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Collaboration Software Adoption: Factors Affecting Adoption of Collaboration Software in Organizations

Information Systems Science

Master's thesis

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ABSTRACT

Objectives of the Study

The objective of the study was to find out what kind of factors was influencing the adoption of collaboration software. The study included two different social groups that were examined and compared with each other. The first group was formed from young university and high school students, the other was professionals working in the IT-industry. The different possible factors were also compared with each other to see which one had a larger effect. A case study of moving away from email in order to use other types of collaboration software was taken to illustrate the transfer of one system to another.

Methodology

A theoretical model was built based on the literature review. The theoretical model consisted of four different factors, constructs that were affecting the adoption of collaboration software. The empirical data was collected in December 2012 by conducting a web-based questionnaire for the two groups in question and it gathered a total of 109 responses. The data was analyzed with quantitative statistical methods; more precisely the method chosen was Partial Least Squares analysis (PLS).

Findings and conclusions

From the four factors ease of use and usefulness of email seemed to have the largest effect towards adopting other collaboration software. Also the attitudes towards new technology usage had a significant effect with the group of professionals. Social norms in the other hand couldn't be backed up with the data extracted.

Keywords

Collaboration, collaboration software, groupware, knowledge management

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TIIVISTELMÄ

Tutkimuksen tavoitteet

Tutkielman tavoitteena oli ymmärtää minkälaiset tekijät vaikuttavat kollaboraatio-ohjelmiston käyttöönottoon siirryttäessä yhdestä kollaboraatio-ohjelmistotyypistä toiseen. Ilmiötä tarkisteltiin kahden eri ryhmän välillä. Ensimmäinen ryhmä koostui nuorista lukio- ja yliopisto-opiskelijoista, kun taas toinen sisälsi vanhempia IT-alalla työskenteleviä ammattilaisia. Mahdollisia vaikuttavia tekijöitä vertailtiin näiden kahden ryhmän välillä nähdäkseen minkälaisia eroja ilmenisi. Yhdestä kollaboraatio-ohjelmistotyypistä toiseen siirtymisestä valittiin tapausesimerkiksi sähköpostista pois siirtymistä.

Tutkimusmenetelmät

Tutkielmassa esitetty teoreettinen malli perustui kirjallisuuskatsauksen löytöihin. Se koostui neljästä eri tekijästä, jotka vaikuttivat kollaboraatio-ohjelmiston käyttöönottoon. Empiirinen aineisto kerättiin joulukuussa 2012 järjestämällä web-pohjainen kyselylomake, joka lähetettiin kahdelle kohderyhmälle. Tutkimuskysely keräsi yhteensä 109 vastausta. Kerätty aineisto analysoitiin tilastollisilla menetelmillä. Valittu menetelmä oli Partial Least Squares -analyysi (PLS)

Tutkimustulokset

Neljästä tutkitusta tekijästä helppokäyttöisyys ja hyödyllisyys osoittautui suurimmiksi vaikuttaviksi osiksi teoreettisessa tutkimusmallissa. Myös uutta teknologiaa kohtaan olevilla asenteilla oli merkittävä vaikutus erityisesti ammattilaisten keskuudessa. Tutkimusaineisto ei sen sijaan tukenut sosiaaliset normit -tekijää vaikuttavana osana.

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Abbreviations			
ATNTU	Attitudes Towards New Technology Usage	KM	Knowledge Management
AVE	Average Variance Extracted	PEOU	Perceived Ease of Use
CA	Cronbach's Alpha	PLS	Partial Least Squares
CR	Composite Reliability	PU	Perceived Usefulness
D&M IS	D&M IS success model	SEM	Structural Equation Modeling
ICT	Information Communication Technology	TAM	Technology Acceptance Model
IRT	Information Richness Theory		

1. INTRODUCTION

A personal computer has become the most important working tool in today's information intensive organization. More precisely, the software installed in this computer allows the employee to work more efficiently and handle information in a more sophisticated way than before. It is evident that software engineering will allow the same progress from this day forward as well.

However, when considering the field of collaboration software (also referred to as groupware), it seems as though there has been a pause in progress. Collaboration software refers to a type of technology that enhances a group in achieving their goals. It often helps them for example in communication, decision making, scheduling, and data sharing.

The interest in this thesis will be on the communication category of collaboration software. Communicating with others has changed tremendously from letters to faxes and mobile phones and towards digital communicating. It is still continuing to be altered with new technological advances. However in today's world, people still deeply depend on email, even though this is a technology dating back about three decades. It has even been predicted to keep its place as one of the core collaboration tools in the upcoming years (IBM, 2013). However, in many cases, email cannot offer the same experience as say face-to-face communication does (Mäki, 2008, p. 38). As part of the groupware products that try to mimic the advantages of working with someone in the same physical presence, email still counts as the most popular collaboration software to date.

Email was first introduced as a messaging and notification system. In the 90's its importance grew tremendously. In particular it started to become a repository system; an archive to store all of your professional information. This also led to an organizational problem of information sharing. If you left the company, all of your knowledge would be destroyed along with your email inbox. The decade brought also a critical feature: file attachments. This converted the software type from just a messaging application to become a primary collaboration tool. Communication and collaboration were based around a document. It would be edited on one

computer and then be sent by email to a colleague for further editing. This kind of procedure is inefficient and frustrating in comparison with how it could be done with other collaboration tools. Information could be shared in a much wiser way than that. (Suarez, 2013)

The need for spreading and elaborating information within a group is usually a key factor in the success of an organization, as no-one can do every task by themselves. Bragge and Kivijärvi (2012, p. 1) note however that at the same time, knowledge is also the least-accessible resource that is difficult to share, imitate, buy, sell, store, or evaluate. They imply that knowledge in organizations is typically dispersed in the minds of its members, working routines and processes, organizational rules, etc. This makes a strong justification to implement better collaboration software that would offer a solution to the problem of knowledge sharing.

The objective of this thesis work is to find out if the evolution of collaboration software is in a halt, and if so, what are the reasons for this. In the ideal situation it would be able to explain why people are so dependent on older forms of groupware technology and not willing to switch to more modern solutions. The example of email will be used to describe the situation of collaboration software adoption. The steps are to first evaluate different collaboration software and find distinct differences between them. Parallel to this evaluation, the main theories of software adoption will be introduced.

With this data, a preliminary theory of collaboration software adoption will be formed. The hypotheses will be evaluated by a professional in the field and then tested with a questionnaire for two groups. The two groups are consisted of different backgrounds. The first one is gathered from young high school and university students and the other respondent group is employees of an IT-firm. Finally in the end of this thesis, the main conclusions will be made as a follow-up from the analysis of the questionnaire results.

1.1. Background and Motivation

Working in the software department of one of the leading IT firms in the world, I find it fascinating how people still highly depend on a technology that was already invented about three decades ago. This behavior can be seen widely even within my own organization and personal job. People consider email as the best option and might not question the suitability of this tool to an appropriate extent. However, email can be seen as a primitive version of collaboration software and there should be better substitutes in the market that are more suitable for different occasions.

The moment that made me focus on collaboration software was when I first heard about Luis Suarez, a Social Software evangelist in our company that had abandoned email for good and started working with other available options. Even though the message of Mr. Suarez was highly promotional, I thought that there was a strong case behind his allegations. I began to consider an organization that would not depend on email for communication. What kind of an organization would this be? Could communication even be narrowed down to a fraction of the present amount?

Many unanswered questions meant that this topic should be investigated more systematically. I decided to see what was slowing down the adoption of collaboration software offered today. Also Mr. Suarez gave me insights to what the current situation is in present organizations in a form of a video interview conducted in the winter of 2013 (Appendix A).

The use of collaboration software has increased during the recent years for example through personal messaging systems and web conferencing. So even though the market is saturated with email, there are already improved products that are slowly acquiring a larger share of the market. This is obvious within the academic society in my opinion. Young students are willing to adopt more sophisticated versions of collaboration software and use them in their group projects and free time. This progress is mostly thanks to freemium and advertise-based companies that offer their consumer products for free. It is also something Luis pointed out in the interview. The younger generation has a different mindset on how communication should be done.

The thesis will try to confirm this phenomenon. However, the older peer group that will be also examined has an advantage to their part. They are all professionals in the field of business software. They work as salesmen and technical specialists in the software department of their organization. This gives them the upper hand when comparing knowledge with the subject opposed to the university students. They know what options there are available and what advantages each of the tools have.

The notation that there might be differences in the adoption rate of collaboration software within different groups of people led me to want to try to compare these groups and possibly find the factors affecting this different adoption rate. These factors can be tied to the social surroundings of software usage as well. Maybe the academic environment inspires youngsters to try out new exciting things. Contrary to this, the more hierarchical business world might be slower in adapting new ways of working, and thus seems to be a runner-up in the case of collaboration software adoption.

The idea is not to compare two different age groups per se. Rather, I want to see how two different mentalities would relate to the issue of collaboration software adoption. The two groups have two different levels of knowledge into the subject, they think differently, and their perspectives to the subject differ from one another. So in a sense I am comparing which one wins: the intuitively tech-fluent youngsters or the thoroughly trained professionals.

All of these issues will be analyzed more precisely from the literature review and thereafter with a separate research conducted.

1.2. Research Questions and Limitations

The research questions are the following:

What factors affect the adoption of collaboration software and what are their relative importances compared with each other?

How do these factors behave in different groups?

The research problem behind this is the assumption that email should not be entitled to such a big role that it is put in today. The intention is to extract a group of factors that influence the deployment of more sophisticated collaboration software and test the accuracy of these factors. The test will be conducted to two different focus groups that will be compared.

The limitations applied in this thesis work are the following:

- The focus is on groupware tools and especially on email
- Different kinds of collaboration software will not be compared in high detail
- The efficiency levels between different software will not be measured
- The respondents won't be categorized other than by profession

The results of investigating the case of email will hopefully give some guidance on what the user's perceptions are in collaboration software in general. In all, efficiency level measurements could give a more accurate understanding about what collaboration software is the best in a specific task, but this thesis doesn't have the resources of conducting multiple measurement sessions. Thus it will focus more on the perceptions people have towards collaboration software and the adoption of it.

Also, this thesis is designed to focus on comparing two social groups, and thus won't ask about other distinguishing factors in the questionnaire. Only the profession is used to separate the two different groups. However, it is worthwhile to understand that the profession is not the sole point of the division. It also represents two different levels of knowledge to the subject. It is a known fact that all of the older generations responses will come from employees working in the field of business software, and that the younger generation respondents are still mainly in their studies.

2. LITERATURE REVIEW

There is a wealth of research that has been done on collaboration software, the oldest papers dating back to the 1980's. As collaboration is an essential part of working in a group of people, it seems to gather interest amongst the academic world to study how information technology can offer an advantage in the field. Also, an interesting aspect is the combination of technology and psychology, as collaboration software is all about a social group of people.

The following literature review will first talk about the subject of collaboration in general. It will break down some of the basic theories on working in a group, but still keeping the technology side out of the topic. The theory of Knowledge Management will be introduced as well in this section. As collaboration is a great deal about information sharing, the theories of Knowledge Management fit well hand in hand with collaboration.

From there the review will move on to the topic of collaboration software. A sample categorization of the current available collaboration software can be found also in this section. Then, getting to the focus point of the thesis, collaboration software adoption will be the topic for the second last section, with the most notorious theories regarding the phenomenon. These theories will set a backbone in the theoretical framework of this thesis.

In the last section there is a discussion about the sociological issues regarding generation Y, as age might also have its part in the topic of technology adoption. As noted before, young adults seem to be more willing to accept new technologies than their older peers. This will be put to the test further on in the thesis.

All of the literature reviewed will be lastly gathered and combined in order to build the factors affecting collaboration software adoption.

2.1. Collaboration in Organizations

Working together for a shared cause is the basis for the existence of organizations. People form up into groups to conquer a task that all of the members see necessary. More precisely, it is not just that they happen to work together by chance, but they rather have a common determination to achieve by collaboration. In today's world, one must form into teams to make a difference.

When dealing with complicated and difficult tasks, teams have become the best strategy for organizations. Teams are mostly organized by management orders and often also dispersed in different locations. However, they have to coordinate, harmonize, and share information the best they can. The group's goals and demands might shift throughout the process, which also requires the ability to coordinate and cooperate. During a group project, team members engage in task work processes and teamwork processes. (Salas et al., 2008)

There is evidence that collaboration can help the team achieve goals in a better manner than by oneself. Working alone is less efficient than allowing the group to collaborate creatively. In situations that have a need for combinations of multiple skills, experiences and knowledge, a group has better chances achieving their goal than individuals working alone (Conti & Kleiner, 1997, p. 26). Co-operation helps in the segregation of duties for instance. People with different abilities and knowledge can take responsibility of segments from the task that others would hesitate to fulfill.

Collaboration is also seen to help in creativity. In the up-and-coming time of innovation, the key organizational capability is collaboration. Collaboration is needed to enhance the knowledge creation and transfer it throughout the organizational branches (Miles, 2000). Idea sharing and iteration result in innovations by using the intelligent resources of a diverse group. The form of a group creates more stimulation and accepts a diverse set of thinking. New innovations are after all many times an unusual combination of two or more old ideas. It is in these situations where group members with different qualifications can encounter something new, something that no one had thought about before the team project (Nurmi, 1996, p. 9).

Nevertheless there is another side to it. Fjermestad and Hiltz (1999, p. 8) notes that often collaboration processes might even drop the productivity of a team if there are no support systems for this type of work routine. This is due to the nature of collaboration. Even though management could try to force workers towards a more collaborative setting, group work is ultimately voluntary. Even worse, the lack of visible support and commitment from top management might affect the teamwork negatively (Conti & Kleiner, 1997, p. 28).

In fact, collaboration is seen hard to manage for hierarchical organizations that are used to top-down control (Payne, 2007). Payne points out how for instance social software depends more on the masses of people rather than management orders: People have to like to work together in order to embrace it. Forced teamwork can lead to poor working atmosphere, stress, and underachievement. In the worst case scenario, the negative opinion of some group member might ruin the whole collaboration process (Bragge & Kivijärvi, 2012, p. 25).

There are also other reasons why a group might fail. Conti & Kleiner (1997) points out that one common problem teams tackle with are keeping a vision of their goal. Egocentric thinking of individual group members might cause problems. Control struggles, political issues and personal agendas can blur the team's vision. Then again the problem can be created by the opposite issues, mainly commonality; group thinking and analysis paralysis also damage the team. Taking a direction which no-one is willing to question can be the doom for the team. Thus it is important to know how to communicate with each other. Team members must understand what the situation is and what is required of them. If this is not in their mindset, it might lead to poor performance and errors due to lousy communication and coordination (Stout, Cannon-Bowers, Salas, & Milanovich, 1999).

Despite the downfalls badly led and planned collaboration might have, it is widely accepted that the best way to succeed is by forming up into groups. But why is this seen as a given truth? What might be the root causes when trying to identify the success of collaboration? Does a task become automatically more successful if extra people are just added to the workforce, or if not, what are the factors affecting beneath the surface?

Knowledge Management

The answer might be found in the foundations of the corporations' way of exploiting information. The fact of the matter is that collaboration is turning out to be the most successful Knowledge Management (KM) strategy for organizations. In other words, it is the way we create and treat knowledge in collaboration processes that makes us successful. Groupware, supporting collaborative working, is partly responsible for the increasing importance of Knowledge Management. This is because the technologies that enable collaboration are also crucial in Knowledge Management implementation. Thus it is relevant to distinguish some basic theory on the subject of KM.

Knowledge is built from data and information. Data is the set of raw facts that is not yet sorted out in any way, whereas information is the end product of understood and organized data. Knowledge in the other hand is a fast collection of gathered and organized information (Zack, 1999). Knowledge Management refers to the company's ability to capture, organize, store, and distribute the knowledge relevant to them.

