USERS' INTENTION TO CONTINUE USING REDESIGNED INFORMATION SYSTEM

REDESIGN EXPLORATION AND CASE STUDY OF A WEB-BASED PLATFORM

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MASTERS IN HUMAN COMPUTER INTERACTION

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AUTHOR'S DECLARATION

I hereby declare that thesis “Users' Intention to Continue Using Redesigned Information System. Redesign Exploration and Case Study of a Web-Based Platform” concerned is the result of my independent research and it has not been previously submitted for a defence.

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This thesis studies user's intention to continue using information system (IS) after its redesign. Today's business demands force information system (IS) to change rapidly. IS owners are forced to redesign their information systems to meet new specifications.

The existing research covers two main perspectives - the designer perspective and the user perspective to redesign projects. From the designer's point of view, there is limited information on user's reaction on the redesign. For Information Technology (IT) business owners this can enhance the risk of losing customers. A redesigned information system (IS) continuance model is proposed to evaluate user's intention to continue using information system (IS) after its redesign.

This model integrates the IS continuance model and takes into consideration additional construct - "comfort with change" and an external variable - "experience". This model is validated using a survey design. A literature review and interviews with redesign project stakeholders complemented this research. Results present similarities of successful redesign implementation from literature and knowledge from the field. Seven hypothesis of the empirical research were proposed, five of them supported by data. Finally, implications of the study propose recommendations for redesign implementation making this work noteworthy to designers.

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ABSTRACT

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The existing research covers two main perspectives - the designer perspective and the user perspective to redesign projects. From the designer's point of view, there is limited information on user's reaction on the redesign. For Information Technology (IT) business owners this can enhance the risk of losing customers. A redesigned information system (IS) continuance model is proposed to evaluate user's intention to continue using information system (IS) after its redesign.

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KOKKUVÕTE

Magistritöös uuritakse kasutajate valmidust ja motivatsioone infosüsteemide kasutamise jätkamiseks peale süsteemide ümberdisainimist.

Tänased ärinõuded sunnivad infosüsteemidele peale tihedaid ja järske muudatusi. Infosüsteemide omanikel on vaja süsteeme pidevalt ümber disainida, et uutele ärinõuetele vastata.

Olemasolevad uurimused keskenduvad süsteemi disaneri ja süsteemi kasutaja perspektiivile ümberdisainimisprojektide suhtes. Disainerite peamine probleem seisneb täna selles, et kasutajate tagasisidet ümberdisainitud süsteemide kohta on vähe. Sellest tulenevalt on infosüsteemide omanikel kõrge risk peale süsteemi ümberdisaini kasutajaid kaotada.

Selleks, et hinnata kasutajate valmidust ja motivatsioone infosüsteemide kasutamise jätkamiseks peale süsteemi ümberdisaini, pakutakse käesolevas töös välja hindamismudel.

Magistritöö raames välja töötatud mudel võtab infosüsteemi kasutamise jätkamise mudeli juures arvesse aspekte nagu "muudatusega harjumine" ja "eelnev kogemus". Mudelit valideeriti uurimistöö raames küsitluse, huvipoolte (stakeholder) intervjuude ning kirjanduse ülevaatega.

Uurimistöö tulemusel saab väita, et akadeemilisest kirjandusest ammutatud teoreetiline teadmine edukate ümberdisaini projektide kohta sarnaneb mitmetes aspektides praktiliste teadmistega, mida kasutatakse IT sektoris. Töös esitati seitse hüpoteesi, neist viiele leiti empiiriliste uuringu käigus kinnitus. Uurimistöö tulemusel pakutakse välja juhtnöörid disaineritele infosüsteemide ümberdisainimiseks.

1. INTRODUCTION

Today's rapid business environment constantly changes requirements towards technology and digital products, creating demands for software updates and fast development (Hong, Thong, Chasalow, & Dhillon, 2011). Digital product owners, designers and developers must adjust to clients' needs and update information systems in order to meet these new specifications. Adaptation of a technical system in order to meet new specifications is the definition of redesign (Eldonk, Alberts, Bakker, Dikker, & Wognum, 1996). Existing literature describes its project management (Eldonk et al., 1996) aspects or development phases of redesign (Chou, 2002). Prior studies are mainly focusing on design owner's point of view and pay little attention to user response of redesign. Davis et al. (1989) theory-based research on information system (IS) acceptance describes the user side of technology acceptance in case of a first time use of IS, but not after a redesign. Bhattacherjee's (2001) Post-acceptance Model of IS Continuance, describes user's intention of IS usage in long term. More attention needs to be given to user responses of redesign. Thus, this particular study aims to explore user's response to cases of IS redesign.

In particular, it aims to explore user response to changes, intentions to use redesigned IS and successful redesign implementation strategies. In order to fulfill the aims of the study, an exploratory study was conducted, existing literature was reviewed, interviews were performed to validate theoretical findings, and a redesign assessment model was proposed.

Following chapters will describe the research problem and its significance, then it presents the research goal, followed by research procedure description.

1.1 RESEARCH PROBLEM AND SIGNIFICANCE

This chapter explains the problem of the research and its significance.

As information systems are perceived differently by stakeholders and users (Hong et al., 2011), it is important to study users' response to redesign as redesign acceptance at user level is crucial to the survival of many business-to-consumer digital products (Bhattacherjee, 2001). If redesigned IS is not being accepted from users and redesign is not being adopted, then benefits

of conducting redesign is greatly compromised, as it is a risk factor for stakeholders. According to Parthasarathy and Bhattacherjee (1998), acquiring new customer's costs is five times more than retaining existing customers.

Success of redesign can be defined from stakeholder's perspective and from user's perspective, but the problem is that both sides have their own expectations toward IS. This problem is called Double dream phenomenon (Desouza, 2007), which is the reason behind why an end product incorporates only part of the expectations.

This study aims to provide answers for researchers and practitioners as it helps to assess redesign and understand user aspect of changes that designers put users into.

1.2 Research Goal and Motivation

The goal of this particular research is to explore existing literature and learn what is known about redesign from user's perspective, what are the reasons why redesign might not be accepted and why it is often resisted. The study seeks to define successful redesign implementation strategies. In addition to theoretical findings, this study aims to validate those with practitioners from the industry. After information on redesign acceptance is gathered, this research also aims to propose a redesign assessment model that facilitates the understanding of user's intention to continue using IS after its redesign. The proposed model will be evaluated using a recently redesigned web-based platform, called Infogram as a case study. Desirable outcomes of the research are design recommendations to redesign implementation.

1.3 Research Procedure

In order to fulfill the goals of this study, a four tier research procedure was designed. The research started with a literature review. At first, existing theoretical foundations on "Redesign", "Resistance to change", "User Acceptance" were examined, followed by an in-depth review of the most valuable concepts. The findings of theoretical research allowed to propose the redesign assessment model named "*Redesigned Information systems continuance model*". The new model was based on IS Continuance Model (Bhattacherjee, 2001) and additional Comfort with Change (Trocchia & Janda, 2000) construct. In addition, user

Experience using IS has been added as external variable, as it is in Theory of Planned Behaviour (Ajzen, I., 1991).'

Those constructs include acceptance of IS measured by Perceived usefulness, Confirmation and Satisfaction constructs. Post-acceptance is measured by IS Continence intention construct. In addition to constructs supported by IS Continuance Model (Bhattacherjee, 2001), Comfort with Change (Trocchia & Janda, 2000) construct is integrated. The data for experience variable was collected by tracking user's account registration date.

Phases	**Research objective**	**Research question**	**Method**
Phase 1	Study the change concept.	What is known in existing literature about resistance to change and adaptation of changes?	Literature review
	Describe change management approaches.	What can be applied to redesign of information systems?	
	Define redesign	What is definition of redesign?	
	Study acceptance and post-acceptance theories	What preconditions of Information Systems (IS) redesign acceptance	
	Formulate aspects influencing user's intention to continue using information system after its redesign.	What are preconditions for redesign to be accepted?	Literature review, interviews

Phase 2	Detect challenges in redesign projects	What problems designers encounter when running a redesign projects?	Interviews
	Define successful redesign implementation approaches	How to implement redesign successfully?	
	Validate theoretical findings with practitioners	How designers rate constructs of proposed redesigned IS continuance model?	
Phase 3	Create draft of redesign assessment model	What constructs should be measured in order to assess redesigned IS?	Case study
	Validate draft of the redesign assessment model	How users of the redesigned IS respond to constructs of the model?	
Phase 4	Propose design recommendations for successful redesign implementation	What are successful redesign implementation preconditions?	Analysis of the exploratory research

Figure 1 - Research procedure, objectives and research questions

Issues associated with redesign projects and implementation strategies were inferred from interviews with designers and project stakeholders. Based on those constructs of the redesign assessment model, a user survey was conducted. Aim was to validate the model with users of the recently redesigned web based software called *Infogram*. After the literature, expert interviews and the survey data was collected, design recommendations for designers were proposed. The table below provides a brief overview of described research procedure.

1.4 THESIS OVERVIEW

The thesis is divided into four chapters. The Introduction chapter, the Theoretical background, the Redesign exploration study chapter and the Conclusions.

The Introduction chapter, focuses on the introduction and the research goal and significance. It also describes the research problem, research question and its objective. Further chapter outlines the theoretical background and provides a comprehensive literature review.

This chapter is followed by the Redesign exploration study chapter, which provides the data collection method. Within the Redesign exploration study, the research problem and strategy is explained, including the overall study procedure. Here the focus is on the description of Exploration study and presenting as well as discussion of the results: Literature review, Interviews, Survey.

