy etl [6] discuss about requirement accuracy getting requirement elicitation. It is more important to achieved more accurately requirement elicitation in agile requirement process. For this purpose, to performed analysis between agile development process and ethnography. There are necessary to introduce a model that works both ethnography techniques and agile process development. Then come up with ethnographic model.it consist of four phases.

A. Shah etl [7] discuss about evaluation of different requirement tools based on functionality, scope and geographical while getting requirement elicitation .The analysis of requirement tools, they follow few key steps. Those steps are research questions, search strategy, search strings, paper selection, paper evaluation, assessment and analysis. Authors draw different tables based upon specification, location, paid, unpaid version, authors and city. In this article, authors evaluate reqtify tool is more efficient in order to functionality, scope and location but this tool is paid and only used in France.

Andreia Silva etl [8]discuss about the requirement elicitation is same important for nonfunctional requirement. For this purpose, they evaluated their NFR guides based on experience of use. Author is evaluated ADEG-NFR guides in the software development organization. The study objective goal is based on question metric Approach. For this purpose, they proposed six parts of study definition. These are motivation, purpose, object, elicitation, perspective domain and scope. The study aim is to fulfillment of its defined objectives.

B.Shahzad etl [11] and his team are proposed review paper that is bases on elicitations techniques and its challenges .in this appear , authors highlight challenges for mobile applications.

They highlighted eight different categories challenged. After overall assessment, the authors described that the main challenges is faced during mobile application requirement gathering is related to stakeholder that is 50% and second is requirement of the project that is 33%. This review shows that, if in upcoming mobile application projects to evaluate these most highlighted issues then it can be overcome the requirement elicitation in mobile development.

W. Silva etl [12] discuss as more important to focused on design thinking (DT) technique using personas and to try overcome the limitations that they are faced in requirement elicitation phase. They are explained DT and other techniques that is used to fulfill its requirement.

A. M. Aranda etl [13] highlight experimentally analyses about the influence of a requirements analysis related to problem domain. They have chosen those analyst and interviewee that they have knowledge about domain (domain aware) and some of those that they don't have enough knowledge about problem (problem ignorant).the difference between baseline experiment and replication of experiment, baseline experiment conducted as domain aware task perform first and ignorant task is performed later and analyzed based on those results. On the other hand in replication

of experiment, the first have chosen ignorant of problem domain and then aware of domain knowledge.

Z. M. Hussain etl [14] discuss in their conference paper about facing issues when they get requirements for web application. There are many challenges faced during requirement gathering from client side and when arrange face to face interview sometime at start interviewee is not ready to elicit your problem rightly . End of the session problem formulation time, they proposed another problem to solution and so many other problem faced by developer while getting requirements. Sometimes, it cause costly activities in software development.

Miryam Reyes etl [15] discuss requirement elicitation gaps through SLR.in this paper, authors cover studies from 1993 to 2015. Through SLR, authors try to find out the answers of two questions and those questions. one thing is highlighted that is techniques used to acquires requirement elicitation process from both academia and industry sides. The collecting data about different techniques and made comparison between different techniques. In the evaluation process, compare which technique is best than others[15].It is important to acquire such user requirements that's engage with IT based system functionalities, then it is possible for both business and IT based system align together.

Chong Wang etl[26] discuss about professional requirement engineers and engineering field s and their publications .the authors analysis the both requirement engineer and non-requirement engineer experience about requirement gathering .

A.S. Saravanan[23] etl discuss about internet of things and industrials capacity to adopt it. The authors proposed a framework to combine both internet of things technology and industrials terms and condition and check pace of success rate.

Nicola Schweitzer[62] etl discuss about changing consumer needs and company survival . For this purposed authors proposed solution through case study. Through case study observe the consumer and understand their needs.

Jorge Melegati etl [63] discuss about software startups and generate innovative software products that change human life.

Anmar Abuhamdah etl [24] discuss about new web and mobile technology . through this company have access their data and customer offers automated.

Kelvin Soen[64] etl discuss about online transactions that is growing day by day .It is play important role to success of online reviews and online transactions.

Samiullah Hunzai etl [34]discuss about impact of software elicitations on industry . In this paper authors, first of all described about elicitation technique then give a frame work. How these techniques validated for different software product. For example which is elicitation techniques is best for web application and so on mobile application and desktop applications.

Ching-Hung Lee etl [35]discuss about customer requirement driven model. Basically authors try to elaborate in this paper about how to develop such mechanism to get customers' requirement by effectively implemented advanced digital technology.

Zuoxu Wang etl[51] discuss about graph based elicitation approach for smart product services For this purpose to formulate a model based on context, product and services.

Ibrahim Hassan Hussein etl [52] discuss about to select right requirement elicitation techniques. While we gather the requirement from customers, clients and stakeholder, we used different requirement elicitations techniques. These elicitation techniques can be interview, prototype and observation. Authors proposed an approach to select suitable for requirement elicit techniques.

Mohammad Kasra Habib etl [43] discuss about detecting requirements smells with deep learning, experiences, challenges and future work.in this paper authors prosed how to check quality of requirements through natural language processing . For this purpose, proposed manually labeled test and using ensemble data set, deep learning and other techniques.

Naiara C. Alflen etl [53]discuss about using combined techniques for requirements elicitation. While getting a requirements from customer. It can be ambiguous, in completeness and inconsistent data. For this proposed, author proposed to use both functional and nonfunctional techniques.

S Alzahari etl[54] discuss about true requirements in block chain technology. Authors proposed new automated requirement gathered approach which is based on block chain application .it is based on trust factors and its attributes.

Mythri Shivakumar etl [65]discuss about cognitive natural language processing assistant for post-operative care.to enhance quality of care in health sector . Authors proposed cognitive NLP assistant using dialog flow.

Christof Ebert etl[55] discuss about the software product and its management through competative software product. The success of any software product is based on software product management. This paper base on good product management is lead to success rate of the software product.

Sonika Pandey etl[56] discuss about improved requirement elicitation process for tactical modules. Basically in defense sector, to developed tactical module is difficult

task. The main reason is information is missing that's why customers have less trust on it. The authors proposed to reduce number of defects through use of subject matter expert.

Charles H. Patti etl[36] discuss about redesign customer service. The redesign customer service is mostly consider through journey mapping and measurement. The authors highlighted important challenges of evaluating customer service delivery. For this purpose, authors are offered a reimagined perspective to measure the complex challenge. These all perspective are improving customer service, decision making customer service experience.

Sameer S Paradkar etl [38]discuss about modeling non-functional requirements different business systems.For this purposes, authors proposed a framework that is linked with Software architecture . Software architecture is based on developing a large, complex applications. Authors proposed solution in way to reduce development cost and increase quality and facilitates evolution.

Zuoxu Wang etl[66] discuss about challenging to increase competition related to value in use in the market. To maintain competition in new value then generate it. For this purpose, authors are proposed a framework that is based on graph . the graph is constructed through novel data driven requirement elicitation for smart PSS.

Hamzeh Eyal Salman etl[57] discuss about clustering of functional requirements . these clustering are construct through agglomerative hierarchical clustering. Software application is now a fundamental part of society. The customers have different needs through different requirements.every software development have their own software requirements. For this purposed authors are proposed an approach that is based on cluster functional requirements on semantic measure.

2.2.2 Factors

2.2.1. Customer Needs & Wants

Customers is key of any software product. Customer can be raised and software product values and decline as well.so it is very necessary to keep in mind customers' needs and wants .every customer needs and wants are differ. Few of customer demands are to good application design and some of customers wants good of responses of the application .efficient speed and some of concern with desired functionality .they concerned with functionality or needs fulfillment. Here question arises need and wants are similar to functional and nonfunctional requirements .then we can say that yes it is more relate to functional and nonfunctional requirement of customer but at some spot it is differ because sometimes customer need are either fun nor nonfunctional requirement . That span of time customer wants to fulfill their needs and wants how it is explain that customer needs basically belong to the fulfillment of the those requirements that is most important and necessary to perform**.**

2.4.2. Functional & non-functional requirements

Every customer's needs and wants are differ from other customers. So some time one of customer needs is become other customer wants.so functional and nonfunctional requirement are vary customer to customer[38] [8][9].

2.4.3. Business requirement model

Business requirement models are basically in any organization working environment .or doing any software project to perform some set of protocols. BRM is basically is set of protocols to do any software development cycle in any organizations[16][22].

2.4.4. Collect Accurate requirements

Customer's right requirement leads to success of the software development cycle. But same time if customer is not aware to give right requirement then it is duty from requirement engineer [34][1].

2.4.5. Business Strategies

Business strategies are very important while developing a software product .how much it is important to developed software product based on customer demands second what will be the outcome or customer used while we developed any software product[30][67][68].