Many researchers have given their interpretation of the subject of KM (Ngai & Chan, 2005, p. 890). The most known of all is likely to be Nonaka's Four Modes of Knowledge Conversion. Nonaka (1991) suggests that there are four steps in creating knowledge in an organization: socialization, externalization, combination and internationalization. These steps are based on the transition from tacit (knowledge that is difficult to transfer from a person to another) to explicit (can be easily transferred to others) knowledge. Any type of knowledge can be converted from tacit to explicit, as well as the other way around. In summary, Nonaka states that true knowledge, which is understandable to the receiver, comes from gut-level commitment and belief. Therefore, building and handing over knowledge requires shared emotion, feeling, mental models, experiences, and what he called "empathy space."

Bragge and Kivijärvi (2012) researched on how to speed up the collaboration-centered knowledge management strategy, where they went through the fundamental nature of collaboration working and pointed out the stumbling blocks that prevent information sharing.

Kivijärvi (2008) had previously stated in his own work that the term ‘knowledge’ could be defined as the ability of an individual or organization to make decisions. This suggests that in a theoretically ideal circumstance collaboration can produce higher value decisions and hereby create better success than what a non-collaborative environment is capable of, but it should be kept in mind that this requires a strong knowledge management strategy supporting the process.

Bragge & Kivijärvi (2012, p. 17) concludes that knowledge has become one of the most critical competence of organizations today and it is the driving force of individuals. Knowledge requires human judgment, is closely related to action, and presupposes values and beliefs. Knowledge isn't just hidden somewhere, ready to be found. It is ultimately the interpretation the members of an organization give to what data they see in front of them (Payne, 2007, p. 24).

The group must, however, have an arrangement on how they communicate and elaborate knowledge to make these interpretations. In the next section, the computer assisted side of collaboration will be introduced with a summary of the different categories of collaboration software as well.

2.2. Collaboration Software

Collaboration software is a set of tools that enable group members to execute tasks that are characteristic to team work, such as collaboration, idea sharing, co-operation, and networking. This is done with a set of computers that allow working with the same documents and projects, either close by or remotely from each other. (Quantum3, 2012)

The definition consists one of the main ideas about why organizations exist in the first place. Organizations need to create a working environment that encourages collaborating and knowledge sharing. In a sense, making computer software that would help collaborate more effectively would result in a more efficient organization. That is why professionals have proposed that there should be collaboration software that would help in making faster decisions with using these systems rather than deal with work face-to-face.

In today's organizations, employees rarely create innovative ideas by themselves. Instead, they accomplish these goals in a group or team. The constant challenge in organizations is to come up with circumstances that support team work, not to mention reward structures to back it up in order to enable the creation of competitive innovations. One of the best ways of assuring team performance is to use collaborative technological infrastructure. This kind of technology enables communication, decision-making, and process design amongst the members of the group. (Fedorowicz et al., 2008, p. 3)

Over the past decade, the collaborative technologies have become an important part of many organizations (Chen & Lou, 2000). To accelerate the knowledge transfer within a firm, programs like Sharepoint and Lotus Notes were designed to help employees collaborate. It is commonly known that the group collaboration can be enhanced by information technologies like email (Laudon & Laudon, 2001).

In the organization level collaboration tools are seen as a way to cooperate and enable innovation, to bring products faster to the market, to increase business model innovations, to provide greater consistency in cross-domain processes, and to have a positive effect in the product development process through improved flexibility. Moving from the organization level to team level, the appropriate use of these technologies should cut down the miscommunication among team members, should enable the re-use of shared knowledge between members, and enhance the task management processes. Finally, on a personal level collaboration tools improve creativity by reducing the amount of routine work. They also improve the use of idle time with better knowledge of the group situation and allow more natural human interaction within a virtual workspace. (Fedorowicz et al., 2008, p. 3)

The downsides of taking new versions or advanced kinds of collaboration software to use can explain reasons on why email is still dominant. Payne (2007) specifies that even without assessing the features of collaboration software, there is a problem that must be resolved: the main focus in implementing KM tools is in convincing employees to use them. Sometimes even price might be an issue why organizations wouldn't want to upgrade their collaboration software.

Some of the collaborative software is too expensive for small and medium sized companies as well as too complex to install and use (Turban et al., 2011, p. 138).

Turban et al. (2011) also report about unsuccessful implementations of collaboration software. This type of system doesn't automatically result in efficiency gains, and businesses need to be aware of the potential problems in the adoption process, ranging from employees losing time when learning to use new software to giving away classified information and company secrets through these new and unfamiliar programs. Many are even questioning the value of collaboration software. Therefore, it is important to concentrate on how companies can capture the value of using collaboration tools with lowering the potential risks at the same time. Even though being optimistic, even Fedorowicz et al. (2008) says that the research community can't be too certain on how these technologies best support creativity and innovation.

Smith & Mckeen (2011, p.252) conclude on the subject of collaboration software value:

> *"It has shown that effective collaboration will not result from simply implementing more collaboration software. Instead, it will require a proactive and holistic strategy that integrates business goals and technology potential. At present, all aspects of collaboration and collaboration technology are in their infancy, so it is understandable that many companies are proceeding cautiously into this new world. Nevertheless, the speed with which both technology and practice are moving strongly suggests that it is time for managers to put some collaborative fundamentals in place. Furthermore, IT managers have an opportunity to provide business leadership around collaboration if they can clearly articulate its business potential and benefits, rather than focusing on the technology itself."*

So it seems that by connecting the software usage itself with the business processes and knowledge management strategies, companies have the best potential of acquiring the benefits of the technologies.

Taxonomy of Collaboration Software

Evaluation of these collaboration technologies has received attention from researchers in the field of groupware, as conductive research will improve the software development cycle and help choosing proper systems by comparing several alternatives for implementation into an organization (Lee, 2007, p. 2). The following section brings several theories of how to identify different collaboration software from one another. It also gives a longer description of email this research will handle in its own questionnaire, and introduces the option Suarez sees to be best fitting as a replacement.

One way of separating collaboration software is by evaluating the information richness. When the recipients understanding can be changed by information in a given time frame, it is called information richness (Webster and Martocchio, 1993). There can be different levels of useful information, referred as richness. Rich information can change the recipient's understanding faster than lean information. In other words, lean information can provide the same amount of information, but it takes more time to do so. The Information Richness Theory (IRT) states that media, that is capable in immediate responses and has more clues (expressions, tones, gestures, etc.) is richer than average. Based on these assumptions IRT provides, email is a leaner medium because it doesn't support the same amount of richness offered by other forms of communication. For instance face-to-face conversations give opportunities to use clues and responding immediately.

However there is other collaboration software that offers the advantages that email misses to deliver. In particular instant messaging can offer a richer expression opportunity with emoticons. Also, it has the specification of synchronous messaging as both participants can communicate at the same time.

A close relative to IRT is the Social Presence Theory, developed by Short, Christie and Williams. Social presence refers to the situation where a virtual interaction feels as physical presence. There are different levels of social presence depending on what media type you are using. Depending on the need of social presence in a particular task, an employee has a range of

medium from which to pick from. Using this assumption, an individual would probably choose to use email for communication if there is no need for physical presence. For instance announcements and reports are the type of mediums that do not need face-to-face communication. (Lancaster et al., 2007, p. 8)

Lancester et al. (2007) continues on stating that other types of evaluation methods to identify variations of software are the playfulness and flow. Playfulness indicates how much fun and positive emotions a task done with the software generates to the user. Thus it is closely connected with the design factors such as color themes and other graphic elements. The program might also have options to customize the theme to the user's taste. Playfulness can make users want to use the software more than others and give them a positive feeling by doing so.

The latter identifier, flow, relates easiness of using the software. A flow of usage can occur when there is a balance between task demands and the capability of the user. If the program is hard to use, it can result in anxiety rather than flow. For example when choosing from a list of a digital form, it might be impossible to get it erased and set to zero value, if it is not given as an option. In this case, the user will have to start the whole task from the beginning. On the other hand, a too simple task can produce boredom rather than flow. This might result in unconscious mistakes when concentration levels fall. But then again, programs that require low concentration levels might give space for more creative thinking and improved work efficiency. (Lancaster et al., 2007)

Mittleman et al. (2008) have done important research in trying to classify groupware technologies. Their cause to do such a job is due to the opaque descriptions of the market offering (p. 2):

> *"These bundles of capabilities – collaboration suites in a realm with no traditional or commonly accepted product categories or commonly accepted capability feature set – make it difficult for practitioners to understand what capabilities they need, what capabilities a given product offers, and to select an appropriate groupware product for their mix of tasks."*

In their work, they construct a list of nine attributes, whereby one can distinguish collaboration software from one another. The comparison chart holds constructs of nine different kind of collaboration technology including: 1) core functionality, 2) content, 3) relationships, 4) supported actions, 5) action parameters, 6) access control, 7) session persistence, 8) alert mechanisms, and 9) awareness indicators.

Table 1 Comparison Scheme (Mittleman et al., 2008)

Capability	**Affordances essential to the nature of the technology**
Core Functionality	Primary functionality provided by the tool.
Content	Possible content for contributions to a collaboration system are: text, links, graphic, and data-stream.
Relationships	Users can establish these kinds of relationships among contributions: collection, list, tree, and graph
Support Actions	Actions that users can take on structures or relations.
Action Parameters	Two key parameters that characterize or modify actions.
Access Controls	The granting or revoking of user ability to execute or permanent.
Session Persistence	The degree to which contributions are ephemeral or permanent.
Alert Mechanisms	The ways participants are notified that something or someone in the system requires their attention.
Awareness Indicators	The means by which users may know what other users have access to a session, the nature of heir roles, and their current status.

As seen from Table 1, a program can be identified to have several features in addition to the core functionality. One can distinguish instances like what content a software display, how it alerts the users of the content, who gets control of the content etc.

Using these attributes they form a group of four different categories of collaboration technologies (bolded in Table 2), based on their most fundamental capabilities.

Table 2 Collaboration Software Categories (Mittleman et al., 2008)

Categories and sub-categories	**Descriptions**
Jointly Authorized Pages	**Technologies that provide one or more windows that multiple users may view, and to which multiple users may contribute, usually simultaneously.**
Conversation Tools	Optimized to support dialog among group members.
Shared Editors	Optimized for the joint production of deliverables like documents, spreadsheets, or graphics.
Group Dynamics Tools	Optimized for creating, sustaining, or changing patterns of collaboration among people making joint effort toward a goal (e.g. Idea generation, idea clarification, idea evaluation, idea organization, consensus-building).
Polling Tools	Optimized for gathering, aggregating, and understanding judgments, opinions, and information from multiple people.
Streaming Technologies	**Technologies that provide a continuous feed of changing data.**
Desktop / Application Sharing	Optimized for remote viewing and/or control of the computers of other group members.
Audio Conferencing	Optimized for transmission and receipt sounds.
Video Conferencing	Optimized for transmission and receipt of dynamic images.
Information Access Tools	**Technologies that provide group members with ways to store, share, find, and classify data objects.**
Shared File Repositories	Provide group members with ways to store and share digital files.
Social Tagging Systems	Provide means to affix keyword tags to digital objects so that users can find objects of interest, and so they can find others with similar interests.
Search Engines	Provide means to retrieve relevant digital objects from among vast stores of objects based on search criteria.
Syndication tools	Provide notification of when new contributions of interest have been added to pages or repositories.
Aggregated Systems	**Technologies that combine of other technologies and tailor them to support a specific kind of task.**

In today's world, many of the collaboration software categories mentioned above can be identified as a popular working tool for several people. From Jointly Authorized Pages, Hotmail, Doodle, and MSN Messenger for instance might ring a bell for most. Streaming Technologies have also become a part of everyday life in offices. In the same way, Information Access Tools such as Google, Dropbox and Reddit have led to easier access of needed data. Lastly,

Aggregated Systems are the kinds of technologies that advantage from multiple former technologies. Social networking services could be seen to fit this description, as they combine several features from the categories.

This categorization will be used as a basis in this research paper. In particular, the spotlight will be held upon Jointly Authorized Pages and Aggregated Systems. Because this research will focus more on why email has such dominance at the moment, it is suitable for opening up a bit more of the specifications this software type has. Another software group that will get a broad introduction is Social Software. This is because Social Software is seen as one of the most promising substitutes for email for the future and it also happens to be extensively popular among young adults. The professional interviewee Luis Suarez has also shifted to social tools in his daily work habits.

Email

Falling into the category of Jointly Authored Pages, and more precisely found in the Conversation Tools –segment, email is by no doubt the best known and most successful collaboration software there is to this date. Keeler (2002) indicated that by allowing asynchronous communication, retaining all records of exchange, and allowing multiple recipients in a single message were the largest benefits that email brought to users. Despite its advantages, however, email remained relatively exclusive until the mid-1990s. Then, in 1996 a young computer engineer, Sabeer Bhatia, created Hotmail, a Web-based email service that could be accessed from any computer connected to the Internet (Keeler, 2002). Hotmail became the driver of free email service and the success of electronic mail took off from there.

As a universal and necessary productivity tool, email is most likely the best succeeding application in the category of networking programs. The usage levels of email have grown astonishingly well after becoming available for the public in 1993. During 2006 alone, the average daily worldwide email traffic was 84 000 000 000 emails delivered. In 2008, more email messages were made than phone calls for the first time in history, reinforcing the number one

status as a communication channel. It is truly an everyday communication tool for the public. (Katuin, 2011, p. 3)

When comparing with other forms that enable communication, there are some advantages and some fallbacks to email. Based on the significant growth and acceptance, email must have more advantages outweighing the disadvantages if asked by the users (Katuin, 2011). Specifically, "*email is easy and convenient, cost-effective, asynchronous, allows multiple addressees on a single message, and provides a written record of correspondence"* (Agnew & Hill, 2009, p. 2). However, some disadvantages can be seen as well. Email is seen to take too much time out of employees' workday, and oftentimes the emails they receive don't even relate to their job (Atos, 2013). It has been stated that in 2010 corporate users received some 200 mails per day, from which one out of five was spam mail. Email also falls short when having to edit existing information. Atos (2013) estimates that in 2013 more than half of the new digital content will be just updates of old information.

Also Suarez (2013) opened up a lot of negative aspects email has for itself. First of all it has become to resemble a delegation machine, where coworkers dump their work to others. This kills the innovative atmosphere and grows more of a political struggle. People might add a large amount of carbon copies to justify their message and raise the apparent importance. Even the email usage itself might be a political choice. Senior employees want to feel valued by retaining their knowledge by using non-transparent systems like email.

Other poor qualifications Suarez (2013) point out is that email is too easy and it is too private for most collaboration situations. Replying to an email doesn't make the respondent think enough, but rather they make the lazy option and reply right away without second thought. It doesn't make you think is this the best way to collaborate and share this piece of knowledge. For the best present collaboration possible, workers should use multiple communication venues for different tasks. In this sense, email is not nearly always the best option possible. Also the fact that the message is only sent to the receiver adds the problem with transparency. Information should be more available for the public at least in the firm level so that duplicates could be cut down. That would cut down the problem that Atos had pointed out earlier. (Suarez, 2013)

When considering why people haven't shifted away from email, one must take in consideration the email specific features versus the other collaboration software that would take its place. For example at free time people might prefer instant messaging more than email, but in the corporate world the latter is the best option. Email might be seen also as a more secure technology than instant messaging, which would favor it. These factors must be examined in the questionnaire executed in this research further on.

Social Software

Payne (2007), who is a director at Henley Management College, tells us that social software has a different story than traditional collaboration software (p. 25):

> *"Traditional tools such as email work from the top down, putting the group, organization or project first. Social software is more bottom-up, and works best without imposed top-down control. It can provide the conditions needed for collaboration in one hit. It might be even changing the way we socialize. If this is true, then maybe social software has the potential to help organizations develop the capability of collaboration. Unlike other software tools used in business, wikis, blogs and social networking sites first become established outside the business world."*

In the Mittleman chart social software drops into the last category, aggregated systems. Aggregated systems are a mixture of several technologies from other categories. Mittleman et al. (2008) tells that there are multiple collaboration products that fall into this category, such as virtual workspaces, social networking sites, and group support systems. Virtual workspaces can have a range of functions, such as document databases, calendars, and chats. All of these functions make it easier for the group members to work towards the project goals.

