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UNDERSTANDING THE IMPORTANCE OF INFORMATION SYSTEMS IMPLEMENTATION IN ORGANIZATION'S EFFECTIVENESS: A COMPARATIVE STUDY ON TWO SWEDISH ORGANIZATIONS

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ABSTRACT

Information systems (IS) exist in order to intensify the information flow within an organization, at all levels, specifically to allow set of data to reach the designated person, in the right format, and at the right time, generating a positive and beneficial contribution to the organization. Therefore, it is essential to investigate their intended purpose and how they affect the organization's effectiveness in particular. This paper aims to investigate two different implementations of information systems in two organizations and understand the impact these implementations have on the respective organization's effectiveness. We use three antecedents, namely, *time-saving*, *workload*, and *system reliability*, to distinguish users' perceptions and experience with the system and how they affect the organization's effectiveness. An interpretative method is used, due to the paradigm's focus on social constructions and human interpretations to explain reality. The result of the findings shows that the implementation of a new IS has a greater impact on an organization's effectiveness, compared to an older system that gets updated and add-ons. By comparing diversities between different implementations of information systems, focusing on how the chosen approach affects the effectiveness in each organization, a better grasp, and understanding of an area that lacks research and attention is highlighted.

Keywords: information system, implementation, organization effectiveness, antecedents, user satisfaction.

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INTRODUCTION

In the present dynamic and ever-changing business landscape, making informed and effective decisions is central to successfully managing organizations. This can be easily achieved by relying on information systems (IS) that are effective and support the diverse information and decision-making needs for their operations. In addition, information systems are designed to support and intensify the information flow within an organization, at all levels. They make sure that a set of data reaches the designated person, in the right format, and at the right time, generating a positive and beneficial contribution to the organization. As indicated by Michael Savoie (2016), information systems can be compared to the central nervous system in the human body, where it does not matter how strong the body is, nor the activity of the brain; if the central nervous system cannot send signals (information) to the body accurate or in a timely manner, the body will not function properly.

The rapid development in the field of information systems have created situations when new systems are continuously emerging, whereas older systems are getting updates and new features added. In this perspective, it is of paramount importance to investigate their intended purpose and how they affect the organization's effectiveness in particular. The effectiveness of an information system can be described and approached through a number of different perspectives (DeLone and McLean, 2013). Evaluation of an effective system can be shown through enhanced productivity, improved performance, and increased control over the decision related to the information that is produced. Thus, the information generated not only can contribute to making the decision-making process more effective and informed, but it can also serve as a catalyst for advancing an organisation's goal.

In accordance with effectiveness and cost-cutting initiatives, the field of information technology (IT) has gained a lot of momentum among organizations, and a large percentage of organizations' budget is continuously invested to introduce, implement, and expand the use of IS within the organization (Lee, 2007; Lytras et al, 2008; Henfridsson and Bygstad 2013). Up to a certain extent, almost every small, medium, and large-scale organization and business are implementing IS. Likewise, more resources are put into place to ensure an effortless exchange of data not only within the internal but also for external stakeholders (Morris, 2013). The implementation of IS, aligned with the organization's business strategy, has a decisive influence on the performance of organizations (Jadda & Idrissi, 2015; Laudon & Laudon, 2017). However, not every investment made in IS related projects turns profitable, seen from the view of expected outcomes. Overall, most organizations fail to produce the expected result. There are several reasons for this, such as the extremely competitive and challenging business environment the world is today, which has resulted in organizations deploying different strategies in attempts to maintain their position in the market.

The constant need of dealing with a competitive market has led organizations to transform themselves from the ground up and to modify their services and products, often with a fast pace of change, where processes are frequently changed. However, these deployments of different strategies to ensure better performance and effectiveness are not reflected in their IT and IS, which is an additional reason for the systems to be seen as obsolete. Furthermore, the need or rather lack of, extensive technical and soft skills during the implementation phase hinders the system to have an effective positive output. But also, the fact that organizations are, to a large extent, not mature enough with respect to the information system they try or even have implemented (Bell & Wood-Harper, 2003; Li & Li, 2011; Marnewick et al., 2017).