2.4.6. Brainstorming

While getting a requirements from customer's .it is important to get all requirement from customers .it is best way to do brainstorming of customer**.** Sometime customer unable to express what he wants in actual.so whatever he wants to express just listen and note down and shape in accurate data[54].

2.4.7. Iterative Approach

Iterative approach is basically gets from agile process. Follow iterative approach to engage customer after every module after getting the requirement. It is easy to connect customer requirement after every. Either we are meeting customer requirement or changing as well is easy and easy to handle at that time. Other than to mitigate at the end of the product. It goes late and challenged product[69][16][15].

2.4.8. New Technology Trends

Follow new trends and technology because new innovation come with more ease. So adopt and develop friendlier product for customers[42][70]**.**

2.4.9. Communication Gap

Communication gap due to language barrier or unknown to technology term and name is difficult to express requirement correctly .telling and getting from customer is two different things[51][17]**.**

2.4.10. User Friendly Designs /Interfaces

Design of the software is matter a lot. Either it is based on structure of the application how it works what are the module and how it work or interface of the software product. Its matter a lot[71][24]**.**

2.4.11. Marketing Strategies

Marketing strategies is most important before development the software product. Before gathering the requirements, it is important to know how to launch the software after development of the software product. And how to get attention from customers[72][73][74].

2.4.12. Customer Feedback

Customer feedback is more important related to software product. Through customer's feedback, we can get opinion and suggestions about the product. We can also get quires what we need to improve about the product[28].

2.4.13. Customers' Demands

We need to analysis what are the customers' demands and market need[75].focuses on customer satisfaction through software product.

2.4.14. Improving Existing Software Products for New Technologies

Improving existing software about new technology .it helps to increase life span and usage of the software product[12].

2.4.15. Customer Quires

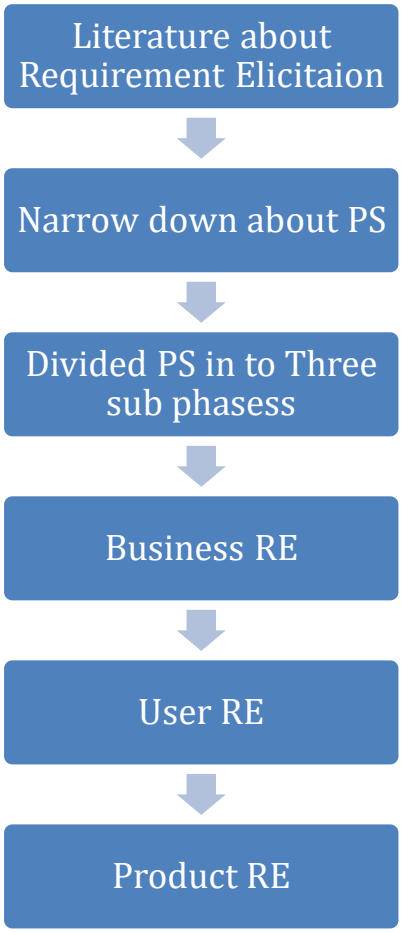
Customer quires is valuable to retain your customers. So focused on customer quires and get back to them on time. Try to solve customer quires on time[69].

2.4.16. Customer Data Privacy

Customers are more concern about their data, so during gathered the requirement and developing a software, it is necessary to focused on data privacy of the customers[76][34].

2.6 Summary

First, I have focused on literature through narrow down the topic. The first phase, read and write about requirement engineering after that I have more specified to the topic and read and write about the requirement elicitation phase then go to the specific about our problem statement that marginalizing difference among customer needs and wants. Our problem statement is related to the requirement elicitation phase that is more relevant to customer satisfaction with the software product. We are explained in our literature who is the customer is actually. What are the need and wants of customers about software products?



There is a very important question why the customer is important for the software development team and software organization. How the success of any software product software and software organization is directly rotational to the customer satisfaction about the software product. Customer satisfaction is based on two things one is needed and the second is wants. We all know need is essential but want is sometimes essential some time it's a desire. In this context, we break down our problem statement into three sub-modules that's are …

1. Business requirement engineering. (Direct with revenue and economy boost up).
2. User requirement engineering (what, How users describe their requirements).
3. Product engineering (functional and nonfunctional requirements relate to the end-user side).

CHAPTER 3

METHODOLOGY

3.1 Introduction

Methodology is generate through set of steps systematically , theoratically analysis of applied desire field of study.The research methodology is based on hybrid method to evaluate the result. Systematic literature review (SLR) is also type of literature review but it is conducted through systematic way.it is based on systematic method and conduct secondary data through it. The best thing in systematic literature review is evaluated the research studies in a critical way and produce the qualitative and quantitative outcomes. There are capability to provide comprehensive summary of current evidence appropriate to a research issue.

The research methodology is based on hybrid method to evaluate the result. The nature of research methodology is depend on research topic and questions. Through this research thesis , we try to evaluate and validate the challenging factor of customer needs and wants [1].

3.1. Research Strategy

The search strategy is very important for conducting a genuine literature view that give positive impact on society. For this purpose, it is necessary to define data source and search

strategy. The search quires , digital database library are used for true publishers. There are few data bases which is used in our research thesis.

i. Elsevier Science Direct
ii. IEEE Electronic Library
iii. Springer Link
iv. ACM Digital Library
v. Google Scholar

During search process, there are lots of data collection approach related to research topic but it is necessary to select only those data that is more relevant and recent.The research process is most elicit and filtered through performng defined inclusion and exclusion criteria.Basically, a research study is a detailed plan about generate a research process. The research strategy process is based on analysis , planning , executing and monitoring the research.the research strategy is also provide support at higher level.moreover , it is completed through research method that gives guidance about research work in details.it guides collection and analysis of data through interviews, questionnaires, or statistical methods.

In this research, first identify the gaps from literature review and then we will evaluate those gaps through survey in the form of questionnaire. after completion of survey from desired respondents, we will further perform focus group through our experts. We will perform focus group to validate the analyzed data which collected from survey.

3.2 Quantitative Research

A quantitative approach is used to collect a data with respect to relavant approach. Basically quantitative research is based on degree that is collected and mapping the data.The method consist of different method that are experiments, observations and closed questionnaires[77].This method is basically well designed and formulated and it is based on statistic.quantiative research produces such data in engineering, that is easily understand and analyzed the data using experiments and statistics.

3.2.0. Instruments

3.2.1. Survey

Survey research is used to identify the features of a wide population of individuals. Survey research are conducted with positive stance.it is closely based on research questionnaires. The survey research is construct the ways,selection of sample size and respondent as well.

3.2.2. The Dichotomous Question

The Dichotomous question is basically based on yes or no.

3.2.3. The Multiple Choice Questions

The multiple choices question are generally have optioned based questions.

3.2.4. Rank Order Scaling

The rank order scaling is basically shows ranks against popularity of the product. It is famous in the market based on rank as well.

3.2.5. The Rating Scale

A rating scale shows rating against any product or brand. These rank gives people about the product when brand or any organizations asked.

3.2.8. Total 100 points

This type of questions asked when you want to purchase a product for reasons .to give reason as input why it is important for you. You give must 100 points these 100 points checks by JavaScript.

3.2.9. The Open-Ended Question

The open ended questions are those questions that is create to explore the answer in depth.

3.2.10. The Demographic Question

Demographic questions are based on integral part of any questionnaire.

3.2.2. Experiment

Through experiments, where we do things in under observation or practically. The experimental data is basically consist of testable hypothesis.it is based on two independent variables manipulate the one dependent variable.

3.3. Qualitative Research

Qualitative research is a situated action in which the investigator is situated inreference to the surrounding environment. It's a set of interpretive and materialprograms that enable people see the universe. These actions have a significant global influence. They turn their surroundings into a series of representations, including fieldwork

observations, interviews, talks, photographs, recordings, and self-memo[78]. During that level, qualitative research necessitates an interpretive, genuine perspectiveto the environment. This means qualitative researchers examine items in their naturalistic environments, attempting to comprehend or view things through thespectacles of the meanings people attribute to them [63].

3.3.0. Instruments

There are many research tools and instrument. But choose only those that is relevant to your problem solving.

3.3.1 The Observation

3.3.1.1. Direct observation

When objectives are not well described then we do direct observation. It is direct observation because you are writing and observation the things when it take placed.

3.3.1.2. Structured observation

Structured observation is carry out selected variables or indicators that's is to be observed.

3.3.1.3. Participant observation vs. Observer participant

There are two types of observation. One is be an observant and second is to observe participant.

3.3.2. Interview

3.3.2.1. In-depth interview

A depth interview is consist of formulated population before.it is freely discuss any idea and feeling about the discussed topic.

3.3.2.2. Face to face interview

A face to face interview is also another shape of depth interview. Face to face interview take place physically and asked questions orally.

3.3.2.4. Semi-structured interview

The half of part of interview is structure and half of interview is not.in simple way few questions are structured in it.