Social software is making its way to the corporate environment step by step. It is reported that firms are either planning or already implementing the use of social tools, where they can share documents and ideas, publish news and blogs, and support team work. Wikis are offering

corporate knowledge in a collaborative effort. Organizations are slowly starting to understand how important connecting people with each other is, and how collaboration can offer an advantage in the competition. (Payne, 2007)

Social software has the potential to increase the collaboration of group members. This means that the knowledge sharing and cumulative value generation is at its peak. Also a difference compared with other collaboration software is that people are more likely wanting to use it. For instance research into the motivation of active users of Wikipedia found that giving your own contribution to the service grows your sense of meaningfulness and motivates you to do more. This suggests that the individual contribution to the Wikipedia service can build the individuals' willingness and capacity to collaborate (Payne, 2007). Yet, we still do not know what kind of impact social software has in the long run. It might be just a new software type that enhances the communication of already highly social and open-minded people. Or then it can be a totally new way of interacting with colleagues and can transform the organization to make it a more open and collaborative society. This might be a question that cannot yet be properly answered.

However there are a few cases of companies moving away from email towards social software providing insight for exploratory research. Tietoviikko (2012) reports that the IT company Atos intends to stop using email for internal communication entirely. The company noticed that half of their employees were using two hours of their time for just reading email as a daily basis. From these emails only 30% was related to the recipients work. The head of the project states that the three largest benefits of the new social software are independence of location, better information flow, as well as easy finding of expertise in certain areas. However, a downside was noted as well: only one out of eight of the test users felt accustomed to the new system.

Luis Suarez (2013) hesitates to agree with Atos accomplishing their plans in cutting email down. He points out that their initiative is too top-down-driven and doesn’t focus on the core problems of email use. Eventually, people will tell you that they don’t care, and they don’t have an opportunity to do it. Email is still the easiest way to get the job done for them. He clarifies:

"You are maybe wondering where Atos failed? They failed in something that is fundamental. They didn't identify and switch from one email into whatever system, they focused on the technology and not on their behavior, not the task. Not the activities, not the mindsets of how to become collaborative. On the mark that says only 1/8 found the new system to be comprehensive, that 12% found a use case for that system. The other 88% didn't find it. For them, email was easier and lazier. This is not about switching tools and switching technology, this is about provoking a totally new mindset on how you work. Focusing on your tasks and activities and you are going to apply new ways to work. That is basic business transformation and organizational change."

Luis sees, however, that email will be eventually overtaken by social tools. There will be a federated social networking tool, where whatever is happening in one network will be populated elsewhere. He also predicts that email will be merged into these systems and become a specific feature in these programs.

2.3. The Adoption of Collaboration Software

The main focus of this thesis will be on the adoption of collaboration software. It will find out how and especially why individuals switch from one software to another. There are many possible reasons. Early research suggests that demographic factors such as age, gender, and cosmopolitanism determine the speed of adoption of information technology (Rogers, 1995). This is an assumption that will be tested in the questionnaire, especially regarding the age factor. However, collaboration software adoption is such a small research area that previous research is hard to find. In this section, there is a brief summarization of what can be considered touching the subject. Also, some more general theories of software adoption will be introduced in their own subtitles. These are great examples that can benefit in the research to be conducted. Some conversation will be taken place about the younger generation in the topic of technology adoption.

When working in a group, one will have a variety of different situations where collaboration software becomes useful. In that sense, only one software might not fit all the needs for each of these situations. According to Bajwa et al. (2002), since situations of different kind require different kinds of solutions, no single IT system would be preferable as universal software to be always used. Rather, a company might need a wide collection of software for different tasks. The things that influence the choice of technology may relate to the amount of information needed, the time limit in where the information has to be gotten, and the efficiency of communication.

Bajwa et al. (2002) made their own research to measure the collaboration software adoption in US firms compared to Australian ones (p. 3):

> *"Promotion of collaboration was measured using four items. Two of these items focused on top management effort to promote intra-organization and inter-organization collaboration, the third item measured the use of virtual teams for collaboration, and the fourth item focused on the existence of a person with responsibility to manage and promote overall collaboration efforts in the organization. While no previous measures for promotion of collaboration were available, the four items were formulated based upon the suggestion of the pilot study participants and their own understanding of collaboration promotion in organizations. A five-point scale (strongly disagree, disagree, neutral, agree, strongly agree) was used for each of the four items."*

Their results suggest that collaboration is important and growing a need for attention among company managers. The survey responses gathered from the executives of Australian and US firms showed that collaboration is a current topic in board rooms in both countries. However, even though collaboration was promoted, there didn't seem to be any formal role taken from within the company to actually manage the implementation of collaboration. In other words, managers are willing to advise employees of the capabilities of collaboration software, but when it comes to the actual adoption, there is no one taking responsibility to guide them. This lack of incorporate leadership might help understand why some technologies have such a low adoption rate, especially when it comes to highly complex and expensive systems.

Collaboration software adoption has also been raised to awareness in the social software category. An interesting question that Payne (2007) asks is what is stopping organizations from using social software? She states that the answer to this might be hidden on the unwillingness to change and anxiety about losing control, mainly from people with a stake in preserving existing structures. Her findings suggest that these are the managers on top of the corporate hierarchy. Thus Payne's findings are a mismatch with Bajwa's. This is most likely due to the focus on a specific collaboration software group, which for many companies may seem like a riskier collaboration tool adopt in their working environment.

In the next sections, the main theories of software adoption will be introduced to form a general idea of what causes are influencing behind the subject. However, some theories will be left out from thorough examination, as they do not fit the description of the current research topic.

For example the Diffusion of Innovation -theory won't be utilized in this thesis because of the nature of the collaboration software technology. In general, adoption rates are relevant to how quickly people accept technology. For instance a technology can have great potential, but it won't grow popular unless society generates a need for it. An innovation slowly penetrates an organization, after which the adoption rate will grow in an accelerating pace (Clarke, 1999). Yet in the case of collaboration software, we can assume that most of the target group has used collaboration software for quite some time already. The technology has made a break through into the society, only the adoption rates haven't accelerated as expected.

In research on technology adoption, the Technology Acceptance Model (TAM) is the most commonly used theoretical model. TAM has been applied to a range of technologies and has been very predictive of individual technology adoption and use (Brown et al., 2010). Thus it will be examined more accurately in the next section.

2.3.1. The Technology Acceptance Model

In 1989, Davis wrote an article about the Technology Acceptance Model. The purpose of the research was to pursue a better measure for predicting and explaining the use of technology. The theory behind TAM focuses on two variables that try to explain the intentions of a person to use a given technology. The two predictors of IT usage in the technology acceptance model are perceived usefulness (PU) and perceived ease of use (EU). Perceived usefulness indicates how much a person sees the IT application to help him in his job performance. It tells how useful the person thinks the program might be. Perceived ease of use is the user's subjective opinion on how hard or easy it would be to use the program in question. This relates to the intuitiveness and simplicity of the IT. The assumption is that these two predictors affect the actual usage.

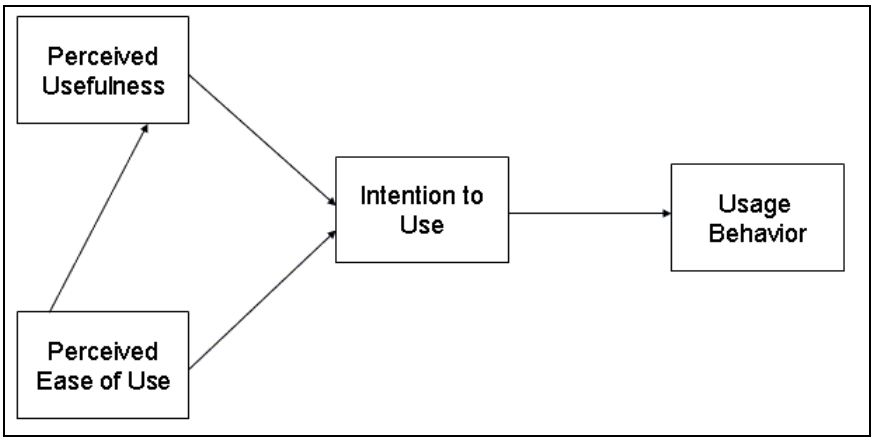

Figure 1 The TAM Model (Davis et al., 1989)

Among many variables that may influence system use, previous research suggests two causes that become the most significant. First, people are biased to make a decision about system usage depending on how much they believe it will affect their work performance. Second, even if potential users see that the program in question is useful, at the same time, they might leave it anyhow. This is because it is seen to hard to use; the effort needed to use the program outweighs the benefits of usage. (Davis, 1989)

The purpose of TAM is to understand how much external factors impact towards users' internal beliefs and attitudes (Dailey and Steiner, 1996). The initial research with TAM made some important conclusions. First off, technology usage could be fairly well predicted from user intentions. Secondly, PU and EU both had a significant role in explaining why users want or don't want to take a program in use. There is over 13400 citations to the journal article about TAM in Google Scholar, which proves the theory to be widely accepted among the academics.

The TAM model has gone through some changes after its first release. Davis along with his colleague Viswanath Venkatesh proposed an updated model of TAM in 2000, that they respectively called TAM2. In 2008, Venkatesh updated the model with the help of Bala to TAM3, where they added sub factors that would influence the perceived ease of use.

These advanced models included some additional key determinants in order to further understand how these affect the intention of usage. An important part for this thesis is the Subjective Norm sub factor (see Figure 2). Subjective Norm was to illustrate the social influence of referents that have an impact on the user's intentions. This was seen especially effective in mandatory settings. In voluntary work, the compliance-based effect didn't seem to do so well. Subjective Norm was also linked to the person's image in the work environment, but lost its leverage over time as the user would get more of his own opinions once getting to know the system in usage. Also, the relevance of the system to one's job, output quality, and result demonstrability was seen to have a positive effect on the perceived usefulness.

The results of the research seemed to back up their hypotheses. The TAM2 model could explain the perceived usefulness with more detail than what the original model could have done. Up to 60% of the variance of usage intentions could be explained with the updated model. The TAM3 is the most comprehensive model with a large set of sub factors for perceived usefulness and perceived ease of use. However in the TAM3 only about 35% of the variance in usage intentions could be explained.

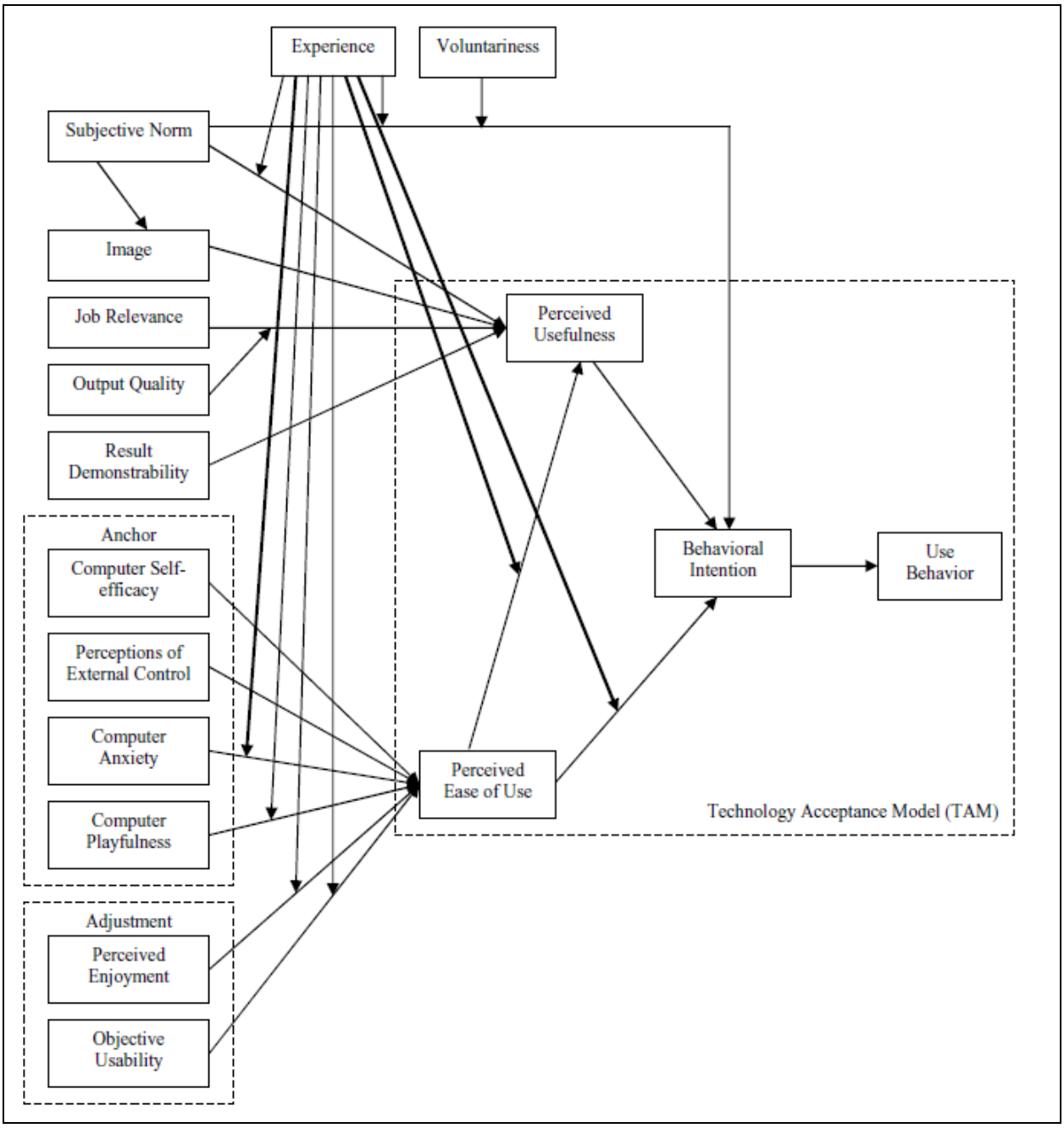

Figure 2 The TAM3 Model (Venkatesh & Bala, 2008)

2.3.2. The DeLone and McLean IS Success Model

The DeLone and McLean model of information systems (IS) success was published in 1992, originally purposed to gather previous research involving the assessment of the deployment of information systems into a more coherent structure. It was also to provide the backbone and guidance for future researchers.

The framework is divided into three areas: in the first column from the left there are system specifications that are system quality and information quality. System quality measures technical success and information quality indicates the semantic success. The next broader area focuses on the user, as use and user satisfaction produces an individual impact that in total will result in an organizational impact.