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The main goal of this paper is to explore two different implementations of information systems in two different organizations from Sweden and understand the impact of IS implementations on the respective organization's effectiveness. In this context, we utilize three antecedents that are *time-saving*, *workload* and *system reliability* in order to distinguish users' perceptions and experience with the system and how they affect the organization's effectiveness. Due to the paradigm's focus on social constructions and human interpretations to explain reality, we apply the interpretative method. Several IS practitioners are involved in the study and four pre-interviews along with seven interviews are conducted. As part of the evaluation, we found that the implementation of new IS has a greater impact on organization's effectiveness compared to an older system that continuously is being updated and gets add-ons. Moreover, when comparing the first versions of the older IS with the latest, the findings showed a large improvement in all antecedents as well. However, the participants in the study highlighted that in order to reach a better level of satisfaction by its users, but also to achieve better effectiveness, there are still several issues that need to be fixed in the older IS.

The remainder of this paper is organized as follows: next section highlights some background work and the state-of-the-art in the field, while research context and method section provides an overview of the research design employed in this study. In the subsequent section we provide the identified findings whereas discussions based on the findings are presented in the discussion section. The conclusion section summarizes the paper, by also highlighting limitations and potential future research.

BACKGROUND AND RELATED WORK

Effectiveness is a board term and can include a number of different aspects and antecedents. This paper is limited to three (3) antecedents within the concept. The following subsections are used to highlight how the selected antecedents (or factors) can help organizations with their effectiveness. Two antecedents that have been frequently brought up and researched throughout the "history" of user satisfaction are productivity and reliability. For this reason, system reliability has been chosen. Productivity has been divided into two separate antecedents, namely, workload and time-saving. Hence, in this study, the antecedents that have been researched as contribution to effectiveness are *workload, system reliability* and *time-saving.*

The selected antecedents have been chosen since many of the other antecedents included at Vaezi et al. (2016) can be grouped in the same category as the selected ones. For instance, *Ease of use* and *Assistance* can be placed in the same category as time-saving. Also, much research already exists on productivity and reliability, however not with the same focus as this paper has. Therefore, the selected antecedents, with the paper, can bring new findings that can be compared to already existing research and thus open up new ideas and opportunities within the field of IS. Figure 1 below showcases how the different antecedents can be seen to belong to the same group.

Workload as an antecedent to effectiveness

In the body of literature, some of the researchers have investigated how the utilization of IS in power distribution management affected work effectiveness and the system's impact on giving meaningful insight into productivity and competition (Chao et al.,2010). Their result showed that by implementing and connecting information systems and incorporating a substation automation system, the workload decreased significantly while improving staff effectiveness and accuracy. In a similar

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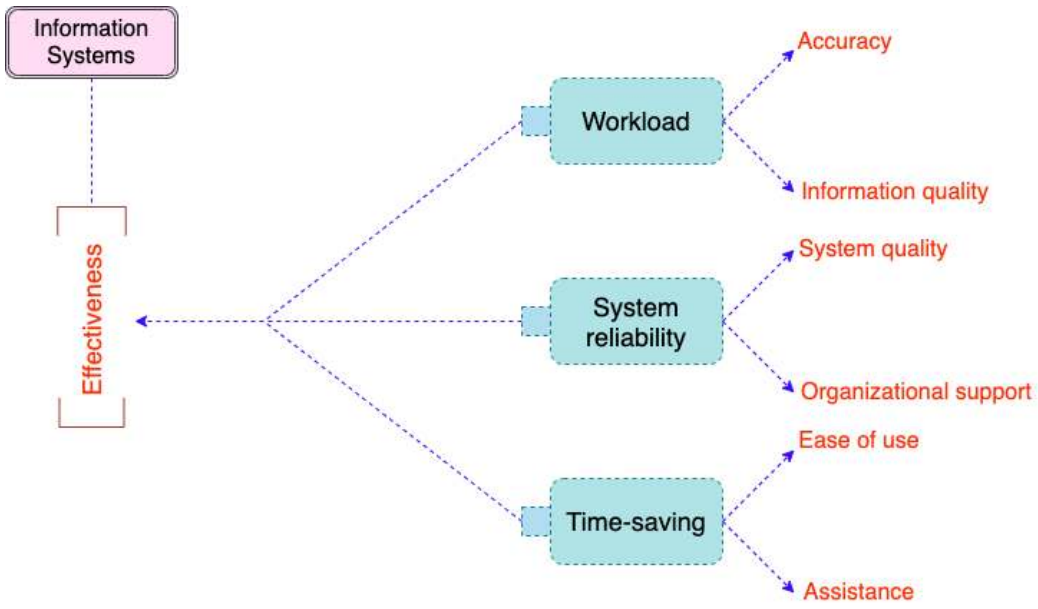


Figure 1. Three effectiveness antecedents investigated in the paper.

context does Niu and Gao (2012) demonstrate the importance of an information system in terms of teacher's workload. Teacher's workload management is characterized by low effectiveness, error-prone, but most of all time-consuming. An information system was created to handle curriculum and parameter management, system maintenance, and report printing, with an idea to operate independently. The information system in place reduced the error rate, improved the work effectiveness, seen to time and workload, and created more flexibility. The outcome of the implementation was that the teacher's workload got reduced and time spent on previous tedious assignments diminished. Similar results were shown by Ma et al. (2009), Watungwa and Pather (2018), who found that the usage of IS that takes into account several individual aspects of each organization, will lead to a reduction of workload and a higher effectiveness standard.

