Government to Citizens E-service Co-Design

A thesis submitted towards the degree of Doctor of Philosophy

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ABSTRACT

e-Government services are typically developed by internal service providers, often neglecting the service end user. Subsequent delivery of services can be jeopardised without due consideration of the service user, lacking in consideration of their needs and expectations in the design process. However, the service provider when designing e-services for varied users, find it is hard to meet the prospective users' expectations and needs and involve them in an iterative design processes. To address this issue; a Co-design approach has been applied and focuses on Jordanian Government to Citizens (G2C) e-services. Co-design tools/methods maximize opportunities and provide new possibilities for communicating and collaborating with varied and diverse users. The main aim of this research is to improve the quality and efficiency of G2C e-services by adopting the Co-design approach including its tools/methods to support user participation throughout design process, and how these tools/methods pretend the features of user participation.

A novel G2C e-Service Co-Design Framework (G2C-SCOF) is constructed with mechanisms for understanding the stakeholders' requirements, and granting them an active role throughout design process of G2C e-service design. A wiki-based Co-design prototype (WCP) is developed and introduced as a response to and evaluation of the developed G2C-SCOF. This research also presents results from the case study in Jordan and used to evaluate WCP effectiveness regarding users' participation role(s) throughout the Co-design process based on standard service design phases. Interestingly, involvement throughout design process as such can be an enriching experience for the users. Offering a channel to uncover their own creativity and provide enjoyment for them as they see their contributions evolve into a viable service. A robust method for uncovering domain concepts is derived that bridges the requirements' gap between service provider and service user within a G2C e-service design context. A first iteration evaluates the adoption and acceptance of Jordan Government Portal (JGP) based on a model titled Methodology for e-Government Service Adoption and Acceptance Measurement (MEGA-M). MEGA-M is then used to design a survey and subsequently investigate how citizens perceive the quality of the JGP. RepGrid methodology with semi-structured interviews are deployed in the second iteration – with 24 participants from diverse backgrounds contributing to a synthesised cognitive model titled Stakeholder's requirements map for G2C Service Design' (SRM-G2C). Finally, a prototype WCP is developed as the third iteration for evaluation purposes. WCP is a platform for facilitating the sharing and expression of ideas and/or assumptions used to improve the effectiveness of G2C e-service design.

The conclusions and contributions drawn from this research are expected to benefit researchers, providing insights for future research in the field of e-Government service design, and practitioners, providing a systematic framework for supporting the collaboration among stakeholders in designing G2C e-services.

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DEDICATION

This thesis is dedicated to my beloved parents, wife, brothers and lonely sister for their unconditional love, endless support and constant encouragement. Thank you for your limitless faith in my abilities.

PUBLICATION

This research led to following papers:

1- NUSIR, M. and BELL, D., 2014. The Development of Government to Citizens e-Service Design Process: Feature Identification Using Repertory Grid. Proceedings of the 13th European Conference on Research Methodology for Business and Management Studies: ECRM 2014, 2014. Academic Conferences Limited, 441.

2- NUSIR, M. and BELL, D., 2013. Systematic Literature Review: Taxonomy of Services In E-Government. 18th UKAIS Conference on Information Systems, 2013, paper 27.

3- NUSIR, M. and LAW, E., 2012. Evaluating the Adoption and Acceptance of eGovernment in Developing Countries: A Case Study of Jordan. Proceedings of the 12th European Conference on eGovernment, 2012, Academic Conferences Limited, pp.852-860.

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ACRONYMS

ANV	Average Normalised Variability
ASPA	American Society for Public Administration
BL	Base Line
BPMN	Business Process Model and Notation
BSBD	Better Services by Design
CA	Computer Anxiety
CBS	Copenhagen Business School
CoP	Community of Practice
CPI_S	Conference Proceedings Index–Science
CPI-SSH	Conference Proceedings Index–Social Science and Humanities
CSB	Civil Service Bureau
CSCIE	Computer Science Citation Index Expanded
CSP	Civil Status and Passport
CTSP	Co-design Tool Selection Process
CW	Citizen Worker
DHS	Department of Human Service
DSR	Design Science Research
DV	Dependent Variable
EPR	Electronic Patient Record
ESEC	e-Government Service Evaluation Criteria
FGD	Focus Group Discussion
G2C	Government to Citizen
G2C	Government to Citizen
G2C-SCOF	G2C e-Service Co-design Framework

GDP	Gross Domestic Product
GDS	Government Digital Services
GEST	Generalised e-Government Service Taxonomy
GPS	Government Procurement Services
GRP	Government Resources Planning
ICT	Information and communication technologies
ISSM	Information System Success Model
IV	Independent Variable
JGP	Jordan Government Portal
JGS	Jordanian e-Government services
MEGA-M	Methodology for e-Government Service Adoption and Acceptance Measurement
MIS	Management Information Systems
MMP	Mechanism of Mapping Process for adapting SR-G2C e-Service
MoICT	Ministry of Information and Communication Technology
MSP	Mechanism of Selection Process for matching SR-G2C e-Service
NAO	National Audit Office
NITC	National Information Technology Centre
NSW	New South Wales
NV	Normalised Variability
ODPM	Office of the Deputy Prime Minister
OECD	Organisation for Economic Co-operation and Development
PD	Participatory Design
PICTIVE	Plastic Interface for Collaborative Technology Initiatives through
RepGrid	Repertory Grid
RPES	RepGrid Protocol for e-Government services
SI	Service Interface

SP	Service provider
SPRF	Service Provider Realisation Framework
SRM-G2C	Stakeholder requirements map for G2C Service Design
SSCI	Social Sciences Citation Index
SSW	Software Shaping Workshop
SU	Service User
SUS	System usability scale
T	Teacher
TAM3	Technology Acceptance Model
TC	Typical Citizen
TDDM	Tailoring of Double Diamond Model
TiG	Trust in the Government
TiI	Trust in the Internet
TUD	Technical University of Denmark
UCD	User-Centred Design
UK-DSF	UK Digital services Framework
UN	United Nations
UNPAN	United Nations Public Administration Network
USL	Universities' Students and Lecturers
VDC	Various and Diverse Centres
VE	Video Exploration
WCP	Wiki-based Co-design Prototype
WOS	Web of Science

Chapter 1 Introduction

1.1 Chapter Overview

This chapter introduces the research background and domain context, problem, motivation and significance. The research context is described in order to better define the scope of the research. Subsequently, the research aim and objectives are presented. The research methodology is briefly described, and the thesis structure is presented.

1.2 Research Background

e-Government is defined as "utilizing the Internet and the World-Wide-Web for delivering government information and services to citizens" (UN and ASPA, 2002, p.1). e-Government services should be accessible and reliable to support main types of e-Government interaction such as government to citizen (G2C), government to business (G2B), government to employee (G2E), and government to government (G2G) (Gant, 2008). e-Government services in developing countries continues face a lot of problems and challenges, especially in the implementation phase, because of the gap between stakeholders' unmet needs and service designs. Furthermore, such a gap is considered to be one of the significant factors that leads to failure of e-Government projects in developing countries (Choudrie et al., 2009). Understanding e-Government development and exploring factors that influence e-Government development have become interesting research topic for researchers (Scholl, 2014). Furthermore, a number of significant problems have been identified in existing e-Government services in developing countries. Designers should pay more attention to service design when developing e-Government services (Huang and Brooks, 2011). AlSoud and Nakata (2010) found that the designers of e-Government portals in developing countries did not pay enough attention to addressing citizens' needs. Consequently, this affects the consistency between what is needed and what is available for users.

This research study is concerned with service design that affects the perceived quality of e-Government services, based on service user's perceptions and other stakeholders' experience. Moreover, the research aims to identify some sound approaches that will improve the quality of e-Government services and maximising users' opportunities in participation in the design process. Therefore, the research study proposes to apply an existing approach called "Co-design

approach" to bridge the requirements gap between citizens' real needs and the service provider/ designers of e-Government services in developing countries, and considers analysing the Jordanian e-Government portal as a case study. The use of Co-design and the focus on Jordanian Government to Citizens (G2C) e-services will encourage citizens to use these services at their own convenience (Bradwell and Marr, 2008).

Nowadays information and communication technologies (ICT) are the main tools that enable people to handle information (Zhao et al., 2008); collecting, organizing, and using it for mundane communication, business transactions or governmental matters. ICT supports users in undertaking their commercial activities at a lower cost, and also increases the capabilities of the users to carry out their work efficiently and effectively. The core of any online service, for example an e-Government portal, should be commensurate with what makes users satisfied in their daily work (Malone, 2004). This indicates that the needs and characteristics of users need to be taken into consideration when designing such ICT-enhanced interactive systems. Confidence in the quality of e-services serves as a motivator of the user's trustworthiness towards an e-Government portal, which in turn promotes the adoption of public e-services (Chee-Wee et al., 2008).

The trust of citizens in their government agencies has gradually eroded (Parent et al., 2005), in that these are perceived as inefficient and ineffective. When citizens deal with these agencies for any service, they are unlikely to get timely or appropriate responses. One means of mitigating this situation is to introduce e-Government or web-mediated citizen-to-government interaction. e-Government is the bridge between citizens and the government to enable them to find and access services online with a high efficiency and quality, motivating citizens to use the service (Parent et al., 2005). The research study was conducted by Heeks (2003) showed most of the applications used in e-Government in developing countries failed, with 35% being classified as a total failure, in which e-Government was not implemented at all or just abandoned upon implementation. Furthermore, 50% was classified as a partial failure, in which the goals were not achieved and/or they gave unwanted outcomes, and such a failure was attributed to limited resources and money.

The research considers Jordan as a case study, since Jordan, one of the developing countries, has not yet started to adopt the 'Co-design approach' as a means of delivery for providing e-Government services to citizens. Therefore, this research is expected to contribute to Jordan's e-

Government research with more concern for government-to-citizens (G2C) e-services provision. Hence, the research findings and recommendations are expected to benefit both the government as service providers and the citizens as service users. Service providers will also provide a new design process based on the Co-design approach, by involving citizens throughout service design for improving e-Government service quality.

1.3 Research Context and Motivation

e-Government services are typically developed by internal service providers, often neglecting the service end user (Axelsson and Melin, 2007; Bridge, 2012). Subsequent delivery of services can be jeopardised without due consideration of the service user, lacking in consideration of their needs and expectations in the design process (Lenk, 2002; Parent et al., 2005; Wee et al., 2008). Furthermore, due to the limited user involvement throughout development design process of the e-Government services (Olphert and Damodaran, 2007; Følstad et al., 2004; Anthopoulos et al., 2007). This research will address this issue, and explore the use of a Co-design approach of the Jordanian Government to Citizens' (G2C) e-services. Hence, this research looks for a means to improve these emerging concerns, with a special focus on the Jordanian's e-Government services. Some researchers suggested that there should be a model integrating the variables that influence the citizens' adoption of e-Government (Mofleh and Wanous, 2008). According to Avgerou and Walsham (2000, p.1), "successful examples of computerization can be found…but frustrating stories of systems which failed to fulfil their initial promise are more frequent".

The past few years have witnessed a revolution in ICT. In developing countries, e-Government should understand the factors that have a direct effect on citizens in adopting and accepting the online services, in order to take them into consideration when delivering these services (Parent et al., 2005). From here, the research study starts to focus on citizens' unmet needs, because this concept plays a crucial role in making citizens more confident in the e-services provided (Mofleh and Wanous, 2008). However, the growing interest of research studies in e-Government has raised many issues, such as how governments can exploit the e-Government benefits, as well as they can motivate citizens to adopt and use e-Government services, and additionally how they can ease the citizen's experience of finding and using such services (Alsoud, 2012). The obvious lack of e-Government services provision in Jordan and the poor, or even the failure of e-services initiatives have motivated the researcher to do this research, so as to conduct an exploration with regard to the factors that obstruct e-service development and usage in Jordan, and how it may be solved.

Many developing countries which have implemented e-Government projects that have adopted and employed a citizen-centric approaches such as user-centred design in their e-Government strategies. However, these projects failed because in practice governments tend to provide their citizens with what the government considers important based on polices and some business issues like investment, regardless of the citizen's expectations of need, which makes observers wonder what is meant by user-centred design strategies. For example, Jordan as a case study in this research is one of the developing countries with a limited number of natural resources and the Jordanian government has consumed an enormous budget on the development of e-Government program and to provide e-services to citizens (Alsoud and Nakata, 2012; MoICT, 2012). The e-Government strategy of Jordan has set a citizen-centric approach to designing service provision (MoICT, 2012; UNPAN, 2008) by adopting a life-event approach to design the G2C e-services, through a citizen lifecycle (Alsoud, 2012). However, the level of e-Government service utilisation among the Jordanian citizens is very low, based on the study which was conducted by this research study to evaluate e-Government services in Jordan (See chapter 4).

According to the Ministry of Information and Communication Technology (MoICT) in Jordan, the vision was "an essential and active participant in the economic and social development through the use of information and communication technology to enable easy access to government information and services for all users regardless of their geographic location or economic status or professional capacity" (MoICT, 2011, para.2). Unfortunately, up to now, the vision has not yet been realized. The e-Government project in Jordan is an example that illustrates the shift of paradigm from the government-centred to citizen-focused (MoICT, 2011). This research aims to explore factors which may play a critical role in the adoption and acceptance of e-Government services. Furthermore, researcher assumes that this emerging concern in developing countries can be addressed by increasingly involving citizens in the development of the e-Government services. As a representative example, the research study examines the Jordanian Government services with the aim of generalizing the empirical findings to other developing countries and advancing the status. According to Gupta (2007), the well-established citizen-centric approach can optimize the potential benefits of an e-Government. This research study will evaluate the activation of this approach to assess the goal to maximize the involvement of citizens in the entire development lifecycle of the e-Government services, in order to meet their requirements and needs (See chapter 4).

1.4 Research Aim and objectives

The aim of this research is to improve the quality and efficiency of G2C e-services by providing a suitable Co-design framework for the development of G2C e-service design process for varied stakeholders, with the aim of maximizing opportunities and provide new possibilities for communicating and collaborating these stakeholders throughout design process. The objectives of this research are as follows:

The objectives of this research are as follow:

1-To explore and review the existing research literature of the use of service design process adopted in e-Government services.

2-To review the earlier practices of Co-design method(s)/tools in e-Government services.

3-To investigate how citizens perceive the quality of the current release of the Jordanian e-Government portal, based on end users evaluation. Furthermore, to identify a list of social demographic variables in influencing the adoption of e-Government.

4-To identify the requirements' of G2C e-service design process (cognitive elements).

5-To Build-up the G2C e-service co-Design Framework (G2C-SCOF).

6-To develop an artefact (WCP) as a response to the developed framework (obj.5).

7-To validate the developed artefact by applying it to Jordan as a case study through an experimental evaluation (obj.6).

1.5 Research Methodology

Design Research methodology is recommended by March and Smith (1995) and Hevner et al., (2004) as a research framework in which IT research can occur by integrating two complementary disciplines. The first of these is behavioural science, in which research is more focused on theorizing and justifying, and the second is design science research (DSR), where the research is more focused on building and evaluating process. While the design science methodology was proposed by Vaishnavi and Kuechler (2004), it is a general research methodology and built based on experimental point of view. Design research examines both the product and process: the process integrates a set of design and behavioural science activities: build, evaluate, justify and theorise (March and Smith, 1995), while the product can be categorised into four categories as defined below (March and Smith, 1995).

- **Construct:** A set of concepts form the vocabulary of a domain that shapes knowledge to describe problems and suggest solutions.

- **Model**: Models use constructs to represent problems as situations and solutions as statements (March and Smith, 1995). Therefore, modelling a set of propositions (statements) articulates the relationship among constructs.
- **Method**: A set of guideline steps is used to perform tasks. These guidelines provide solutions to solving problems by using models and constructs. Furthermore, method is considered as translator from one model to another for solving a problem (March and Smith, 1995).
- **Instantiation:** "The realisation of an artefact in its environment" (March and Smith, 1995, p.258). Instantiations are the employment of constructs, models, and methods.

The research project presented in this thesis begins with the pilot study (survey) and aims to investigate how citizens/service users perceive the quality of the current release of the e-Government portal in Jordan and to identify requirements and improvement suggestions from users' feedback. This step represents iteration 1 in this research study. To achieve the main research aim and its objectives, Design Research Methodology will be adapted from Vaishnavi and Kuechler (2004) as general research methodology. Moreover, March and Smith (1995) research product categorisation will be adopted. As explained earlier, the four research product's categories, which will be adopted in different forms of artefacts (i.e. constructs, models, methods and instantiations) according to research outputs. The Design Research methodology applied to build and design the suitable co-design framework, which is comprised of emergent cognitive model (See chapter 5), and design tools. This step represents iteration 2 (RepGrid) in this research study. The next step is to design an artefact (instantiation) which represents iteration 3. A general research methodology (Vaishnavi and Kuechler, 2004) will be adapted to be flexible, and serve the research project aim. The iterative process in this method involves five design process steps:

Problem awareness identifies the list of factors influencing the development of e-Government services, which will be identified by conducting pilot study in the form of survey based on end-user feedback to evaluate the adoption and acceptance of e-Government services in developing countries, Jordan as a case study in this study. The main aim of this evaluation is to investigate how citizens/service users perceive the quality of the current release of the e-Government portal in Jordan and to identify the requirements and suggestions for improvement from users' feedback. The identified requirements and factors, which are affected in the quality of e-Government adoption, have been explained in detail in chapter 4 as iteration 1 for this research

design. Furthermore, a review of the prior literature to explore the existing gaps in design processes adopted in e-Government services is given.

Suggestion aims to examine a number of tentative solutions of how the problem identified in previous step, which represents iteration 1 might be solved by being more specific and specifying the exact problem influence of quality of e-Government services through the build and design a suitable Co-design framework. This step is constructed in Iteration 2 (RepGrid interviews) with the development of a suitable framework. Further suggestions come out once other iterations are undertaken. Analysing the process of design for current e-Government services may help to investigate how the development of the e-Government service design process is used by employing interviewees' opinions, observations and suggestions, which would help the e-Government projects during the e-Government services development stage.

Development is performed by building and designing a research artefact-WCP (iteration 3) a platform of collaborative communication design tools, which are appropriate with specific requirements and user types (iteration 2) to help them express themselves. The artefact responses and evaluates the Co-design framework (G2C-SCOF) with the purpose of better understanding the design process regarding the e-Government services design and their importance over time with e-Government. The proposed WCP aims at collective innovation and supports diverse stakeholders to meet unmet needs regarding service users.

Evaluation is performed using an evaluation method namely focus group discussion (FGD) through a detailed experiment using fieldwork testing, where this fieldwork comprises two parts before interaction and after interaction with the proposed artefact-WCP platform over the existing domain. Evaluation is carried out using Design Research evaluation criteria to observe the effectiveness and validate the proposed G2C-SCOF. Applying the proposed WCP on a realistic domain (same research participants who had participated in research study) (iteration 2). WCP is used to validate the developed G2C-SCOF (iteration 2) over various and diverse research participants including the predetermined groups (service user, service interface, service provider) in iteration 3. For more detail (See chapter 3).

The conclusion summarises the research output and the results of the previous step (evaluation) and taken into consideration for future improvement, to keep sustainability refinement through cyclic iteration link between development and evaluation stages.

1.6 Research Significance and Contribution

This research is of benefit to both researchers and practitioners (i.e. service user, service provider, and service interface) within the e-Government service provision area. Co-design as a concept is typically used to manage collective creativity. In Co-design, more effort and consideration are taken into account in the early phases of the design process, in which the service/product idea has not been investigated and or yet existed. The contributions are classified as theoretical, methodological and practical. This research has rigorously explored the potential of the Co-design approach, and accordingly, has developed a systematic framework for supporting participation in the design process between stakeholders in designing G2C e-services. This research has produced a set of artefacts, which are summarised and classified as follows (For more detail see chapter 7):

1.6.1 Theoretical contribution-G2C-SCOF

A novel 'G2C-SCOF' was developed and validated by fieldwork testing held in Jordan as the primary contribution of this research, which adopted a variety of design tools and/or methods in progressive phases (See chapter 5). The developed 'G2C-SCOF' moved beyond service usability design issues, (i.e. service convenience) to facilitate stakeholders' involvement throughout the design process, in order to shape their own needs and expectations. In fact, this framework has ***two main contributions*****:** 1) Mechanism of Mapping Process (MMP) for adapting SR-G2C e-Service Design in the 'TDDM' process 2) Mechanism of Selection Process (MSP) for matching SR-G2C e-Service Design with suited design tools/methods of e-service design using 'citations analysis' as a novel technique for matching between these elements.

1.6.2 Methodological and Practical Contribution-WCP

WCP focuses on participation throughout the design process (G2C e-service development phases) and related aspects (See Chapter 5) in order to provide realistic opportunities for supporting user participation throughout design process. Based on a case study (i.e. fieldwork testing held in Jordan), it may be concluded that wiki-based participation using WCP supports participation in the design processes, and allows constant interaction between users and developers. ***This contribution is summarised as two main points:*** 1) WCP as a Collaborative Co-design platform for supporting stakeholders' involvement throughout design process of G2C e-Service, 2) WCP Generating ideas or views by offering a channel to express stakeholders own creativity and provide an enjoyment for them to see their contributions in final service. In particular, the Co-design tools or methods in different forms and functions left a salient effect on

stakeholder participation, summarised as: 1) The connection between participants' roles through participation process, 2) A direct association to participants, 3) Authorising participants an active role as decision-makers throughout design process, 4) Motivating participants by permitting them to express their creativity, which reflect their contributions in final service.

1.6.2.1 Service Provider Realisation Framework

A service provider realisation framework (SPRF) (See figure 5.4) can be applied to represents the sequential/iterative process that combines the Co-design tools and methods that are suitable for stakeholders' requirements and stakeholders' types. SPRF was designed in response to the TDDM (See figure 5.3) - with suitable with operational choices for G2C-SCOF (See table 6.3) used in the Co-design process, as depicted in figure 5.4. This research can assist Jordan and other developing countries in the region (who have similar characteristics to the Jordan domain context) in new ways to better design and develop an e-service/s.

1.6.3 Minor Contribution

A practical contribution is reported in chapter 6 through the evaluation of WCP as response of G2C-SCOF to provide validity (with some limitations) across other domains context or applications.

1.7 Overview and Research Process undertaken in This Thesis

In order to accomplish the main aim and its objectives of the research study. Figure 1.1 describes the overall processes that have been carried out in order to achieve the objectives of this research. The research started, by identifying the stakeholders' requirements of G2C e-service design (SR-G2C) from three input artefacts; literature review (See chapter 2), survey as questionnaire form (See chapter 4) and RepGrid theories (See chapter 5). The SRM-G2C as a cognitive model (i.e. output artefact) was built based on RepGrid theories, which were gained from RPES. Hence, the SR-G2C are known; the SRM-G2C integrates with popular Co-design tools and methods (i.e. input artefacts) as defined earlier to be matched (i.e. selection process- See chapter 5) for each requirement. The result of this integration delivers G2C-SCOF (i.e. theoretical contribution) as an output artefact (See chapter 5). Thereafter, in order to validate the G2C-SCOF; WCP (See chapter 6) was developed. The fieldwork testing has been conducted in Jordan, as a case study, to investigate the applicability of G2C-SCOF. Thereby, to keep the sustainability of development of G2C e-service design, the G2C-SCOF will be refined/extended (if needed) to meet stakeholders' expectations and future needs. The thesis is structured as follows:

Chapter 2- This chapter delivers a general review and discussion in a wider context of areas related to e-Government service design and development, in order to reveal the main limitations and gaps worth investigation. The chapter starts with a broad literature review regarding the categories of e-Government and in particular, G2C e-service design process, as research subject in this research project, and included e-Government history and background and its limitations, e-Government benefits and challenges. e-Government classification and development models, constraints to building e-Government in developing countries , citizen-centric approach, life-event approach, citizens' participation in public servants in e-Government, citizen-centric in e-government, human centred design, Co-design approaches and methods/tools, and Double Diamond model. Furthermore, the chapter presents some examples from earlier research regarding Co-design frameworks and artefacts design.

Chapter 3- This chapter suggests using Design Research as the research methodology to conduct a valid Information Systems study. It considers how the methodology of RepGrid may be applied to address and perform the research design problem, by designing and conducting a RepGrid protocol for eliciting personal constructs regarding research problem and context. Research iterations and outputs are identified and categorised based on the design research product's categories. Further, chapter 3 investigates and describes the Design Research as a methodology that will be applied this research study to achieve research main aim and its objectives. Design Research applies a number of methods, techniques and tools to implement research in Information Systems.

Chapter 4- This chapter represents iteration 1. The chapter provides an overview of Jordan's e-Government services programme, and its effort to implement e-service provision, followed by findings and results obtained from evaluating the Jordanian e-Government portal, in particular e-Government services provided. This chapter reports an experimental investigation in the form of a pilot study. The pilot study has been conducted to achieve two main aims: Empirically, it tests and evaluates the list of factors (e-Government Service Evaluation Criteria (ESEC)) - variables and related attributes identified from the literature that are used to evaluate e-Government services based on efficiency of the delivery of these services. This study aims to investigate how citizens perceive the quality of the current release of the e-Government services in Jordan, and to identify requirements and possible improvement suggestions from users' feedback. The findings of this chapter, together with the findings in Chapter 2, are the motivation for carrying out the extended version of the preliminary conceptual model as Methodology for e-Government

Service adoption and acceptance measurement (MEGA-M) which was developed by the researcher.

Chapter 5- This chapter represents iteration 2-part 1. This chapter first describes the analysis of the RepGrid data, as represented in a systematic approach form. It also elaborates on the quantitative and qualitative results of this analysis. It further investigates the patterns of G2C e-service design process, and describes how these processes are inter-related in enhancing service user's satisfaction and effectiveness. The aim of this iteration is to understand the unmet requirements needed for G2C e-service in the design process, and to develop a basis for value-centric decision making for decision makers who have full authorisation regarding development process. RepGrids' interviews were conducted with three groups (service providers, service users, and service interface) with diverse backgrounds, especially service users.

The iteration 2-part 2 represents a more reflective perspective towards understanding the design process as instances of design practice. Further, this chapter presents a description of the SPRF as Co-design process guidelines for service providers. Moreover, from RepGrid theories (i.e. experience, perspectives and observations) led researcher to build-up the SRM-G2C as a cognitive model reported in this chapter. In this way, the elements involved in the G2C-SCOF are made explicit in the design process of providing support for non-designers in the entire design process. Moreover, describing the adaptation of different stages of a 'Double Diamond model' helped to understand the variety of elements that are deployed throughout the service design process.

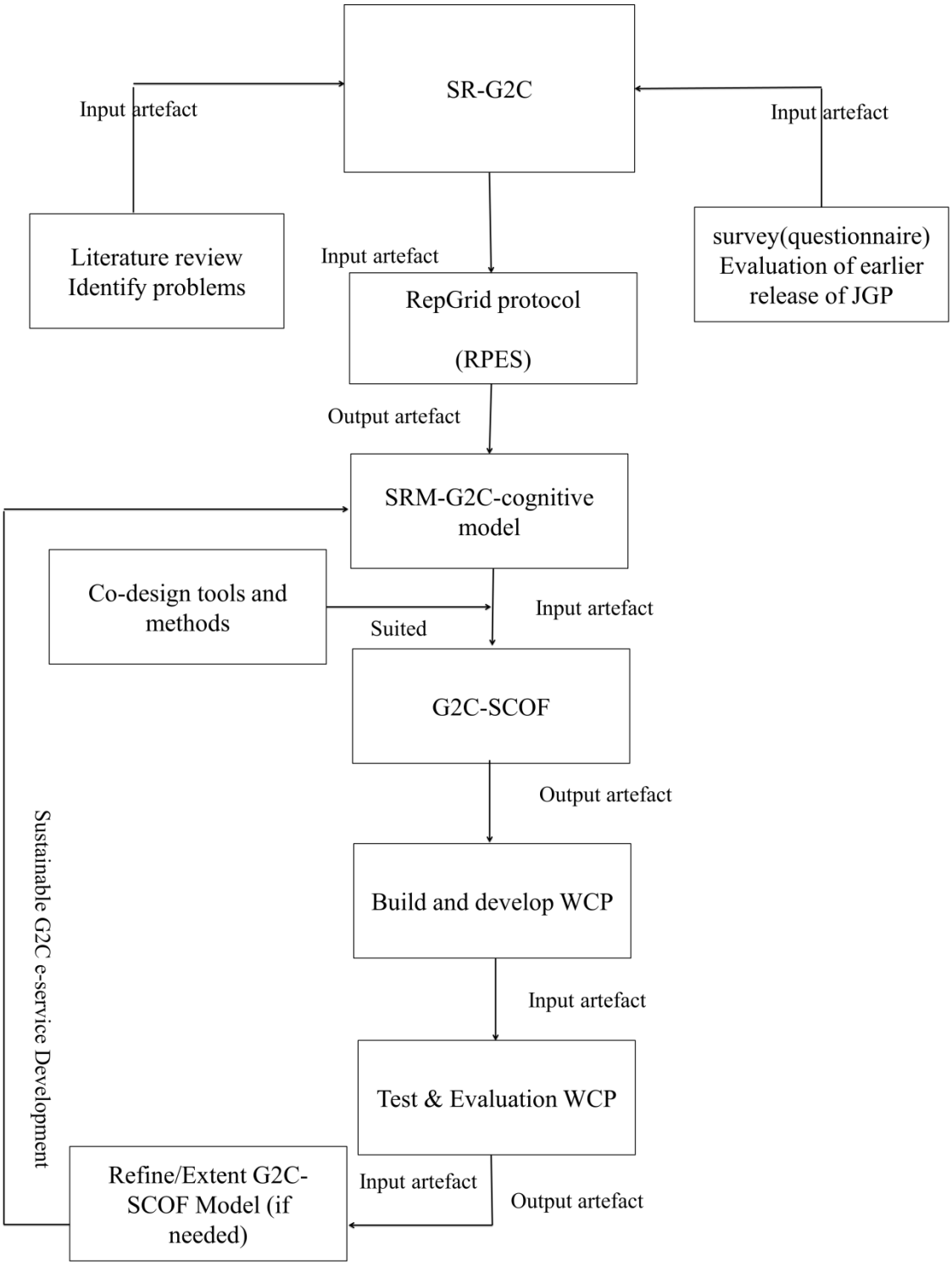

Figure 1.1: Research Process Undertaken in This Thesis

Chapter 6- This chapter represents the third iteration (iteration 3) of this study and it performs seeks test and evaluate the developed G2C-SCOF (See chapter 5) by design, and develop an artefact design/instantiation (WCP). It is developed to facilitate and support the participation process, which aims to feed into the varied stakeholders during service design process, which was produced in the previous iteration. Thus, this iteration seeks to boost the G2C-SCOF by investigating how the developed instantiation may improve the quality and efficiency of G2C e-service design. Subsequently, to explore the benefits and challenges that may confront stakeholders through participation. Evaluation of the proposed framework is done by analysing and examining the case study, which was conducted in Jordan using the experimental evaluation settings. The aim of this iteration is to validate, improve and extend the G2C-SCOF (if need) e-service design to include a wider view of stakeholders and e-service suppliers by analysing the outputs of this iteration based on the proposed design artefact (WCP).

Chapter 7- This chapter presents a comprehensive conclusion of the research iterations are undertaken in this study. Furthermore, it presents the research limitations and research future work. Lastly, a conclusion of this thesis's contributions to knowledge is presented. Possibilities for future research are presented according to research limitations. For ease of reference, the structure of this thesis is mapped to its main aim and objectives, and is summarised in figure 1.2.

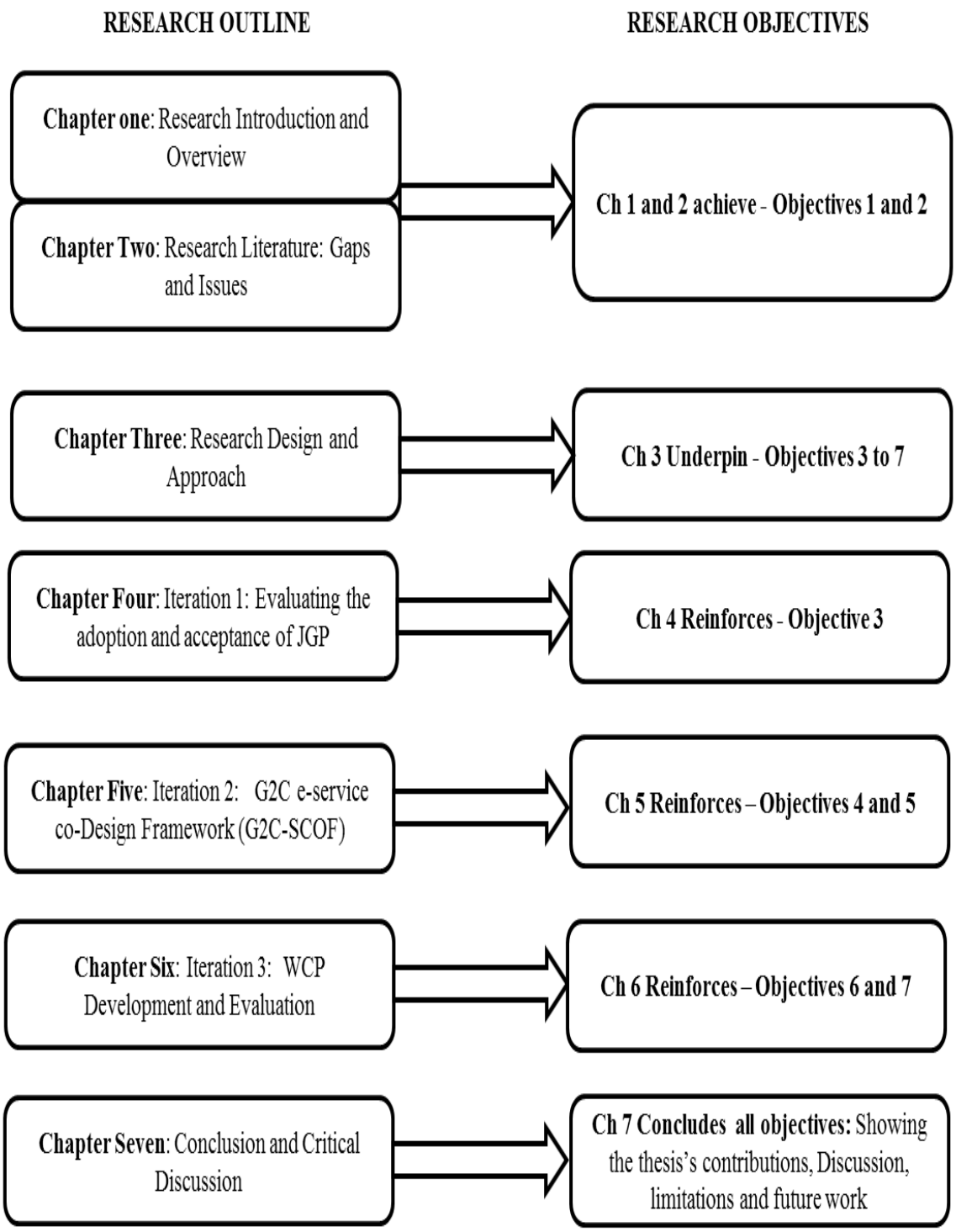

Figure 1.2: Research Outline and Objectives

Chapter 2 Literature Review

2.1 Introduction

This chapter starts by giving a general discussion of e-Government in a wider context. It is then narrowed down to shed lights on review, the areas related to e-Government services regarding the categories of e-Government and in particular, government to citizen (G2C) e-service design, as the research subject in this research study. This chapter reviews critically five main fields that are necessary for this research: 1) e-Government service background and development and its limitations, 2) e-Government services in Jordan 3) The state of art of human centred design, 4) Co-design approaches and methods and tools including the earlier practical and theoretical studies and 5) Double Diamond model as standard model for design process. The main aim of this literature is to deliver an understanding of state-of-the-art e-Government service design and development and Co-design approaches and concepts. Moreover, to reveal the main limitations and gaps worth investigating which helps to improve the current design process.

This chapter is structured as follows. Section 2.2 provides a general review of e-Government and service development. Section 2.3 introduces the e-Government services in Jordan, which was adopted as an example of developing countries. Human centred design is presented in section 2.4 to provide the reader with a holistic overview of alternative methods. Section 2.5 synthesises Co-design as a developmental process including the different Co-design methods/tools approaches of from the literature. A Synthesis of Participatory Design Approaches in the Digital Public service in section 2.6. Section 2.7 introduces the Double Diamond model with a recognised standard design process used in service design. Finally, section 2.8 provides a summary of the chapter.

2.2 e-Government Background and Development

There are several definitions of e-Government regarding the variety of uses and the distinctions sufficiently (Yildiz, 2007). It may also there are other ICTs in addition to the Internet and the Web (Yildiz, 2007), such as “database, networking, discussion support, multimedia, automation, tracking and tracing, and personal identification technologies” (Jaeger, 2003, p. 323).

The late 1990s have witnessed the emergence of the term e-Government, but the history of computing in government organizations goes back to the beginnings of the computer era.

However, a literature on "IT in government" goes back at least to the 1970s (Danziger and Andersen, 2002; Bertot and Jaeger, 2006). This literature ('IT in government') focuses on the use of IT within the government, while the current literature focuses more on external use, such as services to the citizens and their design process (Tat-Kei Ho, 2002). While some of the old e-Government computer issues, such as office automation, are not highly relevant to e-Government service design, many issues such as decision making, service processing, and values are relevant to this research. Therefore, these items of literature (the current one and the old one) should be considered together as the basis of the e-Government field (Grönlund and Horan, 2004). The most significant aspects of this combination are to achieve essential efficiency in increasing the usage of online services, so as to improve citizen satisfaction and improve quality of life (Scholl, 2014).

e-Government development is structured by building models of its stages (Yildiz, 2007). The first model was introduced by Layne and Lee (2001), who they argue that e-Government projects progress through four stages of development. The first stage is cataloguing, providing government information by establishing government entity Web sites. At this stage, the communication will be only one-way interaction between the government as service provider and the various government agencies as recipients (for example, on-line presentations of government information). The second stage is called transaction. Government agencies at this stage can provide online transactions with government entities as branches of government agencies (for example, citizens renew their licenses and pay fines on-line). This makes two-way communications possible. The cataloguing and transaction stages focus on providing an electronic interface for government information and services as service interface (i.e. administrative employees in government agencies). The third stage is the integration of government operations within functional areas in government (for example, database sharing across various agencies). The final stage is horizontal integration, different functional areas are integrated within the same electronic system and put to use through a one-stop window (e-Portal). The last two stages concentration on the integration of the provision of e-Government activities within the existing governmental structure (Yildiz, 2007).

The second model of e-Government development was introduced and presented by the United Nations and the American Society for Public Administration (UN and ASPA, 2002). This model classified as five stages model of development. The first stage is the 'emerging', which represents an independent government websites which offer users with stationary organizational or political information (for example, contact information and FAQ). Second is 'enhanced'

which represents an official government websites but their Contents will consist more of dynamic and specialized information that is frequently updated (for example, Government publications, legislation, and newsletters). The third is 'interactive' stage permits the users to download forms and interact with officials through the online service. The fourth 'transactional' stage, users have the capability to make online payments for transactions. The final stage is seamless which makes the integration of electronic services across government agencies. In summary, the ASPA-UN model similar to that of Layne and Lee's model. Hence, the "ASPA-UN 'emerging' and 'enhanced' stages roughly correspond to Layne and Lee's cataloguing stage" (Yildiz, 2007, p.652). The 'interactive' and 'transactional' stages are comparable to 'transaction' stage of Layne and Lee (2001).

Information is a resource that allows the public to participate in the governance of their country and enables governments to carry on their operations (Yildiz, 2007). The evolution of the routine governmental practices into the digitalised ones enables the public to reach the government services in a more effective and efficient way (West, 2004). Digital government is a broad term that includes "the use information and communication technologies (ICT) in the public sector" (Garson, 2006, p.18). The term e-Governance characterizes efforts to use ICTs for political purposes and the organization of political activity in a country. Implementing e-Government systems is related to implementing ICTs to build systems to support e-Governance (ITU Telecommunication Development Sector's, 2008). Most governments made little progress at portal development, placing services online, or incorporating interactive features onto their websites; their efforts are mostly limited to small steps forward (West, 2007).

e-Government is the bridge between citizens and the government to enable them to get to services online with a high efficiency and quality, therefore citizens become motivated to use it (Parent et al. 2005). Heeks (2003) states that most applications used in e-Government in developing countries failed with 35% being classified as total failure in which e-Government was not implemented at all or just abandoned upon implementation. 50% were classified as partial failure in which the goals were not achieved and/or they gave unwanted outcomes, and such failure was attributed to the limited resources and money. Greenbaum and Kyng (1991) state the service designers should take users' work practices and needs in consideration; users should take part and act in the design making. Communication between designers and users is a requirement while working on a design. In addition, Users' opinions and social interactions regarding a design are taken into account. The origin of the principles of the participatory design goes back to the time of the early Scandinavian systems design in the 1970s (Beak et al., 2008).

The design process should match users' needs such as identity, characteristics, capabilities, preferences and the state of the user; otherwise, it will be considered compromised; because, citizen needs are expressed as citizen profile which can represent the citizen's long-term needs (Kuflik and Shoval, 2000). Thus, users' needs should be known to understand the process well.

e-Government services are typically developed by internal service providers, often neglecting the service end user (Axelsson and Melin, 2007; Bridge, 2012). Subsequent delivery of services can be jeopardised without due consideration of the service user, lacking in consideration of their needs and expectations in the design process (Lenk, 2002; Parent et al., 2005; Wee et al., 2008). Furthermore, due to the limited user involvement in the entire development lifecycle of the e-Government services (Olphert and Damodaran, 2007; Følstad et al., 2004; Anthopoulos et al., 2007). This research will address this issue and explore the use of a Co-design approach of Jordanian Government to Citizens (G2C) e-services. Hence, this research looks …"for means to improve this emerging concern with a special focus on the Jordanian's e-Government services" (Muneer and Effie, 2012, p.79).

2.2.1 Citizen Centric and e-Government Services

A citizen-centric approach is considered as an emerging approach in designing and evaluating e-Government services (Wang et al., 2005). Specifically, it focuses on how characteristics of an e-Government website interacts with both services and users to affect the efficiency of e-services delivery, Performance of e-Government website in facilitating interactions between users (citizens) and their government (Gupta, 2007; Chakravarti and Venugopal, 2008). Thus, this approach enables service providers to find out the factors for observed success or failure of e-Government projects and its services. However, a number of reasons recognised for the suboptimal performance of the citizen-centric approach such as the lack in identifying citizens' true needs and problems in e-Government services design, and deficiency in determining the factors that influence e-Government services adoption by citizens (Alsoud and Nakata, 2012).

In the last few years, concrete e-services that were provided by their governments had dropped short of being citizen-centric as not met end-users' needs (Chakravarti and Venugopal, 2008). The citizen-centric approach for e-Government services have been raised in importance since e-Government websites have become the most extensive way of communication between governments and citizens (Soufi and Maguire, 2007; Wang et al., 2005). ICTs have enabled us to collect, organize, use information, performing business tasks online by connecting with people

all over the world and enable new possibilities for work with a low cost of both transactions and coordination (Zhao et al., 2008). The same concept is applicable to e-Government portals. Human willingness to do daily work is the essence of any online services (e.g. e-Government portal). According to Malone (2004), organizations should concentrate directly on human values, putting individuals at the core of their work. An integrated electronic service system implies, at least, information integration of various units of government within one public organization or across a number of them (Che Chen, 2010), which is different from single-purpose information systems. e-Government still falls short in delivering services (West, 2004).

Even though the citizen-centric approach contributes to increases the opportunity of gaining a good match between the expectations and needs of the citizens and the context in which they find themselves and e-Governmental services through translated the requirements were elicited by this approach as good basis for the design of the service/product of the system (Velsen et al, 2009). However, e-Government services not just only should to match the needs of the citizens for whom they are anticipated, but should also match with the needs and work practices of the service provider as who supply and deliver the services. If this is a bad match, it can reduce the quality of the service that is delivered (Velsen et al., 2009). Furthermore, several governmental ICT projects are about to fail due to the lack of attention of the interests, expectations and cooperative practices of the service providers for those who use these services (Rekenkamer, 2007).

2.2.2 Constraints of Building e-Government in Developing Countries

Using ICTs effectively to serve citizens online is a challenge for developing countries in particular (Norris, 2001). One of the challenges is the uncertainty in developing and providing e-Government services due to the complexity of the technology, organizational routines, and the variety in the acceptance level of technology by individuals. e-Government is not limited to technical aspects of developing and operating successful online services, but developing strategic approaches are needed for organizing perceptible resources such as computers and networks and imperceptible resources such as employee skill and knowledge and organizational processes (ITU, 2008). Thus, government organizations need to take in consideration two factors in order to achieve success; having citizens who are willing and able to take on and use online services, and developing the administrative and technical potency to implement e-Government applications to meet citizens' requirements (Paul, 2007).

A number of constraints acutely affect the disparity of the adoption levels and usage of e-Government in developed economies (ITU, 2008). Firstly, the digital divide as Pippa Norris described, "the OECD warns that affluent states at the cutting edge of technological change have reinforced their lead in the new knowledge economy but so far the benefits of the Internet have not yet trickled down far to South, Central, and Eastern Europe, let alone to the poorest areas in Sub-Saharan Africa, Latin America, and Southeast Asia" (Norris, 2001, p.5). As mentioned earlier, 173 of 190 countries have started to use ICT to provide government services, there is great diversity and a persistent digital divide (West, 2007). Second, it is expected by many adopters of new technologies that technology can solve the problems of the organization; by the beginning of internet era, it was thought that citizens would flock to the web. Third, many countries lack sufficient levels of resources. Decision makers in governments …"are concerned about trading off, using scarce resources to feed, house, nurse, employ, educate and protect its citizens" (ITU, 2008, p.11). The government constituents doubt that investing in ICT-related improvements to government services will improve citizens' lives. Fourth, to build the technological and managerial knowledge, governments should face the developing resources and prevail e-Government services. This makes it imperative to develop skills and know how to successfully carry out (ITU, 2008) the following activities: 1) Digitizing information, 2) Carrying out transactions, 3) Streamlining processes, 4) Reinforce employee productivity, 5) Enabling access to public information, and 6) Fostering citizen participation.

2.2.3 Citizen Consideration and Participation of Public Servants in e-Government

Most e-Government projects are made by taking in consideration life events (Marshak and Grant, 2008). Dissatisfaction occurs if dealing with real life obstacles in e-Government projects fails or citizens fail to access the proper service due to usability errors. Citizens pay attention to the accessibility, usability, efficiency, and simplification traits of digital points of access. If government portals fail to make citizens satisfied, citizens do not return to using these portals, and will not advise others to use it (Mithas et al., 2005).

Generally, e-Government projects concentrate on the technical characteristics of one-stop government portals and on providing customers with a suitable digital environment (Trmbouris and Tarabanis, 2008; Callaos and Callaos, 2002). Researchers are always concerned whether citizens are served and satisfied. A study was conducted in US in form of surveys to show that citizens evaluate their services (i.e. digital public services) (Accenture, 2006). Users who used digital systems to access government start preferring a return to the use of old methods, rather

than using electronic methods (Cash et al., 2003). Additionally, the rate of using digital services has been gradually decreased (Mithas et al., 2005).

The e-Governments of several countries allocate some money for the development of e-Government systems for better services to be delivered to users. e-Government systems provide a wide range of benefits for governments and citizens, for example improving the exchange of information between services and agencies, which makes the process by which users reach services quick and efficient (Malone, 2004). In addition, a greater variety and choices of accesses are available for customers (ODPM, 2004). Making the process more democratic, this has been focused of attention of many governments by promoting wider citizen participation, and reduces social exclusion. However, citizens do not understand the benefits; for example, in the UK they have been slow to take up e-Government despite the significant investments and improved services (Accenture, 2006).

Socio-technical systems theory is clearly important to think about (Olphert and Damodaran, 2007), through showing the interdependence relation between the technical and the human, social, and organisational elements of work systems, and in concentrating on the need for these aspects to be 'co-designed together'. According to Mumford (2000), the most important contribution of the socio-technical approach of a design its value system. She highlighted two aspects in particular. First, the needs of the employee must be the priority in any design. Second is the principle of democracy; employees must be given the chance of participation and to affect decision related to them as users.

To sum up, Olphert and Damodaran (2007) have sought to consolidate the 'socio-technical approach' using an empirical evidence to support their own argues regarding interdependence relation between the technical and the human, social, and organisational elements of work systems to be 'co-designed together'. Furthermore, socio-technical approach' was argued by Enid Mumford "for information systems to be developed as socio-technical systems from the earliest stages in design process" (Olphert and Damodaran, 2007, p.504).

2.2.3.1 Social-Design Interaction

Social interaction is a very important concept in design area of interest in regards to research (Kraut et al., 2012). For example, Preece et al., (2002) in his book named Interaction Design, stated: Humans are inherently social: they live together, work together, learn together, play

together, interact and talk with each other, and socialize. Thus, it only seems natural to develop interactive systems that help and cover diverse kinds of sociality.

In discussing social interaction, a study was carried out by Postma and Stappers (2006) in which 18 students; 13 – 15 years old were chosen to define a product interaction that suited them. The study is composed of two stages. First was to identify the social groups in the class culturally. Second, dividing them into small groups; each group had to participate in a generative session. Each social group showed interactions, relationships, roles and personalities. Based on the insights, a tangible design for a museum was drawn up for school groups were added for the Netherlands Architecture vision.

In this case study, researchers used social interactions as motivator and mechanism to show a museum experience. As a result, it is strongly suggested that new tools and methods should be developed to help designers to design products and services that fit the different social groups of people.

Erickson and Kellogg (2000, p.71) suggested using digital systems such as prototype "focusing on the way in which it uses textual and graphical representations to make socially salient information visible", and to make communication and collaboration between groups much easier by letting each member in a group see the activities of each other's. Thus, social interactions are presented more obviously through the examples mentioned below:

1- Forlizzi and Battarbee (2004) studied the effect of social interaction on user experience. They mentioned an example in which a group of friends runs out of gas when driving to the countryside. Whether this obstacle is taken as an adventure or a disaster depends on how they decide to interpret the situation.
2- Battarbee and Koskinen (2005), state that the experience and background of people and their relation with product or service interaction. Hence, authors move to new concept namely 'co-experience' to describe people 'experiences with products or service in terms of how individual experiences can change as people be a part of social interaction.

2.2.4 Taxonomy of e-Government services

Taxonomy is a description of a formal system/organization by classifying multifaceted and complex phenomena according to a set of common characteristics and dimensions; the aim of this term is to clarify, defining and comparing complex phenomena (Bradley et al., 2007). Figure 2.1, depicted the Generalised e-Government Service Taxonomy (GEST) based on common

features that have been founded among e-Government services themselves through studying their characteristics/facets. In the context of e-Government, the modality of e-Government Services is a popular research area since it modulates the effectiveness of facilitating services to users. Nusir and Bell (2013) classify and identify the characteristics of services in e-Government into five groups: 1) services orientation, 2) services attributes, 3) services organizations, 4) levels of services adoption, and 5) services of communication technology forms. These groups have been identified by analysing e-Government services characteristics through mapping between services characteristics, and use a systematic review of e-Government services characteristics. This taxonomy differs from other taxonomies by focusing on governmental services characteristics rather than governmental and nongovernmental organizations and their municipalities. In conclusion, the taxonomy proposed in this study will aid decision-makers and practitioners in developing e-Government systems to facilitate communicating between supplier-side and demand-side (Nusir and Bell, 2013).

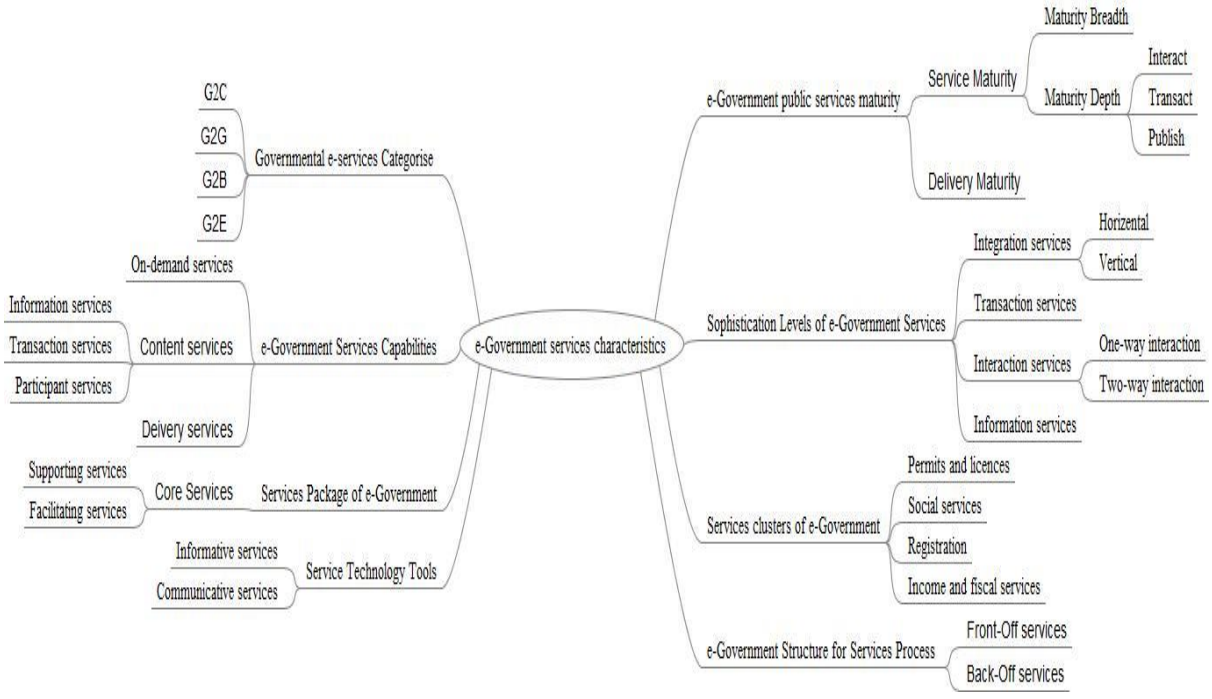

Figure 2.1: Taxonomy of e-Government services (Key characteristics in each group)

2.3 e-Government services in Jordan

e-Government services in general are divided into four phases: (1) publishing contact information for users; (2) interacting in terms of search capabilities of the site; (3) transacting in terms of task completion entirely online and (4) transforming in terms of providing one-stop access services. One of the main priorities of the e-Government is working to deliver e-services

to make sure about an easy access to government services for all recipients and through multiple channels. MoICT (2011) as service provider for e-Government services in Jordan has classified e-services into four main categories: vertical service, cross-governmental service, shared services, and composite service.

Vertical Services:

This type of service is supplied through one single government agency so that these services produce and deliver in the same agency. Hence, the governmental agencies are accountable for developing these services, while e-Government provider supports these agencies to define their services with technical support to make these services ready to deliver to service users. An example of this type of these services: The Domain Registration (.jo) provided by National Information Technology Centre (NITC), such university applications and other services (MoICT, 2011).

Cross Governmental Services:

This type of service is a little different from the previous one, which includes at least two government agencies responsible to submit and coordination these services to civil society. The responsibility of developing and delivering these services is jointed between service provider and government entities as service interface. For instance, the vocational license service and borders visas (MoICT, 2011).

Shared Services:

This type of service namely 'shared service' to reflect the main of its functionality as distinguishes by the possibility to share its services from more than one agency. In fact, the service provider has the contribution in the development phase for these services. For examples of this type of service: Jordan e-Government Portal, SMS Gateway, the national contact centre for government services, Secure Government Network, E-payment gateway of Jordan, and Enterprise Service Bus (MoICT, 2011).

Composite Services:

This is the last type of the service provided by the Jordanian government as service provider; this type is working based on government resources planning (GRP). Thus, the systems or the services provided are occurring often based on collaborative between the service provider and several agencies. Examples of the most important GRP include: financial systems, personnel systems, procurement and materials (MoICT, 2011).

2.3.2 Jordan e-Government Service Program

The main strategy aims for development and implementation of e-Government in Jordan. e-Government in Jordan is keen to providing e-services to citizens across society; regardless of location, economic status, education or ICT ability (MoICT national strategy 2013-2017, 2012). With its commitment to a citizen-centric approach, (service user evaluates these services provided then provide service provider with feedback). "e-Government will contribute to Jordan's economic and social development, as well as the transformation into a competitive, innovative knowledge society" (MoICT national strategy 2013-2017, 2012, p.4). This will be done by consolidating government resources, engaging greater citizen participation in the local economic development and facilitating citizen access to government services in near future through demonstrating more citizen empowerment and less government control (MoICT, 2012). The participation of all in e-Government is imperative to promote economic and social empowerment through ICT for all citizens including helpless groups, which were pre-defined by the UN as the poor, illiterate, old, young, and immigrants (Al-soud, 2012). Hence, the strategy aims to translate these vision into objectives; it presents priority e-Government initiatives, tools and projects; and it identifies targets and milestones to facilitate performance control and raises accountability by clearly defining the responsibilities of key stakeholders (See chapter 4). The four phases of e-transformation are adapting around the maturity of service delivery (emerging, enhanced, transactional, and connected). Government of Jordan is aiming to achieve the transactional phase by end of this Strategy term. Jordan is currently is in the early enhanced stage regarding some limitations such resources, ICT infrastructure, people willingness, polices and budget given that Government of Jordan late of success (MoICT national strategy 2013-2017, 2012).

2.4 From classical User Centred Design to Co-Design

In 1970, the user-centred design approach started to evolve and became widespread in the 1990s (Sanders and Stappers, 2008). Based on the study conducted by Sanders in 1992 (Sanders and Stappers, 2008) the user centred design proved to be most useful in the design and development of consumer products (Kotamraju and Van Der Geest, 2012). For example, the service design is composed of …"visual communication design, information design and interaction design, [integrated together]. Transformation design, the newest [design] of emergent design [discipline], is based on participatory practices, in combination with user-centred methods" (Sanders and Stappers, 2008, p.10). The researchers need to learn more about how to provide a beneficial guide to people how they are progressing at the 'doing' level of creativity, provide beneficial assistance to people who are at the 'adaptive' level, afford a scaffolds that support and

serve people need for creative expression at the 'making' level, and offer a clean slate for those at the 'creating' level (Sanders and Stappers, 2008).

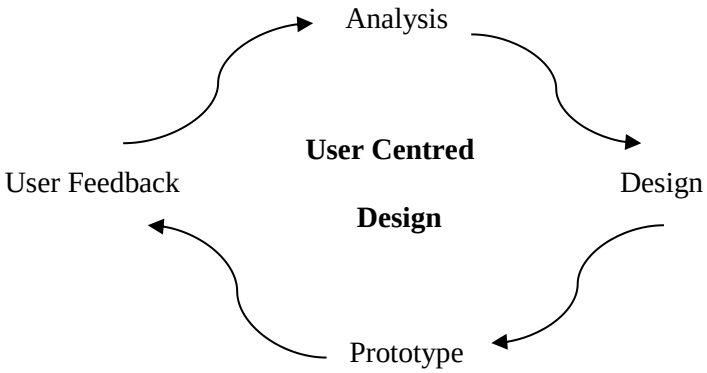

Figure 2.2: Current state of the user-centred design (adapted from Sanders and Stappers, 2008)

Converging multi HCD methods together (Sanders, 2000) to draw simultaneously from marketing research ('what people say'), applied anthropology ('what people do'), and participatory design ('what people make'). Collective generativity has started to replace individual creativity, though respect is an essential between both. The use of generative tools requires the design researchers not only to respect each other, but also to respect people who are served by the design (Sanders, 2000).

Livari (2011) reviewed 327 papers between 1998 and 2007 to identify user-centred designs and found that many of them refer to renowned authors such as Norman (emotional design) or ISO 13407 (Human centred design processes for interactive systems) rather than conceptualize user-centeredness in their contexts. Understanding users' needs is considered to be a key to strategic thinking in user-centred design; because they reflect their expectations and wishes which lead to facilitate transform these needs into requirements (Huang and Brooks, 2011). One of user-centred design's intrinsic characteristics is that it encourages designers to aim towards a user-friendly design in design development (Wakkary, 2003).

To get things done in the way expected, researchers need to put people at the centre of the design development process (Sanders and Stappers, 2008). Such a design aims to discover possibilities and opportunities, taking in consideration people's ideas, desires, needs and aspiration for experience (Leavitt and Shneiderman, 2006). The authors learned that products must be designed holistically; this means hardware and software must be put together (Sanders, 2000). Some community groups like technologists and business strategists are involved in bringing new

products and services to market, thus inducing the role that people play in the design development process. This research heads into a challenge whereby the relationship between people and human experience is becoming the core of interest in overall are much of value than products (Sanders, 2000).

It is worth mentioning the pros and cons in applying the user-centred design approach. Many of these dis/advantages have been noticed. This approach confirms that the service/product will be suitable for its intended purpose in the environment in which it will be used. Table 2.1 summarises these and other advantages and disadvantages of user-centred design (Dix et al., 1997; Preece et al., 1994; Preece et al., 2002).

Sanders and Stappers (2008, p.11) explain the caricature (See figure 2.3) which, shows the lack of the classical user-centred design process and the rationale for transforming to Co-design approach, "the user is a passive object of study, and the researcher brings knowledge from theories and develops more knowledge through observation and interviews". "The designer then passively receives this knowledge in the form of a report, and adds an understanding of technology and the creative thinking needed to generate ideas, concepts, etc" (Sanders and Stappers, 2008, p.12). Hence, the Co-design considers the roles are mixed up. The service user who will finally be served through the design process is given the position of 'expert of his/her experience', and takes a large part in knowledge development, idea generation and concept development. Thus, designer and the researcher work together using the tools for ideation (i.e. in giving form to their ideas), because design talents are an essential in the development of the tools (Sanders and Stappers, 2008).

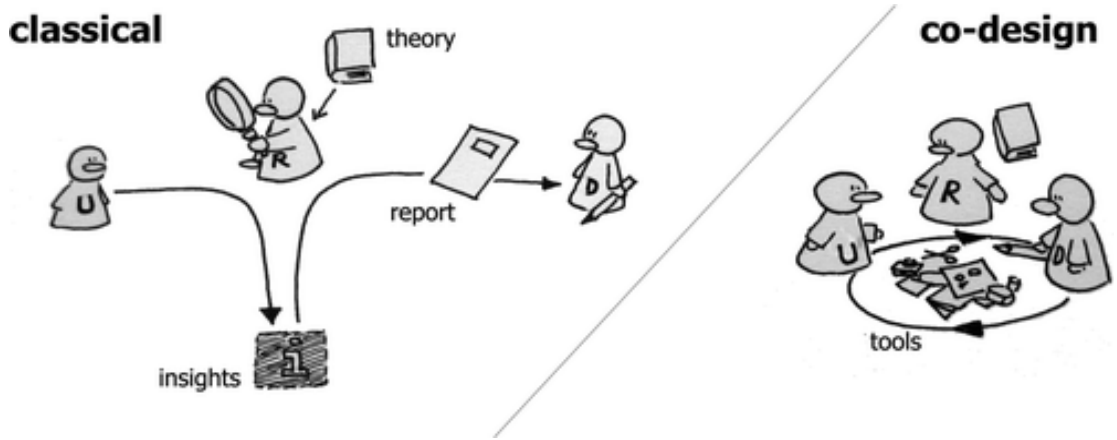

Figure 2.3: Classical roles of users, researchers, and designers in the design process on the left and how they are merging in the co-designing process on the right cited from (sanders and stappers, 2008).

Pros	Cons
Products are efficient and safe.	High cost.
Pay attention to the level of users' satisfaction and managing users' expectation	Time consuming.
The sense of ownership that appears holder users for the product.	Other additional design team may be needed (i. e. ethnographers, usability experts).
Dramatic integration of the products into the environment and less redesign needed.	Difficulty in translating some data into design.
Solution to any emerging problem more readily founded due the well-organized collaborated process.	Sometimes it is difficult to transfer the product to other clients; due to the product being too specific to be used in general to other clients. Thus, this makes it costly.

Table 2.1: Concise Summary of dis/advantage for User-centred design

2.4.1 Citizens' Participation in the Process of e-Government Development

Citizen engagement training, which is directed by the government, is developing in many countries, at both local and national levels (Følstad et al., 2004); a big effort has been made to wide spread the categories of citizens' engagement such as handicapped, disabled people, ethnic minority groups, young people, etc. In general, when citizens involved in technology development or evaluation in relation to e-Government services; researcher explains by three examples are illustrated below to clarify the situation when the engagement is of limited focus, such as the creation or evaluation of websites or services (Olphert and Damodaran, 2007).

The Surrey 50+ website project is the first example to mention. UK government's local e-Democracy programme, including many projects, one of which was the Surrey county council's pilot study that included people over 50 and created a website targeted for them. This study focuses on the active engagement of older people in developing public services to conclude points that help in making better government for older people. Another target was to encourage the use of ICTs among the over-50s via online participation to know more about technology. People who concern regarding their ages and housing associations were a part in this project as well. Hence, the technology employed in this project was an open source content management and designed to fit their local authority use in England. Regarding the contributions from

participants, it was concluded to build a web portal targeted for those above 50. The software was also specially adapted to offer usability for older people to conform to the W3C Web Accessibility Initiative for website standards. The project duration was 6 months including about 2,000 people, and Surrey county council considers that the project was successful in making older people aware of and to use ICT in an effective way (Olphert and Damodaran, 2007, cited in Allen, 2005).

The second example is the Logged Off project carried out by the Carnegie Young People to know whether new technologies could motivate young people (aged from 13-18) to participate more in the political life. A special website was set up in this project, to enable participants to read and discuss the different points of view of other peers. This project recommended that government should make a network of young people who could evaluate ICT initiatives aimed specifically at engaging young participants (Olphert and Damodaran, 2007, cited in Carnegie Young People Initiative, 2003).

The third example is the Canadian National Forum on Health (Walls et al., 1992) introduces citizens in a comprehensive preparation (reading documents, attending briefings, etc.) in order to participate in consultative exercises to inform national policy on health matters. The Canadian citizens who participated were well educated and well equipped to analyse any difficult written material. On the other hand, other successful participation projects such as the Macatawa project (Emery and Purser, 1996), the Chicago neighbourhood planning project (Al-Kodmany, 1999), the K-Net projects (Beaton, 2004), and the Action Aid Reflect ICTs Project (Battarbee and Koskinen, 2005) had participants from different backgrounds with different levels of skills and education. All report that engagement in the projects led to an increase in participants' confidence while sharing their point of views, increased understanding and ability be decision makers.

The above research example suggests that the participation of citizens in e-Government developments did not go deep into the lives of most people involved in the exercises. It also showed that in general decision making in the design of local e-Government had carried out by central government, while citizens having little effect on design development and implementation of e-Government services. Governments are doing a significant effort to let citizens participate in decision making to inform policy and planning decisions but this is in areas other than IS development projects .They concentrate on expanding citizen engagement throughout the development of e-Government systems or applications and how government can

benefit from this extension (Olphert and Damodaran, 2007). Moreover, governments conclude that knowing how to participate in decision making needs primary skills to develop for those whose participation is sought. The core elements are the modifications and development that take place as participants learn new skills. If conditions are right, citizens show a willingness to spend time and pay attention to participation issues.

2.4.2 A Synthesis of Citizens' Engagement

Enid Mumford focused on implementing a participatory approach in the development of computer-based work systems (Olphert and Damodaran, 2007), because it was ethically a real expression of democratic values and it helped in making a good design. Giving users the chance to contribute their expertise and knowledge provides an opportunity for skills exchange that positively affects both designers and users, and help users to accept new systems by giving users a sense of ownership and a suitable understanding of the system (Mckinney et al., 2002).

The results of effective citizen participation throughout the process of development leads to improvement in solution quality and effectiveness as the users' unmet needs can be identified or anticipated in an efficient way (i.e. user's needs should match design process) (Irvin and Stansbury, 2004); these results have significant advantages in that new information and communication technologies have the potential to deliver. For example, in the UK government aspirations for e-Government systems are not limited to making information systems more efficient, convenient, and integrated as well, but also it includes community participation in the political process. As a result, an effective citizen engagement process in the development of e-Government systems will help matching the targets planned (Olphert and Damodaran, 2007).

2.5 Co-design as a Developmental process: Methods, Tools and Approaches

There are many definitions of Co-design regarding literature reviews in different disciplines and industry areas. According to the Design Council (2005), Co-design is a cooperative design between service users' and service designers. Furthermore, Co-design is a principle that implements the idea of using users' preferences in designing a product/service. According to Greenbaum and Kyng (1991) state, the service designers should take users' work practices and needs in consideration; users should take part and act in the design making. Communication between designers and users is a requirement when working on a design. Moreover, users' opinions and social interactions regarding a design are taken into account. The origin of the principles of the participatory design goes back to the time of the early Scandinavian systems,

design in the 1970s (Baek et al., 2008). The design process should match users' needs, such as identity, characteristics, capabilities, preferences and the state of the user; otherwise it will be considered to be compromised, because, citizen needs are expressed as citizen profile which can represent the citizen's long-term needs (Kuflik and Shoval, 2000). Thus, users' needs should be known, to understand the process well.

Co-design is a developmental process. It includes the exchange of information and expertise relating to both the subject of the design process and the process itself (Bradwell and Marr, 2008). Co-design has the potential to help governments adapt to this new environment. It offers to make public services more efficient, to understand and better meet the needs of their users, and to build a sense of reciprocity between those users and service providers (Bridge, 2012). Furthermore, as citizens' expectations of government continue to grow, there is an expectation that public services are better attuned to people's requirements. If governments cannot fulfil this expectation, they risk diminishing levels of public trust in their capacity to deliver (Bradwell and Marr, 2008). For example, if people participate in public service design they are more likely to understand the difficulties in delivery, to sympathise with providers when things go wrong, and to complain in a more informed and constructive manner. Furthermore, user engagement at an early stage is likely to reduce design errors, and the costs associated with those errors (Baek et al., 2008).