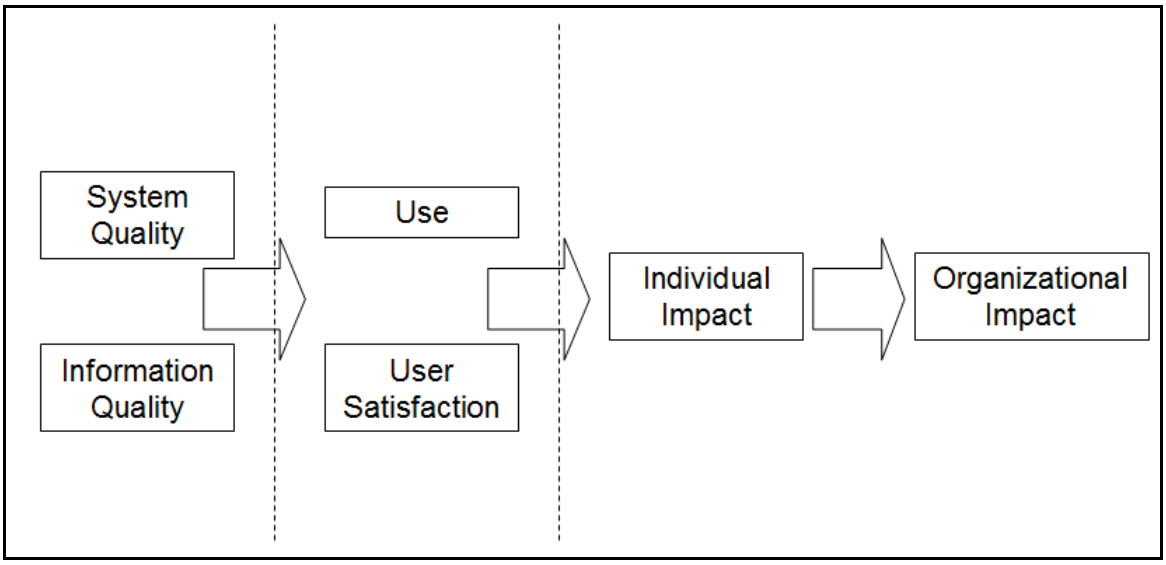

Figure 3 D&M IS Success Model (DeLone & McLean, 1992)

DeLone & McLean (2003) explain the theory (p. 11):

> *"A temporal process model suggests that an IS is first created, containing various information quality. Next, users and managers experience these features by using the system and are either satisfied or dissatisfied with the system or its information products. The use of the system and its information products then impacts or influences the*

individual user in the conduct of his or her work, and these individual impacts collectively result in organizational impacts."

Other researchers have utilized the model in various tests since. The most tested association is between system use and individual impacts. The association has been found to be significant in most studies. The next popular research was the system quality and individual impacts – dependency. The third notable association test was between information quality and individual impacts.

Many researchers have since the original model given their input to the model of DeLone and McLean. Ten years after the first model was published, the original creators introduced an updated IS success model (DeLone & McLean 2003).

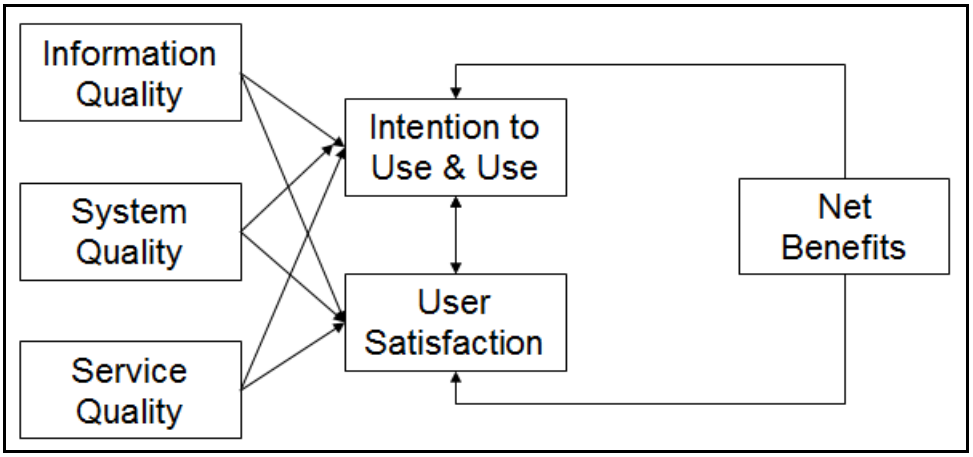

Figure 4 Updated D&M IS Success Model (DeLone & McLean 2003)

The updated model contains six interconnected parts of IS success. The arrows in Figure 3 show how the dimensions connect with each other. As illustrated in the model, a system can be evaluated in terms of information, system, and service quality. These three factors affect the use or intention of use and at the end user satisfaction. Also it is good to keep in mind that the usage has some net benefits. If the net benefits are positive, it will add up the user satisfaction to the system. (York University, 2012)

2.3.3. Technology Adoption amongst Generation Y

When assessing the adoption of new technology, one must also take in consideration the fact of differences in demographics. It seems as there is a variation in the level of which an individual is willing to take new technology into use when comparing age groups with each other. In the late 1960s psychological research into generational theory had its first phase with anthropological and sociological subject matters, and the theories have been able to make some generalizations about people born between certain dates (Codrington & Grant-Marshall, 2004). This section will focus on the second youngest generation, which is generally marked as the letter Y.

While trying to categorize the adoption of technologies between several groups, age is a widely used demographic variable. Morris and Venkatesh (2000) states that in particular the group called generation Y that holds the people born in the 1980's to the early 2000's, is considered to have a high level of new technology acceptance. This generation is known for having a high level of self-confidence, is used to an individualistic environment, and work in a goal-oriented manner (Meier et al., 2010, p. 69). This group will be in a particular focus on the questionnaire because of these qualifications regarding their technology usage.

This generation is said to have surpassed their parents in the technological world, in some cases even influencing the roles to shift from student to teacher when dealing with technology. As innovation keeps to accelerate in technology, generation Y is seen to be on the cutting edge of the advancements. (Meier et al., 2010, p. 75)

Meier et al. (2010) continues that generation Y will be the first generation to fully understand the technology surrounding them when they enter the workforce. The generation Y also has some distinct characteristics that influence them to learn, and are using a wide set of technologies to do so. These technologies include for instance social networking site, collaboration tools, blogs and virtual workspaces (Halse & Mallinson, 2009, p. 58). They also carry an arsenal of electronic devices with them. *"They live in a world of media overstimulation and absolutely love it"* (Berk, 2010, p. 3).

Meletopoulos and Reischl (2009) observed that social media is one big force changing the way youngster communicate. Social media offers a platform for instant information delivery, interaction and networking. Social media has changed the etiquette on how to socialize and how to build a virtual relationship with others that benefits both ends. Generation Y is accustomed to this kind of media. They expect their employers to offer the same level of interaction.

2.4. Factors Affecting Collaboration Software Adoption

The next sections are built to describe the main factors affecting collaboration software adoption based on the literature review. These factors will be used to form a theoretical model in the thesis and will be analyzed with results from the quantitative questionnaire.

2.4.1. Attitudes Towards New Technology

Even though the technological outbreak can be seen to have happened in the generation X era, the population of generation Y was born into technology and in a number of times has a better understanding about the digital world than their teachers and parents (Meier et al., 2010); the use of technology is an integrated part of their lives.

The individuals born in this particular time frame use multiple internet applications for both fun and work, and this kind of life style even defines the way they live, learn and work (Halse & Mallinson, 2009, p. 61). As collaboration software is by definition connection-based, these types of technologies should be quite well-known and used with this generation. The big question is, does this group have a different attitude on how this kind of software should be used? In particular, how would they choose from two different collaboration software types? Generation Yers are in general seen as the early adopter of new technology in addition to the heavy use of the Internet (Kumar & Lim, 2008, p. 570). Perhaps they will be more focused on new collaboration software as well then.

The differences in attitudes towards new technology across generations lead to the first alleged factor that will be tested out with the questionnaire.

2.4.2. Social Norms

Social psychologists have proven that social context can change the way an individual sets their opinion on an unchanging physical object (Robertson, 1989). As seen from the literature review, social influence has been included in the TAM model. The factor of social norms is a modified version of subjective norm that will give indication how much the social environment around you can affect your decisions even in such separate matter than the use of technology. Hsu and Lu (2004) states that in social psychology, especially in the theories of conformity, group members are seen to comply with norms within the group. This in turn deepens the perceptions and behavior of members. They also saw that innovation diffusion research confirms this type of behavior. Adoption decisions are influenced by the social system that goes beyond the personal decision or characteristics of the technology.

In the early stages of the software use, even if the user doesn't have a positive opinion about the program, if they get recommendations from other referents, the person will most likely tend to comply with the views of his peers and use the technology. The user does not have an opinion of his own that is strong enough to diverge. However, over time as the individual gains more and more experience with the technology, the direct effect of subjective norm is expected to diminish. The user can now do a better assessment of his own related to the costs and benefits of the technology. (Morris & Venkatesh, 2000, p. 10)

So even though social influence works as a predictor for usage behavior in certain situations, it runs into its limits when dealing with experienced technology users. That is, the views of others have a large influence on the individual's decisions before they start learning in more detail about the technology and start being experienced in the usage of it (Brown et al., 2010). So in other words there should be a difference seen on how professionals react to social pressure than

their inexperienced peers. Regardless, some contradicting theories state otherwise. In the corporate world, there is research that concludes older workers to be more worried about pleasing their coworkers, and this way they would also conform to the group opinions (Morris & Venkatesh, 2000, p. 7). It will be interesting to see which way the results sway.

Brown et al. (2010) also continues to say that social influence was more important in collaboration technologies because they are "social" technologies. Unlike the individual technologies, communication technologies cannot be used alone. In that sense, there is seen a connection with the social surroundings and the intended adoption of collaboration software.

2.4.3. Ease of Use and Usefulness

A large amount of evidence leans towards stating the importance of technology usefulness when assessing new technology adoption. The user's attitudes towards the technology and their perceptions about the benefits are one of the big factors in technology adoption. (Morris & Venkatesh, 2000, p. 6)

Technology experience, the ability to use a specific type of technology, can become an important reason when selecting a technology and might also cause a perception of the technology (Brown et al., 2010, p. 21). Hereby the questionnaire to be conducted should show evidence that users are willing to adopt new collaboration technology based on how significant they perceive the performance, and how easily they believe it will be to use this technology. Too complex software might keep potential users away. In more detail, the thesis questionnaire will want to find out how easy email usage is perceived compared with other forms of collaborating.

When a person first starts to use a given collaboration software, their beliefs might be negative because it requires new skills and patterns of interaction. Over time, the experience with the specific technology will grow and become gradually easier. As an outcome, the performance will enhance as well. An individual's belief in his or her ability to use technology (also known as computer self-efficacy), can also affect users' perceptions of performance. (Brown et al., 2010)

Again the results might show differences in professional and novice technology users as Brown et al. (2010) point out in computer self-efficacy. At this point it is hard to predict will the tech-savvy generation Y have a higher confidence level in ease of use than what professionals would rate for instance.

3. RESEARCH FRAMEWORK AND METHODOLOGY

The following section is derived from the insight to previous literature and theories. Now that the background is orderly examined, next a new research model with hypotheses will be formed. The testing will be done by a questionnaire, so the creation of equivalent questions must be thought out as well. However before that the chosen research method will be clarified.

3.1. Methodology

In occasions where research wants to find out about relations regarding constructs such as satisfaction, attitudes, or work roles, Structural Equation Modeling (SEM) is most likely the methodology to be chosen (Monecke & Leisch, 2010). SEM is a second-generation technique that makes it possible to simultaneously model the relationships of multiple independent and dependent constructs (Gefen et al., 2000). SEM is capable of doing powerful assessments of interactions and relationships of dependent and independent variables than traditional multivariate techniques. In the other hand regression-based techniques analyze only one layer of possible connections in dependent and independent variables at once (Gefen et al., 2000). This gives the advantage to SEM methodology.

First-generation techniques like regression-based approaches work well when confirming theoretical hypothesis based analysis with empirical data. Nonetheless, Haenlein & Kaplan (2004) see three limitations in them. First off, the regression-based approach assumes that the simple model structure can be applied in reality. However having a model with only one or two constructs seems relatively artificial when living in a multivariate world. The second point is related to the issue as well. Assuming that all variables are observable sets many limitations to the research. However, the factors mentioned earlier can't be measured the same way as say age and gender could be.

The last problem with first-generation techniques has to do with the conjecture of measurement without any errors made. First-generation techniques are, strictly speaking, only applicable when there is neither a systematic nor a random error component—a rare situation in reality. (Haenlein & Kaplan, 2004, p. 248)

With the SEM technique, a researcher can convert a theoretical concept into a research model, then test it with unobservable variables and changing experimental concepts into indicators, which are linked by a set of hypotheses (Haenlein & Kaplan, 2004, p. 286). This model can then be illustrated in a graphical representation, most likely a path diagram that shows how the various elements relate to each other (Diamantopoulos, 1994).

There are two different kinds of approaches when estimating the parameters of SEM, the covariance-based approach and the variance-based one. The covariance-based approach tries to minimize the difference between the predicted model and the theoretical one by matching the covariances. Therefore, when trying to estimate the parameters it will try to reproduce the covariances seen in the observed measures. (Haenlein & Kaplan, 2004, p. 290)

In this thesis, the quantitative research is based on the other option called Partial Least Squares - analysis (PLS). PLS is designed for researching possible relations between two matrices. It is possible to examine latent variables with the covariance structures in these two spaces. This is done by exploring the maximum number of multidimensional variance directions the X space can explain in the Y space. PLS targets to maximize the variance between the dependent and independent variables instead of trying to reproduce the experimental covariance matrix (Haenlein & Kaplan, 2004, p. 290).

There are several reasons why this technique is chosen. PLS comes convenient in situations where a large number of indicators are set per each variable. Because the factors of collaboration software adoption are assumptions, there must be several hypothetical indicators in order to be able to edit and possibly trim out. In PLS it is noted that more indicators per latent variable will lead to more stable results. Also it is noteworthy to point out that the indicators will be formative in this thesis. In situations where there are more formative indicators, covariance-based SEM is

not preferred. PLS in contrast can be reflective, formative, or even both types of indicators in the same model. (Hair et al., 2012)

PLS regression does also an especially good job with small observation sizes, i.e. when there are more predictors of the model compared with the observations gathered (Haenlein & Kaplan, 2004, p. 295). By contrast, the standard regression would fail in these kinds of situations. It is advised that when using covariance-based SEM, the researcher should be able to gather at least 200 observations regardless of other data characteristics. Taking in consideration the fact that the thesis questionnaire will most likely not reach a large respondent group, the PLS method goes well hand in hand with the circumstances.

Also as stated, the covariance-based method tries to minimize the difference between the predicted model and the theoretical model. It requires that the samples are normally distributed, whereas PLS does not have these kind of requirements.

Next the research model will be explained that will be measured with PLS afterwards.

3.2. Hypothesis Development

Recognizing the research question introduced in the beginning of this thesis, previous research to the subject of collaboration software was compiled and reviewed in Chapter 2. With a confirmation that previous literature did not seem to answer the research question, one can conclude that a new research model could be developed.

This thesis wants to understand how two different social groups see software adoption in collaboration tools, especially dealing with email usage. There is undoubtedly some uncertainty when trying to configure factors affecting collaboration software adoption, but also some credible general theories of software adoption that are backed up with previous research.

The research model presented in Figure 4 is a formation that has been developed by the help and knowledge gained from the literature review. Five related hypotheses are written below.