3.3.4. Discussion group

The discussion group based on structured questions where selected participant participate and discuss on those questions. Every participant share their views openly without any biasedness'.

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3.3.5. Focus group

Focus group consist of 6 to 8 people that is specifically expert of that's domain. In focus group consist of two main roles. One is moderator and other is participants. Moderators ask question to the participants. The participants gives the answer in details.

3.4 Mix Method Research

The mixed method research is also relate with triangulate process because the triangulation process get data from different method and then evaluate it. To improve the dependability and reliability of the dada and their clarification[79].

"Mixed methods research is an intellectual and practical synthesis based on qualitative and quantitative research; it is the third methodological or research paradigm. It recognizes the importance of traditional quantitative and qualitative research but also offers a powerful third paradigm choice that often will provide the most informative, complete, balanced, and useful research results [4]

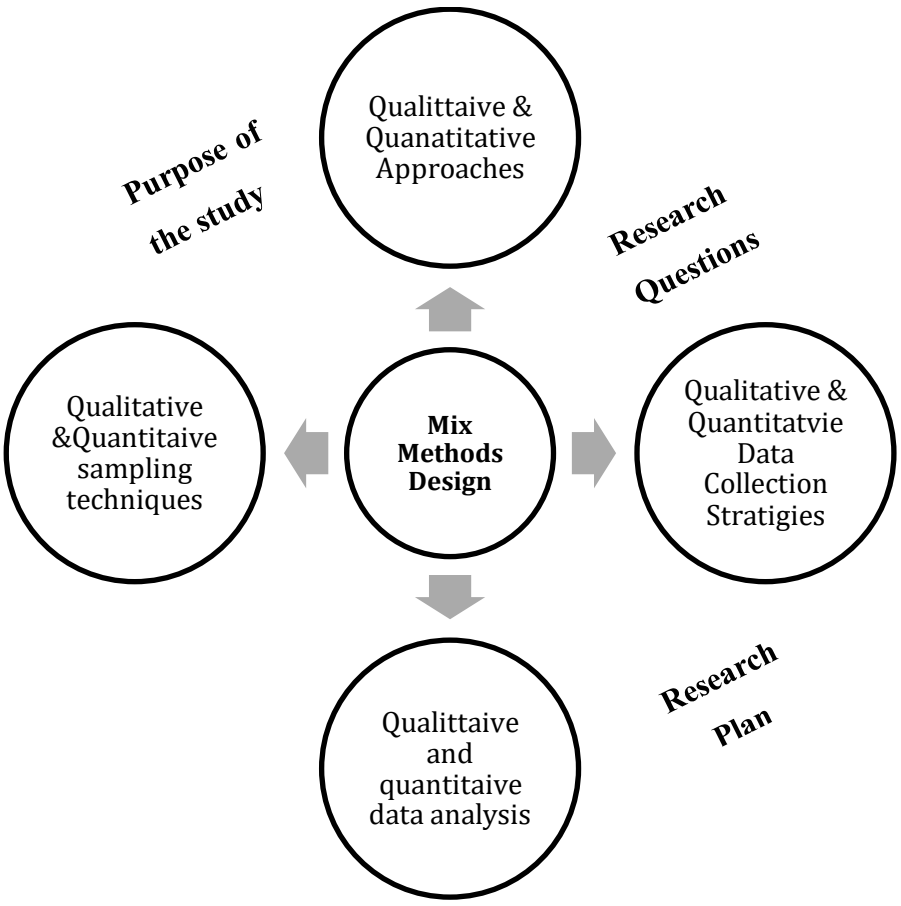

FIGURE 3. Operational Framework Mixed Method Research

According to Creswell and Clark, research problems best suited for mixed methods are those in which i) one data source if insufficient, ii) results need to be explained, iii) exploratory findings need to be generalized, iv) a second method needed to enhance the primary method, v) a theoretical stance needs to be employed and, vi) an overall research objective can be best addressed with multiple phases or projects [5] [6].

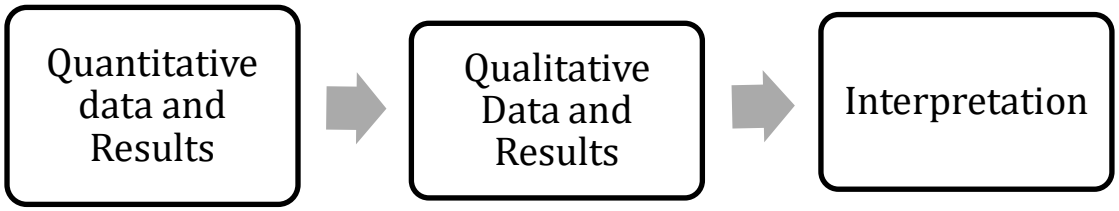

FIGURE 1. Process *Diagram of Mixed Method Research*

This technical briefing provides an overview of how quantitative empirical research methods can be combined with qualitative ones generating the family of empirical software engineering approaches known as mixed-methods [7].

In mixed methodology, we will use questionnaire from quantitative research in the form of survey and then we will evaluate those results in the form of focus group.

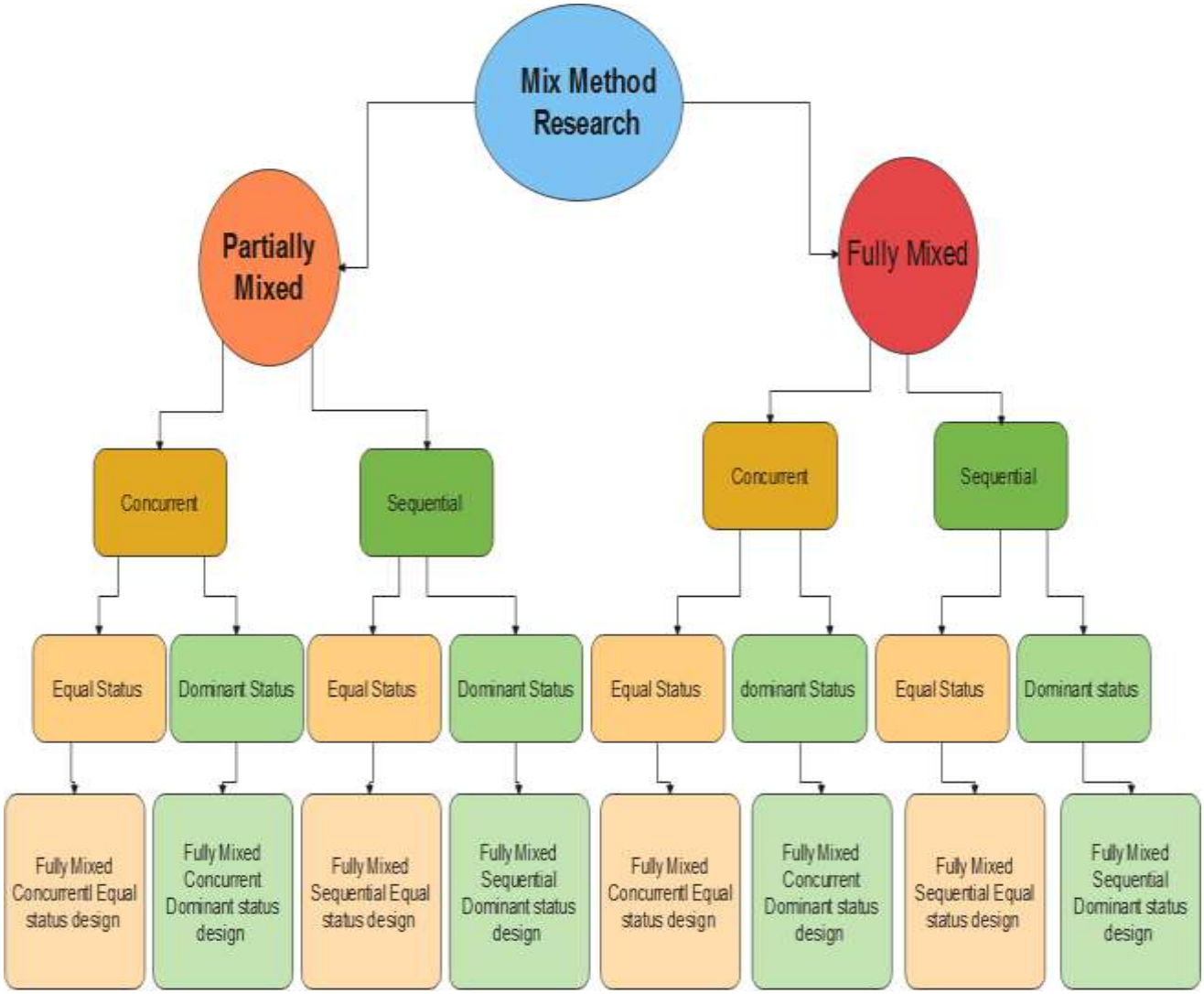

Figure 4. Mixed method research

A research method is considered as mixed when it applies more than one methods to yield consolidate and confirm the findings of the study. The purpose of using the mixed method research is that the findings are current and verifiable with respect to the historical evidence and by the expert opinion .in addition , the inconsistencies can be noted and eliminated before they propagation in to the entire study .there are eight possible design methods to conduct the pragmatic research .Greene[206] has proposed three types of the mixed method research .while leech and Anthony [[207] emphasis on the different dimensions , namely mixing , time and emphasis .the mixing dimension determines if we use partially mixed method or fully mixed method for the research . the time dimension consider s that if the mixing is concurrent or sequential , the third dimension demonstrates that wether equal or dominant status is used

Dimensions

In mixed method research, there are two type one is partially mixed and other is fully mixed. Further in partially and fully mixed have also two type, and these are concurrent and sequential. Sequential has two status that are dominant status and equal status and concurrent is also have two status dominant and equal status .we have to choose fully mixed sequential method for our research thesis work.