Co-design transfer helps to attain an understanding of the thoughts and experiences of the service-users and their communities, and grant them a vital role in the designing stage during service development. Co-design is a tool(s) to help decision makers and practitioners to find equilibrium or between service user needs (e.g. problems, decisions, implementation, and socio-technical) and system requirements (e.g. cognitive model, semantic model, and process follow model) through transformation user needs into system requirements (Bridge, 2012). Co-design is a significant feature of service system/artefact during the delivery of e-Government services development and a method for encouraging new and decisive interaction among service-delivery staff (Bridge, 2012; Iedema et al., 2010). Therefore, the Co-design service-users can theorize new ways of innovation and thinking. For example, in Canada and the United Kingdom, the 'participatory design' approaches and methodologies are important for exchanging knowledge and experiences among service-users and service providers in order to involve them in practice through design process for e-services (Iedema et al., 2010). Co-design is planned to be energetic, involved, inspired, and interactive (Marshak and Grant, 2008). Service-user interactions are now

considered essential in designing service improvements, because end-users engagement is seen to lead to "better and more responsive services," and "build social capital" (Skidmore et al., 2006, p.3).

2.5.1 Background: A Literature Perspective

Early projects used to take the form of cooperation between computer science researchers and union workers. Kristen Nygaard is considered to be the pathfinder of the participatory design, his work mainly concentrating on the collaboration with union leaders and members to create a Norwegian national agreement to guarantee the rights of unions regarding the design and the usage of technology in the workplace (Kuhn, 1996). This stimulated other analogical projects in Scandinavia. In Sweden, a specialist group of researchers worked with trade unions to make up the DEMOS project (Cohen, 2005); with collaboration between Swedish and Danish researchers and the Nordic group Grafic Workers' union. Cohen (2003) reviewed participatory design projects related to the software development and then observed that there was a shift from empowering workers in general to empowering specifically minority and female workers. Thus, an increase in the number of female workers has been witnessed in the workplace. When participatory design was eventually applied in the United States, this political focus was deemphasized (Cohen, 2005). The principle of participatory design has spread, and is practiced in many other fields such as engineering, architecture, and community design (Al-Kodmany, 1999; Carroll et al., 2000; Cohen, 2003).

As previously illustrated, the participatory design approach emerged in Scandinavia; it emerged to let workers have more democratic control in their work environment (Ehn, 1989). The users sometimes are unable to understand the language of the designers due to the cultural, perceptions, thoughts, behaviours, experience, and aspirations differences between users and designers (Muller, 1991), sometimes, it is recommended that the team use prototypes, such as mock-ups (three dimensional paper-based representation) (Ehn and Kyng, 1991). A number of types of prototyping techniques, for example Plastic Interface for Collaborative Technology Initiatives through Video Exploration (PICTIVE) and Collaborative Analysis of Requirements and Design (CARD). The PICTIVE uses a simple tools such as pens, papers, and sticky notes and it works based on low fidelity office products (Abras et al., 2004). While CARD uses playing cards with pictures of computer's screens to study workflow options. A number of reasons lie behind the long duration, until when the principles and practices of participatory design/co-design have made an impact on the fabricated world. The reasons are: 1) To carry out

co-creativity, this needs believing in the creativity of people, 2) Participatory design has been seen as academic endeavour, so it has taken co-design long to have an impact, 3) Co-thinking contradicts with people as consumers, which it is equated with buying and consumption products, and 4) The available technologies have just recently started to be much integrated with the human experiences (Abras et al., 2004).

Moreover, Co-design has improved knowledge about a product (Kautz, 2011). Kautz (2011) stated that who supported the participatory design in that it enables people to develop realistic expectations, and increasing equal decision-making (2011). Co-design transfers to achievement an understanding of the thoughts and experiences of the service-users and their communities (Bridge, 2012), and grants them a vital role in the designing stage during service development.
The past six decades have witnessed a significant effort by the designers who have remarkably moved from the old fashioned designs to the well-developed recent designs (Sanders, 2006), where e-services are targeted to service users through lifecycle events and segmented groups to provide tailor-made services. The most fascinating change in the altering landscape of research design is the Co-designing approach (Stappers et al., 2009).

Bradwell and Marr (2008, p.11) state, "Public services and governments around the world face pressures from a more demanding public, increasing social complexity and diversity, and overstretched resources". Co-design has the potential to help governments adapt to this new environment (Bradwell and Marr, 2008). It grants a completely new form of gathering, and brings stakeholders from various social domains together and charges them with new interactive and practical tasks (Iedema et al., 2010). For instance, in Norway, Sweden and Denmark, the collective resources approach was established to increase the value of industrial production by engaging workers in the development of new systems for the workplace (Sanders and Stappers, 2008).

In essence, the evolution in design research from the formerly known user-centred design to co-designing approach is changing the roles of the designers and the users as explained in figure 2.4 (Sanders and Stappers, 2008). Therefore, in this research aims to apply Co-design to change the roles of users and designers through maximizing the opportunity of the service user (i.e. citizens) to participate throughout design process for their own services to understand their needs well and match theses needs with design process to support the transformation process (i.e. user's needs into service's requirements).

2.5.2 Co-Design in Developing Countries VS Developed Countries

The study conducted by Hussain et al (2012) shows participatory design projects with marginalized people in developing countries. However, for such projects to be successful, designers and organizations in charge of product development must understand that they will be working in a unique context. Hussain et al (2012) identify and describe examples of differentiating circumstances across four categories: human; social, cultural and religious; financial and timeframe; and organizational (See table 2.2).

Participatory design was founded in Scandinavia in the early 1970s. It advanced as a design approach from work beginning in Norway when computer professionals and union leaders strove to enable workers to have more influence on computer systems in the workplace (Winograd, 1996). Several projects in Scandinavia aimed at finding effective ways for computer system designers to collaborate with labor organizations to develop systems that most effectively promoted the quality of work life. Consequently, participatory design is used in a variety of fields, such as product design, urban design, organizational development, geography, and information technology (Sanoff, 2007).

Category	Factors
Human Aspects	-Designer's relationship to participants. -Access to users and other stakeholders. -Participant's capacity to participate. -Language barriers. -Appropriate ways of rewarding participants.
Social, cultural, and religious aspects	-Social and cultural structures that can make it difficult for participants to collaborate at an equal level . -Customs and religious beliefs that can impact participants' willingness to share opinions.
Financial aspects and timeframe	-Financial resources available for transport, rent of workshop premises, hiring translators, training participants, etc. -Time available for training participants and gaining their trust.
Organizational aspects	-The recognition for the importance of user participation in the organization. -The willingness to allocate recourses for participatory design processes. -The hierarchy within the organization that produces or provides the product. -The tradition for using participatory design processes in the organization.

Table 2.2: Factors that can lead to challenges in participatory design projects in developing countries (Cited from Hussain et al, 2012).

Many research studies on participatory design in developing countries result from the field of IS design (Hussain et al, 2012). For example, Elovaara et al. (2006) investigate the differences and similarities between two cases (i.e. Tanzania vs Sweden) in health care. In Tanzania, designers found that they could not take for granted that health professionals would be able to participate. Due to the lack of human resources, health workers had a very hectic schedule and designers had to show flexibility and reschedule meetings when there were emergency situations at the hospital (Hussain et al, 2012). The designers had to follow the participants during working hours and adapt to their work schedule. In the Swedish case, dealing with IS supporting the work practice of civil servants in municipalities, human resources was not a problem and setting aside time for researchers was seen as a priority. Another difference was that the technological skills of participants in Tanzania were more limited than in Sweden. Hussain et al. (2012) concluded, based on the case study, that "[...] participation and how to participate has to be negotiated and adapted to the local setting" (Elovaara et al., 2006, p. 113). A similar conclusion is reached by Puri et al. (2004) when investigating three health information systems case studies in South Africa, India, and Mozambique.

2.5.3 UK Digital Service Framework

UK digital services framework (UK-DSF) is a dynamic framework aiming for supporting the public sector in terms of buy, design, build and deliver digital services using an agile approach, by attaining the appropriate capability to deliver agile software development (Anon, 2015). UK-DSF was put together jointly by Government Procurement Service (GPS) and the Government Digital Service (GDS) specifically to support the strategy. The framework specifically gives stakeholders access to the deep pool of agile suppliers (Hyde, 2013). The UK's Modernizing Government plan (Cabinet Office, 2002) summarises the methodology followed during the development of digital public services. Table 2.3 shows the key findings:

Strategic plan	Supervisor	Method	One-Stop shop	Primary targets	Achievements
Modernizing Government	Office of the e-Envoy	Top-down	UK-online	- Citizen-focused government. - Better services for citizens and businesses	-UK-online portal. -Gateway: portal for authenticated services. -Life-event-driven public services

Table 2.3: UK's e-Government strategic plan (Anthopoulos et al, 2007)

The UK-DSF is based on the agile approach detailed in the Government Service Design Manual (Cabinet Office, 2013) and complying with the digital by default standard. UK-DSF advantages are summarised as: 1) Being faster, 2) Procurements are cheaper, 3) It provides flexibility to cope with change as a Digital Service develops, 4) The services can be significantly cheaper, 5) It provides a diverse supplier range assessed against specific digital capabilities, 6) The framework is re-tendered on a regular basis so contains the latest services and suppliers, 7) There's no "lock-in" and 8) No need for contract negotiation (Anon, 2015). Moreover, UK-DSF put together by Government Procurement Service (GPS) and Government Digital Service (GDS) backings the Government's Digital Strategy by supporting departments to build services that are digital by default, focusing on users' needs (Baldwin, 2013). Francis Maude, minister for the Cabinet Office, states: "The Digital Services framework shows how we are levelling the playing field for government contracts and living up to our ambition to support growth by giving opportunities to new entrants and smaller suppliers who can deliver innovative, cost-effective solutions based on user need" (Baldwin, 2013).

2.5.3.1 UK Digital Service Design Phases

The delivery of e-Government services in the UK was significant (UN, 2010). Interestingly however, a study conducted by the OECD (2009) showed that only 32% of the UK population is using e-Government services. Therefore, the UK digital service strategy aims to develop a Default Service Standard - a set of criteria for digital teams building government services to meet end-users' needs (Cabinet Office, 2013). Today 82% of adults in the UK are online. Completing transactions online has become second nature, with more and more of us going online for shopping, banking, information and entertainment (Cabinet Office, 2013). Building good services means meeting the needs of users. It needs to place users at the heart of service design, incorporating their feedback at every step of the way (Sanders and Strappers, 2008). A new approach has been adopted (See figure 2.4) for working tends to encourage the creation of overly prescriptive policy, which then forms the basis of the requirements document.

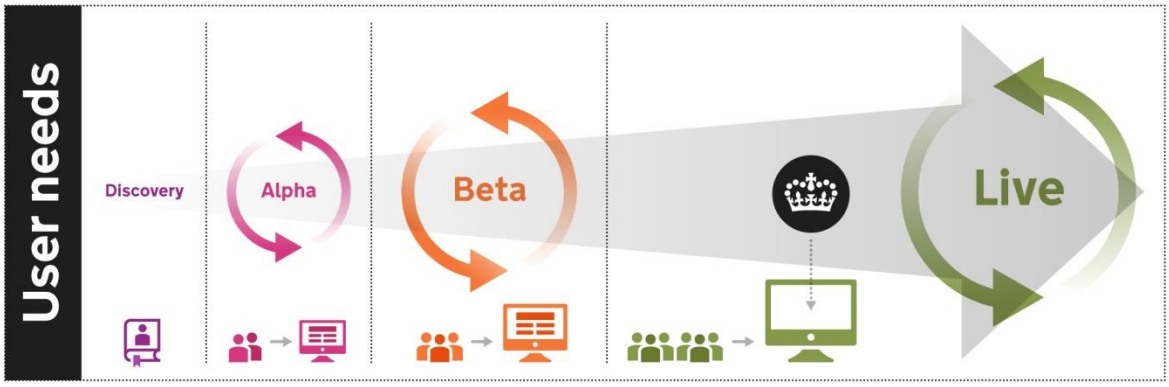

Figure 2.4: UK Digital Service Design Phases (Cited from Cabinet Office, 2013)

This new approach was going live after Aprial-2014, which comprises four main phases as follows: 1) Discovery: A short phase, in which research/designer starts researching the needs of service's users, then find out what should be measuring, and explore technological or policy-related constraints. 2) Alpha: A short phase in which researcher/designer prototypes solutions for users' needs. Then they will be testing with a small group of users or stakeholders, and getting early feedback about the design of the service. 3) Beta: A phase for developing service against the demands of a live environment and understanding how to build and scale while meeting user's needs by releasing a version to test in public. 4) Live: In this phase the work does not stop once the service is live as services need improving, reacting to new needs and demands, and meeting targets set during its development.

2.5.4 Service User Involvement in the Service Design Process

It is important to know how to involve users in the design process, because they represent as end-users who will get benefit and use the final product/service (Sanders, 2008). Moreover, the people who manage the users also have needs and expectations (Stappers et al., 2009) through using techniques such as adaptive design and meta-design for moving from being only as research laboratory terms into practice fields. Referring to Illich's and Lang's (1973) thoughts on convivial and industrial tools by 'tools', Illich refers to anything from 'simple' hardware to productive systems for intangible produces, such as those which produce 'education,' 'health,' 'knowledge,' or 'decisions' (Sanders, 2008).

A number of techniques are used in testing a service or product before implementation. Such as, 1) Think aloud techniques in which, the user is asked to express all the steps of his / her actions (Abras et al., 2004), 2) Videotaping is considered a good way to look for problems in the design

and to review what the participants did (Skidmore et al., 2006), and 3) Interviews and questionnaires about users' satisfaction help designers to evaluate the users' opinions (Abras et al., 2004).

People from the community were asked about the concept of Co-design; four examples have been presented to show their thoughts and perspectives about this concept:

James Rock:

Co-design concentrates on involving users in exploring and developing solutions to their problems. By making users involved in the process of designing, this helps them not only defining a problem but also reach a final solution for it, thus it will be easier for them to buy-in and handle any change. (http://www.designcouncil.org.uk/resources-and-events/designers/design-glossary/co-design/ , 6th of July-12, Design Council)

Pablo Calderón:

It is important to talk about the level of influence when defining Co-design. When people are only asked to give an opinion, it does not necessarily means that it should be taken into account, in that case the level of influence is considered relatively low; when participants are asked to interact and cooperate in the building of a design process, this is a high level of influence. The watchword is not 'you help me', but rather 'we collaborate with each other'. (http://www.designcouncil.org.uk/resources-and-events/designers/design-glossary/co-design/ ,6th of July-12, Design Council, 2007).

Lisa Fuller:

Designers consider co-design as a tool that is used to listen, learn and communicate with users. Thus, designers will decide to modify or not the design according to users' participation. Therefore, designers take the leadership and are the ones concerned about the quality of outcomes. Designers should have the capabilities and skills to decide which users are candidates to collaborate in the designing process. Thus, researchers and designers derive benefit from this collaboration in solving problems of their design. (http://www.designcouncil.org.uk/resources-and-events/designers/design-glossary/co-design/ , 6th of July-12, Design Council, 2007)

Mirko Van den Winkel:

Co-design is not only about dealing with your client as a co-designer; this will not lead to the real innovation. It is about understanding your customers. Regardless of the exact definition of co-designing with users-consumers, the term may also be used only for improving new versions

of old existing products/services. (http://www.designcouncil.org.uk/resources-and-events/designers/design-glossary/co-design/, 6th of July-12, Design Council, 2007).

Table 2.4 summarises the different techniques/methods by which the Co-design approach has been implemented in different e-Government projects.

Projects	Technique/method/tools	Type of the services provided	Participation engagement	References
eGG (e-Government Groupware implemented in Greece)	Metaphorical meaning of the re-birth of public administration	Social services (official documents) such as certificate.	Active (civil servants, end-users, public seniors, politicians)	(Anthopoulos, et al., 2007)
Workshops during participatory planning and design process in Pilsen-Chicago's	1) Visualization technique (GIS provided the planning team through maps and images). 2) (The artist provided an avenue for residents to actively participate in the design process. 3) Computer-photo manipulation (This technique allow to participant to view photorealistic example of proposed design prototype).	Community services.	Active (Stakeholders-including the expert technical at the University of Illinois, , 25 community residents, two architects, two planners, and one artist).	(Lenihan and Briggs, 2011)
The Australian Government Department (DHS)	User satisfaction survey, consultative forums and mapping how customers really interact around life event.	Human services such as healthcare services.	Active with some challenges (different background, and experience) The community engagement based on collaboration where customers, services providers, stakeholders, and government representatives share experiences and ideas.	(Sanders and Westerlund ,2011; Bridge, 2012)
Workshop (a group of researcher and	Cards,(including visual form, size, and colours) every participant prepare a short	To facilitate share the generation and	Somewhat Active with complex	(Al-Kodmany, 1999)

PHD students from different academic departments at Linnaeus University	presentation before coming to workshop by writing key word or phrase on up to six cards. These cards will be then displayed on wall. Thus, the wall was structured as a timeline moving from past to present to future. The next step was for the participants to cluster the cards and thereby concepts.	communication ideas between team members. To understand of design by experiencing, exploring, and experimenting in and with co-design spaces.	challenge that would return to social change and organization transformation. (researchers, and PHD students)	
Surrey county council 50+ website project as part of the UK government.	The technology used in this project website was an open source content package	"Built web-portal aimed at the over 50 age-group. The software was also adapted to offer usability for older people to conform to the W3C web Accessibility".	Active: was successful in raising awareness and usage ICT (older people, housing associations)	(Council, 2008, p.20)
New South Wales Department of Health in Australia	Experience-based design involves interviewing patients, caregivers, and staff and allowing each group to share their stories, prioritize issues for improvement, And jointly 'co-design' new processes and/or facilities.	Emergency health services/ aimed to increase customer satisfaction with state health care services.	Active (patients, staff and caregivers)	(Iedema et al., 2010; Piper et al., 2012)

Table 2.4: Tools/techniques used for co-design in digital public services

2.6 A Synthesis of Participatory Design Approaches in the Digital Public Service

In general, few research studies have been conducted regarding the usefulness of user participation approaches (Olphert and Damodaran, 2007). In particular, regarding Participatory design (PD) in digital public service development (Karlsson et al., 2012). PD dates start as research concept in 1970s (Olphert and Damodaran, 2007). PD is used as a useful approach to understand the design process and to support the interdisciplinary that exists between stakeholders (Anthopoulos et al., 2007). One positive example, which was reflected PD approach is the 'Scandinavian School' where service users (i.e. students) and developers achieved an equilibrium plan as partners (Hendry, 2008). PD was presented as a design paradigm, which was considered as one of the main approaches of end user participation (Schuler and Namioka, 1993). The argument was that the service user is the expert in his/her domain system, and he/she

can only affect his/her experts in design process by indicating their needs and expectations (Karlsson et al., 2012).

The incorporation of PD methods supports the discovery and essential improvement of digital public services, and helps to achieve social acceptance (Iedema et al., 2010). "All governments designated an agency that with the help of senior consultants from the private sector directed the necessary steps in e-Government development (design, implementation, evaluation, improvement, and management of change) and all related projects" (Anthopoulos et al., 2007, p.355). The 'bottom-up' design is a term that is defined by means of educational methods (Jessup, 2008); in which participants consider e-Government as a system composed of subsystems that need to be studied thoroughly, from multiple points of views. It is also known as the procedure in which numerous participants (end users, public seniors, and politicians) participate, exchange knowledge, and support administration modernization. Participants determine their expectations regarding e-Government subsystems, digital public services and their simplification, and the transition from traditional to ICT-based procedures (Olphert and Damodaran, 2007).

This research presents several examples (in the next sub-section) to show various Co-Design artefacts which were implemented in different application domains of e-Government services, using various approaches and techniques.

2.6.1 Limitations in the Earlier Co-design Practices in the e-Government Services

Governments face challenges (Wenger, 2012). New technologies provide governments with the possibility to manage/define the relationship between governments and end-users that they serve. For example, facilitating the Co-design of services, form new participation and or collaboration in service delivery will generate some constrains (Aposotolous et al., 2011).

This research study has reviewed a number of case studies regarding the Australian Public Service, and how to embed Co-design to improve the digital public service. In fact, it is valuable looking at the archive of the Australian Public Service, as it has a robust history of consulting with the community (Bridge, 2012). However, in considering how to embed Co-design to improve the sense of what should be different in how to engage people in the design process (Bate and Robert, 2007). Over the last 20 years, services were initially developed and delivered 'in-house' by government agencies, and the aim was to inform people of the services available

and the requirements for eligibility and access (Parent et al., 2005). Later, in the 1990s government agencies started to move from simply notifying customers as to what services were available to discussing with customers their satisfaction with the services delivered through customer satisfaction surveys and later, using focus groups (Iedema et al., 2010). Nowadays, in Australia, the department of human services **(**DHS**)** is seeking to implement a new approach, in which it started to focus on engaging customers in regards to how services are delivered rather than just looking (Bridge, 2012; Sanders and Westerlund, 2011). This therefore enabled much greater involvement from customers to help determine what type of services should be delivered by what means, and identified customers' desire for more integration and tailoring of services to make them more appropriate to users' needs. This suggests three distinct phases: informing, consulting and co-designing (Bridge, 2012).

The DHS developed a way of collaboratively balancing the desirable, viable and possible by engaging with the community to understand people's lives and circumstances, develop services drawing based on the knowledge of the customers, and deliver services to customers, in which customers can still contribute to innovation the improvement in on-going service delivery (Bridge, 2012). In this technique, DHS develops a map of the customer experience in dealing with a service, and highlights aspects of service delivery that can be re-designed based on customer needs. However, the developed DHS is still limited regarding personalised services delivered in a way most convenient to people, due to lack to address the desire for personalisation and tailoring of services. Hence, there is no proper matching (balance) between user's needs and service requirements throughout the design process.

The New South Wales (NSW) Health in Australia was developed in 2007 as an initial trial program in order to examine the process design implications of patients and caregivers' experiences of emergency department care (Iedema et al., 2010). The program derived in part from the governmental importance for increasing customer satisfaction with health care services. The program was as a form of 'experience-based design' which, involves interviewing patients, caregivers, and staff and allowing each group to share their views, ideas, and expectations for improving the design processes and facilities (Bate and Robert, 2007). The purpose of this program is to make clinicians conscious of patient's needs that they did not realize about, and grant opportunity for clinicians to design their service's processes in collaboration with patients and their caregivers (Iedema et al., 2010).

In-fact, this trial program invites different stakeholders such as patients, clinicians, and caregivers to express their own views and ideas, which reflects the implications of how redesign health care services (Iedema et al., 2010). In reality, however, this project with full respect proceeded to frame the co-design, instead of presenting a real project with functional exercises that aim to create a tangible solution for target people to sort out their problems (Iedema et al., 2010). However, patients, caregivers, clinicians, and support staff were interviewed about issues that were important to them. These issues and problems became the focus of an accurate redesign process, targeting facilities as well as other process issues (Piper et al., 2012).

The electronic patient record (EPR) is a prototype system for the management of patients' records (Ardito et al., 2012). The EPR was designed based on the software shaping workshop (SSW) model for the nurses and physicians regarding their wards (Costabile et al., 2007). The focus of this ERP is on the activities of the head physicians to shape the patients' records by creating their own procedures. "Physicians, nurses and other operators in the medical field are reluctant to accept a common unified format. Thus, they can customize and adapt the patient record to their specific needs" (Ardito et al., 2012, p.82). The SSWs used by physicians and nurses of a specific ward result from the design activity performed by the head physician. However, the head physician cannot update the EPR for his/her ward by inserting new module(s) does not yet design (Ardito et al., 2012). Hence, if required, he has to refer to the design team, which has to create the required module(s) and make them available in the SSW of the stakeholders.

Meta-Design Model as a second example (Fischer and Giaccardi, 2006), which used a number of approaches based on participatory design, and were conducted at Brescia Municipality in Italy to transfer the development of G2C services from software developers to administrative employees (i.e. employees in government agencies) using two phases (Fogli and Provenza, 2012). The first phase, analyses the diverse perspectives of the stakeholders involved in service construction, and usage to derive the Meta-Model; the second phase, the administrative employees apply the derived model to design and develop an 'end-user development environment' that supports employees in building an instance of the service meta-model, which is then automatically elucidated to produce services for citizens (Fogli and Provenza, 2012). However, this approach/practice focuses on administrative employees in participating in an active role and maximizes the opportunity of them to involve throughout development process from early phase, instead of grant this opportunity to service user to involve throughout design

process of building the proposed model rather than just take their perspectives through building stages (Fischer and Giaccardi, 2006). The final stage of this model will generate the 'Meta-model services' for citizens and may not meet their needs and expectations, as they are not involved from an early stage in the design process.

2.6.2 Limitations in the Current e-Government Service Co-design Frameworks

Some examples of the existing state of the art regarding e-Government service Co-design frameworks have been concerned to monitor and evaluate e-Government services using an integrated model. The capacity model, for instance, was developed by IntelCities Community of Practice (Cop) (Deakin et al., 2011). This enabled Intel-Cities' e-Learning platform, knowledge-management system, and digital library to be designed and monitored, and also evaluated. A further example shows that the capability model is a normative Co-design framework (Dong et al., 2013), which allows the 'capability approach' to be evaluated. It is possible to theorize a capability set for design from the field of design studies. This set forms the informational basis to assess government policy and practices towards participatory design (Lombardi et al., 2009) rather than allowing stakeholders to participate throughout the design process. Indeed, the two earlier frameworks made such contributions to the evaluation of policy toward participatory design. One advantage of such frameworks is that they are able to discern the differences between policies that appear to support participatory design. Nonetheless, a limitation is that the categorisation of the set of capabilities is based on a normative description of design (assessing the value of the capabilities to citizens has not been required). Moreover, these frameworks seek to develop a specific kind of e-Government services, using specific types of Co-design tools and methods through using Co-design towards. As a result, these frameworks (with fully respect) continue to experience certain restrictions when being applied to various domain contexts or different domain applications.

2.7 Double Diamond Model: The Design Process

The Double Diamond model includes four distinct phases as standard or typical phases of design process. These phases divided into four stages: Discover Define, Develop and Deliver (Design Council, 2005).

The recent research studies show some researchers worked on Double Diamond through adapting it to be fit with their research. For examples, (Pierri, 2012; Hinman, 2012; Peter Merholz, 2013) who they adapted Double Diamond from 'The Mobile Frontier', (Hinman,

2012). Rosenfeld Media provides a different example of redesigning the Double Diamond model (Merholz, 2013). Furthermore, Pierri (2012) who has adapted the Double Diamond model to introduce the Co-designing approach in healthcare services.

The 'Double Diamond' as design process model is adopted and used in different companies (practical examples); for example, Scott and Fyfe (2014) as manufacturer Company that has been using Double Diamond for developing a huge of textiles for plenty of market areas over the world. Double Diamond used as a "one way of mapping the design process" (Design Council, 2007, para.1). Hence, this process permits to companies to take substantially any concept from idea to outcome in a systematic and comprehensive fashion (Scott and Fyfe, 2014). Furthermore, allowed them to build a global reputation for excellence in both quality and service.

Better Services by Design (BSBD) research project was adopted Double Diamond to improve health and social care services (User Centred Healthcare Design, 2012). The creative process was suggested by the Double Diamond approach, which helps BSBD to think about how to generate and refine health service improvements. Copenhagen Business School (CBS) and the Technical University of Denmark (TUD) did many activities and research projects in 2014, based on the Double Diamond process model (innovation and entrepreneurship in education). Hence, these activities were undertaken to improve the means of planning and implementing courses, by providing individual teachers with a clear means that incorporate aspects of innovation and entrepreneurship in education.

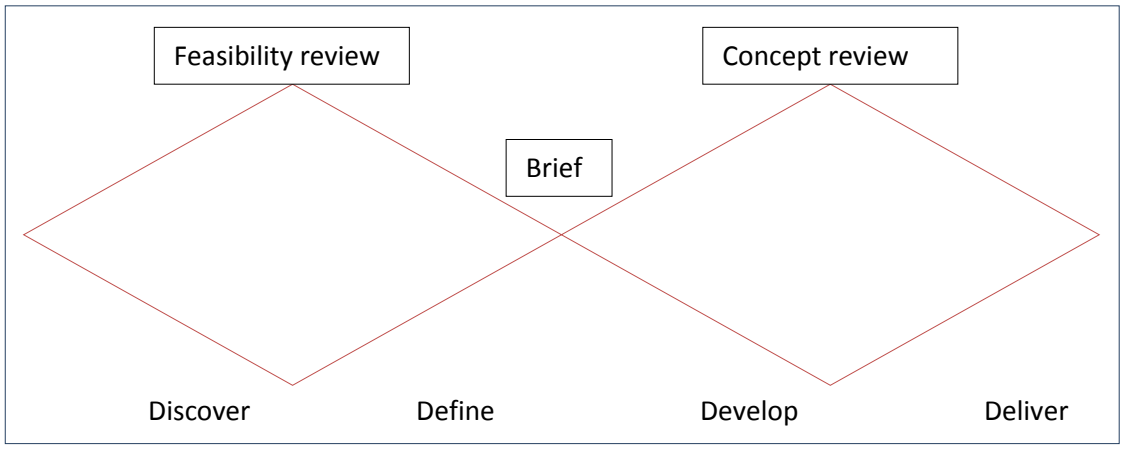

Figure 2.5: Double Diamond model (Adapted from Design Council, 2005)

Table 2.5 shows a summative overview regarding Double Diamond process including its phases, key activities, definitions, and some examples show the wide ranging of companies which were adopted these phases (Design Council, 2007).

Phase	A Brief Description	Key Activity/method	Example
Discover	This begins with gathering insights, idea and/ or inspiration, often sourced from a discovery phase in which user needs are identified.	Market research User research Managing information Design research groups.	'LEGO' refer to this stage of the process as Exploring, 'Microsoft' call it Understand, while 'Starbucks' have coined the term Concept Heights.
Define	Represents the definition stage, in which interpretation and alignment of these needs to business objectives.	Project development. Project management. Projects sign-off.	'Microsoft' calls this the Ideate phase, 'Starbucks' have named it Downtown and 'Whirlpool' refers to it as Synthesis.
Develop	Marks a period of development where design-led solutions are developed, iterated and tested within the company. This process of trial and error helps designers to improve and refine their ideas.	Multi-disciplinary working. Visual management. Development methods, and Testing.	Microsoft refers to this process as Implement, while Virgin Atlantic Airways call it Design.
Deliver	Represents the delivery stage, where the resulting product or service is finalised and launched in the relevant market.	Final testing, approval and launch. Targets, evaluation and feedback loops.	Virgin Atlantic Airways have named this phase Implementation, Microsoft call it maintain, and Starbucks describe it as the Production District.

Table 2.5: A brief Description about Double Diamond Model (Design Council, 2007)

2.7.1 Reflective Practice in Service Design Process

Reflections and critical studies on the discipline of cognitive psychology (e.g. cognitive model in chapter 5) have argued that although there are many theories, models and guidelines available,

design practitioners normally refer to concrete techniques and approaches they are familiar with (Rogers, 2004). Technology designers it can be both terrifying and demoralising to see how the design decisions they make, deliberately or intuitively, shape the feeling of people's everyday experiences. As people adapt to the opportunities and restrictions/limitations delivered by their technologies, their everyday practices, feelings, even their characteristics and sense of self may change, often in unanticipated ways (Sengers et al., 2005).

Sengers et al. (2005) started by describing the practice in the design process regarding precarious reflection, its importance and its influence in HCI. Sengers et al. (2005, p.49) argue, "on-going reflection by both end-users and designers is a crucial element of a socially responsible technology design practice". Design does not occur as a distinctive correlation between requirements and final product/service: Rather, it is measured as the result of a complex process of uncovers a whole through all the diverse elements gathered through research, not by just adding them up (Fallman, 2003).

Reymen and Hammer (2000) defined a method for supporting and assistant practitioners in steady/regular reflection on design contexts. In doing so, they divided the design process into design sittings, where reflection can happen when describing the design state before and after each design sitting. They then provide a comprehensive categorisation of design sittings, activities and tasks in order for designers to be able to identify aspects and properties of the design process and context and become aware of the design situation they are engrossed in. This reflection improves the current design process, and also provides important knowledge for improving design skills for future design processes as well (Reymen and Hammer, 2000).

2.7.2 Models of design process

The extensive research undertaken since the 1950s has shown many design process models. However, there is no single model, which is approved and/or agreed as standard to provide a reasonable description of the design process (Bahrami and Dagli, 1993). Wynn and Clarkson (2005) argued about the difficulty of describing the service design process satisfactorily and it is an equally mystifying task to illustrate the relationships between service design process models concerned with its various aspects.

Wynn and Clarkson (2005, p.37) proposed, a framework that included three categories (Abstract, Procedural, and Analytical). Abstract approaches, "which are proposed to describe the design process at a high level of abstraction". Procedural approaches, "which are more concrete in

nature and focused on a specific aspect of the design project". Analytical approaches "are used to describe particular instances of design projects". Approaches typically consist of two parts: 1) A representation used to describe aspects of a design project and 2) Techniques, procedures and or computer tools.

These parts make the use of the representation to understand better or improve the process of design. After that, parts classified different design models under each category. There are many design process models mentioned in systematic literature, for example Wynn and Clarkson in 2005 was mentioned the Darke's model (1979), March's PDI model (1984), Jones' model (1963), Ehrlenspiels' model (1995), Cross's model (1994), French's model (1999) and Evans model (1959). Most of them present design as a series, linear, and spiral of stages, each of which is visited only once by the ideal process (Wynn and Clarkson, 2005). To …"solve these issues, an iterative procedure is adopted; early estimates are made and repeatedly refined as the design progresses, until such time as the mutually dependent variables are in accord" (Wynn and Clarkson, 2005, p.41). This research study follows the 'Double Diamond model' for service design process. More detail is introduced in the chapter 5.

2.8 Summary: Literature Findings, Disscusion and Research Direction

As discussed in this chapter, strategic decision making in the service design process for e-Government services regularly focuses on reducing time and cost, rather than on service user needs and requirements. Hence, most of the emphasis of research studies have been placed upon creating a mechanism to support service design involvement for designing and evaluating services for end-user based on its sharing knowledge and experience in order to reach final service that matches the future service-user experience (Schuurman et al., 2012; Sanders and Stappers, 2008; Alam, 2002). This chapter has introduced e-Government and reviewed a number of its important aspects especially those related to the G2C e-service development and Co-design approaches and how they are adopted in e-Government service design. The analysed literature has identified gaps in the G2C e-service design process oriented e-service provision: 1) Lack/neglect of service user involvement during the development process for e- Government services, 2) Lack in identifying service users' true needs, and deficiency in determining the factors that influence e-Government services adoption by themselves, 3) The service designers should take users' work practices and needs in consideration, 4) The design process should match users' needs such as identity, characteristics, capabilities, preferences and the state of the user and 5) Delivery of services can be jeopardised without due consideration of the service user,

lacking in consideration of their needs and expectations in the design process; as these reasons made unbalance between user's needs and service's requirements.

This has led to the fact that much less effort has been put in collaborative design (Bradwell and Marr, 2008; Sanders and Stappers, 2008; Friedrich, 2013) between service user and service provider throughout service design process delivery options. This study led the researcher to understand not only the gaps/issues are identified in literature, but also support to develop artefacts. These artefacts are necessary in providing practical and theoretical insights required to design a rigorous approach, which could support for the development of G2C e-service design by involving varied stakeholders through design process. Therefore, the adoption of the Co-design approach enables the service design process for G2C e-service to be better tailored and to match the citizens' unmet needs and expectations at a particular stage of design process.

Chapter 3: Design Research Methodology

3.1 Introduction

This chapter examines the research design and defines the research approach. In an interdisciplinary archetype like Information Systems (IS) there exist several of research methods. Thus, these methods different from each other regarding the essential ways, among them the phases employed, techniques, rational aims and or structure of those phases. The appropriate method for this research is chosen and justified. This chapter investigates and presents Design Research as the chosen methodology to accomplish this research, specifying the phases, techniques and philosophical background behind Design Research. Design Research employs a set of techniques and/or tools to implement research in Information Systems.

In this chapter, Section 3.2 Research design background, as a methodology for Information systems research. Section 3.3 presents Design research evaluation methods criteria associated with DSR. Section 3.4 presents the personal construct theory, and explains how the Design Research Method is applied in this thesis, while Section 3.5 presents the design research iterations. While section 3.6 justifies the Choice of Research Method and Technique. Section 3.7 illustrates the RepGrid as research method for this study, and finally, section 3.8 summarises the chapter.

3.2 Design Research Background

IS design is defined as "the purposeful organization of resources to accomplish a goal" (Hevner et al., 2004b, p.78). According to March and Smith (1995), who presented the appropriate framework for IT research lies in the interaction design and the natural sciences to accomplish both relevance and effectiveness by integrating research outputs and research activities. IT research concentrates on both utility, as design science, and on theory, as natural science. The proposed framework is driven by the distinction between research outputs (services and process) and research activities (service design process). This framework has been split into a two-dimensional framework, as depicted in figure 3.1. The first dimension is called 'research activities', and includes Build, Evaluate, Justify and Theorize. The second is called research outputs, and includes artefacts; constructs, models, methods and instantiations.

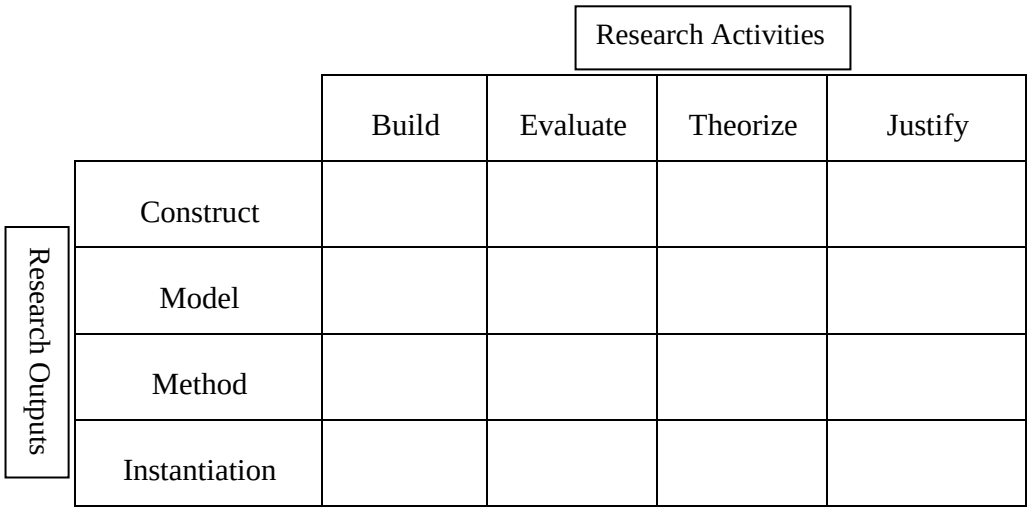

Figure 3.1: A Research Framework (March and Smith, 1995)

Four research activities (See figure 3.1) which are drawn from range of types of design science and natural science are: Build, Evaluate, Justify and Theorize. These activities are employed in IT research to create different types of artefacts: constructs models, methods and instantiations. Furthermore, these artefacts are applied to make sure the utility and efficiency of the produced Information System.

Furthermore, Evaluation has been a popular topic regarding the general IS Research and in DSR. In the general IS literature, evaluation is generally observed from one of two perspectives. In the pre-perspective/ex-ante, a nominee artefact (i.e. system or technology) is evaluated before it is selected and developed. In the post-perspective/ex-post, a selected artefact (i.e. system or technology) is evaluated after it is developed (Klecun and Cornford, 2005). Walls et al. (1992) present the perception of distinct hypotheses for obviously evaluating two components of IS design theories (i.e. the design process and the design product). The framework presented by Pries-Heje et al. (2008) was based on analysis and synthesis of works in IS research and DSR. Their framework provides a strategic view of DSR evaluation and includes two dimensions; the first dimension involves ex-ante, which offers the possibility to evaluate prior to undergoing the risk and effort of building an instantiation of the artefact versus ex-post perspective, which offers the possibility of evaluating the instantiated artefact in reality, not just in theory or hypothetically evaluation. The other dimension involves naturalistic vs. artificial evaluation. March and Smith (1995) classified the research outputs (artefacts) by using the categorisation in order to identify an appropriate procedure to build, evaluate, theorize and justify the research. The four types of research outputs artefacts are defined below.

- **Construct**: A set of concepts form the vocabulary of a domain that shapes knowledge to describe problems and suggest solutions.
- **Model**: Models use constructs to represent problems as situations and solutions as statements (March and Smith, 1995). Therefore, modelling a set of propositions (statements) articulates the relationship among constructs.
- **Method**: A set of the guideline steps is used to perform tasks. These guidelines provide solutions to solving problems by using models and constructs. Furthermore, method is considered as translator from one model to another for solving a problem (March and Smith, 1995).
- **Instantiation:** "The realisation of an artefact in its environment" (March and Smith, 1995, p.258). Instantiations are the employment of constructs, models, and methods. However, instantiation may lead to the complete articulation of its fundamental constructs, models, and methods (March and Smith, 1995). Newell and Simon (1972) magnify the importance of instantiations in computer science; explaining it as an 'empirical discipline'.

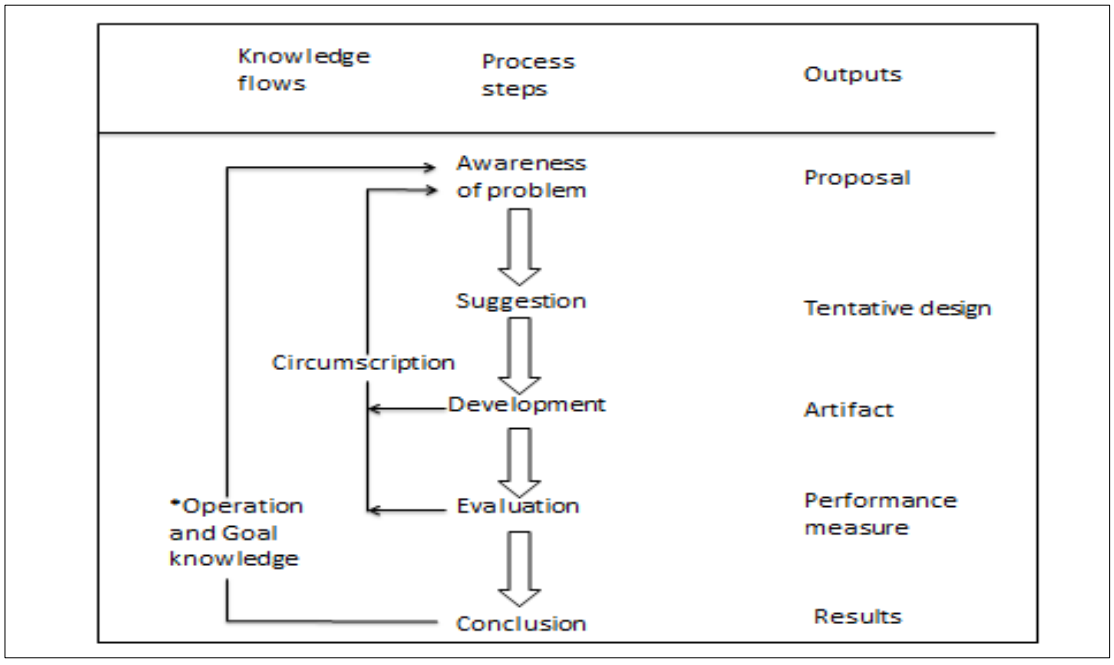

Figure 3.2: General Design Research methodology (Vaishnavi and Kuechler, 2004)

A DSR methodology (See figure 3.2) that incorporates five phases of design and promotes by iterative design cycle as distinguish feature in which helping for sustainable development as key attribute is proposed by Vaishnavi and Kuechler (2004) and adopted from Takeda et al., (1990) based on experimental point of view. The first phase is problem awareness in design research, followed by suggestion as tentative/proposal design solutions. The third phase is development

that may result in learning and improvement being fed back through circumscription into the first step. The most important phase is evaluation of an artefact as fourth phase, in which performance measures from the knowledge base could be applied to test the utility of the artefact. Finally a conclusion involves highlighting the main results of the artefacts outputs. Design Research adding knowledge to the solution space or feeding back to consequent cycles. The system development is represented as research methodology that can lead to more effective design especially when applied in combination with other research methodologies (Nunamaker et al., 1990). Further detail for each phase of design cycle framework is elaborated in section 3.4.

Consequently, design is represented as process, and the steps involved in the design process to employ design as research to generate knowledge. Design Research methodology is recommended by March and Smith (1995) and Hevner et al. (2004) as a research framework. IS research accruing by integrating two complimentary disciplines; the first of these is behavioural science, in which research is more concentrated on theorizing and justifying, and the second is DSR, where the research is more concentrated on the build and evaluates process (March and Smith, 1995).

3.3 Design Research Evaluation

Evaluation is an essential component of the research process. Evaluation processes resides in need to identify artefact performance and measure progress against criteria (i.e. utility, quality, and efficacy) of a design artefact (March and Smith, 1995). The business environment delivers the problem and requirements upon which the evaluation of the artefact is established. This environment comprises the technical infrastructure, which itself is built through the implementation and execution of new IT artefacts. Therefore, evaluation includes the combination of the artefact within the technical infrastructure of the business environment (Hevner et al., 2004). Moreover, evaluating a Design Research artefact is an significant phase, because it is situated in the need to identify artefact performance and measure progress based on the defined metrics (March and Smith, 1995).

In fact, the evaluation is considered to be a complicated process in IS research, in particular through assessment performance artefact against criteria (March and Smith, 1995). Artefacts can cover a range of tasks, for example, which are applicable to various problems, with performance varying significantly over the field of request and thus demonstrate their utility. This does not mean that the evaluation process will represent the artefact only, but the evaluation criteria

themselves must be determined for the artefact in a particular environment (March and Smith, 1995). The evaluation criteria called quality attribute are identified according to artefact type as suggested by March and Smith (1995), and summarized in table 3.1. Usually, evaluation is concerned to answer the important question 'How well does the artefact work?' (March and Smith, 1995). This can be addressed by applying an appropriate evaluation metric, therefore proving the suitable evaluation criteria (Hevner et al., 2004).

Artefact	**Brief Description**	**Evaluation Criteria**
Constructs	The conceptual vocabulary and symbols describing a problem within a domain	"Completeness, simplicity, elegance, understands ability and ease of use" (1995, p.261).
Model	"A set of propositions or statements expressing relationships among constructs"(1995, p.256)	"Fidelity with real world phenomena, completeness, level of detail, robustness and internal consistency" (1995, p.261).
Method	"A set of steps… used to perform a task" (1995, p.257) – how-to knowledge; method can be tied to particular models; they may not be explicitly articulated but represent tasks and results.	Operationally (ability of others to efficiently use the method) …"efficiency, generality and ease of use" (1995, p.261).
Instantiations	The operationalization of constructs, models and methods; it is the realization of the artefact in its environment to ensure its feasibility; e.g. (prototypes or the implemented artefacts).	Efficiency and effectiveness influence an environment and its users.

Table 3.1: Summarised a Combination of Evaluation Criteria with Artefact Types (March and Smith, 1995; Hevner et al., 2004 and Vaishnavi and Kuechler 2004)

Functionality, completeness, consistency, accuracy, performance, reliability, and usability represents the terms of IT artefacts evaluation that fit with the organization, and other relevant quality characteristics or attributes. A design artefact should be comprehensive and effective when it fulfils the requirements and restrictions of the problem it was addressed to solve (Simon, 1996). According to Hevner et al. (2004) who they highlight that the selection of evaluation method should be cautiously considered, and when matched with proper artefact and evaluation metric. These are summed up in table 3.1. For example, descriptive methods of evaluation should only be used for especially innovative artefacts, for which other forms of evaluation may not be realistic. The classifications shown in table 3.2 represent the most common evaluation methods from which an appropriate method/s can be adopted, relying on the type of artefact and the evaluation metrics applied.

Design Research Evaluation Method Types and their Description	
Observation	"Case Study: Study artefact in depth in business environment".
	"Field Study: Monitor use of artefact in multiple projects".
Analytical	"Static Analysis: Examine structure of artefact for static qualities (e.g., complexity)".
	"Architecture Analysis: Study fit of artefact into technical IS architecture".
	"Optimization: Demonstrate inherent optimal properties of artefact or provide optimality bounds on artefact behaviour".
	"Dynamic Analysis: Study artefact in use for dynamic qualities (e.g., performance)".
Experimental	"Controlled Experiment: Study artefact in controlled environment for qualities (e.g., usability)".
	"Simulation: Execute artefact with artificial data".
Testing	"Functional (Black Box) Testing: Execute artefact interfaces to discover failures and identify defects".
	"Structural (White Box) Testing: Perform coverage testing of some metric (e.g., execution paths) in the artefact implementation".
Descriptive	"Informed Argument: Use information from the knowledge base (e.g., relevant research) to build a convincing argument for the artefact's utility".
	"Scenarios: Construct detailed scenarios around the artefact to demonstrate its utility".

Table 3.2: Design Evaluation Methods (Hevner et al., 2004, p.86)

The ability and efficacy of an artefact can be carefully validated via well-selected evaluation methods (Kleindorfer et al. 1998; Zelkowitz and Wallace 1998). In specifying the problem and solution requirements, sufficient degrees of freedom remain to prompt a selection of forms and functions in the artefact that are aesthetically agreeable to both designer and user (Hevner et al., 2004).

3.4 Applying Design Research

The research project presented in this thesis begins with the pilot study (survey/iteration 1) that aims to investigate how citizens/service users perceive the quality of the existing release of the e-Government services in Jordan and to identify requirements and possible improvement. To meet the research aim and objectives, design research will be adopted from Vaishnavi and Kuechler (2004). Moreover, March and Smith (1995) research product categorisation will be adopted. Research products will be recognised in the form of constructs, models, methods and instantiations. The Design Research methodology applied for build-up the "suitable Co-design framework" which is comprised (emergent cognitive model and design tools). This step represents iteration 2 (G2C-SCOF) in this research study. Next step is to design an artefact

(instantiation) which represents iteration 3. Adapted general research methodology (Vaishnavi and Kuechler, 2004) to be flexible and serve the research project aim. The iterative process in this method is including the five design process steps: problem awareness, suggestion, development, evaluation and conclusion, as depicted in figure 3.2.

Problem awareness of the problem will come from a pilot study, a survey (Questionnaire/iteration 1) for evaluating the adoption and acceptance of e-Government services in the developing countries: A Case Study of Jordan. A key aim of this evaluation is to investigate how citizens/service users perceive the quality of the current release of the e-Government services in Jordan and to identify factors and possible improvement suggestions from users' feedback. The identified requirements and factors have been explained in detail in chapter 4 as iteration 1 for this research design. In addition, the findings were derived from literature and covered in chapter 2.

Suggestion includes introducing a preliminary idea of how the problem (derived from iteration 1) might be solved by understanding how the problem influences of quality of e-Government services through design a suitable Co-design framework. This step starts in Iteration 2 (G2C-SCOF) with the development of an appropriate concept framework. Analysing the process of design for current e-Government services may help to investigate how the development of e-Government service design process is used through employing interviewees' opinions and suggestions.

Development is carried out by building/developing a design artefact-WCP (iteration 3) - a platform of collaborative communication design tools assist users (iteration 2) and help them to express themselves. The artefact consists of G2C-SCOF with the purpose of better understanding the dynamic process regarding the e-Government services design and their importance over time with e-Government. The proposed artefact supports collective innovation and the changes that have taken place in recent years to meet unmet needs regarding service users.

Evaluation is performed using evaluation method namely FGD through a detailed experiment using fieldwork testing with the proposed artefact-WCP platform. Evaluation is carried out using Design Research evaluation criteria to examine the effectiveness and validate the proposed G2C-SCOF; by applying the proposed WCP on a realistic domain (Iteration 2). WCP is used to validate in an experimental evaluation over various and diverse research participants including the predetermined groups (service user, service interface, service provider) in iteration 3.

Conclusion the research iteration results and output are summarised and identified, and take into consideration for future improvement to keep the sustainability refinement through cyclic iteration link between development and evaluation stages.

3.5 Design Research Iterations

Design Research is performed through iterative design cycles that can be improvement iterations or improvement and incremental iterations (Hevner et al., 2004). This research is implemented as incremental iterations where each iteration is used to extend and refine the design problem. The design iterations (3 iterations) are used to deliver a final artefact as illustrated below and in more detail in next chapters (4, 5 and 6) as they represent iteration 1, 2, and 3 respectively. In each iteration, the artefact refinement process is formed as a mini Design Research cycle of build and evaluate. This research is implemented as incremental iterations, whereby each iteration is used to extend and refine the design problem.

3.5.1 Iteration 1: Evaluating the Adoption and Acceptance of JGP

This iteration aims to investigate how citizens/service users perceive the quality of the current release of the e-Government services in Jordan and to identify requirements and possible improvement suggested via users' feedback. This iteration will evaluate the e-Government adoption and acceptance; with a focus on a life-event approach as form of citizen-centric approaches (Gupta, 2007; Al-soud, 2012) used by the Jordanian government as an exemplar service provider. Specifically, it focuses on how the design characteristics of e-Government services affect the efficiency of the delivery e-service, based on this approach and take into consideration the anticipated needs of its users (Wang et al., 2005). Underpinning this iteration are well-founded constructs and related variables under each construct gathered from Technology Acceptance Model (TAM3) (Venkatesh and Bala, 2008), Information System Success Model (ISSM) (Delone and McLean, 2003) and further literature in the field of Management Information Systems (MIS).

In order to investigate these requirements and factors an empirical study will be conducted, including a survey (Questionnaire observations, See appendix G) for evaluating the adoption and acceptance of e-Government services in the developing countries: case study in Jordan.

This research project will develop a questionnaire to collect quantitative data that enabled researcher to identify significant factors influencing citizens' adoption and acceptance of e-Government services (Nusir and Law, 2012). The questionnaire will consist of three parts. The

first part comprised 7 items to collect demographic data. The second part described 3 tasks that the respondent will be required to carry out with the JGP. The third part; after completing the tasks given in the second part, it will contain 79 items to evaluate different aspects (See chapter 4). To maximize the validity and reliability of the items of the questionnaire, Researcher will adapt the items use in the previous studies for evaluating the corresponding variables (adoption, acceptance, and satisfaction, intention to use, system quality, info quality, and readiness for e-government. All the 79 items will be evaluated with a 7-point Likert-scale with the leftmost and rightmost anchors being "Strongly Disagree" and "Strongly Agree". However, the items on Information Quality will be rated with a different approach known as semantic differential. Each item will be evaluated against a pair of contrasting descriptor such as "interesting versus dull". For each item, a respondent will be asked to indicate the extent to which it was close to one of the two descriptors. Further detail regarding research instruments will be explained in chapter 4

3.5.2 Iteration 2: G2C e-Service Co-Design Framework

The aim of this iteration is to understand the unmet requirements needed for G2C e-service in the design process and how to match these requirements with suitable design process. This iteration comprises two parts, which are explained in chapter 5; part1 represents the cognitive model (i.e. personal constructs) which is built by theories gained from RepGrid; while part 2 represents the G2C-SCOF and the proposed Service Provider Realisation Framework (SPRF) as guidelines Co-design process. As each of them complement each other; (e.g. part 2 builds on part 1).

3.5.2.1 Personal Construct Theory and Repertory Grid-Part 1

This study is conducted predominantly following an established 'psychological technique', known as RepGrid, …"its theoretical foundation – personal construct theory, the distinctive process of RepGrid, and the appropriateness of this technique" for this study (Siau et al., 2010, p.565). RepGrid as powerful research method and founded based on psychological technique (Hunter and Beck, 2000; Siau, et al., 2010) which suitable for the research objectives. The semi-structure interviews integrated in the RepGrid technique originating from Kelly's (1955, 1963) Personal Construct Theory, which supports to understand well the complex personal views. In this research, researcher acquired the variant of Repertory Grid (RepGrid) which was conducted by Moynihan (1996) and (Siau et al., 2010), as the similar approach of this study. Moynihan's (1996) study was conducted to identify the key factors that managers of IS development projects to take them into consideration when planning new projects for new customers to identify idiographic personal construct systems and then analysed qualitatively (using content analysis).

While the objective of Siau et al. (2010, p.563) study is "to identify and understand the important characteristics of good team members in software development projects". However, both were applied RepGrid to identify significant characteristics for good project members by qualitative (using open coding method) analysis thereafter, they conducted a quantitative analysis to identify the importance scores for each constructs and category. The RepGrid process includes three main activities: element selection, construct elicitation and construct rating (Siau et al., 2010). The next sub-section introduces a brief explanation about RepGrid procedures.

The appropriateness of RepGrid in this study regarding the research question has been asked during interview data collection by government staff (service provider): 'what are the steps that Jordan e-Government project follow when designing government to citizen (G2C) service?' Another research question has been asked by typical Citizens' (service users) and Citizens workers (front-line government staff as interface between service user and service provider): 'How would you like us (government staff/service providers) to do service design to you (Citizens')?' The main purpose of this question is to get more citizens' input into some aspects of service design. An alternative, the study intended to 'inductively' identify the significant requirements/characteristics of G2C e-service design process. RepGrid is an articulate research method (Hunter, 1997; Tan and Hunter, 2002) that fits this research project objective suitably. "RepGrid is also an established psychological technique" (Siau et al., 2010, p.568). Several researchers, both in IS area and another social science areas/fields, have applied this research method (RepGrid) to explore and investigate a research participant's conversation/dialogue (e.g. Hunter, 1997; Davis et al., 2006; Stewart and Stewart, 1981; Ginsberg, 1989; Reger, 1990; Moynihan, 1996;; Siau et al., 2010; Edwards et al., 2009).

In addition, RepGrid is "a powerful research tool for probing interviewees' understanding of complex topics" (Lemke et al., 2003, p.11). RepGrid considers semi-structured method; provide flexibility through gathering interview data (Hunter, 1997). Furthermore, RepGrid is superior to unstructured interview techniques (Moynihan, 1996). In this research took the variant of RepGrid applied by Siau et al (2010). The rationale for Siau's et al (2010) study is to 'identify and understand the important characteristics of good team members in software development projects'. The nature of the above study is relatively similar to that of this research study. In particular, their approach that applied through RepGrid data analysis. The research study applied RepGrid to grasp the "idiographic personal construct system" (Siau et al., 2010, p.568), in the end qualitatively analysing the …"individual RepGrids to identify the categories underlying individual constructs" (Siau, 2010, p.568). Then, the last one is iteration 3 comes with the solution which is figured out to bridge the

communication gap between theoretical context (domain area) which represents decision-making policies and actually service design practice which represents the people who use the service.

3.5.2.1.1 Personal Construct Theory

Personal construct theory originated with, and was developed by George Kelly in 1955; he established this theory based on psychological science during his experiments work in his clinic as a clinical psychologist. Kelly believed that the individual is an "incipient scientist" (Kelly 1955, p.12) in order to understand and release their social environment surroundings. Kelly (1995) argues that individuals, based on their experience and perspectives', will develop a structure of …"personal constructs to assist them in understating and interpreting events (i.e. construe) that occur around them" (Siau et al., 2010, p.565). In essence, a personal construct theory is an impression or concept that has been derived from specific experiences and perspectives' or instances of such behaviour.

An individual's personal construct system may be ascertained by using the technique, which calls RepGrid (Hunter, 2004). RepGrid provide a way of undertaking research into problems solving in a more precise, less biased, way than any other research methods (Stewart and Stewart, 1981). A personal construct system is a unique hierarchical configuration of constructs that guides a person's behaviour (Kelly 1955). This means that when the sets of constructs used by two individuals are similar, the way or the approach of each individual organises constructs often differs (i.e., creates relationships among) (Hunter, 2004). The main role or function of a personal construct theory is to construe the current situation and to anticipate future events (Tan and Hunter, 2002). Individuals can share and appreciate the personal construct systems of others. Furthermore, Kelly argues that personal constructs are bipolar in colouring. For instance, employees based on their experiences may organise their organization's senior management team into those that have 'good leadership skills' and those with 'poor leadership skills'. "Good Leadership Skills--Poor Leadership Skills" considered the bipolar constructs used by employees to categorise the organization's senior management team (Tan and Hunter, 2002). The usage of bipolar labels raises an understanding of how a construct may be adopted by an individual to simplify/assist in interpretation (Tan and Hunter, 2002).

3.5.2.1.2 Repertory Grid Technique

The RepGrid is a cognitive mapping approach, that is, an adaptive structuration theory (DeSanctis and Poole, 1994). Structuration is the process by which individuals generate and

refine a social system through the application of structures (Tan and Hunter, 2002). Kelly formed the …"repertory grid technique as a mechanism to [assist] in the elicitation and evaluation of individuals' personal constructs" (Edwards et al, 2009, p.786). The technique can consistently elicit the research participant's cognitive structure, i.e. personal construct, which is not influenced by the researcher's structure of reference (Roger, 1990; Siau et al, 2010). Furthermore, the RepGrid integrating with semi-structured interview is more efficacious than unstructured methods (Moynihan, 1996).

Basically, the RepGrid blocks approach consists of elements (columns) and constructs (rows) which form the grid. The elements are the objects (i.e. individuals, process) that are the attention of the investigation and the constructs (i.e. elements construe) (Edwards et al., 2009). The RepGrid comprises three key components: elements, constructs and links. Elements represent …"objects of attention in a scientific investigation" (Siau et al, 2010, p.566), while …"constructs represent the research participant's interpretations of the elements" (Siau et al, 2010, p.566), and links show how the research participants interpret each element relative to each construct (Siau et al., 2010). RepGrid is a useful technique, because it provides data that can be analysed both qualitatively and quantitatively using statistical methods (Tan and Hunter, 2002).

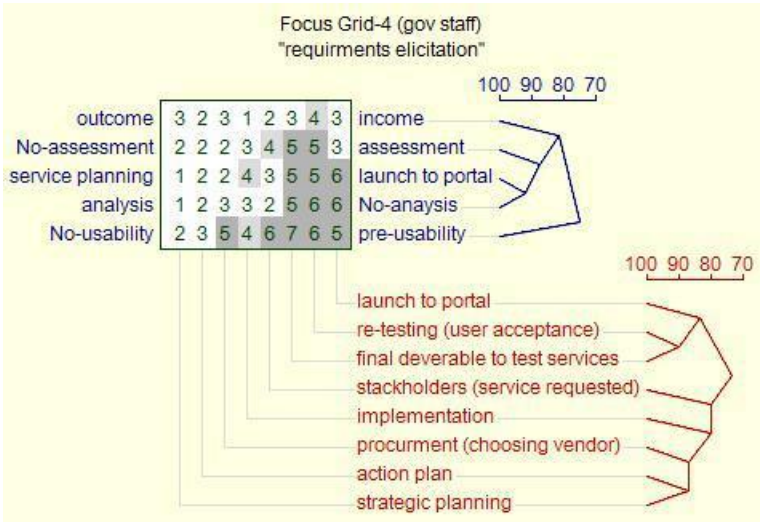

Figure 3.3: An example of the RepGrid layout

3.5.2.1.3 Element Selection

As explained previously, the elements are objects within a specific domain area. The selection process will rely on research questions and objectives (Saiu et al., 2010). Thus, elements may be people such as system analysts (Hunter, 1997), or activities such as systems development

projects (Tan and Hunter, 2002). In prior studies that adopted RepGrid, researchers have chosen between two common ways of selecting elements (Siau et al., 2010). The first way is through the supply of a list of elements to respondents; such that everyone elicits constructs based upon the same elements (partial RepGrid). The second way is to ask respondents to choose or elicit their own elements by themselves. In this case, the respondents work on different sets of elements (full RepGrid). Once the elements have been selected, each respondent will elicit his/her constructs based on his/her selected elements. These elements should be demonstrative of the area to be investigated (Siau et al, 2010). Moreover, the designated elements should provide adequate variability in the consequent construct elicitation process (Hunter and Beck, 2000).

3.5.2.1.4 Construct Elicitation

Construct elicitation is an activity or process to identify a set of constructs by which respondents construe and or interpret the elements. Regarding prior studies applied RepGrid were mentioned there are many ways of eliciting constructs (Stewart and Stewart, 1981; Reger, 1990; Tan and Hunter, 2002). The most common approach to eliciting constructs …''is known as the 'triadic' sort method" (Siau et al, 2010, p566). In RepGrid, three elements (a triad) are randomly selected from a set of elements, regardless of whether these elements are supplied or elicited. For each triad, the respondent will be asked to describe a way in which two elements are similar, yet different from the third element (a brainstorming process for each respondent). As Siau et al. (2010) recommend, elaboration should be within the scope of dialogue. The main role of this method is to ascertain the similarity and contrast of elicited constructs. Kelly (1955) argued this method which is showed that similarity and contrast promote and represents a 'dichotomous' construct (bipolar construct).

A further approach to eliciting constructs, although uncommon, is that researcher/interviewer provides the constructs (Tan and Hunter, 2002). This approach is considered good when comparing individual RepGrids statistically. The last method/approach is known as the 'full context form' (Tan and Hunter, 2002). In this approach the respondent will be asked to sort all the elements into any number of "discrete piles" (Saiu et al., 2010, p.567) based on whatever similarity criteria are chosen by the respondent. This method is usually used to elicit similarity judgments (Siau et al., 2010).

In addition, a laddering method (Stewart and Stewart, 1981) can also be used in each of the aforementioned elicitation approaches. Laddering involves the use of a series of 'how' and 'why'

questions, which permits the research participant to elaborate or more deeply interpret the elicited construct. The laddering process, therefore, will typically enable additional in-depth understanding and considering of what the respondent means by the elicited construct (Siau et al., 2010).

3.5.2.1.5 Linking elements to constructs

Three key methods of linking elements to constructs: dichotomising, ranking and rating (Tan and Hunter, 2002). In essence, dichotomising requires each respondent to place a tick against the element which it is closer to the left pole of the construct, while if it is closest to the right pole, a cross is placed on the right pole (Siau et al., 2010). This method allows respondents to join elements in each side (bipolar constructs include left and right) (Tan and Hunter, 2002). In ranking, the respondent places the elements in order between the two contrasting poles of the constructs (Siau et al., 2010). Ranking enables greater discrimination, avoiding possible skewed distribution from dichotomising (Stewart and Stewart, 1981). The most popular method used during the linking process is rating (Hunter, 1997; Tan and Hunter, 2002; Hunter and Beck, 2000). The participant will be asked to rate elements along constructs by using rating scale (i.e. five scales, seven scales or nine scales) (Siau et al, 2010). The scale number specified is based on the number of elements (Tan and Hunter, 2002). This provides respondents with greater freedom when sorting elements and prevents them from being forced to make non-existent discriminations. This method is considered a common (most of researchers follow it) way to link elements and constructs, and is regarded as having a significant advantage over dichotomising and ranking. In some cases, however, the elements and constructs may not be linked such an example mentioned in Moynihan (1996) study (Siau et al, 2010). In such a case, linking elements to constructs serves no purpose or benefit (Siau et al., 2010). The following section and subsequent subsections provide an explanation to the RepGrid procedures involved in this study.

3.5.2.2 RepGrid Protocol for e-Government services (RPES)

In the subsequent sections, the research study describes its research method in more detail, including the information of the research participants and the RepGrid interview process involved in this study.

3.3.2.2.1 Research participant

By using RepGrid technique in interviews (See appendix F), the researcher is able to identify the requirements/characteristics of G2C e-service design process from the views and or ideas of the interviewees. A number of research studies (Hunter, 1997; Tan and Hunter, 2002) proved that a

small sample size (i.e. 10–25 research participants) is adequate to elicit an inclusive list of constructs (Siau et al, 2010). However, Creswell (1998) proposes using maximum variation as a strategy in a qualitative study, to release diverse perspectives about the matter (Siau et al, 2010). This study followed this guidance and carried out purposive sampling by contacting potential research participants had heterogeneous backgrounds. The purpose of sufficient sampling is to make sure that research participants come from various backgrounds to gain in-depth various perspectives (Siau et al, 2010). In-fact, research study is concerned with the issue of who uses the G2C e-service (service users), because these target people have knowledge regarding their needs and dreams. Interviewing was chosen, as it gives the opportunity to researcher to dig deeper through the subject area, instead of surveys. In total, 23 repertory grid interviews were conducted, lasting between 45 and 90 minutes. However, researcher excluded 4 interviews on the basis of the interviewee's background and his/her familiarity with context domain (G2C e-service development process). The breakdown of interviews can be found in table 3.3. Each interview started with brief overview of researcher questions, in order to ensure they understand the tasks, and then I moved to explain the RepGrid technique in basic way to facilitate interviews process. 19 research participants, all located in Jordan, took part in this study (See table 3.4). This research study conducted the interviews with government staff through two main authorities are responsible about government services (providers). The first one is the Ministry of Information and communication technology (MOICT), the second the National Information Technology Centre (NITC). 3 semi-structured interviews was conducted government employees in each organisation, these employees being responsible for G2C services design and development.

The second group represents the citizen's workers, who work in government entities (those employees as bridge/interface between citizens and government). Therefore, those employees (citizens in the meantime) who have a full knowledge regarding to G2C service design problems and citizens' unmet needs because they face all problems and dealing with it during processing the service to citizens. The last group represents typical citizens (end-users) for the services provided, in this group the respondents cover a spread on age and gender, as well as on, ranging from different managerial and diverse occupations (university students, lecturers, not working people who interest in domain area and administrators). Each category consists of seven, six, six respondents respectively. All interviews were recorded and transcribed. These interviews were followed by repertory grid interviews, as described below (See figure 3.5). In this thesis, the

findings from the repertory grid study, which was applied, to understanding and articulating the real requirements regarding G2C e-service design process are reported.

Stakeholders	Participants category		Number of Participants	
Government Staff (service providers)	*MOICT	**NITC	3	3
Government Staff (Interface staff)	Various governmental agencies		6	
Typical Citizens (Servicer users)	Universities	governmental institutions	3	4
----------	----------		19	

Table 3.3: Sample for Repertory Grid interviews

*Ministry of Information and Communication Technology

**National Information Technology Centre

Research Participants:				
Total				
	1 (n=6)	2 (n=6)	3 (n=7)	19
Age group (years)				
19-24	--	1	2	
25-34	1	2	3	
35-44	4	3	1	
45-55	1	--	1	
Above 55	--	--	--	
Gender				
Male	4	3	4	
Female	2	3	3	
Education level				
High school	--	--	1	
College	--	2	--	
BSc	3	4	2	
MSc	2	--	2	
PhD	1	--	1	
Other	--	--	1	

ICT skills & competency			
Very low	--	--	2
Low	--	1	2
Average	1	4	2
High	5	1	1
Very high	--	--	--
I don't know ICT	--	--	--

Table 3.4: Demographic characteristics of research participants
Note: Group 1: service provider; group 2: service interface; group 3: service user

3.5.2.2.2 The RepGrid Interview process

Figure 3.4 shows an outline of the interview with each research participant. The interview is based on the RepGrid technique, this research follows the Siau et al. (2010) approach with quiet adaptation to be situated with this research project. This approach involved five steps introduction, element selection, construct elicitation, rating of elicited constructs, and review were adapted from Siau et al., (2010).