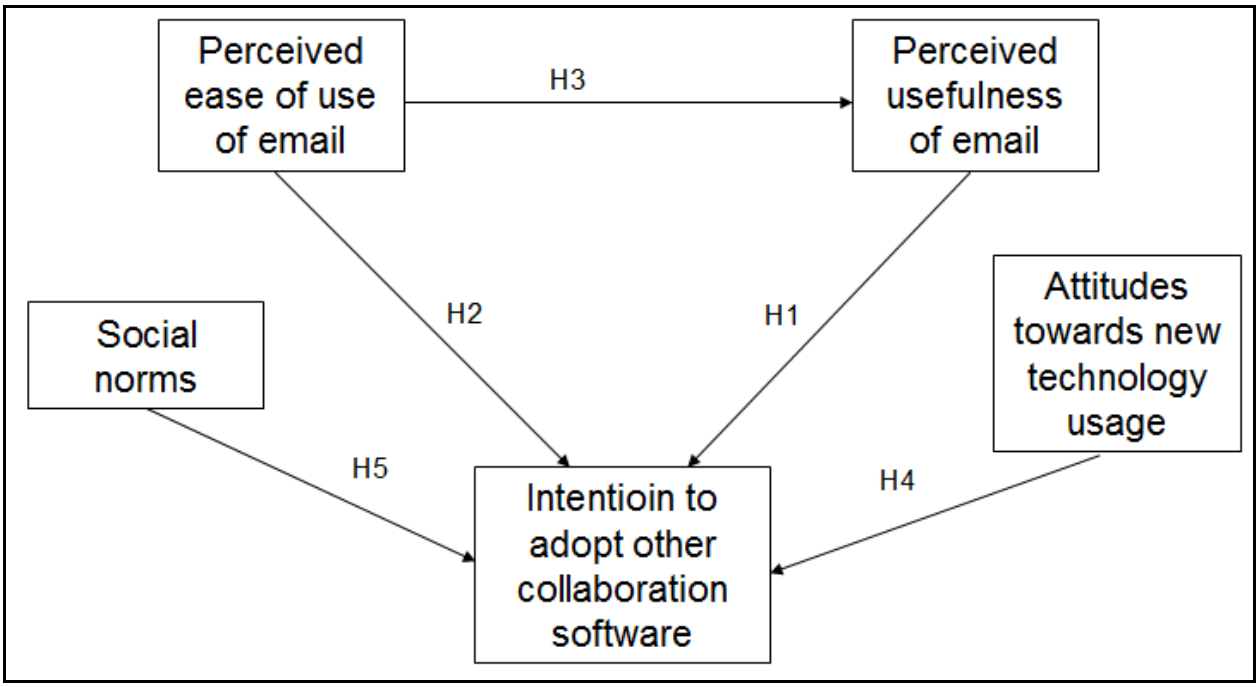

Figure 5 Research model and hypotheses

H1: Perceived usefulness of email affects negatively the intention to adopt other collaboration software.

H2: Perceived ease of use of email affects negatively the intention to adopt other collaboration software.

H3: Perceived ease of use of email affects positively the perceived usefulness of email.

H4: Attitudes towards new technology usage affects positively the intention to adopt other collaboration software.

H5: Social norms affect negatively the intention to adopt other collaboration software.

The theoretical research model has a strong resemblance to the Technology Acceptance Model (TAM) reviewed in the previous chapter. This is because TAM has such strong evidence to be a reliable indicator when trying to figure out in what degree people would be willing to accept and use new technology. It is straightforwardly a well fitting model for the thesis subject in hand. It assumes that perceived ease of use and perceived usefulness would be in central when measuring the influence on an individual's attitudes and behavioral intentions towards technology usage. Thus these two factors are taken to represent willingness to adopt other collaboration software.

When considering the D&M IS success model, it contains nearly the same kind of aspects; net benefits, user satisfaction, and intention of use. However, as the net benefits of using email will not be objectively measured, it is wiser to contain a perceived usefulness –factor to the research model. D&M IS success model will nonetheless help when assessing questions for each factor area when moving further along.

There is also one factor that is taken from the advanced TAM model. The original TAM did not include subjective norm. However, the theories of social psychology make a good argument that it can have an influence. As collaboration software is "social" technology, the perceptions of others have a larger effect than in other technological adoption rates.

The fourth dimension of the research model is linked with the assumption that attitudes will act as a predicting factor when adopting collaboration software. With the theoretic background of generation Y, it is justifiable to investigate the attitudes toward new technology usage. In theory there should be differences on how attitudes affect the adoption in the two different generations. However because the older generation in this case are professionals to the subject of technology, they might as well be very open-minded in attitude measurements.

3.3. Questionnaire and Data Collection

A questionnaire was formed in order to test the theoretical research model and the hypotheses. One of the research questions was how the alleged factors behave in two different social groups. Thus the questionnaire was designed to be answered by two groups. The first actual respondent group consisted mostly of high school and university students. This group represents the generation Y. The second group that was asked to fill out the questionnaire was employees of a multinational enterprise focused on the information technology industry. More specifically they all worked for the software department of the organization.

The questions were based on the theories and example research found in previous literature. They were also reviewed by the professional to the subject of collaboration software. The preliminary questionnaire was tested out with the help of four people that gave their possible recommendations for developing the questionnaire. They also clocked an average of five minutes in responding to the questions.

Overall twenty-six questions were presented to two crowds in different social surroundings. The questions were divided into five different subcategories, in order to resemble the hypotheses. Thus each sub-alignment of questions is objected to strengthen or revoke the made hypotheses. The answers were gathered as a 7-point Likert scale. This is proven to be the best option when using bipolar answers that are opposite with each other (Andrew and Claire, 1997). It also allows more variance in answers, but does not require too much cognitive processing from respondents.

Table 3 represents the questions, their subcategories, and linkage to previous theories:

Table 3 Questionnaire

Background	**(Halse & Mallinson, 2009), (Meier et al., 2010)**
	What age group do you belong to?
	What is your main occupation?
Attitudes Towards New Technology Usage	**(Halse & Mallinson, 2009), (Meier et al., 2010)**
	I like to experiment with new technology.

	New technology makes me feel more empowered.
	I am used to having technology around me most of my lifetime.
Collaboration Software Usage	**(Agarwal & Karahanna, 2000), (Brown, Dennis, Venkatesh, 2010)**
	How often do you use email?
	What types of other Collaboration Software do you use?
	How much would you estimate you are using email compared to other types of Collaboration Software?
	I am unhappy of the amount I have to use email currently.
	I wish I could replace at least a part of my email usage with other types of Collaboration Software.
	If you would want to replace email with other types of Collaboration Software, what would you prefer?
Perceived Usefulness of Email Software	**(Davis, 1989)**
	Email is suitable for sharing different kinds of digital information.
	Information is usually presented in an ideal form in emails.
	Email enhances my effectiveness.
	Email improves my work performance.
	Email makes me more productive.
Perceived Ease of Use of Email Software	**(Davis, 1989)**
	Of all types of Collaboration Software, email is the one that makes my job easier most effectively.
	My current email application is clear and understandable compared to other types of Collaboration Software.
	Using my email application requires only a small amount of mental effort.
	I rarely get frustrated using email when communicating with others.
	I find it easy to do what I want with my email application.
Social Norms	**(Hsu & Lu, 2004), (Morris & Venkatesh, 2000)**
	Using email is required in my day-to-day work.
	I am NOT allowed to use other types of Collaboration Software instead of email.
	My colleagues think I should use primarily email instead of other Collaboration Software.
	Using primarily email instead of other Collaboration Software is a norm in my working environment.
	It's socially preferable to write an email rather than use other Collaboration Software.

The process of getting responses had to be planned for two different groups. The operation was started with the professionals. The commission to do the questionnaire had to get approval from a manager level employee. The questions were reviewed and the purpose of the thesis was clarified in cooperation. After the approval, the questionnaire could be sent. Overall the deployment worked out with ease and a link to the questionnaire was sent by email to the department of software sales. Google Forms was used as the technical tool for response gathering.

With the peer group of students, the deployment proved to be harder than first thought. The initial plan was to get Aalto university students to respond. For this matter the communications department, student union, and the subject club of business technology was contacted for help. Surprisingly, none of these organizations provided help and the subject club didn't even reply to contact requests. The reason for the negative attitude was most probably associated with the privacy protection concerns of the university students.

An alternative plan was then taken to place: the request was posted to a social networking site called Reddit, more specifically to the subreddit called Samplesize. It calls itself a community dedicated to scientific, fun, and creative surveys produced for and by redditors. In Samplesize, one can post their questionnaire and request other Reddit users to fill out the form, even by pointing out what kind of focus group they are looking for. University student respondents were called out to answer the questionnaire, and the thesis was able to get the needed responses for analysis.

The questionnaire gathered 109 responses in total, 57 of professionals and 52 of high school and university students. The next chapter will look more closely on the results.

4. FINDINGS

As stated earlier, the method for analyzing the questionnaire data was chosen to be Partial Least Modeling (PLS) because of its suitability for the thesis circumstances. The program used for calculations was SmartPLS version 2.0.M3, which is offered for free use for research intentions with a 90-day license key.

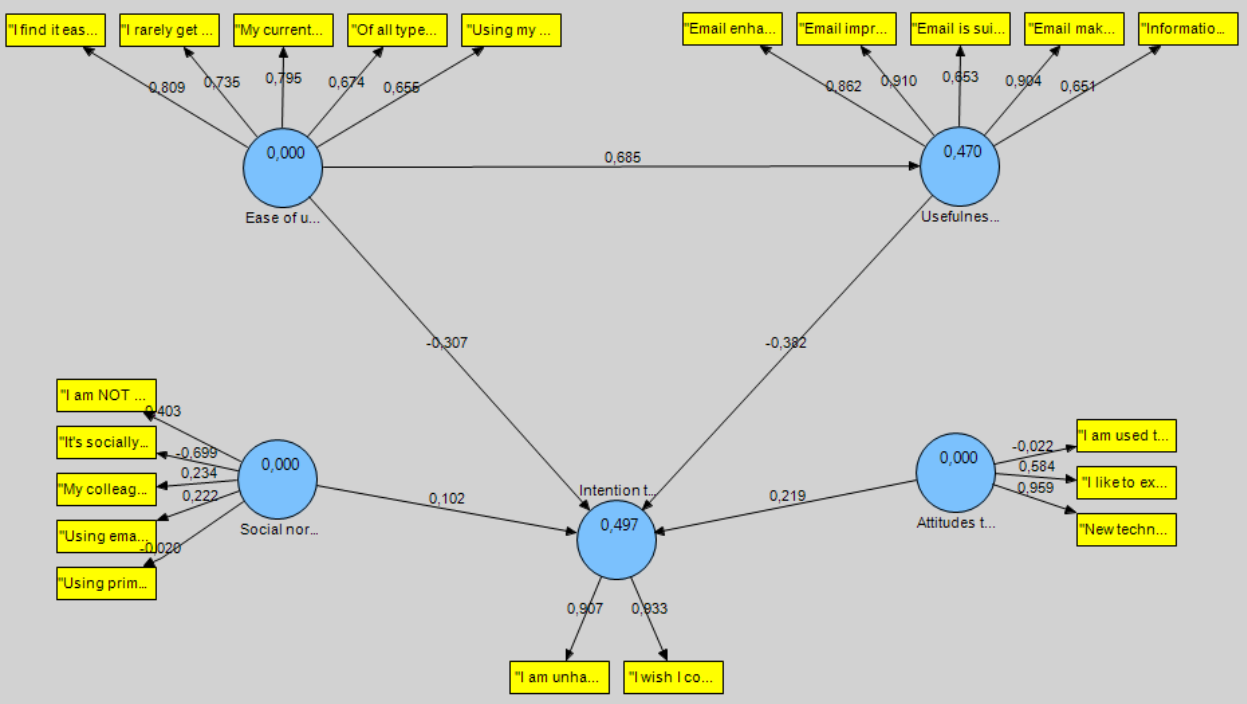

Figure 6 SmartPLS Model

The available data that was gathered was used in the PLS analysis. The data itself behaved in a cohesive way when looking at the responses. Even though the 57 professional and 52 students live in different settings, they both had quite the same kind of answers when looking at the results for the first time. For instance technology seemed to be close to both groups, they both used email daily, and most of them had tried several other collaboration software options at some point. A summary of the questionnaire responses can be found in Appendix B.

To start the data analysis, the constructs were first created and linked to one another accordingly. After building the hypothesized model, the questions were imported as indicator data to the program. The model was ready for analysis, so in the next section measurement model testing with confirmatory factor analysis will be cleared out. After this, the structural relationship is analyzed in its own section.

4.1. Measurement model

The measurement model was tested to be compliant with some basic steps. The first step taken was to check that the PLS algorithm was not forcefully stopped to the marked maximum iteration limit. This can be seen from the stop criterion changes. The iterations were stopped at the sixth run and did not get even near the maximum number set of 300, so in that area everything seemed fine.

Convergent validity was then assessed. This helps to affirm if the theoretically formed constructs are indeed linked in actual reality based on the questionnaire data. Convergent validity is analyzed with two indicators: the average variance extracted (AVE) and composite reliability (CR). The primarily used threshold values for both indicators are accordingly 0,5 (AVE) and 0,7 (CR) (Hair et al., 2011, p. 145). In addition to this, also Cronbach's alpha (CA) was extracted to test the reliability of the questionnaire sample. The threshold value for this is also 0,7.

Observing the data Table 4, it was evident that some changes have to be done, as the AVE for *attitudes towards new technology usage* and *social norms* were below the minimum value 0,5. Also, CR and CA values were below minimum 0,7 in *attitudes towards new technology usage* and *social norms*.

Table 4 Initial Average Variance Extracted, Composite Reliability, Cronbach's Alpha, and Outer Loadings

	AVE	CR	CA	Outer Loadings
Attitudes towards new technology usage	0,420	0,571	0,664	-0,022; 0,584; 0,959
Perceived ease of use of email	0,542	0,854	0,791	0,809; 0,735; 0,795; 0,674, 0,655
Intention to adopt other collaboration software	0,847	0,917	0,820	0,907; 0,933
Social norms	0,151	0,005	0,583	0,403; -0,699, 0,234; 0,222; -0,020
Perceived usefulness of email	0,648	0,900	0,857	0,862; 0,910; 0,653; 0,904

When moving on to greater detail to see what was causing the problems, the outer loadings were extracted to assess indicator reliability. From these values it was possible to notice which indicators were acting in a non-orderly way compared with others.

The outer loadings statistics correspond with the previous data. Especially the construct *social norms* has outer loading values scattered around in a range of -0,699 to 0,403, which shows signs of indicators acting opposite with each other. In other words some of the answers to questions within the social norms –topic implied opposite beliefs than others within the same questionnaire subject. They were not parallel with each other. Another questionable loading was in the *attitudes towards new technology usage* (-0,022). Thus the next step was to reduce these indicators and run the algorithm again. From *social norms* only the two highest ranking indicators were left untouched in order to increase the indicator reliability.

The changes had the following effect summarized in Table 5. The AVE was increased in order for every construct to exceed the threshold value 0,5, as so did the CR levels. The only number to fall short from the ideal value was the *social norms* CA, which was lower than 0,7. However because this is the only indicator scoring low, it is a non-significant error, as all other indicators for the same construct meet their target.

Table 5 Updated Average Variance Extracted, Composite Reliability, Cronbach's Alpha

	AVE	CR	CA	Outer Loadings
Attitudes towards new technology usage	0,723	0,835	0,703	0,695; 0,981
Perceived ease of use of email	0,542	0,854	0,791	0,809; 0,735; 0,795; 0,674; 0,655
Intention to adopt other collaboration software	0,847	0,917	0,820	0,907; 0,933
Social norms	0,694	0,819	0,563	0,87; 0,794
Perceived usefulness of email	0,648	0,900	0,857	0,862; 0,91; 0,653; 0,904; 0,651

After receiving satisfactory levels of measurement model reliability, it was appropriate to check the discriminant validity. This criterion examines the constructs to find out how much alike they are with each other. Ideally, they shouldn't match each other too much. In order to assess this, the square root of AVE for each construct must be compared with the correlations between the latent constructs. In Table 6 are the square roots of AVE in bold on top of the correlations.

Table 6 Correlations

	ATTU	Intention...	PEOU	PU	Social norms
Attitudes towards new technology usage	**0,850**				
Intention to adopt other collaboration software	0,232	**0,920**			
Perceived ease of use of email	-0,035	-0,589	**0,736**		
Perceived usefulness of email	0,025	-0,617	0,685	**0,805**	
Social norms	-0,055	0,073	0,038	-0,018	**0,833**

The construct correlations should not exceed the top numbers. Again the validation was a success as all correlation numbers were kept below the numbers bolded on the top. The measurement model validity was now improved in order to go to the next steps.

4.2. Structural Model

Moving forward the structural model was examined in order to see what the dependences were and how significant they would be. The goal of the questionnaire was to compare the two social groups with each other. However before dividing the answers between students and professionals, the t-values, path coefficients and R-square values were checked with the whole 109-answer data. The t-values showed high significance among the constructs other than the effect of *social norms* to *intended adoption*. Taking these numbers into consideration, the path coefficients and R-square values were calculated among with significance levels in Figure 6.