The final section is the Conclusions, which addresses the overall discussion, drafting some preliminary design recommendations and discusses future work.

The List of references, and Appendixes are provided in the end of the thesis.

2. THEORETICAL BACKGROUND

In the existing web design theory, topics related to redesign, are viewed from the stakeholders perspective as redesign management. This is in contract with information technology (IT) literature, which describes user perspective in theories and models related to Information System (IS) acceptance, or post-adoption, continuance (Venkatesh, et. al., 2003). This particular study seeks to explore redesign from user perspective, looking at resistance to change and acceptance of redesign after a user has gone through first-time use of the service and is forced to re-adapt to IS after it has been redesigned. In order to explore the aspect of redesign management and resistance to redesign, theories from social psychology and organizational management are being integrated, e.g. The Kurt Lewin of Change Management (Burnes, 2004) and Managing the Human Side of Change (Kanter, 1985).

Following chapters describe definition of redesign, (see section 2.1), classification of redesign (see sub-chapter), discuss user acceptance of changing IS from Agile IS perspective (2.1.2.), and describes redesign management (2.1.3.). Redesign is being perceived as change in chapter 2.2, looking at concepts Comfort with change and resistance to change. Chapter 2.3. describes IS Continuance Model and its constructs (2.2.2 Satisfaction, 2.2.3. Perceived usefulness, 2.2.4. Confirmation), which is the base model of particular study. Users' experience using IS is described in chapter 2.4.

At the end of every chapter, definitions and concepts relevant for particular research were defined to frame particular study.

2.1 DEFINITION OF REDESIGN

This section defines what is meant by redesign. It starts by eliciting major redesign definitions and continues by describing the levels of redesign, presents the redesign agile development methods, and finally gives an overview of redesign management approaches.

According to Eldonk et al. (1996), redesign is adaptation of a technical system in order to meet new specifications. Redesign contains two subtasks: (1) diagnosis of problems of old design and (2) respecification of new design. By the reuse of existing knowledge, techniques or

methods, it is possible to achieve a new design with much less effort than by means of design from scratch.

According to the author, redesign can result in a major cost reduction (Eldonk et al., 1996).

Types of the Redesign

Based on different characteristics of IS, redesign can be classified into several types. The examined literature indicates a classification based on scope of redesign (Eldonk et al., 1996) and level of user's behaviour pattern disruption (Robertson, 1967).

There are different types of redesign, depending on the scope of redesign. Types vary in complexity of the adaptation. The different types of the redesign include:

Parametric redesign, holds the adaptation of the form-related variables in a component. The general functionality remains equal, except that a different instantiation is searched for.

Component redesign. This type occurs when one component in the design is replaced by another component with a different behaviour.

Structure redesign. The third type deals with the altering of the structure: the addition, deletion or movement of components within the design.

Robertson (1967) classifies changes in the products based on level of human-behaviour pattern disruption:

Continuous Innovation

Has the lowest disrupting influence on established user patterns. New product is being altered, not established as new product. Example: ordinary toothpaste and alter fluoride toothpaste.

Dynamically Continuous Innovation

Has bigger disrupting effect than a continuous innovation. Although it does not change behavior patterns of the user, it involves the creation of a new product or the transformation of an existing product. Example: analog toothbrush and evolved electric toothbrush.

Discontinuous Innovation

Introduces new products, which establish new behavior patterns. Example: introducing television.

In this study redesign is being defined as any change of environment around information system that user meets while using it. Changes might affect user interface, functionality and features or business side of a digital product. In terms of redesign complexity, redesign in particular study is defined as dynamically continuous innovation (Robertson, 1967), which includes some changes of the product, but do not involve dramatic changes in users' behaviour pattern. The study by Eldonk et al. (1996) covers all redesign levels: parametric, component and structural.

2.1.1 Redesign and Agile Information Systems

Agile information system (IS) development methods refer to a collection of principles and techniques that emphasize early and continuous delivery of valuable software while embracing constant changes in users' requirements (Hong, W., Thong, J., Chasalow, L., Dhillon, G., 2011). Users of agile IS never get a finished system with full set of features because features get introduced periodically based on release cycles. Typical characteristics of agile IS are floating and adaptive user requirements, short development cycles, gradual implementation of valuable features release to release. Agile information system (IS) is, for example, iPhone applications, web-based systems, software as a services.

Agile IS and any redesigned information system are similar in a sense of user perspective - user is forced to experience changes in his system usage lifetime, no matter if it is frequent as in case of Agile IS or infrequent as in case of non-agile IS. Adoption to Agile IS according to Hong et al. (2011) requires some preconditions as adoption of innovation or acceptance of IS.

This study examines agile IS literature and finds it relevant for particular study for two reasons: first, many agile IS management methods (Desouza, 2007) focus and describe user side of changing environments. Second, empirical study of this research studies redesigned web-based system, which is developed with SCRUM agile method. Requirements for redesign and agile IS have similar origins - it is driven by rapid online business domain (Desouza, 2007).

2.1.2 Redesign Management

Redesign can be viewed as a design of a new product reusing old version of the design (Eldonk et al., 1996). Therefore, all known design approaches can be applied in conducting redesign projects. The subchapters below describe few design approaches that can be referred to as redesign.

According to Eldonk et al. (1996) the redesign process consists of specification phase, where input consists of old design description and new specification. The output is a new design description. Redesign there is a subtask of the whole design. The first phase of redesign is concerned with the determination of a new specification for a part or component of the old design. A design solution for this newly derived specification has to be found. This can be accomplished by various methods: synthesis ('design from scratch'), case-based design, redesign, design by a human user.

Redesign and design projects are managed quite similarly, having a research, design, testing, development and implementation phases as any other design project. According to a case study on the redesign of a large and complex website, (Chou, 2002) redesign consists of extended research part and the following phases of redesign:

Research and Analysis

Design decisions are influenced by organizations' strategic goals, expertise of employees, past history of the project, assets and infrastructure. Thus, these components should be studied thoroughly in the beginning of the project.

Users of the IS should be studied as well. Creation of profiles, or so called user personas is useful to communicate with the target audience of the website.

Tasks of the website should be created. And content of the website should be revised before design phase begins.

Design

(Chou, 2002) suggests to gather stakeholder opinions about good examples of website designs.

It is important to understand theoretical concepts and reasoning behind previous design solutions of the website. Organizational structure and website schemes need a revision too.

Important part of the redesign process is definition of labels and terms used in IS. Navigation of the website should be designed respecting a predetermined set of paths to help users find their way through the site.

When initial research is done, research results should be reflected in a prototype. Prototyping phase is followed by testing.

Development

Development phase should be done after the final prototype and design have been assessed and accepted by stakeholders, which ensures that all usability standards are met.

Implementation

Redesign can be implemented at once or gradually in several runs.

2.2 REDESIGN AS CHANGE

This chapter explores change and change management from organizational domain in order to determine if redesign can be perceived as change and whether change management approaches can be applied to redesign.

There are two types of change theories according to (Beer M. & Nohria N., 2000):

Theory E change strategies usually involve heavy use of economic incentives, drastic layoffs, downsizing, and restructuring. Shareholder value is the measure of corporate success.

Theory O change strategies are geared toward building up the corporate culture: employee behaviors, attitudes, capabilities, and commitment. The organization's ability to learn from its experiences is a legitimate yardstick of corporate success.

These two theories combined bring value in the sense of an economic value (hard side) and organizational capability (soft side - like an organizational culture). Leadership in this case means that directions and initiative to change comes from top levels, and people below were engaged by planning incentives to reinforce the change, but not letting incentives to drive the change (Beer M. & Nohria N., 2000).

Although some users of the web application, which had been studied in particular research, have influenced the redesigned outcome with their feedback and requests, though they have not participated in the implementation of changes. Therefore, it can be considered as Theory E change type of change where economic benefits is the pivotal driver of redesign.

2.2.1 Comfort with Change

Comfort is an important determinant in the formation of attitude in a dynamic adoption context according to Hong et al. (2011). As redesign forces users to adopt to unfamiliar environment, it might affect comfort level of the user. In social psychology literature comfort means feeling "at ease" and "calm", which is believed to be a positive effect on human well-being and satisfaction according to Daniels (2000). The reason for motivational problems of changes or disruption of state of "at ease" is the relearning process, which is slower than the initial learning process of first-time experience (Coch, French, 1948).

Study performed by Trocchia, & Janda (2000) indicates that elderly people with higher level of comfort with change were more likely to accept Internet technology.

In a context of redesigned IS, the user is forced to face change of familiar system and the more comfortable user feels about changes per se, the more likely redesigned IS will be accepted.

2.2.2 Resistance to Change

Resistance to change is another issue to address when redesigning. About 70% of all change initiatives fail according to Beer & Nohria (2000). Social Psychology studies suggest that humans resist changing because it requires more work in short term and because of uncertainty in the process of adoption to change (Kanter, 1985).

According to a study developed by Hong et.al. (2011), there are two main reasons why people prefer no change and no action. First, transition cost can make switching from the status quo or performing new actions costly. Second, even when there is no explicit cost associated with the change, uncertainty itself can lead people to status quo inertia.

2.2.3 Change Management

One of the change management approaches suggests using Kotter's 8-step process for implementing changes (Lunenburg, 2001). The implementation of change should start with: (1) establishing a sense of urgency, meaning of creating a reason why change is needed, (2) creating the guiding coalition, meaning creating group of people who lead the changes, (3) developing a vision and strategy, (4) empowering broad-based action by eliminating barriers of change, (5) generating short-term milestones and rewards, (6) establishing gains and guiding to the need for further changes while attracting more people into the process of change, (7) anchoring changes in the culture of the organization by connecting new behaviours with successes of the organization.