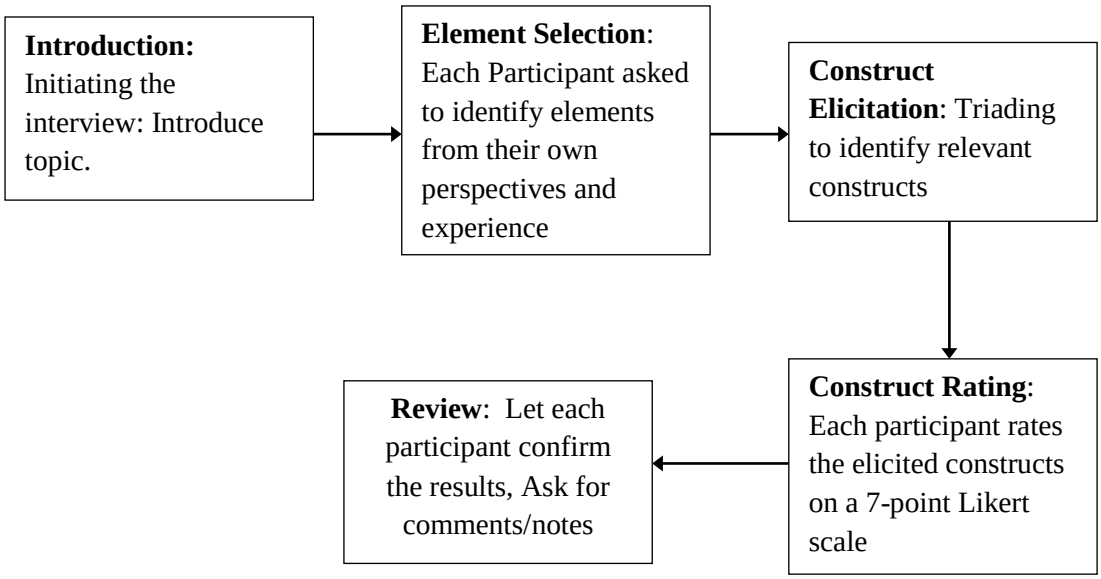

Figure 3.4: The RepGrid interview process (Adapted from Siau et al., 2010).

1-Introduction

At the beginning of the interview, the interviewer introduced the main aim, and related the objectives of the study to the research participant. Research participants confirmed that they were able to elaborate and articulate opinions on the important requirements/characteristics regarding G2C e-service development process. The researcher asked participants to read the information sheet to gain full knowledge of this research; he then asked them to fill the consent form, which

grants the respondent the authority to feel free to withdraw from the study or not participate at all. The introduction allowed respondents to concentrate their thinking around the research topic, and the opportunity to ask questions and discuss this study. Moreover, this form gives an opportunity to the respondent to agree to the interview being recorded. Then, the interviewer introduced and explained the RepGrid process in summary. Respondents detailed their knowledge regarding the research topic and the RepGrid method, the interview proceeded to the element selection step (Siau et al., 2010).

2-Element Selection

In this section, each research participant was asked to identify his/her elements. This study followed two approaches during element selection regarding the specific question based on the group's structure. Government staff were asked (service providers) different to the other two groups (typical citizens (service users) and government interface (front-line staff)). The identified requirements of G2C e-service design process were from each participant in each group (one-one interview). Each respondents is able to form their perspectives and experiences regarding requirements of G2C e-service design process. To minimise influence on participants, this study suggested that they express their opinion using a free dialogue during the interview process.

As recommended by Hunter and Beck (2000), seven elements would provide adequate variability in the subsequent construct elicitation step (Siau et al, 2010). Seven elements or more might increase the variability in the elements (Siau et al., 2010). In this study, regarding the government staff group (service providers), 3 participants came up with nine elements each; one participant identified twelve elements; and the last two participants had four and eight elements. Regarding the citizens workers group (who work in government agencies) 3 participants came up with seven elements each. One participant had five elements; the last two participants came up with eleven elements, while the other one had eight elements. The last group, which includes typical citizens (service user) 3 participants came up with eight elements each. Two participants had seven elements each; one participant had six elements, and the last participant came up with four elements.

Table 6.3 is an example of a RepGrid developed from the interview. In this case from government staff group. This research study did not add any virtual elements as 7 elements was reached. Each element is represented, relying on participant perspectives regarding their experience and thoughts.

3-Construct Elicitation

Construct elicitation was conducted using the triadic sort method. Three elements (the steps of G2C e-service design process) …"as a triad were randomly selected at a time. For each triad, the research participant was asked to identify"… [the requirements of G2C e-service design process to make these services more effective and satisfied, how two of them were similar, yet different from the third] (Siau et al., 2010, p.570). Research participants provided their own perspective. Respondents were encouraged to verbalise their reasoning process. In-addition, their narrative comments were audio-recorded and documented, for later review purposes.

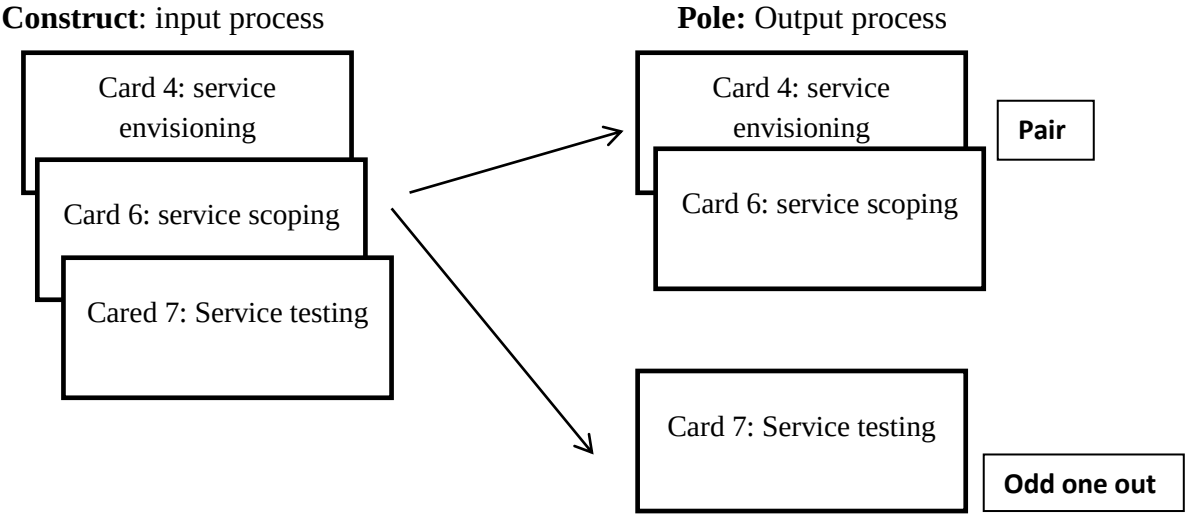

Figure 3.5: Triad of Task Elements (Adapted from Davis et al., 2005)

Scale 1= construct 2 3 4 5 6 7= contrast							Participant No:
Construct	**Elements**						**Contrast**
	E1	E2	E3	E4	E5	E6	
1-bussiness phase	5	4	1	1	6	3	Launch phase
2-design level	3	4	5	3	2	1	Development level
3-mock-up prototype	2	6	6	4	1	1	Testing phase
4-input process	2	6	5	3	1	4	Output process
5-scoping	4	2	2	5	7	6	analysis
6-service requirements	3	7	7	1	3	3	No-requirements

Table 3.5: An example RepGrid based on the interview with a research participant

In the RepGrid example, (See figure 3.5) the G2C e-service development process (elements) on each column represents research participant perspectives, on which an element was elicited by research participant. The corresponding construct on the same row is expressed by a bipolar phrase. For instance (See figure 3.5), when the research participant was chosen, three elements randomly such (service designing, service implementation, and service workflow process), the research participant identified design level---development level …"as the construct to distinguish them into two groups. The construct elicitation step was then repeated, until the research participant could not elicit any additional constructs" (Siau et al, 2010, p.571); literature argues that by repeating the prior elicited constructs to make sure in-depth understanding of what respondent indicates by the elicited construct (Siau et al, 2010). Then, the interview proceeded to the constructs rating step.

4-Construct rating

In this step, all elicited constructs was reviewed and listed on a piece of paper. Thereafter respondents discussed the elicited constructs with the researcher to contend the elicited constructs (Siau et al., 2010). Then, each respondent was asked to provide a score for each elicited construct in terms of measure importance using a 7-point Likert scale (1 represents the most important, and 7 represents the least important). Siau et al. (2010, p.571) argue, as researchers prefer …"interested in the constructs and the labels participants attached to these constructs, rather than the research participants' evaluation on specific elements" (G2C e-service development process), the research participants were requested to rate each element based on/against each elicited construct. In the same RepGrid example (See table 3.5), the scores in the column 'Rate' are the relative importance of the constructs perceived by the research participant. The research participant, for example, rated 'the elicited elements regarding service requirements---No-requirements construct as the most important construct compared with other elicited constructs.

5-Review

At the end of each interview, each respondent was asked to review the constructs that were elicited from the interview. The purpose of this step is to confirm and clarify, making sure that the derived constructs are accurate, complete, and not misunderstood by the interviewer (Siau et al., 2010). The clarification process enables a number of further unifying concepts to be

articulated, and recording of the the rating, providing the basis for a user-driven model of the work context and deepening the analysts' understanding of what the users require of the service - and why it is important (Davis et al., 2006). The total amount of time for each interview ranged from 45 to 90 minutes.

3.5.2.3 G2C-SCOF: Co-design process-Part 2

The Co-design framework will be built based on the derived SRM-G2C-cognitive model (See chapter 5) and combined three groups perspectives (Typical Citizens, service provider and service interface). Furthermore, SPRF as a Guidelines Co-design process for G2C e-service (See chapter 5) that suited with each phase regarding Double Diamond model for service design process and these tools were mapping/tailoring with characteristics/features of G2C service design process. The proposed framework provides an overview of the perspectives of G2C service design activities including (Co-design tools and the adaptation of the Double Diamond design process model) and techniques for engaging non-designers (i.e. Citizens as service users) in specific participatory design activities. It has two dimensions: input artefacts (G2C e-service design requirements) and output artefacts (G2C e-service design process). G2C e-service design process describes the kind of transition that is taking place through service development process, and is described as initiating and scoping, action plan, service development, design team collaboration, evaluation and updating and launch the integration service.

Input artefacts, that describe the design tools are being used to facilitate involve the throughout design process. It is possible to use each of the Co-design tools with any purposes. Output artefacts (design process) describe how the tools/techniques are used. Output artefacts are described along four dimensions: 1) Co-discover, 2) Co-define, 3) Co-develop and 4) Deliver).

This iteration with the two parts provides a view of a particular e-Government service design domain, which is not just only valuable in understanding the internal structure and or service design process, but also in recognising how they are matching to their external environment (varied and diverse stakeholders) and cooperate with it. This iteration demonstrates that designing a new process (SPRF as a Guidelines Co-design process/innovative process) for designing a new service based on the collaboration between stakeholders in order to foster the innovation process of service design, as well as building a platform in order to facilitate the stakeholders' involvement throughout design process and trends to e-services value elements. To service provider's group, in light of rapidly changing service user's demands and requirements,

hence it is vital to have a strong validation framework of collaborative that is capable of providing an investigation of stakeholders' (service user and service interface) collaborative activities in order to design the appropriate e-service to be fit with their future needs. Furthermore, in this iteration, outlining the collaboration issue's regarding service provider has with various stakeholders is essential, because the structure of industries for service/product is shifting towards more modern (e.g. from user-centred design to Co-design) characterised by extensive collaborations with many stakeholders.

To validate the developed G2C-SCOF (iteration 2); researcher has applied it to case study (Jordan) to evaluate it through building design artefact (iteration 3-See chapter 6) as a response for iteration 2.

3.5.3 Iteration 3: WCP Development and Evaluation

Iteration 3 aims to validate the developed Co-design framework-G2C-SCOF (iteration 2). This iteration, the solution is figured out to bridge the communication gap between theoretical context (domain area) which represents decision-making policies and actually service design practice, which represents the stakeholders who use the service. Therefore, the proposed design artefact (wiki-based Co-design prototype-(WCP)) which is a platform of communication tool to facilitate and or mediate sharing and expressing the ideas and assumptions, which are used to improve the efficiency of G2C e-service design, process with respect other design artefacts have been done by others. The WCP is tested to validate in an experimental evaluation over varied and diverse research participants including the predetermined groups. This iteration uses the erudition/knowledge formed by evaluation which was conducted in iteration 1 and the gained theorise and justify activities were derived from Iteration 2 to suggest the possible improvements to the service design process model by applying the developed SPRF as a Co-design process.

Moreover, the proposed WCP has built as response and evaluation of G2C-SCOF, which represents SPRF as a Co-design process model with suitable design tools (see chapter 5). Basically, the proposed prototype-WCP works as a collaborative communication platform to support the participation between stakeholders through maximize and support the opportunity for those people to involve throughout design process in order to design their own services need (more detail in chapter 6). Executing the research in a DSR as an incremental iterative manner enables learning to emerge from Iterations 1, 2 and 3 by applying methods from the knowledge base to e-Government service design. Research iterations are described in more detail in the following chapters.

3.5.3.1 Study Method

This research study has conducted fieldwork testing in Jordan as case study using the focus group discussion interview (FGD) for many reasons (mentioned below) regarding the research context in which demonstrates the proposed prototype-WCP to team groups through presenting the major features of the prototype to collect feedback about the overall design concept and various adopted Co-design tools and methods. The fieldwork is important because only service provider professionals can provide an accurate feedback regarding whether the developed high-level design is appropriate to real-world practice. FGD considers a "form group interview that capitalises on communication between research participants in order to generate ideas" (Kitzinger, 1995, p.299). FGD explicitly use group interaction as a part of the method and this is important in this experiential evaluation which has three different groups (explained in sampling and group composition) in different levels in participation which encourage participants' to talk to one another (Morgan, 1997; Krueger, 2009). Furthermore, this method is particularly useful for exploring participants' knowledge and experience through examining not just what they think, but also how and why they think in that way (Kitzinger, 1995). Focus groups are a useful data collection technique when aiming for a qualitative description (Sandelowski, 2000).

3.5.3.2 Sampling and Group composition

The ideal focus group study includes a reasonable sample (Nassar-McMillan and Borders, 2002) and comprises at least two or three groups, each with 4-6 participants (Krueger and Casey, 2000). From mid-April until mid-May 2014 the fieldwork was conducted with varied and diverse background and experience in particular, the group compositions including eight focus groups: two groups of service providers (n = 8); three groups of service interfaces (n=12) and three groups service users (n=12). The total sum of participants is 32. Service provider groups comprise two-sub groups: ministry of information and communication technology (MOICT) and national information technology centre (NITC); who are responsible for e-Government service development as an internal provider in Jordanian's government; service interface groups comprise three-sub groups: civil service bureau (CSB), civil status and passport (CSP) and income and tax (INT); who they work as an intermediary (interface) between service provider and service user and usually are working in government entities' and agencies'. The last group is service user groups, which comprises three sub-groups as well: a set of teachers (T) who are working in schools and using many government services in their jobs' and or various fields of life; universities students' and lecturers' (USL) and several employees who they are working in

different governmental institutional such a service centres. For instance, various and diverse centres (VDC).

3.5.3.3 Data Analysis

FGDs were recorded in Arabic language, as the mother tongue used in Jordan to grant more flexibility for participants to express their experience and or perspectives'; even some of them can speak English. These interviews' transcripts were translated into English and transcribed manually then imported into excel sheets (Microsoft excel software) for data management. Transcripts from each participant (See appendix M) were combined and treated as one single data set, and analysed subject to inductive thematic analysis as commonly used method (Petty et al., 2012; Braun and Clarke, 2006). An inductive thematic analysis was selected as an accessible and flexible method. This was not tied to any specific theory, and at the same time, had the ability to capture the dynamic and evolving nature of events. The data should be amply described and deeply interpreted (Braun and Clarke, 2006). Transcripts were coded, categorised, and analysed using inductive thematic analysis to identify emerging themes and patterns (See table 3.7 as an example), which were then further analysed according to their relationship to the existing evidence base. In this way, the salient and interesting features of the data were systematically labelled. The codes were sorted into potential themes, which were not identified solely on their pervasiveness, but whether they were pursuing an insight into participants' experiences and perspectives regarding WCP effectiveness (Braun and Clarke, 2006). The themes were reviewed, to ensure that they accurately reflected the data. Finally, data excerpts corresponding with suitable themes were taken from each transcript, facilitating researcher to write a report corresponding quotes that precisely reflected the sample. Quotes were selected to illustrate the range of findings and enrich the qualitative data. Further, pseudonyms were used as appropriate to de-identify individual participants.

3.5.3.3.1 Analysis Procedure

Braun and Clarke (2006) advocated a particular analytic procedure which consists of six main phases, to analyse the transcribed interviews, where for the inductive thematic analysis the 'bottom-up' approach is suggested regarding two reasons: the data have been collected specifically related for research context (e.g., via FGD) and the identified themes also not driven by researcher's theoretical interest. In this exploratory study, the Braun and Clarke's analytic procedure was considered as a means of analysing the interviews, and the six main phases were as follows:

1. Familiarising oneself with the data: as mentioned earlier, all interviews were transcribed manually. Therefore, some pre-knowledge of the data was achieved, and some initial analytical interest and thoughts were constructed. However, the data had to be read several times to get an overall picture of it to allow their general meaning to emerge (Braun and Clarke, 2006; Creswell, 2009).
2. Generating initial codes: during this phase, the data set was read again, to identify a suitable and meaningful description for short segments of data (Braun and Clarke, 2006). By underlined the significant transcripts then the end of this phase, it was found that all the data collected fitted into one common of the 25, 22, and 21 codes regarding the three groups (service provider, service interface and service user) respectively; and the initial codes that have been generated among these three groups.
3. Searching for themes: during this phase, the relevant initial codes were sorted into potential themes (Braun and Clarke, 2006). The researchers' experiences were built based on two earlier steps was used to organise and combine the common initial codes to collate the generated codes for identifying the potential themes/sub-themes form some over-arching data-set. Given its exploratory nature, this study utilised an inductive 'bottom-up' approach by conducting inductive thematic analysis approach based on two reasons were explained earlier.
4. Reviewing themes: at this stage, all the previous themes were reviewed and refined, and the data within each theme was checked to ensure internal consistency (Braun and Clarke, 2006). In addition, the data set was re-read to identify any new themes and or collapse some themes into each other. Furthermore, some theme(s) emerge to anther themes as sub-theme. Moreover, code any additional data within a theme that have been missed in any of the aforementioned phases. This was to ensure that the common 5 themes and 8 sub-themes identified regarding service provider groups, same number regarding service interface groups as well and 3 themes and 10 sub-themes regarding service user groups can make sense with respect to the entire data set.
5. Defining and naming themes: at this stage, all the identified themes needed to be clarified. In addition, those aspects of the data that were to be captured by each theme were determined.
6. Producing the report: this phase begins when I was fully satisfied with set of the identified themes; and involves the final analysis and write-up of the report. The main purpose was to tell a complicated story about extracted data set in a way, which convinces the reader of the validity of analysis.

Data Extract	Codes/Coded for	Potential Theme	Final theme-Subtheme
"WCP's features were allowed me to express myself without spending an effort and so interested to take our ideas/views into consideration." [T1]. "Just I want to add as this system (WCP) which may help participants to extract his/her creativity in spontaneous way" [USL1]. "The input box tool function allowed me to generate my Ideas and feelings; I was not obliged with system's choices" [VDC2]. "I carried out my ideas spontaneously by brainstorming for my views" [VDC3].	1-Offering a valuable functions for generating and exchanging ideas. 2-Helpful and useful system for expressing ideas. 3- Desiring system for through offering channel to uncover own creativity.	1-WCP usefulness and facilitation for involving throughout design process. 2-preparedness/willingness for expressing or getting new knowledge	Open Ideation-Motivating, Expressing creativity, and Enthusiasm

Table 3.6: Inductive thematic analysis process regarding service user groups

3.6 Rational for Using Design Science Research Methodology

There are a number of other excellent DSR process models (i.e. Peffers et al., 2008, Purao, 2002, Gregg et al., 2001). These process models are relative to DSR process model uses in this research study (See figure 3.2). However, these DSR process models, in comparison to the process model showing in figure 3.2 as research method, breaks the awareness of problem into two phase, identify the problem and define objectives of a solution; merge the suggestion and development phases into single phase namely design and development. Furthermore, these models break the evaluation phase into two phases, demonstration and evaluation; and finally change the name of final phase from conclusion to communication (Vaishnavi and Kuechler, 2004). Vaishnavi & Kuechler (2004) propose a general DSR (See figure 3.2) that incorporates five phases of design and motivates an iterative design cycle in which learning is a key attribute.

Hevner et al. (2004) regard Design Research as an innovative means of solving a problem, while Edelson (2002) and Winter (2008) distinguish Design Research by the generality of the proposed solution in that it can be applied to a wider class of situations; thereby leading to design science. Design Research, as presented by March & Smith (1995), signified the beginning of a new research era. This new era enabled research to achieve both relevance and effectiveness by combining research output (product) and research processing (activities) from behavioural and design science in a two-dimensional framework, as presented in figure 3.1. The four research activities drawn from design science and natural science are: Build, Evaluate, Justify and Theorise. These four processes are applied in IS research to produce the following types of artefacts; constructs, models, methods and instantiations. These artefacts are employed to ensure the utility and efficiency of the produced IS. Design Research achieves an optimal solution to the design problem through iterative knowledge refinement.

3.7 Rigour of the study-Data Analysis

Rigour in the study was required to generate credible and trustworthy results (Strauss and Corbin 1998; Yin, 1994). The complexity of conducting this interview method (RepGrid) and different ways to approach to this method, it will be required to get to a certain level of confidence and common understanding in defining and conducting this method in our research area. The qualitative and quantitative methods should be used together, rather than in split between them in RepGrid (Goffin et al., 2011). Goffin et al. (2011) argue of the qualitative transcripts and quantitative grids provide rich information and sources in order to demonstrate the validity of the RepGrid findings. Furthermore, this study will use qualitative and quantitative methods, to increase the internal validity of this research.

3.7.1 Qualitative and Qualitative Analysis

This research study followed five steps to provide a more rigorous data analysis process in this study, and these steps will be explained in detail. The five steps of this analysis are: coding the elicited constructs, collation of common constructs, identification of full construct listing, aggregation of the common constructs labels, and identification of key categories (Lemke et al., 2003; Goffin et al., 2006). According to Goffin et al. (2006, p15) “The grids and interviews transcribed provided a rich pool of qualitative and quantitative data”. The ethical approval (See appendix A, B and C) for the study was obtained from Brunel University The school's Research Ethics Committee.

1 Coding the elicit constructs: This step is usually used when not all elements are the same in all interviews. Thus, it will be worth splitting down the data (analysis) from RepGrid into categories. According to Goffin et al. (2011) supposed that in order to more understand what a respondents mean by each particular construct (i.e. concepts); it is important to attempt to realise the content of constructs. Therefore, researcher elicited all constructs in interviews through an open coding process (Strauss and Corbin, 1998), in particular researcher used the approach which proposed by Allan (2003) for example (See table 3.7) by considering with established data gathering and analysis techniques. Thus, this research study ensured the reliability and validity of the research through this approach, rather than following a micro-coding technique. This is because microanalysis has two disadvantages. First, it is time consuming (analysing data word by word and line by line). Second, it leads to confusion at times. The key points regarded as important to the exploration were recognised in the interview transcriptions (See table 3.7). Then, these were highlighted in draft paper when researcher was listening to the recorded interviews after he translated the interviews from Arabic to English, and gave an identifier attributed sequentially, starting from…"first interview and continuing on through subsequent interviews to give" P-TC1 and so on where P indicates the 'Key Point' (Allan, 2003, p.2). To differentiate the key points made in subsequent groups, identifiers (TC) were used to distinguish. For example, Key point 'P-TC1' was made by the first typical citizen. The text of the key points is shown in middle column of table 3.7. The key point identifiers are shown in the left-hand column of table 3.7, and the code in the right-hand column.

2 Collation of the common constructs: In this step the verbal explanation provided by each respondents were analysed in earlier step of constructs (i.e. concepts). Therefore, relying on reviewing the transcripts; researcher started looking for of common constructs (i.e. concepts) based on frequency mention by respondents. The construct label was identified, by using where possible the most common concepts from research participants (Goffin et al., 2006).

3 Identification of full construct listing: when the construct labels are identified; then the aggregating was began by identical construct labels together, and the frequency of mention of each consturct's labels was specified across the all respondents.

4 Aggregation of the common construct labels: In this step the construct was aggregates labels to group them together into suitable or fit categories. This was done relying on literature review regarding literature service design process and researcher own experience and other derived from respondent's perspectives.

5 Identification of key categories: This step was determined based on the combination of two indicators: frequency and variability (Goffin et al., 2006). Frequency is one indication of importance (Goffin et al., 2006). A high frequency of mention can indicate that a category is obvious, and straightforwardly mentioned. However, this is not sufficient to determine which categories are very important. Therefore, this research used anther criterion called variability. A category/construct derived from, or with a wide spread of ratings differentiates strongly between the elements and this spread is a construct labels variability. The variability of each single construct in each grid was calculated, using an idiogrid 2.4 software tool to analyse an individual grid. Variability is a mathematical measure of the spread of ratings for a construct (Goffin et al., 2006). It is calculated as the percentage of total sum of squares of elements' ratings for each single construct in a grid.

Categorisation of elements and constructs (Qualitative analysis) in order to analysis the grids and interview transcripts will provide a rich pool of qualitative and quantitative data using open coding the manner of Grounded Theory. While, the quantitative analysis used in order to **Identification of key constructs** using two criteria: Variability and Frequency**.** More details on these two (quantitative and qualitative analyses) will be provided in Chapter 5.

ID	Key Point	Code
P-TC1	Distribute questionnaires to get early knowledge about citizen's needs.	*Citizen's needs*
	Studying and analysing about government possibility to implement the requested services.	*Studying and analysing the service feasibility.*
	Implement the concerned services.	*Design and development*
	Service assessment from citizen's side to get feedback.	*Evaluation*
	Modify the service (if needed) based on feedback	*Re-design/develop services*
	Launch the service online.	*Service ready for using*
	Test the services from government side to check service quality and security.	*Testing.*
P-TC2	Opinion poll to explore user needs.	*User needs*
	Aware citizens for using e-government services through advertisements and training courses.	*Citizens' willingness*
	Activate the services.	*Launch beta- service online*
	Test these services through beta-version of service by citizens.	*Testing of service*
	Assessment these service based on (testing-beta version) to get feedback.	*Evaluation of service*
	Modify (update) the service relying on feedback.	*Re-design/develop services*
	Continuance development of service design	*Keep updating services*
P-TC3	Distribute questionnaires through random sample to get general users' needs.	*user needs*

	Distribute questionnaires for government entities/agencies staff to ask them how would like they to involve in design process for e-services.	*Co-design (sharing and generating ideas and experience).*
	Start the designing phase.	*Design phase*
	Implementation phase	*Development phase*
	Test a beta-version of service by back to targeted citizens.	*Testing of service*
	Assessment of these services.	*Evaluation phase*
	Modify these services (if needed).	*Re-design/develop services*
	Launch these services online.	*Launch service online*
P-TC4	Create more than one mock-up prototype regarding requested services.	*Present many templates of service design*
	Make voting for most template version appropriate with citizen's experience.	*Voting to choose the best service design*
	Activate a beta-version of service for citizens.	*Launch beta- service online*
	Assess the developed services to get feedback.	*Evaluation phase*
	Modify these services (if needed) based on provided feedback.	*Re-design/develop services*
	Launch the service online.	*Final version of service for delivering*

Table 3.7: Qualitative analysis (key point coding) derived from the interviews data gathered from typical citizens group.

3.8 Summary

At the outset of the study, that aims to understand the domain problem regarding service design process of G2C e-service as perceived from diverse groups using RepGrid method, which is an in-depth interviewing technique, has been used. The rich pool of data helped to understand the problem(s) of the current service design. Research method in this chapter enables varied user to benefit from both qualitative and quantitative data analysis.

The methodology (Vaishnavi and Kuechler, 2004) is executed in five Design Research steps: 1) Problem awareness (service provider designed G2C e-service regarding business and political issues with neglecting service user's needs), 2) Suggestion solutions of suitable techniques (RepGrid used as an established psychological technique), 3) Development of the main Design Research artefact (communication tool in order to collaborative diverse stakeholders through design process), 4) Evaluation of the artefact according to synthesise Design Research evaluation methods, and 5) Conclusions (iterations' outputs), in order to accomplish or achieve the research aim and objectives. The research study is executed in three incremental Design Research iterations.

Each of the iterations is used to build and evaluate a set of artefacts aimed at improving the process of G2C e-service design. The first iteration is conducted a literature review method to understand well the existing or earlier knowledge base (human-centric design then move up to Co-design methods/tools) and find the gap between service design itself and reality (unmet service user needs). Furthermore, conducting a survey study (i.e. questionnaire) to evaluate the existing e-Government portal in Jordan. The second iteration builds the G2C-SCOF, which derives regarding a cognitive mapping among requirements next to appropriate design tools in order to better articulate the service provider's perceptions regarding the development of service design process. Finally, the third iteration develops the instantiation/artefact by adopting the suited Co-design tools/methods to translate this framework into artefact (communication tool that facilitates the integration and collaboration between stakeholders in the design process for G2C e-service). To summarise the chapter presents a mapping between the DSR reasoning research activities and artefacts and the current research processes and outputs.

Chapter 4: Evaluating the Adoption and Acceptance of JGP

4.1 Introduction

Citizens of developing countries perceive low levels of quality and efficiency in their e-Government services, typified by limited user involvement throughout development lifecycle of each e-Government services. This iteration provides a comprehensive evaluation of Jordan's e-Government Portal (JGP) and its effort to implement e-service provision based on 'user-based evaluation'. This iteration aims to explore the key factors influencing citizens' adoption and acceptance of JGP. Researcher has developed a conceptual model known as Methodology for e-Government Adoption and Acceptance Measurement (MEGA-M) based on existing literature focusing on e-Government Service Evaluation Criteria (ESEC)- variables and related attributes. This iteration reports an experimental evaluation in the form of a survey (i.e. questionnaire). The survey has been conducted to achieve two objectives: 1) Empirically, to test, and evaluate the ESEC including variables and related attributes identified from the literature as validated instruments that are used to evaluate JGP with its services based on efficiency of the delivery of these services, 2) Perceptually, to investigate how citizens perceive the quality of the existing release of the e-Government services in Jordan and to identify requirements and possible improvement suggestions from users' feedback. The findings and results obtained from the conducted evaluation of the JGP, in particular e-Government services provided. Hence, the findings of the empirical evaluation, together with the findings derived from existing knowledge base (literature review), are the motivation for carrying out the extend version of the preliminary conceptual model MEGA-M.

This chapter is structured as follows: Section 2 describes the current state of e-Government services in Jordan. This is followed by conceptual model known as MEGA-M (Section 3). An evaluation of e-Government Portal of Jordan is presented in section 4. The findings and results are described in Section5. Evaluation, summary and Implications are explained in section 6. Finally, the summary from the evaluation procedure is drawn in section 7.

4.2 e-Government services in Jordan

4.2.1 A Jordanian National Context

Jordan has become one of the countries in the Middle East as leader in developing, adopting and utilizing information and communication technology (ICT). Recently, Jordan has decreased over regional economies. Since Jordan is a relatively resource poor economy and economic

movement has historically been dependent on international donors it is important for Jordan to develop independent economic competitiveness. According to world economic forum report (2013) shows that Jordan occupies the ***64th rank*** out of 144. Jordan has been affected by the global financial and economic crisis in recent years. GDP growth slowed down to 2.3% in 2010 and has not returned to pre-crisis levels since GDP growth was 8.2% in 2007 (world economic forum report, 2013). Therefore, these growth rates are not adequate to create an essential employment to absorb the country's approximately 60,000 new entrants into the labour market every year. Thus, Jordan can only be an independent through fostering the talent, creativity and education/skill of its people. Moreover, it is significant that ICT infrastructure should be recurrently improved at the levels found in competing economies. Infrastructure delivers a platform for new product and or service development and innovation.

As part of upgrading and improving government organisations and processes, Jordan introduced new regulations, rules and legislations that liberate some services from government control, in order to regulate the privatisation and to encourage foreign investments (Al-soud, 2012). These new rules and legislation have been set as foundation blocks to the derivation of Jordanian e-Government vision and strategy through the adoption of new information and communication technologies (ICT) (e.g. life-event approach, See chapter 2). This practice of the leading Jordan's government for implementing e-Government services, in conjunction with the commitments and support expressed by King Abdullah II and the Jordanian government via the newly created Ministry of ICT (MoICT, 2006). Jordan has adopted a new philosophy and practice on how to introduce ICT to facilitate rapid social and economic progress (Ciborra and Navarra, 2005).

In order to, explore this further, a short interview has been conducted with Mrs. Manal Jarrar – the acting head of strategic planning and e-services in summer of 2011, in which she mentioned that "The Jordanian e-Government services have offered a detailed description for more than two hundred services that the citizen can benefit from as informative services instead of transactional services". "These services are categorised according to subject areas such as educational services, financial services, health services, civil status services, etc. In fact, this is not what the official e-Government services of Jordan are about. However, it is one of the first steps towards a fully functional e-Government portal that provides the right service to the citizens based on their needs". Hence, this suggests that the current e-Government services do not consider the citizen needs for designing and providing the e-Government services and therefore, Jordan needs a new design approach for the G2C e-service design process. Therefore, this research study motivates to identify the factors, which affected the adoption and acceptance of e-services through

conducting a survey to evaluate the current release of e-Government services based on user's perspectives and experience. Moreover, Ciborra (2003) states that the importance of e-Government initiative and program in Jordan is due to three main reasons. Firstly, Jordan's government public sector is still a major employer, thus representing a very important economic organisation. Secondly, one can find in this domain many of the actors also present in the other projects: donors, public and private partnerships, foreign government agencies/entities wanting to provide help, and so on. Thirdly, there is an opportunity or possibility to study the arrangement of a new infrastructure inside a large administration not only within the context of improving its efficiency, but also supporting the growth of the nation.

The ability of changing the e-Government initiative and program in Jordan and other developing countries should be raised, which encouraged to face the public sector, by promoting economic development, cost savings, better services, efficiency and effectiveness. Though many prior studies state that the efforts of developing countries to achieve their e-Government objectives are uncertain due to the insufficient developments of e-Government (Heeks, 2003; Ciborra and Navarra, 2005; Dada, 2006). e-Government strategy in e-Government program in Jordan stated that the vision of e-Government initiative is dedicated and or committed to delivering services to people across community, irrespective of location, economic status, education or ICT ability; and to stay committed to a citizen-centric e-Government, in order to transform e-Government and contribute to Jordan's economic and social development (MoICT, 2006).

4.2.2 Stakeholders of the e-Government Services

e-Government by definition requires the active participation of many stakeholders, both within and outside government. Together, these stakeholders share ownership of e-Government (e-Government strategy 2013-2017, 2012).

The primary stakeholders in Jordan's e-Government are: 1) e-Government beneficiaries, 2) Business, and 3) Government agencies.

4.3 Methodology for e-Government Adoption and Acceptance Measurement-Conceptual Model (MEGA-M)

The research study has conducted the literature review related to e-Government adoption and acceptance, including design requirements for e-services, which are described in detail (subsequent sections in chapter 2). This research has constructed a conceptual Model which is called MEGA-M (See figure 4.1) by integrating, as well as augmenting the key notions from

Technology Acceptance Model (TAM3) (Venkatesh and Bala, 2008), Information System Success Model (ISSM) (Delone and McLean, 2003) and other relevant literature in the field of Management Information Systems (MIS). These models (TAM3 and ISSM) have been chosen to lead for greater acceptance and effective utilisation of e-Government services in Jordan through understanding how various interventions can influence the known determinants of IT adoption and use which is helping to address the gaps were identified in literature. Thus, the empirical study has been conducted to draw from the proposed model MEGA-M. A great progress has been done by MEGA-M in understanding the determinants of citizens' regarding G2C e-service design including adoption and use. According to Gross (2005), proved that low adoption and utilisation of IT by employees are considering as major obstructions to successful IT implementations in organizations. Moreover, the MEGA-M model used in this study through conducting an empirical study (See section 4.4) to investigate how the citizens perceive the quality of the Jordanian e-Government services (JGS) and to identify requirements and possible improvement suggestions from users' feedback, which has basically been developed with minimal user involvement. The JGS has to be advanced to the third phase of a typical e-Government development lifecycle (i.e. transactional phase) rather than staying in the first phase (i.e. Information phase) (NAO, 2002).

Furthermore, the ideas with key notions explored from validated models (TAM3 and ISSM) and related literature regarding the field of MIS have contributed the construction of a MEGA-M known as Conceptual Model on e-Government Adoption and Acceptance. According to the Ministry of Information and Communication Technology (MoICT) in Jordan, the vision (See chapter 1) was an essential and active participant in the economic and social development. However, unfortunately until now, the vision has not yet been realized regarding some issues and gaps were explained in chapter 2. The e-Government project in Jordan is an example that illustrates the shift of paradigm, from the government-centred to citizen-focused. In this study, researcher aims to explore the factors, which may play a critical role in the adoption and acceptance of e-Government services. Furthermore, assumes that this emerging concern in developing countries can be addressed by increasingly involving citizens in the development of e-Government services. As a representative example, this study examines the Jordanian Government Portal (JGP) with the aim of generalizing the empirical findings to other developing countries and advancing the status.

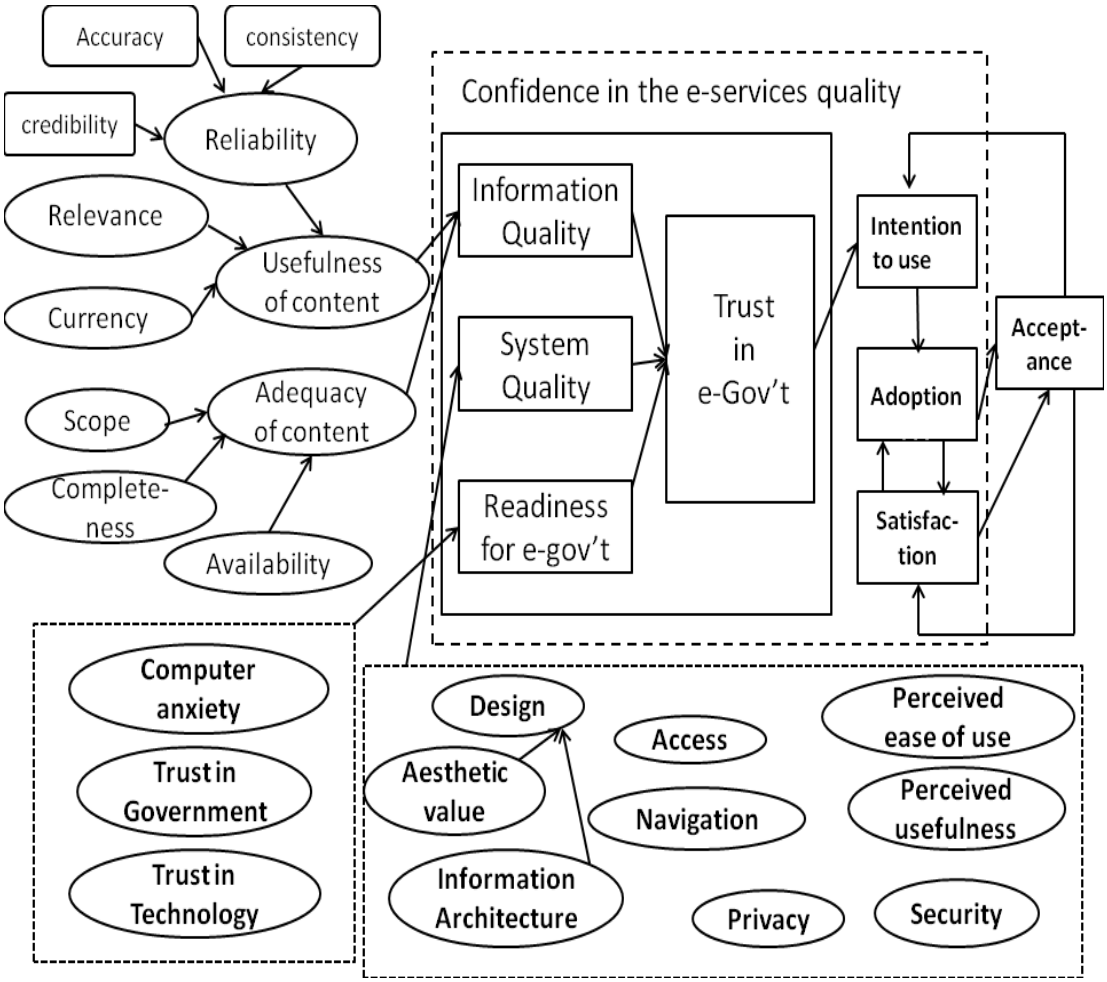

Figure 4.1: Conceptual model on e-Government adoption and acceptance (MEGA-M) (Adapted from Delone and McLean (2003) and Venkatesh and Bala (2008)).

As illustrated in MEGA-M, there are four criterion variables, namely intention to use, adoption, user satisfaction and acceptance, which are interlinked with each other. A set of three major predictor variables: 1) information quality, 2) system quality and 3) readiness for e-Government influence the values of these criteria through the mediating construct trust in e-Government. Furthermore, each of the predictors is in turn affected by a cluster of factors (such as design and reliability) and sub-factors (such as aesthetic value and consistency). The empirical study defines the key variables of MEGA-M, which are mostly adapted from the work of Delone and McLean (2003) and that of Venkatesh and Bala (2008). The empirical study (See section 4.4) represents the one of the source of designing G2C e-service through identifying the initial list of factors requirements that influences on e-Government adoption and acceptance. Consequently, this design of e-Government services is based on real needs and the requirements of citizens' preferences through involvement stakeholders throughout design process for these services which will be explained in detail in chapter 5/iteration 2).

Harraizeh and Choudhury (2009) conducted an empirical study by developing a schematic model named the ecommerce technology acceptance model (ECTA). ECTA represents a comprehensive framework clarifying the linkage between external and internal components of ecommerce technology acceptance model (ECTA), the external factors presented by trust, culture, and sociology of technology that are required to determine the overall attitude of individuals to accept and use e-commerce technology.

4.3.1 Criterion variables

There are four criteria will be illustrated later (See figure 4.2), which are interlinked with each other. Each of them has a set of major variables and attributes. These variables and attributes contain 79 items to evaluate different aspects (See figure 4.3). To maximize the validity and reliability of the items of the questionnaire. Researcher has adapted the items used in the previous studies for evaluating the corresponding variables (adoption, acceptance, satisfaction, intention to use, system quality, Information quality, and readiness for e-government. All the 79 items were evaluated with a 7-point Likert-scale with the leftmost and rightmost anchors being "Strongly Disagree" and "Strongly Agree". However, the items on Information Quality will be rated with a different approach known as semantic differential. Each item was evaluated against a pair of contrasting descriptor such as "interesting versus dull". For each item, a respondent has been asked to indicate the extent to which it was close to one of the two descriptors. Sum up these criteria:

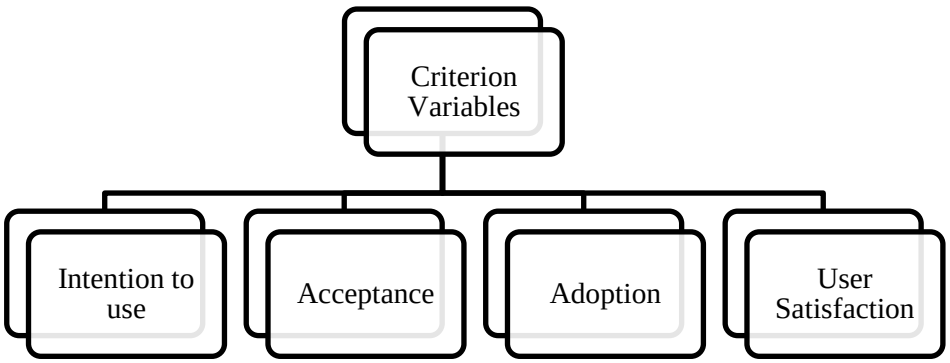

Figure 4.2: The four major criterion variables

Intention to use: This reflects the user's attitude towards an interactive information system (i.e. the JGS in this case) based on his or her perception of its quality. It is interrelated with adoption (i.e. the actual use of the object), and affects user satisfaction. The intention to use also has an

impact on trust in e-Government (Nusir and Law, 2012). Furthermore, perceived ease of use and perceived usefulness were found to have moderate effect on intention to use (Van der Heijden, 2003).

Adoption: User satisfaction must be derived from actual use of an interactive system. Positive user experience will lead to user satisfaction. Similarly, improved user satisfaction will lead to increased intention to use (Ahn et al., 2005). Adoption (i.e. actual use of system or service) hence, the adoption and acceptance of e-Government is important to take into consideration these concepts: the perceived usefulness of e-Government's services, trust (i.e. government agencies), personal experiences with e-Government services, and perceived behavioural control (Horst et al., 2007).

User satisfaction: This is affected by system quality and information quality. A poor quality system is associated with dissatisfaction and negative net benefits. Hence, negative correlations between these qualities and user satisfaction can be predicted (Brooke, 1996). A number of research studies (e.g. Ciuffreda and Rigas, 2008; Brinck et al., 2002) have been conducted for evaluation of user satisfaction; these studies have shown the assessments provided with an evidence of the enhancements in the performance, usefulness, and usability interfaces.

Acceptance: This may occur with the continued use (or adoption) of the information system or services. User satisfaction can also contribute to acceptance and vice versa. Similarly, high acceptance will likely enhance the intention to use. However, in some cases (i.e. non-voluntary use of a system), the continued use does not necessarily lead to acceptance. It may even have some negative impact on satisfaction (i.e. aggravating the negative emotion towards the system). The expectation confirmation theory (ECT) has identified there is a strong relation between satisfaction and acceptance as concepts of usability (Dabholkar et al., 2000). Furthermore, this theory model has been applied in different studies (e.g. Bhattacherjee, 2001) to provide an evidence about this relation through assessing the end-user expectation toward regarding product or service acceptance, where the end-user observe the service/product quality and performance in stage of acceptance of service/product.

4.3.2 Predictor variables and associated attributes

Information Quality: This is one of the quality dimensions in the ISSM. In study, it refers to the quality of the information provided in the JGP. This dimension is dependent on two factors (Urbach et al., 2009; McKinney et al., 2002; Yang et al., 2005), namely usefulness of content

and adequacy of content with each of them consisting of sub-factors. The former consists of reliability, relevance and currency, and the latter consists of completeness, availability and scope. In addition, in e-Government, the construct of trust is very important especially the information delivered by the government agencies' or entities websites (i.e. information quality) (Klischewski and Scholl, 2006).

System Quality: This also originated from the ISSM. It refers to citizens' perception and their expectation of the performance of the e-Government portal with regard to information retrieval and delivery. It is influenced by six factors: 1) Perceived ease of use: the degree to which citizen believes that using an e-Government portal to perform transaction with the government would be free of effort (Chee-Wee et al., 2008). Furthermore, System quality has been linked to the perceived of use (DeLone and McLean, 2004). 2) Perceived usefulness: the degree to which citizen believes that using an e-Government portal would improve the outcome of his/her governmental transaction (Chee-Wee et al., 2008), 3) Accessibility: one of the benefits of using an e-Government portal is that it serves as a gateway to integrate all information and services. It contains two implicit aspects: availability and responsiveness. Citizens expect the portal to be accessible all the time with a high speed (Yang et al., 2005), 4) Navigation: the ease of going back and forth between pages to locate the required information with a certain number of clicks (McKinney and Yoon, 2002), 5) Security and Privacy: they have become important attributes in

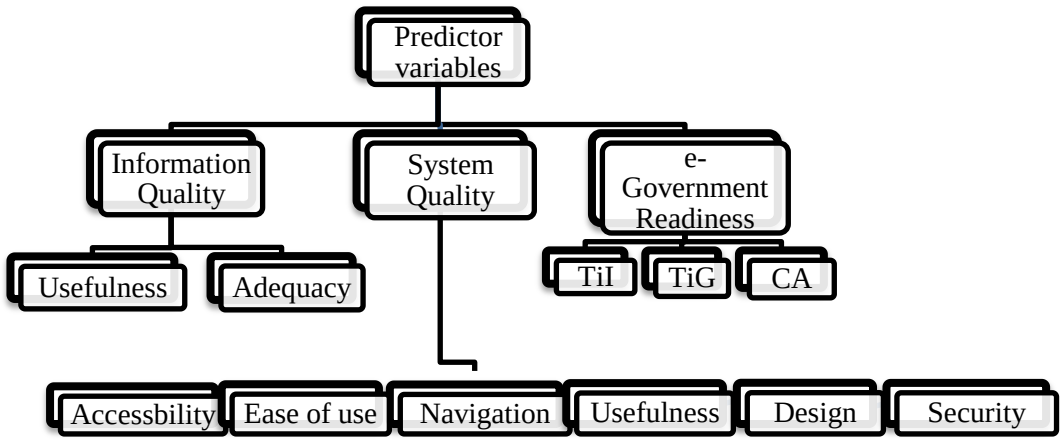

Figure 4.3: Hierarchical for Predictor variables and associated attributes

terms of protecting personal information and of securing any transaction (Yang et al. 2005), 6) Design: a good design plays a crucial role in attracting, sustaining, and retaining interest of its users (Ranganathan and Ganapathy, 2002). This aspect involves two sub-factors: A) Aesthetic

values, how the information is visually presented, with text, image, colour and/or other multimedia, determines the 'aesthetic value' of the website and B) Information Architecture, the content presented in a portal, should be organized by placing the critical information in a conspicuous position, by grouping related information together and by eliminating any irrelevant information (Leavitt and Shneiderman, 2006).

Readiness for e-Government: According to the UN's e-Government survey (2008), readiness is defined, as "preparedness of ICT-strategy that needs to take into account the level of development, access to infrastructure and the skill level in the country". The studies showed that the e-readiness of Jordan ranked 51st among 70 countries and got a score of 4.76 out of 10 (EIU and IBM, 2010). Based on proposed conceptual model, this factor is influenced by three variables: A) Trust in the Government (TiG) , B) Trust in the Internet (TiI): Trust has been identified as playing a very important role in citizens' demand for as well as acceptance of e-Government services (Mofleh and Wanous, 2008). In particular, Pavlou (2003) uncovered an obvious influence of trust on intention to use and usage attitude.

TiG is the level of confidence that citizens have in their government agencies and governmental departments. TiI is the level of confidence that citizens have in the services and applications accessible in the internet (Cheema, 2005; Aydin and Tasci, 2005) and C) Computer Anxiety (CA) according to Leso and Peck (1992), computer anxiety is defined as a fearful or apprehensive feeling when interacting with or anticipating the use of a computer. This research shows that CA affects users' (citizens') perceived ease of use of an information system (Saade and Kira, 2009).

4.4 Empirical Study for Evaluation the JGP

The evaluation of JGP adoption and acceptance has been conducted based on MEGA-M by applying pilot study (i.e. user-based evaluation-survey). More specifically, it focuses on how the characteristics/requirements of e-Government services affect the efficiency of the delivery of these services, and the design of the G2C e-service should take into consideration the anticipated needs of its users (Wang et al., 2005). The aim of e-Government is to encourage citizens to use e-Government services and information because they find their leisure there. (Horan et al., 2006).

The pilot study was conducted in Jordan in 2011; where this research used a questionnaire (See appendix G) to collect quantitative data to identify significant factors influencing citizens'

adoption and acceptance of e-Government services. The evaluation used a number of empirical methods, including questionnaire observations, with end-users (service user). Moreover, with reference to the conceptual model (See figure 4.1) illustrates the adoption and acceptance of JGP. Participants performed many tasks based on the research protocol (See appendix G) during the final evaluation for the release version of JGP, to identify the list of factors and requirements that influences on the perceive quality and efficiency of the e-Government services. Finally, the level of service quality and efficiency was determined statistically.

4.4.1 Research Participants

The research protocol as questionnaire form (See appendix G) was distributed to a sample of 352 Jordanian participants with diverse demographical backgrounds. 305 completed responses and 34 partially completed responses were gathered. 13 responses were deemed invalid and thus discarded. 40% of the respondents were aged 19-24 years old, 50% are males, 61% had a university bachelor degree or above, 75% and 61%had internet access at work and at home, 52% had high ICT skills, and 44% used computer one to three hours per day for different purposes. More detail see table 4.1.

Demographic Variables	Group	305 valid responses
Age group (years)	19-24	122
	25-34	66
	35-44	52
	45-54	41
	55 +	24
Gender	Female	152
	Male	153
Education level	High school	44
	College	75
	BSc	96
	MSc	49
	PhD	25
	Other	16
Often on average do you use computer for your work or study per day	Less than one hour	50
	1-3 hours	134
	4-6 hours	78
	More than 6 hours	43

ICT skills & competency	Very low	33
	Low	31
	Average	24
	High	128
	Very high	67
	I don't know ICT	22

Table 4.1: Demographic characteristics of research participants

4.4.2 Research Instrument

The questionnaire consisted of three parts. The first part comprised 7 items to collect demographic data. The second part described 3 tasks that required the respondent to undertake with JGP. The third part contained 79 items to evaluate different predictor variables, criterion variables and related attributes as illustrated in figure 4.1 and explained in Section 4.3 and subsequent sections. To maximize the validity and reliability of the items of the questionnaire, items were adapted from the previous studies (see table 4.2) to evaluate the corresponding variables (adoption, acceptance, satisfaction, intention to use, system quality, and readiness for e-Government; see Section 4.3 and subsequent sections for the definitions).

Construct	Description	Reference
Information Quality (IV)	User perception of the quality of information presented on website	(Urbach et al., 2009; McKinney et al; 2002; Yang et al., 2005; Delone and McLean, 2003).
System Quality (IV)	User perception and their expectation of website performance information retrieval and delivery	(Urbach et al., 2009; McKinney and Yoon, 2002; Ahn et al., 2005; Koyani et al., 2004; Chee-Wee et al., 2008; Paul, 2007; Ranganathan and Ganapathy, 2002; Leavitt and Shneiderman, 2006)
Readiness for e-government (IV)	"State of preparedness of persons, systems, or organizations to meet a situation and carry out a planned sequence of actions" (businessdictionary.com).	(Saade and Kira, 2009), (Aydın and Tasci, 2005), (Cheema, 2005), (Saade and Kira, 2009), (Mofleh and Wanous, 2008).
Portal use (DV)	Use precedes user satisfaction in process sense.	(Delone and McLean, 2003; Ahn et al., 2004)
User satisfaction (DV)	Indirect affected by acceptance and the quality	(Brooke, 1996; Delone and McLean, 2003; Venkatesh

	of the system and information.	and Bala, 2008; Ahn et al., 2004)
Intention to use (DV)	The person who has not yet used system/service, but plan to do so in the future	(Delone and McLean, 2003; Venkatesh and Bala, 2008; Ahn et al., 2005)
Services acceptance (DV)	Resulting satisfaction from use and overall satisfaction.	(Delone and McLean, 2003; Venkatesh and Bala, 2008)

Table 4.2: Main Variables Affecting on Adoption and Acceptance JGP Independent variable (IV), Dependent variable (DV)

4.4.3 Procedure

All of the items (79 items) in the questionnaire were validated based on previous research studies (See table 4.2). All items (See table 4.3) were evaluated with a seven-point Likert-scale with the leftmost and rightmost anchors being 'Strongly Disagree' and 'Strongly Agree'. But the Information quality rated on differential scale (each pair represents extreme contrasts are rated on scale of 1 to 7). A similar approach to Iqbal et al. (2011) was followed using UCD techniques including questionnaire observations. The data was analyzed, all scores were converted to form 7 Likert scales to System usability scale (SUS) have a range of 0 to 100. According to Brooke, "the SUS is generally used after the respondent has had an opportunity to use the system being evaluated…respondents should be asked to record their immediate response to each item, rather than thinking about items for long time" (1996, p.5). Because one of the parts of the developed questionnaire called Satisfaction 'Usability' was using standard items in SUS, hence to make all items scoring consistency obtained SUS scoring for all items. To calculate the SUS score, first the sum the score contributions from each item. Each Items score contribution ranged 0 to 6. For positive items, the score was obtained by subtracting 1 from the scale position. For negative items, the score was obtained by subtracting the scale position from 7. The scores were multiplied by 5/3 to obtain the overall value of SUS (Brooke, 1996). For further explanation of how SUS scoring assessment ratings procedure operated, see figure 4.4 below. The M0>70 = acceptable (Bangor et al., 2009).

items	**Adoption & Acceptance**	**Strongly disagree**						**Strongly Agree**	**NA**
	'Behavioral Intention to use'								
	Statements								
(BI1)	I will frequently use this portal in the future.	1	2	3	4	5	6	7	
(BI2)	I will use this portal rather than other sources for getting governmental services.	1	2	3	4	5	6	7	

(BI3)	I will recommend others to use this portal.	1	2	3	4	5	6	7	
(BI4)	Assuming I had access to the portal, I intend to use it.	1	2	3	4	5	6	7	

Table 4.3: Example of the questions including validated items, BI: Behavioral Intention.

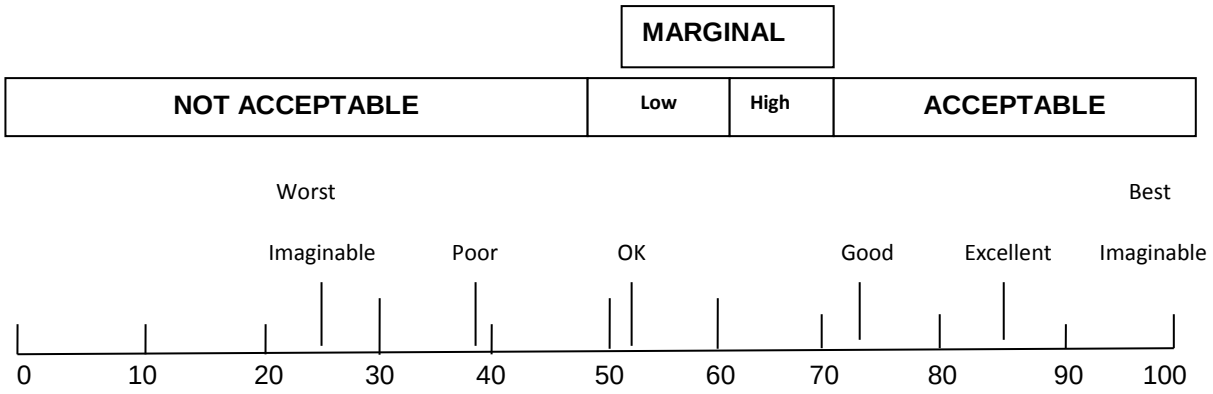

Figure 4.4: Mean SUS score ratings corresponding to the six adjective ratings.

4.5 Results and discussions

4.5.1 Descriptive statistics

The results of the descriptive statistics of the respective items are presented in two parts: 1) Readiness of Jordanian Citizens for E-Government and 2) adoption and Acceptance of e-Government portal for Jordan Citizens) corresponding to the phases depicted in table 4.4. The number of items, mean, standard deviation of the scores of the majority of the items in the study and what items belong to each part are presented in the table 4.4 (shows 14 constructs under the column of NO and number of elements were covered in each construct under the column items). The first part presents the results that indicate whether participants were ready for e-Government. The second part reveals the results of those items that were designed to measure whether the respondents accepted or rejected JGP, based on their perceptions and expectations.

NO	Construct	# Items	*Mean (SUS)	Stand Dev (SUS)
	Part 1: Readiness of Jordanian Citizens for E-Government			
1	Trust of government	4	49.84	19.544
2	Trust of Internet	4	47.82	20.451
3	**Computer anxiety**	4	**65.84**	18.771
	Part 2: Adoption & Acceptance of E-Government portal for Jordan Citizens			

4	*Satisfaction	10	51.49	13.992
5	Intention to use	4	54.04	22.654
6	Access	4	46.20	22.489
7	Navigation	4	51.86	20.272
8	Perceived ease of use	4	52.19	15.674
9	Perceived usefulness	4	50.01	21.820
10	Information architecture	6	52.32	20.544
11	Aesthetic value	6	51.86	20.272
12	Privacy	5	35.62	22.107
13	Security	6	32.89	22.304
14	Information Quality	13	47.70	21.016

Table 4.4: Results summary for usability test

*The mean score for satisfaction variable shows the usability test score.

4.5.1.1 Readiness of Jordan citizens for e-Government

With reference to Table 4.4 (part 1), the average score for the trust in the government and that for the Internet are almost equal. They indicate that the perceived level of trust for both aspects is not sufficient. The respondents believe that the government agencies are inefficient, because they do not respond to any request for services seriously and it takes them a long time to respond to such request. For the internet, it seems that they believed that the infrastructure of the services was not well prepared, and that the high subscription costs may undermine the trust as well. The average score of computer anxiety is somewhat acceptable (mean score is 65.84-See table 4.4 bolded construct). Hence, the result can imply that most of the respondents do have the willingness to use and interact with technologies.

4.5.1.2. Adoption and Acceptance of the E-Government portal

As shown in Table 4.4 (part 2), the average scores for all items are almost equal except those for privacy and security. The average scores (See figure 4.2) suggest that the views and attitudes of the respondents with regard to the features of the JGP are not compatible with the citizens' real needs. This may be attributed to the fact that there has been minimal involvement of the citizens in that implementation phase. Concerning security and privacy, the average scores do not fall in the acceptable range. According to the views and perceptions of the respondents, the level of personal information protection offered by the JGP and the security of any transaction through the JGP were perceived to be insufficient.

4.5.2 Inferential statistics

An inferential statistics was used such as independent-sample t-test and one-way ANOVA to verify if there were any statistical significant differences in the average scores of the criterion variables with respect to several demographic variables: age, gender, education, ICT literacy, computer use, and internet access. The results indicate that the level of education, age and ICT skills are the three most significant social demographic variables in influencing the adoption of e-Government. More specifically, for ICT skills, the number of items showing significant difference in the criterion variable adoption (portal use) is 24 (out of 79 items), for Education it is 45, for Age it is 46. Overall, this research study shows some significant findings that may inform the design of an e-Government portal in developing countries like Jordan.

No.	Variable	ICT Skills		Education		Age	
		F-value	p-value	F-value	p-value	F-value	P-value
Part 1: Readiness of Jordanian Citizens for E-Government							
1	Trust in government	1.505	0.188	0.941	0.421	0.657	0.622
2	Trust in Internet	0.981	0.429	1.451	0.228	1.020	0.397
3	Computer anxiety	3.646	**0.003**	2.738	0.044	2.175	0.072
Part 2: Adoption & Acceptance of E-Government portal for Jordan Citizens							
4	Satisfaction	1.315	0.257	6.203	**0.000**	4.757	**0.001**
5	Intention to use	2.009	0.077	6.904	**0.000**	3.095	**0.016**
6	Access	3.070	**0.010**	7.569	**0.000**	4.484	**0.002**
7	Navigation	1.566	0.169	7.569	**0.000**	6.532	**0.000**
8	Perceived ease of use	1.775	0.118	2.110	0.099	5.141	**0.001**
9	Perceived usefulness	1.595	0.161	2.872	**0.037**	2.476	**0.044**
10	Information architecture	1.653	0.146	5.308	**0.001**	2.468	**0.045**
11	Aesthetic value	2.014	0.077	3.266	**0.022**	4.583	**0.001**
12	Privacy	3.060	**0.010**	3.419	**0.018**	3.718	**0.006**
13	Security	4.295	**0.001**	3.545	**0.015**	4.617	**0.001**
14	Information Quality	1.512	0.186	12.049	**0.000**	5.665	**0.000**
		Pv	4	Pv	10	Pv	11

Table 4.5: Results of significant differences in the adoption of e-Government by three social demographic variables

Note: "Pv" is the number of variables showing significant differences at $p<0.05$ are bolded respect to social demographics variables

4.5.2.1 ICT skills, Age and Education

Table 4.5 lists the statistical results for ICT skills. For the first part of the study, the differences in computer anxiety by the ICT groups are statistically significant at $p < 0.05$. However, no significant differences are found for the variables Trust in the Government and Trust in the Internet. For the second part of study, three variables, namely Access, Privacy and Security,

show statistically significant differences ($p < 0.05$) in the adoption of the JPG, according to the perceptions and experiences of the sample of the Jordanian citizens involved in this study. In summary, the level of ICT skills is an important factor, especially those citizens with high and very high level of ICT skills.

Table 4.5 lists the statistical results for age differences. No significant differences are found for part 1 of the study. But in the second part has been found the following differences in average scores by the age groups; ten variables (No. 4-14 table 4.5) show statistical significant differences ($p < 0.05$). In summary, age is an important factor for the part 2 of this study, especially those citizens aged between 14-17 and 18-24. Table 4.5 also lists the statistical results for education differences. For the first part of the study, the following differences in average scores by the Education groups are statistically significant at $p < 0.05$ according to computer anxiety, No significant differences have been found for the variables Trust in the Government and Trust in the Internet. For the second part of the study, ten variables (4-14 except No. 8) show statistically significant differences ($p < 0.05$). In summary, education is an important factor for the part 1 and 2 of the study, especially those citizens with their education level between secondary school and undergraduate.

4.5.2.2 Information quality, System quality and e-Government readiness

The statistical results for information quality list in (No.14 table 4.5). For social demographic variables of the study, the differences in education and age are statistically significant at $p < 0.05$. However, no significant differences are found for the variable ICT skills. In summary, the information quality variable is an important factor influencing citizens' adoption and acceptance of JGP, especially the usefulness of content and adequacy of content, according to the perceptions and experiences of the sample of the Jordanian citizens involved in this study.

Table 4.5 lists the statistical results for system quality differences. No significant differences are found for ICT skills except three variables (access, security, and privacy). However, in the education has been found the following differences in average scores ($P<0.05$); nine variables (No. 4-13 table 4.5 except NO.8). While, in age group is statistically significant at $p < 0.05$ according to all variables under system quality (No.4-13 table 4.5). In summary, system quality is an important factor influencing citizens' adoption and acceptance of JGP, especially the security, privacy, and the items related to usability.

Finally, the statistical results for e-Government readiness list in table 4.5 part 1. The only variable is computer anxiety (No.3 table 4.5) shows significant differences at $p < 0.05$ in e-Government readiness respect to ICT skills and education. However, no significant differences are found for trust in internet and trust in government respect to all social demographic variables (ICT skills, education, and age). In summary, the e-Government readiness is moderately important factor influencing citizens' adoption and acceptance of JGP, especially computer anxiety with those citizens who have low and very low level of ICT skills and very low education.

4.6 Survey evaluation

4.6.1 Findings from the survey

The evaluation study has investigated the readiness and functionality of e-Government portal in Jordan in terms of their information quality, system quality (service quality), and readiness of e-Government to citizens' request as depicted by detail in figure 4.1. The evaluation revealed that there is some standard variation between these attributes regarding the Jordanian e-Government portal which imply a need to set up unified standards for all attributes and features that were intended to provide online services to public in order to minimize the confusion for service users in using different services provided by the official e-Government portal.

A large number of developing countries around the world are deploying e-Government projects to the aim to reach advanced levels of e-Government services within short time periods (Mofleh et al., 2008). This chapter explored the factors that curtail the role in e-Government services adoption. The findings of conceptual understanding and starting point to improve services by increasing interaction and integration and communication between citizens and the governments through exchange ideas and views. This study has identified three major constructs (information quality, system quality, and e-Government readiness) that will increase citizens' confidence on e-Government services. By referring to the variables under each of construct (See table 4.5) showing 'Pv' the number of variables that have significant differences in average scores are statistically significant at $p<0.05$ with respect to the three social demographics variables. Finally, Governments must take in consideration the user's unmet needs and apply them in the strategy of the e-Government, in order to get the trust back that were not given (See table 4.5) as no significant differences are found for the variables of trust in the Government.

4.6.2 Implication for Iteration 2

The outcome shows that the Jordan e-Government is still in the informative phase; it has a weak service quality design, inflexible navigation, low ease of use, and fails to meet citizens' needs. This research has reviewed the literature (See chapter 2) related to the development problems in e-Government projects for developing countries, and more specifically, those in relation to e-Government services. Based on the literature review (See chapter 2) and the findings in chapter 4, one may conclude that a research study investigating the adoption and acceptance of the e-Government projects, in particular in Jordan is necessary. The full success of e-Government services implementation is dependent not only on government support but also on citizens' participation and involvement throughout design process to design their own services to accept and adopt those e-Government services (Følstad et al., 2004; Jansen, 2006). Therefore, one of the objectives of this study is to understand well of the citizens' requirements of G2C e-service design.

The lack of empirical e-Government services adoption research in Jordan context that focuses on adoption such services based on 'life-event approach' (See chapter 2) which is failed to address the citizens' needs (MoICT, 2012). Therefore, bridging the requirements gap between service provider and servicer user is one of the motivations for conducting 'Co-design approach' in this study in a developing country such as Jordan. In addition, qualitative research will be also conducted through the case study due to the quantitative research as questionnaire form is not adequate (De Leeuw, 2005), which included RepGrid as semi-structured interviews with varied stakeholders. The RepGrid integrating with Co-design approach will enable this research to understand, in depth, the stakeholders' requirements and how to match these requirements with service design process.