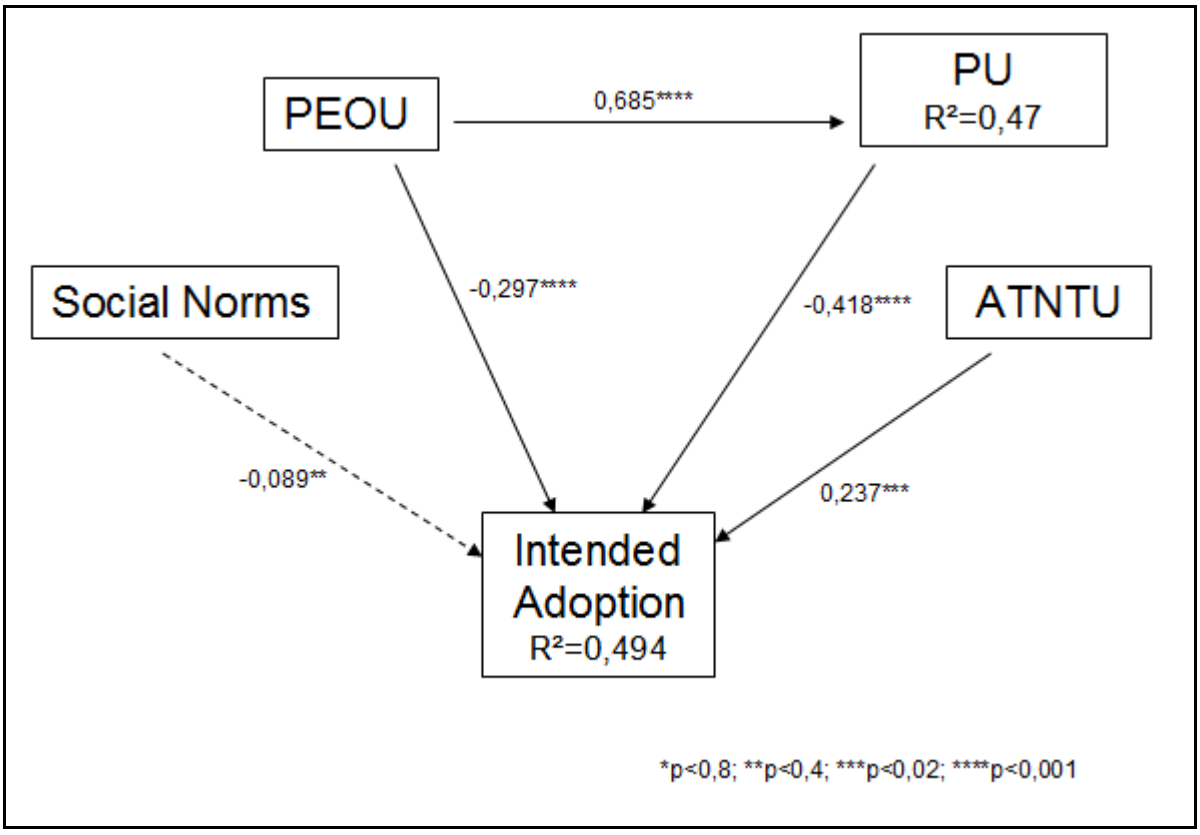

Figure 7 Path Coefficients and R-square Values for Whole Data

Table 7 Whole data t-values

	T Statistics
Attitudes towards new technology usage -> Intention to adopt other collaboration software	2,3863
Perceived ease of use of email -> Intention to adopt other collaboration software	9,6518
Perceived ease of use of email -> Perceived usefulness of email	16,4446
Perceived usefulness of email -> Intention to adopt other collaboration software	3,9927
Social norms -> Intention to adopt other collaboration software	0,9681

The magnitudes of path coefficients were especially good in *perceived ease of use* and *perceived usefulness*. Also the R squared levels were acceptable in *perceived use* and *intended adoption*. The *social norms* didn't seem to have a big effect on the inner model and the significance was fairly weak as well.

The next step was to separate the 52 student answers and the 57 office employees and run the same structural model calculations for both data. The findings were quite different compared with the numbers as a whole. The t-values of the younger group were worrisome, but were statistically significant for the older generation. The worst p-level from the group of students was *attitudes towards new technology usage* to *intended adoption*, but yet again the constructs adopted from TAM gave satisfactory values. For professionals, the p-values from *social norms* and *perceived use* to *intended adoption* were not that significant, but other indicators were fine.

The problem with students could possibly be solved with some fine adjustments to the constructs and outer loadings, but after several tries it was evident that the overall variance of the young respondents was too high in general, not in just specific questions. Thus the structural model that was formed after confirmatory factor analysis was not altered and the analysis was continued keeping in mind that the reliability was not as high enough as could have been hoped.

The path coefficients were also different compared with the model with all data combined. In the case of students, *attitudes towards new technology usage* didn't seem to have anything to do with *intended adoption*. It explained only with a magnitude of 0,036 not forgetting the extremely poor significance rate. Therefore no conclusions could be made from these numbers and thus H4 was not supported. In the same fashion *social norms* was showing low significance towards *intended adoption* (β=-0,128; p<0,3), thus likewise H5 was not supported. *Perceived ease of use* showed somewhat higher ratings for the younger respondents than *perceived usefulness*. All H1, H2, and H3 hypotheses were supported by the data. Overall about 60% of the changes in *intended adoption* could be explained by the explanatory constructs (R^2=0,598).

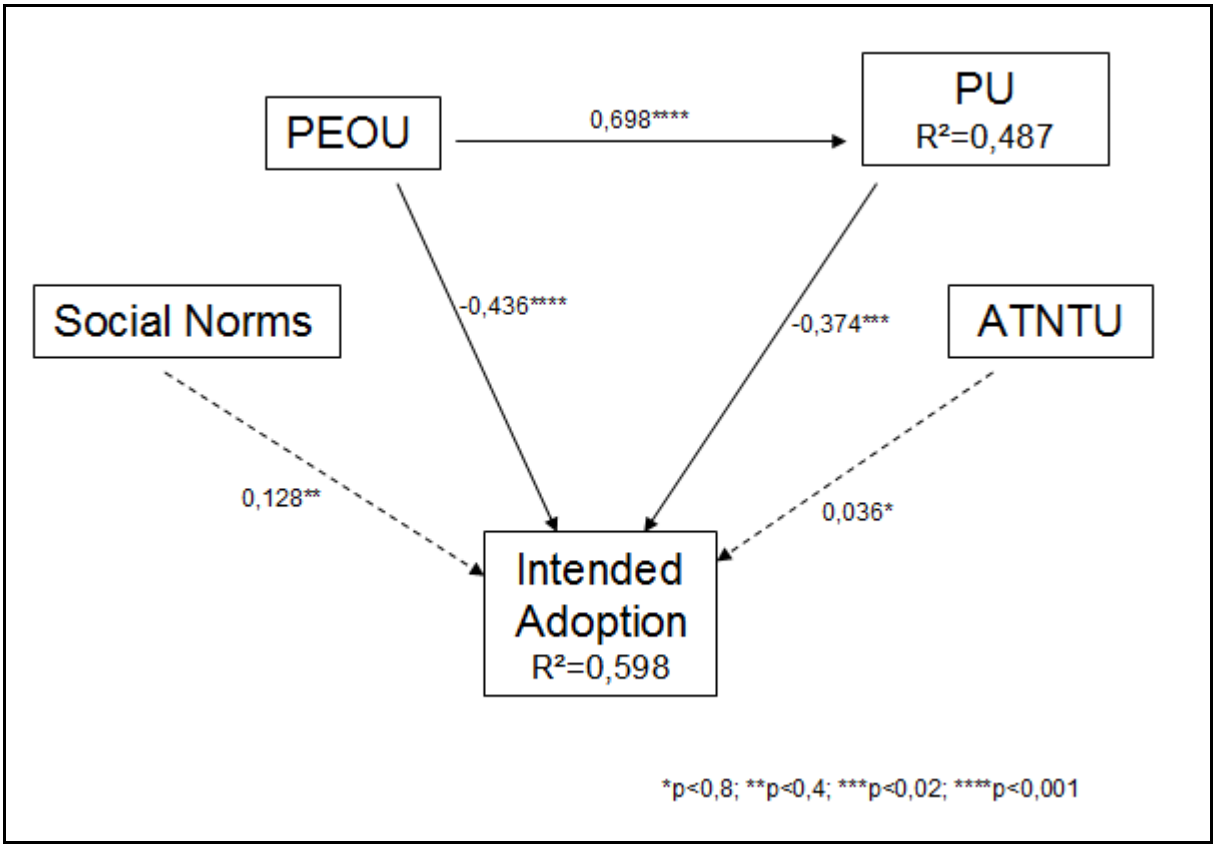

Figure 8 Path Coefficients in Students

With professionals, the data comprised more reliable numbers and the model behaved more predictable. Yet again, *social norms* didn't seem to have that big of an effect, thus H5 wasn't supported with professionals. However *attitudes toward technology usage* had a significant positive impact on *intended adoption* (β=-0,465; p<0,02). The TAM elements behaved more or less in the same manner as in with other data. Thus H1, H2, H3, and H4 were supported.

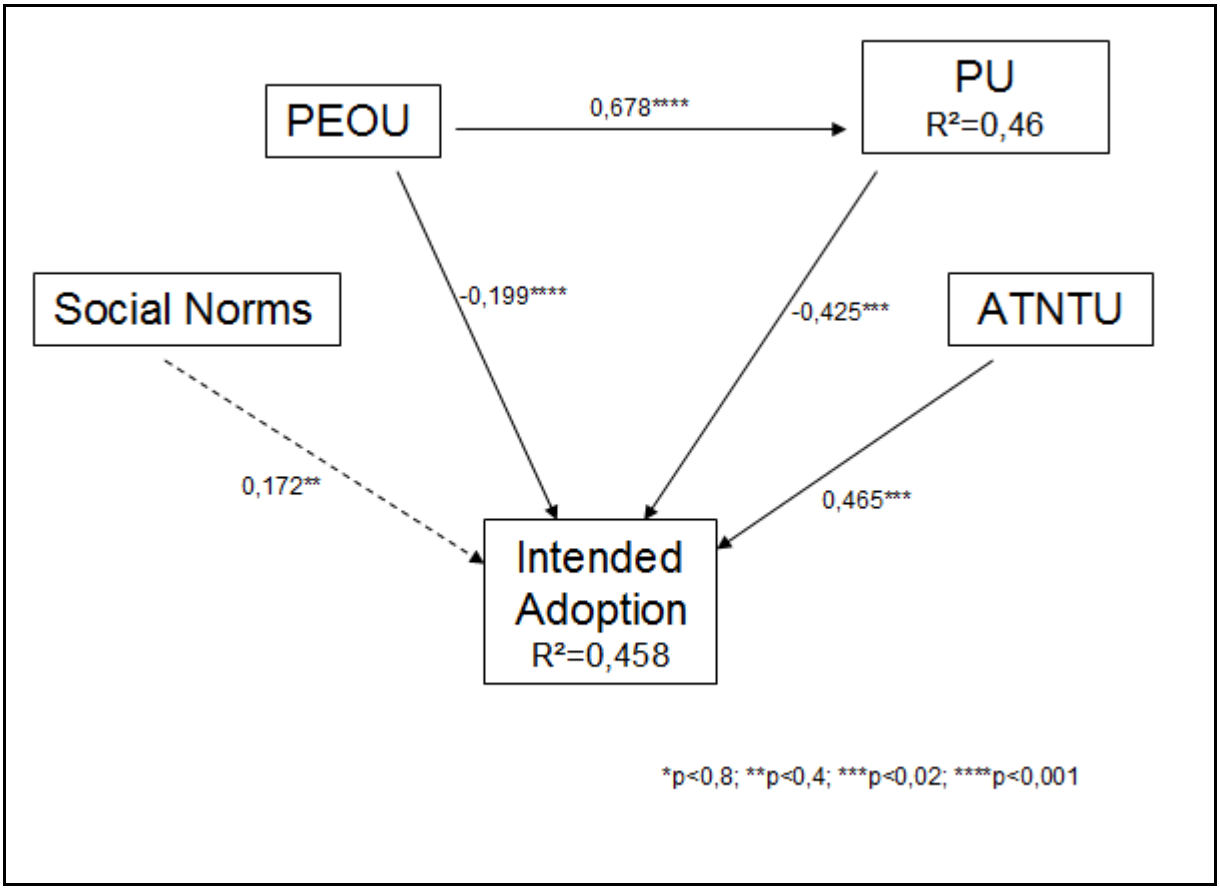

Figure 9 Path Coefficients in Professionals

Table 7 T-values

	Students T Statistics	Professionals T Statistics
Attitudes towards new technology usage -> Intention to adopt other collaboration software	0,2880	2,9979
Perceived ease of use of email -> Intention to adopt other collaboration software	10,0573	5,1235
Perceived ease of use of email -> Perceived usefulness of email	13,6867	10,6994
Perceived usefulness of email -> Intention to adopt other collaboration software	1,0512	1,5053
Social norms -> Intention to adopt other collaboration software	2,5012	2,823

As noticed, the actual data proved to back up some of the hypotheses made earlier, but also made some constructs questionable in both data sets. Even though the sample sizes were quite low, they are scientifically reliable if the sample size is compared with the outer model loadings equaled per construct. A good ratio is proven to be ten observations for each outer loading (Hair et al., 2011, p. 144). The largest group of outer loadings was found in construct *perceived ease of use* with five questions. Thus the minimum required amount of observations is fifty, which was exceeded with both student and professional respondent data.

5. DISCUSSION AND CONCLUSIONS

After calculating key figures from the questionnaire results, the results are analyzed in below sections and also the main points of Suarez's vision of the adoption is talked through. After this, finally the overall conclusions are done in the last section.

5.1. Discussion

Overall the results were somewhat surprising and broke some beliefs generated in the course of the literature review. Also it was noticeable that the respondents from professionals seemed more homogenous and the answers were more in line with each other compared to student respondents. All of the older group respondents work for the same organization, have the same interest in information technology, and even have quite the same picture of what collaboration work is about. This made the analysis easier and more beneficial.

Then again for the students even though the respondents represented the same age group, their background couldn't be traced. Thus their social, economic and academic situations could be quite different from each other. This was evident when analyzing their data, as the responses as a whole didn't behave in a collective way. Maybe if the responses had been gathered from the same school students, say Aalto for instance, the data may have been more coherent.

When going into more specifics of the two data sets, attitude towards new technology usage behaved in an interesting way. The working force indicated positive connections between the attitudes and intended adoption of other collaboration software. That is, they are open to new technology and would be more willing to adopt new communication ways replacing email. The professionals think that technology has been close to them their whole life as well as their younger peers and that they are willing to experiment and try new things with it as well. They do not shun about using new technology.

Interestingly, in the same construct with the data from younger respondents there was no connection at all. This might be because questions about attitudes towards new technology are obsolete to the respondents. The younger generation is so attached to technology that this factor didn't resonate with intended adoption. Most youngsters (96%) felt that technology has been close to them their whole lives, but then again the opinions about collaboration software adoption scattered amongst the same group. The older generation's opinions went more hand in hand with each other.

The area of social norms seemed to behave as a weak predictor for intended adoption overall. In both groups, the significance levels were too low. The message was quite clear that the theory social norms modified from TAM subjective norm was not backed up in practice. When analyzing the different questions in this area more closely, it is noticeable that both respondent groups are obligated to use email in their work. It was also seen as a norm to use email that however wasn't affiliated with social pressure. That is to say, people are familiar of using email as their primary communication software, but they wouldn't see it as a must.