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Research Context and Justification

First of all, we will identify the gaps between customers' needs and wants through systematic literature review and then we will list down possible high value gaps and the mitigation plan to overcome those gaps through questionnaire by doing the survey from the industry and professionals. Then we will conduct a focus group from the subject matter experts to triangulate the mitigation plan to overcome the gap between customers' needs and wants. The next step will be Methods and Respondent's Profiles To get the justified responses a survey is conducted among the respondents who are expert in requirement engineering, and software engineering.

3.5. Methods and Respondent's Profiles

To get the justified responses a survey is conducted among the respondents who are expert in software engineering fields, requirements elicitations field and team lead.

3.5.1. Survey

A survey instrument is usually a questionnaire that is very important and requires special considerations. This section presents guidelines to design survey questionnaire and to develop internal and survey questions. Internal questions are open ended questions that are later transformed to survey questions. Internal questions represent main objective or goal of the investigation that is being carried out. The results and conclusions of a survey directly

depend on the quality of the used questionnaire. The main strength of survey research lies in the collection of a population's behavioral and attitudinal attributes quantitatively, which allows uniform interpretation of the collected attributes.

3.5.2. Research Objective

The purpose of this research is to develop a check list to marginalized customer need and expectations. The research objectives are :

1. To identify gap between customer's need and expectation.
2. To identify the consequences of gaps between customers' need and expectation.
3. To reduce the gap between customers' expectation and need.

3.5.3. Top-down approach/bottom-up approach

Formulations should capture the goal of the survey, either as statements of the expected outcome or as questions that break down the problems or issues of interest [27]. The questions are based on 'what, how and why'.so that research objectives is also constitute the research questions. The top down approach can be illustrated in a survey by van Hersh et al [49].It is all about how software architects and described where the goal was to understand the reasoning process that industrial software practitioners follow the architecting structure. Van Hersh et al is continue to breaking down the goal in to research questions. The research questions breaking down structure is mapped through existing literature that is based on research questions.

3.5.4. Sample Size

The sample size of our research will be systematic sampling SRS. The sorted sampling frame composed by N units and sample of n units are selected previously. This sequence initialized by randomly selected unit i.so that next units are also selected through addition of the interval k continuously.in the result integer will divided between N and n.For example, if

the population size is 200 and the sample size must be 50.lets k-4, then if i-3, the following 10 first units will be included in this sample 3, 7, 11, 15, 19, 23, 27, 31, 35 and 39.

The sample size of our research to have answer to all our questions will be will consisting of 200 – 250 qualified respondents.

3.5.5. Respondent's profile for survey

Kasunic [25] gives a set of basic criteria that can be used in Software Engineering surveys to elicit the major attributes on describing the target audience. Furthermore, we recommend categorizing them as dependent "D" used for dependent. or independent "I" used for independent from the research context, and we will choose our audience based on the following criteria.

- Size
- Job and responsibilities
- Education level
- Relevant experience (D)
- Domain knowledge

3.5.6. Survey Medium

For conductng survey the medium are

- University
- In person
- Social Media
- LinkedIn

3.5.7. Survey Instrument

A survey instrument is consists of questionnaires and these questionnaires are very important and have special considerations. In this section, we contain guidelines for creating survey questions as well as designing questionnaires.The internal quires are based on the main objective and goal of the investigations being conducted. The respondents have directly affected the survey's results quality and conclusions.the survey is consider quantitative approach. The collection of the population based on topic behavior and nature of the problem statement.These all allow the consistent interpretation of the data.

3.5.8. Survey Questions

I. Customer needs and wants are equally necessary for the software development team.

II. Customer needs and wants are more relevant to functional and non-functional software requirements.

III. The ambiguous customer requirements can lead to the failure of software products.

IV. It is vital to adopt new business strategies and technology trends in software houses.

V. It is necessary to get the correct requirements in detail from the customer.

VI. The iterative approach is suitable for a customer to involve during and after the software development phase.

VII. The customer needs to be vigilant about new technology trends and benefits.

VIII. The communication gap plays a vibrant role in the failure of software projects.

IX. The user-friendly interface of the software product is a vast reason to attract the customers.

X. The marketing strategies increase the popularity of the software product among customers.

XI. Software organizations focused on own strategies and develop software product rather than collect customer feedback from the markets.

XII. The software products are the basis of failure due to neglect of customer's needs and demands.

XIII. Most software houses are not focused on improving existing software products for new technologies

XIV. Customer is a key to software success, so it is necessary to solve his/her quires regarding software products

XV. Customers are more concerned about the privacy of the data.

3.5.9. Response format

The response collected through different mediums from respondents which are following :

- Paper
- Google form

3.5.10. Justification for Survey

First of all, we identified the gaps between customer needs and wants through a systematic literature review, afterthat, we are list down all problems to overcome those gaps through a questionnaire by surveying the industry and professionals.

So, the finding of literature is validated through survey and it confirms through professionals and the industry.

3.6. Focused Group

The simple and common method to evaluate the survey results are focused group. The qualiatative research is consist of focus group. Through focus group,expert people gives their opinions, views, andsuggestons during focused group meetings. It is based on such people that is representing survey investigators and participants.It helps to evaluate instrumentations and identify ambiguities related to questionairs. Focus groups have been conducted either face to face or conducting through an online webinar. Through online or face-to-face gatherings groups of people can share their views openly. The focus group consisted of usually 6 to 8 people and asked survey questions. A Focus group is open to talk and share their views openly. the focus group member can give a long answer and share their views in detail. Through focus

groups, it can also be used and help to get such information during survey design.to evaluate which question is better for sample pupolations. what topics are important to sample a population What will be the understanding of the topic from people? How they react to it and gives a response to it.

3.6.1. Respondent's profile for focused group

The respondent's profiles of the survey are..

- Educational Experience
- Professional Experience
- Subject Master Expert

3.6.2. Sample Size Focus group

For sample size , the 6 to 10 respondents is mostly invited to participate in it.Through respondents conduct online or physically meeting and ask questions and get response live.

3.6.3. Focus Group Questions

I. Customer needs and wants are equally necessary for the software development team.

II. Customer needs and wants are more relevant to functional and non-functional software requirements.

III. The ambiguous customer requirements can lead to the failure of software products.

IV. It is vital to adopt new business strategies and technology trends in software houses.

V. It is necessary to get the correct requirements in detail from the customer.

VI. The iterative approach is suitable for a customer to involve during and after the software development phase.

VII. The customer needs to be vigilant about new technology trends and benefits.

VIII. The communication gap plays a vibrant role in the failure of software projects development.

IX. The user-friendly interface of the software product is a vast reason to attract the customers.

X. The marketing strategies increase the popularity of the software product among customers.

XI. Software organizations focused on own strategies and develop software product rather than collect customer feedback from the markets.

XII. The software products are the basis of failure due to neglect of customer's needs and demands.

XIII. Most software houses are not focused on improving existing software products for new technologies

XIV. Customer is a key to software success, so it is necessary to solve his/her quires regarding software products

XV. Customers are more concerned about the privacy of the data.

3.6.4. Qualitative Study

Qualitative data is consist of non numerical data like text, video and audio. It also can be interview , survey and transcript etc.during qualiataive research, we analyzed the data through sound and sounds with visuals.

3.6.5. Justification of focus group

First, we identified gaps between customer's needs and want through a systematic literature review.after that, we distribute all the gaps in to three phases that are user requirements , product requirements and business requirements. Then we will conduct a focus group from professional experts and get their response related to questionairs.

3.7. Verification and Validation

In this section, the gaps between customers needs and wants that we are identidied from the systematic literature review. Then we are validated those gaps through triangulation process to validate a focus group.

3.7.1. Quantitative Validation

To measure the gaps between customers' needs and wants through this is known as quantitative validations. In this section, focus group is validated through triangulation process.