4.7 Summary

The evaluation and analysis conducted in section 4.5 and the findings presented in section 4.6 regarding the e-Government services of Jordan and in particular e-services provided to assess the use of the citizen-centric approach within different e-Government services. Accordingly, a number of issues have been found in the accessibility, usability, transparency, trustworthiness and responsiveness of the e-Government portal of Jordan. Furthermore, a set of limitations has been identified when adopting and using the citizen-centric approach for the G2C e- services provision by e-Government portal. Hassenzahl and Wessler (2000) argued due the obvious problem with user-based evaluation methods (i.e. questionnaire-quantitative data was done in

this iteration) regarding efficiently and sufficiently. Therefore, this research considers the RepGrid technique (Kelly, 1955); as a possible candidate method for capturing service requirements and design space from a user's perspective. Moreover, these findings will be used to direct this research study to expand/refine and specify the proposed MEGA-M by focusing in e-Government services, in particular G2C e-service design through building and designing the "Co-design framework", presented in next chapter as Iteration 2.

Chapter 5: G2C e-service Co-Design Framework

5.1 Introduction

The aim of this iteration is to understand the unmet requirements needed for G2C e-service in the design process and how to match these requirements with suitable design process. RepGrid interviews were conducted with three groups (service provider, service user, and service interface) with diverse backgrounds, especially service users. In summary, this chapter has two parts: part 1 includes the findings and results regarding the key characteristics: Repertory Grid interviews with 24 respondents but I excluded five of them regarding the quality of their backgrounds; and Qualitative and Quantitative analysis of Repertory Grid data. While, part 2 represents the 'G2C-SCOF' and the importance 'SPRF' as Guidelines Co-design process in G2C e-service design for decision makers who have full authorisation regarding development process; further it explains the G2C service design process and activities in detail, based on interview data findings and results were derived from part 1. This chapter first describes the analysis of the Repertory Grid data, as represented in a systematic approach form. It also elaborates on the quantitative and qualitative results of this analysis. It further investigates the patterns of G2C e-service design process, and describes how these processes are inter-related in enhancing service user's quality and efficiency.

The rest of the chapter is organised as follows. The section 2 provides a description of the quantitative method and results. Section 3 describes the qualitative method and shows an example of 'key point coding' approach. Section 4 elaborates the implication regarding findings and results. In section 5 and 6, researcher elaborates on the relationship between Grounded theory and case studies and the relationship with RepGrid interviews respectively. Section 7 shows the discussion part of the regarding findings and how the domain area was affected.

5.2 Results of the RepGrid-Part 1

5.2.1 Key Patterns of G2C e-Service Design

A quantitative measure of the importance of each value category was performed, using two criteria, Frequency and Variability, as proposed by Goffin et al. (2006). *Frequency* is defined as the percentage of participants who have mentioned constructs in a category. Frequency is used to identify a 'common construct' and avoid redundancy (Goffin et al., 2006; Lemke et al., 2003; Jaeger, 2003). *Variability* is a mathematical measure of the spread of ratings for a construct

(Goffin et al., 2006). It is calculated as the percentage of the total sum of squares of elements' ratings for each single construct in a grid. A higher spread of elements' ratings for a construct shows that the interviewee perceives it as a more important characteristic/requirement regarding G2C e-service development process. However, Goffin et al. (2006) consider that high frequency of mentions may indicate that a category or constructs is obvious to participants, without being important, hence an integration of frequency and variability will be used to measure importance. This section presents, the two criteria have been investigated in more detail for the three groups (service providers, service users, service interface).

The grids provide quantitative results. The analysis was based on the five steps (see Chapter 3 for detail) recommended in the methodology literature regarding Repertory Grid (Goffin et al., 2006; Lemke et al., 2003), following the four steps below:

Step 1: Collation of common constructs

From the 19 Repertory Grid interviews (See appendix L), a total of 99 constructs were elicited from all respondents. Many of these were common, (i.e. constructs that are mentioned by several respondents) such as 'service development/implementation', 'service analysis' and 'service feedback'. To explain how the constructs are collated, table 5.1 shows the construct labels and the categories derived from the related constructs. Furthermore, table 5.1 shows the construct labels for each group of common constructs. For example, it can be seen that construct label "service strong analysis---service with poor analysis" was elicited from 3 respondents (50% of total-6 respondents). From these construct labels mentioned under each category, it may be seen that the respondents themselves used various terms regarding service development or service implementation or service design. Thus, the study found a suitable construct label to aggregate all common constructs. Table 5.1 shows the number of constructs per each construct label through frequency indicator. For instance, the construct label 'Service development/implementation from service provider side---development/implementation from service user side' derived from 3 common constructs were mentioned by three different grids (respondents- 50% of total).

Step 2: Identification of full construct labels listing

Research study has listed all 34 construct labels that were mentioned overall respondents as overlap constructs (See table 5.4). For example, table 5.1 also shows the frequency of mention for each construct label (i.e. 'service strong analysis' is mentioned 3 times). The total sums of the

frequency regarding construct labels (See table 5.1) are 35, and were mentioned by six respondents. Each of the construct labels (i.e. set of constructs) include a common construct. The wide range of construct labels (common constructs) indicates the difficulty of G2C e-service design process relationships. Therefore, the researcher's grouping of the construct labels into suitable categories could enhance the understanding of the partnership between them; in next step will explain that in more detail.

Step 3: Aggregation of the common construct labels

In this step, the construct labels were aggregated together to group them into suitable or fit categories. This was done by relying on the literature review regarding the service design process and the researcher's own perspectives integrating with the respondents' perspectives in terms of how to group these labels together. For example, the category 'service initiating and scoping' was shaped by combining two construct labels, as they have common characteristics referring to service discovery as an initial stage of service design (See table 5.1): these construct labels are: 'service requirements' and 'service scoping' together to identify the mentioned category. At this point, this step cannot identify key categories, or which categories are important. Thus, the process is continued in step 4.

Step 4: Identification of key categories

The frequency count and variability as two criteria are necessary to identify the important categories left open to interpretation in the repertory grid (Goffin et al., 2006). These criteria are taken based on the literature review regarding frequency of mention and variability (Goffin et al., 2006); the construct/category that has been mentioned by at least 25% of respondents has more importance in demonstrating G2C e-service design process than a category/construct that is less frequently mentioned. For example, the 'income process' (See table 5.1) was mentioned by 2 respondents (((2/6)*100%) equals 33%, 6 is the total number of respondents in service provider group). The percentage of frequency was calculated for each category. The percentage of frequency, for instance, the 'planning and analysing' category, was 20% (See table 5.1); this value was calculated by finding the sum of frequencies (7) for all constructs under this category, and dividing it by the total sum of frequencies overall categories (i.e. 7 as frequencies summation of all construct under this category dividing by 35 (7+3+13+12) as a total sum frequencies overall all the categories). In this study, all the categories that fulfil this criterion are highlighted (See table 5.1, i.e. service development and deployment). The variability measure is dependent on the number of constructs in an individual grid. For example, if 20 constructs were elicited

from a respondent, the average variability would be 5 per cent (i.e. 100/20) (Goffin et al., 2006). Thus, a different numbers of constructs between grids led to normalising these constructs by normalised variability (NV). Goffin et al. (2006, p.200) define the formula to calculate variability. "This was done by multiplying the variability of each construct by the number of constructs in the individual grid, divided by the average number of constructs across all respondents" (19 participants)-5.21. Based on this formula proposed by Goffin et al (2006), the average constructs elicited per-interview was calculated. For example, (See table 5.1), the government staff group (service providers), as there were on average 5.84 (i.e. 35/6) constructs elicited per interview, the average variability per-construct is 17.12 (i.e. 100/5.84). After this, the normalised variability (NV) for each single construct label (common constructs) across different grids was calculated. Eventually, the category with an average normalised variability (ANV) of greater than 17.12 meant that the construct differentiated more strongly between elements (i.e. close, average, distant), while a category with an ANV less than 17.12 indicated that constructs differentiated less strongly between elements.

Construct/Category	Frequency (25%)	NV	ANV (BL 17.12)
Service initiating and scoping	3(08)		19.18
Service requirements---service provider requirements	2(33)	19.67	
Service scoping---have no scoping	1(16)	18.69	
Service planning and analysing	7(20)		15.04
Service planning---service not planned	1(16)	22.22	
Service managed and organised---service not organised	1(16)	09.04	
Service strong analysis---service poor analysis	3(50)	15.76	
Income process---outcome process	2(33)	13.16	
Service development and deployment	**13(37)**		**19.32**
Service testing---service not testing	1(16)	15.60	
Service development/implementation from service provider side---development from service user side	3(50)	19.40	
Final design template---initial design template	2(33)	23.63	
Service activated/existence---service not targeted	2(33)	12.01	
Service usability---service not usable	1(16)	19.69	
Service procurement---service development	2(33)	13.65	
Service closing phase-service scoping phase	1(16)	26.08	
Service prototyped (mock-up) ---service launched directly to end user	1(16)	24.50	
Service evaluation and updating	12(34)		16.50
Service assessment---No-assessment	4(66)	09.65	
Service evaluation---No-evaluation	1(16)	10.30	
Feedback from end user---feedback from government entities	3(50)	19.62	
Service keep updating---service not meet future experience	3(50)	20.88	
Provide service feedback---get service feedback	1(16)	22.08	

ANV: Average Normalised Variability; **NV**: Normalised Variability

Table 5.1: Results of quantitative analysis regarding government staff group (service providers)

The frequency and variability for each construct has been calculated for each of the three groups, and are presented in Tables 5.1 to 5.3. Table 5.4 shows the combined results for all three groups and the results for each individual group are shown in tables 5.1 to 5.3. The frequency of mention has been calculated by manually counting the number of respondents who have mentioned constructs that belong to a category. Moreover, variability was calculated by using Idiogrid 2.4 software. The average constructs elicited per interview have been calculated for government staff (service providers), service interface (government entities), and typical citizens (service users) as 5.84, 4.83, and 5.14 respectively. The average variability as base line (BL) per-construct for the above groups has also been calculated at 17.12, 20.70, and 19.45 respectively. Finally, to obtain the importance baseline for ANVs (Goffin et al., 2006), researcher had to calculate the average variability per construct, which is the average number of constructs across all of the respondents in each group, expressed as a percentage. Average variability per construct has been shown as BL (abbreviated for Base Line) in tables 5.1 to 5.3 for each group. In tables 5.1 to 5.3, the categories (G2C e-service development process) that had a frequency of greater than 25% and an above average variability (BL) are highlighted.

Construct/Category	Frequency (25%)	NV	ANV (BL 20.70)
Service initiating and scoping	**11(40)**		**25.55**
User needs---service provider needs	5(83)	28.86	
Service user perspectives---service provider perspective's	1(16)	28.85	
Translate user needs as basis of service requirements---translate provider needs as basis of service requirements	1(16)	20.39	
Service studying ---service generating	4(64)	24.10	
Service usability	4(14)		15.81
Service effective---service ineffective	1(16)	02.07	
Service efficient---service inefficient	1(16)	18.63	
Service categorisation---service scattered	1(16)	20.81	
Service organised---service not well organised	1(16)	21.73	
Service development and deployment	5(18)		17.99
Service development/implementation---legacy service	2(33)	16.37	
Service testing---service evaluation	1(16)	22.21	
Service design---No-design at this level	1(16)	10.11	
Development the requested service---development the Services which brings business/investment	1(16)	23.29	
Service evaluation and updating	7(26)		19.30
Service feedback---No-feedback provided	3(50)	20.03	
Service evaluation---legacy service	4(66)	18.58	

ANV: Average Normalised Variability; **NV**: Normalised Variability

Table 5.2: Results of quantitative analysis regarding service interface group (government entities employees)

Construct/Category	Frequency (25%)	NV	ANV (BL 19.45)
Service initiating and scoping	6(18)		18.15
User needs---service provider perspectives	3(57)	12.56	
Citizens' opinions---service provider opinions	1(14)	06.50	
User perspectives---service workflow process	1(14)	33.94	
Questionnaires targeted citizens---questioners targeted government entities	1(14)	19.61	
Service planning and analysing	11(32)		18.13
Service utilisation---user needs	1(14)	34.27	
Service categorisation---service scattered	1(14)	23.95	
Service concerned---design phase	2(28)	07.04	
Initial service design template---service assessment	1(14)	03.96	
Service selection---service development	1(14)	19.34	
Service planning and analysing---service directly implementing	1(14)	28.14	
Problem solving---identification problem	1(14)	02.01	
Service related to citizens---service related to service provider	2(28)	04.17	
Design approval from service provider side---design approval from service user side	1(14)	20.33	
Service development and deployment	8(23)		22.27
Service ease of functional---service received	1(14)	20.33	
Design phase---test phase	1(14)	21.29	
Service development/implementation----No-implementation	4(57)	24.08	
Mock-up service prototype---Service not prototyped	2(28)	24.40	
Service evaluation and updating	**9(26)**		**19.49**
Service assessment---No-assessment	5(71)	15.93	
Service updating---No-updating	4(57)	23.05	

ANV: Average Normalised Variability; **NV**: Normalised Variability

Table 5.3: Results of quantitative analysis regarding typical citizens group (service users)

The average constructs elicited per interview was calculated overall groups (service providers), citizens workers (government entities), and typical citizens (service users) as 5.21 (i.e. 99/19). Next, the average variability (BL) per construct was calculated in the overall group as 19.19 (i.e. 100/5.21). Finally, the percentage frequency and ANV for categories overall three groups has been has calculated.

The overall results in table 5.4 show, for example, that 'service initiating and scoping' was mentioned by 21% of all respondents and that the variability of their responses was 20.36 (which are higher than the Baseline overall average normalised variability is 19.19. This indicates that service initiating and scoping was on average as an important category; even it was mentioned by fewer than 25% of respondents, but their responses for this category ranged widely and were very different, perhaps because all stakeholders' overall groups have a higher spread of element (G2C e-service development process) ratings for the elicited constructs related to this category; this shows that the interviewees perceive it as an important characteristics/requirements regarding

G2C e-service development. While 'service planning and analysing' was mentioned by 24% of respondents, the variability was low (16.38), indicating that all respondents were relatively similar in this regard, perhaps because all stakeholders were responsive to their perceptions to some degree. However, the 'service usability' category shows the same indication of service 'planning and analysing' regarding frequency and ANV which both of them appear very low. Moreover, this is the only category that is shown not to overlap among groups, which reflects unimportant or necessary requirements through development process for G2C e-service based on their perceptions'. The most highly important elicited categories are 'service development and deployment' (27% as frequency of mention and 19.54 as an ANV) followed by 'evaluation and updating' (29% as frequency of mention and 21.07 as an ANV).

Construct/Category	**Frequency (25%)**	**ANV (BL 19.19)**
Service initiating and scoping	21	20.36
Service requirements---service provider requirements		
Service scoping---have no scoping		
Service user perspectives---service provider perspective's		
Translate user needs as basis of service requirements---translate provider needs as basis of service requirements		
Service studying ---service generating		
Citizens' opinions---service provider opinions		
Questionnaires targeted citizens---questioners targeted government entities		
Service planning and analysing	24	16.38
Service planning---service not planning		
Service managed and organised---service not organised		
Service strong analysis---service with poor analysis		
Income process---outcome process		
Service utilisation---user needs		
Service categorisation—service scattered		
Service concerned---design phase		
Initial service design template---service assessment		
Service selection---service development		
Problem solving---identification problem		
Design approval from service provider side---design approval from Service user side		
Service development and deployment	**27**	**19.54**
Service testing---service not testing		
Service development/implementation from service provider side---development with service user		
Service design template---initial design template		
Service activated/existed---service not targeted		
Service usable---service not usable		
Service procurement---service development		
Service closing phase-service scoping phase		
Service prototyped (mock-up) ---service launched directly		

Service evaluation and updating	**29**	**21.07**
Service assessment---No-assessment		
Service evaluation---No-evaluation		
Feedback from end user---feedback from government entities		
Service keep updating---service not meet future experience		
*Service usability	04	05.27
Service effective---service ineffective		
Service efficient---service inefficient		
Service categorisation---service scattered		
Service well organised---service not well organised		

ANV: Average Normalised Variability

Table 5.4: Results of quantitative analysis regarding the overall categories (important categories have been bolded). *service usability: This is the only category not common overall groups. Following the principles of key point coding (Allan (2003)), researcher identified 34 unique construct labels. Five categories were identified, namely Service initiating and scoping, service planning and analysing, service development and deployment, service evaluation and updating, and service usability.

Table 5.5 summarises the requirements categories that have higher importance, (as defined previously based on the combined frequency and variability ratings). It may be seen in the integrated table that some categories are important to all respondents e.g. service development and deployment and service evaluation and updating, whereas some others distributed in varied groups e.g. (as shown in table 5.5); this indicates that different groups (diverse respondents) have contrasted patterns of requirements of G2C e-service development process. Therefore, these ratings help to differentiate the needs and expectations of different stakeholders.

Overall	**Government staff (service provider)**	**Administrative employees (service interface)**	**Typical Citizens (service user)**
Service development and deployment	Service development and deployment	Service initiating and scoping	Service evaluation and updating
Service evaluation and updating	----------	----------	----------

Table 5.5: Summarised of the categories of higher importance.

For example, the categories with lower ANV (of ratings) might just mean that the respondents have the same perceptions in some degree of the category for the rated elements (G2C e-service development process) and does not necessarily mean lower importance in terms of variability, although it has to be mentioned with high frequency because this category may not be obvious

enough to respondents. Hence, researcher still considers ANV to be a useful parameter for identifying importance, but encourages the observing of the whole picture of how stakeholders perceive these requirements. This is seen as essential and more useful in practice, rather than merely focusing on the top categories.

Aside from the quantitative data from Repertory Grid interviews, this technique/method has provided the present study with a rich pool of qualitative data, which complements these quantitative data. In the following section, the results will be discussed in the context of the qualitative data gathered from various groups.

5.2.2 Emergent Categories of G2C e-Service Design

A number of categories of a high quality of G2C e-service design process have been investigated, namely service development, service initiating and scoping, service evaluation and updating, service planning and studying, and service usability. Research study amalgamated RepGrid as a data collection method and key point coding (Allan, 2003) as a form of open coding in Grounded Theory as data analysis methods that have …"proven to be effective in developing constructs in a relatively under-studied area" (Siau et al., 2010, p.577).

The RepGrid is embedded in grounded theory (Edwards et al., 2009), because it is a method that grounds data in the culture (i.e. beliefs, principles, and values) of the research participants, if they choose both the elements and the constructs, and it is clearly useful where there is an insightful need to discover the personal worlds of the research subjects. Therefore, categories derived from the findings arise from the data, rather than being brought together by the researchers (Rogers and Ryals, 2007). Researcher uses the coding technique (See appendix K) by adopting a key points coding (Allan, 2003) rather than coding by micro-analysis of the data based on the open coding methodology outlined by Strauss and Corbin (1998), because micro-analysis has two disadvantages. First, it is time consuming (analysing data word-by-word and line by line). Second, it leads to confusion at times. The key points regarded as important to the exploration were recognised in the transcriptions, then highlighted in draft paper when researcher was listening to the recorded interviews, after he translated the interviews from Arabic to English, and gave an identifier attributed sequentially starting from…"first interview and continuing on through subsequent interviews to give" P-TC1 and so on where P indicates the 'Key Point' (Allan, 2003, p.2).

The key points regarded as important to the exploration were recognised in the interview transcriptions. Thereafter, went through all of the elicited constructs, the related interview notes,

and the interview transcripts, by eliminating redundant or overlapping constructs. To differentiate the key points made in subsequent groups, identifiers (TC) were used to distinguish. For example, Key point 'P-TC1' was made by the first typical citizen. The text of key points is shown in the middle column of table 3.4. The key point identifiers are shown in the left-hand column of table 3.7 in chapter 3, and the code in the right-hand column.

Research study identified 34 unique 'construct labels' by eliminating redundant or overlapping elicited constructs. Five categories were identified, namely *service imitating and scoping*, *service planning and organising*, *service development and deployment*, *service evaluation and updating*, and service usability. Then, the 34 construct labels were categorized into five categories overall three groups, including 19 respondents with different background and experience. Table 5.4 depicts the construct labels and categories, as well as the frequency and ANV for each category. Results have been grouped into common themes in the following sections, to allow for comparison between categories.

Service development and deployment

This category is one of the most important categories to emerge from this research study (overall frequency 27% and ANV 19.54) and highlighted as can be seen in table 5.4. This category is moderately important in service providers group and less so to service users and service interface; that stakeholders from various groups perceives' their decision makers have to take in consideration the important requirements under this category; these requirements have been allocated from diverse groups with different backgrounds by eliminating the redundant requirements. Requirements were summarised (See table 5.4) to facilitate understanding: service testing, service implementation from both sides of stakeholders (service providers and service users), prepare an initial design template for requested service, which helps to avoid any design problems in early stage. Furthermore, initial design template leads to saving money and time, and inviting all participants to engage in design process, which involves service users as people who use these services, develop mock-up prototype to test the developed service before launch it for end-user. This category is important to test the function of e-services, including efficiency and effectivity, which belong to the business side of e-service development, by choosing the vendor(s).

Service evaluation and updating

This category is placed second in the ranking regarding both criteria (frequency and ANV) overall groups (29% and 21.07 respectively), as depicted in table 5.4. This indicates the process

of assessment and improvement should occur continuously to ensure these services keep meet evolution of user's experience. The characteristics that fall under this category are represented as feedback provided from both beneficiaries (service providers and service interface) through service assessment during the developing phase. The characteristics include the design stage in earlier period and take these feedbacks in consideration to update and improve (evaluation) services. This category clearly shows clearly the typical citizens group (service users) as an important group, and moderately important in other groups (service providers and users). See table 5.1-5.4, which reflects their frequencies and ANVs.

Despite the moderate importance of evaluating and updating, the overall groups mentioned feedback, evaluation and assessment e-services as being of high importance, in particular the typical citizens group. In fact, giving citizens a greater perception of evolution e-services by proper and consistent feedback for updating e-service can sometimes be more valuable than government entities (doing the) evaluating. The category was of low importance in terms of feedback, and updating regarding government staff as service providers.

Service planning and analysing

Based on the responses from the case groups, research study found that this category does not show any importance from various groups, even if there is a relatively low importance in groups of service providers and service users and not even mentioned in citizens workers (service interface). This reflects very low concern regarding planning and analysing (overall groups frequency 24% and ANV 16.38); it is also a very bad indicator for stakeholders who show no interest or pursuit regarding these requirements that fall down under this category. The most important requirements should consider by decision makers, through preparing to develop a new service or re-develop the existing one. Researcher perceives the neglect of this category from respondents, which leads to an inefficient, indeed unsatisfactory e-service development process. This is because analysing these services to identify unmet needs facilitates interaction between service providers and service users.

At the service-providers level, research study investigates the convenience of them for analysing these requirements, which derived from initiating, and scoping phase; it is worthy to analyse and plan these requirements. Service providers who are responsible and have the authority to develop these services based on derived requirements. Therefore, without in-depth analysis to figure out the requested/concerned services to be able to classify these services into categorised groups.

Interestingly in a/the more collaborative relationship, the service provider is expected to have a strategic planning approach in managing the relationship with the service user when analysing the requirements, in order to improve the development phase.

Service initiating and scoping

Unexpectedly, service initiating and scoping (overall frequency 21%, ANV 20.63) does not show a significant important as category overall groups based on both criterion (frequency and ANV). This category is shown to be important from the point of view of service interface (government entities) (40% and 25.55). This may indicate that these people (government entities) represent the most significant reflection with problems, which happened with service users, because they consider front-line staff dealing with service users. Therefore, they meet these problems as processors of the requested e-services. In contrast, this category shows the moderate importance of the service providers group and service users (See table 5.1-5.4) regarding frequency and ANV criterion. As previously explained, service initiating and scoping has not mentioned (i.e. frequencies) to reach the minimum criterion (25%) but it spreads strongly to cover all elements (ANV=20.36) (G2C e-service design process) which shows a close relationship between elements based on construct ratings. This may indicate that respondents not mentioning this category as they did not find it clear enough. However, a big difference between respondents has shown that their responses may relate to diverse perceptions' and opinions'.

This category is considered to be an essential for development high quality e-services; because in this phase (initiating and scoping) of development e-services, the requirements/needs have been identified regarding stakeholders perspective's and or opinion's by using different approaches such as surveys or interviews. These approaches may help service providers or decision makers to determine exactly what they are needs to be taken into consideration to identify the most concerned services. In order to, facilitates translation process of the identified service users' needs as basis of service requirements. This process helps service providers to classify these services based on the importance requested, in order to categorise the derived requirements into suitable categories.

Service usability

This category comes at the bottom of the ranking, based on frequency and ANV (overall 4% and 5.27); the requirements fall under this category, which is often, ignored by respondents but can play a key role in adding value to the e-Government projects. This category has been mentioned by only one group (government entities/service interface), working as a link between service

providers and users to meet tight regulatory requirements for their processes' regarding G2C e-service. However, other groups (service providers and users) are neglected in this category. The reason for this neglecting that they may see this category as cosmetically required, rather than functionally required. However, the requirements that fall under this category are valuable for service users who have to become acquainted with the service functional benefits of the G2C e-service efficiently and effectively. By providing a wide range of G2C e-service usable process, which is perceived as a key value category in almost all groups for improvements in the design process regarding service providers can contribute to creating sense of usability for the service users by providing efficient and effective e-services. In fact, using opportunities for being usable of G2C e-service functional also shows service users how flexible and beneficial this service is, and ready to add value to service user's processes.

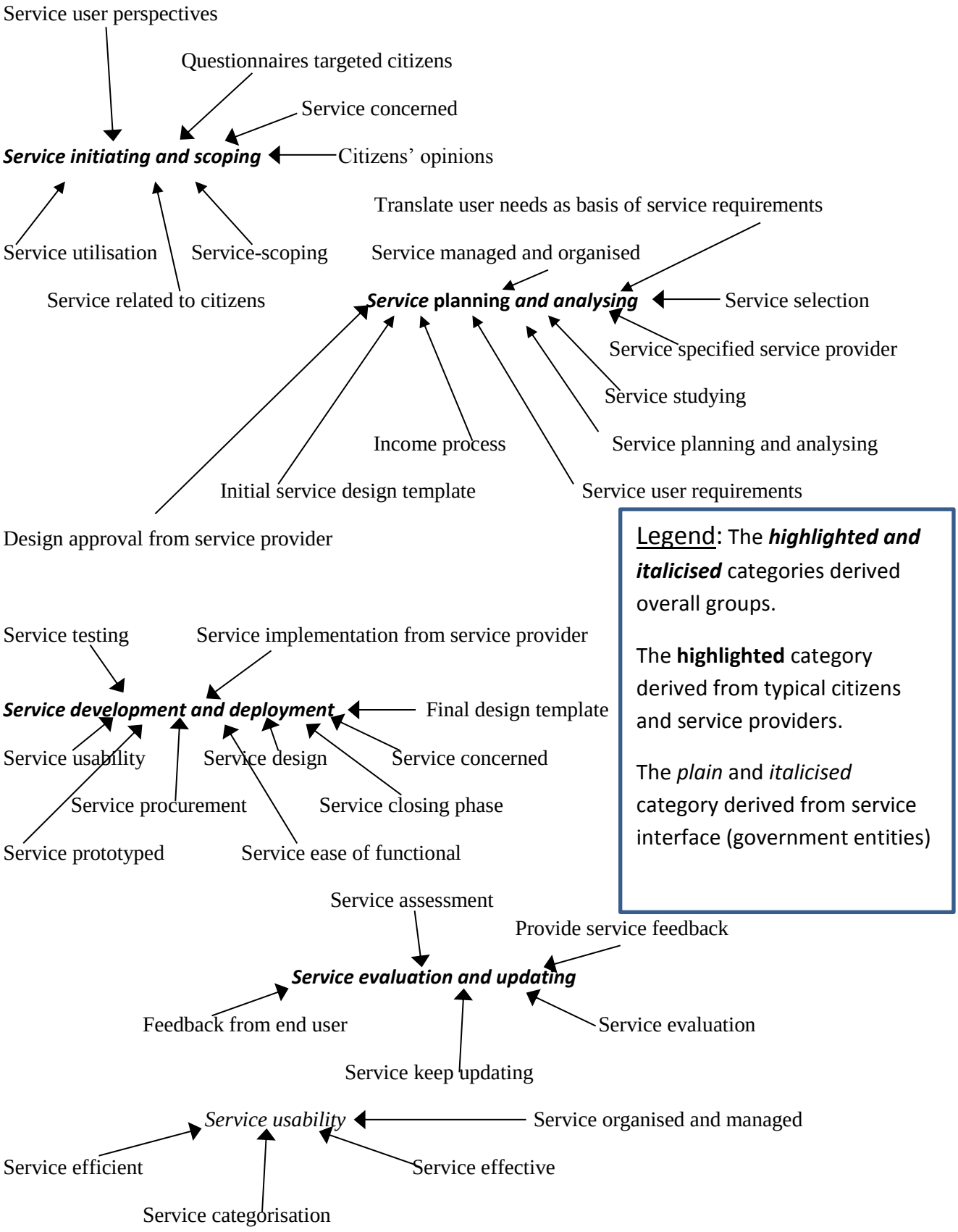

Figure 5.1: Stakeholder's requirements map for G2C Service Design (SRM-G2C)-cognitive model based on Grounded theory (Key point coding)

5.3 G2C-SCOF's Requirements

The construct labels and categories identified in this study may serve as a cognitive mapping (See figure 5.1) for developing G2C-SCOF (See table 5.7). This study also has practical implications for e-service developers. The requirements for a high quality of G2C e-service development process in e-Government projects, as identified in this study, may be used as guidelines for service provider to enhance G2C e-service design incorporating service interface and service user relying on the requirements that have been identified overall groups (diverse stakeholders) (Siau et al, 2010). The RepGrid interviews granted a number of important insights: the approach/technique allowed the construct value in use to be more understandable; the five categories (especially the key categories 'service development and deployment' and 'service evaluation and updating') identified are shown to be important considerations for service developers in the development phase of their G2C e-service Provision.

Among all the categories/constructs covering requirements of high quality G2C e-service design process, some were mentioned under the service development category, and have overlap characteristics that are relevant to requirements in any empirical settings. For example, service test and service design are always considered to be important requirements in any e-Government project (Anthopoulos et al., 2007; Hyman, 1993). Service development and deployment is one of the most important categories to emerge from this study (overall frequency 27% and ANV 19.54), as can be seen in table 5.4. This category is moderately important in the service providers group, and less so to the service users and service interface; that stakeholders from various groups perceives' their decision makers have to consider the developmental aspects of service development.

Service evaluation and updating is relevant to the process of assessment and improvement in e-Government services development. It includes: service assessment and service updating. In general, these requirements are key determinants of the ability of improvement to function/fit service user needs well (Kuflik, 2000). This category is placed second in the ranking regarding both criteria (frequency and ANV) overall groups (29% and 21.07 respectively), as depicted in table 5.4. This indicates the process of assessment and improvement should be occurring continuously to ensure that these services keep meet the evolution of the user's experience. The evaluation and updating characteristics (See table 5.4) fall under this category, represented as feedback provided from both beneficiaries (service providers and users) through service assessment in development phase, includes the design stage in earlier period and takes this

feedback into consideration to update and improve (evaluation) services. This category is important to the citizens group (service users), hinting at their wish to improve service quality and evolution.

Service planning and analysing was seen as unimportant, and was not adopted effectively (Tat-Kei Ho, 2002). This reflects little concern for planning and analysing (overall groups' frequency 24 % and ANV 16.38). Service usability comes at the bottom of the ranking. Based on frequency and ANV (overall 4% and 5.27), the requirements fall under this category, which is ignored by respondents in spite of the ability to support acceptance and satisfaction (Hung et al. 2006). In this study, was found the category of service initiating and scoping to be an unexpected finding (overall frequency 21%, ANV 20.36). It is shown not to be one of the most important categories overall groups based on both criterion (frequency and ANV) (See table 5.4). This category is shown to be important from the point of view of service interface (government entities employees) (40% and 25.55). This may indicate that these people (government entities employees) represent significant problems reflection, which happened to service users because they consider front-line staff dealing with service users. Therefore, they meet these problems as processors for requested e-services. In contrast, this category shows the moderate importance of the service providers group and the service user regarding ANV criterion and frequency. The importance categories were identified by respondents differs from the findings in Gouscos et al. (2002). One reason may be that the context of the study (Gouscos et al., 2002) is not as specific as in this study. All quotations' (key point coding), as evidence, were derived from research participants and linked to elicited constructs/categories that have been reported in appendix K.

5.3.1 Operational Choices for Developing G2C-SCOF

In order to select tools and techniques, a systematic process (or matching) is required between the elicited constructs and available Co-design tools. Tools and methods have been mapped based on the characteristics/requirements of G2C e-service design. A citation analysis technique has been used in the selection of design tools and methods. The following subsections are explained how G2C-SCOF is developed in systematic approach.

5.3.1.1 Citation analysis

ISI Web of Science (WOS) is used as a data source for gathering the citation results (frequency of mentions). WOS is the world's leading citation database, with a multi-disciplinary coverage of over 11,000 high impact journals in science and social sciences, as well as international

proceedings for over 122,000 conferences (Reuters, 2012). Web of Science Databases selected for this study were computer Science Citation Index Expanded (CSCIE), Social Sciences Citation Index (SSCI), Conference Proceedings Index–Science (CPI-S), and Conference Proceedings Index–Social Science and Humanities (CPI-SSH) (Liu et al., 2013).The data was retrieved in November, 2013 and the data timespan was set to range from 1970 to 2014 (including journals/articles, paper conferences and conferences in press). The requested 'terms' were searched and retrieved from these sources with great care. Thereafter, main categories were mapped between requirement and the typical phases of the service design process. For example, see table 5.7 rows 2 and 10.

The task begins with a query to the databases with previously defined terms (elicited from RepGrid interviews). These terms were collection of keywords related to the requirements of e-Government service design from the diverse stakeholders. Following this were the identified design tools and methods, which may be used to meet this part of the design process, (See table 5.7, column 3). Papers that contain any of these terms (See table 5.7, columns 1 and 2) in the topic, which includes title, abstract, and Keywords, were retrieved for further investigation. Popular design tools and methods situated for each phase of the Double Diamond model are identified (See appendix O). Subsequently, the citation results were identified as having a high frequency of mention regarding the elicited requirements next to the proposed design tools or methods (For example, see table 5.6 shows the popular tools/methods in Co-discover phase). Afterwards, the percentage of frequency of mention for each design tool or method was calculated by finding the frequency of mention of the design tool/method, divided by the total sum of frequencies of mentions the design tools for the corresponding requirement as a percentage). For example, service user's perspectives (See table 5.6) matched with user diaries as the highest frequency of mention based on the citation analysis (41) with frequency percentage of 54% (Frequency of mention User diaries dividing by the total sum of frequencies of mention other design tools for the service user perspectives (41/ (8+41+2+25))*100%) (See table 5.7, column 3), compared to the other design tools/methods (i.e. the service safari is a research method for understanding services by going researchers/designers 'on location' and experience a service first hand to find out what service experiences are like (Design Council, 2007) has the lowest frequency of mention (2)) (See table 5.6). Meanwhile, the percentage of frequency regarding RepGrid was calculated based on the Goffin's measure, as baseline of 25% (See table 5.7, column 4). For example, the 'service requirements' was mentioned by 2 respondents (((2/19)*100%) equals 11%, 19 is total number of respondents). The percentage of

frequency was calculated for each category. For example, the percentage of frequency regarding the 'initiating and scoping' category was 21%; this value was calculated by finding the sum of frequencies for all constructs under this category and dividing it by the total sum of frequencies overall categories (i.e. 20 as frequencies summation of all construct under this category dividing by 94 (20+22+25+27) as a total sum frequencies overall all the categories-20/94). Eventually, the percentages of frequencies, which were derived from citation analysis and those emanating from RepGrid interviews, were compared.

Terminology often varies across the selected literature. Therefore, to achieve a complete search, variations were thoroughly explored in order to build complete search terms. For example, 'service user requirement' OR 'end user requirement' OR citizen requirement for 'service user requirements' index. Resulting search terms were then identified with appropriate service design tools terms by using AND queries. For example, TOPIC: (service user requirement OR end user requirement OR citizen requirement) AND TOPIC: (service user shadowing OR user shadowing OR shadowing).

	Service design tools/methods			
Requirements	**User Journey mapping**	**User diaries**	**Service safari**	**User shadowing**
Service user perspectives	8	41	2	25
Questionnaires	31	220	43	873
Citizens opinions	4	22	4	13
End user requirements	0	6	2	47
Service scoping	10	62	1	103
Service studying	21	417	9	201
User needs	7	52	3	46

Table 5.6: Service initiating and scoping- Discover Phase (Co-design tools Vs Requirements) overall groups.

The last issue that needs to be identified is that there are papers cited having the requested terms in their topics (title, abstract, and keywords), but in fact, the requested terms may not be discussed. Terms are merely mentioned for reference purposes. However, all citation results have been included in this research as a matching technique, regardless of whether these papers were related to the investigated terms or not.

Categories/Requirements overall groups	****Design tools**	**(frequency) ^Citation results%**	***Goffin measure baseline (frequency)25%**	**ANV**	**Service provider**	**Service user**	**Service interface**
Initiating and scoping			(20)21	20.36	**CO-Discover Phase**		
Service requirements	User shadowing	(47)85	(2)11	19.67	✓✓		
Service user perspectives	User diaries	(41)54	(2)11	28.85			✓
Service scoping	User shadowing	(103)58	(1)05	18.69	✓		
User needs	User diaries	(52)48	(9)47	25.12	✓	✓✓✓✓	✓✓✓✓
Service studying	User diaries	(417)64	(4)21	24.10	✓	✓	✓✓
Citizen opinions	User diaries	(22)51	(1)05	06.50		✓	
Questionnaires	User shadowing	(873)75	(1)05	19.61		✓	
Service planning and analysing			(22)24	16.38	**CO-Define Phase**		
Service planning	Design Brief	(143)87	(2)11	25.18	✓	✓	
Service managed and organised	Design Brief	(16)33	(2)11	09.04	✓		✓
Service analysis	Design Brief	(461)84	(4)21	21.95	✓✓	✓	✓
Income process	Design Brief	(13)86	(2)11	13.16	✓✓		
Service utilisation	Design Brief	(92)95	(1)05	34.27		✓	
Service concerned/requested	Design Brief	(414)90	(4)21	07.04	✓✓	✓✓	
Initial service design template	Design Brief	(82)94	(1)05	03.96		✓	
Service selection	Design Brief	(162)87	(1)05	19.34		✓	
Problem solving	Design Brief	(535)78	(1)05	02.01		✓	
Service categorisation	Design Brief	(184)73	(3)15	23.95	✓	✓	✓
Design approval/agree	Design Brief	(497)94	(1)05	20.33		✓	
Service development			(25)27	19.54	**CO-Develop Phase**		
Service testing	Scenario	(1786)50	(1)05	18.90	✓		
Service implementation	Role Playing	(5171)56	(9)47	19.95	✓✓✓	✓✓✓✓	✓✓
Service design template	Scenario	(5358)53	(4)21	15.70	✓✓	✓	✓
Service usable (efficient and effectiveness)	Scenario	(501)56	(2)11	20.01			✓✓

service activated/existed	Role Playing	(1250)58	(3)16	17.65	✓	✓	✓
Service closing phase	Scenario	(29)51	(1)05	26.08	✓		
Service procurement	Scenario	(194)53	(2)11	13.65	✓✓		
Service prototyped/mock-up	Scenario	(1541)50	(3)16	24.40	✓	✓	✓
Service evaluation and updating			(27)29	21.07	**Deliver Phase**		
Service assessment	Scenario	(1878)97	(8)42	13.42	✓✓✓✓	✓✓✓✓	
Service feedback	Scenario	(1283)96	(7)37	22.62	✓✓✓✓		✓✓✓
Service updating	Scenario	(3379)97	(7)37	20.83	✓✓✓	✓✓✓✓	
Service evaluation	Scenario	(3776)98	(5)26	27.42	✓		✓✓✓✓

Table 5.7: G2C-SCOF: compare the RepGrid interviews results next to citation results regarding the G2C e-service requirements next to design tools.

*Goffin et al measure based on the percentage of frequency of mentions as baseline 25%

^citation analysis based on high percentage of frequency of mentions requirements next to design tools by using web of science as database source.

**The highly percentage frequency design tool mentioned next to service requirements

5.3.1.2 The link between RepGrid and Citation results

The citation results indicate design tools for operationalising the framework, based on popularity and time aspects. Alternatively, RepGrid provides the specified G2C-SCOF requirements for design processes and stakeholders (user types). To summarise, RepGrid provides a systematic approach to framework selection and adaptation, while citation analysis provides a supporting systematic approach for selecting the tools and techniques to operationalise the framework.

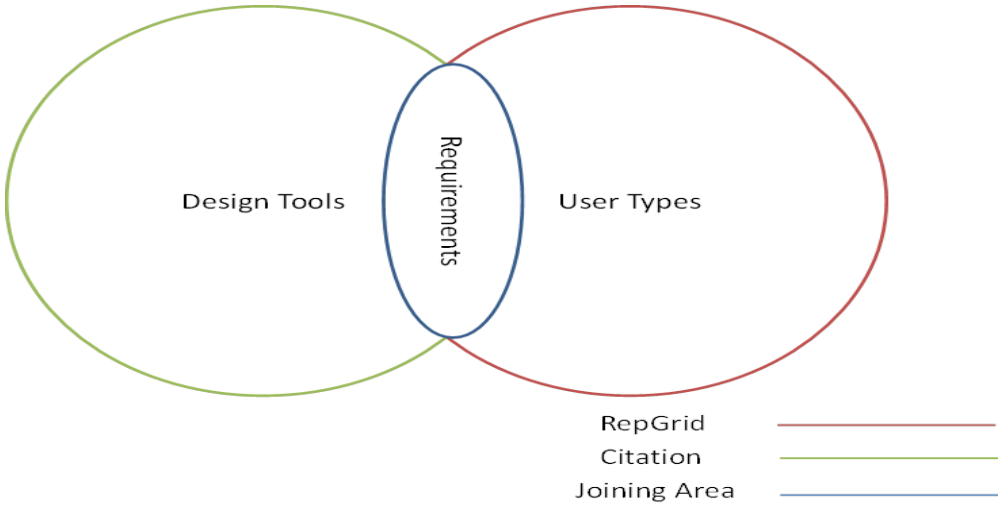

Figure 5.2: Links between RepGrid and Co-design

Comparisons between citation and RepGrid results also allow the extraction of features, which may be already used in G2C e-service design process. Therefore, in order to explore the relationship between the RepGrids' frequencies and citation results as a technique used for selection process. A comparison process is presented in the four sets (in the following four sets below), each representing the main categories and their characteristics. This process will lead to technique selection.

1-Initiating and Scoping

Set 1 represents the initiating and scoping category, and reflects the discover phase. In general, this category shows relatively low frequency of mention that reached an overall of 21% regarding RepGrid frequency indicator (See table 5.7). A cluster of requirements falls under this category. As depicted in table 5.7, the service requirements fit with *user shadowing* as popular design tools regarding the citation results, which was highly mentioned in literature (85%)**.** However, it was very infrequently mentioned by service provider group (11%), but not mentioned in service user and service interface. This indicates the real requirements gap between the service provider and service user and service interface. The service user's perspectives is mentioned an average number of times (54%) next to *user diaries*, as design tools may be useful to ideate/generate service user's assumptions, thoughts and perspectives. There is an obvious contradiction compared with RepGrid result, which is mentioned very infrequently (5%) (as baseline 25%). Furthermore, 'service user's perspectives' was mentioned only by service interface and it was ignored by service users and providers. This may be due to the fact that the service interface (government entities) deals regularly with the service user. Thus, this group faces most users' problems during processing applications and or tasks. 'Service scoping' is similar to citation results (58%) mentioned next to *user shadowing* as a compatible with this requirement. This requirement was classified as unimportant (5%) in the service provider group, and was not mentioned by service users and interface. This in fact reflects the contradiction situation between overall groups, which represents the identifying of service scoping (number, type, and complexity of services being provided) by only the service provider as an individual activity, by neglecting the role of service users who have a right to involve in the service scoping process.

Interestingly, the users' needs next to user diaries have been moderately mentioned in the literature (citation), at 48%, while they were frequently mentioned (47%) in the RepGrid results. This may indicate that the respondents are concerned with this issue as a prerequisite for service

design; but not mentioned by internal service provider. It may also show that service users' needs were neglected by service provider during the service design process. *User diaries* are considered to be the most popular design tool to fit user needs regarding citation results (48%). The citation results (64%) for the service studying next to *user diaries* were shown to be the most popular design tool compatible with service studying. On the other hand, RepGrid results regarding research participants'' responses show that the service-studying requirement is not very important (21%) (as baseline 25%). This was mentioned by service interface but not specified by service providers and service users. This may occur due to the service interface representing a communication link with the other groups (service provider and service user). Thus, the service interface interacts directly with the service user, which also allows them to identify service users' issues and problems. Meanwhile, it can be seen that investigating the service provider's dominance over the service design process proves that these services developed without taking into consideration other group issues and problems. Service users claim the services are developed based on service provider policies and/or decision-making authorities. The last two requirements in this category are the questionnaires and citizen opinions', but they came next to *user shadowing* and user *dairies* respectively. The citation results show that the compatibility between these pairs is (75%, 51%). However, these requirements were very infrequently mentioned regarding RepGrid results (5% for each). This may allow one to conclude that the service users' requirements were completely ignored by the service provider and service interface.

2-Service Planning and Analysing

Set 2 represents the service planning and analysing category, and reflects the define phase in the Double Diamond model of the design process. This category in general has shown relatively low frequency (24%) (See table 5.7). This indicates that the overall requirements that fall into this category are not taken into consideration during the service design based on the RepGrid interviews (as baseline 25%). The RepGrid results for all requirements are mentioned as very low (INFREQUENTLY) (See table 5.7). On the other hand, citation results have been shown as very high (all requirements showed a very high frequency of mention next to *design brief* as design tool and it was the most popular tool for utilising/ideating these requirements). Most of these requirements were mentioned as being of concern by service users, but were mentioned only a few times by other groups, as depicted in table 5.7. In conclusion, these results indicate that service planning and analysing was absent from the development process. Hence, this is proved through the contradiction between the citations and the RepGrids results; the citation

recommended taking into consideration this category in service design development, while the service provider and service interface did not mentioned it as an important requirement throughout the development process. This may refer to the centralization of authority, and some policies play a crucial role in decision making in regards to service analysing and planning.

3-Service Development and Deployment

Set 3 is the service development and deployment, and reflects the develop phase in the Double Diamond model of design process. This category in general has shown a moderately high frequency of mention regarding RepGrid results (27%). Nevertheless, all requirements (except 'service implementation' above the baseline) derived from respondents (RepGrid interviews) are low mentioned (as baseline 25%) (See table 5.7). This reflects the variability of very high overall respondents. Furthermore, the overall requirements that fall in this category are not taken into consideration based on RepGrid results. This reflects neglect and lack of concern for issues derived from requirements to be features that may be used it in design process.

The citation results have shown moderately low results. Most of these requirements fitted in design tool called *scenario* (See table 5.7); and the *role playing* was compatible just with two requirements (service implementation and service activated). Thus, these tools are considered to be the most popular design tools for utilising/ideating the service development requirements (See table 5.7). These requirements comprise: service design, implementation, testing, usability, procurement, and launch service prototype.

The service provider mentioned most of these requirements, but a small number of other groups were mentioned (See table 5.7). This may interpret as new evidence of the systematic ignoring of the role of the service user and or service interface in the service design process. Furthermore, the RepGrid results were used as a proof of the fact that the service provider clearly dominates in the design process, especially in this phase, which confirms that the other groups (service users and service interface) are not involved throughout the development process.

4-Service Evaluation and Updating

The last category represents set 4, which is service evaluation and updating, and reflects the deliver phase in the Double Diamond model of the design process. This category in general shown a very highly mentioned based on RepGrid results (29%). This category includes service evaluation, assessment, feedback, and updating. The overall requirements under this category

appear to be very important regarding citation and RepGrid results. Thus, these requirements should be taken into consideration during the service process design.

The RepGrid results show that the requirement (e.g. service assessment) was highly mentioned (42% as baseline of 25%) but, the service updating, service feedback and evaluation were mentioned relatively high (37%, 37%, and 26% respectively). On the other hand, the citation results show very high results (all requirements showed a very high frequency of mention next to *Scenario* as design tool). The interpretation of high citation results may refer to the fact that these requirements were mentioned in various scientific and non-scientific fields, which contribute to an increase in the frequency of mention, while the high frequency mentioned regarding RepGrid results might concern the diverse groups for these requirements, and they expect these are important to improve the service design process. However, research findings regarding this category did not find any common constructs among groups (See table 5.7). Research study argues that regarding the high diversity between groups based on their views and or perspectives.

5.4 Double Diamond Model and SPRF-part 2

5.4.1 A SPRF for the G2C e-Service Process Design

In fact, the service design and design process are interconnected (servicestrategies.com, 2014). Service Co-processes design journey represents all the steps that diverse stakeholders go through during service design, which effects on service user's experience (known as business process). Therefore, the operational choices for G2C-SCOF (See table 5.7) have been transformed to a tangible framework for the Co-design process (See figure 5.4) to identify opportunities for enhancement that will enable service providers to deliver an efficient service at the high level of quality to service users. This research study argues that the reason why the Double Diamond model has chosen (See next subsection) is that this model is not the only model of the design process, but that there are some core phases within a design process that are commonly used.

5.4.1.1 Justification of chosen Double Diamond Model for G2C e-service Co-design process

Many design models exist (See chapter 2), with many having linear, sequential and spiral features (non-iterative). The new landscape of design needs continuous evolution to meet and address the end users' experience and perspectives (Sanders and Stappers, 2008). Double Diamond was chosen because it has appropriate phases that fit with research aim and findings. Furthermore, it has an effective way of visualising the design process. Like many other frameworks, it provides a non-linear, iterative process made of four iterative steps, and these steps map…"the divergent and convergent stages of the design process, showing the different

modes of thinking that designers use" (Design Council, 2005). Thus, there are/were characteristics that made this model applicable to the team (collaborative designers and non-designers). Double Diamond works on the sustainable evolution principle. In fact, this model specifically fits the research findings (emergent main categories' were derived from RepGrids- See figure 5.1), as these categories show applicability with each phase in Double Diamond through the existing appropriateness between each category and phase. For example, 'service initiating and scoping' category represents an early category with its requirements in service design through identifying service users' needs, service problem and service's requirements, as these characteristics that fit in with the discover phase represent the first phase of the design process).

5.4.2 Tailoring the Double Diamond Model (TDDM)

Designers using design tools and methods for designing services initially have to design the process itself (Pierri, 2012). This research, like many research studies, uses the Double Diamond model from the Design Council as an effective way to visualise the design process. Double Diamond has been used to introduce the Co-design approach when involving various stakeholders (i.e. Citizens, administrative employees in government entities, and Service provider) who are using and or designing the G2C e-services. It is apparent that the process needs to be adapted to meet specific stakeholder's needs, perspectives and expectations in the G2C domain.

A similar approach has taken here, to fit the research purposes. The adapted version (See figure 5.3) of the Double Diamond has been produced for this research. It proposes a different weight for different phases (See examples of the adapted Double Diamond from 'The Mobile Frontier' (Hinman, 2012) - Rosenfeld Media for a different example of redesigning the Double Diamond model and 'The Double Diamond Model of Product Definition and Design' (Merholz, 2013).
Furthermore, the TDDM was affected by SRM-G2C-cognitive model (See figure 5.1), resulting from theories and constructs gained from the RepGrid interviews. Different weights and stakeholder's engagement are identified for different phases, based on the common interest, tasks and needs (intersection) between stakeholders in these phases. Consequently, phases have been renamed to fit in more closely with the Co-design approach (e.g. Discover renamed to Co-discover).

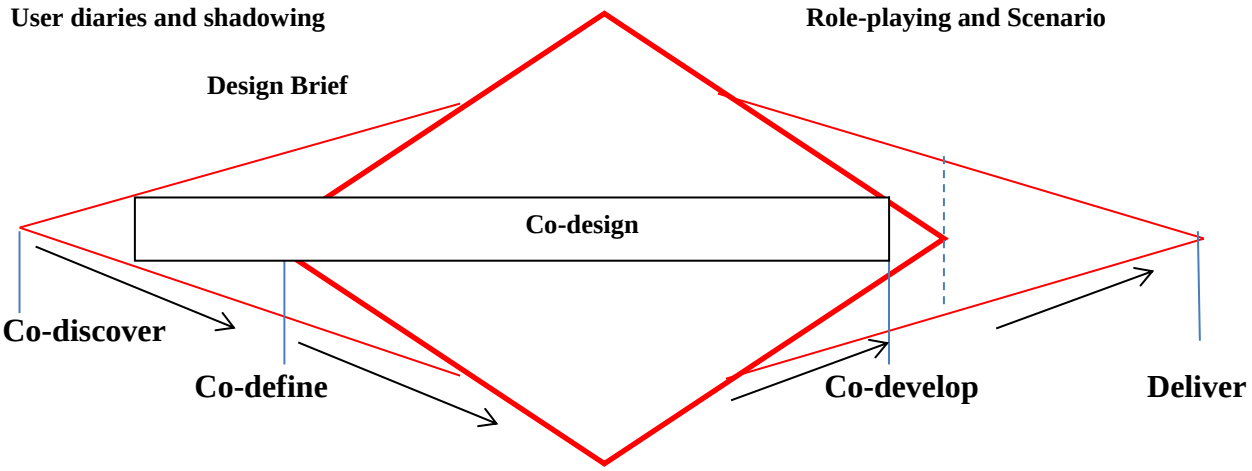

Figure 5.3: TDDM for G2C e-service (adapted from Design Council, 2005)

The first two steps (i.e. co-discover and co-define) represent the defining process, while the last two steps (co-develop and deliver) represent the designing process. The diamonds in figure 5.3 represent the convergent and divergent 'mode of thinking' employed in relation to the RepGrid's findings (See figure 5.1): "Modes of thinking either expand to a divergent approach, or a more focussed convergent approach, in order to refine the ideas explored at the previous divergent stage" (Clune and Lockrey, 2014, p.4).

The middle diamond (i.e. 'co-define' and 'co-develop') and 'co-discover' are different, as collaborative phases between stakeholders who they involved throughout these phases. The middle diamond also has a different size (larger than the other one) due to the number of the common (intersecting) constructs and requirements overall stakeholders (See figure 5.1 and table 5.7). Consequently, the design processes of co-define and co-develop will take longer than in a normal design process. Furthermore, time is above all needed because the Co-design process should be a 'learning opportunity' for all those who are involved (various stakeholders). The two diamonds overlap to indicate that the Co-design is starting. The dashed line at the end of the Co-design phase (at co-develop phase) indicates where the potential for further development through all stakeholders joined in all the phase of the design process. In many real world examples of Co-design, and in particular the social and healthcare service, the delivery stage is led by professionals, due to policies and business issues and restrictions. In fact, in this study, the common constructs did not exist in the delivery phase, due to the absence of construct intersection among stakeholders. On the contrary, in other phases, all stakeholders' constructs/requirements were intersected.

The ‘co-define’ and ‘co-develop’ phases will need convergent thinking (Clune and Lockrey, 2014), to include different stakeholders to find out a concrete strategy of planning and suggest alternative practices by synthesising the problem. Meanwhile, co-discover needs more divergent thinking, due to the coverage of diverse stakeholders for more in-depth, concrete exploration problem phase. The co-develop phase will also include designing an e-service and testing phase of the e-service. Furthermore, service launching as a beta version to get early feedback will usually happen in this phase.

Moreover, in terms of co-define and co-develop, the research findings (See figure 5.1) argued that these two stages were best suited to semi-structured/structured interview method through looking for answers to specific questions and gaining a detailed insight into a specific task, activity or journey. A further reason given is that they were looking for aspirations, emotional reactions and other hidden/non-spoken information.

Any model that seeks to visualise the design process should point out the incessant overlapping of divergent and convergent thinking that assist service user to involve in different phases (Pierri, 2012). A number of Co-design tools and best practices are available for bringing G2C-SCOF production into the mainstream, mapping between available Co-design tools and the characteristics of each design process phase. These include service activities. In order to select a tools and techniques to operationalise the framework; a systematic approach is needed to map the framework requirements to available solutions.

5.4.3 The SPRF as a Co-design Process

A realisation framework (SPRF as a Co-design process) in the form of guidelines for service provider in e-Government service design, that can be applied to represents the sequential/iterative process combining the Co-design tools and methods that suitable with stakeholders’ requirements and stakeholders’ types. SPRF was designed based on the TDDM (See figure 5.3), to be suitable with operational choices for G2C-SCOF (See table 6.3) used in the Co-design process, as depicted in figure 5.4. This research is intended and expected to assist Jordan and other developing country approaching in the region (who it has somewhat close characteristics like Jordan domain context) in new ways of designing and developing e-service to citizens as service users. The standard Business Process Model and Notation (BPMN) used to design SPRF as notations designate the logic of steps in a business process (i.e. G2C e-service design).Notations have been especially designed to coordinate the iterative processes and connections that flow between diverse participants in different design stage activities.

Furthermore, BPMN is different from other business process models, as it has a unique features such as independence (self-sufficient) from any process methodology, the building of a consistent bridge which decreases the gap between business processes and their implementation, and the facilitation of communication between stakeholders (3 groups mentioned earlier) to understand each other as using a unified model process (Notation-BPMN, 2011). The SPRF comprises from three Co-phases (Co-discover, Co-define, and Co-develop) and Deliver phase were adapted from TDDM.

Co-Discover: This stage represents the first phase of SPRF as a Co-design process, which is named service initiating and scoping. In this phase, the problem was identified by analysing the RepGrid results. The popular design tools and methods fit in this phase were performing a set of tasks during a constructive interaction with service as an inputs artefact; and these tools/methods work as processer to generate and express the ideas or views from diverse participants. The outputs artefact forms as observations and or insights and may help designers or service provider to understand users' needs. These outputs will be an input into the Co-define phase.

Co-Define: The define phase works as a filter through the review, selection and discarding of ideas. A combination of the ideas identified in previous phase are analysed and synthesised into a brief to help to explore the potential design led-solution. The Design Brief is a design tool, as suitable for the elicited requirements in this phase (RepGrid results). This phase comes as a complementary stage. Therefore, Co-define starts from the output artefact of Co-Discover stage; the design brief ideates the inputs artefact, and then translates these inputs into screened and prototyped ideas through a design-led solution service. The Co-Define phase ends with a clear definition of the problem(s) and a plan for how to address core reference point for all stakeholders in the Co-Develop stage, which is illustrated in next phase.

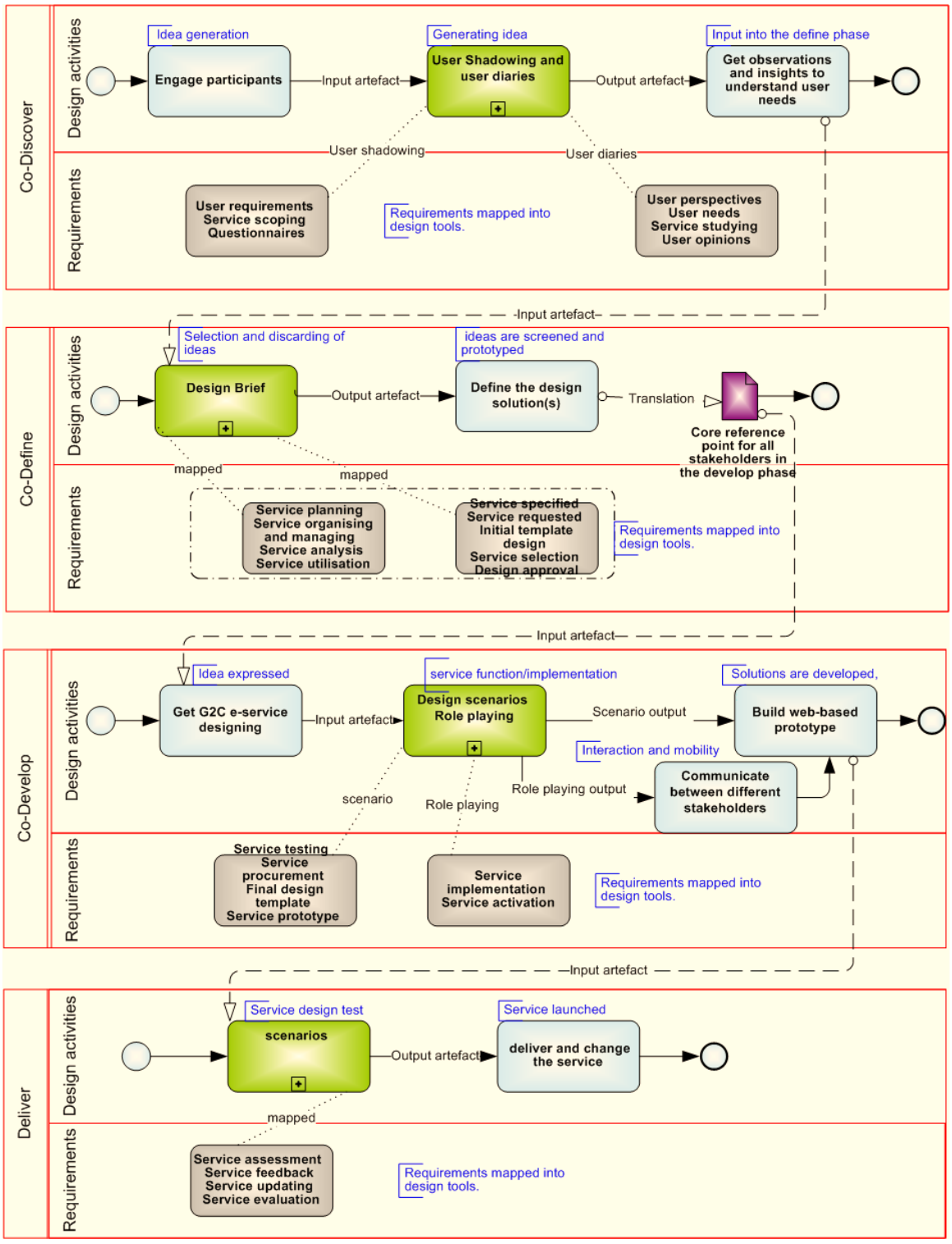

Figure 5.4: SPRF as a Co-design process of G2C e-service

Co-Develop: At the Co-Develop phase the G2C e-service has been taken through a formal design led-solution (sign-off), which has given the "corporate and financial support" (Design Council, 2007, P.19). This phase starts by designing solutions for the G2C e-service design process (expressed ideas) as an inputs artefact transfer to two design tools (Design scenario and Role playing) work critical role to translate/process these requirements through facilitate the communication between service users and service interface with design teams who belonged to service internal-provider to implement the service function. In the meantime, service provider will focus on bringing the agreed service to realisation. Design scenario outputs match the elicited requirements with processes to form them as functions or features in the proposed instantiation (i.e. WCP as an example used in this research), while the Role playing outputs work to mediate and support the scenario outputs through interaction and movability involvement throughout design activity processes. At the end of the Co-Develop phase, the design process will have carried the service development team to a stage where the G2C e-service is ready for delivery to launch a beta-version of service that help to gain a worth feedback to keep the service sustainable updating.

Deliver: This phase is called service evaluation and updating; this phase represents the final service testing. The outputs artefact represents a walkthrough through manifestation in each touch-point. This point in the design process includes correlation with appropriate internal design teams without involvement from other stakeholders (based on RepGrids' results), which showed no engagement from the service user or service interface at this stage of design. However, this study argues about it is using the Co-design tools in this stage, which returns to possible collaboration between design teams themselves in future.

5.5 Summary

This iteration of the research has investigated the G2C-SCOF using operational choices for a Co-design framework (i.e. RepGrid interviewing technique and systematic approach for design tools and methods). This research used quantitative and qualitative approach based on key point coding the manner of Grounded Theory (Allan, 2003) in order to achieve a better understanding of SRM-G2C-cognitive model. The RepGrid has been adopted to capture the personal construct systems with diverse research participants. The aggregated results over all groups suggest that two categories (service development and service evaluation and updating) and their

characteristics (constructs) are the most important requirements for the development of G2C e-service design process.

The list of important characteristics, in-addition the relative importance from the perspectives of three groups with diverse backgrounds and experience, can serve as the criteria for decision makers to select appropriate requirements through development G2C e-service. Categories and related requirements, which were elicited from RepGrid, were used as basis for each stage of TDDM through mapping these requirements with suite stage. After this, they matched with suitable design tools and methods using the mechanism of selection process (Citation analysis) to develop a G2C-SCOF and facilitate the procedure to develop the SPRF as guidelines Co-design process for G2C e-service with combination and integration of varied and diverse stakeholders throughout design process for their own services. In this iteration, a novel G2C-SCOF of combining two methodologies, RepGrid and suited design tools and methods have been presented, based on a 'citations analysis' technique, which is used to match between both of them.

The results of this iteration have been analysed in detail and presented above. This has provided the service user and service interface with a means to activate their roles throughout design process. In addition, it can help service providers through SPRF as a guidelines Co-design process. Furthermore, it can encourage them to sustainable development for G2C e-services to keep improving the provided services. The developed Co-design framework-G2C-SCOF in this iteration is expected to support various stakeholders throughout design process by designing and implementing its elements (i.e. the proposed design tools and methods) in WCP as collaborative platform, which will be presented in the next design research iteration (chapter 6) to validate the developed G2C-SCOF.

Chapter 6 WCP Development and Evaluation

6.1 Introduction

WCP was designed and developed in order to support the collaborative communication between stakeholders (i.e. Citizens as service users and Service providers) throughout the design process to bridge the requirements gap between them to improve the quality and efficiency of G2C e-service. This involves the semantic matching of selection processes between stakeholders' requirements in each design process phase with suitable Co-design tools and methods as explained in second iteration (See chapter 5, table 5.7). Iteration 3, aims to validate the developed Co-design framework-G2C-SCOF (iteration 2). This iteration demonstrates the evaluation method used through a detailed experiment using fieldwork testing, where this fieldwork comprises of two parts before interaction and after interaction with the WCP platform. Correspondingly, the specified G2C-SCOF is used as a measurement framework in the study, to investigate the use of the applied and utilised Co-design tools and methods influence on collaborative practices components (involvement throughout design process phases) and on open ideation (i.e. generating ideas) in terms of communication, interaction, engagement and participation consequence of user's experience, perspectives and feelings.

This chapter is structured as follows. Section 6.2 introduces the WCP and its features. Section 6.3 illustrates the WCP construction. While section 6.4 describes the fieldwork testing in Jordan with details of the evaluation experimental settings and the findings and discussion are presented in same section. Section 6.5 presents a general discussion. Finally, the chapter is summarised in Section 6.6.

6.2 Definition of WCP

WCP works as a collaborative communication platform between stakeholders. WCP applies Co-design tools and methods in the context of re-designing or designing new G2C e-service together (i.e. citizens, administrative employees in government agencies, and service provider). Collaboration practices between stakeholders begin from early stage of design (i.e. Co-discover-user ideation) through active participation by various stakeholders using the systematic Co-design tools and methods (See table 5.7). The stakeholders can be any one who is interested to be involved throughout design process to take an active role in some or all phases of the design process to design a service for themselves; by Co-design tools and methods provided (i.e. WCP's

tools and methods) that utilised to support stakeholders participation throughout design process. The WCP's tools and methods are illustrated in the next subsection. Figure 6.1 shows the high-level conceptual design model of WCP, which reflects the process of service design. Furthermore, it describes different parts of the implemented WCP's features and how need to interact to perform its features. Further explanation regarding the design model of WCP illustrated in section 6.3 and subsequent subsections.

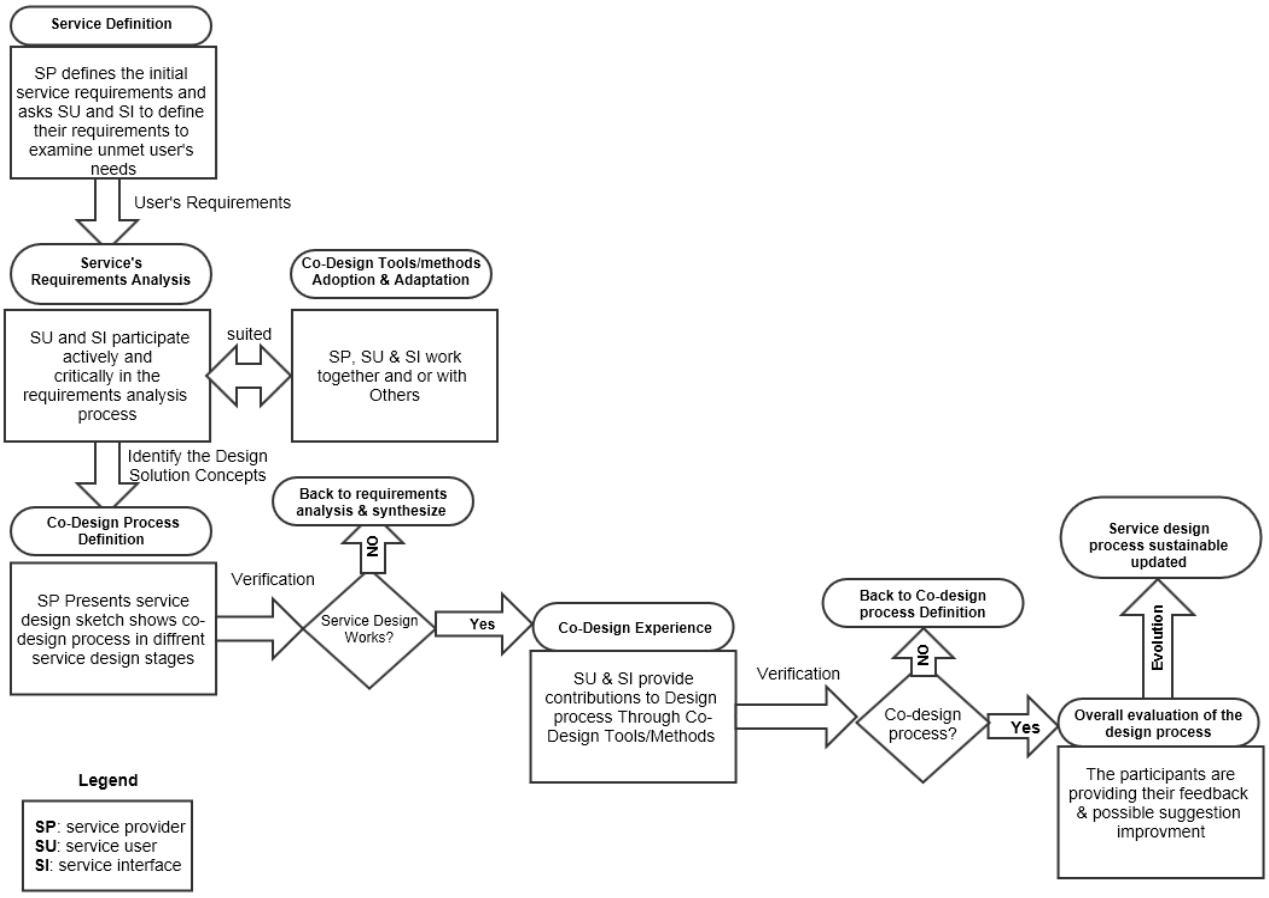

Figure 6.1: High-Level Conceptual Design Model of WCP

6.2.1 Literature Based Design WCP Features Realisation

In order to select appropriate tools and methods of service design, citation analysis results are integrated into TDDM (See figure 5.3). In this step, WCP's features (design tools and methods) were identified by linking between citations and a RepGrids results. These appear as characteristics of G2C e-service design (See table 5.7). Joining both of outputs (citations and RepGrids) provides a suitable design tools and methods for stakeholders groups (user types) as an operationalising design framework (See table 6.1) as a summarised of table 5.7.