Particular study perceives redesign as change and aims to empirically validate change management approaches in design domain.

2.3 INFORMATION SYSTEM CONTINUANCE MODEL

This section describes Information System Continuance Model (Bhattacherjee, 2001), which explains an IS user's intention to continue using information system. Results of Bhattacherjee (2001) study support the claim that satisfaction with IS use is the strongest predictor of users' continuance intention. Perceived usefulness is described as a significant but weaker predictor

to intention-behavior association. Both satisfaction and perceived usefulness have a positive impact to confirmation if user's expectations about the IS have been met (Figure 2).

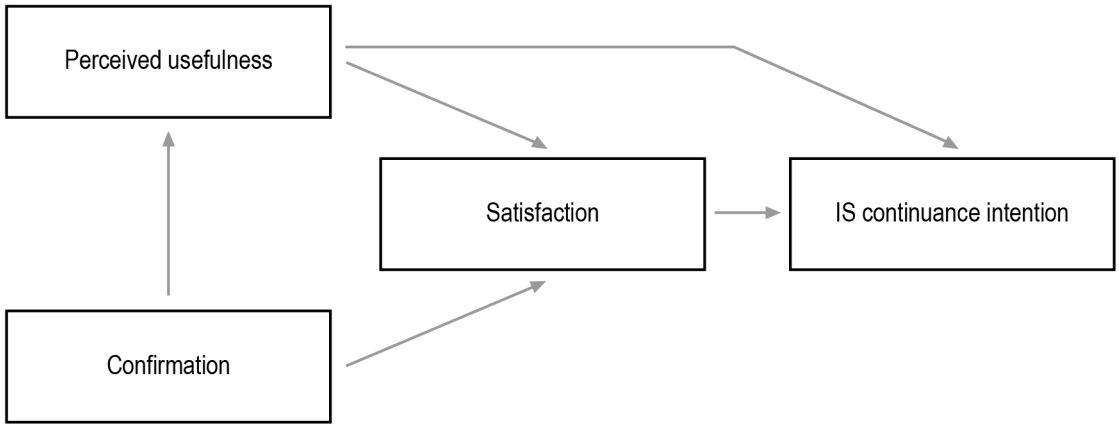

Figure 2 - IS Continuance Model (Bhattacherjee, 2001)

IS Continuance Model (Bhattacherjee, 2001) is based on expectation-confirmation theory and framework (Oliver, 1980) used in marketing and psychology literature, which describes the process of consumer's transition from initial expectation of a product or service prior to repurchase intention. Similar to System Continuance Model, first, consumers form expectation about the product. Second, consumers accept and use product, then after a period of consumption, they form a perception about the performance, and the assessment forms a determinant to what extent their expectation has been confirmed. Fourth, depending on the confirmation level, follows a satisfaction, which leads to repurchase intention.

Particular study examines IS Continuance Model (Bhattacherjee, 2001) in context of redesigned IS, by observing the same constructs: perceived usefulness of redesigned IS, confirmation of redesigned IS performance, satisfaction with redesigned IS and following intention to continuous usage of redesigned IS.

2.3.1 Satisfaction

Satisfaction construct in the consumption context is defined as “the summary psychological state when the emotion surrounding disconfirmed expectations is coupled with the consumer's prior feelings about the consumption experience” (Oliver, 1980). Satisfaction is proven to be an important factor in the formation of intention to continuous use of IS (Bhattacherjee, 2001)

as well as in the expectation-confirmation theory (Oliver, 1980). Satisfaction is believed to influence attitude change and purchase intention. From study, it is proven that satisfaction can be seen as a function of the expectation (adaptation) level and the perceptions of disconfirmation (Oliver, 1980). Satisfaction can be defined as affective consumer condition that results from a global evaluation of all the aspects that make up the consumer relationship (Flavián, C., Guinalíu, M., Gurrea, R., 2005).

From IS Continuance Model (Bhattacherjee, 2001) it can be concluded that, user who is satisfied with the IS itself will be more likely to develop intention to continuous use of the IS and thus accept the redesign. Website design (here redesign), greatly influences satisfaction of internet consumer as stated by (Lohse, G.L. & Spiller P.,1998).

In case of particular study, satisfaction with redesign derives from previous experience with IS. Satisfaction is generated with two constructs: expectation of the IS performance (perceived usefulness) and confirmation of expectation following actual use. Perceived usefulness and confirmation constructs are described below.

2.3.2 Perceived Usefulness

Perceived usefulness (PU) as a construct is believed to be important determinant in prediction of user's intention to use IS (Venkatesh et al., 2003). In most used information adoption models perceived usefulness is associated with first-time IS use, where perception of IS is generated when user has lack of experience with IS. In IS continuance model (Bhattacherjee, 2001) perceived usefulness is associated with some experience with IS as consumer's expectation is based on the opinions of others or information gathered from mass media.

In particular research, user has accepted the IS from past experience, but now has encountered redesign and must perceive usefulness of redesign. Thus, PU is defined as adapted IS and expectation towards IS changes - usefulness of redesign.

2.3.3 Confirmation

PU and Confirmation is positively related to satisfaction with IS as it indicates the benefits of a system which forms further intention to use the IS (Bhattacherjee, 2001). Confirmation is assessed against a baseline expectation, which is perceived usefulness of IS.

In particular study, acceptance of IS, followed by expectations towards redesign and confirmation usefulness of redesign form a satisfaction of redesigned IS which form satisfaction with IS in general.

2.4 EXPERIENCE USING INFORMATION SYSTEM

From a Theory of Planned Behaviour Ajzen, (1991) empirically proved that Experience is one of the background factors that forms users' behavioral, normative and control beliefs towards decision making. Between the subjective norm and behavioral intention, a higher level of experience moderates importance of subjective norm, thus increasing likelihood of behaviour intention formation.

According to Taylor & Todd (1995), experience affects behavior formation as factors like perceived usefulness, attitude towards behaviour control, and perceived behavioral control were more important with higher levels of experience, but subjective norm became less notable.

Interestingly, resistance to change varies depending on experience level of participant. A study done by Coch, & French (1948) in sewing plants of textile factory where individual worker pay system was changed in order to improve production results showed that learning and adoption period for experienced operators was longer than for new operators. However, when assessing transfer of a new job experienced operators rated efficiency of changes higher than new users.

In the particular research, experience of users can be compared between old users and new users where experience is perceived as past experience using IS.

3. REDESIGN EXPLORATION STUDY

The following chapter contains information about an exploratory study. This study aims to understand factors influencing user's intention to continue using IS after its redesign and preconditions of redesign acceptance.

3.1 RESEARCH METHODOLOGY

In order to research user acceptance of redesigned IS, the impact of redesign from different points of views were examined. Initially a literature analysis was performed to find out what were the major redesigned concepts and indicators. This was done by reviewing the literature including redesign topics from social psychological, marketing, information system points of view. This analysis led to formulation of the research scope and drafting of the main research question. In order to explore in-depth insights, different stakeholders of redesign projects were also interviewed.

Findings, gathered from theoretical and empirical research, resulted in a proposed model named "*Redesigned Information Systems Continuance*". The new model was integrated from IS Continuance Model (Bhattacherjee, 2001) and Comfort with Change (Trocchia & Janda, 2000) construct. In addition, user Experience Using IS has been added as external variable, from Theory of Planned Behaviour (Ajzen, I., 1991). The final research step was to empirically validate this theoretical model using a field survey. The survey contained items associated with constructs of integrated model. The survey was distributed among users of recently redesigned web-based software, called "*Infogram*".

3.2 RESEARCH PROCEDURE

This research study procedure contains two main parts: an initial theoretical approach, which includes a literature review and an empirical approach.

Part one:

The theoretical approach aimed to understand what the preconditions are of IS redesign acceptance.

The first part of the research included an initial literature scoping study on the following subjects: user acceptance from IT literature, change and human resistance to change in social psychology literature, redesign management. Also, subjects from the marketing and design theory literature were included in this literature scoping, see section 3.2.1. Then the results of literature review were summarized and visualized in a concept map, see Appendix 1 for more information.

To narrow the scope of the research, a few concepts were further delineated and researched in more detail. This procedure aimed to look for definitions and resources related to redesign projects and user acceptance. The results of this research step (concept review) were organized in a table. This table contains concepts, definitions and literature references.

Part two:

Empirical approach aimed to validate the results of previous theoretical research.

In practice six semi-structured interviews were conducted with different redesign stakeholders. Interviews were summarized and key outcomes outlined. From results of the theoretical research the main determinants for user acceptance of redesign were defined and included in the recently redesigned service user survey, see section 3.3.4.

The following paragraphs provide description of Literature Review, Structured Interviews with redesign project stakeholders, Selection of Model, Constructs and Measurement Scales and the Survey.

3.2.1 Literature Review

To better understand what are the preconditions of IS redesign acceptance, theoretical research has been divided in three redesign topics, those included:

1. Redesign as change, term in social psychology and organizational management literature;

2. Redesign in User Acceptance and Information Technology literature;

3. Redesign management in design theory and marketing literature.

As referred before (see chapter two) results from this literature review, regardless of the industry describing redesign (or change) concept, focused on the behavior and reaction of user, client or consumer acceptance of the redesigned product. Expected conclusions of the literature review had to explain preconditions of successful redesign and the most effective implementation of the changes.