3.7.2. Qualitative Validation

To qualitatively measure the challenging factors of customers' needs and wants through survey.The verification process is done by survey questionairs . the survey questionairs are filled by respondents.

3.7.3. Objectives and Activities

The objective and main activity of this research are to find out the gaps between customer needs and wants and then proposing the mitigation plan to improve the success of challenging factors of customers' needs and wants through software devlopemnt life cycle.So that,we identified the gaps between customers' needs and wants through a systematic literature review.After that, perform a survey to verify those challenges. Then we perform validation process through focus group.

3.5 Summary

In this section, we have explained the research methodology in detail. In this, we have explained the research strategy that how we will be going to conduct our research using mixed research methodology where we will be using the qualitative and quantitative research methodologies. In which we have explained in detail the conduction of survey and focus group strategies, research objective, top-down and bottom-up approach.

So, in chapter 3 , we are explained the methodology in details and also describe strategies how we conduct research.

CHAPTER 4

DATA COLLECTION

4.0 Introduction

The requirement engineering phase is the foundation of any software development life cycle. While getting requirements from customers, it is important to get the right requirements at right time. During the requirement elicitation phase, both customer and development phase problems those problems lead to failure project. These failures are challenged project create problem following three domains effectively.

a) Business requirement engineering. (Direct with revenue and economy boost up).

b) User requirement engineering (what, How users describe their requirements).

c) Product engineering (functional and nonfunctional requirements relate to the end-user side).

For this purpose, we formulate our problems stated named as marginalizing customer needs and wants. The problem statement is verified by conducting a survey and get a response from the software engineers, developers, and marketers.

4.1. Survey Results

The requirement elicitation phase is a foundation of the software development lifecycle. The success of the software development life cycle depends on to get the right requirements from the customers. the requirement elicitation phase. First, we formulate questionnaires against our problem statement. After that, surveying our respondents

4.1.0. Respondent

Our respondents are professionals, marketers, and students. Our problem statement is lead to three-phase that belongs to the business side end product and customer needs .so this the reason we include our respondent from both side either the software development side and customer side both during the requirement gathering phase and after deployment of the product. What is the response from the customer side against the new software product? We include software engineers, team lead, and marketers.

Sr.no	Respondents
1	Software engineers
2	Team lead
3	Senior graduate students
4	Marketers

Responses

We have estimated 300 to 350 responses collected by our respondents. By the end of the survey, we collected 300 responses. We have started our survey from 25 may till 25 June 2021.

Table 41. Survey Results

No	**Factors**	**Strongly Agree (2)**	**Agree (1)**	**Neutral (0)**	**Disagree (-1)**	**Strongly Disagree (-2)**	**Total (300)**
1	Customer needs and wants equally important	116*2=232	141*1=141	13*0=0	20*(-1)=(-20)	9*(-2)=(-18)	335
2	Functional and non-functional requirements	84*2=168	167*1=167	21*0=0	22*(-1)=(-22)	6*(-2)=(-12)	301
3	Business requirement model	60*2=120	147*1=147	59*0=0	20*(-1)=(-20)	14*(-2)=(-28)	219
4	Get accurate requirement from customer	122*2=244	122*1=122	15*0=0	31*(-1)=(-31)	10*(-2)=(-20)	315
5	Adopt new business strategies	125*2=250	127*1=127	32*0=0	10*(-1)=(-10)	6*(-2)=(-12)	355
6	Brainstorming while getting the requirement in details	169*2=338	100*1=100	16*0=0	7*(-1)=(-7)	8*(-2)=(-16)	415
7	Adopt iterative approach	98*2=196	160*1=160	27*0=0	11*(-1)=(-11)	4*(-2)=(-8)	337
8	Adopt new technology trends	54*2=108	136*1=136	78*0=0	27*(-1)=(-27)	5*(-2)=(-10)	207
9	Communication gap	126*2=252	131*1=131	30*0=0	6*(-1)=(-6)	7*(-2)=(-14)	363
10	User friendly designs /interfaces	112*2=214	130*1=130	42*0=0	8*(-1)=(-8)	8*(-2)=(-16)	320
11	Marketing strategies	94*2=188	167*1=167	30*0=0	3*(-1)=(-3)	6*(-2)=(-12)	340
12	Customer feedback	135*2=270	109*1=109	26*0=0	13*(-1)=(-13)	17*(-2)=(-34)	332
13	Customers' demands	57*2=114	152*1=152	63*0=0	22*(-1)=(-22)	6*(-2)=(-12)	232
14	improving existing software products for new technologies	50*2=100	126*1=126	73*0=0	43*(-1)=(-43)	8*(-2)=(-16)	167
15	Customer quires	98*2=196	155*1=155	34*0=0	5*(-1)=(-5)	8*(-2)=(-16)	330
16	Customer data privacy	126*2=252	112*1=112	46*0=0	8*(-1)=(-8)	8*(-2)=(-16)	340
17	Customer services	98*2=196	155*1=155	34*0=0	5*(-1)=(-5)	8*(-2)=(-16)	330

Results from Weightage Values

The weightage values are those value that's the sum of total response against questions.

Table 4. 2 Accepted or rejected values

No	**Factors**	**Weightage Values**	**Avg. Weightage Responses**	**Results**
1	Customer needs and wants equally important	335	1.117	Accepted
2	Functional and non-functional requirements	301	1.003	Accepted
3	Business requirement model	219	0.73	Rejected
4	Get accurate requirement from customer	315	1.05	Accepted
5	Adopt new business strategies	355	1.183	Accepted
6	Brainstorming while getting the requirement in details	415	1.383	Accepted
7	Adopt iterative approach	337	1.123	Accepted
8	Adopt new technology trends	207	0.69	Rejected
9	Communication gap	363	1.21	Accepted
10	User friendly designs /interfaces	320	1.067	Accepted
11	Marketing strategies	340	1.133	Accepted
12	Customer feedback	332	1.107	Accepted
13	Customers' demands	232	0.773	Rejected
14	improving existing software products for new technologies	167	0.557	Rejected
15	Customer quires	330	1.1	Accepted
16	Customer data privacy	340	1.133	Accepted
17	Customer services	330	1.1	Accepted

The final result in sequence

Write some more details about the final results after finding the weightage values.

Table 4. 3 Final results of a survey

No	**Factors**	**Weightage Values**	**Avg. Weightage Responses**	**Results**
1	Customer needs and wants equally important	238	0.79	Accepted
2	Functional and non-functional requirements	196	0.65	Accepted
3	Adopt new business strategies	355	1.18	Accepted

4	Brainstorming while getting the requirement in details	415	1.383	Accepted
5	Adopt iterative approach	277	0.923	Accepted
6	Communication gap	363	1.21	Accepted
7	User friendly designs /interfaces	320	1.0667	Accepted
8	Customer quires	330	1.1	Accepted
9	Customer data privacy	340	1.133	Accepted
10	Customer services	330	1.1	Accepted
11	Marketing strategies	340	1.133	Accepted
12	Customer feedback	68	0.2266	Accepted
13	Get accurate requirement from customer	315	1.05	Accepted
14	Business requirement model	219	0.73	Rejected
15	Adopt new technology trends	207	0.69	Rejected
16	Customers' demands	232	0.773	Rejected
17	improving existing software products for new technologies	167	0.556	Rejected

Result explanation

Here you have to explain the results including its Cronbach alpha value.

Cronbach Alpha:

We are using the corn Bach alpha value to evaluate our responses either it is consistent, reliable, or not. Corn bach alpha values have some steps and range to evaluate the responses accordingly.

Corn bach alpha formula: $\alpha = \frac{N\overline{c}}{\overline{v}+(N-1)\overline{c}}$

1. First we find variance against each question

Formula: Var. P (first col: Last col)

In our case= var.p (L2:L301)

The same method was applied to the rest of the questions as well.

2. Sum of all the variance

Formula: Sum (first variance col: last Variance Col)

In our case:

=Sum (L303: LAA) = 14.14316

3. Variance of total scores

Formula: Var.P (row1: last row)

In our case:

=var.p (L2:AB2)

Applied for all rows same formula and procedure.

4. Sum of variance of total scores

Formula: Var.P (Col1: Collast)

In our case:

=var.p (AB2:AB302) = 0.274634

5. Corn bach Alpha

(Total Questions / (TQ-1))*1-sum of all variance /Variance of Total scores

= (16/ (16-1))*1-14.14316/0.274634

=1.002761

Low significance factors

Low significance values are those values that are mostly rejected from respondents due to some reason. These reasons can be

- They don't understand the question properly
- Negligence while performing survey
- Lack of awareness about the domain knowledge
- Lack of structure about requirement elicitation gathering phase in software organizations.