The elicited characteristics can be used in the service design process to identify the stakeholders (user types) who are concerned with specific characteristics/requirements. Popular design tool(s) and method(s) that fit requirements can be chosen (suitable across stakeholder groups). Importantly, these tools and methods were applied in WCP to facilitate and support stakeholders' involvement throughout design process phases. A summary is provided in table 6.1.

G2C e-service Requirements/characteristics	**Design process phases**	**Popular design tools/methods applied in WCP**	***Stakeholders(user types)**
Service initiating and scoping			
User requirements	Co-Discover Phase	User shadowing	P
User perspectives		User diaries	I
Service scoping		User shadowing	P
User needs		User diaries	P, U, and I
Service studying		User diaries	P, U, and I
User opinions		User diaries	U
Questionnaires		User shadowing	U
Service planning and analysing			
Service planning	Co-Define Phase	Design Brief	P, and U
Service managed and organised			P, and I
Service analysis			P, U, and I
Income process			P
Service utilisation			U
Service concerned/requested			P, U, and I
Initial service design template			U
Service selection			U
Problem solving			U
Service categorisation			P, U, and I
Design approval			U
Service development and deployment			
Service testing	Co-Develop Phase	Scenario	P
Service implementation		Role playing	P, U, and I
Service design template		Scenario	P, U, and I
Service usability		Scenario	I
service activated		Role playing	P, U, and I
Service closing phase		Scenario	P
Service procurement		Scenario	P
Service prototyped		Scenario	P, U, and I

Table 6.1: G2C-SCOF: Identification features for G2C e-service
*P: service provider, U: service user, I: service interface

Table 6.1 includes four main columns, which reflect the significant mapping sources. Column 1 represents the G2C e-service requirements, column 2 represents the four main phases for development the service design process and which were originated by design council as "Double Diamond model", third column provides the popular design tools and methods to facilitate the design process (Co-design), and the last column characterises the stakeholders (user types) regarding the elicited requirements. The systematic process of building and developing WCP features will be explained in next section. Table 6.2 shows a brief description for each tool and method was applied in WCP. Further explanation for each design tool or method illustrates how these tools/methods were utilised in WCP to fit in each phase of service design process (See table 6.1) through describing the core functions, which were depicted in figure 6.1.

Features(WCP's tools and methods)	**Design Process Phases**	**Brief Definition**
User Dairies	Co-discover	Design method permits to stakeholders to express their own ideas or perspectives in different ways.
User Shadowing	Co-discover	Design method uses to understand how people interact with object (i.e. service) around them to understand their needs.
Design Brief	Co-define	Design tool might be realised as a written form focuses on the desired characteristics of design.
Role Playing	Co-develop	Design tool shows role of the stakeholders and acting out their interactions with a service in order to refine the design process.
Scenario	Co-develop	Design method is used to communicate the provided feedback from stakeholders, helping to improve service design.

Table 6.2: WCP Design Features

6.3 Artefact (WCP) Construction

This section presents the building and development of the proposed WCP, as depicted in figure 6.1, which shows an abstract level of WCP features. Each step in the WCP development is further described in the following sections and sub-sections. The WCP was developed based on design feature realisation (operationalising the design framework-See table 6.1). Each design feature (i.e. design tool or method was applied in WCP) will be illustrated. The 'use case design modelling' was built as design model to identify WCP's activities through defining the relation to WCP's features (Bustard and Wilkie, 2000).

6.3.1 Use case Based Software Design

The use of use-case design modelling (See figure 6.2) is carried out in order to design the WCP, showing how the use-cases (WCP's functions) are performed in terms of collaborative communication between the pre-defined stakeholders. Figure 6.1 describes WCP's elements (functions) and how stakeholders will interact with WCP's functions to perform their activities in the workspace. In fact, the developed use-case modelling (See figure 6.2) was used to define the core elements (i.e. functions) of design activities in different design process phases. The activities design features for the WCP will be explained in 6.3.1.1.

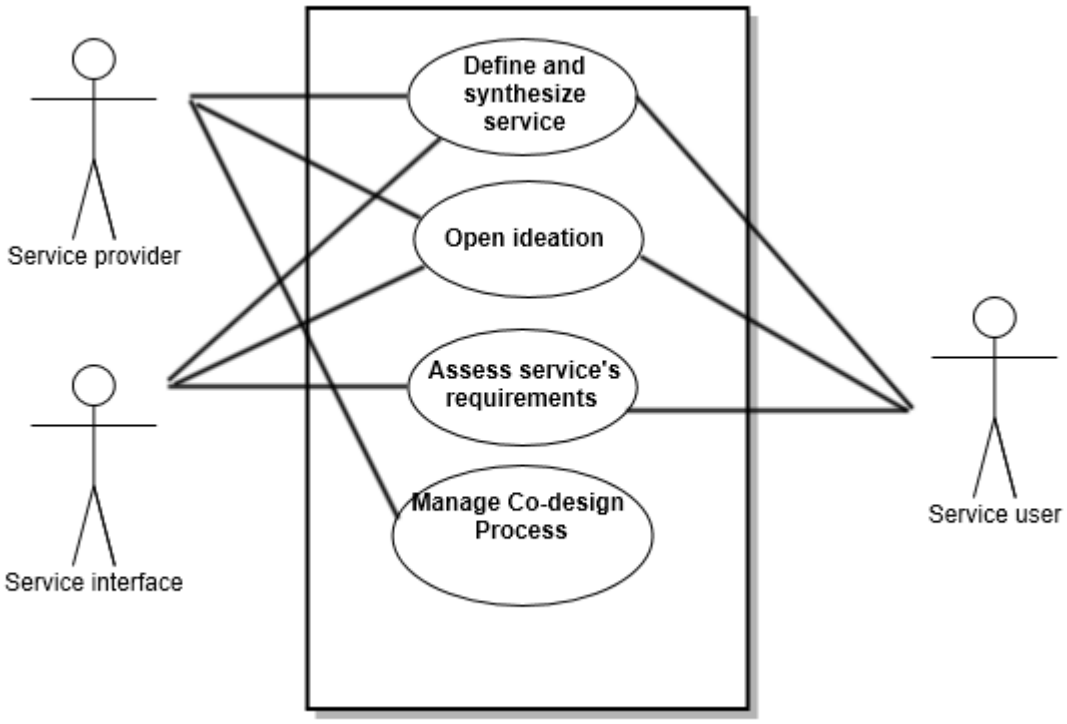

Figure 6.2: Core elements of WCP Platform

6.3.1.1 Activities of Design Features for WCP

Define and synthesize service: This function was applied in WCP by utilising 'user shadowing' in the form of 'social media tools' (i.e. FB and AOL utilised in WCP) (See appendix N-figure 1), to enable service providers to define services by posting a service definition (i.e. brief description about service, who will need it, and why they need it) in WCP platform, and/or share service definition via social media. Service provider defines the service, which is highly requested via a 'checklist' function that uses google form (See appendix N-figure 4) by service user and service interface. Thereafter, service providers share the defined service description with others (i.e. service user and service interface) to get their feedback and perspectives. Service interface and service users read and synthesize the service definition, and provide their feedback via social media tools provided in WCP by exchanging ideas and views using commenting

option. Afterwards, service providers review and discuss these ideas/views (end users' needs) with service user and service interface in order to manage these views/ideas to be able to address and consider throughout define service's requirements.

Open ideation: This function is for all participants, and it was applied in WCP by utilising 'user diaries' in a form of 'simple blog forum' (See figure 6.3). Participants are interacting and posting their feedback through discussion forums as asynchronous online posts/comments. These posts or comments contain text reflecting participants' ideas and views regarding specific topic. Discussion blog forum shows some detail for each participant to post or comment – capturing username of the participant, signature and time of writing. Furthermore, the discussion blog forum can be used for ideas ideation and exchange experiences. Discussion forum fosters brainstorming for participants through idea posting and exchanging ideas and views with others. Participants' may also be able to add feedback. For example, write their own ideas, views desires or observations as posts. Typically, service providers may provide ideas regarding the service design solution. Hence, the service user and service interface are asked to comment on the proposed ideas or views and generate their own ideas/views.

Assess service requirements: This function is for service user and service interface. Participants get the opportunity to assess the service design requirements/characteristics, derived based on define and synthesize function. This function is applied in WCP as a 'design brief' tool and utilised in the form of 'rating and voting' option using five scales in the form of five stars (See figure 6.4). Furthermore, the voting option counts the number of participants who have participated in assessment process. This option will calculate the average rating for each characteristic, which was rated by number of participants. Furthermore, the participants also can post their feedback by utilising social media tools.

Manage Co-design process: This function was applied in WCP by utilising 'Role Playing' and 'Scenario' design tools in the form of 'SPRF' (See figure 5.4) as a guideline in Co-design process model using BPMN. Service providers have authority to manage the G2C e-service design process, based on the feedback gained from service users and service interface, through exchanging each others ideas and views via social media tools, in order to synthesize the design process to fit with their expectations and experience. The 'Gliffy drawing tool' (See appendix N-figure 8) as an online tool was utilised in WCP to facilitate the Co-design process management (i.e. editing) for service providers. Furthermore, the Gliffy tool is provided with video tutorial guides for service provider to explain how it can be used. Service user and service interface can

post/comment their views and/or ideas in WCP platform and/or share it with others. The SPRF as a Co-design process template will be continually updated based on participants' feedback to fit with diffrent experiences.

6.3.2 WCP Building and Development

The WCP's features (See table 6.2) was developed using a software application called 'Mediawiki' version 1.22.8. It is written in the PHP 5.3.2 programming language and uses a backend database MySQL 5, and was installed in Microsoft's WebMatrix3 as platform server for operation purposes. The core elements adopted in WCP are presented in table 6.2, which can be used and combined to enable of usage the variety Co-design methods and tools. WCP is technically based on an open source content management system Mediawiki. Furthermore, it consists of professional extensions have been utilised for development WCP's features (such plugins that can be flexibly taken into use, depending on what kinds of tools need to be installed in the workspace). The WCP itself was not the main interest in the research context, due to the fact that it was developed as an individual exertion with limited time.

Mediawiki was chosen to support the functional requirements for developing WCP's features, namely encouraging people to participation.

6.3.2.1 WCP Prototyping as Collaborative Co-design Platform

WCP is an innovation workspace (WCP-platform). The innovation workspace was produced in WCP by realizing a number of features (core elements as pre-defined in table 6.2). For examples, generating checklists for possible services, creating an account, upload media that informs design, search, a toolbox including options and text boxes for providing feedback on the service design process. WCP was built on open source content management system where stakeholders' generate their ideas, perspectives, and stories through playing an active role throughout design process. Furthermore, social media tools are used for sharing these ideations. Figure 6.3 shows the user interface screenshot of WCP's homepage. Figure 6.4 shows a simple structure blog forum that encourages participants to make preliminary contributions. Figure 6.5 shows rating and voting features, granting participants the opportunity to assess the service design characteristics. Each participant has an account that enables them to build his own characteristics within the WCP workspace. See appendix N for all interfaces screenshots of WCP.

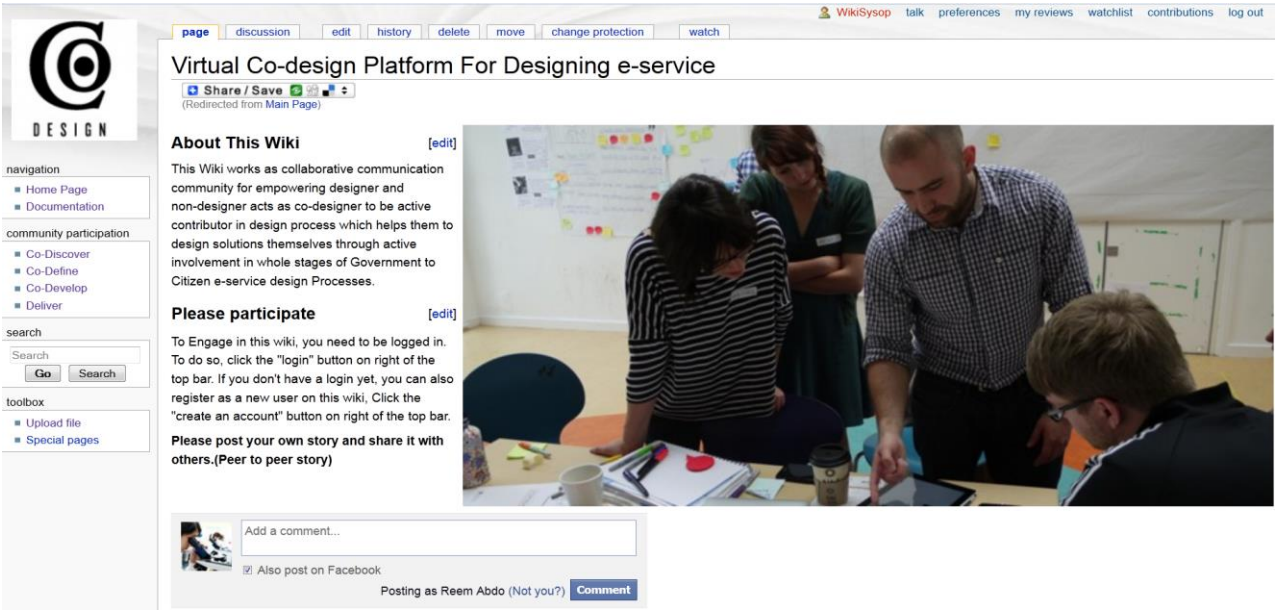

Figure 6.3: WCP's Homepage

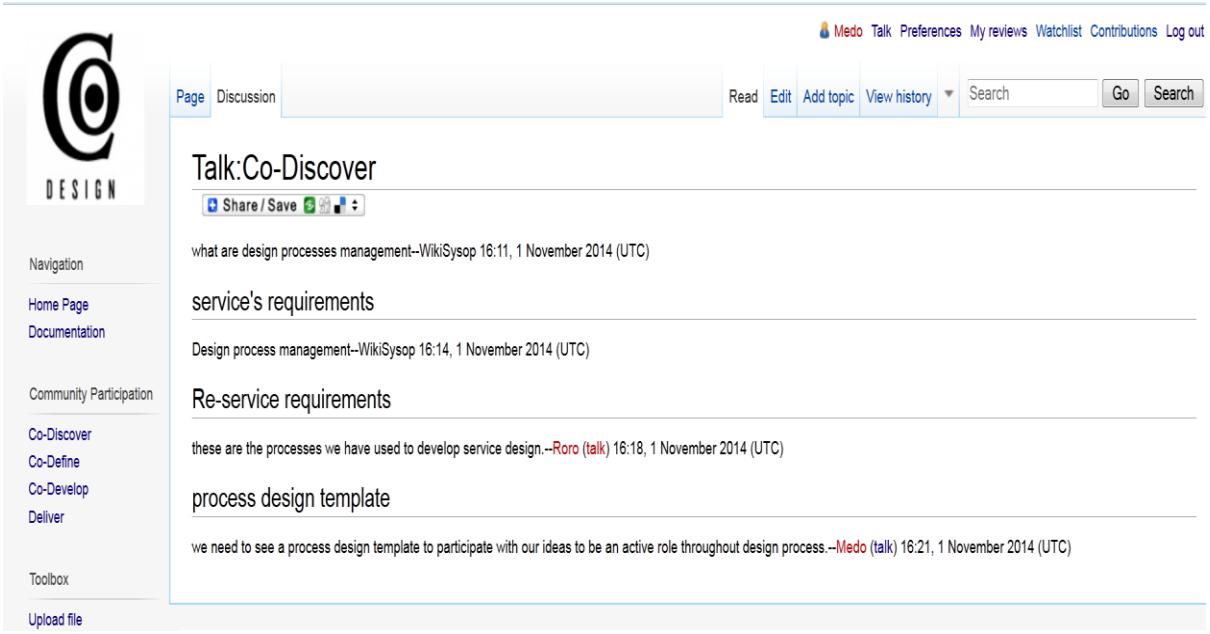

Figure 6.4: Discussion Forum as asynchronous online messages

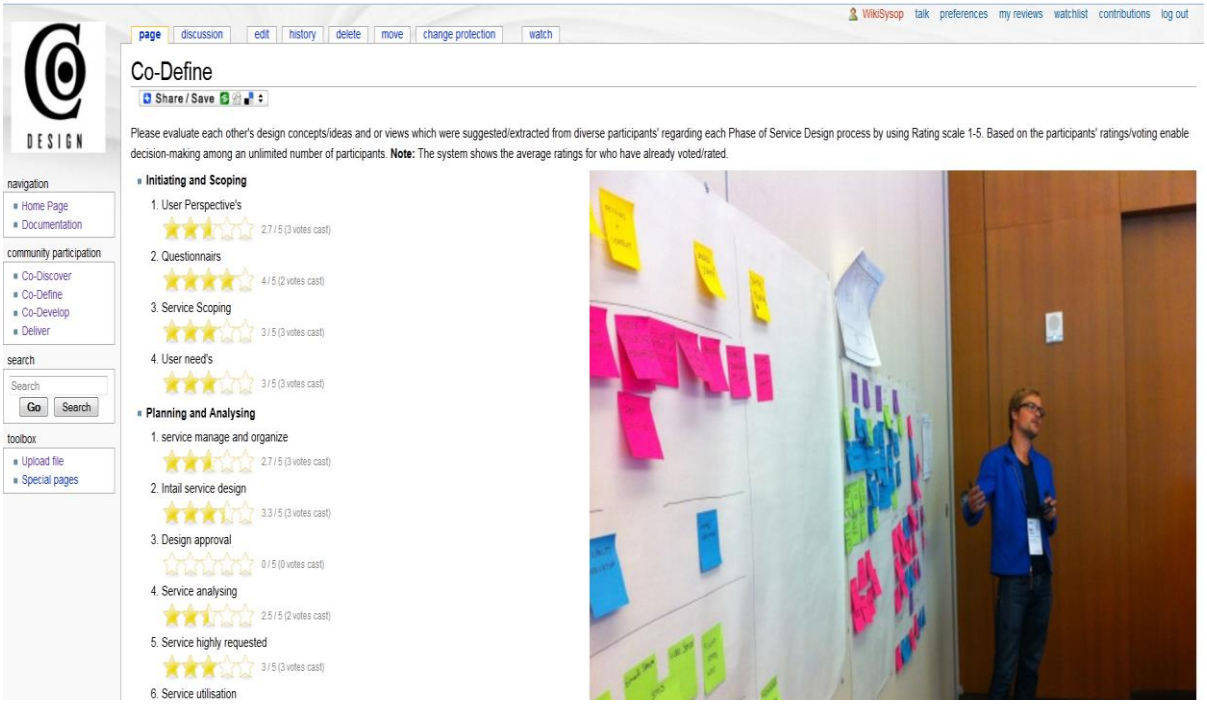

Figure 6.5: Rating and voting for each service design characteristic

6.4 Fieldwork Testing

The fieldwork was conducted in Jordan as case study using the focus group discussion (FGD) interviews. See Chapter 3 for further detail about the method. The fieldwork testing enables the design instantiation (WCP) to be evaluated.

6.4.1 Design an Experimental Protocol

The participants were requested to carry out the following procedure as summarised in table 6.3. Firstly, the participants were asked to sign an inform consent form and asked to complete the background profile questionnaire (demographic). After presenting a short introduction about the proposed prototype (WCP) and its features, participants were given ten minutes to describe their individual roles and further minutes to complete their roles (i.e. roles operations) to make sure they verify their understanding according to task roles. The FGD sessions lasted between 45 and 60 minutes in total. FGDs' sessions were recorded by researcher, who then moderated these discussions. Subsequently, the participants began to collaborate with the planning task based. The internal service provider who is responsible for supplying the service to service users shared storie(s) regarding specific service definition (including service requirements). Furthermore, the service provider was also requested to share information and invite people to engage in the WCP

and then review and track other groups' (service user and service interface) - encouraging others to share and exchange ideas.

No	List of Procedure steps	Input/output
1	Arrange an appointment with pre-defined participants (including 3 groups).	Group composition-see table 6.4
2	Participants will be informed to sign an inform consent form.	Get permission to tape-record the interviews discussion.
3	Participants will be asked to complete the background profile questionnaire.	Various and diverse participants to ensure about the representative sample.
4	Provide them with a brief introduction/description regarding the proposed system and its features.	Introduce the system aim/engaged into system
5	Pre-test interview through asking participants some questions.	Ask questions/Completed pre-test Interview (preliminary interview)
6	Participants will be given ten minutes or less to describe them about their individual roles regarding each group for each phase of service design.	Roles (written in research protocol)/verified their understanding of their task roles.
7	Participants begin to collaborate on the planning task based on group roles.	Participants involved in design/system tried and tested.
8	The 'service internal provider' will be instructed to share a scenario regarding the specific service nature including service requirements and the stakeholders who will use this service. Furthermore, they also will be requested to share info, review, and invite people to engage into the system.	Service introduction scenario (mention in research protocol)/ designed an initial service template
9	Service user and service interface will be asked to participate and collaborate in the proposed system through using system by give them chance to use its features such discussion forum, blog, rating/voting, probe post/comment, and provide feedback regarding the design process.	Recruitment the stakeholders' in the design process through the proposed co-design tools /taped-record the interviews (voice).
10	Post-test interview. Once they finish the specified task roles, the researcher will do an interview with them through focus groups discussion through asking specific questions.	Task roles/ Post-test completed interview (voice-record).

Table 6.3: List of procedure steps are following through FGD

During the fieldwork testing, researcher worked with service interface and service user as they used the provided service as well. However, service interface may have more experience as mediator between service provider and service user. Service interface typically face problems when supporting G2C e-service design and operation.

The last two groups were asked to participate and collaborate in the proposed prototype through testing the prototype by give them chance to use/try the prototype features and provide feedback regarding the design process. All of these features will enable participants to share and exchange one another's ideas and views, which may be contribute to improving the effectiveness of the service design to meet their future needs. Once, they finished their specified task's roles. The

researcher conducted semi-structured interviews with participants using FGD in order to ask specific questions. The FGD interview included pre-test question and post-test questions as research protocol for this fieldwork (See Appendix I) to be able to assess each single feature of the proposed prototype through providing a qualitative feedback.

6.4.2 Participants

From mid-April until mid-May 2014 the fieldwork was conducted including eight focus groups: two groups of service providers (n = 8); three groups of service interfaces (n=12) and three groups service users (n=12). The sum total of participants is 32. Table 6.4 summaries the social demographic variables. For more detail about sampling and group composition, (See chapter 3-iteration 3).

Focus Group Number: Each sub-group comprises 4 participants				
Total				
	1 (n=8)	2 (n=12)	3 (n=12)	32
Age group (years)				
19-24	--	2	2	
25-34	1	4	5	
35-44	4	4	3	
45-55	3	1	1	
Above 55	--	1	1	
Gender				
Male	5	8	5	
Female	3	4	6	
Education level				
High school	--	--	--	
College	--	2	3	
BSc	3	6	6	
MSc	4	3	1	
PhD	1	--	1	
Other	--	--	1	
ICT skills & competency				
Very low	--	--	2	
Low	--	1	3	
Average	1	4	5	

High	5	6	2
Very high	2	1	--
I do not know ICT	--	--	--

Table 6.4: Demographic characteristics of focus group participants
Note: Group 1: service provider; group 2: service interface; group 3: service user

6.4.3 Analysis and Results

6.4.3.1 Qualitative Data

As explained earlier, 32 semi-structured interviews were conducted using FGD with participants, who had on average a good experience, interest and background related to domain context (i.e. e-Government service design), in order to gain quality of qualitative data. The research protocol (See appendix I) was about two main sections (pre-test interview questions and post-test interview questions). The FGD interviews were analysed using inductive thematic analysis (Braun and Clarke, 2006) (See chapter 3-iteration3). Given the advantages for its structure and procedures to be fixable, and it can be used to capture the dynamic and evolving nature of events (Patton, 2005).

6.4.3.2 Findings and Discussion

6.4.3.2.1 Pre-test interview questions

Service provider groups background and experiences

In the service provider groups (MoICT and NITC), participants joined to participate in WCP evaluation for numerous reasons from idealistic (making a better service) to individual aims (looking for connections and or association to other stockholders). A number of questions were asked by researcher (Pre-test interview questions, See appendix I), to get knowledge about participants' background and experiences regarding software development, Co-design approach including Co-design tools are used or using, and end-users involvement throughout design process, and e-Government services are used regularly in their life, which are summarised in table 6.5.

Subject/topic	Background and experience/Theme	Examples of participants answers
Software/service development (row 1)	Lack of expertise	"In-fact the service provider who responsible about service strategies and polices not service development. So, we send the service requirements to private development companies"(

		NITC.2)
e-Government services using (row 2)	poor of ICT infrastructure and e-services awareness	"There is no advertisements and propaganda about these services" (MOICT.2) "I used anon-criminal certificate but still this service not fully developed as we need regarding infrastructure problem and some policies restrict us to deal this type of services electronically" (NITC.2)
Co-design tools as users (row 3)	Difficult topic to talk about	"This issue is new for me I didn't hear about it before" (MOICT.4) "I didn't know about it" (NITC.2)
Co-design tools approach used in software development (row 4)	Positive talk with some concerns	"sure it's important idea but I refused the idea of participate service user in design issue" (MOICT.4) "Good idea but still difficult to implement in our third world country regarding ICT infrastructure or people awareness and mentality" (NITC.1)
End-user involvement in design process (row 5)	Absence of User-involvement	"we didn't actually involve any end-user in design process, what we have had no more grant them an opportunity to provide us with feedback regarding e-services provided" (all MOICT & NITC by consensus)

Table 6.5: Service providers (MoICT & NITC) background and experience

Table 6.5 shows the identified background and experiences which are, listed in it with examples from participants' interviews as quotations. This table consists from three columns: subject/topic, background and experience (Theme) and some examples from participants' interviews. In the MoICT and NITC groups (internal service providers), participants had a lack of expertise and found this a difficult topic to talk about in terms of software/service development and Co-design tools users. However, those participants are given a poor ICT infrastructure and e-services awareness. However, positive talk with some concerns regarding end-user involvement, e-Government services usage, and Co-design approach.

The extracted findings (i.e. Themes) reflect an overview of internal service providers (MoICT and NITC) and show the lack of expertise in service development. They acknowledged that the service design and implementation are undertaken by private software companies. Hence, they are only responsible for service planning and strategies (for example, NITC.2-table 6.5 row 1); which leads, to lack of knowledge and relatively away from service design processes (e.g. the

process of translation the requirements into real services for using); this factor shows the requirement gap between service provider and service user. Furthermore, the service providers claimed that the delimited use of e-Government services was due to poor ICT infrastructure and the awareness for these services (for example, MoICT.2 and NITC.2, See table 6.5 row 2). Service providers were surprised by this issue, and had no real knowledge or experience before (for example, MoICT.4 and NITC.2, See table 6.5 row 3). However, they showed willingness for using these tools in future to improve the service development processes (for example, MoICT.4 and NITC.1, See table 6.5 row 4). The last theme shows that the role of end-user is still absent and or passive regarding the involvement in the entire design process and they claimed those people (citizens') still not yet ready to involve due to their mentality and ICT experiences. All participants in both groups acknowledged this issue (See table 6.5 row 5).

Service interface groups Background and experience

This group includes three sub-groups (CSB, INT, and CSP); participants joined to participate in WCP evaluation for same reasons of service provider groups. Researcher was asked the same questions as have been asked before to service providers groups, to maintain consistency between these groups and facilitate to extract the similarities and differences between them, based on subject/topic mentioned earlier in table 6.5.

subject/topic	Background and experience/theme	Examples of participants answers
Software/service development (row 1)	Lack of expertise	"not that much but I have some experience related to our department like develop some software's to facilitate our works" (CSB.2) "we don't have experience about this issue at all" (INT.1,2,3,4)
e-Government services using (row 2)	Lack of usefulness/ineffective and awareness	"Once I used the Jordanian government portal I did find something worthy or deserve all websites provided are info services rather than transaction services" (CSB.4) "I limited used them because they as information services for inquiring no more" (INT.3)
Co-design tools as users (row 3)	Difficult topic to talk/ Lack of Willingness	"No comment. It is new topic for us" (CSP.4) "No, I'm not sure about this term Co-design" (INT.1)
Co-design tools approach used in software	Positive talk-satisfaction, empowerment	"yes of course it will be good idea and worthy if we know how to deal with it and when" (CSB.1)

development (row 4)		"It is the best means if recruit in prober way" (CSP.2) "The interaction between all parts is very important" (INT.2)
involvement in design process (row 5)	partial marginalisation	"In-fact No, because this thing is new for us especially in third world country" (CSB.1) "We didn't actually involve in any design process, what we have had no more give a feedback regarding service responding." (CSP.1,2,3,4) "in general No, we are not participated as service user , just we are as service recipients like service user" (INT.1)

Table 6.6: Service Interface (CSB, INT, and CSP) background and experience

Table 6.6 presents very close findings (themes and orientation) comparable with service provider groups, with a slight different regarding the subject of involvement in the design process; in this group reflects 'partial marginalisation' as mentioned in table 6.6 row 5 with provided a quotations as an evidence. However, other areas show very close answers, as illustrated in table 6.5. Researcher justifies these quite similarities regarding both groups (service interface and service provider) "as both of them are working based on planned strategies which posed, based on Jordanians' government policies and some business issues" (service director in Jordanian e-Government portal).

Service user groups background and experience

The final group includes three sub-groups (VDC, USL and T). It is primary group for this research project as they use the services. The researcher extracted the participants' background and experiences regarding same subject/topic that were asked about and where is summarised in table 6.7.

Field/area	Background and experience/theme	Examples of participants answers
Software/service development (row 1)	No experience and or knowledge	"No experience or knowledge at all"(T.1,2,3,4) "No experience or knowledge at all"(USL.1,2,3,4) "I was working as programmer to change some systems form traditional to computerised system. For example, accounting system, and banking system" (VDC.1) "I only work to develop just simple websites for graduation

		projects for undergraduate students"(VDC.3)
e-Government services using (row 2)	Lack of service quality and service significance awareness including (depersonalisation and complication)	"In-fact I don't know if we have something like that, no one talks to us about this issue and what the services provided"(USL.2) "I used civil status and Traffic violations and fuels support service, and were these services somehow difficult regarding some pugs"(VDC.1) "I didn't know if we have e-government portal includes e-service for citizens."(T.4)
Co-design tools as users (row 3)	Difficult topic to talk/ Lack of knowledge	"No sorry I don't have any experience about that."(T.3) "Actually I didn't use anything like that."(USL.3) "Just when I was studying I dealt with software like FrontPage." (VDC.4)
Co-design tools approach used in software/service development (row 4)	Positive talk-enthusiasm, empowerment	"yes sure, if we work as a team to develop something, it becomes of great value, work as a collaborative communication environment will positively effect the output."(T.2) "It's encouraging us to participate more to extract the common sense from end user and employee it in design process." (USL.2)
involvement in design process (row 5)	Completely marginalisation/ignoring	"No participation at all in service design process" (T.1,2,3,4) "Actually no, I didn't remember something like that"(USL.1) "I just gave feedback especially when I was browsing some system, and provided them with reports as pop-up and I got answer from them regarding my issues" (VDC.1)

Table 6.7: Service User's (VDC, USL and T) background and experience

The participants showed a slight difference regarding their background and or experiences in all subject/topic were asked about as explained in table 6.7. As other participants in earlier groups, they showed no real experience or knowledge regarding service/software development (row 1-examples of participants' answers). However, participants (service users) have contradicted service providers' (who highlighted ICT and user awareness). They highlight service significance awareness and service quality (row 2-examples of participants' answers).

Regarding the using Co-design tools, service users did not show any different perspectives from previous groups (service providers and service interfaces) (row 3-examples of participants' answers). However, service users showed a real enthusiasm and interesting to adopt these tools in future to facilitate their participation throughout design process for their own services to meet their needs as they expected (row 4- examples of participants' answers). The last theme was about involvement throughout design process based on their services; the majority of them ensured that they were completely marginalised to be part in the development of G2C e-service design process (row 5- examples of participants' answers).

6.4.3.3.2 Post-test interview questions

Participants were asked a number of questions (See appendix I) to evaluate WCP effectiveness (i.e. facilitation and usefulness) as platform for open ideation and collaborative communication between stakeholders through a range of design tools.

Four key themes and six sub-themes emerged. All themes and sub-themes were found very close together between service provider groups' and service interface groups', which were expressed by participants' based on their subjective perspectives, feelings and experiences after they tried/used a range of design tools applied using WCP's features.. Hence, the thematic map overarching both groups has been built (See figure 6.6). However, these groups have a level of diversity regarding their own perspectives about the opportunities and challenges for applying co-design approach, which involves service user throughout design process. Figure 6.5 provides a summary of the thematic map, regarding participants' responses to list of post-test interview questions (See appendix I). This provides the evaluation for WCP, accessing effectiveness (i.e. usefulness and facilitation) of these Co-design tools and methods applied using the WCP through each phase of service design process and how could match their experiences and perspectives.

The four major themes and sub-themes have been identified, and where each theme is interpreted and discussed.

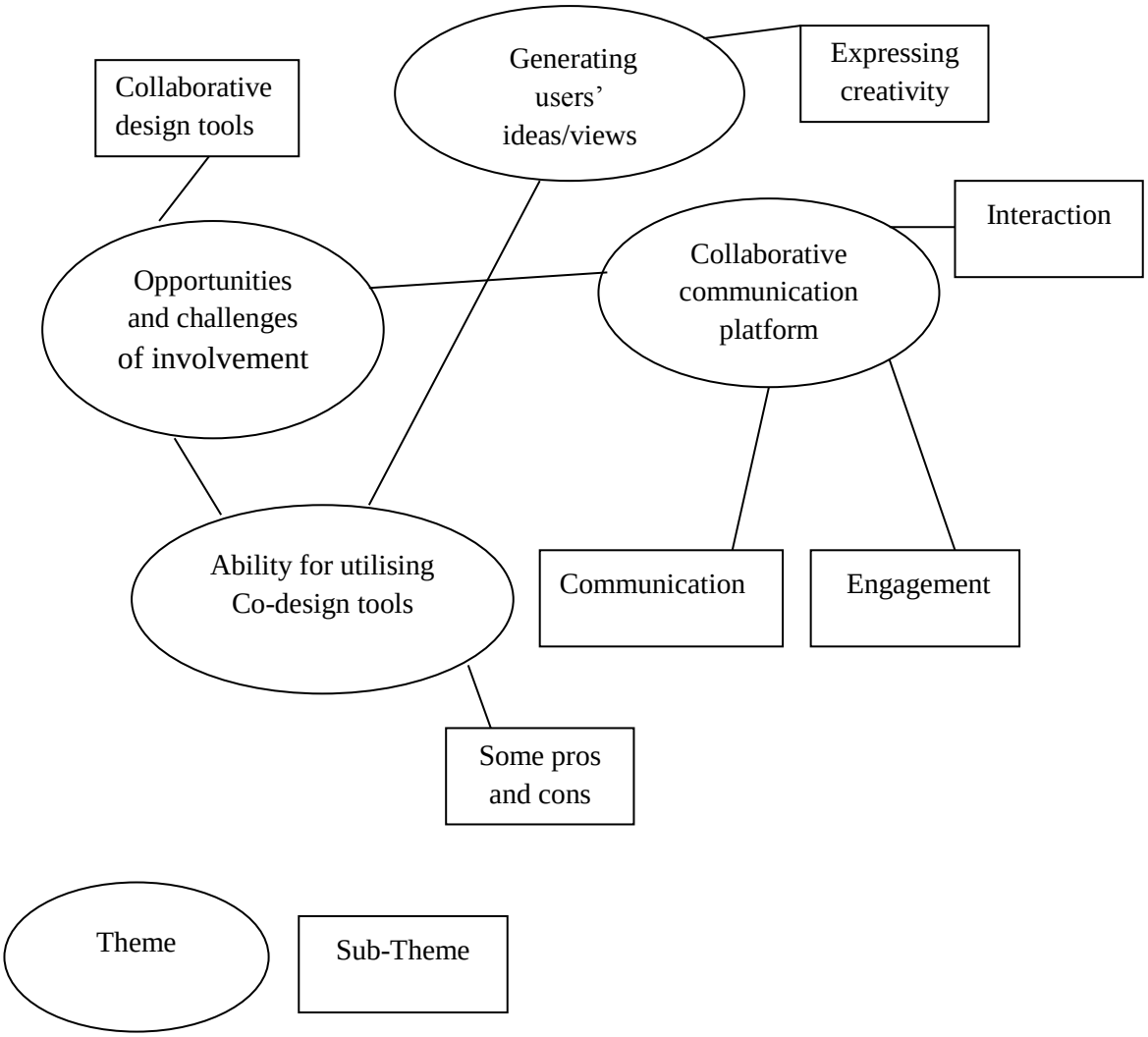

Figure 6.6: Thematic map, showing the major themes and sub-themes regarding service provider and service interface groups.

1-Generating users' ideas/views

A number of Co-design tools and methods have been utilised for generating innovative ideas/views as applied in WCP. User diaries and user shadowing (e.g. Forum-based discussion and social media tool respectively) as examples of design tools were used to base ideation on users' own stories and needs. These tools were utilised to facilitate communication between participants (e.g. This facility granted participants an active role in addressing one other issues or regarding specific topic to trigger ideas). Two specific methods/tools ideated the participants' ideas and views: 1) idea posting and sharing 2) asynchronous online messages – as described in more detail in section 6.3. Ideas are posted on the WCP and available to everyone. The initial ideas are typically based on participant knowledge and perspectives through the exchange of ideas/views.

"This system aids us to generate our ideas and contribute in a direct way to any issue" [MOICT4]. *"Somehow very good. Further, this platform can support us to express our ideas and contribute in the service design"* [NITC3]. *"I can say I had a good experience, and felt social media tools very*

important tools to share our ideas with others" [NITC2]. *"It was very good experiment by using the tool like discussion forum which assist me to express what I have in my mind in easy way"* [CSB4].

2-Collaborative communication platform

A majority of participants reported positive experiences when they were trying the prototype, and even considered it a more pleasant and fun approach. Service interface groups were participating in an efficient way. The participants mostly felt that engaging together was more meaningful. However, one participant from the service interface group asked for more usability improvement (i.e. apply a demo (video tutorial) to assist different people who come from diverse background how to use system in easy way). This key theme was found by collapsing two themes together (e.g. user participation and communication and collaborative Co-design platform) due to insufficient data support them.

"It was a positive experience through engaging with system, in a quick way and I felt it worked well and really i engaged and participated with others'" [NITC1]. *" It was good that this system provides participants different tools which allowed them to participate in different level of design and would be appropriated with their expectations"* [MOICT2]. *"Okay, so I agree with my colleague NTC1 it provides the participant a kind of facilitation to interact with other participants'"*" [CSP4]. "*The platform shows a fully support through interacting and communication with others by available communication tools like social media (FB)"* [INT2]. "*I advise you to add a demo to explain how to use system to make it useful and easy to use"* [CSB.2].

Participant responses showed that the most popular Co-design tools/methods (rating/voting, blog-based discussion (post ideas) and social media) facilitated the involvement of stakeholders throughout different stages of the service design process.

"I think the blog tool and rating both of them are very valuable to aid participants during design process" [MOICT4]. *"Blog/post tool for exchange ideas and post scenarios"* [NITC1]. *"The rating/voting design tool to evaluate each other idea"* [CSB1]. *"The social network tool is a very interesting tool to share our ideas and views"* [CSP2].

3-Ability for utilising Co-design tools

Service interface groups joined in this evaluation to share their own perspectives to improve or expand the different stages of the iterative design process by learning more about WCP's features, how they are going to represent diverse stakeholders, and participate in e-service design process. Furthermore, WCP's features are able to encourage stakeholders to participate in discovering and defining design issues in different stages, rather than developing and evaluating

design solutions. However, participants can do their best when defining and discovering the design problem/issues and the design solutions for each stage of design process.

> *"We need to see the service user involves actively in stages of discover and define rather than developing and delivering; because regarding my perspective these stages are too sensitive and if service users are involved actively in earlier stages"* [CSP1&2; INT1; and CSB3]. *"I think the participating in all stages of the design process is not necessary"* [NITC1].

Service provider groups supported the earlier suggestions from the service interface. However, they focus more about the approach of fitting Co-design tools to be situated with each design process stage, which will aid participants in tailoring their perspectives. Furthermore, utilizing the standard design stages with suitable design tools could support/facilitate the elicitation of service users' unmet needs, and this in turn would affect the in service design process effectively.

> *"In some ways, I see the idea of my colleague* [NITC.2]. *if implemented in right way and recruitment the suitable design tool to elicited service user needs it will influence service design in an effective way"* [NITC1] [MOICT1&3].

At the end of the discussion (post-test interview) regarding design process stages for e-services, a number of participants who belong to service provider groups had some concerns regarding the way of involvement throughout design process phases. They then recommended some suggestions to involve service users throughout discover and define phases rather than develop and deliver phases; arguing that end-user will be actively engaged in the first two phases as they can express their needs and suggest some possible design solution included their requirements. While the last two phases as sensitive phases require high effort and creative skills especially from uneducated people. However, the researcher explained to them that this stage (deliver stage) does not include the Co-design stages in this research project regarding the reasons were explained in chapter 5.

> *"From my opinion I see it is as better if the evaluation phase could be improved through the use of an easy technique to assess the design process rather than write a feedback through textbox/paragraph to save effort and time"* [NITC3&MOICT1]. *"we need to see the service user involve actively in stages of discover and define rather than develop and deliver because regarding my perspective these stage are too sensitive and if service users involved actively in earlier stage I'm sure the service will meet their expectation which is included service requirements and identify the problem and proposed the design solutions"* [MOICT.2]. "*I would like to see the service user involve*

actively in stages of discover and define rather than develop and deliver because regarding my perspective these stages are too sensitive and if service users involved actively in earlier stage" [CSP.1].

4-Opportunities and challenges of Involvement

The service interface groups showed more enthusiasm than service provider groups regarding the adoption of these tools used as a facilitation approach to bring different stakeholders together throughout design process. Service providers still have some concerns regarding the service user participation such a people awareness and mentality, especially in a developing country like Jordan. Furthermore, the people there are not prepared well to interact with this type of technology. However, service interface groups have different opportunities and they tried to reduce these concerns and sort them out by adopting Co-design tools by selected a random stakeholders from various and diverse communities in order to engage participants in more spontaneous way.

"It is a Good idea, but it is still difficult to implement in our third world country regarding ICT infrastructure or people awareness and mentality" [MOICT1&2]. *"Sure it's an important idea, but I refused the idea of participate service user in design issue. May we develop several design templates then ask users to give feedback by using voting/rating"* [NITC1]. *"Of course it is important step but we still have some concerns like should take in consideration in which phase he/she should participate and how will participate"* [NITC3]. *"The Co-design should be between three parts: service user, service provider and service developer"* [CSB4]. *"Furthermore, it would be good if we developed design tools for various and diverse service user to able those to participate in design process for their own services used"* [CSP2].

Service interface groups were different from service provider. They spoke about improvements and how they can adopt these improvements to enhance the proposed prototype (WCP) rather than focussing on the limitations and shortcomings with respect to service provider suggestions.

"I don't know if there is an opportunity to add some tools to be compatible with disabled People" [CSB1]. *"I advise you to add a demo to explain how to use system to make it useful and easy to use"* [CSB2]. *"Moreover, if you try to simplify each stage of design process to make all citizens have ability to involve in different stages through reduces the stakeholders' space of writing or reading"* [CSP3]. *"It would be good if you added a tutorial video to explain system for those people have limited knowledge in ICT"* [INT4].

Service user groups

Three key themes and ten sub-themes emerged from service user groups. These themes and sub-themes were similar to service provider groups and service interface groups. However, key themes were different based on characteristics (some potential themes were collapsed into others). A thematic map was built to represent these themes associated with service user groups. However, service user groups have similarities in their own perspectives about the opportunities and challenges may confront the adoption of Co-design methods and tools, the participation and collaboration with others and open ideation (i.e. participants' ideas).

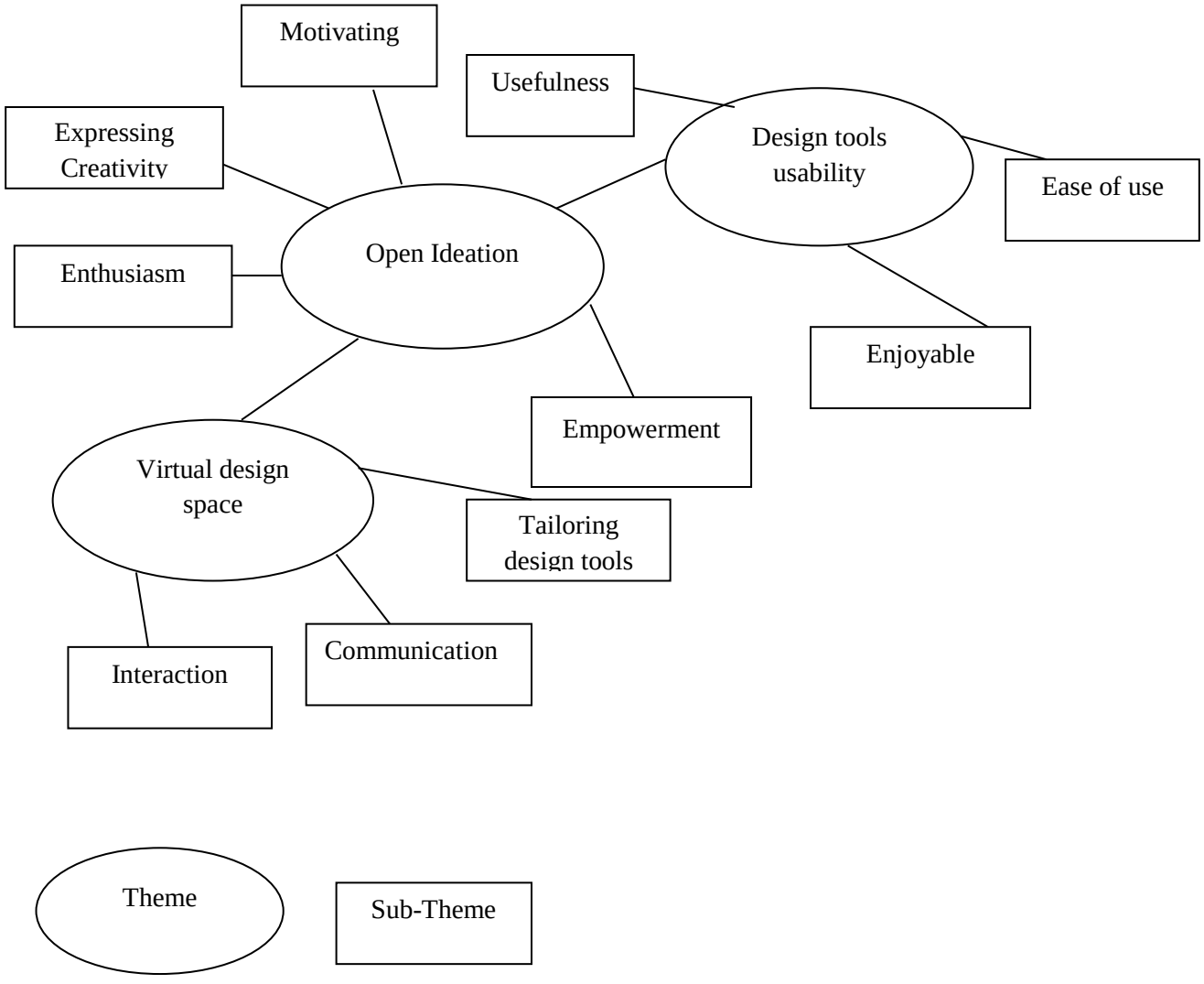

Figure 6.7: Thematic map, showing the major themes and sub-themes regarding service user groups.

Figure 6.7 summarises the thematic map of participant responses to a list of post-test interview questions, (See appendix I) asked before to service providers and interfaces groups' about WCP as a collaborative communication platform.

1-Open Ideation

This theme includes four sub-themes, as depicted in figure 6.6 and was built based on participants' perspectives and feelings across three sub-groups. In-fact, they showed their excitement and enthusiasm through were trying/using the discussion forum-blog (asynchronous online messages) feature. Open ideation is generated in the form of brainstorming through idea posting and discussion with others. The exchange of ideas and views between different participants took place irrespective of place and time. In addition, discussion forum-blog helped them to express their creativity. Ideas or views begin from early stage of design process (i.e. discover phase) when participants start express their needs.

> *"It allowed me to express myself without effort and if they really take our ideas/views into consideration"* [T1]. *"Just I want to add this system which may help participant extract his/her creativity in a-direct way"* [USL1]. *"Especially the input box tool service allows me to generate my Ideas and feel free; I'm not obliged with your choices"* [VDC2]. "*Carried out my ideas spontaneously such like brainstorming regarding my views*" [VDC3].

2-Design tools usability

This theme was obvious that the participants started to express their experience by referring to certain salient design characteristics related to WCP features for the proposed workspace environment in terms of ease of use and useful (sub-themes). This reflects simplicity of use as no need third party help was needed. Furthermore, WCP was considered by participants using the written guidelines provided.

> *"I think it was very good and not strange and did not take me a long time. Some of the features were known before, like checkbox or rating and dealing with social network"* [T1]. *"Almost perfect and nice experiment as first time deal with collaboration system allows me to be an active component in design process"* [USL4]. *"I think the most significant thing in this system it is explained self so no need to video tutorial just needs to read the notes and go ahead"* [T2].

Characteristics of WCP's features (e.g. usability will encourage the opportunities for increasing participation and share experience and/or exchange ideas with others in an easy and simple way with minimal effort. However, only one participant talked about challenges it being a bit difficult to fit all stakeholders knowledge or experience depend on their intellectual.

> *"Very good system just may be a bit difficult to fit all people knowledge and abilities especially if you deal with third world country"* [USL2].

Participants who had a positive experience tended to require minimal effort when using WCP, the WCP design allowed participant control over the collaboration and participation throughout the design process for their services. In addition, WCP effectiveness is seen in the communication between stakeholders as main functions supports involvement throughout design process. The participants refer to the online Co-design tools and methods platform for expressing their experience and ideas.

> *"I'm happy and had nice experiment with other people through an active role by using social networking for posting or sharing"* [USL4]. *"Yes, I had vital role, through the discussion forum I generated my ideas and replied to others through asynchronised messages"* [VDC2]. *"I agree with my colleague T1 that the discussion was a fascinating through social networks asynchronous messages help exchange ideas to reach to correct or right ideas"* [T2].

3-Virtual design space

This theme represents an essence theme that combines most of the proposed WCP's features. As some literature shows the significance of collaboration design; hence in the virtual design spaces (such innovation workspace supported this prototype) (Buur and Bødker, 2000; Nambisan, 2002) virtual spaces support opportunities for collaborative design (Co-design). As an evolving area, there is still need for further research into how the potential of the various Co-design tools would be utilised in an appropriate way to be fit with design processes.

The participants show their satisfaction by using the provided Co-design tools and methods with virtual Co-design space. The appropriate co-design tools that facilitates the elicitation participants' perspectives and needs are: 1) Rating and voting, which allows the participants to evaluate each other ideas, 2) Blog-based discussion to Post and share their experiences to exchange ideas/views with other, and 3) social media tools such Facebook, which are facilitated and expanded knowledge through interacting with others and broadcast their opinions. Some examples as evidence to show the participants' responses regarding the valuable Co-design tools aid/support the participation throughout design process of G2C e-service.

> *"The social network tool is a very interesting tool to share our ideas and views"* [T2]. *"I think the blog tool and rating are both very valuable to aid participants during the design process"* [T4]. *"Blog/post tool for exchange ideas; and post our story scenarios"* [USL3].

6.5 General Discussion

Design of services not just takes into consideration how the service will be usable, but also engage stakeholders in design process to make them engage with their services. Thus, the main goal of Co-design is to bring different people into the design process through collaborative

communication technologies (Wilkinson and De Angeli, 2014). The fieldwork testing aimed to evaluate WCP's features (design tools and methods) that were applied and utilised in WCP based on research participants' preferences and perspectives regarding the use of WCP's features to support them to involve throughout design process. The findings (See figures 6.6 and 6.7) regarding the inductive thematic analysis, as a set of key themes and sub-themes have emerged from service provider and service interface groups. More precisely, four key themes and six sub-themes emerged through inductive thematic analysis. Meanwhile, service user groups identified three key themes and ten sub-themes emerged through inductive thematic analysis as well; some of sub-themes (enjoyable, ease of use, motivating, and enthusiasm) as priori sub-themes were found in research literature (Gitlin, 2002; O'Brien, 2010; Wilkinson and De Angeli, 2014). In addition, the findings have shown the most three popular design tools that were utilised in WCP: rating and voting, blog-discussion forum, and social media tools (in-particular FB). Furthermore, WCP's features emphasized the subjective evidence (participants' feelings, experiences and perspectives) that use Co-design tools to design their own services that provide service user with better communication and participation experience. Furthermore, Co-design tools play a crucial role generating stakeholders' ideas and views by brainstorming, which is undertaken either by themselves or together with other users (Westerlund, 2007).

6.6 Summary

This iteration develops and evaluates the artefact design (WCP instantiation) of this research. WCP encapsulates the previously developed G2C-SCOF (See chapter 5) and works as collaborative communication platform for improving the quality of G2C e-service design through supporting diverse stakeholder groups to participate and collaborate together and design their own services. Iteration 3 combines the outcomes of Chapters 4 and 5 in order to bridge the previous outlined gap (the requirements' gap between service provider and service user regarding the G2C e-service design). A practical contribution that has been undertaken in this iteration is through construction and evaluation of the proposed WCP. The evaluation method (i.e. FGD) was illustrated through an experiment protocol (See table 6.5 and chapter 3 for more detail) and demonstrated through testing WCP in the field. The results and findings based on the evaluation method showed the proposed WCP proved an effective in improving the collaborative practices when developing G2C e-service. Finally, the derived knowledge and understanding from this iteration uncovers a number of challenges or limitations that should take into consideration in future work.

Chapter 7 Conclusions, Critical Discussion and Future Work

7.1 Introduction

This chapter concludes the research. It starts by providing a summary, with discussion, of how the aims and associated objectives were met. In this thesis, I have presented a variety of Co-design methods and tools, each providing opportunities for stakeholders to be active and fully involved throughout service design process. Methods and tools are proposed that support stakeholder participation throughout the design process from the early phase (i.e. Co-Discover-exploration and ideation) to final phase (i.e. Deliver phase- evaluation of the design process). The applicability of the methods and tools were evaluated throughout the design of a prototype (WCP) that was then tested during fieldwork as part of the Jordanian case study (See chapter 6).

Section 7.2 provides a summary of the research; Section 7.3 presents the research significance and the contribution to knowledge. Section 7.4 presents an outline of this thesis. The research limitations are subsequently discussed in section 7.5 with implications for future work covered in Section 7.6. Lastly, Section 7.7 concludes this thesis.

7.2 Research Summary

Over the course of this research, a number of tools, methods and opportunities for transforming users from passive contributors to active users have been examined and situated within the service design process. In particular, the G2C e-service design process is positioned within this research context (i.e. a developing country approach). The methods and tools provided were used to support diverse stakeholder participation throughout the design process, from investigation, involvement and ideation to prototype using. The applicability of these methods and tools were validated by fieldwork testing using an experimental evaluation held in Jordan as a case study (See chapter 6). e-Government services are typically developed by internal service providers often neglecting the service end user, in particular in developing countries (Lenk, 2002; Parent et al., 2005; Heeks, 2003). Thus, this research has addressed this issue by exploring and applying the use of Co-design methods and tools.

The research started, by identifying the stakeholders' requirements of G2C e-service design (SR-G2C) from three input artefacts; literature review (See chapter 2), survey as questionnaire form (See chapter 4) and RepGrid theories (See chapter 5). The SRM-G2C as a cognitive model (i.e. output artefact) was built based on RepGrid theories, which were gained from RPES. Hence, the

SR-G2C are known; the SRM-G2C integrates with popular Co-design tools and methods (i.e. input artefacts) as defined earlier to be matched (i.e. selection process-See chapter 5) for each requirement. The result of this integration delivers G2C-SCOF (i.e. theoretical contribution) as an output artefact (See chapter 5). Thereafter, in order to validate the G2C-SCOF; WCP (See chapter 6) was developed. The fieldwork testing has been conducted in Jordan, as a case study, to investigate the applicability of G2C-SCOF. Thereby, to keep the sustainability of development of G2C e-service design, the G2C-SCOF will be refined/extended (if needed) to meet stakeholders' expectations and future needs.

e-Government is a bridge between citizens and government to enable them to obtain services online with high efficiency and quality; therefore, citizens become motivated to use these services (Parent et al., 2005). One important question regarding G2C e-service is as follows: '*what are the important requirements/characteristics of good understanding for developing the e-service design process*?' The subsequent delivery of services may be jeopardised without due consideration for the service user. Furthermore, lack of consideration of their needs and expectations in the design process is problematic. The evolution and innovation (i.e. adaptation/tailoring) have in part been attributed to improve e-Government services quality through creative design solutions, and maximizing service users' participation in designing their own services (Anthopoulos et al., 2007); (Sanders and Stappers, 2008); (Iedema et al., 2010). Therefore, this research has delivered a Co-design framework (G2C-SCOF) as a theoretical contribution by tailoring a number of Co-design tools and methods to be fitted in different stages of design process (See chapter 5) to facilitate stakeholders' involvement throughout design process. Furthermore, the research has aimed to broaden their understanding of how these services will be designed to support and facilitate the commination and collaboration process with service providers and others. The objectives set out in Chapter 1 are summarised below:

Objective 1 - To explore and review the existing research literature regarding the use of the service design process adopted in e-Government services.

Objective 2 - To review the current practices of Co-design method(s)/tools in e-Government services.

Objective 3 - To investigate how citizens perceive the quality of the current release of the Jordanian e-Government services, based on end user feedbacks. Furthermore, to identify a list social demographic variables in influencing the adoption of e-Government.

Objective 4 - To identify the requirements' of the G2C e-service design process (cognitive elements).

Objective 5 - To build-up the G2C-SCOF for the G2C e-service.

Objective 6 - To develop an artefact as response and evaluation of the developed framework (obj-5)

Objective 7 - To validate the developed artefact by applying it to Jordan as a case study through an experimental evaluation.

Table 7.1 summarises the three Design Research iterations and explains the objectives and output artefacts of each.

Iteration	**Activities**	**Chapter**	**Output**	**Artefact Type**
1.	1.1 Investigate how citizens/service users perceive the quality of the current release of the e-Government services in Jordan	Chapter 4	Identified the requirements and the possible improvement suggestions factors from users' feedback	Construct Method
	1.2 Evaluate the e-Government services adoption and acceptance		Identified domain of concern, Explored the factors as the initial design that need investigation when designing and implementing G2C e-service	Method
	1.3 Develop an initial conceptual Model		MEGA-M	Model
	1.4 Evaluate the conceptual model by conducting pilot study (Survey-Questionnaire)		List of factors that effected on JGP adoption and acceptance. In particular, e-Government services	Method
	1.4.1 Analysis: Advance statistical analysis			

			development (e-service designing)	
	1.5 Carrying out an improvement as an incremental research using RepGrid technique		List of requirements and suggestions feedback to improve the existing approach (life-event) in next iteration. Expanding and refining the MEGA-M model.	Construct
2.	2.1 Semi-Structured interviewing with Varied stakeholders using RepGrid technique	Chapters 3 and 5	SRM-G2C as a cognitive model of emergent categories represents G2C e-service design characteristics. Emergent categories including the identification features in each category	Model Construct Method
	2.2 Analysis 1- Identified categories/constructs by Coding the interviewees' transcripts- using key-point coding as manner of Grounded Theory method			
	2.3 Analysis 2- Identification of key categories using frequency and variability			
	2.4 Suggest an improvement, refine and extend existing steps of design process using Co-Design approach		G2C-SCOF	Method Model construct
3.	3.1 Design and Develop an wiki-co-design prototype as response of-G2C-SCOF	Chapter 6	WCP	Instantiation

	3.2 Evaluate the WCP by using FGD, which has conducted after test WCP using fieldwork testing.		WCP validation	Method
	3.3 Analysis : Thematic analysis as form of Grounded Theory		Thematic Maps including a list of benefits and challenges' of WCP and list of stakeholders' WCP experience.	Method Model
	3.4-Extend/Refine and evaluate G2C-SCOF		Sustainable development for improvement purposes	Model Instantiation

Table 7.1: Summary of Research Iterations

7.3 Research Contribution

This research is of benefit to both researchers and practitioners (i.e. service user, service provider, and service interface) within the e-Government service provision area. Co-design as a concept is typically used to manage collective creativity. In Co-design, more effort and consideration are taken into account to the early phases of the design process; in which service/product idea has not been investigated and or existed yet. Furthermore, this approach works based on the confidence of end-users as they are only users can investigate what they need as service users (Sanders and Stappers, 2008). This research follows the DSR guidelines (March and Smith 1995; Vaishnavi and Kuechler, 2004; Hevner et al. 2004). The main contributions according to Design Research are carried out one or more artefacts in different iterations, which derive the form of a construct, method, model and/or instantiation (Vaishnavi and Kuechler, 2004; Hevner et al., 2004).

The contributions are classified as theoretical and methodological and practical. This research has rigorously explored the potential of Co-design approach, and accordingly, has developed a systematic framework for supporting participation in the design process between stakeholders in

designing G2C e-services. This research has produced a set of artefacts, which are summarised and classified as follows:

(A) Theoretical contribution-G2C-SCOF

A novel 'G2C-SCOF' was developed and validated by fieldwork testing held in Jordan as the main contribution made by this research, which adopted a variety of design tools and or methods in different phases (See chapter 5) in the service design process which have been tested and evaluated in Jordan. The developed 'G2C-SCOF' moved beyond service usability design issues, (i.e. service convenience) to facilitate stakeholders' involvement throughout design process, in order to shape their own needs and expectations. This is critical, as it has been pointed that e-Government service design characteristics such as e-service design qualities should be improved sustainably, and this change should be considered as a significant factor for shaping unmet users' needs (FØlstad et al., 2004; Farr, 2012). With this in mind, and to increase the generalisation of the framework, the 'G2C-SCOF*'* was tested over different interaction experiences (See Chapter 6), and the results proved the validity of the framework from the use by varied and diverse stakeholder groups. Therefore, it is reasonable to assume that the proposed framework can be generalised across similar interaction experiences. This framework as depicted in Chapter 5 (See table 5.7) is based on the derived 'SRM-G2C'-cognitive model (See chapter 5-figure 5.1) derived from three group perspectives: a) Service user, b) service interface, c) service provider and the proposed SPRF as a Co-design process for G2C e-service (See Chapter 6). In fact, this framework has ***two main contributions*****:** 1) Mechanism of Mapping Process (MMP) for adapting SR-G2C e-Service Design in the 'TDDM' process 2) Mechanism of Selection Process (MSP) for matching SR-G2C e-Service Design with suited design tools/methods of e-service design using 'citations analysis' as a novel technique for matching between these elements.

The proposed framework provides an overview of the perspectives of G2C service design activities including (Co-design tools and Double Diamond design process) and techniques for engaging non-designers (i.e. Citizens as service users) in specific participatory design activities. It has two dimensions: input artefacts (G2C e-service design requirements) and output artefacts (G2C e-service design process). The G2C e-service design process describes the kind of transition that is taking place through the service design process, and is described as initiating and scoping, action plan, service development, design team collaboration, evaluation and updating and launch of the integration service. Input artefacts describe the design tools used to facilitate involvement throughout design process. Each are … "described along four dimensions:

1) probing participants, 2) priming participants in order to immerse them in the domain of interest, 3) [gaining] a better understanding of their current experience or, 4) [generating] ideas or design concepts for the future" (Sanders et al., 2010, p.196), for instance by ideating and sharing future and or current experience and perspectives. It is possible to use each of the Co-design tools or methods with any purpose. Output artefacts (design process) describe how the tools/techniques are used, and described along four dimensions: 1) co-discover, 2) co-define, 3) co-develop and 4) deliver.

(B) Methodological and Practical Contribution-WCP

WCP focuses on participation throughout design process (G2C e-service development phases) and related aspects (See Chapter 5) in order to provide realistic opportunities for supporting user participation throughout design process. Based on the case study (i.e. fieldwork testing held in Jordan), it can be concluded that wiki-based participation using WCP supports participation in the design processes and allows constant interaction between users and developers (Friedrich, 2013). For varied and diverse stakeholders, participation in WCP is an easy, convenient, enthusiastic and rewarding way to participate in design processes. However, not all participants feel rewarded due to the reasons explained in chapter 6. Furthermore, the findings of this thesis suggest that the 'WCP' provides additional benefit from considering and understanding the salient e-service design characteristics of G2C (see chapter 5) to stimulate a more participation through a range of facilitators and aids. Consequently, stakeholders are able to contribute effectively to address their unmet needs (e.g. discussion-blog forum and social media tools). Furthermore, it was suggested that wiki-based Co-design (i.e. WCP) consider the use of the adopted Co-design methods and tools, to aid participants through generating their ideas (See chapter 6). This is including, the online tool (i.e. Gliffy) which is used to manage the proposed SPRF as a co-design process. Furthermore, free online email providers (i.e. Yahoo and Hotmail), and social media tools (i.e. FB and AOL) to facilitate the communication between participants (e.g. exchanges ideas and views to shape their own elements in the participation process). Since the findings show a positive and beneficial encouragement on stakeholders' participation, intention to involve and satisfaction.

Chapter 6 demonstrates that the social media plays an important role in stakeholder participation. Empowering/activating stakeholders as real partners through involvement in the design process as decision-makers for their own services (i.e. combination of various types of user involvement). Facilitating the communication between stakeholders enables continuous

connection and interaction to different stakeholders. Finally, participants in the case study showed an enthusiasm and enjoyment during tasks in which they were able to generate ideas/views together with others (i.e. co-creation experience as motivation aspect). The research has contributed to knowledge by validating the use of WCP (See chapter 6), as a response to theories gained from the developed 'G2C-SCOF' (Theoretical contribution). Furthermore, the G2C e-service design process (See chapters 5) and has shown practical evidence for the applicability and utility of the proposed 'G2C-SCOF'. According to the intended objectives of the G2C-SCOF (Objective 5) to support the communications and collaborations, first between the citizens and e-Government services, and then citizens with service interface as an administrative employees in government agencies. Subsequently, the developed framework is applied to the Jordanian case study. The WCP is a virtual collaborative communication platform, and maximizes the opportunity of the participation for various stakeholders' in G2C e-service design process. The research has provided a new method for designing e-Government service processes by developing a systematic G2C-SCOF (See chapter 5), as well as providing a set of guidelines for designing e-Government services (SPRF as a Co-design process-See chapter 5), based on the proposed framework approach. ***This contribution is summarised as two main points:*** 1) WCP as a Collaborative Co-design platform for supporting stakeholders' involvement throughout design process of G2C e-Service. 2) WCP Generating ideas or views by offering a channel to express stakeholders own creativity and provide an enjoyment for them to see their contributions in final service. In particular, the Co-design tools or methods in different forms and functions were left a salient effect on stakeholder participation. Which are summarised: 1) the connection between participants' roles through participation process, 2) A direct association to participants, 3) Authorising participants an active role as decision-makers throughout design process, 4) Motivating participants by permitting them to express their creativity, which reflect their contributions in final service.

A '***sub-contribution'*** of contribution B is to provide a realisation of the framework (SPRF as a Co-design process) in the form of guidelines (See chapter 5) for service provider in e-Government service design, that can be applied to represents the sequential/iterative process combining the Co-design tools and methods that suitable with stakeholders' requirements and stakeholders' types. SPRF was designed based on the TDDM (See figure 5.3), to be suitable with operational choices for G2C-SCOF (See table 6.3) used in the Co-design process, as depicted in figure 5.4. This research is intended and expected to assist Jordan and other developing country

approaching in the region (who it has somewhat close characteristics like Jordan domain context) in new ways of designing and developing e-service to citizens as service users.

(C) Minor contributions:

A practical contribution reported in chapter 6 through the evaluation of WCP as response of G2C-SCOF to prove its validity (with some limitations) across other domains context or applications.

7.4 Research Outline

Chapter 1 has provided the main research aims and objectives. Furthermore, it has been provided of the research background, problems, and motivation. While, chapter 2 provides a review according the limitations of existing approaches and a review of citizen-centric approach, human centred design method(s) and Co-design methods and tools, and existing service design processes were adopted in e-Government services. Gaps in the G2C e-services design have been uncovered: Service user involvement throughout the development process for e- Government services, identifying service users unmet needs, and maximize the possibility for determining the factors that influence e-Government services adoption by themselves. The design process should match users' needs, such as identity, characteristics, capabilities, preferences and the state of the user.

Chapter 3 suggests using Design Research as the research methodology for conducting a valid Information Systems study. It deliberates how the methodology of RepGrid was applied to address and perform the research design problem, by designing and conducting a RepGrid protocol for eliciting personal constructs regarding research problem and context. Research iterations and outputs were identified and categorised based on the design research product's categories. Further, this chapter investigated and described the Design Research as a methodology which will be applied this research study to achieve research main aim and its objectives.