Using scoping studies approach proposed by Arksey H., O'Malley L. (2005) this literature review begun by proposing several research questions:

1. What is known in the existing literature about resistance to change and adaptation of changes?

2. What can be applied to redesign of IS?

3. What are the preconditions for redesign acceptance?

In order to answer the questions above, the selection was narrowed to a group of three search directions, those included: resistance to web site change, acceptance of redesign and redesign effect on user behavior (Figure 3).

A group of four initial search keywords was selected; those include: Resistance to Change; Redesign; User acceptance; Web design. These keywords were also used to review relevant studies on redesign approaches.

Articles were searched in the following domains: Social Psychology, Information Technology literature, Design Theory and Marketing. Findings and main search directions of the research were charted in a mind map containing concepts, keywords, and theoretical models associated with redesign, see Appendix 1.

Following the initial scoping study most relevant keywords were re-examined. This procedure aimed to redefine and narrow existing literature associated with these keywords. From this process a new set of keywords were identified: Resistance to change, Agile Information systems, Attitude, User Behavior, Redesign, IS Post-Adoption, IS Acceptance, IS Continuance,

Satisfaction, Experience. Those lead to the second phase of literature review. Repeatedly, this search was framed using the same above described research domains. Final results of this literature review process were summarized into a table, which summarizes terms definition, reference and includes comments of each keyword.

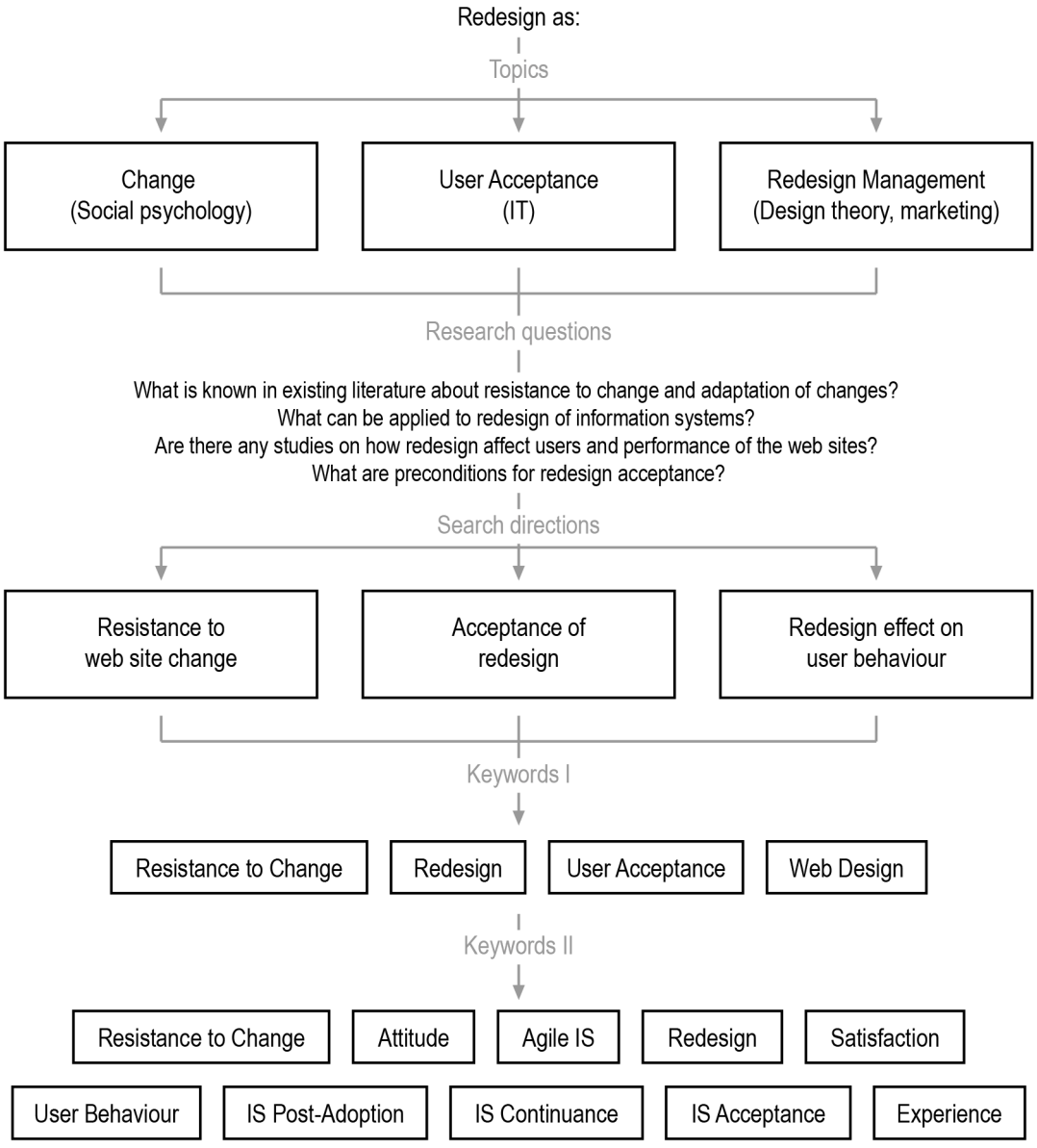

Figure 3 - Scoping study process

3.2.2 The Semi Structured Interviews

The literature review enabled a better understanding of the research topic, but information from the field was missing. In order to detect issues that stakeholders have in the process of redesign, six interviews with designers and project managers were conducted. A prerequisite for interviewee's selection was participation in a redesign project of any scope or any phase of it. Four interviews were face to face meetings and two were conducted via a Skype call.

Objectives and Interview Questions

The goal of the interviews was to get an understanding on the issues that occur in the process of redesign projects. It was also important to find out their opinion on the preconditions of IS redesign acceptance.

In addition to the main interview goals, the objective was also to validate the theoretical findings. The outline of the interview contained seven questions. However, during the conversations and depending on the background of the interviewee, additional questions were asked.

Objective	**Interview questions**
Understand what are the problems in redesign process: From stakeholders' perspective Stakeholder's view on problems from user perspective	From your experience, what problems might occur when running a redesign project?
	What in your opinion are the key factors for redesign acceptance from user perspective?
Identify solutions to redesign problems mentioned by stakeholders	How problems associated with redesign projects should be tackled?
	How do you measure success of a redesigned project?

Find out good redesign implementation practices	In your opinion, what are good/bad redesign implementation practices?
Validate IS continuance and change acceptance constructs, found in literature	How important (in a scale 1-10), in your opinion, are these factors in acceptance of redesign from user's perspective: Perceived Usefulness, Intention to continuous use of IS, Satisfaction, Confirmation Comfort with change

Figure 4 - Outline of the interview. Interview objectives and interview questions.

3.2.3 The Proposed Model, Hypothesis and Measurements

As referred before the main aim of this research is to study user's intention to continue using IS after its redesign.

The focus in particular was on the assessment of recently redesigned service after the last phase of its redesign. For stakeholders of the "*Infogram"*, redesign is beneficial to find out if the system is being accepted, what are the preconditions of successful redesign acceptance, and to recognize what is the most effective implementation of the changes. *Infogram* as a service requires repeated usage of the platform and long term retention of users.

Literature revealed that the Expectation-Confirmation Model of IS Continuance (Bhattacherjee 2001) could be the best construct for our empirical research of the study together with additional Comfort with Change (Trocchia & Janda, 2000) construct and Experience as external variable (Figure 5). From literature analysis, seven hypotheses were drafted in this study. Those are:

1. From the IS Continuance Model (Bhattacherjee, 2001) one can conclude that, a user who is satisfied with the IS itself will be more likely to develop intention to continuous use of IS and thus accept the redesign.

   H1 There is a positive effect between Satisfaction and user's intention to continue using the redesigned IS.

2. Perceived usefulness is defined as an adapted IS and expectation towards IS changes - usefulness of redesign.

   H2. There is a positive effect between Perceived usefulness and intention to continue using the redesigned IS.

3. In particular study acceptance of IS, followed by expectations towards redesign and confirmation usefulness of redesign form a satisfaction of redesigned IS which further form a satisfaction with the IS in general.

   H3. Confirmation has a positive effect on satisfaction.

4. Confirmation is assessed against a baseline expectation which is perceived as usefulness of IS.

   H4. Confirmation is positively associated with perceived usefulness of IS use.

5. According to Trocchia (2000) study, a higher level of comfort with change increases the likelihood that internet technology will be accepted. In the context of a redesigned IS the more comfortable user feels about changes per se, the more likely he will form intention to continuous use of IS.

   H5. There is a positive effect between Comfort with change and user's intention to continue using the redesigned IS.

6. Experiments indicate that experienced participants of change showed lower comfort with change as learning and adoption period was longer and they showed bigger resistance to change.

H6. There is a negative effect between Experience of use and comfort of change.

7. According to Taylor & Todd (1995), experience affects behavior formation, as perceived usefulness was more important with higher levels of experience.

H7. There is a positive effect between Experience of use and perceived usefulness

Acceptance of IS is measured by Perceived usefulness, Confirmation and Satisfaction constructs. Post-acceptance is measured by IS Continuance Model (Bhattacherjee, 2001). In addition to constructs supported by IS Continuance Model, Comfort with change construct is included to support hypothesis that Comfort with change has a positive effect on intention to continue using IS. Likewise, the user experience level, as an external variable extracted from user data, support the hypothesis that higher level of experience negatively affect comfort with change and positively affect Perceived usefulness of redesign.