Especially the attitudes in the working force are more liberal when it comes to using other collaboration software technology. This is most likely due to the nature of work the respondents are in. They are specialized in technologies for businesses and are aware of the different options, most likely even more so than their younger peers. They also have the opportunity to use products owned by the company in their day-to-day work. Perhaps the Knowledge Management –strategy in this firm influence the assumed options professionals see fit. For the students, there really isn't any given strategy on how to share knowledge; the process evolves on its own.

The professionals seemed to have more critical opinions about email as a collaboration tool. The differences were subtle but noticeable. Specifically questions dealing with ease of use and some questions related with usefulness got more negative views from employees than students. For example 58% of professionals thought that information isn't presented in an ideal form in emails compared with the 38% in the other group. When 62% of students saw email as clear and understandable, only 44% agreed from professionals. The working force also seemed to get more easily frustrated using email than youngsters (40% vs. 25%).

The reasons on why the professionals see email as a weaker collaboration tool is hard to conclude from the given data. Some possibilities can relate to longer experiences working with email and thus having a wider perspective on the issue. It can also be connected with the fact that all employees are using the same email program, whereas the younger group has a variety of options from which to choose.

Overall the largest factors affecting collaboration software adoption would have to be related to the program features rather than surrounding matters. Questions like how effortless the program is and how much it seems to benefit at your work are the major questions that affect the adoption of other collaboration software. Even though norms exist in school and in the work environment, the respondents don't believe it has that big of an effect on what collaboration tool they are willing to use. However as noted before, the norm might already be set to a more adoptive behavior in the IT firm so that they would not identify themselves with a exclusively email-necessary society.

As seen from the analysis, only about 50-60% of the intended adoption of other collaboration software behavior could be explained with the theoretical model. Thus there is open space for future research to find out the missing constructs. One could see it even appropriate to divide the perceived ease of use and usefulness construct to smaller areas in order to specify more precisely what qualifications affected the most. Also other use cases could be taken to observation. For instance when would a person switch instant messaging to something else? Or as Luis Suarez predicted that social tools will get larger utilization, maybe the study of possible usage scenarios could be interesting to conduct.

5.2. Main Points from Luis Suarez

Luis Suarez has worked several years towards provoking social tools adoption within his company and amongst customers. In the act of doing so, he has made a radical decision in minimizing his personal email usage to only 2% of what it initially was before the cut. Suarez was one of the characters that gathered interest to run this thesis work. This section goes through the main points that he had to offer on the subject.

Suarez had three initial reasons why he saw email as less efficient collaboration software compared with social tools. First off email never felt productive enough. This is because people can kill other productivity by using email as a delegation machine. It can also be used as a political weapon inside the company. The second reason had to do with finding the right mindset to collaborate. As working a lot with college students he identified that they are more open to share information. In some instances, the corporate world promotes holding back information for power, but in collaboration, sharing is power. The third reason was because of time management. With moving away from email, Suarez has proved to save more time to do other work, which others would spend reading their inbox.

Suarez also talked about the problems email has today. He emphasized that using email is too easy to use, thus not making him think about what communication channel would be best to share each message in question. Humans are not psychologically designed to work with wholes, but rather with fragments of information. Having social tools that are fragmented towards only a single function assists in this kind of working method. Also affiliated to this matter is the fact that email was not designed as a collaboration tool, but rather a notification system. Throughout the years it has gotten so popular that new functions such as file attachments have been added to the system. These functions however do not make the work process easier. When working in a group, passing around a document for further editing makes the process document-centric rather than conversation-centric. People treat email as a file repository, which it is not. On the other hand, there are multiple use cases for different social tools that could for instance handle file sharing more efficiently than email.

In the future there is big potential to move away from email. Suarez predicts that it will return to be used as a notification system. Social tools will gain larger market share. However switching away will require a business transformation strategy that focuses on the behavior that will change, not the technology. This was a complication Atos faced in their own attempts to kill email. They should have thought out more on how the tools will help them in a new way of working and underlining them to the employees who are making the switch.

5.3. Conclusions

Most work requires team effort, no matter if it is in the academic society or the business world. This sets a demand for tools for collaborating. Communication has already been possible for a long time with the use of email, but during the last decade more and more software-based innovations allow a diversity of options for the team members.

This thesis wanted to explore what issues affect the adoption of collaboration software, and took an example scenario of switching away from email. The subject seemed to be relevant as it was open for discussion lead by the Social Software evangelist Luis Suarez. Even though the amount of email is predicted to grow in the near future, there seems to be a large amount of pressure focused on cutting down the time spent within this program.

The research questions wanted to find an answer to the following: What factors affect the adoption of collaboration software and what are their relative importances compared with each other? The other research question was, how do these factors behave in different groups?

The subject was examined with two different social groups, students and professionals. The results show that the perceptions of the usability and usefulness of email lead to the most resistance to move away. Both groups saw their email software easy to use and useful for their work. However, professionals were less happy with their current email software.

Attitudes towards new technology usage indicated to help a bit with the intended adoption of other collaboration software. The confidence levels in the responses of students were not scientifically significant, but indicated that they were very familiar with technology in general. So were the professionals as they work with the subject of business software. For them, the effect seemed to be more significant. However, the forth hypothesized factor social norms did not have any effect in neither of the respondent groups and thus was not supported in the thesis.

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APPENDICES

Appendix A – Luis Suarez Interview Transcript, 25.2.2013

1. **Tell me briefly what your job description is?**

I work for the Software Group and I am part of the Software Marketing team. I'm currently as a social computing evangelist and helping our company to understand how to benefit from social tools. My role is to show our technical people how to share their eminence and expertise and their thought leadership using Social Software tools, both in an internal perspective and external one. On my free time I started this movement to not use email a couple of years ago, and at the moment it has turned into a beast of its own. It was originally something that I started as a one man movement and now there is hundreds of thousands of people in this as well, in different levels, different scales and different percentages; but they are still doing it.

2. **What made you switch away from email?**

It was in February 15th, 2008, just celebrated the anniversary. I can tell people there were three main reasons why I did it.

Number one was that I never felt productive enough with email. I mean I don't feel that email is wrong per se, it's a good system as how you communicate with people but I think that what I really don't like about email is how we have abused it ourselves to kill each others productivity. People use it as a delegation machine. So they dump their work into you when they share those tasks.

I don't like it either when they use it as a political weapon or as a bullying weapon. When they use the cc and the bcc field, and they feel like they are entitled to use the power. I feel that if we are all part of the same organization I don't have to fight you and your political silliness.

The last item from the nonproductively issue is the item were I didn't feel that email was enough of a collaboration tool. So email is still a good communication tool, but it is actually a pretty bad collaboration tool. This is because it is not transparent and it isn't open enough to allow flows of knowledge to go through.

Reason number two after the productivity issues has to do with during the course of the summer I go to work with a bunch of college students, like you, and I've been doing it for a good number of years and one of the ideas I notice when I'm interacting with them is that we got the job done. A lot of collaboration, but we never ever exchange an email. We did everything through instant messaging, Twitter, LinkedIn, Google Plus, whatever the social network was used. So I thought to myself, this is a generation that will start coming into the workplace. I need to find a particular way to work with that part of the workforce, so I don't feel like left out. I still got thirty years of working ahead of me so I need to adjust to how you guys work, because eventually next time you might be my manager. So that was the next reason why I stopped using email. If they can do it, why can't I? So I wanted to prove that it was possible.

The younger generation must start using email because their senior colleagues are using email, so they find themselves like they need to fit in. There senior peers are saying that "hey I only use email and if you don't use email you can't communicate with me." So that becomes a power struggle. It becomes a political struggle, as senior employees want to feel valued by retaining their knowledge. Here information is power. When I start working with these younger employees and work with their technologies, they are going to have my knowledge. It's actually the opposite. Its information and knowledge shared is power. The more the younger generation gets to know you, the more powerful you become. You become visible. There is something called recognition and merit, that doesn't perhaps bring you money, but it brings you legacy. And that legacy is how would you like yourself to be remembered from the knowledge what you share when you're not there. Do you want to not share anything at all and therefore be ignored? Or

someone who goes the extra mile who the younger generation sees self-sufficient and with they can do better things now that they are connected with you.

Then the senior employees say that they are not sure if they want to do that. Really, so you are saying you have spent thirty to forty years working you ass off in a company like IBM and you don't care how people will remember you when you are gone? You don't like to be remembered as that hard working person that was very collaborative and very open that people could have approached. Or would you rather be remembered as someone who didn't do anything else than was looking after their own inbox? That means when your inbox is gone, you're gone.

They might also argue that this just has to do with the generational debate, with generational diversity. I say no, this has a lot to do with your working style. I'm not young anymore, but yet I'm one of the most social people in the company using these social networking tools. It's a mindset. You really find a new way to interact with people. That's when people realize this is not about young versus older people. This is about finding out how to become more collaborative and more open with these tools that we have at our disposal. Unless you provoke and get them out of their comfort zone, which in this case is their email box, they never going to go anywhere. I can show you how to use the tools but more importantly, younger employees are going to show you how to use them. It not like a top-down power struggle, it's more like a peer-to-peer collaboration. You share something with me, I share something with you. That's essentially collaboration.

The third reason was that as a social business consultant and evangelist, when I consult people and I encourage them to use these different kind of social tools, one of the interesting things as problems as why they can't use these tools is that they don't have the time. That is the number one excuse. So they are busy with customers, with presentations, and on top of that they have to handle their email and on top of that you're telling me that I should use social networking tools? I'm sorry but I just don't have the time. So I told them that how about I prove to you that you can live without email, using these social tools, and you will be more productive than what you now are, leaving you with more free time every day not having to go through these silly emails. Will

you be listening then? And then they are like yeah, good luck with that! But I've been doing it for five years with strong evidence. So those are the three reasons that made me quit.

3. What are the fallbacks you see in email specifically today?

The main problem with email is that it's too easy. People might think that this is crazy, but it really is. It doesn't require thinking. Whenever you receive an email and you read through it, if you know the answer, you right away reply to it. You reply to it without thinking. That's a problem. You aren't thinking what the best venue for that solution is. Email makes us lazy. I know this is a very loaded topic, from the perspective that someone would say "how can you say email makes us lazy". It doesn't allow you to think. It doesn't make you think is this the best way to collaborate and share this piece of knowledge. Email is very good in boosting the MeMeMe –factor, in a sense that I only care about my work stream and I don't care about anything else happening around me. In the late 80's it might have worked, but in a world where we are more distributed and no longer work in only one project, we work in multiple teams across geography and time zones, email is no longer cutting it.

Also the fact that it's too private is a problem. People use it just to live on that mantra of the need to know –basis. So I only share information when you need it, when you ask for it. That's a wrong attitude. When you look in to social networking tools, it's no longer that I need to know, it is actually share everything publicly by default, unless you have been told otherwise. Why not, what are you hiding?

When you reply to an email, you don't think so much what you say. It is seen as a private dialogue. In this type of communication you are allowed to make mistakes without having to suffer. In a public sphere it's different. It's totally different when you write an email and when you write a blog post. As a starting point the audience is different. As a starting point with email you know exactly who you are sending it to. When you put up a blog post, you don't know who

is going to read it. You just basically share it out there. You become more engaging because you are open to the unexpected. You are open to the uncertain. Also email is communication in silos.

With email you can share knowledge when you are available. What happens when you are on a vacation? What about when you leave the company? This is the most serious issue. After that all of that information is gone. That is actually one of the main issues with email today; knowledge will disperse when the inbox is deleted.

When email was first designed forty years ago, it was designed as a messaging and notification system, as an alert system. In the 90's we changed that, we made it to a repository system. That's our problem. We need to go back to basics. I'm not telling people not to use email, I am telling them to stop using email as a common repository. Email can be used as a feed aggregator, as a rss feed. You can use it to get notifications about new content in social networking sites. Email was designed to do just that so you should use it for that purpose only.

Some people might say that they have a problem in doing that. In my perspective it's a much more fundamental problem if you cannot change. It doesn't have anything to do with social networking and email. It a problem with trust, in the sense that you don't trust your work because you don't want to share it. You don't trust your colleagues because you don't want them to know about their knowledge. And you don't trust your boss because you are uncomfortable of sharing all that information. I tell them at this moment that "I don't mean to be harsh to you, but I think you are in the wrong job."

Going to the features of email, there are some fallbacks. Attachments for instance. When email was first brought into life, it didn't have attachments. You would have a file repository where you would go for files. Now in the late 90's the attachments were brought into email. They introduced what I like to call document-centric computing. So communication and collaboration was based around a document. A word document was passed around by email. You would add your information to the file and then forward it to your colleagues. That was the biggest mistake ever made, because document-centric is not conversation-centric. Its more of me doing some work and then dumping it to you so you can continue finishing it off. If you look into it, some of

the social networking platforms out there are very document-centric versus people centric. The problem with that is that people treat those as file repositories. They aren't social networking sites anymore.

If you are able to put the same content in a blog post or a wiki post, why wouldn't you? What's the point in creating a document when you can just create a blog that doesn't have the friction where people have to open the file, saving it to the computer and using another program for viewing it. Imagine the amount of extra clicks and extra work. Also the size is a issue. Why would you go on and send me a 30mb file attachment when you can actually put the same information in a wiki with screenshots and everything else. Why are you wasting my time? Usually the answer is that because it is so easy to send it via email, just add the attachment and so on. Yeah, it's easy to you to send it, but its not easy to me who receives it. From that perspective attachments are evil, and I'm very blunt about it.

If someone would ask me, what are two features that would kill email today, I would say attachments and the other one would be reply to all –feature. The reply to all is the worst thing to imagine, because its some kind of a thing where we try to prove our existence. Where we try to cover all our tracks, to show people "hey I actually did this kind of work. Trust me, I got it in my email." How sad is that if you have to prove by email that you have done your job? Again it goes back to the trust issue. I tell people that I don't need to know.

4. **How can these fallbacks be addressed with newer forms of collaboration software?**

When I first started doing this thing without email, I started going through some research. I did a lot of reading on how we psychologically behave in a corporate environment, and one of the interesting things that I learned was that the reason why we have so many problems with email, especially with the issues of information overflow, its because our brain is not been designed to work with wholes. It cannot comprehend the whole thing. Our brain is designed to actually work

with fragments and make decisions in fragments. We actually do fragmentation mentally, that's how we make decisions when we are confronted with a problem.

So the way I describe it to people is that ok, I know you all use social networking tools. They answer yes, they use them. So if you were to share pictures where would you go. Typical pause, and they say they would do it in Facebook. Facebook is an exception, because its not a social network, it's a publishing platform. So take off Facebook as an example. Then people would say Picasso or Flickr. Then I ask to tell me what else you can do in those sites. What other features do the sites have? Well not much. That's exactly the point! They are fragmented. The only reason you would go to those sites would be for those pictures, nothing else.

If you want to go for pictures, you can use flickr, if you need links you can check out Delicious, if you need to share files you can do it in Dropbox. From having everything in one single basket, I call it actually Pandora's Box which is email, to actually fragmenting information to tools that are designed for that kind of information. Depending on the context of what you want to do, you will go to one place or another. Depending on the tasks and the activities you have to do, pick the best option out there. What you actually start doing is you become far more focused on that particular task. So instead of multitasking you do monotasking. Our brain has not been designed to multitask. Regardless of what people say, we cannot do multiple things at the same time, at least when knowledge work is involved. What happens then is that when you start monotasking you actually spend less time doing that task, and much more effectively.

So instead of telling people "hey this is my option to collaborate with each other", I tell them that these are the options. Figure out what is the task that you need to do, and we can think what the best option for doing them is. Some say that they don't know where to go. That is fine, that's something I can help you with, because I have the experience. Once I show it to you, you will remember it the second time. You get to even choose which option you will use. The main idea is to get them focused on the task, not the technology.