Chapter 4 presented and provided an overview of Jordan's e-Government service adoption and acceptance, to identify knowledge base (literature review) and stakeholders' needs (Questionnaire-user-based evaluation). Furthermore, its effort to implement e-service provision, followed by findings and results obtained from evaluating the JGP and its services provided. It revealed some of the issues that needed to be considered and deliberated (See chapter 4). Researcher has developed a conceptual model known as Methodology for e-Government

Adoption and Acceptance Measurement (MEGA-M) based on existing literature focusing on ESEC- variables and related attributes. This chapter reports an experimental evaluation in the form of a survey (i.e. questionnaire). The survey has been conducted to achieve two objectives: 1) Empirically, to test, and evaluate the ESEC including variables and related attributes identified from the literature as validated instruments that are used to evaluate JGP with its services based on efficiency of the delivery of these services, 2) Perceptually, to investigate how citizens perceive the quality of the existing release of the e-Government services in Jordan and to identify requirements and possible improvement suggestions from users' feedback.

Chapter 5 has two parts: part 1 includes the findings and results regarding the following key characteristics: Repertory Grid interviews with 24 respondents; and qualitative and quantitative analysis of Repertory Grid data. While, part 2 represents the 'G2C-SCOF' and the importance 'SPRF' as Guidelines Co-design process in G2C e-service design for decision makers who have full authorisation regarding development process; further it explains the G2C service design process and activities in detail, based on interview data findings and results were derived from part 1. Finally the different patterns of perceived categories and/or concepts from service providers and service-users were discussed, which emphasise the importance of considering contrasting value patterns at different levels for effective and better informed decision making.

Following the analysis of the interview data collected through the RepGrid method of the research context (See Chapter 3). Chapter 5 presented a description of the service design process as an instance of Co-design practice. Moreover, it explained G2C-SCOF as suitable co-design framework for G2C e-service design. A number of theories, which were gained from RepGrids (experience, perspectives and observations), led to build up the SRM-G2C-cognitive model as reported in Chapter 5.

Chapter 6 responded to the stakeholder requirements, which were gathered from the previous chapter (chapter 5), with a design instantiation. Developing the design artefact is presented and this includes use case modelling design. Moreover, it illustrates the evaluation method of the research outputs, with details of the evaluation settings. The WCP evaluation is presented and discussed before concluding in this chapter.

7.5 Research Limitation

The present research has made a number of contributions as explained earlier. However, this does not prevent certain challenges and or limitations from being encountered. In this research

study, the proposed G2C-SCOF (see chapter 5) was built based on a SRM-G2C cognitive model (personal constructs' and requirements) which reflects individuals' perceptions. Hence, the selection process (citation results) matched these elicited requirements with Co-design tools and methods, which were selected as popular design tools or methods (See chapter 5). The applicability of these methods and tools was limited regarding the domain context criteria, which where fieldwork study was conducted in Jordan as a case study using an experimental evaluation (See chapter 6) as not really reflect the actual domain, which will validate the framework. Therefore, the generalizability of the proposed 'G2C-SCOF' and its related methods/tools remains limited. In addition, this may lead to some challenges such as the fact that this proposed 'G2C-SCOF' does not necessarily fit, or is able to be directly adopted in various contexts without adaptation. It would thus need to be adapted in terms of stakeholders (i.e. citizens) mentality and awareness, a developing country approach such as (ICT infrastructure, people background, knowledge and experience and depending on research context.

Another limitation was in the research the RepGrid's interview technique has individual weaknesses (See chapter 5) that require explanation. In some cases, participants found RepGrid not fully clear, as they perceived the technique as a psychological assessment technique. In most cases, however, individual participants produced a similar set of elements for comparison.

A limitation in practical field test was caused by a lightweight prototype of potential online features (See chapter 6) being developed based. Therefore, the success of the final system (fully developed) cannot yet be evaluated and also lies beyond the scope of this study. Indeed, research study has concentrated on investigating participation activities and how stakeholders can contribute in G2C e-service design-based on Co-design tools and methods adopting and adapting to foster participation and communication between service user and service provider as the two major elements, which facilitate the bridge of the requirements gap between both of them. However, participants in the case study participated in the fieldwork testing voluntarily. In the leisure-time context, lightweight Co-design tools/methods appeared to be an appropriate way to improve the quality of e-service design (Friedrich, 2013). Co-design approaches may not necessarily be considered professional enough when developing systems in a work context (Friedrich, 2013).

7.6 Implications for Future Work

Future research is needed to further advance and widen 'G2C-SCOF' with additional context and/or refine its key elements to be applicable and capable to address the future needs, which

will be reflected in superior stakeholder satisfaction. For example, it is recommended to test and evaluate a variety of Co-design tools or methods by various and diverse stakeholders at each stage of service design before they actually adopted, even this approach will cost considerable time, money and effort. Nevertheless, this way may enhance the generalizability as provide the suited tools/methods fit various contexts through grant an opportunity for stakeholders to use these tools/methods to judge their self by greater opportunities to participate in idea generation. In addition, this may potentially affect the e-service quality and user acceptance of the final service.

The developed Co-design tools and methods of the kind methods provided in the literature and used in different case studies often offer a single or limited solution to a specific need. Thus, a limited number of features and functionalities help stakeholders gain just a general view of the significance collaboration and the facilitation of participation (Friedrich, 2013). Therefore, it is recommended that more experiments with more complex organisation design contexts in different industrial areas are carried out. This will help to evaluate how scalable these methods or tools are within the organisational context. Sophisticated participation using Co-design tools and methods that are associated with the existing e-Government's development projects. Furthermore, research is also desirable in cases where e-Government services have already been developed and launched, and need sustainable development through further adoption (i.e. service use).

7.7 Summary

Over the course of the last decade, a number of studies have found that e-Government services are typically developed by internal service providers, often neglecting the service end user. Subsequent delivery of services can be jeopardised without adequate coverage of the service user needs (Olphert and Damodaran, 2007; Zhao et al., 2008; Heeks, 2003; Bridge, 2012; Iedema et al., 2010). Unsurprisingly, the service user is often left out of the design process and limiting the likelihood of addressing their needs and expectations. While the collaboration throughout product design process is more effective in the form of group activity; as the communication between varied stakeholders, become obvious due to the stakeholders consideration of the task activity that plays a central role to meet their needs (Thalen and van der Voort, 2012). Another issue is generated as result of previous issue (lack of involvement) that the design process should match users' needs such as identity, characteristics, capabilities, preferences and the state of the user; otherwise it will be considered compromised; because, citizen needs are expressed as

citizen profile which can represent the citizen's long-term needs (Kuflik and Shoval, 2000). Thus, users' needs should be better known in order to understand the impact of the process.

Given these issues, this research has investigated the effect of adopting 'Co-design approach' for maximising opportunities for user participation in design process and to bridge the requirements gap between users' unmet needs and the service provider or designers of e-Government services. This research extends the earlier knowledge of the diverse stakeholders involvement and their active roles in design process through the following two main contributions: 1) presenting a G2C-SCOF as a Co-design framework, 2) The WCP as a collaborative communication platform to support/improve stakeholders' experience throughout participation.

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APPENDICES

Appendix A- Ethics approval

School of Information Systems, Computing and Mathematics
David Gilbert, Head of School, Professor of Computing
Jasna Kuljis, Head of Information Systems and Computing, Professor of Computing
Tony Rawlins, Head of Mathematical Science, Professor of Mathematics

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Zidong.Wang@brunel.ac.uk

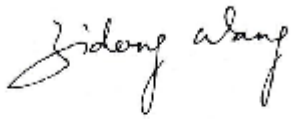
Date: 8th April 2013

STATEMENT OF ETHICS APPROVAL

Proposer: Muneer Saeed Ahmad Nusir
Title: e-Government Service Co-design

The school's research ethics committee has considered the proposal recently submitted by you. Acting under delegated authority, the committee is satisfied that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that you will adhere to the terms agreed with participants and to inform the committee of any change of plans in relations to the information provided in the application form.

Yours sincerely,



Professor Zidong Wang
Chair of the Research Ethics Committee
SISCM

Appendix B- Consent information sheet

Information Sheet

My name is Muneer Nusir and I'm a PHD student in the department of Information systems and computing, undertaking research under supervision of Dr.David Bell.

My research project investigates co-design methods/tools for use in e-Government services. In this research project, the planned research addresses the human centred design of e-Government services and their subsequent access. Through the use human centred approaches and citizen design, customer engagement of e-Government services will be investigated – using customer type, context and activity. This study will identify approaches for more effective-Government service provision and provide new service design approaches addressing service-users' needs. Therefore, I need to collect interview data with Jordanian citizens and governmental staff who are working and have knowledge in this area. The questions are being asked during the interview to identify the specific steps to design government to citizen (G2C) e-services. **Attention:** All information given at an interview is confidential. It is for you to make it clear in the information sheet what and how the information will be used in your research. The identity of the participant is confidential in relation to an interview. It cannot be anonymous because the interviewer will see the interviewee and the interviews will be audio-taped. By reading this form and consent form, you give your agreement to researcher to use your voice and verbal protocols transcribed from the audio-records, but not your name. However, you need to be aware of the requirements of the Data Protection Act. The research participant can feel free to take part in this interview or not and he/she can withdraw at any time without consequence. **"If you have any concerns or complaints regarding the ethical elements of this project please contact: siscm.srec@brunel.ac.uk or Professor Zidong Wang, Tel. No. 01895 266021".**

Appendix C- Consent from

Participant Identification Number: _____ ***Please tick the appropriate box***

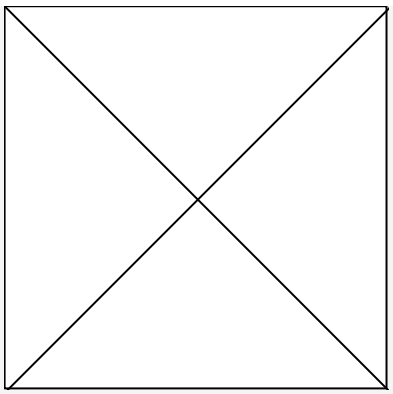
	YES	*NO*
Have you read the Research Participant Information Sheet?	☐	☐
Have you had an opportunity to ask questions and discuss this study?	☐	☐
Have you received satisfactory answers to all your questions?	☐	☐
Who have you spoken to?		
Do you understand that you will not be referred to by name in any report Concerning the study?	☐	☐
Do you understand that you are free to withdraw from the study:		
• at any time	☐	☐
• Without having to give a reason for withdrawing?	☐	☐
• (remove if not relevant, adapt if necessary) without affecting your future care?	☐	☐
I agree to my interview being recorded.	☐	☐
I agree to the use of non-attributable direct quotes when the study is written up or published.	☐	☐
Do you agree to take part in this study?	☐	☐

Signature of Research Participant:

Name in capitals: Date:

Appendix D- Consent from (in Arabic)

رقم تعريف المشارك: _____

	نعم	لا
يرجى وضع علامة في الخانة المناسبة		
 هل قرات المعلومات الواردة في ورقة المشاركين في البحث؟	☐	☐
هل كان لديك فرصة لطرح أسئلة ومناقشة هذه الدراسة؟	☐	☐
هل تلقيت إجابات مرضية لأسئلتك ؟ مع من تحدثت؟	☐	☐
هل تدرك انه لن يتم الإشارة إليك بالاسم في أي تقريريخص الدراسة؟	☐	☐
هل تدرك أن لك حرية الانسحاب من الدراسة: في أي وقت	☐	☐
دون الحاجة لاعطاء سبب للانسحاب ؟	☐	☐
• (إن لم يكن إزالة ذات الصلة، والتكيف إذا لزم الأمر) دون أن يؤثر بك الرعاية المستقبل؟	☐	☐
أنا أوافق على تسجيل مقابلتي	☐	☐
أنا أوافق على الاستخدام الغير منسوب عند كتابة الدراسة أو نشرها.	☐	☐
هل توافق على المشاركة في هذه الدراسة؟	☐	☐

توقيع المشارك:
الاسم
التاريخ:

Appendix E- Consent information sheet (in Arabic)

اسمي منير نصير و أنا طالب دكتوراه في قسم نظم المعلومات و الحوسبة ، وإجراء البحوث

تحت إشراف الدكتور ديفد بيل.

مشروع بحثي يدور حول أساليب و أدوات تحقيق التصميم المشترك بين المواطن و الحكومة لاستخدامها في الخدمات المقدمة من الحكومية الإلكترونية. في هذا المشروع البحثي نتناول التخطيط لمشاركة المستخدم في تصميم محاور خدمات الحكومة الإلكترونية والوصول اليها في وقت لاحق , سيتم تحقيق النهج ذلك من خلال استخدام محور الإنسان و المواطن في التصميم و مشاركة العملاء في خدمات الحكومة الإلكترونية،بحسب المستخدم و سياق النشاط. هذه الدراسة ستحديد النهج لتقديم الخدمات الحكومية الفعالة بشكل أكبر وتقديم نهج تصميم الخدمة الجديدة الملبي لاحتياجات المستخدمين. لذلك، انا بحاجة لجمع البيانات الكمية والنوعية مع المواطنين الأردنيين و الموظفين الحكوميين الذين يعملون ولديهم معرفة في هذا المجال. ويجري طرح الأسئلة خلال المقابلة لتقييم النموذج المقترح التي هي عبارة عن منصة تعاونية من أداة مراحل (G2C) تصميم الاتصالات لإشراك أصحاب المصلحة في عملية التصميم بأكملها في الخدمات الإلكترونية.

انتباه : جميع المعلومات الواردة في المقابلة سرية .انها من أجلك لجعل المعلومات واضحة في ورقة المعلومات ماذا وكيف سيتم استخدام هذه المعلومات في البحث الخاص بك . هوية المشارك السرية فيما يتعلق بالمقابلة.و لا يمكن أن تكون مجهولة المصدر لأنه في المقابلة سوف نرى الضيف وسوف تكون المقابلات سمعية و مسجلة . من خلال قراءة هذا النموذج و نموذج الموافقة تعطي موافقتك للباحث بأن يتم استخدام صوتك والبروتوكولات اللفظية المكتوب من المسجلة كصوت ، ولكن ليس اسمك. ومع ذلك ، تحتاج إلى أن تكون على بينة من متطلبات قانون حماية البيانات . يمكن لك كمشارك في البحث المشاركة في هذه المقابلة أو لا و يمكنك أن تنسحب في أي وقت دون عواقب.

ملاحظة:في أي وقت إذا كان لديك أية مخاوف أو شكاوى بشأن العناصر الأخلاقية ل هذا المشروع يرجى الاتصال ب

siscm.srec @ brunel.ac.uk

أو

البرفسور زيدون:

هاتف رقم 266021 01895

Appendix F- Repertory Grid Interview questions and guidelines

Main Question and Reasons:

The main question for this study has been built based on some reasons like literature review related to research problem, objectives, and research questions.

Main question is: **What are the steps that Jordan e-Government project follow when designing government to citizen (G2C) service?** / Or I can ask more specifically about types of services provided to citizens like social services (official documents/certificate) because this type of services is considered the most interesting G2C type to citizens according to a survey (pilot study) which was conducted last year by researcher, he asked about which type of G2C services is needed to improve and launch online to meet citizens' real needs.

Supporting questions and reasons

1- How G2C services could be delivered? (To sure the services delivery process fit for purpose).
2- How would you like us (government staff) to do service design to you (Citizens')? (To get more citizens' input into some aspects of service design).
3- What type of services should be delivered and by what means? (For seeking a much greater involvement from citizens').
4- How citizens' experience services, face the obstacles and their daily frustration? (To show the diversity and complexity of circumstances and preferences)
5- What citizens' are willing to contribute and/or improve their services experience and outcomes of the services? (To understand the citizens' needs better and to identify hot spot in touch points that citizens' has with G2C services in accessing government services).

Table 1: A chronological order of steps that a research participant would follow when conducting an investigation using the RepGrid technique Adapted from (P.Alexander et al., 2010; M.Hunter, 2003 And Y.Dwivedi et al., 2011).

# NO	chronological order of steps
1	Research participant (citizen) is asked to give name/title per-card (elements have been elicited earlier by government staff (expert in domain knowledge)).
2	Research participant is asked to pick out three cards (Tirade) randomly from the total cards.
3	Research participant is asked to choose two cards from the "tirade", which are more alike.
4	Thereafter, he/she is disseminated the two cards physically from the third one.
5	Then, he/she is asked to sort the (tirade cards) that have been chosen in step 3 into two piles based on similarities and dissimilarities discrimination.
6	Once completed, the research participant is asked to verbal description of each pile.
7	Then, the verbal description become labels for construct and contrast (meaning of labels are explored via laddering technique).
8	The steps 3, 4 and 5 (sort process) are repeated until no further meaningful constructs.
9	Finally, the researcher asks the research participant to rate construct for each element based on specified scale that has been determined earlier.

Appendix G- Research Protocol: User-based Evaluation of the current release of the e-Government Service of Jordan

Pilot study

User-based Evaluation of the current release of the e-Government Service of Jordan

This pilot study aims to investigate how citizens perceive the quality of the current release of the e-Government portal in Jordan and to identify requirements and improvement suggestions from users' feedback.

You are requested to carry out the following tasks:

(1) Fill in the Background Questionnaire;
(2) Attend a pre-test interview with a set of questions about your previous experience of interacting with an e-Government portal.
(3) Attend a post-test interview with questions about your experience of interacting with the e-Government portal of Jordan.

NOTE: Nothing will be recorded that can reveal or disclose your personal Identity.

Muneer Nusir

Postgraduate student, Department of Computer Science.

University of Leicester.

Under the supervision of

Dr Effie Law

For more information please contact me via:

E-Mail: msan1@le.ac.uk

Part 1 **Background Questionnaire**

Q.1 what is your age?

□ 14-17 □ 18-24 □ 25-34 □ 35-44 □ 45-54 □ 55+

Q.2 what is your gender?

□ Male □ Female

Q.3 what is your highest educational level achieved?

□ Secondary school □ College □ Bachelor Degree

□ Master's Degree □ Doctorate □ other

Q.4 Do you have an Internet access at home? □ Yes □ No

Q .5 Do you have an Internet access at work? □ Yes □ No

Q.6 How often on average do you use computer for your work or study per day?

□ less than one hour □ 1-3 hours □ 4-6 hours □ more than 6 hours.

Q.7 How would you rate your level of competence for working with information and communication technologies (ICT)?

□ Very low □ low □ medium □ high □ very high □ don't know what ICT is

Part 2 **Willingness for e-Government**

Instruction:

Please rate your level of **agreement** with each of the following statements by **circling** the appropriate number on the 7-point scale.

NA: Not Applicable

items	**readiness for e-Government**	**Strongly Disagree**						**Strongly Agree**	**NA**
	'Trust of government'								
	Statements								
(TG1)	I think I can trust government agencies.	1	2	3	4	5	6	7	
(TG2)	Government agencies can be trusted to carry out online transaction faithfully.	1	2	3	4	5	6	7	
(TG3)	I trust government agencies keep my best interest in mind.	1	2	3	4	5	6	7	

(TG4)	In my opinion, government agencies are trustworthy.	1	2	3	4	5	6	7	

items	readiness for e-Government	Strongly Disagree						Strongly Agree	NA
	'Trust of Internet'								
	Statements								
(TI1)	The internet has enough safeguard to make me feel comfortable using it to transact personal business with government agencies.	1	2	3	4	5	6	7	
(TI2)	I feel assured that legal and technological structures adequately protect me from problems on the internet.	1	2	3	4	5	6	7	
(TI3)	In general, the internet is a robust and safe environment to transact with government agencies.	1	2	3	4	5	6	7	
(TI4)	Overall I have trust for making transaction over the internet.	1	2	3	4	5	6	7	

items	readiness for e-Government	Strongly Disagree						Strongly Agree	NA
	"Computer Anxiety"								
	Statements								
(CA1)	Computers do not scare me at all.	1	2	3	4	5	6	7	
(CA2)	Working with computers makes me nervous.	1	2	3	4	5	6	7	
(CA3)	I do not feel threatened when others talk about computers.	1	2	3	4	5	6	7	
(CA4)	Computers make me feel uncomfortable.	1	2	3	4	5	6	7	

Part 3	Task Scenarios

Please go to 'E-Government' website http://www.jordan.gov.jo and carry out the five tasks given below.

Note: You are recommended to use Internet Explorer web browser v6 or higher.

Task 1: Please take at most 3 minutes to browse the e-Government portal.

Task 2: You have lost your personal ID card and have no time to go to the Government office in person to apply for a replacement. Hence, the convenient way to do so is to submit an application through the e-Government portal. With the access to the portal, please proceed with this task.

Task 3: You are now free to choose one of the "Most Used Services" (not to repeat Task 2) and explore this e-service. Please let me know why you find the Service chosen interesting.

……

……

Part 4	Questionnaire

After accomplishing the tasks above, please describe your user experience by answering the following questions.

Instruction:

Please rate your level of agreement with each of the following statements by circling the appropriate number on the 7-point scale.

items	Adoption & Acceptance	Strongly disagree						Strongly Agree
	'User Satisfaction'							
	Statements							
(S1)	I think that I would like to use the Jordanian e-Government portal frequently.	1	2	3	4	5	6	7
(S2)	I found the portal unnecessarily	1	2	3	4	5	6	7

	Complex.							
(S3)	I thought the portal was easy to use.	1	2	3	4	5	6	7
(S4)	I think that I would need the support of a technical person to be able to use this portal.	1	2	3	4	5	6	7
(S5)	I found the various functions in this portal well integrated.	1	2	3	4	5	6	7
(S6)	I thought there was too much inconsistency in this portal	1	2	3	4	5	6	7
(S7)	I would imagine that most people would learn to use this portal very quickly.	1	2	3	4	5	6	7
(S8)	I found the portal very awkward to use.	1	2	3	4	5	6	7
(S9)	I felt very confident using the Portal.	1	2	3	4	5	6	7
(S10)	I needed to learn a lot of things before I could get going with this portal.	1	2	3	4	5	6	7

Note: (JGS): The Jordanian e-Government portal

items	**Adoption & Acceptance**	**Strongly disagree**						**Strongly Agree**	**NA**
	'Behavioural Intention to use'								
	Statements								
(BI1)	I will frequently use this portal in the future.	1	2	3	4	5	6	7	
(BI2)	I will use this portal rather than other sources for getting governmental services.	1	2	3	4	5	6	7	
(BI3)	I will recommend others to use this portal.	1	2	3	4	5	6	7	
(BI4)	Assuming I had access to the portal, I intend to use it.	1	2	3	4	5	6	7	

items	System Quality	Strongly disagree						Strongly Agree	NA
	'Access'								
	Statements								
(A1)	JGS is responsive to my request.	1	2	3	4	5	6	7	
(A2)	JGS can quickly load all text and graphics	1	2	3	4	5	6	7	
(A3)	The Webpages of JGS can be loaded with a high speed	1	2	3	4	5	6	7	
(A4)	The homepage of JGS can be loaded with a high speed.	1	2	3	4	5	6	7	

items	System Quality	Strongly disagree						Strongly Agree	NA
	'Navigation'								
	Statements								
(N1)	JGS has an adequate number of links.	1	2	3	4	5	6	7	
(N2)	JPG has a clear description for each link.	1	2	3	4	5	6	7	
(N3)	In JGS it is easy to go back and forth between pages.	1	2	3	4	5	6	7	
(N4)	In JGS, It needs a few clicks to locate information	1	2	3	4	5	6	7	

items	System Quality	Strongly disagree						Strongly Agree	NA
	'Perceived ease of use'								
	Statements								
(PEU1)	Learning JGS site is easy for me.	1	2	3	4	5	6	7	

(PEU2)	It will be impossible to use JGS without expert help.	1	2	3	4	5	6	7	
(PEU3)	My interaction with JGS is clear and understandable.	1	2	3	4	5	6	7	
(PEU4)	Using JGS site requires a lot of mental effort.	1	2	3	4	5	6	7	

items	**System Quality**	**Strongly disagree**						**Strongly Agree**	**NA**
	'Perceived usefulness'								
	Statements								
(PU1)	Using JGS enables me to accomplish my task more quickly.	1	2	3	4	5	6	7	
(PU2)	Using JGS improves the performance of my task	1	2	3	4	5	6	7	
(PU3)	Using JGS increase the productivity of my task.	1	2	3	4	5	6	7	
(Pu4)	Using JGS improves the quality of my task.	1	2	3	4	5	6	7	

items	**System Quality "Design"**	**Strongly disagree**						**Strongly Agree**	**NA**
	'Information Architecture'								
	Statements								
(IA1)	The content of JPG is well organized.	1	2	3	4	5	6	7	
(IA2)	The page organization makes the content easy to read.	1	2	3	4	5	6	7	
(IA3)	The homepage is well structured with the government's information and services.	1	2	3	4	5	6	7	
(IA4)	The information of JGS is organized into logical	1	2	3	4	5	6	7	

	categories.								
(IA5)	Categories contain related information.	1	2	3	4	5	6	7	
(IA6)	The most important information is placed on top of the page.	1	2	3	4	5	6	7	
items	**System Quality**	**Strongly disagree**						**Strongly Agree**	**NA**
	'Privacy'								
	Statements								
(Pv1)	I am concerned about the potential abuse of my personal information given to JGS	1	2	3	4	5	6	7	
(Pv2)	I am concerned about how much I can trust JGS with my personal information.	1	2	3	4	5	6	7	
(pv3)	It is important to specify how my personal information will be collected by JGS.	1	2	3	4	5	6	7	
(Pv4)	It is important that JGS can maximize privacy.	1	2	3	4	5	6	7	
(pv5)	I am worried about who will have access to my personal information given to JGS.	1	2	3	4	5	6	7	
Items	**System Quality**	**Strongly disagree**						**Strongly Agree**	**NA**
	'Aesthetic values '								
	Statements								
(AV1)	JGS is visually attractive.	1	2	3	4	5	6	7	
(AV2)	JGS user interface has a proper font size and colours.	1	2	3	4	5	6	7	
(AV3)	Graphical visual presentation aids on the JPG are useful.	1	2	3	4	5	6	7	
(AV4)	The layout of pages makes tasks easier.	1	2	3	4	5	6	7	
(AV5)	JGS has a clear design,	1	2	3	4	5	6	7	
(AV6)	JGS has a simple layout for its content.	1	2	3	4	5	6	7	

items	System Quality	Strongly disagree						Strongly Agree	NA
	'Security'								
	Statements								
(sc1)	I am concerned about fraud when I order services over JGS.	1	2	3	4	5	6	7	
(sc2)	I am concerned about the user authentication and authorization in JGS.	1	2	3	4	5	6	7	
(sc3)	I am concerned about lack of security for JGS.	1	2	3	4	5	6	7	
(sc4)	I am concerned about the vulnerability of JGS to online hackers.	1	2	3	4	5	6	7	
(sc5)	I am worried about unauthorized access to my personal information given to JGS.	1	2	3	4	5	6	7	
(sc6)	It is important to have login account for JGS.	1	2	3	4	5	6	7	

Instruction: Here below are pairs of words to assist you in your evaluation of the quality of the information presented in the Jordanian e-Government Portal. Each pair represents extreme contrasts. The possibilities between the extremes enable you to describe the intensity of the quality you choose. Try to give a spontaneous response. Keep mind that there is no right or wrong answer. Your personal opinion is what counts. Look at this example:

Likeable						X		Disagreeable

This evaluation tells us that the product is predominantly Disagreeable, but that there is marginal room for improvement.

Items	Information Quality							
	Word pairs							
(IQ1)	understandable							incomprehensible
(IQ2)	useful							useless
(IQ3)	valuable							Valueless
(IQ4)	accurate							Inaccurate

(IQ5)	Up-to-date								Outdated
(IQ6)	specific								General
(IQ7)	relevant								Irrelevant
(IQ8)	complete								incomplete
(IQ9)	consistent								inconsistent
(IQ10)	sufficient								insufficient
(IQ11)	available								unavailable
(IQ12)	Widely-scoped								Narrowly-scoped
(IQ13)	Credible								Incredible

Appendix H- Research Protocol (In Arabic)

دراسة تجريبية

تقييم المستخدم للإصدار الحالي من بوابة الحكومة الإلكترونية الأردنية ، تهدف هذه الدراسة التجريبية لمعرفة كيف ينظر المواطنون إلى جودة الإصدار الحالي من بوابة الحكومة الإلكترونية في الأردن، وتحديد المتطلبات والإقتراحات من قبل المستخدم .

يطلب منك القيام بتعبئة الاستبيان التالي مع التأكيد انه لن يتم تسجيل أي شئ يمكنه الكشف عن اي بيانات تخص هويتك الشخصية :

منير نصير
طالب الدراسات العليا، قسم علوم الحاسب الآلي.
جامعة ليستر.

تحت إشراف
DR.Effie Law
لمزيد من المعلومات الرجاء التواصل عن طريق:
البريد الإلكتروني: msan1@le.ac.uk

الجزء الأول: خلفية المستجوب

1. **ما هو عمرك؟**
   □ 17-14 □ 24-18 □ 34-25 □ 44 -35 □ 54-45 □ 55 +
2. **ما هو جنسك؟**
   □ ذكر □ أنثى
3. **ما هو أعلى مستوى تعليمي حققته؟**
   □ مدرسه ثانوية □ بكالوريوس □ كلية □ ماجستير □ دكتوراه □ أخرى
4. **هل لديك إنترنت في المنزل؟**
   □ نعم □ لا
5. **هل لديك إنترنت في مكان العمل؟**
   □ نعم □ لا
6. **كم متوسط استخدامك لجهاز الحاسوب للعمل أو الدراسة في اليوم الواحد؟**
   □ أقل من ساعة واحدة □ 1-3 ساعات □ 4 -6 ساعات □ أكثر من 6 ساعات.

7. كيف تقيم مستواك في التعامل مع تكنولوجيات المعلومات والاتصالات (ICT)؟

□ منخفضة جدا □منخفضة □متوسطة □ عالية □عالية جدا □ لا أعرف ما هي تكنولوجيا المعلومات والاتصالات.

الجزء الثاني: الرغبة في الحكومة الإلكترونية

يرجى تقييم درجة اتفاقك مع كل عبارة من العبارات التالية بوضع دائرة حول العدد المناسب .

الـــــرغبـة فـــي الوكالات الـحـكـومـــــيه							
البنود	"الثقة فـــي الوكالات الـحـكـومـــــيه "	أعارض بشدة			حيادي	أوافق بشدة		
(TG1)	أعتقد أنني أستطيع الثقة في الوكالات الحكومية.	1	2	3	4	5	6	7
(TG2)	يمكن الوثوق بالوكالات الحكومة لتنفيذ المعاملات عبر الإنترنت بأمانة.	1	2	3	4	5	6	7
(TG3)	أنا على ثقة من أن الوكالات الحكومية تأخذ مصلحتي في عين الإعتبار.	1	2	3	4	5	6	7
(TG4)	من وجهة نظري، الوكالات الحكومية جديرة بالثقة.	1	2	3	4	5	6	7
البنود	"الثقة في الإنترنت"	أعارض بشدة			حيادي	أوافق بشدة		
(TI1)	الإنترنت يتمتع بالحماية الكافية ليجعلني أشعر بالراحة عند إستخدامه لممارسة أعمال شخصية مع الوكالات الحكومية.	1	2	3	4	5	6	7
(TI2)	أشعر بالثقة بأن الهياكل القانونية والتكنولوجية توفرحماية كافية لي من مشاكل الإنترنت.	1	2	3	4	5	6	7
(TI3)	بشكل عام، شبكة الإنترنت هي بيئة قوية وآمنة للتفاعل مع الوكالات حكومية.	1	2	3	4	5	6	7
(TI4)	على وجه عام لدي الثقة الكامله لاداء المعاملات عبر الإنترنت.	1	2	3	4	5	6	7
البنود	"الرغبة بالكمبيوتر"	أعارض بشدة			حيادي	أوافق بشدة		
(CA1)	أجهزة الكمبيوتر لا تخيفني على الإطلاق.	1	2	3	4	5	6	7
(CA2)	التعامل مع أجهزة الكمبيوتر يجعلني عصبيا.	1	2	3	4	5	6	7
(CA3)	أنا لا أشعربالقلق عندما يتحدث الآخرين عن أجهزة الكمبيوتر.	1	2	3	4	5	6	7
(CA4)	أجهزة الكمبيوتر تجعلني أشعر بعدم الراحة.	1	2	3	4	5	6	7

الجزء الثالث: سيناريوهات العمل

يرجى الدخول إلى الموقع http://www.jordan.gov.jo "الحكومة الالكترونية" وتنفيذ المهام الثلاثة الواردة أدناه.
ملاحظة : ينصح لك استخدام إنترنت إكسبلورر V6 متصفح ويب أوما هو أعلى.

المهمة 1 : يرجى أخذ على الأكثر 3 دقائق لتصفح بوابة الحكومة الإلكترونية.

المهمة 2 : لقد فقدت بطاقة الهوية الشخصية وليس لديك الوقت للذهاب إلى مكتب الحكومة لتقديم طلب الحصول على بديل. وبالتالي ، فإن الطريقة الملائمة للقيام بذلك هو أن تقدم طلبا من خلال بوابة الحكومة الإلكترونية.

المهمة 3 : لك حرية الاختيار واحدة من "الخدمات الأكثر استخداما"(مع عدم تكرار المهمه رقم 2) و تصفح هذه الخدمة الإلكترونية.والرجاء كتابة الأسباب التي تجعل الخدمة المختارة مثيرة للاهتمام.

.....
.....
.....

يرجى تقييم درجة اتفاقك مع كل عبارة من العبارات التالية بوضع دائرة حول العدد المناسب .
المقصود " بالبوابه " : بوابة الحكومه الالكترونيه الاردنيه .

اعتماد وقبول							
البنود	"رضا المستخدم"	**أعارض بشدة**			**حيادي**	**أوافق بشدة**		
(S1)	أعتقد أنني أود استخدام بوابة الحكومة الإلكترونية الأردنية بشكل متكرر.	1	2	3	4	5	6	7
(S2)	واجهت صعوبات غير مبرره في بوابة الحكومه الالكترونية.	1	2	3	4	5	6	7
(S3)	اعتقد انه كان من السهل استخدام البوابة.	1	2	3	4	5	6	7
(S4)	أعتقد أنني بحاجة إلى مساعدة شخص خبير لكي أكون قادر على استخدام هذه البوابة.	1	2	3	4	5	6	7
(S5)	أعتقد أن الوظائف المختلفة في هذه البوابة متكاملة و متناسقة.	1	2	3	4	5	6	7
(S6)	اعتقد أن هناك الكثير من التناقض في هذه البوابة.	1	2	3	4	5	6	7
(S7)	أعتقد أن معظم الناس تتعلم كيفية استخدام البوابة سريعا جدا.	1	2	3	4	5	6	7
(S8)	لقد وجدت استخدام البوابة صعب.	1	2	3	4	5	6	7
(S9)	شعرت بثقة كبيرة باستخدام البوابة.	1	2	3	4	5	6	7
(S10)	كنت بحاجة لمعرفة الكثير من الأشياء قبل أن أتمكن من استخدام البوابة.	1	2	3	4	5	6	7

JGP : بوابة الحكومة الإلكترونية الأردنية

اعتماد وقبول							
البنود	"القابلية لاعادة استخدام البوابة"	**أعارض بشدة**			**حيادي**	**أوافق بشدة**		
(BI1)	سأكرر استخدام هذه البوابة في المستقبل.	1	2	3	4	5	6	7
(BI2)	سأستخدم هذه البوابة بدلا من مصادر أخرى للحصول على الخدمات الحكومية.	1	2	3	4	5	6	7
(BI3)	سأوصي الآخرين باستخدام هذه البوابة.	1	2	3	4	5	6	7
(BI4)	على افتراض أني تمكنت من الوصول إلى البوابة الالكترونيه سوف أستخدمها.	1	2	3	4	5	6	7

جودة النظام							
البنود	"الأستجابه"	**أعارض بشدة**			**حيادي**	**أوافق بشدة**		
(A1)	موقع JGP يستجيب لطلبي.	1	2	3	4	5	6	7
(A2)	موقعJGP يمكنه تحميل كافة النصوص والرسومات بسرعة.	1	2	3	4	5	6	7
(A3)	يمكن تحميل صفحات موقع JGP بسرعة عالية.	1	2	3	4	5	6	7
(A4)	يمكن تحميل الصفحة الرئيسية لموقع JGP بسرعة عالية.	1	2	3	4	5	6	7
البنود	التصفح	**أعارض بشدة**			**حيادي**	**أوافق بشدة**		
(N1)	موقع(JGP) لديه عدد كافي من روابط الانترنت.	1	2	3	4	5	6	7
(N2)	موقع(JGP) لديه وصفا واضحا لكل رابط.	1	2	3	4	5	6	7
(N3)	من السهل التنقل بين صفحات موقع (JGP) .	1	2	3	4	5	6	7
(N4)	في موقع JGP، تحتاج إلى بضع نقرات فقط للوصول الى المعلومات المطلوبة.	1	2	3	4	5	6	7
"سهولة الاستخدام"								
البنود	"سهولة الاستخدام المدركة "	**أعارض بشدة**			**حيادي**	**أوافق بشدة**		
(PEU1)	التمكن من استخدام الموقع الالكتروني (JGP).	1	2	3	4	5	6	7
(PEU2)	من المستحيل استخدام موقع (JGP) من دون مساعدة خبير.	1	2	3	4	5	6	7
(PEU3)	التفاعل مع موقع(JGP) واضح ومفهوم.	1	2	3	4	5	6	7
(PEU4)	استخدام موقع (JGP) يتطلب الكثير من الجهد العقلي.	1	2	3	4	5	6	7

"سهولة الاستخدام"							
البنود	"الفائده المدركة "	أعارض بشدة			حيادي	أوافق بشدة		
(PU1)	استخدام موقع(JGP) يمكنني من انجاز مهمتي بسرعة أكبر.	1	2	3	4	5	6	7
(PU2)	استخدام موقع(JGP) يحسن من أداء مهمتي	1	2	3	4	5	6	7
(PU3)	استخدام موقع(JGP) يساعد في زيادة إنتاجية مهمتي.	1	2	3	4	5	6	7
(PU4)	استخدام موقع (JGP) يحسن من نوعية المهمه التي اريد القيام بها.	1	2	3	4	5	6	7
"التصميم"								
البنود	"هيكلية المعلومات"	أعارض بشدة			حيادي	أوافق بشدة		
(AI1)	محتوى موقع (JGP) منظم بشكل جيد.	1	2	3	4	5	6	7
(AI2)	ترتيب الصفحه يجعل منها سهلة القراءة.	1	2	3	4	5	6	7
(AI3)	الصفحه الرئيسيه (الصفحه الاولى) منظمه بشكل جيد بحيث تتناسب مع المعلومات والخدمات الخاصه بالحكومه.	1	2	3	4	5	6	7
(AI4)	المعلومات في موقع (JGP) مصنفه الى فئات منطقيه.	1	2	3	4	5	6	7
(AI5)	كل فئه من الفئات تحتوي على معلومات مترابطه مع بعضها البعض.	1	2	3	4	5	6	7
(AI6)	اهم المعلومات وضعت في اعلى الصفحه.	1	2	3	4	5	6	7
"التصميم"								
البنود	"القيم المظهرية"	أعارض بشدة			حيادي	أوافق بشدة		
(AV1)	واجهة المستخدم في موقعJGP تحوي حجم الخط وألوان مناسبان.	1	2	3	4	5	6	7
(AV2)	صفحة JGP جذابة بصريا.	1	2	3	4	5	6	7
(AV3)	عرض الصور الرسومية على موقع JGP مفيد.	1	2	3	4	5	6	7
(AV4)	تصميم الصفحات يجعل تنفيذ المهام أسهل.	1	2	3	4	5	6	7
(AV5)	موقع JGP لديه تصميم واضح.	1	2	3	4	5	6	7
(AV6)	موقع JGP لديه تصميم بسيط لمحتوياته.	1	2	3	4	5	6	7

جودة النظام							
البنود	"الخصوصية"	أعارض بشدة			حيادي	أوافق بشدة		
(PV1)	أنا قلق حول احتمال استغلال معلوماتي الشخصية الممنوحة لـي JGP .	1	2	3	4	5	6	7
(PV2)	أنا قلق حول مدى ثقتي باعطاء معلوماتي الشخصية لي JGP .	1	2	3	4	5	6	7
(PV3)	من المهم أن يتم تحديد كيف سيتم جمع المعلومات الشخصية من قبل JGP .	1	2	3	4	5	6	7
(PV4)	من الضروري أن تقوم JGP بزيادة الخصوصية للمعلومات المعطاه من قبل المستخدم.	1	2	3	4	5	6	7
(PV5)	أنا قلق بشأن من سيتمكن من الوصول إلى معلوماتي الشخصية الممنوحة لي JGP	1	2	3	4	5	6	7
البنود	"السرية"	أعارض بشدة			حيادي	أوافق بشدة		
(SC1)	أنا قلق من الاحتيال عندما أطلب خدمة من JGP .	1	2	3	4	5	6	7
(SC2)	انني أشعر بالقلق من الشخص المخول لإستخدام معلوماتي الشخصيه في JGP	1	2	3	4	5	6	7
(SC3)	أنا قلق حول انعدام او نقص السريه في JGP	1	2	3	4	5	6	7
(SC4)	أنا قلق من ضعف موقع JGP تجاه قراصنة الأنترنت .	1	2	3	4	5	6	7
(SC5)	أنا قلق من الدخول غير المصرح به إلى معلوماتي الشخصية الممنوحة لـي JGP	1	2	3	4	5	6	7
(SC6)	من المهم أن يكون في الموقع اسم مستخدم وكلمة مرور لدخول الموقع.	1	2	3	4	5	6	7

التعليمات :

في الأسفل أزواج متناقضة من الكلمات لمساعدتك في تقييمكم لنوعية المعلومات المقدمة في بوابة الحكومة الإلكترونية الأردنية. الاحتمالات بين النقيضين تمكنك من وصف شدة الجودة التي تختارها. لا يوجد إجابة صحيحة أو خاطئة. رأيك الشخصي هو المهم. أنظر الى هذا المثال :

مرغوبه						X		غير مرغوبه

هذا التقييم يخبرنا أن المنتج غير مرغوب به في الغالب، إلا أن هناك مجالا بسيطا للتحسن.

البنود	نوعية المعلومة								
IQ1	مفهومة								غير مفهومة
IQ2	مفيدة								غير مفيدة
IQ3	قيمة								غير قيمة
IQ4	دقيقه								غير دقيقة
IQ5	محدثه								قديمة
IQ6	محدده								عامة

IQ7	ذات الصلة							بعيدة الصلة	
IQ8	كاملة							غير كاملة	
IQ9	متسقة							غير متسقة	
IQ10	كافية							غير كافية	
Q11	متاحة							غير متاحة	
IQ12	نطاقها واسع							نطاقها ضيق	
IQ13	موثوقة							غير موثوقة	

Appendix I- Research Protocol User-based Evaluation of the proposed wiki-based Co-design prototype

Field Study

User-based Evaluation of the proposed wiki-based co-design prototype of the G2C e-service development design

This field work and the focus groups discussion aim to investigate and assess the proposed functional prototype system regarding how the users' engage and participate/involve in the design processes of the G2C e-service in different levels of e-service development and to identify requirements and improvement suggestions from users' feedback.

You are requested to carry out the following tasks:

1- Fill in the consent form.
2- Fill in the Background Questionnaire.
3- Attend a pre-test interview with a set of questions about your previous experience of participating with software development.
4- Attend a post-test interview with questions about your experience of interacting with the proposed collaborative co-design prototype system.

NOTE: Nothing will be recorded that can reveal or disclose your personal Identity.

Muneer Nusir

Postgraduate student, Department of Information system and computing.

Brunel University.

Under the supervision of

Dr David Bell

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E-Mail: moneer_techno@yahoo.co.uk

Part 1	Background Questionnaire

Q.1 what is your age?

□ 18-24 □ 25-34 □ 35-44 □ 45-54 □ 55+

Q.2 what is your gender?

□ Male □ Female

Q.3 what is your highest educational level achieved?

□ Secondary school □ College □ Bachelor Degree

□ Master Degree □ Doctorate □ Other

Q.4 what is your profession?

_____

Q.5 How would you rate your level of competence for working with information and communication technologies (ICT)?

□ Very low □ low □ medium □ high □ very high □ don't know what ICT is

Part 2	Pre-test interview-FGD

Q1. Do you have experience of software development? (Describe it?)

Q2. Could you please describe in detail your experience with the e-services provided by the Jordanian e-Government you have used?

Q3. Tell us about yourself as an online co-design tool(s) user? (When, Why, and How)?

Q4. What do you think of co-design as an approach used in software development in general?

_____

Q5. Do you involve service user (end-users) in the design process? If Yes

---

Q5.1 At what point in the design process?

Q5.2 In what ways?

Please go to 'wiki-based co-design' site (www.wikibasedcodesign.) and carry out the given tasks below.

Part 3	***Task Scenarios-***

Task 1 (All groups): Please take at most 3 minutes to browse the Wiki-based co-design site.

Task 2 (service provider): Imagine a scenario for developing specific type G2C e-service through describing the definition of service/ or the requirements' needed and explain for whom this service, then share your scenario using one of the popular social network to get feedbacks and exchange ideas and views with other stakeholders.

Task 3 (service user/interface): Please engage into a system then involve with different stages of service design using the participation community links.

Task 4 (All groups together): review and discuss the evaluated ideas/views and the feedback from the generated report.

Part 4	***Post Test Interview-FGD***

After accomplishing the tasks above, please describe your user experience by answering the following questions.

Q1. How would you like to introduce your experience of using the wiki-based co-design site?

Q2. Did the system meet your expectations? (How/why?)

Participation and experiences (in different phases)

Q3. Did you actively participate in the proposed wiki-based co-design system?

3.1 In what way? If not, why not?

3.2 Would you have wanted to participate more?

3.3 What kind of participation do you think was expected of users?

Q4. How suitable was this system (wiki-based co-design) as platform for ideation and co-design tool?

Q5. How would you like to describe your role among active users?

Q6. Which of the proposed co-design tools were shown a valuable aid/support the design and development of G2C e-service?

Q7. What exactly are the benefits and the limitations of the proposed tools?

Q8. How can the different stages of the design process be methodically improved?

Appendix J-Research Protocol (in Arabic)

دراسة ميدانية

التقييم القائم على المستخدم من خلال استخدام نموذج تصميم المشارك المقترح لتصميم و تطوير الخدمة الإلكترونية من قبل الحكومة و المواطن.

يهدف هذا البحث الى استقصاء و تقييم نظام النموذج الأصلي العملي حسب ارتباط المستخدمين, و المساهمة في عمليات تصميم الخدمات الإلكترونية في مستويات مختلفة من حيث تطوير هذه الخدمات وتحديد متطلبات و اقتراحات لتحسين هذه الخدمات من خلال التغذية الراجعة من قبل المستخدمين.

✓المطلوب تنفيذ المهمات التالية :

1. تعبئة نموذج الموافقة على الاشتراك في البحث .
2. تعبئة الاستبيانة.
3. حضور مقابلة ما قبل تجربة الموقع (مجموعة من الأسئلة حول خبرتك السابقة للمشاركة بتطوير المواد و البرامج الالكترونية).
4. حضور مقابلة ما بعد تجربة المواقع (مجموعة من الأسئلة حول خبرتك في التعامل مع الموقع و التصميم التشاركي).

✓ملاحظة: المعلومات الواردة في البحث سرية وتستخدم لأغراض البحث فقط.

الجزء الأول : معلومات شخصية✍

***العمر**: 18 -24 25 -34 35 -44 45 -55 اكثر من 55

***الجنس:** ذكر انثى

***اعلى مؤهل علمي:**
ثانوية عامة كلية مجتمع بكالوريوس ماجستير دكتوراه اخرى

***الوظيفة** .....

***كيف تقييم كفأتك في استخدام تكنولوجيا المعلومات و الاتصال:**
منخفضة جدا منخفضة متوسطة عالية عالية جدا لا اعلم عنها

✌الجزء الثاني : مقابلة المستخدم قبل تجربة الموقع

1) هل لديك خبرة في تطوير البرامج الالكترونية؟ (اذكرها)
2) اشرح بالتفصيل خبرتك في الخدمات الالكترونية التي استخدمتها و المقدمة من الحكومة الالكترونية الاردنية؟

3) حدثني عن نفسك كمستخدم لأدوات التصميم المشارك(الأدوات التي تسمح لك كمستخدم في المشاركة بتصميم الخدمة) متى؟ لماذا ؟ كيف؟

4) ما رأيك بالتصميم المشترك كوسيلة مستخدمة في تطوير البرامج بشكل عام ؟
5) هل اشتركت كمستخدم في عملية التصميم؟ اذا كانت اجابتك نعم اذكرها بالتفصيل
6) في أي مرحلة من مراحل التصمصم اشتركت؟ كيف؟

✓ارجع للموقع الالكتروني و نفذ المهمات التالية لجميع المجموعات
www.wikibasedcodedesign.co.

الجزء الثالث: سيناريوهات المهام ✍

مهمة 1 : (موجهة لجميع الفئات) يرجى أخذ على الأكثر 3 دقائق لتصفح موقع التصميم المشترك.
مهمة 2 : (موجهة لمزود الخدمة): تخيل سيناريو لتطوير نوع معين من الخدمة الإلكترونية من خلال وصف طبيعة هذه الخدمة / أو المتطلبات اللازمة و ذكرالفئة الموجهة لها هذه الخدمة، ثم نشر السيناريو على واحدة من شبكات التواصل الاجتماعي للحصول على تغذية راجعة لهذه الخدمة وتبادل الأفكار والآراء مع أصحاب المصلحة الآخرين.
المهمة 3 (موجهة للمستفيد من الخدمة / واجهة): الرجاء الدخول إلى النظام/الموقع ثم الاندماج مع المراحل المختلفة من تصميم الخدمة باستخدام الروابط المشاركة.
المهمة 4 (موجهة لجميع الفئات): يمكنك مراجعة تقييم الأفكار / الآراء التي تمت من قبل مستخدم الخدمة وابلاغ الاصدقاء . وعلاوة على ذلك، يمكنك تبادل الأفكار والآراء و مع الآخرين من خلال منتدى المناقشة.

الجزء الرابع: مقابلة المستخدم بعد تجربة الموقع: ✍

✓ بعد انجاز المهمات السابقة، صف خبرتك كمستخدم بالأجابة عن الأسئلة التالية:

1. بشكل عام، كيف تصف خبرتك كمستخدم للموقع المذكور؟
2. هل يلبي الموقع رغباتك و توقعاتك؟ كيف؟ و لماذا؟
3. هل شاركت بفاعلية في الموقع المقترح؟ كيف؟ اذا كانت الاجابة لا ، لماذا؟
4. ما نوع المساهمة التي كنت تتوقعها من المستخدمين و ما هي الخبرات التي اكتسبتها من المشاركة ؟
5. ما مدى مناسبة هذا النظام للعمل كمنصة للافكار؟
6. كيف تصف دورك في مجموعة المستخدمين النشطة داخل الموقع؟
7. ما هي الادوات المقترحة في التصميم الأكثر توضيحا للجانب الداعم في البرنامج و تطوير الخدمات الاليكترونية؟ و ما هي بالتحديد الفوائد و النواقص في الأدوات المستخدمة؟

7.1 برأيك كيف يمكن تحسين عمليات التصميم التفاعلي في مختلف المراحل؟

Appendix K- RepGrid Interview transcription (Three Groups)

Service provider-Key point coding

The researcher uses the coding technique by key points rather than coding by micro-analysis of the data, because micro analysis has two disadvantages. First, it is time consuming (analysing data word by word and line by line). Second, it leads to confusion at times (Allan, 2003).

The key point regarded as important to the exploration were recognised in the transcriptions, highlighted in draft paper when the researcher was listening to the recorded interviews after he translated some interviews from Arabic to English, and "gave an identifier attributed sequentially starting from first interview and continuing on through subsequent interviews" to give P-ICT1 and so on where P indicates the 'Key Point'. To differentiate key points made in subsequent groups; identifiers (ICT, NITC) were used to distinguish. For example, Key point 'P-ICT1' was made by the first worker of government staff who works in ICT1. But, the Key point 'P-NITC1' was made by the first worker of the government staff who works in NITC1. The text of key points is shown in middle column of table 1. The key point identifiers are shown in the left-hand column of table 1 and the code in the right-hand column.

Table 1: Key points and codes from the interviews data gathered in Ministry of information and communication technology (MO-ICT) And National information technology centre (NITC).

ID	Key Point	Code
P-ICT1	-Scoping of service through studying the workflow process of service. -Prepare a sample to be envisioning of how the service should be provided. -Review all documents (requirements of proposal) before send it to vendor (private company responsible about service design and development). -Subject to approval by e-Government programme and government agency (the government entity who provide the services to end-user). -The vendor prepares a prototype (initial design) represent a workflow process. -Start a real design stage if e-Government programme and a particular agency have approved the initial design. -Go next stage of service development (implementation). -Testing the developed service by e-Government programme and a particular agency based on criteria have identified preconceived. -Soft-launch for the approved service to e-Government Portal.	*Scoping* *Envisioning* *Requirements* *Subject to approval* *Prepares a prototype* *Design stage* *Implementation stage* *Testing based on criteria* *Soft-launch*
P-ICT2	-Studying the user needs through government agencies. -Gathering all requested info about concerned service.	*User needs* *Requested info*

	-Studying and analysing the feasibility for applying the requested service. -Procurement stage (the vendor who will develop the service). -Development Phase -Testing services by e-Government programme and government agencies based on user acceptance and security. -Modification stage (if needed) based on the feedback will be collected from e-Government programme staff. -Re-testing to make sure about quality of service. -Launch the service online.	*Studying and analysing the feasibility* *Procurement* *Development* *Testing* *Re-design/develop of service* *Final acceptance* *Launch service online*
P-ICT3	-Strategic planning for studying and analysing the e-Government services in government agencies. -Action plan (workflow process) -Procurement (vendor choosing) -Development phase (including designing of service) -Final deliverable to test the developed service. -Re-testing the service (final acceptance closer) -Stockholders feedback based on the service they requested -Soft-launch of service	*Strategic planning* *Envisioning* *Studying and analysing the vendor choices* *Development* *Testing phase* *Final acceptance* *Feedback* *Soft-launch*
P-NITC1	-Visible study to get all requirements and needs -Action plan to prepare a workflow process -present a developed workflow for target users to early feedback -update workflow (if needed) based on feedback -implementation for each phase based on action plan -present each implemented phase to get feedback -modify each stage of development phase (if needed) -Testing the service by NITC and target users -Finishing (including launch service online)	*Requirements and needs* *Workflow process* *Early Feedback* *Modify the workflow* *Implementation stage* *Feedback* *Modify the development phase* *Testing (final acceptance closer)* *Launch service-online*
P-NITC2	-Identify the user needs through government entities. -Determine from previous step the most service requested. -Procurement (vendor choices) -Designing and developing stages -Administration and support for e-services	*User needs* *Most service requested* studying and analysing the vendor choices, *Development phase* *Managing and maintenance for e-Gov services*
P-NITC3	-Studying the user needs -Analysing the possibility of implementation for requested services -Studying the service beneficiary through asking	*User needs* *Analysing the requested services* *Service beneficiary and*

	about authorisation (policies) from government agencies regarding the possibility to develop the concerned service. -Action plan (project management and user acceptance) - Service design and validation -Implementation -Testing the service -Launch a beta-version of prototype -Gathering feedback from government entities -update the service (if needed) based on feedback -Take in consideration the feedback come from end-users -Soft-launch the service to portal	*concerned service* *Workflow process* *Service design stage* *Implementation stage* *Service quality and security* *Mock-up prototype* *Feedback from government entities* *Modify the service* *Feedback from end-users* *Launch service to portal*

The Emergence of concepts

The code "user needs" emerged from P-ICT2. The codes from all other keys points were compared with this to get if similar codes occur often. The following codes were considered to have commonality: "user needs" from P-ICT2; "strategic planning" from P-ICT3; "requirements and needs" from P-NITC1; "user needs" from, P- NITC2; "user needs" from P-NITC3. The common characteristic is "Strategic planning for studying and analysing user needs" and this was the first concept to emerge from data. This is noted in Table 2.

"The process of comparing the codes with each other, to find higher order commonality, produced the concepts from the codes" (Allan, 2003, p.4) (See table 1). The concepts are summarised below in Table 2.

Table 2: Emergence of concepts from the codes in table 1

ID	Codes	Emergence of concepts
P-ICT2, P-ICT3, P-NITC1, P-NITC2, and P-NITC3	User needs, strategic planning, requirements and needs, user needs, and user needs	Strategic planning for studying and analysing user needs.
P-ICT1, P-ICT3, P-NITC1, and P-NITC3	Envisioning, envisioning, workflow process, and workflow process	Initial project management of how the service will be provided.
P-ICT1, P-ICT2, P-NITC1, P-NITC2, P-NITC3	Requirements, requested info, requirements and needs, most services requested, analysing the requested services, and concerned service	Studying and analysing the service requirements
P-ICT1, P-ICT2, P-ICT3, P-NITC2, P-NITC3	Subject to approval, studying and analysing the feasibility, studying and analysing the vendor choices, studying, analysing the vendor	Studying the feasibility for applying and developing the requested services through e-government programme as supplier and vendor as developer

	choices, and service beneficiary	
P-ICT1, P-NITC1, P-NITC3	Prepare a prototype, early feedback, and mock-up prototype	Launch a beta version of service to get early feed back
P-ICT1, P-ICT2, P-ICT3, NITC1, NITC2, NITC3	Design and implementation, development, development, implementation, development, service design and implementation	Development phase including (service design stage and implementation stage)
P-ICT1, P-ICT2, P-ICT3, P-NITC1, P-NITC2, P-NITC3	Testing based on criteria, testing, testing phase, testing (final acceptance close), managing and maintenance, and test service quality and security	Testing phase including test (service quality and security and final acceptance)
P-ICT2, P-NITC1, P-NITC3	Re-design/develop, modify the development phase, and modify the service	Keep updating the service design to be compatible with end-user feedback
P-ICT1, P-ICT2, P-ICT3, P-NITC1, P-NITC3	Soft-launch, launch service online, soft-launch, launch service online, launch service to portal	Launch for the approved services to e-Government portal

The Emergence of categories from government staff group (ICT and NITC)

By comparing each concept in turn with all other concepts, further commonalities are found which is from the extensive categories (Allan, 2003). According to Glaser and Strauss (1967) who they developed this method, which is repetitively comparing concepts with each other. Thus, the researcher is …"applying the constant comparison technique to each concept in turn, a common theme" (Allan, 2003, p.4) was found amongst the concepts mentioned in Table 2.

By comparing the concepts with each other in this group, the researcher grouped "Strategic planning for studying and analysing user needs"; and "Studying and analysing the service requirements" a category emerged in figure 1 as "Initiating and scoping phase"

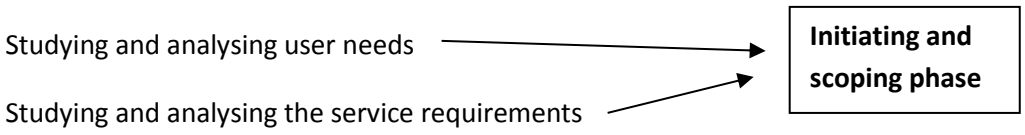


Figure 1: Diagrammatical emergence of the category "Initiating and scoping phase"

Grouping "Initial project management of how the service will be provided" and "Studying the feasibility for applying and developing the requested services through e-government programme as supplier and vendor as developer" in figure 2 gave the category "Action plan (workflow process for service design and citizen's needs".

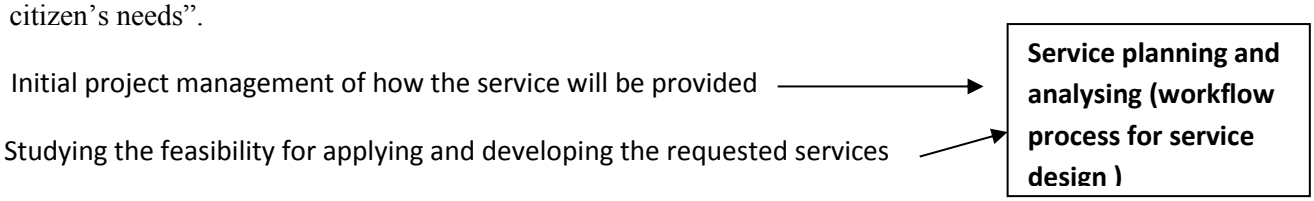


Figure 2: Diagrammatical emergence of the category "Action plan (workflow process for service design and citizen's needs"

Grouping "Launch a beta version of service to get early feedback"; "service design stage and implementation stage"; "Testing phase including test (service quality and security and final acceptance)"; "Keep updating the service design to be compatible with end-user feedback"; and "Launch for the approved services to e-Government portal" in figure 3 gave the category "Re-engineering development process".

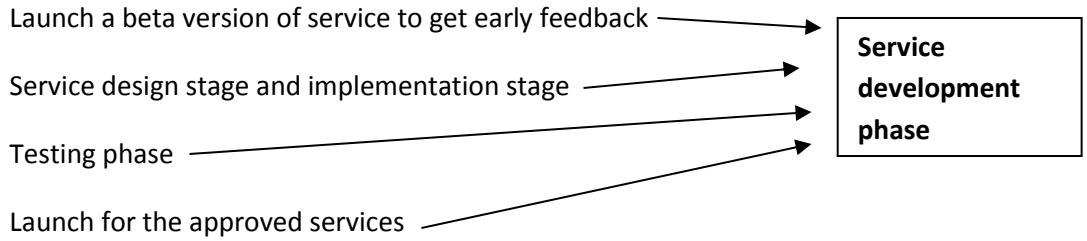


Figure 3: Diagrammatical emergence of the category "Service development phase"

Table 3: Emergence of categories from the concepts in the data from government staff group

Initiating and scoping phase
Strategic planning for studying and analysing user needs
Studying and analysing the service requirements
Service planning and analysing (workflow process for service design)
Initial project management of how the service will be provided
Studying the feasibility for applying and developing the requested services through e-government programme as supplier and vendor as developer
Service development Phase
Launch a beta version of service to get early feedback
service design stage and implementation stage
Testing phase including test (service quality and security and final acceptance)
Keep updating the service design to be compatible with end-user feedback

Service interface-Key point coding

The researcher uses the coding technique by key points rather than coding by micro-analysis of the data, because micro analysis has two disadvantages. First, it is time consuming (analysing data word by word and line by line). Second, it leads to confusion at times (Allan, 2003).

The key point regarded as important to the exploration were recognised in the transcriptions, highlighted in draft paper when the researcher was listening to the recorded interviews after he translated some interviews from Arabic to English, and "gave an identifier attributed sequentially starting from first interview and continuing on through subsequent interviews to give" P-CW1 and so on where P indicates the 'Key Point'. To differentiate key points made in subsequent groups; identifiers (CW) were used to distinguish. For example, Key point 'P-CW1' was made by the first citizen worker in government agencies/entities. The text of key points is shown in middle column of table 1. The key point identifiers are shown in the left-hand column of table 1 and the code in the right-hand column.

Table 1: Key points and codes from the interviews data gathered in various government agencies in different provinces.

ID	Key Point	Code
P-CW1	-Determine the user needs. -Service easy to use. -Test services to identify if it appropriate with user needs. -Modify the service (if needed) to be compatible with needs and requirements. -Continues for updating service to be suitable with user experience.	*User needs* *Service easy to use* *Test service* *Modify service* *Continuous of updating*
P-CW2	-Storing the citizen's data in database to make it easier for citizens during applying any official docs through his/her ID. -Mock-up prototype for the most requested services. -Identify user needs and requirements. -make modification based on citizen's perspectives. -Test the service through citizens. -Launce the service online. -Take in consideration worthy feedback to keep service up to date.	*Data stored in database* *mock-up prototype* *User needs* *Service modification* *Service testing* *launch service online* *update services*
P-CW3	-Identify the user needs. -Studying and analysing the possibility of applying these needs with respect the capability of government ICT infrastructure and citizen's willingness. -Test a beta-version of service to uncover citizen's satisfaction. -Applying service online -Re-development phase (including designing of service) -Re-launch the services. -Re-assess the service to keep it update.	*user needs* *Government capability and citizens' willingness.* *Test a beta version of service* *applying service online* *Re-development of service design* *Re-launch the service* *Re-assess the services*
P-CW4	-Distribute questionnaires for citizens to identify	*Identify user needs*

	user needs. -Design a database for each Brand of services without redundant same characteristics in different brands. -Take in consideration the possibility of development these services. -Design initial template for services to grant citizens chance to test these services. -Assess these services through mock-up prototype. -Gathering feedback from citizens about these services. -Activate these services and launch it online	 *design database for each brand of service* *possibility of developing these services* *Design initial template for requested services* *Assess these services through designed template* *Gets feedback* *Launch service-online*
P-CW5	-Engaging a large segment of citizens for creating questionnaires. -Distribute questionnaires in society to get feedback about their needs. -Identify user needs and requirements. -Analysing these needs and studying the possibility of implementation. -Prepare initial design through real engaging between citizen's government service designers. -Testing these services through a beta-version by using a small sample of citizens. - Modify these services based on the feedback - Re-testing the services but with large sample of citizens. - Modify these service (if needed) based on feedback. - Launch service online (e-Gov portal). - Continues assessment process for services to get effective feedback.	*prepare questionnaires* *distribute questionnaires* *Identify user needs and requirements* *Analysing these needs and possibility of applied* *Initial design for services* *Testing a beta version of services* *modify these services based on Feedback* *Re-testing the services* *modify the services* *launch services* *continuous assessment*
P-CW6	-Do field survey to identify user needs. -Gathering all requested information related to most significant needs. -Analysing the gathered data to help government staff to determine real user needs. -Analyse the most service requested to identify service requirements. - Beginning of service design stage -Test these services to get feedback -Modify these services (if needed). -Launch the service online.	*Field survey* *Gathering all requested information related to user needs* *Real user needs* *Identify service requirements* *Initial design of service* *Test these services and feedback* *Modify the services* *launch the service online*

The Emergence of concepts

The code "user needs" emerged from P-CW1. The codes from all other keys points were compared with this to get if similar codes occur often. The following codes were considered to have commonality: "user needs" from P-CW1; "User needs" from P-CW2; "User needs" from P-CW3; "Identify user needs" from, P- CW4; "*Identify user needs and requirements*" from P-CW5; "Real user needs" from P-CW6. The common characteristic is "Strategic planning for studying and analysing user needs" and this was the first concept to emerge from data. This is noted in Table 2.

"The process of comparing the codes with each other, to find higher order commonality, produced the concepts from the codes" (Allan, 2003, p.4) (See table 1). The concepts are summarised below in Table 2.

Table 2: Emergence of concepts from the codes in table 1

ID	Codes	Emergence of concepts
P-CW1, P-CW2, P-CW3, P-CW4, P-CW5, P-CW6	User needs, User needs, User needs, Identify user needs, Identify user needs and requirements, and Real user needs.	Identify users' needs and requirements
P-CW1, P-CW2, P-CW4.	Service easy to use, Database easy to retrieve/browse and service useful.	Service efficiency and effectivity.
P-CW1, P-CW2, P-CW3, P-CW4, P-CW5, P-CW6.	Test the service, Service testing, Test a beta version of service, Assess the service through designed template, Testing a beta version of service, and Test services.	Testing and assessment of services through beta-version (prototype) of services to get early feedback.
P-CW1, P-CW2, P-CW3, P-CW5, P-CW6.	Modify the service, Service modification, Re-development the services, Modify the services, and Modify the services.	Re-designing and adjustment of services.
P-CW1, P-CW2, P-CW3, P-CW5,	Continues of services updating, Updating services, Re-assess the services, and Continues assessment.	Keep updating the services based on feedback from re-/assessment phase.
P-CW2, P-CW3, P-CW4, P-CW5, P-CW6	Launch service online, applying service online, Launch service online, Launch service to portal, and Launch the service online.	Launch services online/e-portal
P-CW2, P-CW3, P-CW4, P-CW5,	Service classification and service organisation.	Service categorisation

P-CW6.		
P-CW3, P-CW4, P-CW5, P-CW6 (2)*.	Government capability and citizens' willingness, possibility of developing these services, Analysing these needs and studying the possibility of implementation, Identify service requirements, And Gathering all requested information related to user needs.	Studying and analysing the user needs and government possibility of e-service development.
P-CW5, P-CW6.	Prepare/distribute questionnaires, and field survey.	Distribute questionnaires to get early feedback about citizen's needs.

*: elicited two codes from P-CW6

The Emergence of categories from Service interface group

By comparing each concept in turn with all other concepts, further commonalities are found which is from the extensive categories (Allan, 2003). According to Glaser and Strauss (1967) who they developed this method, which is repetitively comparing concepts with each other. Thus, the researcher is …"applying the constant comparison technique to each concept in turn, a common theme" was found amongst the concepts mentioned in Table 2 (Allan, 2003, p.4).

By comparing the concepts with each other in this group, the researcher grouped "Identify user needs and requirements"; and "Distribute questionnaires to get early feedback about citizen's needs" a category emerged in figure 1 as "Initiating and scoping phase"

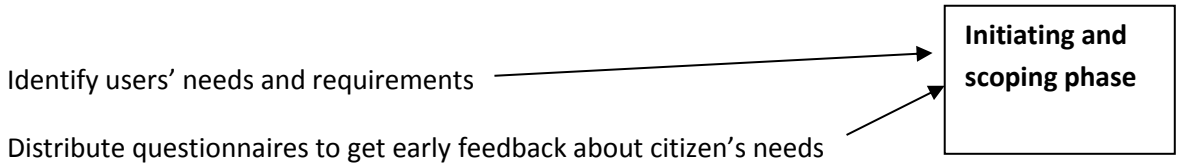


Figure 1: Diagrammatical emergence of the category "Initiating and scoping phase"

Grouping "Design database for each brand of service to make it easy for browsing"; "Create an initial design/template for requested services" and "Studying and analysing the user needs and government possibility of e-service development" in figure 2 gave the category "Action plan (workflow process for service design citizen's needs)"

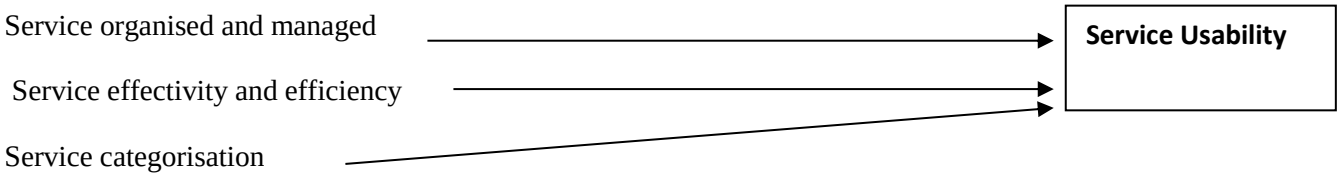


Figure 2: Diagrammatical emergence of the category "Action plan (workflow process for service design citizen's needs)"

Grouping "Testing and assessment of services through beta-version (prototype) of services to get early feedback"; "Keep updating the services based on feedback from re-/assessment phase" and "Re-designing and adjustment of services" in figure 3 gave the category "Evaluation and updating phase".