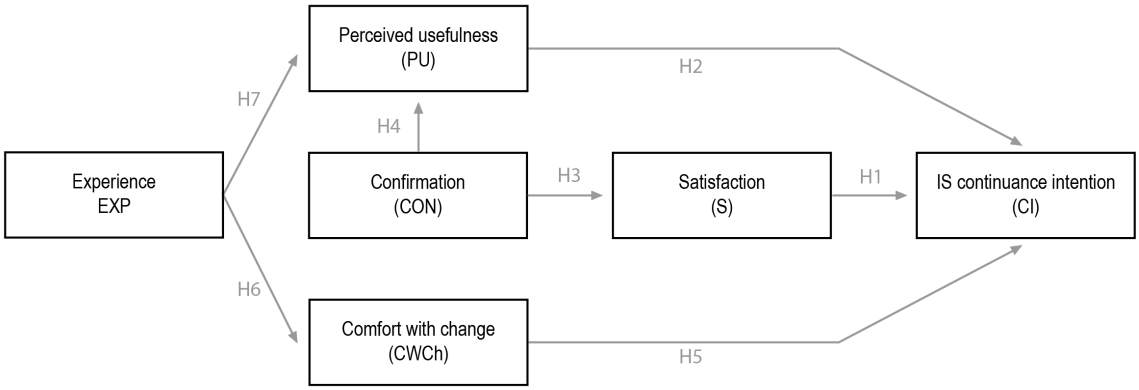

Figure 5 - Redesigned IS continuance research model

3.2.4 Survey - Redesign of *Infogram*, a Data Visualization Platform

Empirical data of the study was collected from the IS *Infogram* - a web browser-based data visualization platform. In order to collect data and validate integrated model of IS continuance a user survey was conducted. The data was collected a month after launch of the last phase of the web platform redesign.

There were three phases of *Infogram* redesign:

- first, brand and interface appearance introduction,
- second, layout changes of the main parts of the platform,
- third, layout changes of remaining parts and introduction of the new features.

The stakeholders had not yet assessed *Infogram* redesign implementations. Therefore, the company management team was interested in conducting a survey which could give them a better understanding of user satisfaction with the service after its redesign.

Users were informed about the launch of each redesign phase via email newsletters, blog posts and social media. Some new features had in-app notifications highlighting new parts of the interface and providing link to tutorials section of the service.

The *Infogram* redesign case was found suitable for this study as the service by nature requires repeated usage and long term retention of users. The system expects that users create multiple infographics or charts, as well as expose them to third party websites thus attracting new users, which is crucial for company's business. Subscription-based pricing model also shows *Infogram* creator's intention for continuous usage of the service.

Data Collection

Infogram users were invited to fill the survey in the email newsletter. An email invitation contained information about the survey. An incentive (a $200 Amazon gift card) was given to those who filled the survey.

The survey was built in an online survey application Typeform. Survey data was collected from: 18th March, 2016 until To: 28th March, 2016.

In addition to the responses on survey questions, user-given demographic data was collected. User IDs (emails) and IP addresses of respondents were collected automatically.

Sample

According to the company policy, paying customers shall not receive promotional materials nor newsletters against their will. Therefore, the survey got distributed among monthly active non-paying users from United States only. US customers are considered to be the main business and geographical focus for *Infogram*, as 45% of all users and 40% of paying customers are from United States. The company has 1,3 million registered users, approximately 10% of registered users are monthly active. Less than 1% of users are paying customers. A survey invitation email was sent to 9206 recipients. Excluding bounced emails, 7256 emails were delivered. Open rate of invitation email was 16.7% (1212 opened emails). 2.8% (202 recipients) clicked on the "Go to Survey" link. 126 responses were received. After removing incomplete data, 119 usable responses were left with completion rate of 71%. 51 survey was not completed.

Survey Design

The survey aimed to serve the needs of a particular research including the needs of *Infogram* management. Survey contained sixteen questions, five of them were composed based on integrated proposed model named "*Redesigned IS continuance research model*" (figure 6). Remaining eleven questions of the survey gathered information about background data like occupation and age of user, evaluation of pricing of the service, usage frequency, competitors etc. The survey contained four main parts, each focusing on different needs of *Infogram* management team:

1. focus on the platform use cases and occupation of users,
2. satisfaction with the service and business aspects of it,
3. evaluation of the features,
4. satisfaction with recent changes (redesign) in general.

As the survey was distributed among senior users and new users, who might experience only some changes during their service usage lifetime, it did not include evaluation of specific redesign elements, but focused on the service assessment, mentioning changes in general.

IS Continuance Model (Bhattacherjee, 2001) examines pre-acceptance and post-acceptance of IS by measuring four constructs. Acceptance of IS is measured by Perceived usefulness, Confirmation and Satisfaction constructs. Post-acceptance is measured by IS Continence intention construct. In addition to constructs supported by IS Continuance Model, Comfort with change construct (Trocchia, & Janda, 2000) is included to support hypothesis that Comfort with change has a positive effect on intention to continue using redesigned IS. In addition, user experience using IS has been added as an external variable, as it is in the Theory of Planned Behaviour (Ajzen, I., 1991).

Each construct had one corresponding item - survey questions available in a table below. All items, except for Satisfaction construct, were measured with five point Likert scale, which was adopted from (Bhattacherjee, 2001). Satisfaction construct was measured with 10-point NPS scale. In addition to 4 constructs of the IS Continuance Model (Bhattacherjee, 2001), a fifth model Comfort with Change (Trocchia, PJ., and Janda 2000) construct was integrated. "Experience" measure was taken, extracting user registration date from user account data. Registration data was converted into "days of experience" until survey filing date.

Construct	**Definition**	**Survey question**	**Measurement Scale**
Perceived usefulness			5pt Likert
PU	User's perception of the expected benefits of IS use	The advantages of *Infogram* outweigh the disadvantages	
Confirmation			5pt Likert
CON	User's perception of the congruence between expectation of IS use and its actual performance	*Infogram* met my expectations	

Satisfaction			10 point NPS score
SAT	User's affect (feelings with) with prior IS use	How likely would you recommend *Infogram* to a friend?	
Continuance Intention			5pt Likert
CI	User's intention to continue using IS	All things considered, I expect to continue using *Infogram* during the next four weeks.	
Comfort with change			5pt Likert
CWCH	User's ability to adopt	I feel comfortable with new features and interface updates of *Infogram*	

Figure 6 - Constructs, questions and measurement scale in the survey

3.2.5 Instrument Validation

The instrument was validated through a pilot test performed on two (2) subjects for the interview and three for the survey. Small modifications, mostly related to the formulation of questions, were made to make this procedure more comprehensible. E.g.: "What in your opinion are the key factors for redesign acceptance?" was changed to "What in your opinion are the key factors for redesign acceptance from user perspective?".

Some interviewees claimed that it is very difficult to understand academic terms that were used in question formulation, e.g. instead of using term "Information system", terms like "products, services, applications" were used.

Following sections will provide a more detailed overview of the result gathering process from this research. It starts by describing results from literature, then interviews and concludes with the survey.

3.3 RESULTS AND DATA ANALYSIS

In order to examine the causes influencing user's intention to continue using IS after its redesign and redesign acceptance, two literature review phases were conducted.

3.3.1 Literature Results

Firstly, literature reviews started with a scoping study of three chosen topics:

- redesign as change – a term in social psychology and organizational management literature,
- redesign in user acceptance and information technology literature; and
- redesign management in design theory and marketing literature.

Findings of the first phase were charted into a mind map (see Appendix 1).

Secondly, main keywords were inspected in more detail, describing concepts, definitions and relevant studies associated with these keywords. Findings were organized in a table.

In the first phase of literature analysis, 17 articles from psychology, marketing, and IS literature were reviewed. Initial findings allowed to map 5 topics describing redesign acceptance or changes per se. Findings were organized into "Web design", "User Acceptance", "Innovation", "Marketing", "Change" groups (Appendix 1).

The findings on Web design described redesign project management approaches (Eldonk et al., 1996, Ferreira, J. et al., 2005 and Chao-Yang, 2009) or redesign case studies (Felker & Chung, 2005 and Shelstad, 2005). In design theory literature, information on **redesign from project stakeholders' perspective** was comprehended.

One of the most relevant studies that was found during the initial literature review, was a study by Hong, W. et al., 2011 "User Acceptance of Agile Information Systems. A model and Empirical Test", as it looks at the **user side of agile IS acceptance.** A study by Hong, W. et al had a particular influence on the selection of constructs and theoretical background of this particular study. The research procedure of particular research used **intention to continuous use of IS as a success measure of accepted redesign** and it was formed from a study by Hong, W. et al., 2011, followed by integration of IS continuance: an expectation-confirmation model (Bhattacherjee, 2001).

Although agile IS and redesigned IS are somehow similar cases, particular study focuses on one-time changes that user experiences, instead of periodical changes that user experiences using agile IS.

Existing theories and models of User acceptance, like Technology acceptance model (TAM), Theory of Planned Behaviour (TBP) and Theory of Reasoned Action (TRA) were reviewed within a study by Venkatesh, (2003) "User Acceptance of Information Technology: Toward a Unified View". **Experience factor used in the model of particular research was included** from Theory of planned behavior (Morris & Venkatesh 2000).

Literature describing Innovation Acceptance proved to be related to redesign, as innovation and redesign causes **Status Quo Bias, uncertainty** and requires **transition cost** in process of adoption changes (Hong, W. et al., 2011).