Better workload is something every organization strives for. If the workload increases, without opportunities for control by the employee, it results in psychological, physical, and emotional fatigue, as well as increased strain and stress. This has a negative influence on performance which can affect the whole organization (Barnes, 2009). As previously stated in the introduction, an increased effectiveness is one reason why IS' are implemented in organizations. If the workload is negatively affected by the IS, or not at all, the system has lost one of its primary functions, which is why there is an underlying necessity to study its effect in organizations.

System reliability as an antecedent to effectiveness

Information system reliability has in recent years become more important not only for the sustainability of the system within organizations, but also when applied in the economy and

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environment. The need for a method to improve system reliability has grown and has become a more ever-pressing matter for scholars and researchers alike. Zhijie (2010) researched the life cycle of IS and the importance of a reliable system for it to deliver on its objective and improve overall effectiveness in the designated area. Their research shows that declining system performance will result in an increased recognition from the user organization that the system should be discontinued. Although it could have been avoided from the start. Likewise, the researchers Sommerville (2007) and Matsuura et al (2012 studied the importance of understanding the value of investing heavily on an information system which is compatible with the needs of the organization. Organizations often invest substantial money on IS, its operation and infrastructure. The system investment is seen as an overwhelming reason to continue using existing IS and steer away from discontinuance intentions.

System reliability is a crucial antecedent whether or not its users can work within the system and rely on it. In our study, investigating this antecedent in an older IS (Organization B) and a newer (Organization A), then comparing the two, will allow us for a better understanding on how big of a factor system reliability is and how the reliability may change over the years. Furthermore, if the reliability of the system is low, all operations that function within the IS may fail, or function to a lesser degree. This in turn may affect the effectiveness of the whole organization.

Time-saving as an antecedent to effectiveness

In the field of IS, one of the main objectives for IS is to be time efficient. Therefore, a large percentage of the field's scholars and researchers focus their research on implementations and changes that can impact the organization's time usage. Antono et al. (2018) have studied the learning evaluation of a childhood education organization and how an implementation of an IS could benefit the organizations in terms of time effectiveness. Their research showed that before the information system got added, it took teachers 1 hour 21 minutes 30 seconds to complete the learning evaluation. In that time, they had to recap the daily grades, add descriptions and other information to each grade, and also manually input student grades into a grade book. The time needed to complete the task had reduced from 1 hour 21 minutes 30 seconds, to 2 minutes 19 seconds 24 milliseconds, and the information system had an increased time efficiency of 94.94 percent.

Fager et al. (2019), researched and compared information systems and their effect on time effectiveness. They found that the implementation of an IS is not enough to ensure time effectiveness. Rather *which kind* should be the focus for organizations and businesses alike. Moreover, when the *right* information system is implemented, based on the organization's objectives and issues needed to be resolved, the system will bring a positive effect on on-time effectiveness. In similar context did Soyemi et al. (2014), showing that choosing the right IS, in their case a system that allows in exchanging and sharing clinical records among hospitals, results not only in better and faster decision making, but also improves the effectiveness and saves a great time within the whole organization

With less time being put into completing various tasks, Antono et al. (2018), Fager et al., (2019), and Soyemi et al. (2014) showcase that through the use of information systems the overall time spent in the office, whether that would be at a university, hospital, or a private business, can be optimized and spent on more important tasks. Thus, optimizing the organization to the extent that employees can focus on more precious objectives and work faster and efficiently.

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RESEARCH CONTEXT AND METHOD

Epistemology was chosen for the study, as it takes into consideration the human aspect and cognition, which is of importance to the paper. Within IS there are several main paradigms, which guide the chosen science. The selected tradition used for the paper is interpretivism, due to the paradigm's focus on social constructions and human interpretations to explain reality. In this context, the aim of the paper is to understand how the participants interpret the information system when it comes to set of factors based on effectiveness. Interpretive research paradigm can contribute to both IS theory and practice, in regard to human interpretation and social context in organizations focusing on computer-based IS (Myers & Avison, 2002; Prasad, 2005).