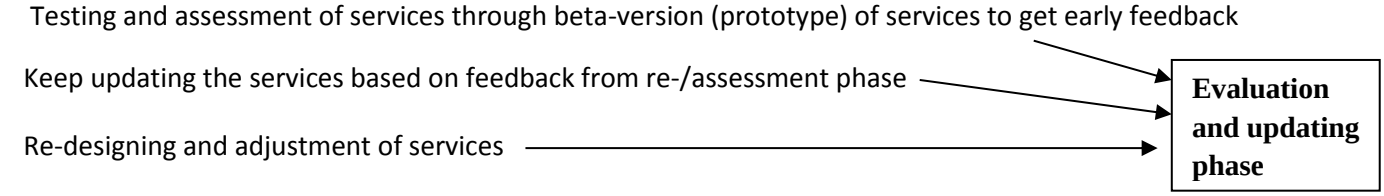


Figure 3: Diagrammatical emergence of the category "Evaluation and updating phase"

The last concept is "Launch services online/e-portal" in figure 4 gave the category "Development and final deliverable".

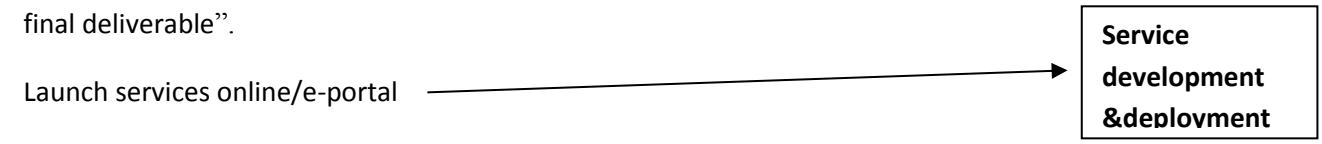


Figure 4: Diagrammatical emergence of the category "Development and final deliverable"

Table 3: Emergence of categories from the concepts in the data from government staff group

Initiating and scoping phase
Identify user needs and requirements
Distribute questionnaires to get early feedback about citizen's needs
Service Usability
Service organised and managed
Service effectivity and efficiency
Service categorisation
Evaluation and updating phase
Testing and assessment of services through beta-version (prototype) of services to get early feedback
Keep updating the services based on feedback from re-/assessment phase
Re-designing and adjustment of services
Service development and deployment
Launch services online/e-portal

Service User-Key point coding

The researcher uses the coding technique through adopting key points coding (Allan, 2003) rather than coding by micro-analysis of the data, because micro analysis has two disadvantages. First, it is time consuming (analysing data word by word and line by line). Second, it leads to confusion at times.

The key point regarded as important to the exploration were recognised in the transcriptions, highlighted in draft paper when the researcher was listening to the recorded interviews after he translated the interviews from Arabic to English, and gave an identifier attributed sequentially starting from first interview and continuing on through subsequent interviews to give P-TC1 and so on where P indicates the 'Key Point'. To differentiate key points made in subsequent groups; identifiers (TC) were used to distinguish. For example, Key point 'P-TC1' was made by the first typical citizen. The text of key points is shown in middle column of table 1. The key point identifiers are shown in the left-hand column of table 1 and the code in the right-hand column.

Table 1: Key points and codes from the interviews data gathered from typical citizens with different backgrounds, experiences and who are interesting to G2C service design.

ID	Key Point	Code
P-TC1	-Distribute questionnaires to get early knowledge about citizen's needs. -Studying and analysing about government possibility to implement the requested services. -Implement the concerned services. -Test the services from government side to check service quality and security. -Service assessment from citizen's side to get feedback. -Modify the service (if needed) based on feedback. -Launch the service online.	*Citizen's needs* *Studying and analysing the service feasibility* *Design and development* *Testing* *Evaluation* *Re-design/develop services* *Service ready for using*
P-TC2	-Opinion poll to explore user needs. -Aware citizens for using e-gov services through advertisements and training courses. -Activate the services. -Test these services through beta-version of service by citizens. -Assessment these service based on (testing-beta version) to get feedback. -modify (update) the service relying on feedback. -continuance development of service design.	*User needs* *Citizens' willingness* *Launch beta- service online* *Testing of service* *Evaluation of service* *Re-design/develop services* *Keep updating services*
P-TC3	-Distribute questionnaires through random sample to get general users' needs. -Distribute questionnaires for gov entities/agencies staff to ask them how would like they to involve in design process for e-services. - Start the designing phase. -Implementation phase -Test a beta-version of service by back to targeted citizens. -Assessment of these services -Modify these services (if needed). -Launch these services online.	*user needs* *Co-design (sharing ideas and experience).* *Design phase* *Development phase* *Testing of service* *Evaluation phase* *Re-design/develop services* *Launch service online*

P-TC4	-Create more than one mock-up prototype regarding requested services. -Make voting for most template version appropriate with citizen's experience. -Activate a beta-version of service for citizens. -Assess the developed services to get feedback. -Modify these services (if needed) based on provided feedback. -Launch the service online.	*Many templates of service design* *Voting to choose the best service design* *Launch beta- service online* *Evaluation phase* *Re-design/develop services* *Final version of service for delivering*
P-TC5	-Take in consideration the most complaining come from gov entities regarding to user needs. - Start the designing phase relying on citizen's needs. -Design service to be as break-down (classifying to categories) to facilitate browsing services. -Co-operation between e-gov entities to be as e-portal. -Activate the Two-way interaction to keep user up to date. -Grant users options like suggestions and/or complainants to keep get feedback. -Test the service through mock-up version of service - Take in consideration the updated feedback to keep services improving.	*Identify user needs* *Service design phase* *Classifying service to categories* *Collaboration between gov entities/e-portal* *Two-way interaction* *Feedback* *Testing a beta version of services* *Service updating*
P-TC6	-formation of the committee to study the existing G2C service. - Studying and analysing all required info to facilitate the development phase. -Take in consideration the provided feedback. -Launch service online.	*Studying and analysing the existing service* *Well Prepare regarding development phase* *Provided feedback* *Final version of service for delivering*
P-TC7	-Identify initial citizen's needs through gov agencies staff. -Prepare questionnaires based on initial needs and distribute it on citizens to explore more needs and measure of reality of previous initial needs. - Design a mock-up service regarding real needs - Test the mock-up prototype through random sample of citizens and gov staff. - Modify/update the prototype based on provided feedback. - Beginning of development/implementation phase. - Launch service online - Keep updating these services based on feedback	*Initial user's needs* *Real user's needs* Mock-up prototype Testing phase Re-designing/developing Developing phase Final service deliverable Service updating

	will be provided by citizens.	

The Emergence of concepts

The code "Citizen's needs" emerged from P-TC1. The codes from all other keys points were compared with this to get if similar codes occur often. The following codes were considered to have commonality: "user needs" from P-TC2; "User needs" from P-TC3; "User needs" from P-TC3; "Initial user needs" from, P- TC5; "Real user needs" from P-TC7. The common characteristic is "Identify user's needs" and this was the first concept to emerge from data. This is noted in Table 2.

"The process of comparing the codes with each other, to find higher order commonality, produced the concepts from the codes" (Allan, 2003, p.4) (See table 1). The concepts are summarised below in Table 2.

Table 2: Emergence of concepts from the codes in table 1

ID	Codes	Emergence of concepts
P-TC1, P-TC2, P-TC3, P-TC5, *P-TC7.	Citizen's needs, User needs, User needs, Identify user needs, Initial user's needs and Real user's needs.	Identify user's needs
P-TC1, P-TC2, P-TC6.	Studying and analysing the service feasibility, Citizens' willingness, and Studying and analysing the existing service.	Defining service requirements.
P-TC1, P-TC3, P-TC4 *P-TC5, P-TC6, P-TC7.	Design and development, Design and development phase, Service design phase, Well Prepare regarding development phase, Classifying service to categories, Many templates of service design and Develop phase.	Designing and developing the service architecture.
P-TC1, P-TC2, P-TC3, P-TC4, P-TC7.	Re-designing/developing services (mentioned 5 times)	Modification and updating service.
P-TC1, P-TC2, P-TC3, P-TC5, P-TC7.	Testing, Testing of service, Testing of service, Testing a beta version of service, and Testing phase.	Testing phase of service.
P-TC1, P-TC2, P-TC3, P-TC5, P-TC6.	Evaluation, Evaluation of service, Evaluation of service. Evaluation phase, Feedback, and provided feedback.	Assessment phase for e-services

P-TC1, P-TC3, P-TC5, P-TC6	Service ready for using, Final version of service for delivering, Two-way interaction, Final version of service for delivering, Final version of service for delivering.	Finishing phase (service online).
P-TC5	Collaboration between government entities.	E-portal service
P-TC2, P-TC4, P-TC7.	Launch beta- service online, Launch service online and Mock-up prototype	Testing and evaluation of trail version of service
P-TC2, P-TC5, P-TC7.	Service updating, Service updating, and Keep updating service	Service improvement and maintenance
P-TC3	Sharing ideas and experience between end-users and e-services designers.	Co-design

*: elicited two codes from P-TC7, P-TC5

The Emergence of categories' from typical citizens group

By comparing each concept in turn with all other concepts, further commonalities are found which is from the extensive categories (Allan, 2003). According to Glaser and Strauss (1967) who they developed this method, which is repetitively comparing concepts with each other. Thus, the researcher is …"applying the constant comparison technique to each concept in turn, a common theme" was found amongst the concepts mentioned in Table 2 (Allan, 2003, p.4).

By comparing the concepts with each other in this group, the researcher grouped "Identify user needs"; and "Defining service requirements" a category emerged in figure 1 as "Initiating and scoping phase"

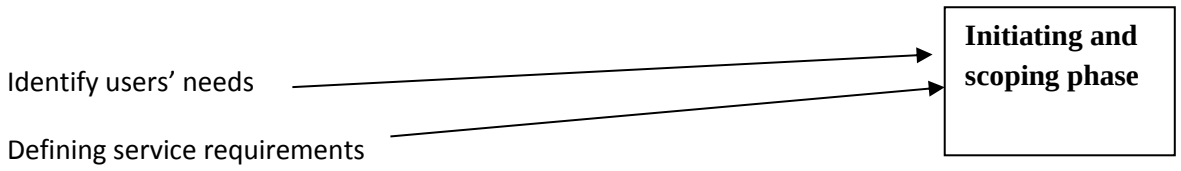


Figure 1: Diagrammatical emergence of the category "Initiating and scoping phase"

Grouping "Modification and implementation phase"; and "Assessment phase for e-services" in figure 2 gave the category "Evaluation and Updating".

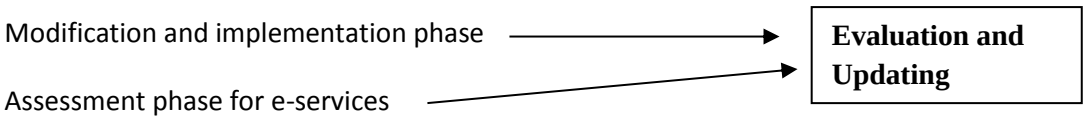


Figure 2: Diagrammatical emergence of the category "Evaluation and Updating"

Grouping "Designing and developing the service architecture"; "Testing phase of service"; "Finishing phase (service online)"; and "Service improvement and maintenance" in figure 3 gave the category "Service development and deployment".

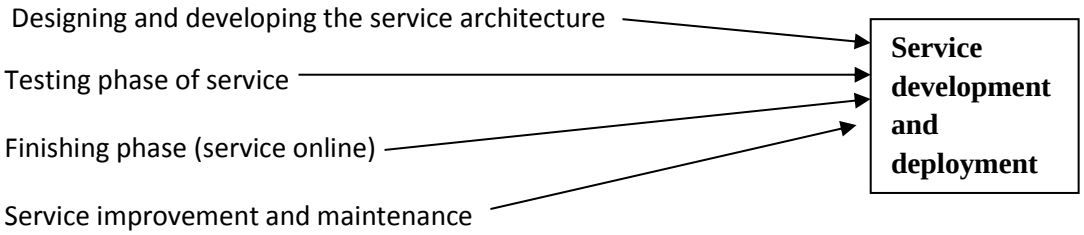


Figure 3: Diagrammatical emergence of the category "Service development and deployment"

The last two concepts are "E-portal service" and "Co-design" in figure 4 and figure 5 gave the category "Launch the service integration" and "Co-design" respectively.

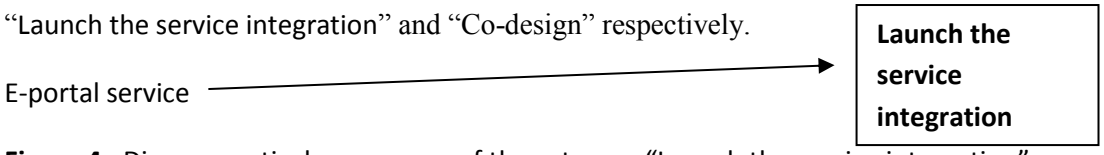


Figure 4: Diagrammatical emergence of the category "Launch the service integration"

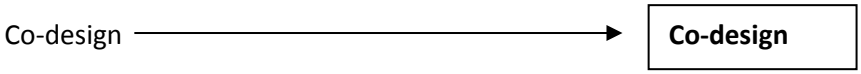


Figure 5: Diagrammatical emergence of the category "Co-design"

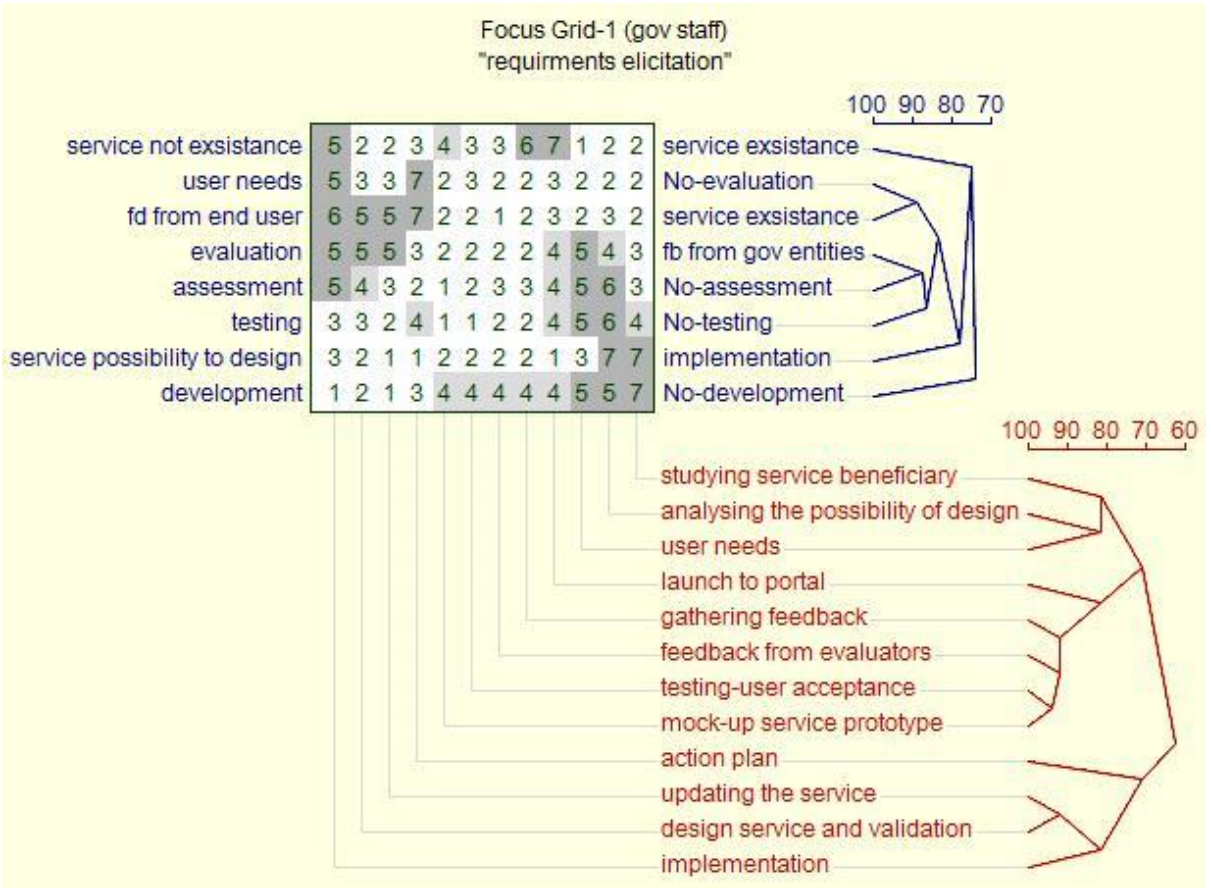
Table 3: Emergence of categories from the concepts in the data from government staff group

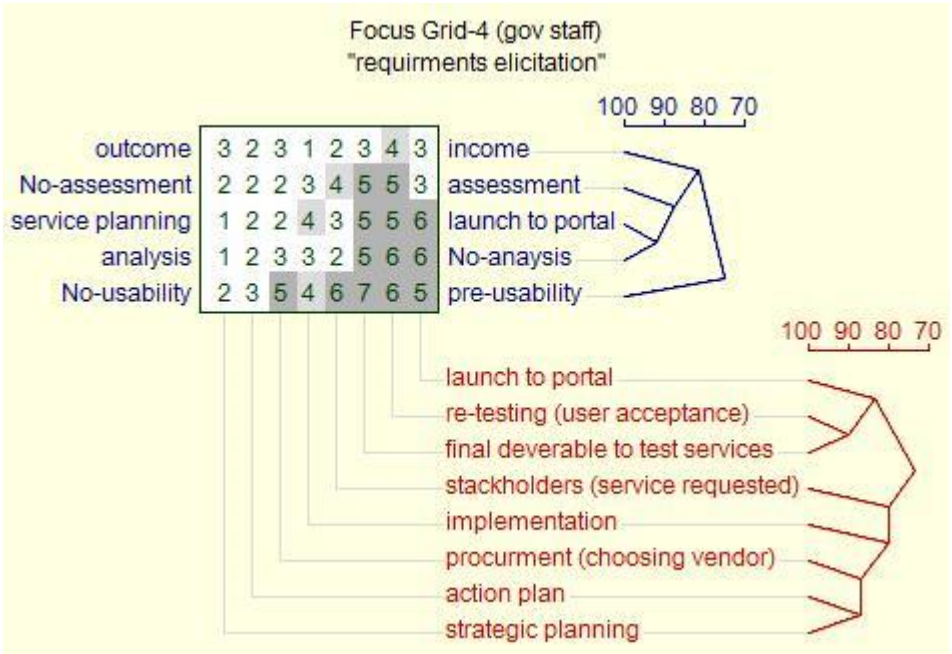
Initiating and scoping phase
Identify users' needs
Defining service requirements
Evaluation and Updating
Modification and implementation phase
Assessment phase for e-services
Service development and deployment
Designing and developing the service architecture
Testing phase of service
(service online)
Service improvement and maintenance
Launch the service integration
E-portal service
Co-design
Co-design

Appendix L-Interview transcription (Quantitative Analysis)

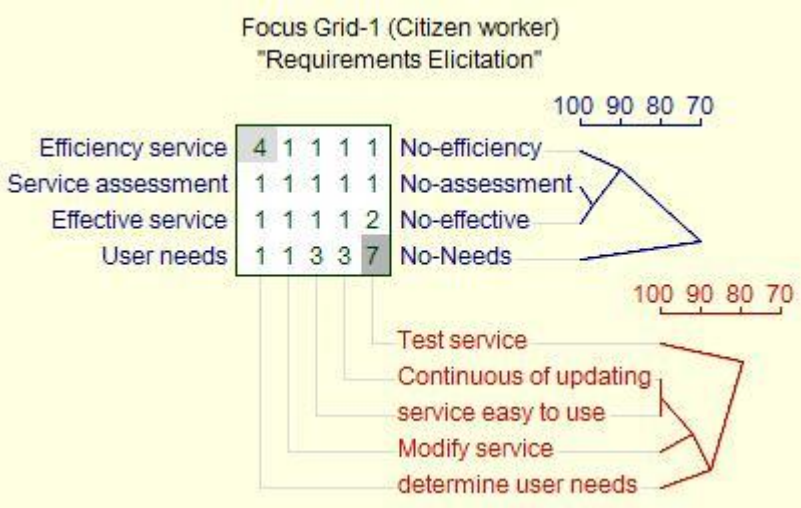
Researcher will show just two examples for each group

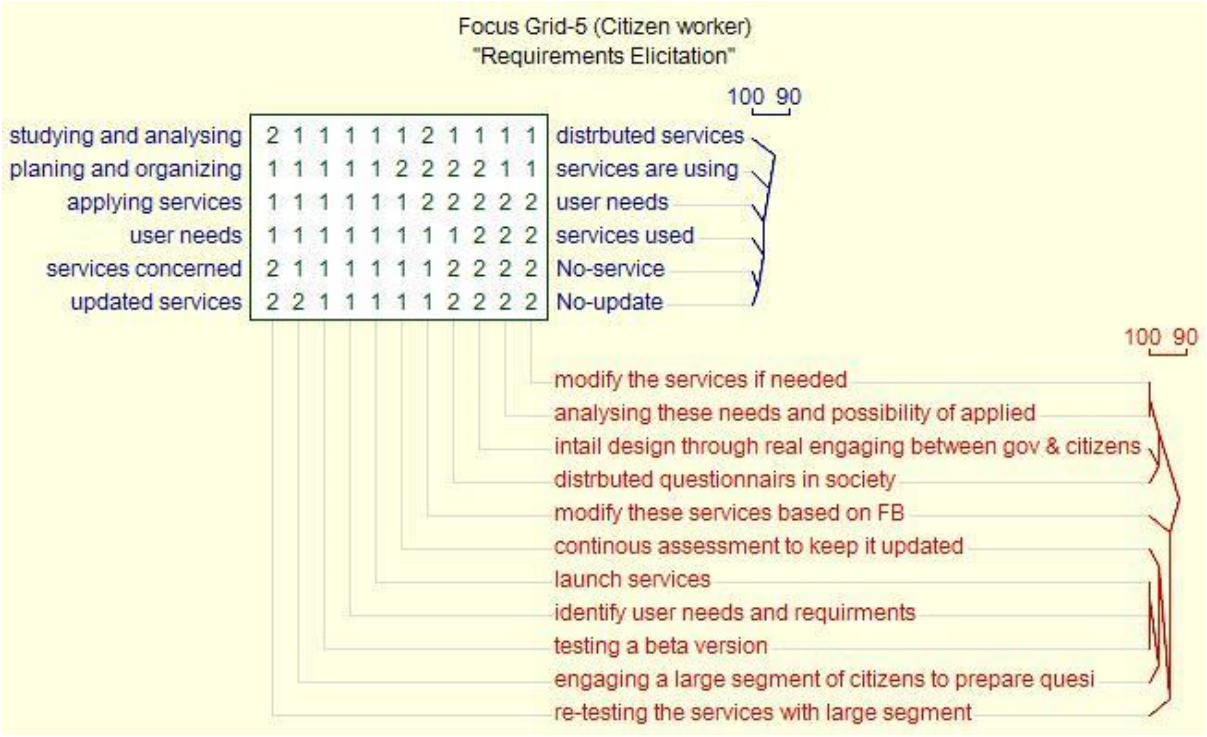
Service Provider


Focus Grid-1 (gov staff)
"requirments elicitation"
100 90 80 70
service not exsistance 5 2 2 3 4 3 3 6 7 1 2 2 service exsistance
user needs 5 3 3 7 2 3 2 2 3 2 2 2 No-evaluation
fd from end user 6 5 5 7 2 2 1 2 3 2 3 2 service exsistance
evaluation 5 5 5 3 2 2 2 2 4 5 4 3 fb from gov entities
assessment 5 4 3 2 1 2 3 3 4 5 6 3 No-assessment
testing 3 3 2 4 1 1 2 2 4 5 6 4 No-testing
service possibility to design 3 2 1 1 2 2 2 2 1 3 7 7 implementation
development 1 2 1 3 4 4 4 4 4 5 5 7 No-development
100 90 80 70 60
studying service beneficiary
analysing the possibility of design
user needs
launch to portal
gathering feedback
feedback from evaluators
testing-user acceptance
mock-up service prototype
action plan
updating the service
design service and validation
implementation

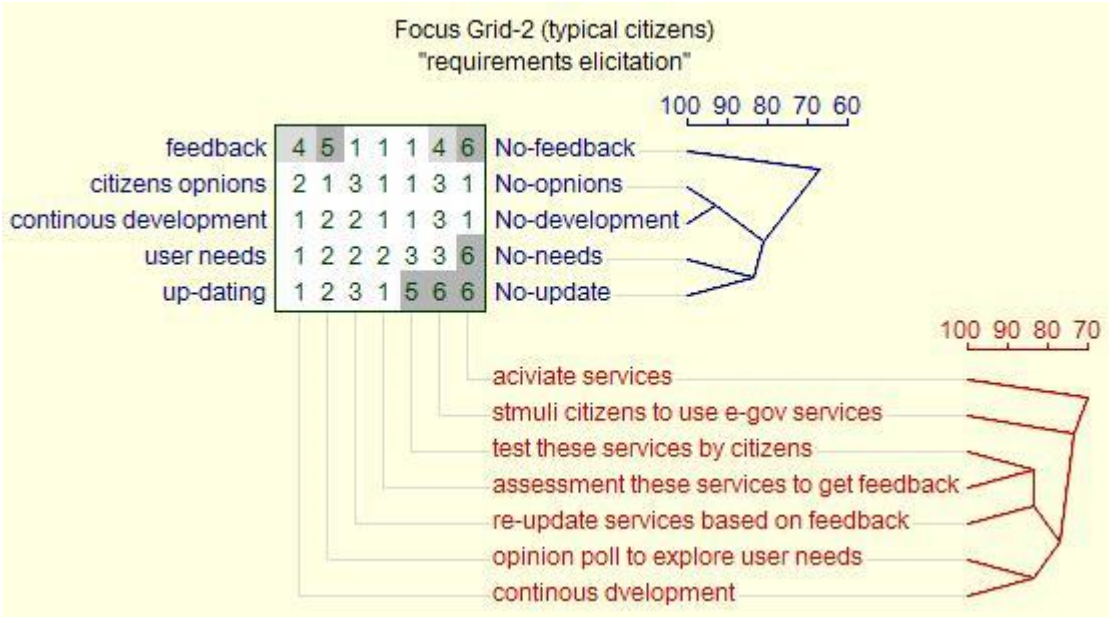

Focus Grid-4 (gov staff)
"requirments elicitation"
100 90 80 70
outcome 3 2 3 1 2 3 4 3 income
No-assessment 2 2 2 3 4 5 5 3 assessment
service planning 1 2 2 4 3 5 5 6 launch to portal
analysis 1 2 3 3 2 5 6 6 No-anaysis
No-usability 2 3 5 4 6 7 6 5 pre-usability
100 90 80 70
launch to portal
re-testing (user acceptance)
final deverable to test services
stackholders (service requested)
implementation
procurment (choosing vendor)
action plan
strategic planning

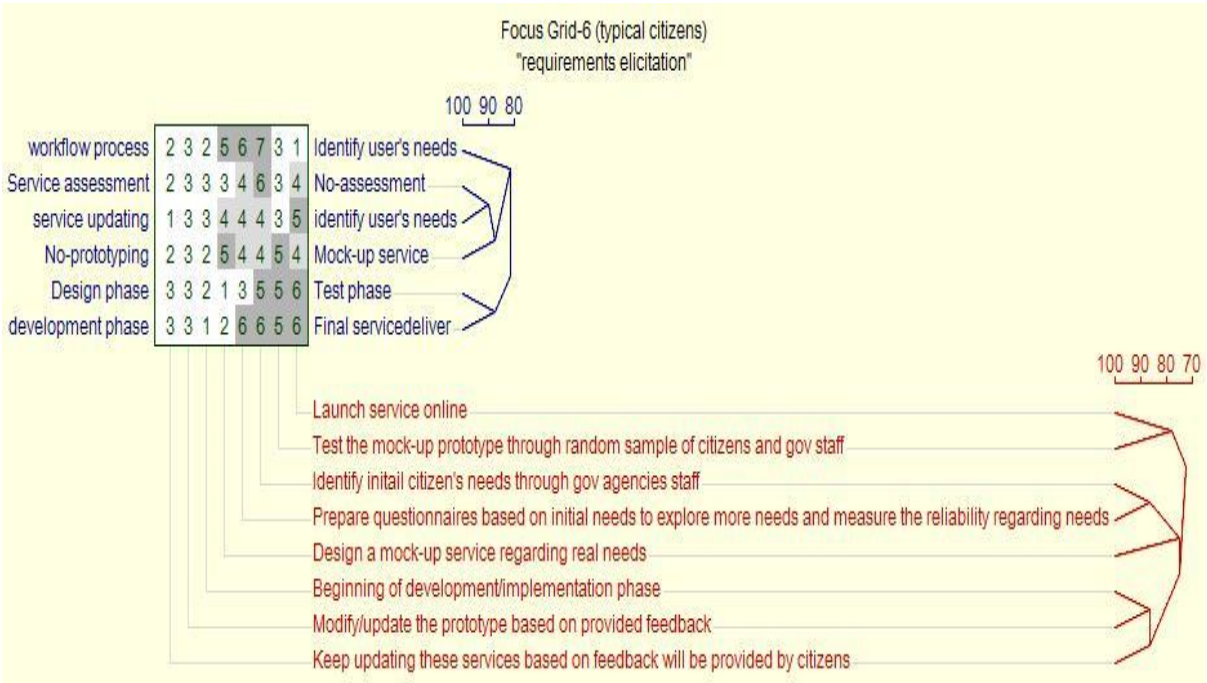
Service Interface





Service User





Appendix M- Focus Group Discussion Interview transcription (Thematic Analysis)

Service Provider

Service provider-Group1 (MOICT); n=4 Participants

Pre-test question

Data Extract: (FGD transcripts by stripping off nonessential words). Note: the participants ordered sequentially regarding the discussion; notes and initial ideas have been underlined	**Initial set of ideas were generated from data-set**	**Codes/coded for**	**Potential Themes-sub themes**
Q1 Do you have experience of software development? (Describe it?)			
MOICT.1:No MOICT.2: yes, <u>testing</u> the developed service and <u>contribute in developing service design template</u>. MOICT.3: yes, <u>web application development for research paper</u> like <u>simulation</u> for online banking. MOICT.4: No	1- Humbly knowledge in service development	Lack of Learning and understanding	Lack of expertise regarding software development
Q2 Could you please describe in detail your experience with the e-services provided by the Jordanian e-Government you have used?			
MOICT.1: my <u>experience is good</u> but in-fact there <u>is no advertisements and propaganda</u> about these services. MOICT.2: I used anon-criminal certificate but still this service not fully developed as we needed regarding <u>infrastructure problem and some restrictions policies</u> which prevents us to deal this type of services electronically. MOICT.3: I didn't use any of these services as citizen due <u>to lack of awareness and or advertisements</u> regarding the beneficiary of these services. MOICT.4: I used some of informative services like inquiry about civil-servant status, <u>not transactional one due to financial issue</u> like online-paying MOICT.1: there is a priority for building services rather <u>than advertise about it or why citizen needs it</u>. This problem returns to financial cost it needs for that.	1- E-services problems regarding ICT, infrastructure, and restriction policies 2- Most of e-services provided are informative services 3- No awareness regarding e-service using and or the beneficiary of these services.	Obstacles of ICT infrastructure and knowledge Awareness regarding service beneficiary	Lack of infrastructure and awareness

MOICT.3: I have testing for the e-government services in-particular the interactive services but I found still need more developing to reach our experience.			
Q3	Tell me about yourself as a co-designer user? (When, Why, and How)?		
MOICT.1: maybe I used some application offer these tools which aids me to be more interactive. But, in-fact I didn't feel about that in direct way may these design tools were embedded in application or system. MOICT.2: I'm same my colleagues MOICT.4 I didn't know about it. MOICT.3: No, I didn't use with any application available for co-design to make me as a co-designer to adapt the application or service to meet my needs. MOICT.4: This issue is new for me I didn't hear about it before, Researcher: anyone would like to add something else. Participants: No thanks.	1- Not really they have knowledge/experience about co-design tools 2- No desiring for learning new thing	Lack of Willingness	Difficult topic to talk about
Q4	What do you think of co-design as an approach used in software development in general?		
MOICT.1: good idea with still difficult to implement in our third world country regarding ICT infrastructure or people awareness and mentality. MOICT.2: I agree with MOICT.1 MOICT.3: your question not clears for me. Researcher: what I'm trying to say if the co-design will affect in positive or negative way on the software development based on your point of view. MOICT.3: yahhh, of-course it is important step but we still have some concerns like should take in consideration in which phase he/she should participate and how will participate. So, may the collaboration should be between service user and service interface. MOICT.4: sure it's important idea but I refused the idea of participate service user in design	1- Too early to involve service user in design process 2- They welcomed of the idea of participation between service provider and service interface 3- Service provider centralisation 4- Service provider still has concerns regarding citizens awareness and mentality	No desiring for diverse user engagement Service centralisation	Positive talk with some concerns

issue. May we developed several service design templates then ask users to give feedback by using voting/rating. MOICT.3: the service user interest the service output (such ease of use, useful or friendly) regardless about procedure of service design process. Researcher: sorry, but the service will not be useful or ease of use unless the service user participate in design process. MOICT.3: maybe you are right but still too early to do that in our country regarding the problems mentioned earlier. MOICT.2: Moreover, we still have policies restrict us to make all e-government service online. Therefore, we still need more time to reach this point (service user participate in service design).			
Q5	Do you involve service user (end-users) in the design process? If Yes (in what way, how, and why)		
All of them answer by consensus we didn't actually involve in any design process, what we have had no more give a feedback regarding initial service design template before implementation process start. Furthermore, they say our duties and responsibilities related to administration and strategic role rather than service development role because we are ministry (public sector) the service development fall under private companies responsibilities.	1-The current responsibility represents through administration and strategic role 2-service development fall under private companies responsibilities	No Feeling responsibility Service provider away from development stage	Absence of User-centricity

Post-test questions			
Q1	In general, how would you like to describe your user experience of using the wiki-based co-design site?	**Codes were generated from data-set (coded for/coding)**	**Potential themes-sub themes**
MOICT.1: in general it is average but I hope if you have a various questions in different level to be more appropriate for different citizens. Researcher: what do you mean?		1- They showed various experience such (good, very good, moderate) 2- Easy to use	Platform for generating users' ideas/views-system efficiency, effectivity,

MOICT.1: I think it's good if you create different questions for each group. Researcher: I respect your idea but I need to compare between these groups based on same questions as they work together. MOICT.2: I can say good experience and I felt it easy to use and clear without need someone explains the system. MOICT.3: should be clearer especially if we want to deal with typical citizens. But I can say it was a good experience its simple like Wikipedia site. MOICT.4: This system aids us to generate our ideas and contribute in a direct way to any issue		(simple) and useful 3- expressing own opinions or ideas	
Q2	Did the system meet your expectations? If yes (How/why?)		
MOICT.1: yes, through permitting for service provider to post and share a scenario regarding service nature and requirements and who will get benefit from these services. MOICT.2: yes, through allow us to read all participants feedback and comments and we will be more interactive with those participants. MOICT.3: is this question like previous one? Researcher: actually no, in this question I need to know if this meets your experience as you were thinking. MOICT.3: okay, somewhat yes, because it provides us channel to keep contacting with citizen to hear their opinions, perspectives, and they have right to participant in design their own services. MOICT.4: No, because I have some concerns about some obstacles may meet those participants like ICT knowledge or people mentality.		1- They showed happiness regarding the system used 2- Approved that the provided design tools were met their thoughts' 3- System showed the interactivity and responding 4- Lack ICT knowledge and infrastructure	expressing creativity-effectiveness
Q3	Did you actively participate in the proposed wiki-based co-design system? 3.1 In what way? If not, why not? 3.2 Would you have wanted to participate more? 3.3 What kind of participation do you think was		

	expected of users?		
MOICT.1: yes, through investigate the feedback report which is provided from citizens. And of-course why not participates more in future especially if it develops more. The blog/post tool. MOICT.2: yes, during provide us tool allow us to manage the SPRF As Guidelines Co-design process based on user feedback. Yes I need more to get more experience and develop our ideas. Cliffy tool for designing business process. MOICT.3: Of-course yes, during participatory service during service selected and or interactions between users, yes I need more participation in expand way. Choosing the most interested service needs. MOICT.4: No, because as I told u before it's not met my expectation and regarding the concerns I mentioned in previous question. Researcher: Do you need me to stop now to take rest or go ahead? All participants : No, we can go ahead!!	1- Most of them were actively participated 2- Talked about system characteristic's like interactivity and collaboratively 3- Some concerns regarding ICT knowledge and infrastructure	End user engagement-communication
Q4	How suitable was this system (wiki-based co-design) as platform for ideation ideas through the co-design tool provided?		
MOICT.1: Through asynchronous messages between users and provider using blog/discussion forum. MOICT.2: exchange ideas and share them with others. MOICT.3: same my colleague MOICT.2. MOICT.4: I agree with my colleagues who said about blog tool to facilitate exchange ideas and get new ideas. MOICT.2: moreover, the input box provided in each page, which help user to express his /her ideas, not just selected or evaluates the existed one.	1- Too much valuable for generating and exchanging ideas 2- Helpful and useful system for expressing ideas and get new ideas	Generative platform-collaboration, communication
Q5	How would you describe your role in the active users' group?		

MOICT.1: it was a positive role through browsing the system even in quick-way but I felt really engaged and participate with my own ideas and perspectives. MOICT.2: It was good that this system provides participants different tools, which allowed them to participate in different level of design and would be appropriated with their expectations. MOICT.3: it was not too bad but I wish if it develops more to meet all users' level of thinking. MOICT.4: I agree with my colleague MOICT.2 it provides the participant a kind of involvement through engagement features with system and provide him/her rights to express his/her own ideas'/opinions'. MOICT.2: it was good this system provides participants different tools which allowed them to participate in different level of design and would be appropriated with their expectations.'		1- Showed a positive role in participating 2- Showed a good engagement 3- Service user need's involvement 4- System met their expectations	Collaborative communication platform
Q6	Which of the proposed co-design tools were shown a valuable aid/support the design and development of G2C e-service?		
MOICT.1: the rating/voting design tool to evaluate each other ideas MOICT.2: are you talking here about the tool are provided in this system? Researcher: yes Mr, I need to know which of these tool/features make you too interested. MOICT.2: Gliffy online tool for managing the service design process. MOICT.3: Blog/post tool for exchange ideas. And post scenarios. MOICT.4: I think the blog tool and rating both of them are very valuable to aid participants during design process.		1- Rating/voting 2- Blog/post 3- Gliffy online tool	Collaborative design tools
Q7	What exactly are the benefits and the shortcomings of the proposed tools?		

MOICT.1: the most benefit is making participants more interactively and participatory and I didn't see any disadvantages. MOICT.2: the benefit social network/media or any co-design tools will help to share our ideas/perspectives but the shortcoming represents not all tools necessarily match all participants expectations and or experience MOICT.3: I'm with my MOICT.2 colleague. MOICT.4: it is difficult to give cons or pros especially I'm not fully convinced for participating the citizens in design process through providing them with co-design tools.		1- interactive and participatory with system (pros) 2- not all tools necessarily match participants expectations (cons)	Co-design platform-challenges and opportunities
Q8	How can the different stages of design process be methodically improved?		
MOICT.1: it is a difficult question but I have to answer; I think as I mentioned earlier simplify each stage of design process to make all citizens have ability to involve in different stages. Researcher: Do you have how or at least any suggestions. MOICT.1: in-fact No, may developers know about this issue. MOICT.2: I agree with my colleague MOICT.1. Furthermore, we need to see the service user involve actively in stages of discover and define rather than develop and deliver because regarding my perspective these stage are too sensitive and if service users involved actively in earlier stage I'm sure the service will meet their expectation which is included service requirements and identify the problem and proposed the design solutions. MOICT.3: Both of my colleagues MOICT.1 and 2 have reasonable answer and acceptable. From my opinion I see it is better if can improve evaluation phase through use easy technique to		1- Simplifying the participatory for service user in different stages 2- Encourage involving service user in discover and define stages rather than develop and deliver 3- Some criticisms regarding deliver phase 4- Implement and recruit the design tools in suitable way to be fitted in different service design stages and diverse people background	Ability for utilising co-design system with one's own perspectives-facilitation

assess the design process rather than write a feedback through textbox/paragraph to save effort and time. MOICT.4: I agree with my colleague MOICT.1. MOICT.1: somewhat I see the idea of my colleague MOICT.2 if it implemented in right way and recruited in suitable design tool to elicited service user needs it will affect in service design in effective way. MOICT.3: yes, may this right (based on MOICT.4) especially if we face a problem with service user in the last two stages regarding the ICT knowledge or mentality.		

Service provider-Group2 (NITC); n=4 Participants

Pre-test question

Data Extract: (FGD transcripts by stripping off nonessential words). Note: the participants ordered sequentially regarding the discussion; notes and ideas have been underlined.	**Coded For**	**Codes**	**Potential Themes-sub themes**
Q1 Do you have experience of software development? (Describe it?)			
NITC.1: yes, testing the developed service and contribute in develop service design template. NITC.2: No Researcher: why service provider doesn't have really experience of software development or at least for service development? NITC.2: in-fact the service provider who responsible about service strategies and polices not service development. So, they send the service requirements to private development companies. NITC.3: yes, I participated during develop web services for enhancing some service application regarding G2C e-service. NITC.4: No	1- In-general, Not too much experience in development	Learning and understanding	Lack of expertise regarding software development

Q2	Could you please describe in detail your experience with the e-services provided by the Jordanian e-Government you have used?			
NITC.1 : I used some of informative services like inquiry about civil-servant status, not transactional one due to financial issue like online-paying. NITC.2 : I used anon-criminal certificate but still this service not fully developed as we need regarding infrastructure problem and some policies restrict us to deal this type of services electronically. NITC.3 : there is a priority for building services rather than advertise about it or why citizen needs it. This problem returns to financial cost it needs for that. NITC.4 : my experience is good but in-fact there is no advertisements and propaganda about these services NITC.2 : I didn't use any of these services as citizen due to lack of awareness and or advertisements regarding the beneficiary of these services. NITC.3 : I have testing for the e-government services in-particular the interactive services but I found still need more developing to reach our experience.	1- No awareness regarding e-service using and or the beneficiary of these services. 2- E-services problems regarding ICT, infrastructure, and restriction policies	Awareness regarding service beneficiary and ICT infrastructure	Lack of infrastructure and awareness
Q3	Tell me about yourself as a co-designer user? (When, Why, and How)?			
NITC.1: in-fact I didn't feel about that in direct way may these design tools were embedded in application or system. NITC.2 : This issue is new for me I didn't hear about it before, NITC.3 : No I didn't use with any application available co-design make me as a co-designer to adapt the application or service to meet my needs. NITC.4 : I'm same my colleagues, I didn't hear about it NITC.2 I didn't know about it.	1- No knowledge or experience about co-design tools.	No Willingness	Difficult topic to talk about
Q4	What do you think of co-design as an approach used in software development in general?			
NITC.1 : good idea with still difficult to implement in our third world country regarding ICT	1- Service provider centralisation 2- Service provider	Service centralisation	Positive talk with some concerns

infrastructure or people awareness and mentality. NITC.2 : sure it's important idea but I refused the idea of participate service user in design issue. May we developed several design templates then ask users to give feedback by using voting/rating. NITC.3 : of-course it is important step but we still have some concerns like should take in consideration in which phase he/she should participate and how will participate. NITC.4 : I agree with NITC.3 NITC.1 : the service use interest the service output (such ease of use or friendly) regardless about procedure of service design. NITC.3 : Moreover, we still have policies restrict us to make all e-government service online. Therefore, we still need more time to reach this point (service user participate in service design).	still has concerns regarding citizens' awareness and mentality.		
Q5	Do you involve service user (end-users) in the design process? If Yes (when, how, and why)		
All of them answers by consensus we didn't actually involve in any end-user design process , what we have had no more give a feedback regarding service performance and effectiveness. Furthermore, they say our duties and responsibilities related to testing and verification role rather than service designing role because our department (NITC) responsible about service testing to grant authorisation or not to these services for launching purposes.	1- The current responsibility represents through testing and verification e-services	No Feeling responsibility represent others who not involved	Absence of User-centricity

Post-test questions

Q1	In general, how would you like to describe your user experience of using the wiki-based co-design site?	**Codes/coded for**	**Theme-sub theme**
NITC.1 : in general it is average but maybe if use this more time I will get more experience. NITC.2 : I can say I had a good experience, and felt social media tools very important tools to share our ideas with others.		1- Good experiment regarding effectiveness and usefulness 2- Express ideas	Generating users' ideas/views-

NITC.3: Somehow very good. Further, this platform can support us to express our ideas and contribute in the service design NITC.4 : should be clearer especially if we want to deal with typical citizens but I can say it is good experience its simple like Wikipedia site.	3- expressing own opinions or ideas	
Q2 Did the system meet your expectations? If yes (How/why?)		
NITC.1 : yes, it provided me a chance to exchange my ideas with other and evaluate other ideas. NITC.2 : yes, through allow us to read all participants feedback and comments and we will be more interactive with those participants. NITC.3 : somewhat yes, because it provides us channel to keep contacting with citizen to hear their opinions and perspectives and they have right to participant in design their own services. NITC.4 : yes, through permitting for service provider to post and share a story scenarios' regarding service nature and requirements and who will get benefit from these services.	1- System showed Interactivity and collaboratively between participants	expressing creativity
Q3 Did you actively participate in the proposed wiki-based co-design system? 3.1 In what way? If not, why not? 3.2 Would you have wanted to participate more? 3.3 What kind of participation do you think was expected of users?		
NITC.4: No, because as I told u before it not met my expectation and regarding the concerns I mentioned in previous question. NITC.2: Furthermore, rating feature is important to assess each other ideas or suggestion regarding design solutions. NITC.1: yes, through investigate the feedback report which is provided from citizens. And off-course why not participates more in future especially if it develops more. The blog/post tool. NITC.2: yes, during provide us tool allows managing the SPRF As Guidelines Co-design process based on user feedback. Yes I need more to get more experience and develop our ideas. Gliffy tool for designing	1- Talked about system characteristic's like interactivity and collaboratively 2- They showed positive active in the participation process 3- Some concerns regarding ICT knowledge and infrastructure	End user engagement-communication

business process. NITC.3: Of-course yes, during participatory service during service selected and or interactions between users, yes I need more participation in expand way. Choosing the most interested service needs.			
Q4	How suitable was this system (wiki-based co-design) as platform for ideation and co-design tool?		
NITC.1 : Through asynchronous messages between users and provider using blog/discussion forum. NITC.2 : exchange ideas and share them with others. NITC.3 : same my colleague NITC.2 NITC.4 : I agree with my colleagues who said about blog tool to facilitate exchange ideas and get new ideas. NITC.3 : moreover, the input box provided in each page which help user to express his/her ideas not just selected or evaluate the existed one.		1- Very good indicators were shown regarding generating ideas 2- Helpful and useful system for expressing ideas and get new ideas	Expressing creativity and communication
Q5	How would you like to introduce your role as active users'?		
NITC.1 : It was a positive experience through engaging with system, in a quick way and I felt it worked well and really i engaged and participated with others'. NITC.2 : Good experiment and it was positive role through has an account and profile I can involve and participate with others'. NITC.3 : it was not too bad but I wish if it develops more to meet all users' level thinking. NITC.4 : I agree with my colleague NITC.3 NITC.3 it provide the participant a kind of involvement through engaged feature with system and provide him/her rights to express his/her own ideas'/opinions' NITC.1 : it is good if this system provide participants different tool allow them to participate in different level of design and would be appropriated with their expectations'.		1- Talked about a positive role through different tools provided 2- Service user need's involvement 3- System met their expectations	Collaborative communication platform
Q6	Which of the proposed co-design tools were shown a valuable aid/support the design and development		

	of G2C e-service?		
NITC.1 : Blog/post tool for exchange ideas. And post scenarios. NITC.2 : Gliffy online tool for managing the service design process. NITC.3 : your question make me a bit confused so could you please explain it more!!! Huhuhbuhuhuh laughing Researcher: basically my question about which of design tools that you have used make you more jointly or involved with system or others NITC.3 : yah now I understood. the rating/voting design tool to evaluate each other ideas and social media network like FB. NITC.4 : I think the blog tool and rating both of them are very valuable to aid participants during design process.		1- Rating/voting 2- Blog/post 3- Social media network	Collaborative design tools
Q7	What exactly are the benefits and the limitations of the proposed design tools?		
NITC.1 : the most benefit is making participants more interactively and participatory and I didn't see any disadvantages. NITC.2 : it is difficult to give cons or pros especially I'm not fully convinced for participating the citizens in design process through provide him the design tools. NITC.3 : I'm with my NITC.1 colleague. NITC.4 : the benefit social network/media will help to share our ideas/perspectives and shortcoming represents those tools not necessarily match all participants expectations and or experience		1- Interactivity and participatory through the design tools provided 2- experimenting with collaborative and communication system 3- a bit concerns if these tools not match all participants experience	Popular WCP tools -challenges and opportunities
Q8	How can the different stages of design process be methodically improved?		
NITC.1 : it is a good question; I think the participating in all stages of design process is not necessarily. Researcher: So why, and which are the stages should participate? NITC.2 : its better, to see the service user involve actively in stages of discover and define rather than develop and deliver because regarding my perspective these		1- Encourage involving service user in discover and define stages rather than develop and deliver 2- Some criticisms regarding deliver	Ability for utilising co-design platform with one's own perspectives-facilitation

stages are too sensitive and if service users involved actively in earlier stage. NITC.3 : Both of my colleagues NITC.1 and 2 have reasonable idea and acceptable. From my opinion I see it is better if can improve evaluation phase through use easy technique to assess the design process rather than write a feedback through paragraph to save effort and time. NITC.4 : I agree with my colleague NITC.1 NITC.1 : somewhat I see the idea of my colleague NITC.2 if implemented in right way and recruitment the suitable design tool to elicited service user needs it will affect in service design in effective way. NITC.2 : yes, may this right (based on NITC.4) especially if we face a problem with service user in the last two stages regarding the ICT knowledge or mentality.	phase 3- Implement and recruit the design tools in suitable way to be fitted in different service design stages and diverse people background 4- Helping or making better the proposed co-design system with one's own perspectives	

Service Interface

Service Interface-Group1 (CSB); n=4 Participants

Pre-test question				
Data Extract: (FGD transcripts by stripping off nonessential words). Note: the participants ordered sequentially regarding the discussion; notes and initial ideas have been underlined		**(coded for/coding)**	**Codes**	**Potential Themes-sub themes**
Q1	Do you have experience of software development? (Describe it?)			
CSB.1: No CSB.2: not that much but I have some experience related to our department like develop some software's to facilitate our works such certificate issues and licenses. CSB.3: As my colleague CSB.2 says CSB.4: No, however, I did something like that when I was studying in undergraduate level during develop some graduate projects.		2- limited knowledge in service development	training and experience	Lack of expertise regarding software development

Q2	Could you please describe in detail your experience with the e-services provided by the Jordanian e-Government you have used?			
CSB.1: regarding my service request, I used the civil service for applying to job. And some other websites belong to government like ' unrwa '. Researcher: if these websites really belong to government like ' unrwa '? CSB.1: yes these new websites work under government supervision and take all rights from them. CSB.2: may I have question please? Researcher : yes please ask what you like CSB.1: I want to know if your proposed project will enhance the collaboration process between stakeholders. Researcher: Ohm, good question in-fact the e-government services have a lot issue to investigate so the collaboration in new science proved it efficacy for improving the service design effectiveness. CSB.1: Mmmmm. Got it. CSB.2: my experience is too weak because I always keep sort out my needs by others. CSB.3: I'm same my colleague CSB.1 experience CSB.4: once I used the Jordanian government portal I did find something worthy or deserve all websites provided are info services rather than transaction services.	4- Most of e-services provided are informative services rather than transaction 5- No awareness regarding e-service using and or the beneficiary of these services.	useless Awareness regarding service beneficiary	Lack of usefulness and awareness
Q3	Tell me about yourself as a co-designer user? (When, Why, and How)?			
All participants answer by consensus they didn't use software like that. Furthermore, did not show any single indicator about this issue. But one of participant had an experience with an interactive system.	3- No knowledge/experience about co-design tools 4- No desiring for learning new thing	Lack of Willingness	Difficult topic to talk about	

Q4	What do you think of co-design as an approach used in software development in general?		
CSB.1: yes of course it will be good idea and worthy if we know how to deal with it and when. But I need to understand the difference between interactive system and co-operative one. CSB.2: what the difference between interactive system and collaborative one. Researcher: Hoch, Great question, the interactive one allow you to deal with system in flexible way and get a response or feedback automatically but co-operative on as you called it allow you to participate in designing the system through the provided tools/features. CSB.3: in our life regarding my experience two opinions better than one and three better than two,… ect. CSB.4: the co-design should be between three parts: service user, service provider and service developer. Researcher: the new design science proved that and ensured about the significance in the affectivity output compare with tradition approaches used before. CSB.4: Okay, so the cooperative one is more important now regarding in your answer. Researcher: yes	5- they showed interesting indicators regarding co-design idea 6- They welcomed the idea of participation between all parts (recipients and provider) 7- Desiring for learning and understanding	willingness for collaboration work Willingness for getting new knowledge	Positive talk-satisfaction
Q5	Do you involve service user (end-users) in the design process? If Yes (in what way, how, and why)		
CSB.1: in general No, CSB.2: in-fact No, because this thing is new for us especially in third world country. Researcher: However, sooner or later we try to improve this experiment to enhance the user centred design step by step. CSB.2: No, I didn't CSB.3: same my colleague CSB.1 CSB.4: just I trained to use system and I explored some pugs or problems but not participating in designing system or specific	1-The current responsibility represents through using and fixing some pugs 2-service development related to service provider-development department	Limited role through using and training to use system Service interface away from development stage	partial marginalisation

services.			
Post-test questions			
Q1	In general, how would you like to describe your user experience of using the wiki-based co-design site?	**Generated codes/ coded for**	**Potential theme-subtheme**
CSB.1: easy to use and the information provided are sufficient like online questionnaire and FB as social network CSB.2: yah, it's very good but I'm not sure all people if can deal with it regarding their ICT knowledge Researcher: I think it will be reasonable it like any simple website and you normally deal with all form of social networks. CSB.3: I agree with my colleague CSB.2 CSB.4: It was very good experiment by using the tool like discussion forum which assist me to express what I have in my mind in easy way		1-They showed positive experience such (good, very good) 2-Express ideas	Generating uses ideas/views
Q2	Did the system meet your expectations? If yes (How/why?)		
CSB.1: yes, indeed, it is too much met my thoughts. CSB.2: yes, its good system especially if keep update and develop it regarding user expectation. CSB.3: yes is interactive system it gave me directly report shows the previous answers and I can edit my answer if I need that. CSB.4: yes, I felt it was helpful especially when using social network to exchange my ideas with others.		5- They showed happiness and comfort regarding the system used 6- Approved that the design tools provided were met their thoughts and perspectives' 7- System showed the interactivity and responding	Generative design tools
Q3	Did you actively participate in the proposed wiki-based co-design system?		
CSB.1: yes, through using the social network. CSB.2: yes, during provide us tools make us participatory in design, and I need to use this		4- they actively participated 5- Talked about system	End user engagement, involvement

system more and more to discover all features. CSB.3: of-course yes, during participatory service during service selected and or interactions between users, yes I need more participation in expand way. Choosing the most interested service needs. CSB.4: ya sure, in an active way like participated to determine my service needs. And I hope to participate more; I was thinking to participate in social network like FB. CSB.3: Furthermore, rating feature is important to assess each other ideas or suggestion regarding design solutions. CSB.2: moreover, it easy to use through engaging and involving and I'm sure al participants will not face problem with using it.	characteristic's such interactivity and collaboratively	
Q4	How suitable was this system (wiki-based co-design) as platform for ideation ideas through the co-design tool provided?	
CSB.1: the input box provided in each page, which help user to express his /her ideas, not just selected or evaluate the existed one. CSB.2: exchange ideas and share them with others. CSB.3: same my colleague CSB.2 Researcher: just I need to explain this question more how did you feel this system aid to generate your ideas. CSB.4: I agree with my colleagues who said about blog tool to facilitate exchange ideas and get new ideas. CSB.2: it gives me more space to expand my views and opinions. CSB.1: Furthermore, tools help me to notice something new not in my mind for example, in checkbox I can find many choices so I can feel free to choose without restriction through grant me a permission to add something in input box.	3- Too much valuable and flexible for generating and exchanging ideas 4- Helpful and useful system for expressing ideas and get new ideas	Expressing creativity and communication
Q5	How would you like to introduce your role as active users'?	
CSB.1: nice idea makes me	5- Showed a positive	Collaborative,

encourage finding other ideas and posting my ideas as well. CSB.2: sorry I didn't understand your question. Researcher: for example in social network like FB, when you post your mind/views and make other interactive with your perspective. CSB.3: okay, it is good if this system provide participants different tool allow them to participate in different level of design and would be appropriated with their expectations' CSB.4: Okay, so I agree with my colleague NTC1 it provides the participant a kind of facilitation to interact with other participants.	role in participating 6- Showed a good engagement 7- Service user involvement 8- System met their expectations	communication, and interaction
Q6	Which of the proposed co-design tools were shown a valuable aid/support the design and development of G2C e-service?	
CSB.1: the tool for input box which allows us to feel free. And post scenarios. CSB.2: rating/voting and furthermore, add suggestion input box CSB.3: I liked the tool of checkbox it's easy to use and give choices and space to select. CSB.4: I think the blog tool and rating both of them are very valuable to aid participants during design process.	4- Rating/voting 5- Blog/post 6- Dynamic tool like input-box	Collaborative design tools
Q7	What exactly are the benefits and the limitations of the proposed design tools?	
CSB.1: I do not know if there is an opportunity to add some tools to be compatible with disabled people. Researcher: will think about this issue as next step as a future work but we need to sort out the problem with normal people. CSB.2: I advise you to add a demo to explain how to use system to make it useful and easy to use. CSB.3: it has many advantages but just I'm worry regarding people desirable to participate in this type of system based on their knowledge and the facilities	1- Experimenting with collaborative and communication with system 2- Demo explains the role for each group 3- not all co-design tools necessarily match participants expectations	Popular WCP tools -challenges and opportunities

provided. CSB.4: the benefit of social network/media will help to share our ideas/perspectives and shortcoming represents those tools not necessarily match all participants expectations and or experience		
Q8	How can the different stages of the design process be methodically improved?	
CSB.3: I agree with my colleague CSB.1. Furthermore, we need to see the service user involve actively in stages of discover and define rather than develop and deliver because regarding my perspective these stage are too sensitive and if service users involved actively in earlier stage. CSB.1: yes I agree may it's good idea to add some demo to explain for stakeholders how to use system Researcher: it's already added if see the deliver link has six input box one of them for this purpose. CSB.1: it is good if you add a tutorial video to explain system for those people have limited knowledge in ICT. Researcher: may if add input box to insert the system weakness point. CSB.3: Moreover, If you try to simplify each stage of design process to make all citizens have ability to involve in different stages through reduces the stakeholders' space of writing or reading.	1- Implement and utilised the design tools in suitable way to be fitted in different service design stages and diverse people background 2- Encourage involving service user in discover and define stages rather than develop and deliver 3- Some criticisms regarding deliver phase	Ability for utilising co-design platform

Service Interface-Group1 (CSP); n=4 Participants

Pre-test question				
Data Extract: (FGD transcripts by stripping off nonessential words). Note: the participants ordered sequentially regarding the discussion; notes and initial ideas have been underlined		**(coded for/coding)**	**Codes**	**Potential Themes-sub themes**
Q1	Do you have experience of software development?			

(Describe it?)			
CSP.1: No CSP.2: No CSP.3: No CSP.4: No	3- No knowledge at all in service development	No knowledge	No knowledge or experience regarding software development
Q2 Could you please describe in detail your experience with the e-services provided by the Jordanian e-Government you have used?			
CSP.1: The civil status and passport one of most important service needs from citizen so we concerned about this service and prepare it with full data need and provided to most of governmental institutional to facilitate for citizen all his needs or requirements need when he/she visit any governmental departments. CSP.1: may I have question please? Researcher : ya sure feel free CSP.1: just I need to know why you ask about our experiences with Jordanian e-government not in general with any governmental Researcher : Actually, because I'm doing my study in Jordan as case study so that's why I concern with Jordanian government that used by Jordanian citizens' CSP.1: Okay got it thanks. CSP.2: I have a good experience with G2C e-services, and so interested with national communication centre service ; through this service the citizen can ask for his/her enquires and or requirements regarding any civil services. CSP.3: I agree with my colleague CSP.1 it facilitates the connection between governmental departments and easy to access to info needs. CSP.4: No, Didn't regarding my role in this entity.	1- One of most services used by citizens 2- Civil status and passport provided most of other agencies by full data 3- The citizen can ask for his /her enquires and or requirements regarding any civil services. 4- It facilitates the connection between governmental departments and easy to access to info needs.	Connectivity Popularity Goodness Facilitation Accessibility	service quality of civil status & passport - pleasurable
Q3 Tell me about yourself as co-designer user? (When, Why, and How)?			
CSP.1: No, I'm not sure about this term "co-design" CSP.2: during my study in university like Microsoft office	1- No knowledge/experience about co-design tools	Lack of knowledge	Difficult topic to talk about

software or some programming language during the embedded tool provided in these software's which help me to design some forms and templates. CSP.3: No, I'm not sure about this term "co-design" CSP.4: No comment. It is new topic for us.			
Q4	What do you think of co-design as an approach used in software development in general?		
CSP.1: very good idea especially if public people sector CSP.2: it is the best means if recruitment in prober way. CSP.3: I agree with my colleagues CSP.1 and 2 with some concerns regarding ICT knowledge and people mentality. CSP.4: yes of course it will be good idea and worthy if we know how to deal with it and when. CSP.2: furthermore, its good if we developed design tool for various and diverse service user to able them to participate in design process for their own services used. CSP.4: just I'm worry about the infrastructure as an obstacle like internet access to prevent all people in different geographic area	1- they showed interesting indicators regarding co-design idea 2- Desiring for learning and understanding	willingness for collaboration work Willingness for getting new knowledge	Positive talk-knowledge, powerful
Q5	Do you involve service user (end-users) in the design process? If Yes (in what way, how, and why)		
All of them answers by consensus we didn't actually involve in any design process, what we have had no more give a feedback regarding service responding. Furthermore, they say our duties and responsibilities concern about complete the citizen requests rather than involving in service designing.	1-The current responsibility represents through concern about complete the citizen requests rather than involving in service designing. 2-service interface away from designing stage/process	Limited role through using and training to use system	partial marginalisation
Post-test questions			
Q1	How would you like to describe your user experience of using the wiki-based co-design site?		
CSP.1: easy to use and the information provided are sufficient. CSP.2: yah, it is very good	1- They showed various experience such (good, very good, moderate)	Generating users ideas and views-, expressing creativity	

because I felt with action and reaction in different level and I can use it without need for help or guidance. CSP.3: I agree with my colleague CSP.2 CSP.4: Nothing to add more than my colleagues, I agreed with them. CSP.2: I'm happy with idea with added the social network to this system to enable us to be more interactive.	2- Easy to use (simple) and useful	
Q2	Did the Wiki meet your expectations? If yes (How/why?)	
CSP.1: it is difficult from first time I say yes, I need more time to use it and to know every single feature to reach my expectation. CSP.2: yes, I felt it is help me especially when using social network to exchange my ideas with others. CSP.3: yes is interactive system it gave me directly report shows the previous answers and I can edit my answer if I need that. CSP.4: yes, its good system especially if keep update and develop it regarding user expectation.	1- They showed happiness regarding the system used 2- System showed the interactivity and respondent	expressing creativity-collaboration
Q3	Did you actively participate in the proposed wiki-based co-design system?	
CSP.1: yes, through investigate the feedback report which is provided from citizens. And of-course why not participates more in future especially if it develops more. The blog/post tool. CSP.2: yes, during provide us tool allow us to manage the SPRF As Guidelines Co-design process based on user feedback. Yes I need more to get more experience and develop our ideas. Cliffy tool for designing business process. CSP.3: of-course yes, during participatory service during service selected and or interactions between users, yes I need more participation in expand way. Choosing the most interested service needs.	1- they actively participated 2- Talked about system characteristic's like interactivity and collaboratively	End user engagement-involvement

CSP.4: No, because as I told u before it not met my expectation and regarding the concerns I mentioned in previous question. CSP.2: Furthermore, rating feature is important to assess each other ideas or suggestion regarding design solutions. CSP.1: moreover, it easy to use through engaging and involving and I'm sure al participants will not face problem with using it.		
Q4	How suitable was this system (wiki-based co-design) as platform for ideation ideas through the co-design tool provided?	
CSP.1: the input box provided in each page, which help user to express his /her ideas, not just selected or evaluates the existed one. CSP.2: exchange ideas and share them with others. CSP.3: same my colleague NITC.2 CSP.4: I agree with my colleagues who said about blog tool to facilitate exchange ideas and get new ideas. CSP.3: Through asynchronous messages between users and provider using blog/discussion forum. CSP.1: just I want to add this system may help participant extract his/her creativity in-direct way.	1- Too much valuable for generating and exchanging ideas 2- Helpful and useful system for expressing ideas and get new ideas	Appropriateness design tools with different participants
Q5	How would you like to introduce your role as active users'?	
CSP.1: it was a positive role through browsing the system even in quick-way but I felt really engaged and participate with my own ideas and perspectives. CSP.2: may it will be very active through available co-operative tool enable users to involve in design decision making. CSP.3: it is good if this system provide participants different tool allow them to participate in different level of design and would be appropriated with their expectations' CSP.4: what do you mean by active user?	1- Showed a positive role in participating 2- Showed a good engagement 3- Service user involvement	Collaboration communication platform

Researcher: I mean if you really involved or participated with others through social network provided to post or comment or share something CSP.4: okay, ,,so, I agree with my colleague CSP.3 it provide the participant a kind of involvement through engaged feature with system and provide him/her rights to express his/her own ideas'/opinions'		
Q6	Which of the proposed co-design tools were shown a valuable aid/support the design and development of G2C e-service?	
CSP.1: the rating/voting design tool to evaluate each other ideas CSP.2: the social network tool is very interesting tool to share our ideas and views. CSP.3: Blog/post tool for exchange ideas. And post scenarios. CSP.4: I think the blog tool and rating both of them are very valuable to aid participants during design process.	1- Rating/voting 2- Blog/post 3- Social network	Collaborative design tools
Q7	What exactly are the benefits and the limitations of the proposed design tools?	
CSP.1: the benefit(s) is enhancing user centred design and decision making will be taken. CSP.2: it is difficult to give cons or pros especially I'm not fully convinced for participating the citizens in design process through providing him the design tools. CSP.3: it has many advantages but just I'm worry about those people who desire to participate in this type of system based on their knowledge and the facilities provided. CSP.4: the benefit social network/media will help to share our ideas/perspectives and CSP.1: I'm with my CSP.2 colleague. CSP.3: furthermore, the most benefit is making participants more interactively and participatory and I didn't see any disadvantages.	1- Experimenting with collaborative and communication/interaction with system 2- enhancing user-centred design	Popular WCP tools -challenges and opportunities

Q8	How can the different stages of the design process be methodically improved?	
CSP.1: the illustration photograph or caricature make easy to understand each step of design. CSP.2: I agree with my colleague CSP.1: I would like to see the service user involve actively in stages of discover and define rather than develop and deliver because regarding my perspective these stage are too sensitive and if service users involved actively in earlier stage I'm sure the service will meet their expectation which is included service requirements and identify the problem and proposed the design solutions. CSP.3: yes, may this right (based on CSP.1 and 2) especially if we face a problem with service user in the last two stages regarding the ICT knowledge or mentality. CSP.4: I agree with my colleague CSP.1, nothing to add more than this. CSP.3: somewhat I see the idea of my colleague CSP.1 is good, but I need to notify for important thing to reduce/move from anything need to write into basic no need effort of thinking and save time like add dropdown menu to select the choices rather than write them. CSP.4: I think as I mentioned earlier simplify each stage of design process to make all citizens have ability to involve in different stages.	1- Implement and recruit the design tools in suitable way to be fitted in different service design stages and diverse people background 2- Encourage involving service user in discover and define stages rather than develop and deliver 3- Some criticisms regarding deliver phase	Ability for utilising co-design platform

Service Interface-Group2 (INT); n=4 Participants

Pre-test question			
Data Extract: (FGD transcripts by stripping off nonessential words). Note: the participants ordered sequentially regarding the discussion; notes and initial ideas have been underlined	**(coded for/coding)**	**Codes**	**Potential Themes-sub themes**
Q1	Do you have experience of software development?		