Understanding on redesign classification was obtained from Eldonk et. al. (1996), where **redesign is classified based on scope of redesign**: as parametric redesign, component redesign and structure redesign. According to a study of Robertson, (1967) **innovations can be classified according to level of human-behaviour pattern disruption**: continuous innovation, dynamically continuous innovation, discontinuous innovation. Hence, redesign can be seen as continuous innovation, as it requires some behavior pattern disruption, but does not introduce completely new product to the user.

Customer loyalty, online loyalty and customer retention, keywords from marketing literature, were examined in order to find relation to **user's loyalty after redesign**. Use of **Satisfaction** and **Perceived usefulness** constructs were confirmed by Flavian, C. et al. (2005) study where

these constructs are applied, as in Bhattacherjee (2001) study of information systems continuance model.

Redesign can be seen as a change, which is described in organizational and management domain. **Resistance to change** can be perceived as "all forces which contribute to stability in personality or in social systems" (Dent, E.B. & Goldberg, S. G., 2013).

Second part of the literature review focused on in-depth research of selected keywords: Resistance to Change, Attitude, Agile Information System, Redesign, Satisfaction, User Behaviour, IS Post-Adoption, IS Continuance, and IS Acceptance. Basic concepts, definitions and theories associated to selected keywords were charted in a table (See Glossary chapter).

3.3.2 Literature Discussion

The existing literature of redesign describes redesign from designer's perspective, thus particular study seeks to explore redesign from user perspective, looking at resistance to change, acceptance of redesign and successful redesign implementation strategies.

As resistance to change is defined as one of the problems that designers and product owners encounter, this concept was examined in depth. Organizational literature studies resistance to change, change management and cognitive beliefs that form one's decision making or behavior.

Regarding change implementation strategies, a notable approach is the Kotter's 8-step process for implementing changes (Lunenburg, 2001). Findings from the change literature can be applied to redesign field as some change implementation strategies (Kotter's 8 step process) were mentioned by designers in the interviews.

Literature review helped to understand what are the redesign classification approaches and how redesign acceptance varies depending on the scope of redesign. According to Eldonk et al., (1996) redesign classifies depending on the complexity of the adaptation, but from the study of Robertson (1967), redesign as innovation can be classified based on the level of human-behavior pattern disruption.

Agile IS literature described user side of agile IS development that has a similar focus of particular research. However, agile IS and redesigned IS are not as similar. According to Hong et al. (2011) with time users of the agile IS tend to get used to new updates and in a case of an unsatisfactory release they blame the version of the system, and not the whole system per se. This is different from redesign, which usually is a one-time change of the IS, so users don't expect other version of the system.

According to organizational change management literature Hong et al., (2001), people resist change. There are two main reasons why people prefer no change and no action. First, transition cost can make switching from the status quo or performing new actions costly. Second, even when there is no explicit cost associated with the change, uncertainty itself can lead people to status quo inertia.

3.3.3 Interview Results

For the purpose of this study, six redesign project stakeholders were interviewed. Four of the interviewees were web designers that specialized on project redesign, and two participants were project managers. Types and scope of redesign projects in which participants took part were not discussed and specified. The focus of the interview was on issues, solutions and designers' perceptions about users' acceptance of redesign.

Observations show that, if an interviewer did not specify perspective from which the interviewee should answer (designer-client or designer-user relationships), then answers focused around designer-client relationships, instead of user perspective of redesign project. Freelance designers of small projects or print designers focused on designer-client communication, but project managers of large web projects had user perspective in mind.

There are some patterns found in answers of designers, especially when asked about problems designers face during redesign process. Findings from interviews, summarized and organized per question, are described below:

Problems When Running a Redesign Project

- **Attachment to the previous design**. It includes both, attachment to visual solutions and emotional aspects of *old design*. Affection to the current design or the system is observed among users and clients (other stakeholders). It was mentioned that a sub problem of the attachment to an existing design solution is the resistance to major changes of products or services.

- **Volatile scale** of the redesign project, uncertain and **changing specification**. Several designers mentioned this problem. Due to new incoming requests, which come along in the middle of the redesign project, sub issues of this problem are **floating deadlines** and thus **increased budgets** of the redesign projects.

- For large redesign projects it was mentioned that **maintaining consistency** of all parts of the system is challenging. Especially if implementation of redesign happens in phases.

- Several respondents admitted that it is crucial to understand which properties of old design should remain unmodified. If pre-redesign research part is done poorly, there is a risk to **lose well-functioning parts of the product** after redesign.

- One common problem is **updating all learning and visual materials, where old design appears**. It is time and resource consuming process, which is often forgotten by the project stakeholders.

Problem Solutions

- Consistency problem can be solved by, first, redesigning products on a larger scope- establishing patterns, then, breaking project into modules and redesigning separate functions or parts of the service.

- In order to overcome resistance to change, **benefits of redesign should be clearly communicated** among stakeholders and users of the product. It helps if redesign is explained and examples are given before launch of the redesign.

- Interviewees admitted that almost all problems can be predicted and circumvent by **proper planning** and good **project management**. E.g., problem of volatile scale of redesign projects and risk to lose well-functioning parts of the product, can be solved with:
    - user research
    - detailed planning of the project
    - well-designed and flexible budget for unplanned situations
    - prepared internal (organizational) and external (marketing) communication plan
    - extensive user testing and early feedback gathering.

Key Factors of Redesign Acceptance from User Perspective

- Interface consistency and maintenance of established user behavioral patterns.
- Use of existing web patterns (whenever possible) that are familiar to users.
- Well-designed implementation plan, especially in cases of major redesign.
- Clear communication of redesign benefits.
- Redesign that is based on user needs and feedback, not on stakeholder requirements, will be accepted better.

Measuring the Success of Redesigned Project

- Measurement of success of a redesign varies depending on a project. In principle, it is the improvement of **key performance indicators** (KPI) that are defined and established in the company.

- From designers' perspective, redesign is successful, if it is future-proof. If in a few months after the launch, there is no need to redesign the product again.

- Overall **feedback** of users and ratings (if measured) are positive.

- Redesign success measurements should be **set before** redesign as a part of research and planning phase.

- Feedback from **different channels** (marketing, social, face to face etc.) should be positive

- **Time spent on basic tasks** of the product or service should be shorter than before redesign.

Good/bad Redesign Implementation Practices

- Redesign should be implemented **gradually**, ideally seamlessly. Especially in case of large projects with extensive functionality.

- In order to implement **future-proof design solutions**, designer should be aware of product future plans. Clear product vision facilitates design process and redesign implementation planning.

- Changes **based on users' feedback** should be introduced first.

- A bad practice is to redesign a good working design with value.

- A good implementation is when there is a well-known, evaluated and communicated need for redesign that is strategically planned, implemented and communicated internally and externally and afterwards evaluated. A bad implementation is when parts of this process are missing.

Rating of Constructs

Interview participants were asked to rate importance (from 1 to 10 points) of given redesign acceptance constructs (Figure 7). Perceived usefulness (average rating 8.3 out of 10) of redesign was rated as the most important condition for acceptance of redesign, whereas comfort with change (7 out of 10) as the least important factor for redesign acceptance. Confirmation (7.8), satisfaction (7.8.) and Continuance intention (7.7) was rated miscellaneously, without clear definable pattern.

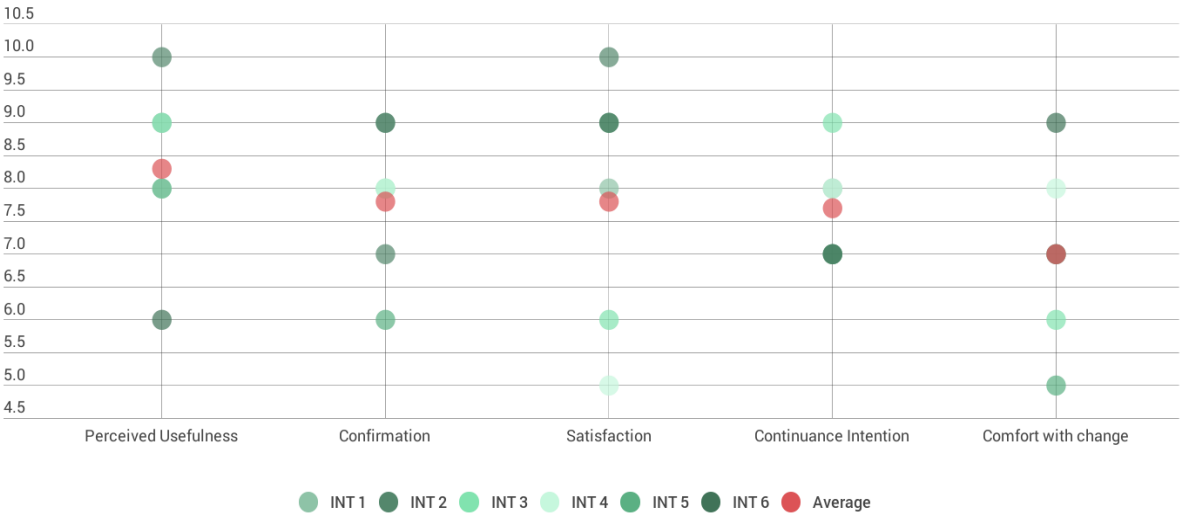

Figure 7 - Rating of constructs from Redesigned IS Continuance model

3.3.4 Interview Discussion

One of the first problems mentioned by designers and project managers, was the resistance to change followed by attachment to existing *old* design. It was suggested that the resistance to redesign can be eased with proper communication and clear reasoning of the need for a redesign. The benefits of a change should be communicated internally among stakeholders of a redesign project and externally with users of the system. Positive acceptance of redesign and early feedback can be gathered if changes are being communicated explicitly.