No	Factors	Weightage Values	Avg. Weightage Responses	Results
1	Business requirement model	219	0.73	Rejected
2	Adopt new technology trends	207	0.69	Rejected
3	Customers' demands	232	0.773	Rejected

4	improving existing software products for new technologies	167	0.556	Rejected

High Significance factors

Write in total that how many factors of the survey are accepted by respondents then explain the acceptance of each factor one by one.

No	**Factors**	**Weightage Values**	**Avg. Weightage Responses**	**Results**
1	Customer needs and wants equally important	238	0.79	Accepted
2	Functional and non-functional requirements	196	0.65	Accepted
3	Adopt new business strategies	355	1.18	Accepted
4	Brainstorming while getting the requirement in details	415	1.383	Accepted
5	Adopt iterative approach	277	0.923	Accepted
6	Communication gap	363	1.21	Accepted
7	User friendly designs /interfaces	320	1.0667	Accepted
8	Customer quires	330	1.1	Accepted
9	Customer data privacy	340	1.133	Accepted
10	Customer services	330	1.1	Accepted
11	Marketing strategies	340	1.133	Accepted
12	Customer feedback	68	0.2266	Accepted
13	Get accurate requirement from customer	315	1.05	Accepted

Focus Group Results

A focus group is based on professional experts and during conducting focused group 6 to 10 experxts are more than enoughThe selection of experts is an important step because those people are represented the large population they are attempting. The focus group research also consists of a moderator. The role of the moderator is to ensure the results and discus will be unbiased. The main pillars of the focus group are

Participants:

The selection of participant for focus is very crucial and important process**.** The main criteria for selecting the participants, they must have domain knowledge.

The moderator:

The role of moderator is to conduct the focus group session and ask question from experts.

Table 4. 4Results from focus group data

No.	Identified Factors	P1	P2	P3	P4	P5	P6
1.	Customer needs and wants equally important	Strongly agree	Agree	agree	agree	agree	Strongly agree
2.	Functional and non-functional requirements	agree	Agree	Strongly agree	agree	Strongly agree	Strongly agree
3.	Adopt new business strategies	agree	Agree	agree	agree	agree	agree
4.	Brainstorming while getting the requirement in details	agree	Agree	agree	agree	Strongly agree	Strongly agree
5.	Adopt iterative approach	disagree	Agree	agree	agree	Strongly agree	agree
6.	Communication gap	Strongly agree	Agree	Strongly agree	agree	agree	Strongly agree
7.	User friendly designs /interfaces	agree	Agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree
8.	Customer quires	agree	Agree	Strongly agree	Not sure	agree	agree
9.	Customer data privacy	Not sure	Agree	Strongly agree	Strongly agree	agree	agree
10.	Customer services	agree	Agree	agree	agree	agree	agree
11.	Marketing strategies	agree	Agree	agree	agree	agree	Strongly agree
12	Customer feedback	agree	Agree	agree	agree	agree	agree
13	Get accurate requirement from customer	agree	Agree	agree	agree	agree	agree
14	Business requirement model	agree	Agree	agree	agree	agree	agree
15	Adopt new technology trends	Dis agree	Agree	Not sure	Dis agree	agree	Dis agree
16	Customers' demands	agree	Agree	agree	agree	agree	disagree

17	improving existing software products for new technologies	disagree	Disagree	agree	disagree	Not sure	agree

Likert Scale for focused group responses

0= Agree, 1=Disagree, 2=Strongly Agree , -2= Strongly disagree , 0 = Neutral

Results from Focus Group

No.	Identified Factors	P1	P2	P3	P4	P5	P6	Agree *2	Disagree*-2	result	Average Weightage
1.	Customer needs and wants equally important	2	1	1	1	1	2	6	0	12	2.000
2.	Functional and non-functional requirements	1	1	2	1	2	2	6	0	12	2.000
3.	Adopt new business strategies	1	1	1	1	1	0	5	0	10	1.666
4.	Brainstorming while getting the requirement in details	1	1	1	1	2	2	6	0	12	2.000
5.	Adopt iterative approach	-2	1	1	1	2	0	4	1	8	1.333
6.	Communication gap	2	1	2	1	1	2	6	0	12	2.00
7.	User friendly designs /interfaces	1	1	2	2	2	2	6	0	12	2.00
8.	Customer quires	1	1	2	0	1	1	5	0	10	1.666
9	Customer data privacy	0	1	2	2	1	1	5	0	10	1.666
10	Customer services	1	1	1	1	1	1	6	0	12	2.000
11	Marketing strategies	1	1	1	1	1	2	6	0	12	2.000
12	Customer feedback	1	1	1	1	1	1	6	0	12	2.000
13	Get accurate requirement from customer	1	1	1	1	1	1	6	0	12	2.000
14	Business requirement model	1	1	1	1	1	1	6	0	12	2.000
15	Adopt new technology trends	-2	1	0	-2	1	-2	2	3	4	0.666
16	Customers’ demands	1	1	1	1	1	-2	5	1	10	1.666

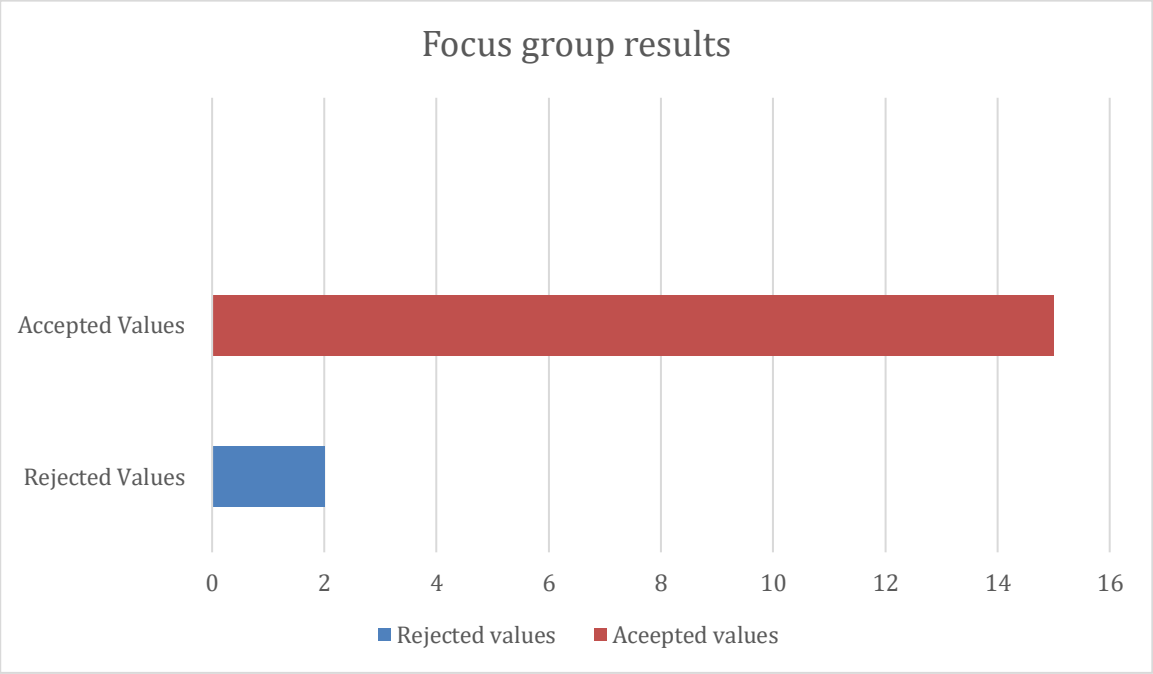
17	improving existing software products for new technologies	-2	-2	1	-2	0	1	2	3	4	0.666

Table 4. 6 Final Results from Focus Group

No.	Factors	Average weighted	Final Results
1.	Customer needs and wants equally important	2.000	Accepted
2.	Functional and non-functional requirements	2.000	Accepted
3.	Adopt new business strategies	1.666	Accepted
4.	Brainstorming while getting the requirement in details	2.000	Accepted
5.	Adopt iterative approach	1.333	Accepted
6.	Communication gap	2.00	Accepted
7.	User friendly designs /interfaces	2.00	Accepted
8.	Customer quires	1.666	Accepted
9.	Customer data privacy	1.666	Accepted
10	Customer services	2.000	Accepted
11	Marketing strategies	2.000	Accepted
12	Customer feedback	2.000	Accepted
13	Get accurate requirement from customer	2.000	Accepted
14	Business requirement model	2.000	Accepted
15	Adopt new technology trends	0.666	Rejected
16	Customers' demands	1.666	Accepted
17	improving existing software products for new technologies	0.666	Rejected

So out of a total of 17 values, we have 15 values are accepted and 2 values are rejected. First of all, we construct a table that contains totals values after that we find average weightage value of respondent responses .we are consider those values as acceptated values that are above 0.95 and below 0.95 values are rejected.