	(Describe it?)			
INT.1 : No INT.2: No INT.3: No INT.4: No, but we trained in specific software related to our department to enable to use it then in coming months we discovered some mistakes and pugs in system.		1- No knowledge at all in service development	No knowledge	No knowledge or experience regarding software development
Q2	Could you please describe in detail your experience with the e-services provided by the Jordanian e-Government you have used?			
INT.1: I used the civil service website to find answer about some enquires just like that no more because most of e-government service is not activated. Researcher: And did you find answer for your enquires? INT.1: somehow yes but still not meet my expectation. INT.2: may I have question please? Researcher :of-course INT.1: why you selected Jordan as a case study? Or Jordanian government? Researcher: Ohh, good question in-fact the e-government services have a lot issue to investigate especially in developing countries, so I found Jordan a good example to do my study on it because Jordanian government portal still have some concerns from citizens. INT.1: Mmmmm. Got it. INT.2: in general the e-government services activated in private companies more in public companies, Anyway, I used the e-service provided from driving and license department and hospitals. INT.3: I limited used them because they as information services for inquiring no more. INT.4: I'm same my colleague INT.3 limited user for these services.		1- Civil service one of most services used by citizens 2- The citizen can ask for his /her enquire and or requirements regarding any civil services. 3- But still not meet our expectation 4- The service provided still info services.	Limited used e-services provided Not quite nice	service quality –limitation, ineffective
Q3	Tell me about yourself as co-designer user? (When, Why, and How)?			

INT.1: No, I'm not sure about this term "co-design" Researcher: I mean the means make you more interactive or participatory with system or any software INT.1: Actually No, I'm sorry!! INT.2: During my study in university like Microsoft, office software or some programming language during the embedded tool provided in these software, which help me to design some forms and templates. INT.3: may during my projects like project administration and through developing simulation. INT.4: No comment. It is new topic for me.		1- No knowledge/experience about co-design tools or in general as topic issue	Lack of knowledge Lack of understanding topic.	Difficult topic to talk about
Q4	What do you think of co-design as an approach used in software development in general?			
INT.1: the co-design should be between three parts: service user, service provider and service developer. INT.2: the interaction between all parts is very important. INT.3: in our life regarding my experience two opinions better than one and three better than two, ect . INT.4: yes of course it will be good idea and worthy if we know how to deal with it and when. But I need to understand the difference between interactive system and co-operative one. Researcher: Hoch, Great question, the interactive one allow you to deal with system in flexible way and get a response or feedback automatically but co-operative on as you called it allow you to participate in designing the system through the provided tools/features. INT.4: Okay, so the cooperative one is more important now regarding in your answer. Researcher: the new design science proved that and ensured about the significance in the affectivity output compare with tradition approaches used before.		1- they showed interesting indicators regarding co-design idea 2- Desiring for learning and understanding about this topic and use it.	willingness for collaboration work Willingness for getting new knowledge and trying new thing	Positive talk-knowledge, empowerment
Q5	Do you involve service user (end-users) in the design			

	process? If Yes (in what way, how, and why)		
INT.1: in general No, we are not participated as service interface , just we service recipients INT.2: I have question may be not related, what about our e-government services ranking. Researcher: could you specify your question more, ranking based on what? INT.2: regarding the effectiveness!! Researcher: unfortunately, u still very weak based on UN report 2014. Still have a lot of problem like ICT and infrastructure. ect . INT.3: same my colleague INT.1 INT.4: just we trained to use system not participating in designing system or specific services.	1-The current responsibility represents through concern about complete the citizen requests rather than involving in service designing. 2-service interface away from designing stage/process	Limited role represents through using and training to use system	partial marginalisation
Post-test questions			
Q1	In general, how would you like to describe your user experience of using the wiki-based co-design site?		
INT.1: easy to use and the information provided are sufficient, I think no need to be ICT professional or familiar to use the system INT.2: yah, it very good because I felt with action and reaction in different level and I can use it without need for help or guidance. INT.3: I agree with my colleague INT.2 INT.4: Nothing to add more than my colleagues, I agreed with them. But I'm not sure if system applicable with all service user level (I mean ICT level) INT.2: I'm happy with idea with added the social network to this system to enable us to be more interactive	1- They showed various experience such (good, very good, moderate) 2- Easy to use (simple) and useful	Design tools usability-easy and useful.	
Q2	Did the system meet your expectations? If yes (How/why?)		
INT.1: it is difficult from first time I say yes, I need more time to use it and to know every single feature to reach my expectation. INT.2: yes, I felt it is help me especially when using social	1- They showed happiness regarding the system used	expressing creativity	

network to exchange my ideas with others. INT.3: yes is interactive system it gave me directly report shows the previous answers and I can edit my answer if I need that. INT.4: yes , its good system especially if keep update and develop it regarding user expectation.		2- System showed the interactivity and respondent	
Q3	Did you actively participate in the proposed wiki-based co-design system? 3.1 In what way? If not, why not? 3.2 Would you have wanted to participate more? 3.3 What kind of participation do you think was expected of users?		
INT.1: yes, through investigate the feedback report which is provided from citizens. And of-course why not participates more in future especially if it develops more. The blog/post tool. INT.2: yes, during provide us tool allow us to manage the SPRF As Guidelines Co-design process based on user feedback. Yes I need more to get more experience and develop our ideas. Cliffy tool for designing business process. INT.3: of-course yes, during participatory service during service selected and or interactions between users, yes I need more participation in expand way. Choosing the most interested service needs. INT.4: No, because as I told u before it not met my expectation and regarding the concerns I mentioned in previous question. INT.2: Furthermore, rating feature is important to assess each other ideas or suggestion regarding design solutions. INT.1: moreover, it easy to use through engaging and involving and I'm sure al participants will not face problem with using it.		1- they actively participated 2- Talked about system characteristic's like interactivity and collaboratively	End-user engagement-involvement
Q4	How suitable was this system (wiki-based co-design) as platform for ideation ideas through the co-design tool provided?		
INT.1: the input box provided in each page which help user to express his/her ideas not just		1- Too much valuable for generating and	Appropriateness design tools with different

selected or evaluate the existed one. INT.2: exchange ideas and share them with others. INT.3: same my colleague INT.2 INT.4: I agree with my colleagues who said about blog tool to facilitate exchange ideas and get new ideas. INT.3: Through asynchronous messages between users and provider using blog/discussion forum. INT.1: just I want to add this system may help participant extract his/her creativity in-direct way.	exchanging ideas 2- Helpful and useful system for expressing ideas and get new ideas	participants
Q5	How would you describe your role in the active users' group?	
INT.1: I can say was a very active role through exchange our ideas with others. INT.2: The platform shows a fully support through interacting and communication with others by available communication tools like social media (FB). INT.3: it is good if this system provide participants different tool allow them to participate in different level of design and would be appropriated with their expectations' INT.4: what do you mean by active user? Researcher: I mean if you really involved or participated with others through social network provided to post or comment or share something INT.4: okay, ,,so, I agree with my colleague INT.3 it provide the participant a kind of involvement through engaged feature with system and provide him/her rights to express his/her own ideas'/opinions'	1- Showed a positive role in participating 2- Service user involvement in design process	Collaborative communication platform
Q6	Which of the proposed co-design tools were shown a valuable aid/support the design and development of G2C e-service?	
INT.1: Blog/post tool for exchange ideas. And post scenarios. INT.2: the social network tool is very interesting tool to share our ideas and views. INT.3: rating/voting and	1- Rating/voting 2- Blog/post 3- Social network	Collaborative design tools

furthermore, add suggestion input box INT.4: I think the blog tool and rating both of them are very valuable to aid participants during design process.		
Q7	What exactly are the benefits and the limitations of the proposed design tools?	
INT.1: may the shortcoming just I see the design process diagram may it not easy to understand for all service users. INT.2: it is difficult to give cons or pros especially I'm not fully convinced for participating the citizens in design process through providing him the design tools. INT.3: it has many advantages but just I'm worry about those participants' who desire to participate in this type of system based on their knowledge and the facilities provided. INT.4: the benefit social network/media will help to share our ideas/perspectives and shortcoming represents those tools not necessarily match all participants expectations and or experience INT.1: I'm with my INT.1 colleague. INT.3: furthermore, the most benefit is making participants more interactively and participatory and I didn't see any disadvantages.	1- Experimenting with collaborative and communication/interaction with system 2- enhancing user-centred design 3- not fully understandable	Popular WCP tools -challenges and opportunities
Q8	How can the different stages of design process be methodically improved?	
INT.1: I don't have anything to say for me I see it's already improved. INT.2: I agree with my colleague INT.1. Furthermore, we need to see the service user involve actively in stages of discover and define rather than develop and deliver because regarding my perspective these stage are too sensitive and if service users involved actively in earlier stage I'm sure the service will meet their expectation which is included service recruitments and	1- employment the design tools in suitable way to be fitted in different service design stages and diverse people background 2- Encourage involving service user in discover and define stages rather than develop and	Ability for utilising co-design platform-

identify the problem and proposed the design solutions. INT.3: may if add input box to insert the system weakness point. Researcher: it's already added if see the deliver link has six inputs- box one of them for this purpose. INT.4: it is good if you add a tutorial video to explain system for those people have limited knowledge in ICT. Researcher: yes I agree may good idea to add some demo to explain for stakeholders how to use system INT.4: Moreover, If you try to simplify each stage of design process to make all citizens have ability to involve in different stages through reduces the stakeholder's space of writing or reading.	deliver 3- Some criticisms regarding deliver phase	

Service User

Service User-Group1 (T); n=4 Participants

Pre-test question			
Data Extract: (FGD transcripts by stripping off nonessential words). Note: the participants ordered sequentially regarding the discussion; notes and initial ideas have been underlined	**(coded for/coding)**	**Codes**	**Potential Themes-sub themes**
Q1 Do you have experience of software development? (Describe it?)			
T.1: No T.2: No T.3: No T.4: No	1- No knowledge at all in service development	No knowledge	No knowledge or experience regarding software development
Q2 Could you please describe in detail your experience with the e-services provided by the Jordanian e-Government you have used?			
T.1: I used Edu-wave site as related to ministry of education all services related student issues T.2: I used the ministry of education website for education purposes not personal services T.3: actually like my previous colleagues nothing more, T.4: I didn't know if we have e-	1- Limited using e-government service which was representing through education purposes 2- No awareness about these	Limitation No awareness	Services quality-depersonalisation

government portal includes e-service for citizens. Researcher: could I know the reason behind not using the Jordanian e-government services? All participants' response there is no awareness about these services and how to use it and why we need it.	services		
Q3	Tell me about yourself as an online co-design tool(s) user? (When, Why, and How)?		
T.1: I used movie maker software that includes some tools to adapt or edit and express my views T.2: may I have different experiment I used Photoshop to generate my opinions or perspectives T.3: No sorry I don't have any experience about that. T.4: in-fact I'm same my colleague T.3	3-No knowledge/experience about co-design tools	Lack of knowledge	Difficult topic to talk about
Q4	What do you think of co-design as an approach used in software development in general?		
T.1: very good idea, especially if provided with situated tools which aids citizens in all of design and allow all citizen to participate not only who familiar with ICT knowledge or who designer. T.2: ya sure if we work as team to develop something it becomes a great value, work as a collaborative communication environment will effect positively in the output. T.3: same my previous colleagues, furthermore, the collaboration will effect in the development in the positive way through exchange ideas. T.4: I agree with all previous response, nothing new to add.	1-they showed enthusiasm indicators regarding co-design idea 2- Desiring for learning and understanding	willingness for collaboration work Willingness for getting new knowledge	Positive talk-enthusiasm, empowerment
Q5	Did you involve as an (end-users) in the design process? If Yes (in what way, how, and why)		
T.1 No T.2 No T.3 No T.4 No Researcher: so I think we will move to next part which is	No participation at all	Ignoring	Completely marginalisation

represent post-test interviews related to system you have used.			

Post-test questions			
Q1	In general, how would you like to describe your user experience of using the wiki-based co-design site?	**Codes/coded for**	**Potential themes-subthemes**
T.1: (above the average) I think it was very good and not strange and not take long time some of features known before like checkbox or rating and dealing with social network T.2: I think the most significant thing in this system it is explained it self so no need to video tutorial just need to read the notes and go ahead T.3: the system was clear and easy to use T.4: I agree with my colleagues. Nothing more to add		1-They showed very good experience 2-Easy to use (simple and clear) and useful	Design tools usability-usefulness, ease of use
Q2	Did the system meet your expectations? If yes (How/why?)		
T.1: yes, because it was allow me to express my ideas without effort and if they really take our ideas/views into consideration T.2: yes, especially the input box tool allows me to generate my ideas and feel free; I'm not obliged with system choices. T.3: yes like my previous colleagues T.4: I agree with my colleague T.1		1-They showed happiness regarding the system used 2-System showed the generating and responding as a platform	Open ideation-motivating
Q3	Did you actively participate in the proposed wiki-based co-design system? 3.1 In what way? If not, why not? 3.2 Would you have wanted to participate more? 3.3 What kind of participation do you think was expected of users?		
T.1: yes, through the transparency so I can all responses people directly after I finish my answer so I will take in my mind to answer in clear way to be with right people. T.2: I have question regarding the SPRF As Guidelines Co-design process diagram in co-develop stage, the service users have permission to edit these		1-they actively participated 2-they showed enthusiasm to be part in design process	Collaborative co-design platform-enthusiasm, communication

process or not? Researcher: good question, even this issue explained in diagram, actually this option for editing grant for service provider and service user and interface just can't add feedback regarding the process. T.3: yes, I would to participate more and more to discover all features. T.4: yes sure I'm happy to be part in design for services I used or will be used from my side.		
Q4	How suitable was this system (wiki-based co-design) as platform for ideation ideas through the co-design tool provided?	
T.1: yah, help me to generate my ideas through give consequence processes. T.2: I think the generating ideas lie in social networks during posts or drop comments…etc. T.3: it was so suitable system for that through the situated tools provided which is facilitated our engagement and involvement in different design stages T.4: I agree with my colleague T.3	1-Too much valuable for generating and exchanging ideas 2-Helpful and useful system for expressing ideas and get new ideas 3- Expressing the ideas sequentially and Communicatively	expressing creativity-collaborative
Q5	How would you describe your role in the active users' group?	
T.1: yes I got a positive roles through a discussion forum which is help me to generate more ideas T.2: I agree with my colleague T1 the discussion forum was a fascinating through social network or asynchronous messages help exchange ideas to reach to correct or right ideas. T.3: hahaahaha, laughthing here, why not think to build up a system like this one to help us to provide the collaboration between us and our students to improve the education books and teaching ways. T.4: nothing to add more than my colleagues.	4- Showed a positive experience in participating 5- Showed a good communication/connection 6- Expressing end-users engagement and involvement	Positive experience: user participation-communication
Q6	Which of the proposed co-design tools were shown a valuable aid/support the design and development of G2C e-service?	

T.1: rating/voting and furthermore, add suggestion input box T.2: the social network tool is very interesting tool to share our ideas and views. T.3: Blog/post tool for exchange ideas; and post scenarios. T.4: I think the blog tool and rating both of them are very valuable to aid participants during design process.	7- Rating/voting 8- Blog/post 9- Social network	Appropriate design tools- interaction, communication
Q7	What exactly are the benefits and the limitations of the proposed design tools?	
All participants answer by consensus we didn't notice the real shortcomings deserve to mentions at least now regarding our used with not too long time, However but we need add comment regarding the rating or selection option	10- collaborative communication platform 11- enhancing user-centred design 12- improving innovation process	Design tools- Opportunities and challenges
Q8	How can the different stages of the design process be methodically improved?	
T.1: may if use illustration photograph make easy to understand each step of design. T.2: I agree with my colleague T.1. I think service user involve actively in stages of discover and define rather than develop and deliver because regarding my perspective these stage are too sensitive and if service users involved actively in earlier stage I'm sure the service will meet their expectation which is included service requirements and identify the problem and proposed the design solutions. T.3: yes, may this right (based on t.1 AND t.2) especially if we face a problem with service user in the last two stages regarding the ICT knowledge or mentality. T.4: I agree with my colleague T.1, nothing to add more than this.	13- appropriate the recruitment design tools in situated design stage 14- Encourage involving service user in discover and define stages rather than develop and deliver 15- Helping or making better the proposed co-design system with one's own perspectives 16- Showing the participatory design an important in the success service design	Tailoring design tools- functionality

Service User-Group 2 (USL); n=4 Participants

Pre-test question				
Data Extract: (FGD transcripts by stripping off nonessential words). Note: the participants ordered sequentially regarding the discussion; notes and initial ideas have been underlined		**(coded for/coding)**	**Codes**	**Potential Themes-sub themes**
Q1	Do you have experience of software development? (Describe it?)			
USL.1: No USL.2: No, USL.3: No USL.4: No, Researcher: so shall we move to next question		1-No knowledge at all in service development	No knowledge	No knowledge or experience regarding software development
Q2	Could you please describe in detail your experience with the e-services provided by the Jordanian e-Government you have used?			
USL.2: actually I used the Emirates e-government services to get the certificate and they sent it to Jordanian embassy but regarding to Jordanian e-government I never used it Researcher: why you didn't use Jordanian e-government? USL.2: in-fact I don't know if we have something like that no one talks us about this issue and what the services provided. USL.1: just I used the eduwave website to get my accumulative average when I was in high school, however, regarding other e-services I didn't used because may I'm not need any services from government. USL.3: I used some services return student services in university website to contact our lecturers or to get some info Researcher: But I think these type of services belong to university not belong government e-services. USL.4: I never used these services belong to Jordanian e-government because I didn't know about it and why I need it.		1-Limited using e-government service which was representing through education purposes 2-No awareness about these services 3- No advertising/announcement regarding these services	Limitation No awareness	Services quality-depersonalisation, embarrassment

Researcher: what do you think reason for that? USL.4: I think this issue returned the Jordan government not play a vital role to aware us about that through advertising..etc.			
Q3	Tell me about yourself as an online co-design tool(s) user? (When, Why, and How)?		
USL.1: what do you mean by co-design tools Researcher: I mean the means you have used to help you to involve or at least participate in design something USL.1: ohhhhh, I don't know if you consider Photoshop I used it, and it provides some features help to be more involved for editing photos to shape them as I like. USL.2: I used the rational software (UML) to describe a specific case or edit and add some component to express my mind USL.3: actually I didn't use something like that. USL.4: regarding to any website or service I never participate in design them or at least ask me how I like to be the service. But I used some application like photo editor which is allow me to shape/adapt these photos to meet my experience.	1-No really knowledge/experience about co-design tools 2-Showed desiring to get new knowledge about co-design	Lack of knowledge	Difficult topic to talk about
Q4	What do you think of co-design as an approach used in software development in general?		
USL.1: ya it is a good idea and fantastic if employed in right way. Researcher: what does u mean by right way? USL.1: I mean when, who and how to use these tools in design process USL.2: I agree with my colleague USL.1, furthermore it's encourage us to participate more to extract the common sense from end user and employee it in design process. USL.3: ya good idea why not add co-design tools for each type of e-service USL.4: I'm totally with this idea	1-they showed enthusiasm indicators regarding co-design idea 2-Desiring for learning and understanding	willingness for collaboration work Willingness for getting new knowledge and applied these tools through service design stages.	Positive talk-enthusiasm, empowerment

because will foster the two-way interaction. But not like human and machine			
Q5	Did you involve as an (end-users) in the design process? If Yes (in what way, how, and why)		
USL.1: actually No, I didn't remember something like that. USL.2: Ya I used software allow me to play with design when developers provide us with initial design for calculator and the service user edit the design to meet their own experience like enlarge some buttons. USL.3: No USL.4: No Researcher: so I think we will move to next part.	Weak and very limited participation	Vulnerability Not quite worthy participation	Completely marginalisation
Post-test questions			
Q1	In general, how would you like to describe your user experience of using the wiki-based co-design site?	Codes/coded for	Potential themes-subtheme
USL.1: it was very clear system just I'm worry about people participating especially we are developing country and people not aware about something like that. Researcher: where is your problem exactly? USL.1: how you want make citizen know about that and participate? Researcher: through share this system by social networks and advertisements,, ,,, etc USL.2: very good system just may be a bit difficult to fit all people knowledge and abilities especially if you deal with third world country. USL.3: nice site and I activated with my short participation. USL.4: almost perfect and nice experiment as first time deal with collaboration system allows me to be an active component in design process.	1-They showed various experience such (good, very good, moderate) 2-Easy to use (simple) and useful 3-Quite nice	Design tools usability-ease of use, useful	
Q2	Did the system meet your expectations? If yes (How/why?)		
USL1: it is difficult to assess from the first time, but I can say	1-They showed willingness regarding	Positive expectation-quite	

yes, I need more time to use it and to know every single feature to reach my expectation. USL.2: yes, I felt it was helpful me especially when using social network to exchange my ideas with others. USL.3: yes is interactive system it gave me directly report shows the previous answers and I can edit my answer if I need that. USL.4: yes , its good system especially if keep update and develop it regarding user expectation.		the system used 2-System showed the interactivity and responding	nice
Q3	Did you actively participate in the proposed wiki-based co-design system? 3.1 In what way? If not, why not? 3.2 Would you have wanted to participate more? 3.3 What kind of participation do you think was expected of users?		
USL.1: yes, through engaging process because I create account and tried system, USL.2: yes, through activated feature which make me more active with system? USL.3: I agree with my participants its good experiment because I involved and felt myself as part in system through the feature provided. USL.4: yes, I participated and create an account because this this was flexible and I can use it more and more.		1-they actively participated 2-showed excitation to be part in design process	Collaborative co-design platform-enthusiasm, communication
Q4	How suitable was this system (wiki-based co-design) as platform for ideation ideas through the co-design tool provided?		
USL.1: the input box provided in each page which help user to express his/her ideas not just selected or evaluate the existed one. USL.2: exchange ideas and share them with others. USL.3: same my colleague USL.2 USL.4: I agree with my colleagues who said about blog tool to facilitate exchange ideas and get new ideas. USL.3: Through asynchronous messages between users and provider using blog/discussion		1-Too much valuable/worthy for generating and exchanging ideas 2-Helpful and useful system for expressing ideas and get new ideas	expressing creativity-collaboration

forum. USL.1: just I want to add this system may help participant extract his/her creativity in-direct way.		
Q5	How would you describe your role in the active users' group?	
USL.2: I was feeling so active through my participating in an open decision making. Researcher: USL.1 left for a few mins. Then he will back. USL.3: I played a good role through be vital role in design e-services and this is very new thing. So we are excited. USL.4: I'm happy and had nice experiment with other people through an active role by using social network for posting or sharing.	1-Showed a positive role in participating 2-Showed a good communication/networking 3-Expressing end-users engagement and involvement	Positive experience-communication
Q6	Which of the proposed co-design tools were shown a valuable aid/support the design and development of G2C e-service?	
USL.1: rating/voting and furthermore, add suggestion input box USL.2: the social network tool is very interesting tool to share our ideas and views. USL.3: Blog/post tool for exchange ideas. And post scenarios. USL.4: I think the blog tool and rating both of them are very valuable to aid participants during design process.	1-Rating/voting 2-Blog/post 3-Social network	Appropriate design tools
Q7	What exactly are the benefits and the limitations of the proposed tools?	
USL.1: I didn't notice any disadvantage this is first time dealing with information system website. USL.2: the benefit is become a real part in design process. USL.3: sure it is beneficiary system because provide us an opportunity to be am part in design process. USL.4: the most significant thing which allows for non-designer to participate as designer through provide us with suitable design tools make us more interactive and participatory users. USL.3: one more, I didn't feel	1- collaborative communication platform 2-enhancing user-centred design 3-improving innovation process	Collaborative co-design platform– co-design tools, communication, engagement

am different between designer or non-designer I can use it easily through the co-design tools provided.		
Q8	How can the different stages of design process be methodically improved?	
USL.1: I think the design process is sustainable process so it needs updating continually so see we need to make this system available for citizen to take their ideas and feedback to improve the stages of design in general. Researcher: so you encourage the idea for used and test system first to be able to enhance it. USL.2: just I think simplifying each stage of design to be able to participating all level of users because I noticed some features for service provider or service interface just. USL.3: actually I don't know how because I see it is already improved and met my expectation. USL.4: just I think keep this system upgraded to ensure about this system meeting users experience and expectations.	1-apply the design tools in suitable way to be fitted in different service design stages and diverse people background 2-Encourage involving service user in discover and define stages rather than develop and deliver 3-Showing the participatory design an important in the success service design stages	Tailored design tools-involvement, sustainability upgrading, simplicity

Service User-Group3 (VDC); n=4 Participants

Pre-test question			
Data Extract: (FGD transcripts by stripping off nonessential words). Note: the participants ordered sequentially regarding the discussion; notes and initial ideas have been underlined	**(coded for/coding)**	**Codes**	**Potential Themes-sub themes**
Q1	Do you have experience of software development? (Describe it?)		
VDC.1: I was working as programmer to change some systems form traditional to computerised system. For example, accounting system, and banking system. VDC.2: No,	1-Average knowledge and or experience	Average knowledge	A quite knowledge or experience regarding software development

VDC.3: just I work to develop just simple websites for graduation projects for undergraduate students VDC.4: not that much it is just like evaluation website to give feedback or rating a specific program.				
Q2	Could you please describe in detail your experience with the e-services provided by the Jordanian e-Government you have used?			
VDC.1: I used civil status and Traffic violations and fuels support service, and were these services somehow difficult regarding some unexpected errors. VDC.2: I used land survey and fuels support service and was complicated regarding the private question were asked. VDC.3: I used civil status and passport to know all required info and docs need to apply for any civil service. And I used some services belong to my work. VDC.4: actually I used civil service beruea and fuels support service, the used for these service depend on our needs and they provide some feature to edit our information VDC.1: ya we can edit our personal info like email phone name… etc.		1-Limited using e-government service which was representing through education purposes 2-Current services showed some pugs and some implementation problems	Limitation of using Weak service development	Services quality-complication, embarrassment
Q3	Tell me about yourself as an online co-design tool(s) user? (When, Why, and How)?			
VDC.1: my experience related to software programming in past we have to be familiar with these software but know the added a new wizard tools to facilitate our using and not necessary to be expert or have knowledge to use these software's. Like the new oracle software. VDC.2: I agree with participant VDC.1 VDC.3: No I didn't VDC.4: just when I was studying I dealt with software like FrontPage.		1-No really knowledge/experience about co-design tools 2-Showed desiring to get new knowledge about co-design	Lack of knowledge Some negative talk	Difficult topic to talk about
Q4	What do you think of co-design as an approach used in software development in general?			

VDC.1: regarding the co-design it has positives and negatives, will start will positives it takes in consideration the feedbacks through use these tools, I will give an example the Microsoft windows deliver several release like windows 7 with many versions to cover all end users satisfactions. VDC.2: I agree with participant VDC.4 VDC.3: ya of-course nice ideas if it employed in right way and when we need to use it and how to use it. VDC.4: very good idea and help to expand our knowledge and how to thinking.	1-they showed various/distinct indicators regarding co-design idea 1-Desiring for learning and understanding	willingness for collaboration work powerful approach	Positive talk-enthusiasm, empowerment
Q5	Did you involve as an (end-users) in the design process? If Yes (in what way, how, and why)		
VDC.1: I just gave feedback especially when I was browsing some system and provided them with reports as pop-up and I got answer from them regarding my issues. VDC.2 No VDC.3 No VDC.4 No Researcher: so I think we will move to next part which is represent post-test interviews related to system you have used.	1-Very Weak and very limited participation	Vulnerability Not quite worthy participation	Completely marginalisation

Post-test questions			
Q1	In general, how would you like to describe your user experience of using the wiki-based co-design site?	**Codes/coded for**	**Potential theme-subtheme**
VDC.1: regarding registration process like create account and login it was very easy and this is encouraged to have a lot of users engage to system. However, regarding the content in the main page I hope it will be simpler to attract a wide scale of people with diverse background. VDC.2: it was good and has many options and nice idea to use social networks like FB, and can publish or share own minds. VDC.3: good experience and I		1-They showed a good experience 2-Easy to use (simple) and useful 3-Comprehensive systems including several features	Design tools usability-ease of use, usefulness

agree with VDC.2 VDC.4: was very good and we can expand our knowledge.		
Q2	Did the system meet your expectations? If yes (How/why?)	
VDC.1: yes, because it was allow me to express myself without effort and if they really take into in consideration our ideas and views. VDC.2: yes, especially the input box tool service allows me to generate my ideas and feel free, I'm not obligatory with your choices. VDC.3: carried out my ideas spontaneously such like brainstorming regarding my views. VDC.4: I agree with my colleague VDC.1	1-They showed happiness regarding the system used 2-System showed flexibility and relaxation 3-experimenting with various design tools	Open ideation-enthusiasm
Q3	Did you actively participate in the proposed wiki-based co-design system? 3.1 In what way? If not, why not? 3.2 Would you have wanted to participate more? 3.3 What kind of participation do you think was expected of users?	
VDC.1: actually I was thinking if you provide the system with system admin 24/7 to monitor all pugs and feedbacks. VDC.2: in-fact nothing to add more than other participants. VDC.3: I'm happy with interactivity like the automatic report provided and social network. VDC.4: yes, through the customisation provided which is foster our participated in system and sure I like to involve more and more. VDC.1: yes, through the social networks provided, which allow us to exchange ideas but I have comment regarding interactivity of system I felt it was not too interactive. Researcher: what do you mean not too interactive? VDC.1: I don't receive an automatic response Researcher: if u noticed each feature in this system grant you with automatic responses like	1-They somehow actively participated 2-showed happiness to be part in design process 3-System fosters the participant to engage and involve in active way.	Collaborative co-design platform-enthusiasm, communication

checkbox and rating they provide you with all response and moreover the rating provided you average rating for all participants but if you talk about social networks you all talk about thousand hundred feedback we can grant an automatic responses.		
Q4	How suitable was this system (wiki-based co-design) as platform for ideation ideas through the co-design tool provided?	
VDC.1: yahoo, help me to generate my ideas through give consequence processes. VDC.2: I think the generating ideas lie in social networks during posts or drop comments…etc. VDC.3: Carried out my ideas spontaneously such a brainstorming for my views. VDC.4: I agree with participant VDC.3	1-Too much valuable/worthy for generating and exchanging ideas 2-Suitable and useful system for expressing ideas and get new ideas 3-Desiring for learning and understanding through brainstorming approach	Platform as an expressing/generating the creativity-collaborative
Q5	How would you describe your role in the active users' group?	
VDC.1: in-fact I used the system with a quiet short time so I can't judge perfectly, however, you added a nice features in right way which grant us permission to exchange ideas/views VDC.2: yes I had vital role, through discussion forum I generate my ideas and replied others through asynchronised messages. VDC.3: I agree with participant VDC.4 VDC.4: I gave nice tools enabled me to be more active and involved with other in different level of design.	1-Showed a quite nice positive in participating 2-Showed a very good communication 3-System showed end-users engagement and involvement	Positive experience: user participation-communication
Q6	Which of the proposed co-design tools were shown a valuable aid/support the design and development of G2C e-service?	
VDC.1: rating/voting and furthermore, add suggestion input box VDC.2: the social network tool is very interesting tool to share our ideas and views.	1-Rating/voting 2-Blog/post 3-Social media network	Appropriate design tools-interaction, communication

VDC.3: Blog/post tool for exchange ideas. And post scenarios. VDC.4: I think the blog tool and rating both of them are very valuable to aid participants during design process.		
Q7	What exactly are the benefits and the limitations of the proposed design tools?	
VDC.1: may the shortcoming just I see the design process diagram may it not easy to understand for all service users. VDC.2 : it is difficult to give cons or pros especially I'm not fully convinced for participating the citizens in design process through providing him the design tools. VDC.3: it has many advantages but just I'm worry regarding people desirable to participate in this type of system based on their knowledge and the facilities provided. VDC.4: the benefit social network/media will help to share our ideas/perspectives and shortcoming represents those tools not necessarily match all participants expectations and or experience VDC.2: I'm with my VDC.4. VDC.1: furthermore, the most benefit is making participants more interactively and participatory and I didn't see any disadvantages.	1- collaborative communication platform 2- interactively and participatory system 3-improving innovation process **limitations** 1- some ambiguity regarding SPRF As Guidelines Co-design process diagram 2- not fully appropriates all design tools with diverse stakeholders	Design tools Opportunities and challenges
Q8	How can the different stages of the design process be methodically improved?	
All participants agreed by consensus regarding the last stage of service design which is called deliver, through writing feedback waste time and need effort so they suggested adding something like list-menu or wizard to select criteria needs development rather that write their feedbacks.	1-apply the design tools in suitable way to be fitted in different servic 2- Helping or making a better proposed co-design system	Tailoring design tools-functionality

Appendix N-WCP's Interfaces (Wiki-based Co-design prototype)

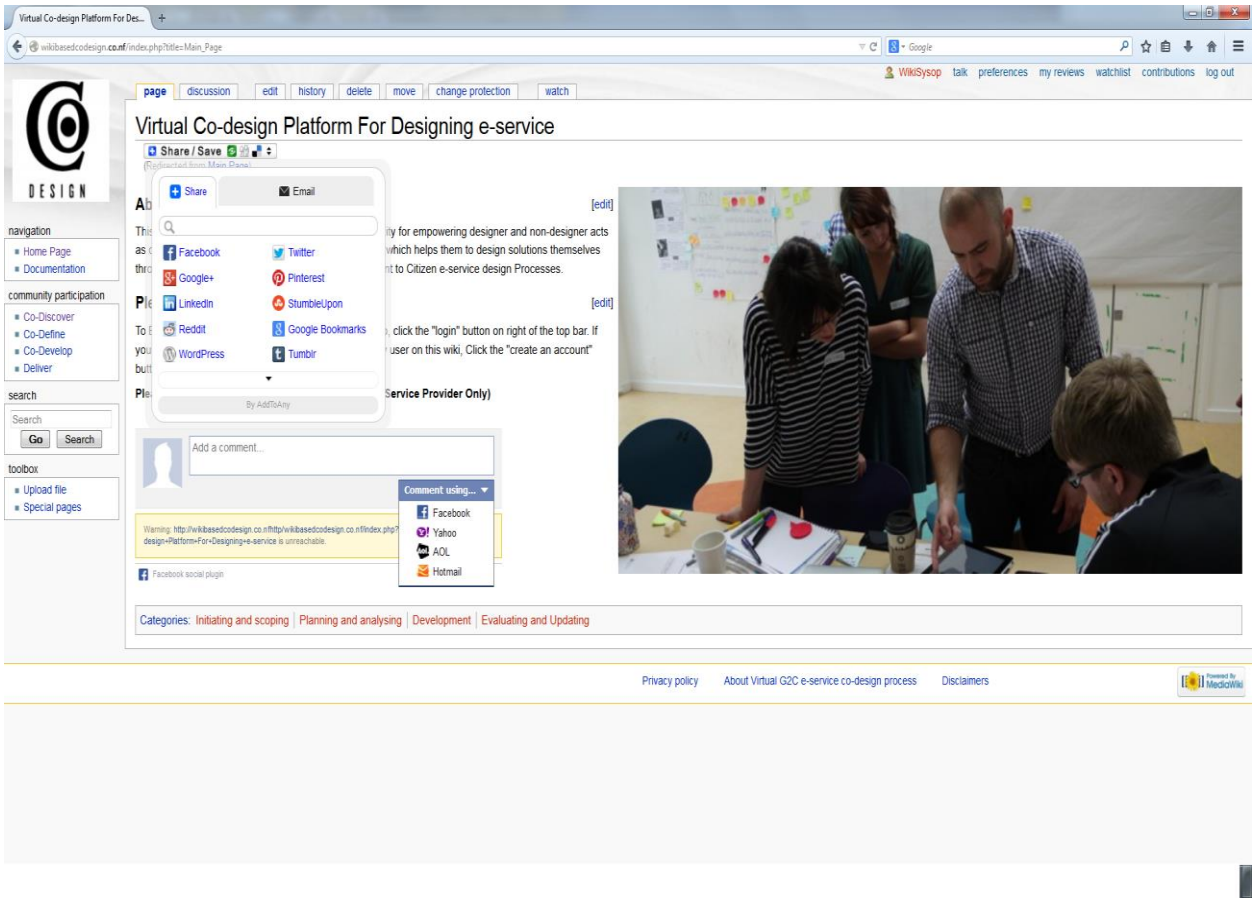


Figure 1: Wiki-based Co-design prototype Homepage

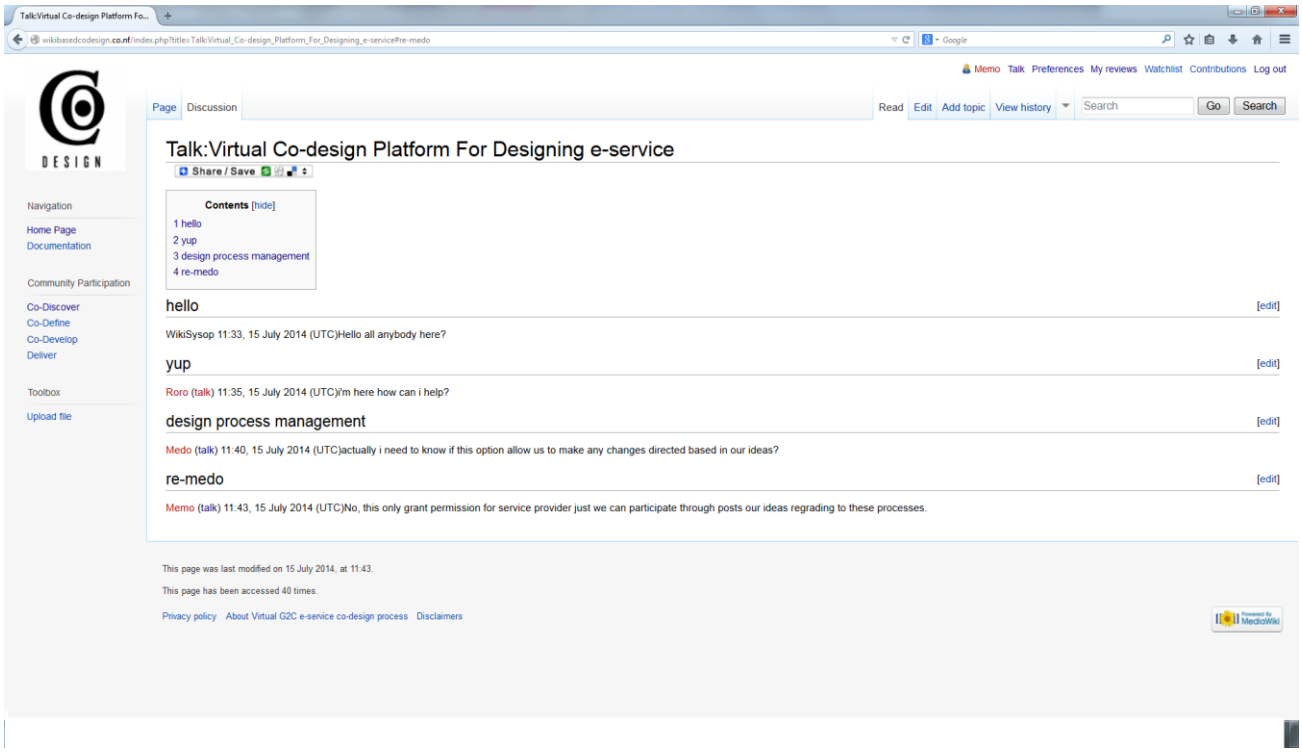


Figure 2: A Discussion Forum (Asynchronous Messages)

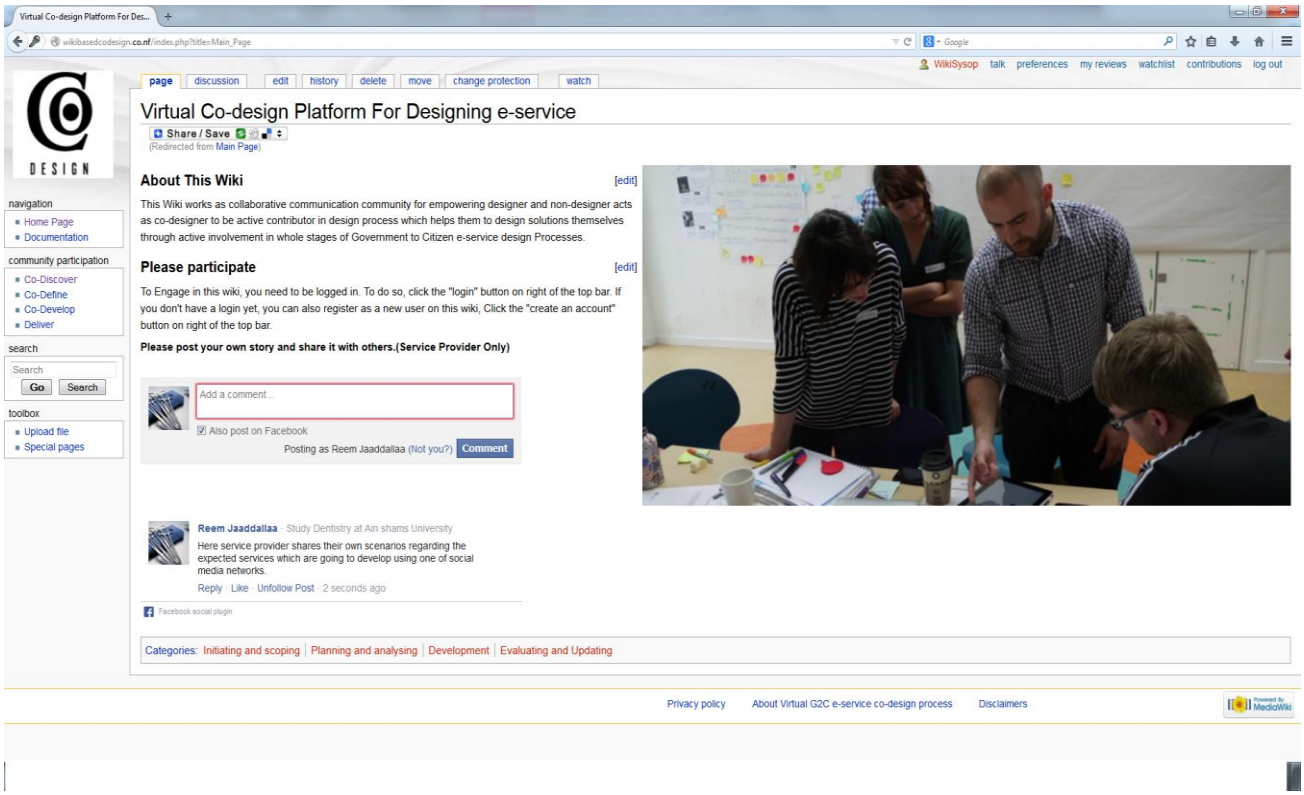


Figure 3: Social media networks to exchange ideas/views (i.e. FB plugged in Mediawiki)

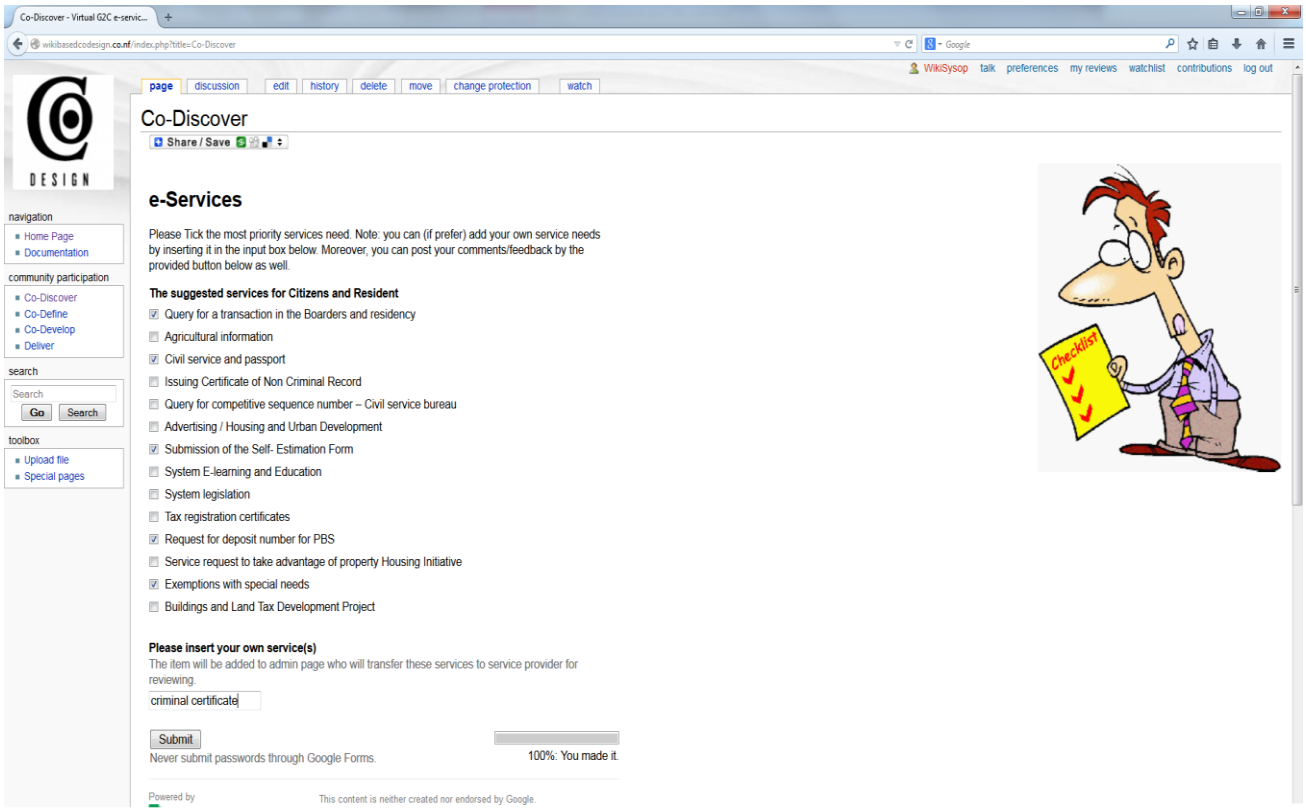


Figure 4: Co-Discover Phase represents the suggested services and or citizens their own services by using the checklist feature.

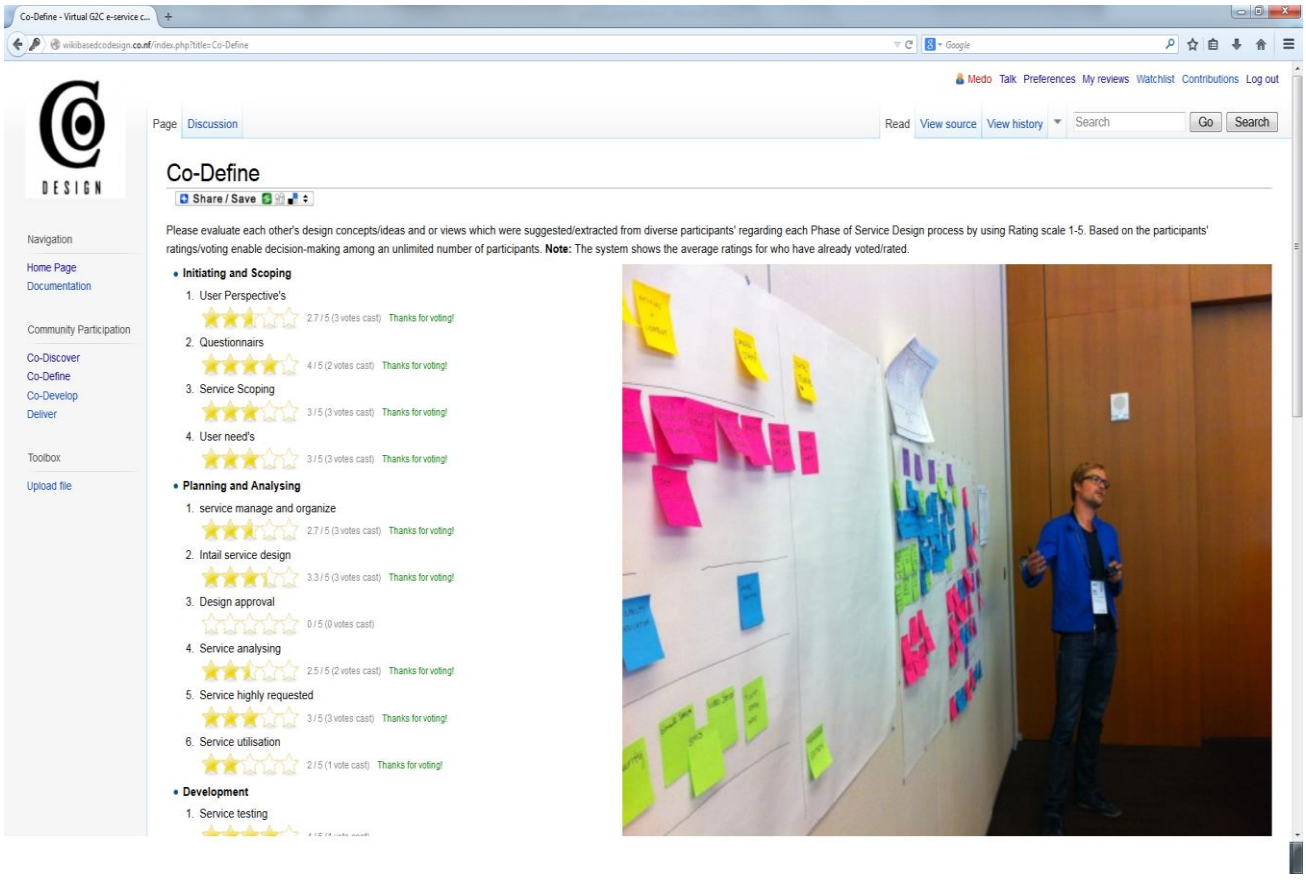


Figure 5: Co-Define Phase represents service characteristics in each stage by using rating/voting feature

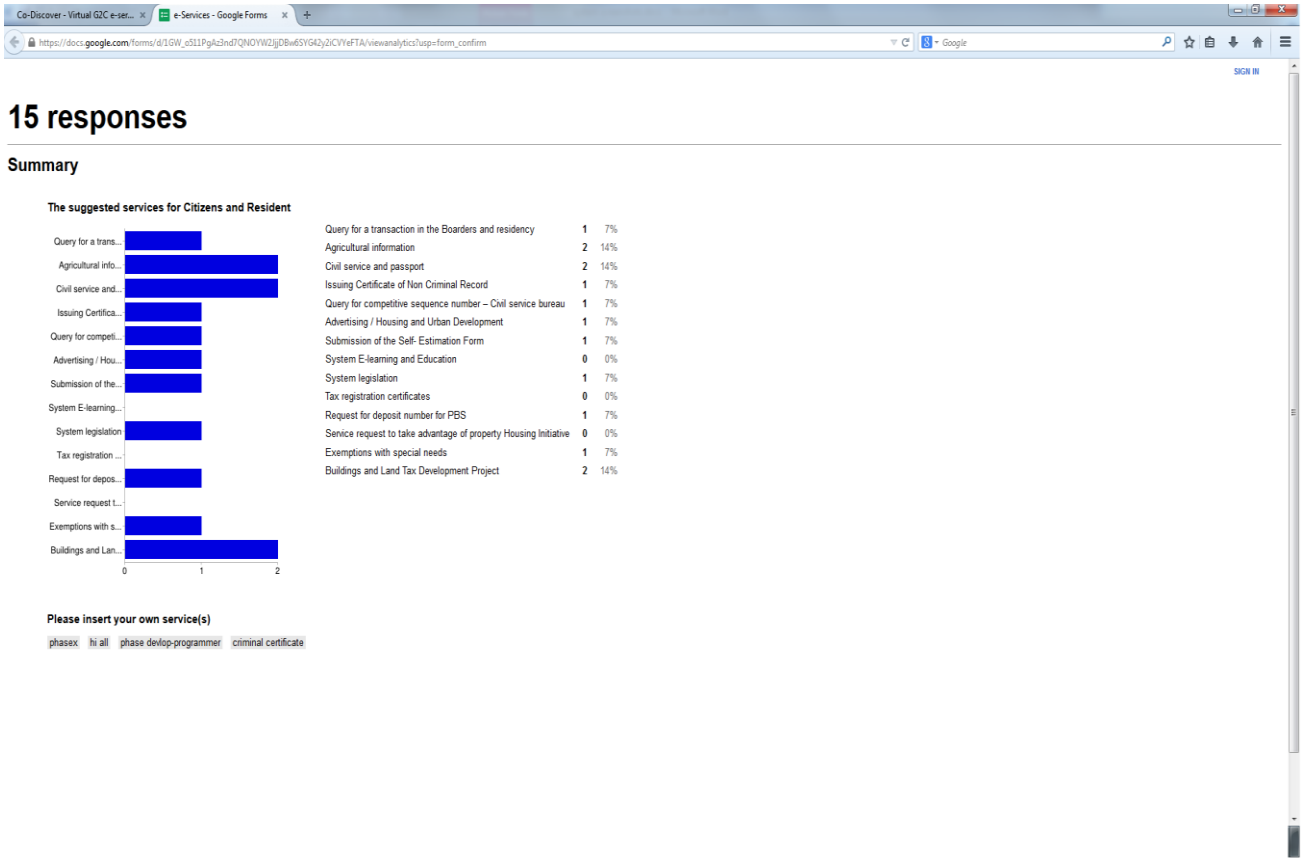


Figure 6: Report shows the concise summary regarding the citizens' suggestions (see figure 4)

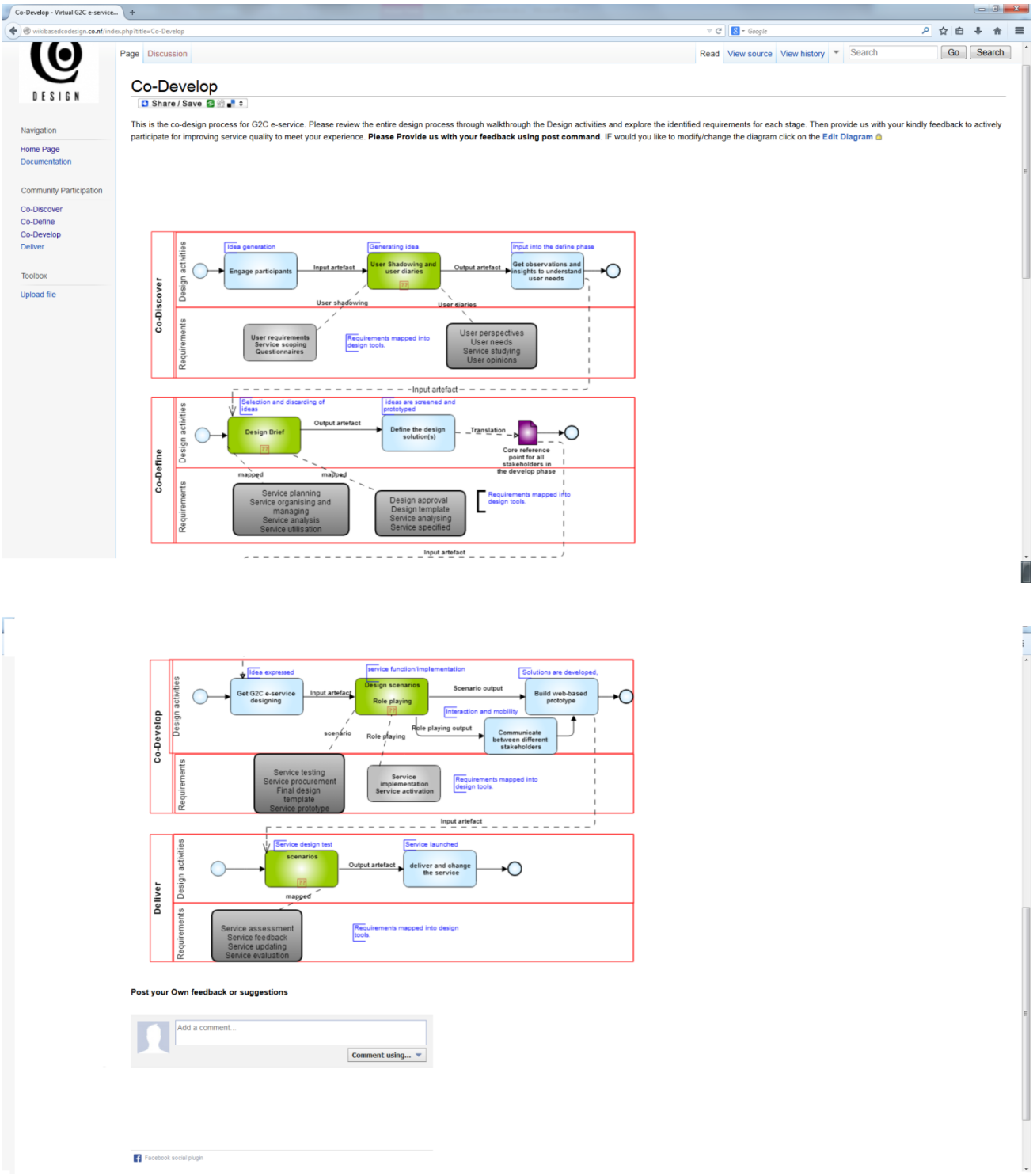


Figure 7: Co-Develop Phase represents the SPRF as Guidelines Co-design process for G2C e-service design stages

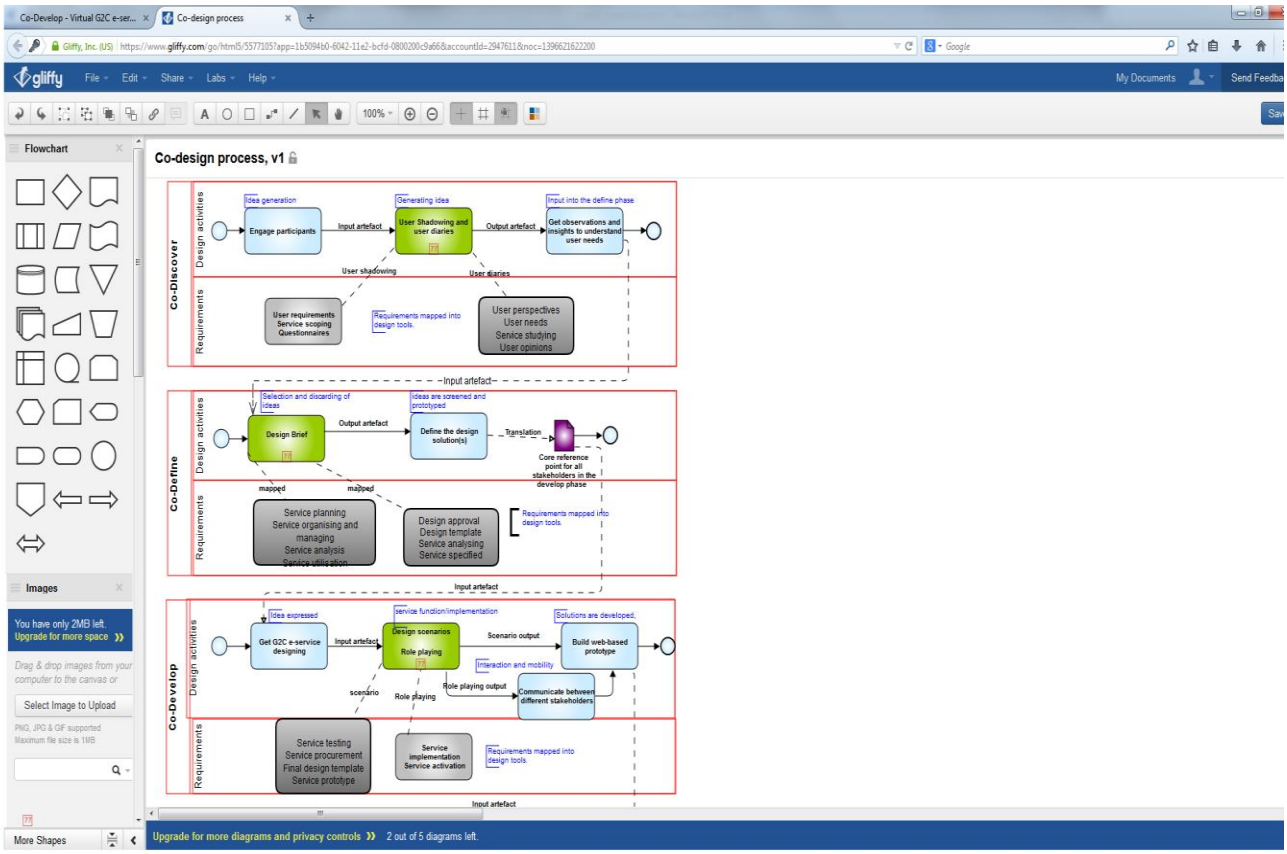


Figure 8: The SPRF as a Guidelines Co-design process management by using online Gliffy software as plugged in Mediawiki

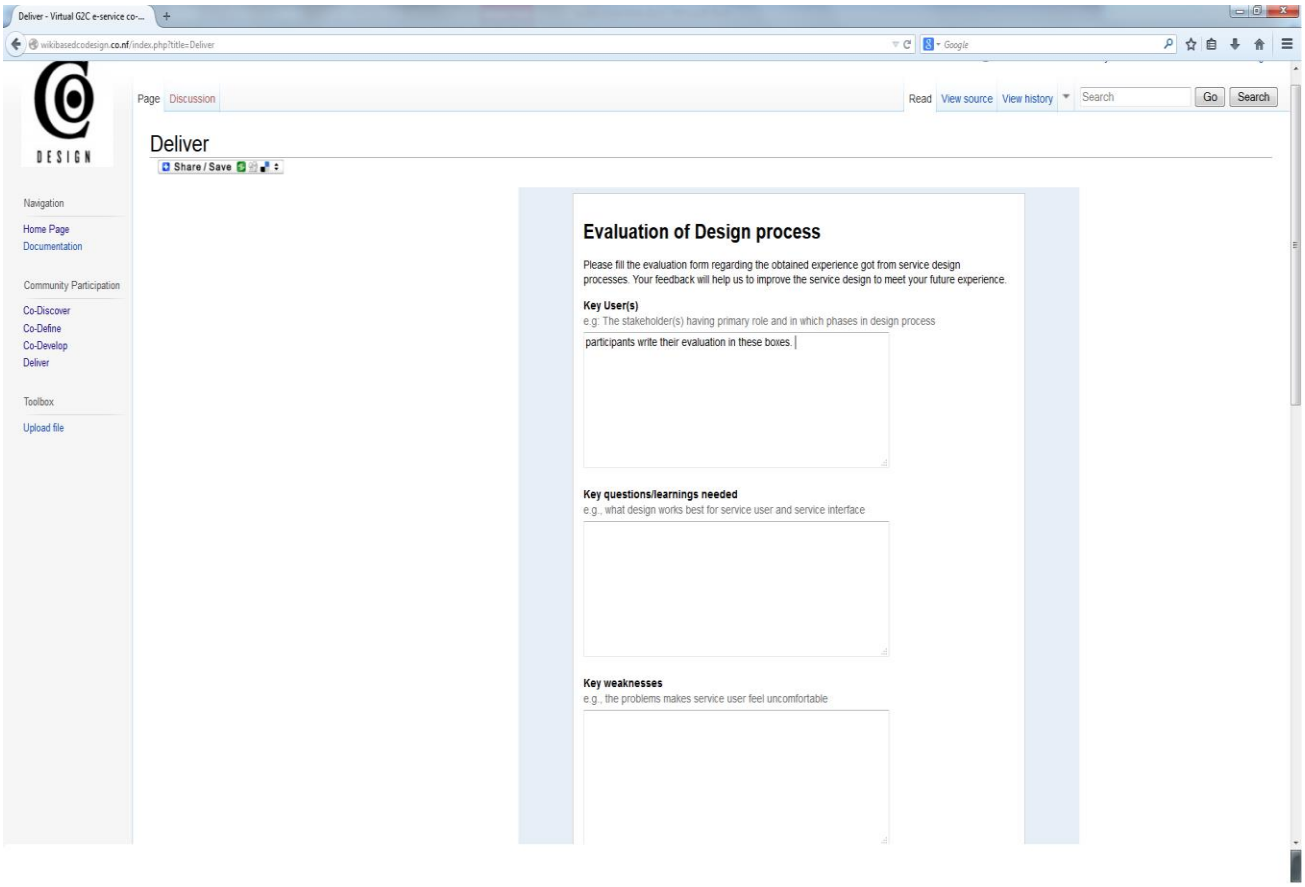


Figure 9: The Co-develop Phase represents the evaluation form of design process.

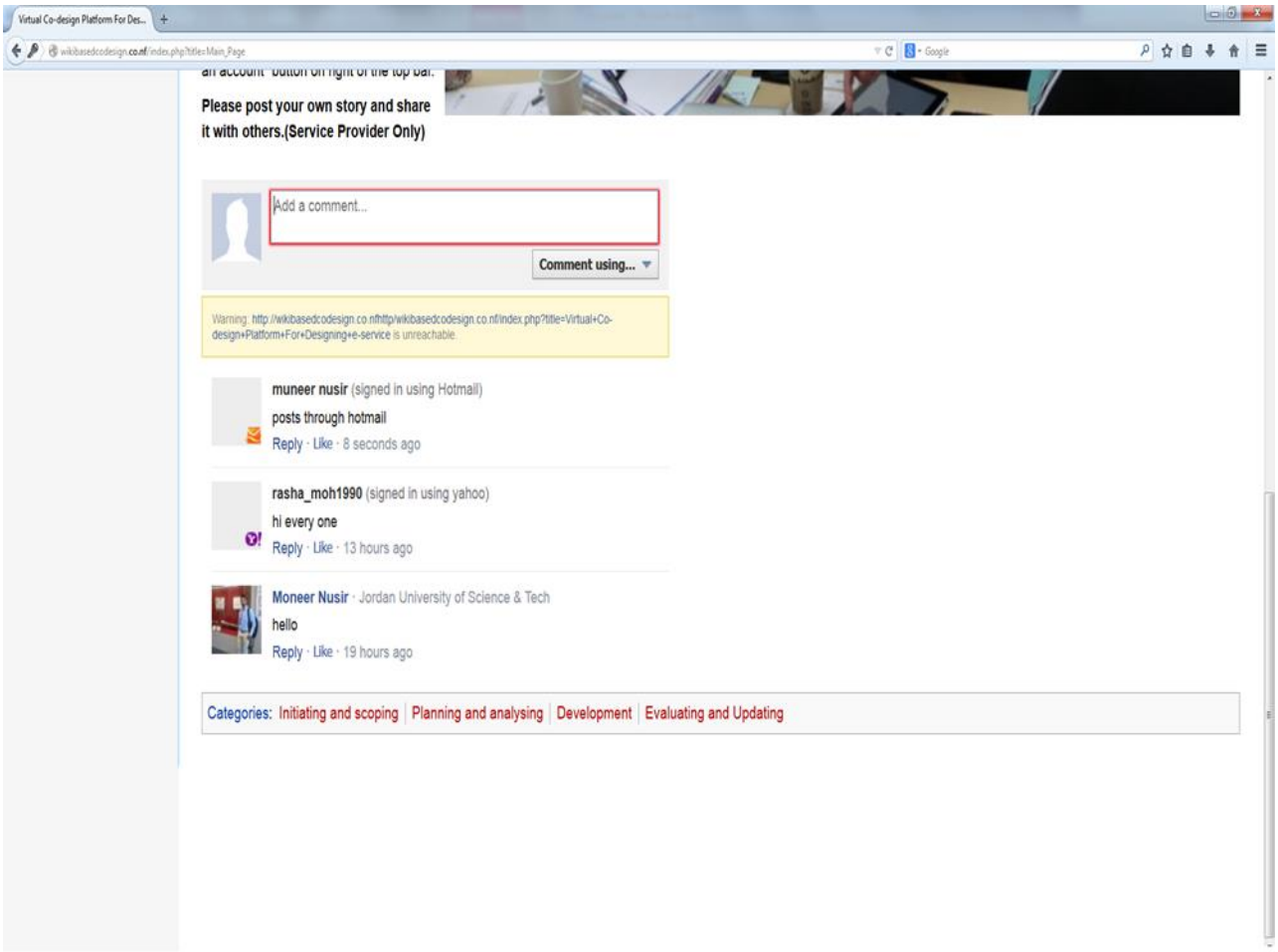


Figure 10: Example shows various social media networks used among participants during the communication between each other.

Appendix O-Citation Results

Service initiating and scoping-Discover Phase

	Service design tools/methods			
Requirements	User Journey mapping	User diaries	Service safari	User shadowing
Service user perspectives	4	17	2	9
Questionnaires/survey	22	164	40	702
Citizens opinions	2	22	4	13
Service user requirements	0	6	2	47
Service scoping	10	62	1	103
Service studying	21	417	9	201
User needs	7	52	3	46

Citation Analysis based on frequency of mentions: co-design tools Vs requirements overall groups.

Service planning and analysing-Define Phase

	Service design tools/methods			
Requirements	User Personas	Brainstorming	Design Brief	*Cluster and vote
service planning	2	19	143	0
Service utilisation/employment	1	3	92	0
Income process	1	1	13	0
Service managed and organised	11	11	16	1
Initial service design template	0	4	82	1
Design approval/agree	5	21	497	1
Service related to citizens	40	25	184	2
Service selection/choice	9	13	162	1
Service specified/identified	13	45	292	4
Problem solving	15	129	535	27
Service concerned/requested	8	33	414	4
service analysing/investigating	25	57	461	5

Citation Analysis based on frequency of mentions: co-design tools Vs requirements regarding service providers and service users.

* Design tools used in Define and Develop phases

Service development and deployment-Develop phase

	Service design tools/methods							
Requirements	Role Playing	Experience Prototyping	Business Model Canvas	*Service Blueprinting	*Story Board	*Touch point matrix	**Cluster and Vote	**Scenario
Service testing	1604	143	0	30	2	0	5	1786
Service implementation	5171	487	0	86	2	0	1	3355
Service design template	4244	387	1	20	8	0	4	5358
Service usable	320	73	0	0	1	0	0	501
service activated/existed	1250	35	0	2	2	0	1	876
Service closing phase	24	4	0	0	0	0	0	29
Service procurement	156	10	0	5	0	0	0	194
Service prototyped/ mock-up	702	799	0	20	1	0	2	1541

Citation Analysis based on frequency of mentions: co-design tools Vs requirements overall groups.

*Design tools used in develop and deliver phases

**Design tools used in define and develop phases but (scenario) not strongly recommended in define phase.

Service evaluation and updating-Deliver phase

	Service design tools/methods			
Requirements	Scenario	*Service Blueprinting	*Story Board	*Touch point matrix
Service assessment	1878	51	2	0
Service evaluation	3776	66	2	0
Service feedback	1283	47	4	0
Service updating	3379	82	6	0

Citation Analysis based on frequency of mentions: co-design tools Vs requirements overall groups.

*Design tools used in develop and deliver phases.