Planning phase of the redesign project was named as the most important factor to avoid issues like floating deadlines, unpredictable budget and changes of specification of the ongoing project.

Well conducted research prior to redesign helps to avoid situations when parts of the system that users liked got changed thus calling non-acceptance of redesign.

Regarding implementation of a redesign, gradual and seamless introduction of changes was suggested as being the best strategy for causing the least resistance. A key factor for redesign to be accepted is basing redesign on solving user-reported problems.

On average, all constructs of the Redesigned information system continence model were rated evenly; comfort with change (7 out of 10), confirmation (7.8), satisfaction (7.8.) and continuance intention (7.7), except for Perceived usefulness which was rated 8.3 out of 10.

3.3.5 Survey Results

Five of seven hypotheses associated to variables of "Redesigned IS Continuance" research model were supported by the data of the survey (Figure 8).

Infogram users who were more likely to recommend service to others by expressing satisfaction with it, showed higher intention to use IS in near future (correlation coefficient r=0.562, moderate positive, according to 0.3....0.7 Pearson's coefficient) which supports hypothesis 1. Relation of these constructs is positive in IS Continuance Model (Bhattacherjee, 2001) as well. Users who were satisfied with the IS itself were more likely to develop intention to continuous use of IS.

The second hypothesis was supported by data as well. The survey respondents who had positive past experience with *Infogram*, rated usefulness of the service higher and were more likely to use *Infogram* in near future (correlation coefficient r=0.562, moderate positive, according to 0.3....0.7 Pearson's coefficient).

As hypothesis 3 assumed, users who confirmed their expectation towards the service performance, were more likely to recommend IS to others and express satisfaction with it (correlation coefficient r=0.672, moderate positive, according to 0.3....0.7 Pearson's coefficient).

Perceived usefulness and Confirmation proved to be positively related (correlation coefficient r=0.531, moderate positive, according to 0.3....0.7 Pearson's coefficient) to satisfaction with IS as stated in the study by Bhattacherjee, (2001). Which supports proposed hypothesis 4.

According to hypothesis 5, comfort with change should be positively correlated with intention to use IS. Survey results showed that people with higher level of comfort with change were more likely to accept internet technology. Users of *Infogram* who felt more comfortable with redesign of *Infogram*, showed higher willingness to use IS in near future. This relation is in line with the results from comfort with change construct from a study by Trocchia, & Janda, 2000.

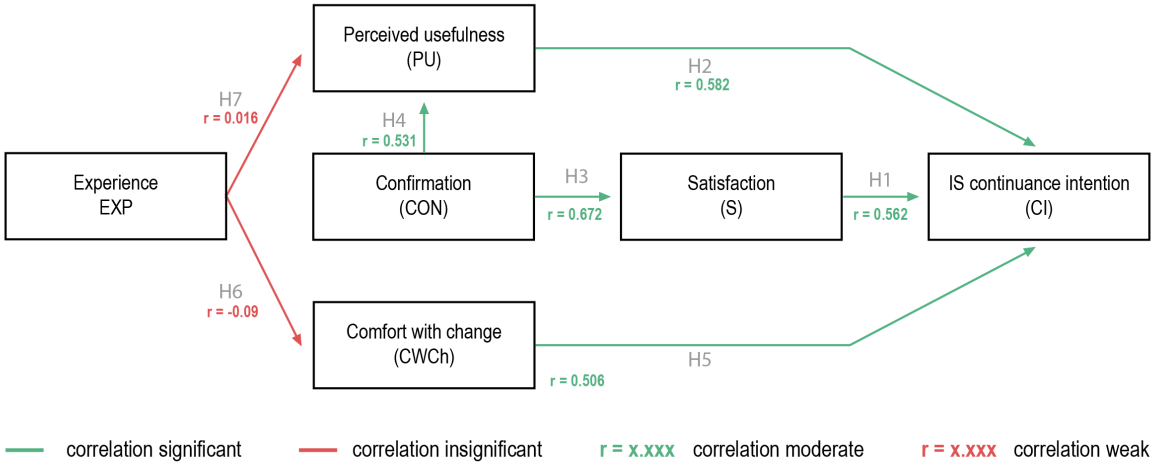

Figure 8- Analysis of Redesigned IS Continuance research model.

Although *Infogram* users with higher level of Experience were less comfortable with redesign of *Infogram*, this appeared to be weak and insignificant correlation between variables, thus hypothesis 5 has not been validated. According to Taylor & Todd (1995), experience affects behavior formation as perceived usefulness, were more important with higher levels of experience, but in case of *Infogram* relation between experience level and perceived usefulness was not validated. Therefore, hypothesis 6 was not supported by data as well.

3.3.6 Survey Discussion

Particular survey instrument suffers from several limitations. First, proposed redesign assessment model has been validated with web-based application's redesign. It would be

valuable to validate model in other cases than a web-based application redesign. Branding redesign, hardware or service design changes might show different results and importance of other cognitive beliefs influencing redesign acceptance.

Second, redesign in the particular case study included changes of visual aesthetics, layout of the interface, feature expansion and business aspects of the service. As the range of changes is so wide, it is difficult to distinguish, whether the user response is associated with interface redesign or service offering changes.

Third, according to survey data, the respondents of the survey did not support the experience variable. Insignificance of the experience variable could be explained with incorrectly taken measures of user's experience using IS. Only date of registration was taken into account, but in reality, experience is determinate by frequency of service use. Additional measures of experience variable could be the amount of infographics in the library.

Fourth, new users of the system and experienced users received the same survey. Survey focused on general redesign of the system, not mentioning specific functionality. Therefore, users who started to use the system later might struggle with evaluating all changes. Although introduction of the survey gave background information about the purpose of the research, some users might rate performance, satisfaction and usefulness of the whole service, not the recent changes.

Fifth, one of the study limitations is the fact that only user's self-reported evaluation of the system was taken into account. According to a study Chin, (1996), self-reported usage data is not so reliable in comparison to computer recorded usage data.

4. CONCLUSIONS

The goal of particular exploratory study was to identify the determinants of redesigned IS acceptance from user's perspective and learn what are the successful redesign implementation practices from designer's perspective.

Particular study made an initial step in examining redesign from user's perspective and proposing redesign assessment guidelines instrumental for designers who run redesign projects. This study brings IS acceptance, IS adoption, post-adoption and change management theories into a new context of redesign. Prior research focused on redesign from design owner's perspective and change, therefore filling the gap in the theory.

There are several findings from this study. First, the IS continuance model and comfort with change construct are suitable for integrating proposed Redesigned IS continuance model. The proposed model was supported by data. Relation between satisfaction and continuance intention (hypothesis H1), perceived usefulness and continuance intention (H2), confirmation and satisfaction (H3), confirmation and perceived usefulness (H4), comfort with change and continuance intention (H5) proved to be moderate predictors for formation of intention to use redesigned IS.

Second, the external variable - user's experience using IS, proved to be weakly correlated with formation of comfort with change (H6) and perceived usefulness (H7).

Third, the interview results showed that many redesign management practices, claimed by the experts in field, are in line with the IS post-adoption and change management literature. For example, the Kotter's 8-step process for implementing changes suggests to pay attention to communication when defining a need for change, while designers in interviews claim that marketing communication of changes is crucial for a successful implementation of redesign. The change management literature also advises to promote leading participants of change, while experts in field recommend to involve power-users of IS first, thus gathering early redesign feedback from dedicated users of the system.

Noteworthy contributions of the study include drawing attention to redesign acceptance from users' perspective and successful redesign implementation from designer's perspective.

4.1 OVERALL DISCUSSION

The goals of particular research were to explore literature, define reason behind resistance to change, examine successful redesign implementation approaches, validate theoretical findings with experts in field, create redesign project assessment model and empirically validate it in the case study.

As noted in the initial stages of the literature review, redesign literature focuses on project management and assessment parts of redesign, not user's reactions on redesign. The most relevant literature in this sense is the Agile IS literature. The User Adoption literature covers first time use of the systems, which is partly relevant to particular study.

What are the reasons why redesign might not be accepted and why it is often resisted? According to change management literature, people resist changes because of two main reasons: first, transition cost can make switching from the status quo or performing new actions costly. Second, even when there is no explicit cost associated with the change, uncertainty itself can lead people to status quo inertia.

Redesign implementation strategies were gathered from the expert interviews and literature. Various similarities emerged, such as the importance of communication with people involved in change, highlight of benefits associated with changes.

In addition to theoretical findings, this study aims to validate them with the practitioners in field. Designers validated resistance to change which was noticed among users and stakeholders and clients of the redesign projects. The success was being measured with KPI which is similar to continuous use of the product, proposed to be a success measure by particular research. All constructs of particular model were rated equally well, except for comfort with changes, that designers considered to be the least important factor in redesign acceptance.

After information about redesign acceptance is gathered, redesign assessment model was proposed. Model was based on IS Continuance model as continuous use of the service was proposed to be the success measure of a redesign. Additional Comfort with change constructs were added to detect change factor's role in technology acceptance process. According to

hypothesis Experience supposed to be an important variable influencing perceived usefulness of the product and satisfaction, but it was not validated in the model analysis.

Proposed model was tested in a case study of the recently redesigned web-based platform, called *Infogram*. Five of seven hypothesis of the model were statistically proven. Experience data was irrelevant in relation to the chosen model.