Result explanation



The low significance factors according to the focus group are:

We have 2 low significance factors and it is rejected by the respondents, the rejected values are

1: Most software houses are not focused on improving existing software products for new technologies

Reason:

Respondents explain and also tells their experience that most of the software houses are not to update the software product due to the complexity of the software product.

2: Customers are more concerned about the privacy of the data

Reason:

Respondents point out about privacy of data, in Pakistan specifically, there is no data act implemented to secure the customer data. Most of the customers don't care about privacy bases on limited knowledge of it.

The accepted or high significance factors according to focus group

We have 15 high significance factors that are accepted by the respondents.

the followings accepted values are

1. Customer needs and wants are equally necessary for the software development team.
2. Customer needs and wants are more relevant to functional and non-functional software requirements.
3. The ambiguous customer requirements can lead to the failure of software products
4. It is vital to adopt new business strategies and technology trends in software houses.
5. It is necessary to get the correct requirements in detail from the customer.
6. The iterative approach is suitable for a customer to involve during and after the software development phase.
7. The customer needs to be vigilant about new technology trends and benefits.
8. The communication gap plays a vital role in the failure of software projects.
9. The user-friendly interface of the software product is a vast reason to get success from customers.
10. The marketing strategies increase the popularity of the software product among customers.
11. Software organizations focused on own strategies and develop software product rather than collect customer feedback from the markets.

12. The software products are the basis of failure due to neglect of customer's needs and demands.
13. Customer is a key to software success, so it is necessary to solve his/her quires regarding software products.

4.3 Summary

Research question 1 is related to identify gaps between customers' needs and wants from literature. for this purposed , we selected such journal ,conference ,webs, and books that is related to customers elicitations techniques , elicitations issues ,few of papers based on reviews of the existing works and framework about requirements elicitations phase. First question is directly targeted related to what is gaps between customers' needs and wants the after that's, we identify gaps between customers' needs and wants from literature, highlighted high values factors that's is most problematic for elicitations phase through literature. After that, generated survey questionnaires to validate from professional, post graduates students of software engineers and team leads.

Survey is conducted after identified gaps to get maximum responses from targetd respondent. These challenges are communication gaps, brainstorming, marketing strategies, and business requirement model and customers feedback. The survey results is also described and focused results as well.

CHAPTER 5

RESULTS AND ANALYSIS

5.1 Introduction

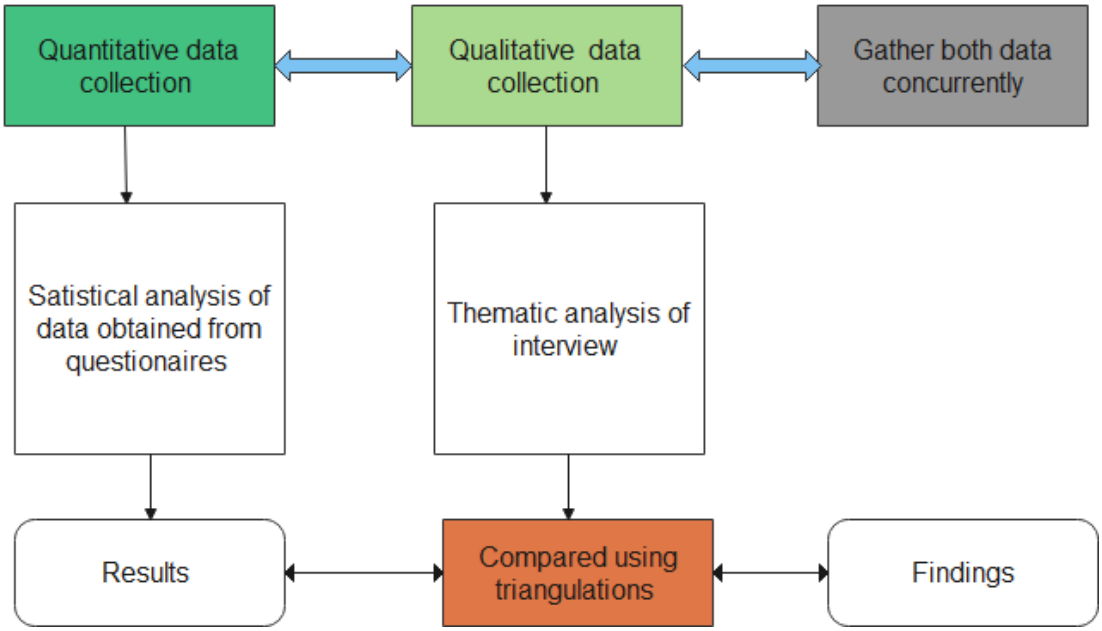
In this chapter, we analyze the survey and focus group results through the triangulation process. in the first questions, identify the gaps between customers' needs and wants through literature and highlighted high valued gaps. So, that perform survey from professional against these factors. To validate the survey through a focus group from experts. In the end, we analyze both data through a triangulation process. for question three, proposed a framework using the existing best of the solution provided in the literature.

5.2 Results and Analysis

We improve the validatity and trustworthiness of our rsearch through adopting triangulation process.

1. The triangulation research process is based on more than one research method.the purpose of triangulation process is to gives more confidence of research findings through cross validations process.
2. Triangulation process is try to overcome the biases through cross validation .
3. The more comprehensive picture of research can get by using two different method . at the end , verify and validate the data through those methods.

4. The triangulation process is validating the data that's is used both in qualitative and quantitative studies.



The process of validating two or more research methods is called triangulation. We are analyzed survey data through focused group and this process is known as qualitative method. The data is validated through two method one is qualitative and second method is quantitative method and both method is done under a triangulation process.The more exact and justified data will come from a comparison of both surveys and focus group results. The final results shows that accepted and eliminated factors using high and low significance factors. After that , we get final results which contains the results in favor of research or rejected the results. Positive replies will suggest that experts concur that customers' needs and wants identified gaps. There is a need to give a solution to existing gaps between customers' needs and wants.

Table 5.1 comparisions of the outcomes from both approaches

Sr No.	Factors	Survey final results	Focus results	Dominants results
1	Customer needs and wants equally important	1.117	2.000	2.000
2	Functional and non-functional requirements	1.003	2.000	2.000
3	Business requirement model	0.73	1.666	1.666
4	Get accurate requirements from the customer	1.05	2.000	2.000
5	Adopt new business strategies	1.183	1.333	1.333
6	Brainstorming while getting the requirement in details	1.383	2.00	2.00
7	Adopt iterative approach	1.123	2.00	2.00
8	Adopt new technology trends	0.69	1.666	1.666

9	Communication gap	1.21	1.666	1.666
10	User friendly designs /interfaces	1.067	2.000	2.000
11	Marketing strategies	1.133	2.000	2.000
12	Customer feedback	1.107	2.000	2.000
13	Customers' demands	0.773	2.000	2.000
14	improving existing software products for new technologies	0.557	2.000	2.000
15	Customer quires	1.1	0.666	0.666
16	Customer data privacy	1.133	1.666	1.666

By using the triangulation process, we compared survey and focus group results. We observed that out of 15 values, 14 values are accepted and 2 are rejected. the final analysis results of triangulation are 4 low significance values and 11 high significance values. In the triangulation process, we focused on the dominant status of the fully mixed research method under a concurrent approach.

The following are the low significance factors..

1: Customer is a key to software success, so it is necessary to solve his/her quires regarding software products.

Reason: Lack of experience from respondents in dealing with customer queries or are unable to understand this question.

The following are the high significance factors are…

1: Customer Needs and wants are equally necessary for the software development team

Reason: The Respondents have experienced or understand this question. The respondents can be working in software requirements discipline.

2: Customer needs and wants are more relevant to functional and non-functional software requirements

Reason: Respondents are more familiar with software development life cycle and know the importance of functional and nonfunctional requirements.

3. The ambiguous customer requirements can lead to the failure of software products.

Reason: respondents know the worth of ambiguous data, which leads to challenging or failure software product .

4. It is vital to adopt new business strategies and technology trends in software houses.

Reason: The Respondents have experienced or understand this question .the new business strategies and technology trends are equally necessary to boost business and software product success.

5 .It is necessary to get the correct requirements in detail from the customer.

Reason: The Respondents have experienced or understand this question To get the correct requirements in detail from the customer is necessary for successful software product development.

6. The iterative approach is suitable for a customer to involve during and after the software development phase.

Reason: The Respondents have experienced or understand this question that iterative approach is suitable for a customer to involve during and after the software development phase.

7. the customer needs to be vigilant about new technology trends and benefits.

Reason: The Respondents have experienced or understand this question . the important point,customer should aware of new trends and technology.

8. The communication gap plays a vital role in the failure of software projects.

Reason: Respondents either have a lot of experience or understand this question that communication plays a vital role to express or elaborate on software requirements. If a customer is unable to elaborate about the requirements then how software product development will be successful.