5. Why aren't employees switching to other forms of collaboration software (or are they)?

Let's talk about Atos, which is trying to employ a ban on email usage in the whole company. I have known Atos for several years. They blasted out to the world that they are going to go obliterate email completely from Atos, for 75 000 people world-wide. It brought up a huge uproar, and plenty of people said to me "you have been trying to do that for the last three years, what do you think about these guys in Atos?". I said that it's an interesting marketing stunt because they will never going to make it happen. I mean as a starting point it's a corporate mandate. Its top-down driven. Eventually people will tell you that they don't care, and they don't have an opportunity to do it. Email is still the easiest way to get the job done for them. Remember this MeMeMe –mentality? Now what happens in Atos is that this is their third year trying to do it. I've talked to them last year and they said they have about 30% of people not using email. I hesitated if they will get the rest 70% in less than a year of which they got left according to the initial plan. They hoped so, but personally I think it's not going to happen.

The reason why it's not going to happen is because far too many choices and options. Choices are good as long as you got constrains. Constrains means that instead of having forty choices you would only have to pick from one two or three. So the actual option that they have is multiple choices. None of these options are integrated with each other. So there are islands that sit everywhere. The difference in how I work is that I have restricted my choices down to three. If it is work related: Connections. If it is external: Twitter or Google Plus. That's it. I'm giving you three options to do that, nothing else. If you are elsewhere, we can go there. But if you need to find me, use one of these three tools.

You are maybe wondering where did Atos fail. They failed something that is fundamental. They didn't identify and switch from one email into whatever system, they focused on the technology and not on their behavior, not the task. Not the activities, not the mindsets of how to become collaborative. On the mark that says only 1/8 found the new system to be comprehensive, that 12% found a use case for that system. The other 88% didn't find it. For them email was easier

and lazier. This is not about switching tools and switching technology, this is about provoking a totally new mindset on how you work. Focusing on your tasks and activities and you are going to apply new ways to work.

An allegory for the situation is that they tried to put lipstick on a pig. They tried to make the pig pretty, but a pig is a pig. They didn't transform their organization. They didn't try to get rid of the hierarchy, or the top-down driven mandates, or the use cases for the email. They just tried to make it happen with a new tool. It's not going to work. That's basic business transformation and organizational change. You need to provoke change for business purpose. At least this is my opinion.

6. What are the factors affecting people not switching away?

Email is too easy. They are used to it, they have been used to it for 25 years. Your generation should be the one disrupting the model. I'm saying that because right now people feel that these social networking tools aren't as easy as email, they wont make the switch. The hardest thing is to change. And using social networking tools isn't easy. It is because it requires you to think. Thinking takes energy and effort. This is what your generation does automatically. You are used to it, we aren't. We are used to working on an environment where we rely on phones, faxes, and email messages. People don't want to change their behaviors, that is the main reason.

What is happening now is that the older generation is outnumbering the younger one. You are a minority at the moment. But there are some statistics and demographics that prove that in five to ten years you will be the vast majority of the workplace. Email will not die in five years, but is going to reposition itself, its going to go back to basics. The new generation will use email as a notification system only. I've been trying to kill email for the past five years but I couldn't. but I was able to cut email down to 98% from all of the volume that I was getting when I first started. It's about two email per day, rather than over thirty.

Also email is still brilliant for some use cases. It is unique in these use cases. One of these cases is the universal identifier. That means that everyone has got an email address. In fact when you sign up for new services, or you book some tickets, the first thing they are going to ask is your email address. Social networking tools do not have that universal identifier. But if you look on how social networking tools have been influenced society today, it is very hard to find someone who doesn't have a Facebook account, who doesn't have a Linkedin account, who doesn't have a Twitter id. In the future we won't have just a single universal identifier, we are going to have multiple of them depending on where you want to spend time.

Imagine if someone sends me an email and asks me a question. The easiest way for me is to respond to that message back and give the answer. But rather I usually look at the closing information of the signature of that person. This is because in there they tell me where they hang out online. Then I just go where they are. In that sense we are connected.

7. How will the future be different in terms of the adoption of new collaboration technology compared to the near past?

We are not going to use one universal identifier, but rather several ones. Ideally, and this is like ideal status that is not happening at the moment, eventually we will have a federated social networking tool. This means that whatever is happening in one network will get populated elsewhere. My feeling is the one that the one who is going to provoke that is Google Plus. One of the reasons why it's my favorite social networking tools is because it has the potential to integrate with everything that we do in the internet.

I've been exposed to social networking platforms for a long time. One of the things that I have noticed in the last six to eight years is that even before I started doing this email thing is that each of those Social Software started from completely different places. Sharepoint is a file sharing repository. Yammer is an activity stream. Connections is Bluepages. Here we see it. All of the social networking tools started as a task specific program. Now if you look further on of what is

happening today, you can see how they are core to the functionality, but they have incorporated features from each other tools. In most of the tools you can do all of the features. They are becoming a lot more hybrid and promiscuous. We are going to reach a point in time where the vast majority of the enterprise Social Software vendors will be offering the exact same type of features and capabilities. At that point we are not going to being talking about Social Software, we will talk about email. Email will be the integration factor that will make it all happen into one single platform. And it's coming. The next challenge is what happens when all the vendors offer the same functionality? How would a customer pick one or the other?

That's when you move to the transformation space. That's when you have to change the corporate culture, the mindset of workers. We are going to see how social networking products will be very standardized. This will make it easier for us to interact.

Appendix B – Summary of Questionnaire Responses

Response	Generation Y	Generation X
I like to experiment with new technology.		
Strongly Disagree	0 %	0 %
Disagree	4 %	4 %
Neither Agree or Disagree	17 %	12 %
Agree	35 %	54 %
Strongly Agree	44 %	30 %
New technology makes me feel more empowered.		
Strongly Disagree	0 %	0 %
Disagree	12 %	4 %
Neither Agree or Disagree	29 %	23 %
Agree	42 %	60 %
Strongly Agree	17 %	14 %
I am used to having technology around me most of my lifetime.		
Strongly Disagree	0 %	2 %
Disagree	0 %	4 %
Neither Agree or Disagree	4 %	4 %
Agree	38 %	49 %
Strongly Agree	58 %	42 %
Email is suitable for sharing different kinds of digital information.		
Strongly Disagree	2 %	7 %
Disagree	17 %	28 %
Neither Agree or Disagree	4 %	16 %
Agree	44 %	47 %
Strongly Agree	33 %	2 %
Information is usually presented in an ideal form in emails.		
Strongly Disagree	0 %	4 %
Disagree	38 %	49 %
Neither Agree or Disagree	23 %	21 %
Agree	31 %	25 %
Strongly Agree	8 %	2 %
Email enhances my effectiveness.		
Strongly Disagree	2 %	4 %
Disagree	13 %	18 %
Neither Agree or Disagree	37 %	33 %
Agree	29 %	40 %
Strongly Agree	19 %	5 %
Email improves my work performance.		
Strongly Disagree	2 %	2 %
Disagree	17 %	28 %
Neither Agree or Disagree	23 %	21 %

Agree	35 %	40 %
Strongly Agree	23 %	9 %
Of all types of Collaboration Software, email is the one that makes my job easier most effectively.		
Strongly Disagree	8 %	4 %
Disagree	27 %	33 %
Neither Agree or Disagree	19 %	26 %
Agree	21 %	26 %
Strongly Agree	25 %	11 %
My current email application is clear and understandable compared to other types of Collaboration Software.		
Strongly Disagree	4 %	11 %
Disagree	12 %	21 %
Neither Agree or Disagree	23 %	25 %
Agree	37 %	32 %
Strongly Agree	25 %	12 %
Using my email application requires only a small amount of mental effort.		
Strongly Disagree	2 %	5 %
Disagree	6 %	14 %
Neither Agree or Disagree	19 %	18 %
Agree	37 %	47 %
Strongly Agree	37 %	16 %
I rarely get frustrated using email when communicating with others.		
Strongly Disagree	8 %	7 %
Disagree	17 %	33 %
Neither Agree or Disagree	15 %	23 %
Agree	42 %	30 %
Strongly Agree	17 %	7 %
Using email is required in my day-to-day work.		
Strongly Disagree	4 %	0 %
Disagree	10 %	0 %
Neither Agree or Disagree	6 %	12 %
Agree	25 %	30 %
Strongly Agree	56 %	58 %
I am NOT allowed to use other types of Collaboration Software instead of email.		
Strongly Disagree	42 %	46 %
Disagree	29 %	44 %
Neither Agree or Disagree	10 %	7 %
Agree	13 %	4 %
Strongly Agree	6 %	0 %

My colleagues think I should use primarily email instead of other Collaboration Software.		
Strongly Disagree	6 %	4 %
Disagree	21 %	19 %
Neither Agree or Disagree	44 %	49 %
Agree	23 %	26 %
Strongly Agree	6 %	2 %
Using primarily email instead of other Collaboration Software is a norm in my working environment.		
Strongly Disagree	6 %	0 %
Disagree	12 %	12 %
Neither Agree or Disagree	19 %	25 %
Agree	42 %	53 %
Strongly Agree	21 %	11 %
It's socially preferable to write an email rather than use other Collaboration Software.		
Strongly Disagree	4 %	2 %
Disagree	23 %	23 %
Neither Agree or Disagree	19 %	37 %
Agree	35 %	37 %
Strongly Agree	19 %	2 %
I wish I could replace at least a part of my email usage with other types of Collaboration Software.		
Strongly Disagree	29 %	2 %
Disagree	17 %	12 %
Neither Agree or Disagree	17 %	23 %
Agree	27 %	42 %
Strongly Agree	10 %	21 %
Email makes me more productive.		
Strongly Disagree	6 %	5 %
Disagree	17 %	26 %
Neither Agree or Disagree	27 %	26 %
Agree	33 %	33 %
Strongly Agree	17 %	9 %
I find it easy to do what I want with my email application.		
Strongly Disagree	6 %	2 %
Disagree	4 %	32 %
Neither Agree or Disagree	19 %	14 %
Agree	44 %	40 %
Strongly Agree	27 %	12 %
I am unhappy of the amount I have to use email currently.		
Strongly Disagree	25 %	0 %
Disagree	29 %	12 %
Neither Agree or Disagree	21 %	32 %
Agree	23 %	37 %
Strongly Agree	2 %	19 %

Appendix C – Question Outer Loadings

All Data First Run	ATTU	PEOU	PU	Social norms	Intention to...
I am used to having technology around me most of my lifetime.	-0,022				
I like to experiment with new technology.	0,584				
New technology makes me feel more empowered.	0,959				
I find it easy to do what I want with my email application.		0,809			
I rarely get frustrated using email when communicating with others.		0,735			
My current email application is clear and understandable compared to other types of Collaboration Software.		0,795			
Of all types of Collaboration Software, email is the one that makes my job easier most effectively.		0,674			
Using my email application requires only a small amount of mental effort.		0,655			
Email enhances my effectiveness.			0,862		
Email improves my work performance.			0,910		
Email is suitable for sharing different kinds of digital information.			0,653		
Email makes me more productive.			0,904		
Information is usually presented in an ideal form in emails.			0,651		
I am NOT allowed to use other types of Collaboration Software instead of email.				0,403	
It's socially preferable to write an email rather than use other Collaboration Software.				-0,697	
My colleagues think I should use primarily email instead of other Collaboration Software.				0,234	
Using primarily email instead of other Collaboration Software is a norm in my working environment.				-0,020	
I wish I could replace at least a part of my email usage with other types of Collaboration Software.					0,933
I am unhappy of the amount I have to use email currently.					0,907

All Data Second Run	ATTU	PEOU	PU	Social norms	Intention to...
I like to experiment with new technology.	0,695				
New technology makes me feel more empowered.	0,981				
I find it easy to do what I want with my email application.		0,809			
I rarely get frustrated using email when communicating with others.		0,735			
My current email application is clear and understandable compared to other types of Collaboration Software.		0,795			
Of all types of Collaboration Software, email is the one that makes my job easier most effectively.		0,674			
Using my email application requires only a small amount of mental effort.		0,655			
Email enhances my effectiveness.			0,862		
Email improves my work performance.			0,910		
Email is suitable for sharing different kinds of digital information.			0,653		
Email makes me more productive.			0,904		
Information is usually presented in an ideal form in emails.			0,651		
I am NOT allowed to use other types of Collaboration Software instead of email.				0,870	
My colleagues think I should use primarily email instead of other Collaboration Software.				0,794	
I wish I could replace at least a part of my email usage with other types of Collaboration Software.					0,933
I am unhappy of the amount I have to use email currently.					0,907

Employees	ATTU	PEOU	PU	Social norms	Intention to...
I like to experiment with new technology.	0,679				
New technology makes me feel more empowered.	0,958				
I find it easy to do what I want with my email application.		0,753			
I rarely get frustrated using email when communicating with others.		0,805			
My current email application is clear and understandable compared to other types of Collaboration Software.		0,740			
Of all types of Collaboration Software, email is the one that makes my job easier most effectively.		0,607			
Using my email application requires only a small amount of mental effort.		0,745			
Email enhances my effectiveness.			0,865		
Email improves my work performance.			0,932		
Email is suitable for sharing different kinds of digital information.			0,604		
Email makes me more productive.			0,935		
Information is usually presented in an ideal form in emails.			0,634		
I am NOT allowed to use other types of Collaboration Software instead of email.				0,899	
My colleagues think I should use primarily email instead of other Collaboration Software.				0,480	
I am unhappy of the amount I have to use email currently.					0,828
I wish I could replace at least a part of my email usage with other types of Collaboration Software.					0,909

Students	ATTU	PEOU	PU	Social norms	Intention to...
I like to experiment with new technology.	0,837				
New technology makes me feel more empowered.	0,956				
I find it easy to do what I want with my email application.		0,82			
I rarely get frustrated using email when communicating with others.		0,62			
My current email application is clear and understandable compared to other types of Collaboration Software.		0,818			
Of all types of Collaboration Software, email is the one that makes my job easier most effectively.		0,785			
Using my email application requires only a small amount of mental effort.		0,472			
Email enhances my effectiveness.			0,874		
Email improves my work performance.			0,896		
Email is suitable for sharing different kinds of digital information.			0,626		
Email makes me more productive.			0,890		
Information is usually presented in an ideal form in emails.			0,618		
I am NOT allowed to use other types of Collaboration Software instead of email.				0,990	
My colleagues think I should use primarily email instead of other Collaboration Software.				0,720	
I am unhappy of the amount I have to use email currently.					0,913
I wish I could replace at least a part of my email usage with other types of Collaboration Software.					0,934

Appendix D – t-statistics

All Data	T Statistics	Probability	Confidence, %
Attitudes towards new technology usage -> Intention to adopt other collaboration software	2,3863	0,019	98,1
Perceived ease of use of email -> Intention to adopt other collaboration software	9,6518	0,001	99,9
Perceived ease of use of email -> Perceived usefulness of email	16,4446	0,001	99,9
Perceived usefulness of email -> Intention to adopt other collaboration software	3,9927	0,001	99,9
Social norms -> Intention to adopt other collaboration software	0,9681	0,335	66,5
Employees	**T Statistics (|O/STERR|)**	**Probability**	**Confidence, %**
Attitudes towards new technology usage -> Intention to adopt other collaboration software	2,9979	0,004	99,6
Perceived ease of use of email -> Intention to adopt other collaboration software	5,1235	0,001	99,9
Perceived ease of use of email -> Perceived usefulness of email	10,6994	0,001	99,9
Perceived usefulness of email -> Intention to adopt other collaboration software	2,823	0,007	99,3
Social norms -> Intention to adopt other collaboration software	1,5053	0,138	86,2
Students	**T Statistics (|O/STERR|)**		
Attitudes towards new technology usage -> Intention to adopt other collaboration software	0,288	0,77	23
Perceived ease of use of email -> Intention to adopt other collaboration software	10,0573	0,001	99,9
Perceived ease of use of email -> Perceived usefulness of email	13,6867	0,001	99,9
Perceived usefulness of email -> Intention to adopt other collaboration software	2,5012	0,016	98,4
Social norms -> Intention to adopt other collaboration software	1,0512	0,298	70,2