4.2 PRELIMINARY DESIGN RECOMMENDATIONS

Without change there is no progress (Dent & Goldberg, 2013), therefore designers are encouraged to redesign digital products in order to meet new business and user requirements. In comparison to designing from scratch, redesign can bring not only major development and user retention cost reduction (Eldonk et al., 1996), but it also guarantees that product will have a value, as there are users who were already attached to the previous design. Which eases research part of the project.

In order to run a successful redesign project that meets best expectations, product owners should pay attention to user's response to redesign. Resistance to change might put business at risk. Particular research gives some redesign recommendations, which could contribute to successful redesign project management.

Proposed Redesigned IS continuance model shows importance of Satisfaction construct as precondition of formation intention to IS use. It is in accordance to user acceptance and IS adoption theories, where satisfaction is a phase before action or behavior is being formed. Therefore, designers should pay attention to satisfaction measures. 10-point Net promoter core for Satisfaction measurement used in this study gave desired results, but no further validation of its applicability to other case studies was provided.

Particular study recommends to conduct change implementation in accordance to Kotter's 8-step process and compares insights given by experts in interviews:

1. Change implementation should start with establishing a sense of urgency, meaning, creating a reason why change is needed. Benefits of redesign should be clearly communicated among stakeholders and users of the product.

2. Creating the guiding coalition, meaning, creating a group of people who lead the change. Designers suggested to take user's feedback into account when planning a redesign, as well as user's request should be launched first, thus empowering the group of users who have direct impact on product design.

3. Developing a vision and strategy, whereas designers highlighted the importance of planning and research phase. From designer's perspective, it was mentioned that designers should know the vision in order to design future-proof solutions.

4. Eight-step model recommends to empower broad-based action by eliminating barriers of change. In each project the barriers might be different.

5. According to Kotter, generating short-term milestones and rewards is important in the implementation process. In case of redesign projects, it was suggested to split redesign implementation into steps, not launching all changes at the same time.

6. Establishing gains and guiding towards the need for further changes while attracting more people into the process of change. In case of a web based IS, redesign could be launched among new users first and after additional feedback is gathered and adjustments made, launch the changes among old users who had attachment to previous design.

7. After redesign has been launched users should feel the reward for adoption to changes, as they get used to redesign. As the eight-step model proposes - anchoring changes in the culture of organization by connecting new behaviors with successes of organization.

From expert interviews it was also concluded that the research part is crucial in design of successful redesign projects, as in a case if research phase is done poorly, there is a risk to lose well-functioning parts of the product after redesign.

Regarding success measures of redesign, it was suggested to track key performance indicators, depending on the type of project as well as collect the overall feedback of users. Some designers recommended to track time spent on basic tasks.

In terms of redesign project management approaches, it was mentioned that redesign and design projects are managed quite similarly, having a research, design, testing, development and implementation phases as any other design project.

4.3 FURTHER WORK

The goal of particular exploratory study was to draft redesign assessment model by identifying determinants of redesigned IS acceptance from user's perspective and learn what are successful redesign implementation practices from designer's perspective.

This exploratory work forms a basis for future discussion of bridging a distinct field of redesign and change management. It also establishes a platform for future development of a set of recommendations for potentially improving redesign implementation and user-centered approach to it.

Proposed Redesigned Information Systems Continuance model was studied in a present setting, looking at user response to redesign. In order to strengthen findings researched by the particular study, it should be conducted in longitudinal, continuous setting by measuring post-adoption of redesign.

It is recommended to revise the survey tool used in this particular research, as some limitations were encountered. E.g., taking into account computer measured data not just self-reported data.

As proposed redesign assessment model has been validated with web-based applications' redesign. It would be valuable to validate the model in other cases than the web-based application redesign. Branding redesign, hardware or service design change might show different results and importance of other cognitive beliefs influencing redesign acceptance. Results of this particular study could benefit from larger sample of test subjects from different types of systems.

In particular research each construct is measured by one corresponding item - survey question. Further studies should validate strengthened relations between constructs by having more items per construct in order to have control measures.

From IS acceptance theories there are other determinants that affect technology acceptance and could be integrated in the research of user's willingness to use redesign. According Barki, & Hartwick (1994), voluntariness is variable that affects IS adoption, as well as age of users and sometimes gender.

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Glossary

Acceptance	Situation where users have already adopted the IS and have relatively rich experience with it. They are faced with the decision to continue or terminate the usage of the IS Satisfaction is a key affective variable in the study of user acceptance of agile IS. (Hong et al., 2011)
Agile information system	Information system that has been created according to principles and techniques that emphasize early and continuous delivery of valuable software with embracement of constant changes in users' requirements. (Hong et al., 2011)
Attitude	Attitude is defined as a response to an antecedent stimulus or attitude object. (Hong et al., 2011)
Comfort with change	User's ability to adopt (Trocchia, PJ., and Janda, 2000).
Confirmation	User's perception of the congruence between expectation of IS use and its actual performance (Bhattacherjee, 2001).
Continuance Intention	User's intention to continue using IS (Bhattacherjee, 2001).
Perceived usefulness	User's perception of the expected benefits of information system use. (Bhattacherjee, 2001)
Redesign	Redesign is adaptation of a technical system in order to meet new specifications. (Eldonk et al., 1996)
Resistance to change	Resistance to change is a combination of an individual reaction to frustration with strong group-induced forces. (Dent, & Goldberg, 2013)

Satisfaction	Affective state or overall emotional reaction to a service experience. (Hong et al., 2011). Or User's affect (feelings with) with prior IS use (Bhattacherjee, 2001)
Stakeholders	Individuals or organizations who stand to gain or lose from the success or failure of a system (Nuseibeh & Easterbrook, 2000). For a software system, this can include managers, designers, and users of a system.

Appendix 1

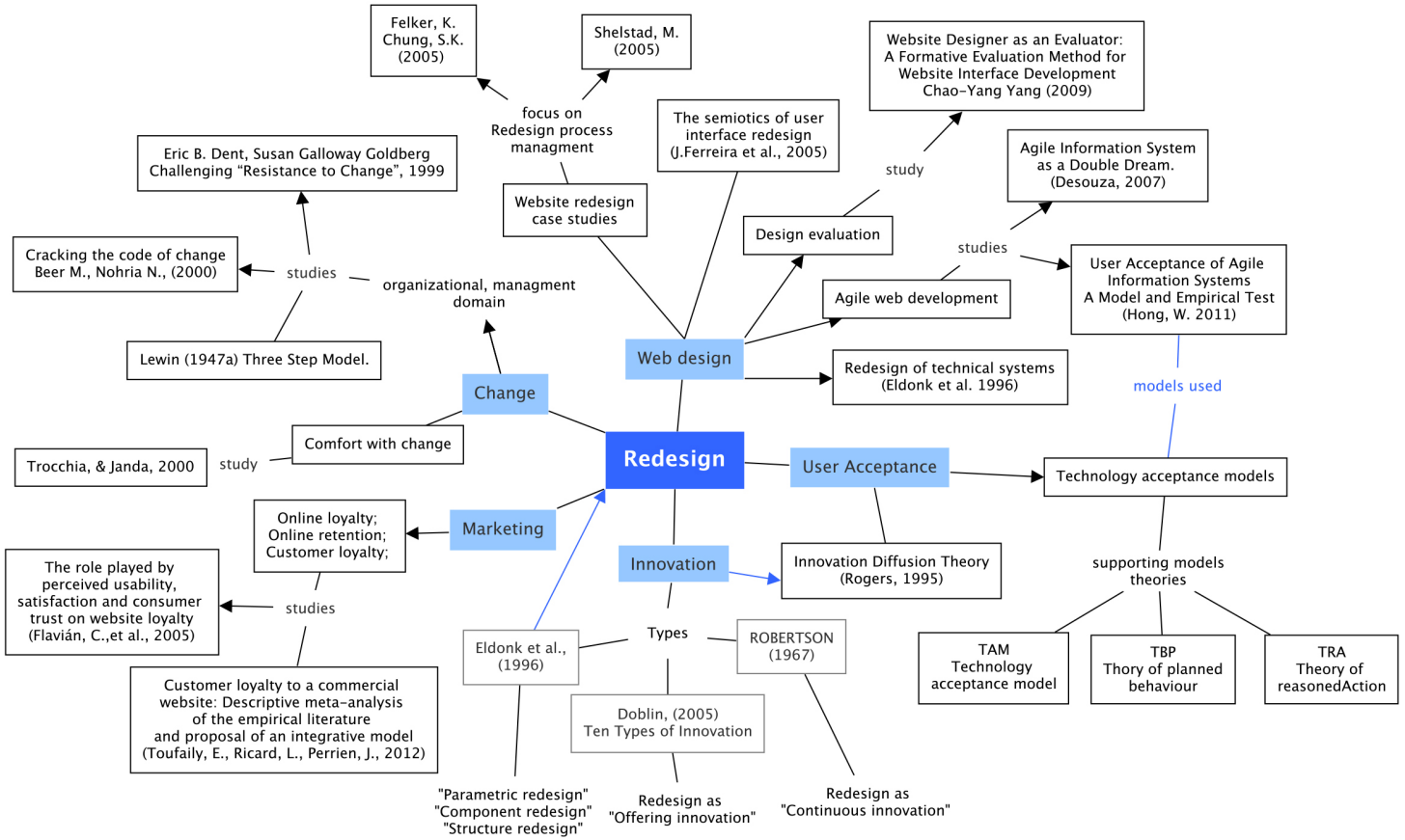

Figure 9 - Mind map of the initial literature scoping study.