9. The user-friendly interface of the software product is a vast reason for the success of software products.

Reason The Respondents have experienced or understand this question .the user-friendly interface of the software product is a vast reason for the success of software products software product successful.

10. The marketing strategies increase the popularity of the software product among customers.

Reason: The Respondents have experienced or understand this question .The marketing strategies increase the popularity of the software product among customers.

11 Software organizations focused on own strategies and develop software product rather than collect customer feedback from the markets.

Reason: The Respondents have experienced or understand this question .the customers feedback are equally necessary to boost business and software product success.

12. The software products are the basis of failure due to neglect of customer's needs and demands.

Reason: The Respondents have experienced or understand this question .the failure of the software product due to neglect of customer's needs and demands.

13. Most software houses are not focused on improving existing software products for new technologies.

Reason: The Respondents have experienced or understand this question. The improving existing software product to get more customers to used and enhanced its feature according to new technology trend.

14. Customers are more concerned about the privacy of the data.

Reason: The Respondents have experienced or understand this question .The data privacy is more important for the customers.

5.3 proposed Frame work

In our third question, how the gap among the customer's needs and expectations can be reduced. For this solution, we proposed framed work against highlighted issues that is gathered from literature then we proposed solution from the best results of different authors through literature. Our proposed framework is the best solution of at one framework.

Proposed solutions

This study proposes a solution to existing gaps during customer needs and wants by using the best of proposed results from the literature. The solutions to existing problems are

1. Domain Knowledge

Customer demand, quires, and accurate requirements can be reduced through domain knowledge. so both developer, requirement engineer, and customers must have domain knowledge of software products[26][51][16].

2. Ethnographic environments

Brainstorming the requirement can be better in ethnographic environments[3][4].

3. Classical NLP

The NLP techniques and tools are used for the SRE process. It is used using some manually plain text with along automated NLP algorithm. It makes easy to get all requirement and understand the customers' requirements[43].

4. Prioritization of requirement

Prioritization of requirements based on functional and nonfunctional requirements and customer's needs and wants. Prioritizations of the requirement can reduce data privacy issues as well[49].

5. Smart user design strategies

Smart user design interacts with customers and is easy to understand everyone. Either they are familiar with technology or new user[17].

4. Scrum Development process

The Scrum development process is best before and during gathering the requirement. Because in every module customer involvement makes sure to reduce the rate of failures projects[80].

5. Innovative business model

The innovation business model of any organization leads to developed successful revenue-based projects .in terms of a good business software product.it leads to business strategies and business requirement models[62].

6. **Customers satisfaction relationship & Quality services measures**

Customer's satisfaction relationship & quality service measure, what customer feedback about quality of the product. The positive feedback about software products. Give incentives and give away to engage and stay customer in long term.

At the end of all three-phase we write down, we should categories each sub-phase of elicitations to contribute best software developments on both sides at the customer's side and development and business side[10].

5.4 Summary

In this chapter , analysis the data from both research method .the hybrid methodology is used to verify and validate the results. After that, a proposed framework which is based on the best existing solution given in the literature to be the best solution of existing gaps between customer needs and wants. The resesrch topic is validating and verifying the data in the context of supporting the thesis through mixed method research .

CHAPTER 6

CONCLUSION AND FUTURE WORK

6.1 Introduction

The main focus of this research is to identify the best solutions to identified gaps between customers' needs and wants of software development life cycle. The whole thesis is based on three research questions which are investigated and validated to give the solutions about identified gaps between customer's needs and wants for the requirements elicitations phase. So, research is divided into three research questions.

6.2 RQ1. How do customer's needs and expectations differ?

The first question is about how we differentiate between customers' needs and wants. First of all, customer needs and wants are differ depends on their requirements. Here question arises that either customer is used a customized software product or it is based on a general software development product. Here we explained generally what is customer needs and wants according to different literature reviews. but in the end, the question remains how we can say that it is quietly right about customers' needs and wants are different in such a way. we explained related to literature customer needs and wants are different according to customer requirements. Few of a customers'

needs are other customer's wants. So in a customized software development cycle. Customer needs and wants are dependent on customers' requirements. What they want in their Software products. Second general software products' needs and wants differ from customer's feedback, quires, and marketing demands. These all are illustrated from the literature that in general software development products are based on customer needs and wants to depend on feedback, customer quires, and marketing strategies.

In the first question, we differentiate customers' needs and wants to be based on customized software and general software development life cycle.

Basic for Comparison	**Needs**	**Wants**
What is Meaning	Need to refer to the basic requirement of the software product to develop and run the software.	Wants are described as those functional and nonfunctional requirements that customers like to have in the software product.
Nature	Restricted	Infinite
Characterizes	Need	Want
Existence state	Necessary	Unnecessary
Modification	May stay constant over time	May modification over time
Non-fulfillment	Understanding barriers during gather the requirements	Budget and vary the requirements.

RQ2. What are the consequences of the difference in customer's needs and expectations?

In the second question, get consequences of the difference in customer's needs and wants from literature review through systematic literature review. We have studied reviewed 60 papers related to customers' needs and wants. Further to understand the requirement engineering and especially requirement elicitation technique. We dived requirement elicitation technique in further three sub-phases and these phases are

- User requirements
- Product requirements
- Business requirements

We have collected literature based on these three categories and find gaps between customers' needs and wants. First of all, we divided the requirement elicitation phase into sub-three phases. From each phase, we identify gaps between customer needs and wants. We identify those gaps are consequences through literature that's, creates problems to meet or understand customer needs and wants.

In this question, we try to identify gaps from literature and highlight top valued gaps from literature related to customer's needs and wants .so that identify 16 factors that are affected customer needs and want during g requirement elicitation phase. After the identification of gaps, we formulated survey questions to get a response from a professional software engineer, requirement engineer, postgraduate field researcher, and team lead. The factors identified are customer needs and wants, functional and non-functional requirements, Business requirement model, Get accurate requirements, Adopt new business strategies, Brainstorming, Adopt iterative approach, Adopt new technology trends, Communication gap, User-friendly designs /interfaces, Marketing strategies, Customer feedback, Customers' demands, improving existing software products for new technologies, Customer quires, Customer data privacy, and Customer services. These are the main factors that, we get from literature and then to perform survey from professionals. After the survey results, we validate the survey's results through a focus group.

RQ3: How the gap between the customer's needs and expectations can be reduced.

In the third question, we get a survey and focus group results, we perform triangulation process, triangulation process to validate the survey and focus group results. After validating the results, we found 13 values are accepted and 4 are rejected .after that we proposed a framework against these values. We give a framework of these factors that are affected to customers' needs and expectations during the requirement elicitation phase. we get the checklist from literature which is the best solution provides from different literature and combined it in our framework. If these checklists perform during the requirement elicitation phase. We can reduce the issues that are faced during the requirements elicitation phase.

6.4. Contribution

There are many ways to contribute to our research in society. Research is based on differentiating customers' needs and wants. Customers' needs and wants are differentiates based on three sub-phases of the requirements elicitations phase that's been discussed in our previous chapters. The sub-phases are user requirements, product requirements, and business requirements. These are the three requirements sub-phases that are directly linked with gathered the requirements from customers or analyzing the customers' needs and wants. For this purpose, we proposed framed work. The framework can contribute in such ways that are.

1. Our proposed framework is based on the best solution to merge in one place.

2. Practically, if we implemented proposed framed work, it can help us in our software organizations, for example, user requirements, product requirements, and business requirements.
3. During gathered the user requirements from customers, if we focused on domain knowledge, applied classical NLP strategies and prioritizations of the requirements. We can lead a successful software development life cycle. The success rate of software will be higher than before.
4. They focused on user requirements through domain knowledge, classical NLP, ethnographic environments, and prioritizations of the requirements to get accurate requirements from customers.
5. During the software development life cycle, it is essential to involve the customers, it overcomes the upcoming ambiguity or challenges during software product development.
6. If we focused on business requirements, before starting the software development life cycle then we can understand market strategies, customer's recent demands & trends in the markets.
7. Through the business requirements model, we can analyze the market demands and customers' interests as well.

All these factors can eliminate the issues that are mostly we are faced during the development life cycle. It also helps us in generate good revenue of the software product. When we developed software products according to customers' needs and wants, it's automatically popular with customers.

6.5 Limitations

1. The research solution is based on local market.
2. The global software development is not focuses in our thesis . GSD has its own set of steps. So that , our research will based on local maket.
3. Identify all possible gaps with in scope but it is possible to not cover all aspect or gaps due to research scope that is based on medium and small software development process.
4. Our research topic consists of one year time frame to complete research thesis and conclude it So, it is not possible to cover over all gaps.

.

6.3 Future Work

Since there is our proposed framework related to reduced existing gaps between customers' needs and wants. But it depends, how fast and how long it is used in the software industry in the future. In this research thesis, we are focused local market, in the future, we would like to work at the global level.

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