Two research questions have guided this study:

What is the impact of the implementation of a new information system on an organization's effectiveness?

How does the implementation of add-ons, i.e., updates, on a current (already deployed) information system impact organization's effectiveness?

A qualitative approach was chosen for this paper, with interviews as the primary data collection method. The paper uses semi-structured interviews. The main advantages of interviews are that the method enables rich data collection and speed. Furthermore, the format enables deeper insights about the individual(s) views, motivations, beliefs, and/or experience, factors that are crucial to the paper.

Interviews in two different public organizations, Växjö Municipality (Organization A) and The Swedish Enforcement Authority (Organization B), were used as primary data. The purpose of the interviews was to gather information about the two information systems and impressions of the employees, to accurately display which kind of implementation is more efficient. We use a purposive sampling method for selecting respondents. With this method, the respondents are deliberately selected for the interviews to ensure that the selected individuals possessed the desired information needed (Dolores & Tongco, 2007). In total, 7 individuals were interviewed to be used as the main data gathering. Table 1 and 2 present the roles and experiences of the selected employees working in the information system.

Table 1. Organization A's participants.

Participant	Working Role	Years of Experience with the IS
Participant A	Business Controller	1
Participant B	Head of Department at Work and Welfare	2.5
Participant C	Budget Director	2.5

Table 2. Organization B's participants.

Participant	Working Role	Years of Experience with the IS
Participant D	Coordinator	10
Participant E	Administrative Officer	10
Participant F	Lawyer	4
Participant G	Administrative Officer	10

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Furthermore, to present a deeper insight into the systems, some data has been collected through other resources provided by the organizations. In order to generate useful data as possible from the candidates' answers, several steps were put into place to ensure high-quality interview questions. After the first version was drafted, it was inspected and critiqued by four individuals from each organization with insights of the subject and the paper. The feedback was then assessed, and changes were made in questions that needed qualification or in other ways improved. The third stage was to test the questions on said individuals and get additional feedback. Afterwards, one subject was interviewed as a finale test, their answers were then incorporated in the final version of the interview questions. Afterwards, the interviews began and took place during a time-period lasting around one month. Lastly, the collected data was analyzed (see Figure 2).

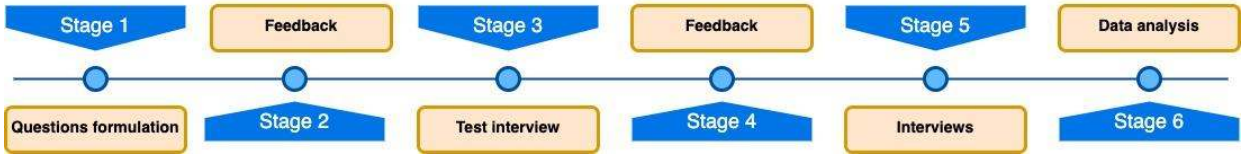


Figure 2. Interview process - creating and fine-tuning the questions for the interviews.

The interviews were recorded to allow for deep analysis which is further used as an aid to pick up themes and concepts that otherwise could go unnoticed. An inductive strategy is used in qualitative research as it allows for the questions to be answered in natural settings.

Thematic analysis

It is important to point out that in a qualitative paper like an interview, the data is often too dense for it all to be used for analysis (Creswell & Creswell, 2014). For this reason, there are many different methods to be used for text analysis. In this case, an adaption of Lichtman's thematic analysis method is used. The method helps to identify and analyze useful data and to find concepts and themes, which is according to Lichtman (2014), is a large part of qualitative research. The original analysis method consists of six (6) steps of thematic analysis: *initial coding*, *revisiting initial coding*, *developing an initial list of categories*, *modify the initial list by re-reading the material*, *revisit categories and sub-categories*, and *proceed from categories to concepts*. This method is often referred to as the 3 C's (Codes, Categories, and Concepts) of data analysis. However, the adaptation made for this paper is to remove the coding sequence of the method and replace it with a standardized comparison between the answers of the interviews. The adaptation can be seen in Figure 3, below.

The data analysis started with each of the seven participants being interviewed, each one being recorded. Subsequently, the interview texts were analyzed, one by one, to find concepts and themes related to the research. The concepts and themes were then compared to the other participants' responses, within the same organization but also from the participants of the other organization. After concepts and themes had been identified between the participants they were selected to be used. Also, in order to validate the collected data, after each session, a summary and discussion with the participant is held, to ensure that the collected data corresponds with that was said during the interview (Creswell & Creswell, 2014).

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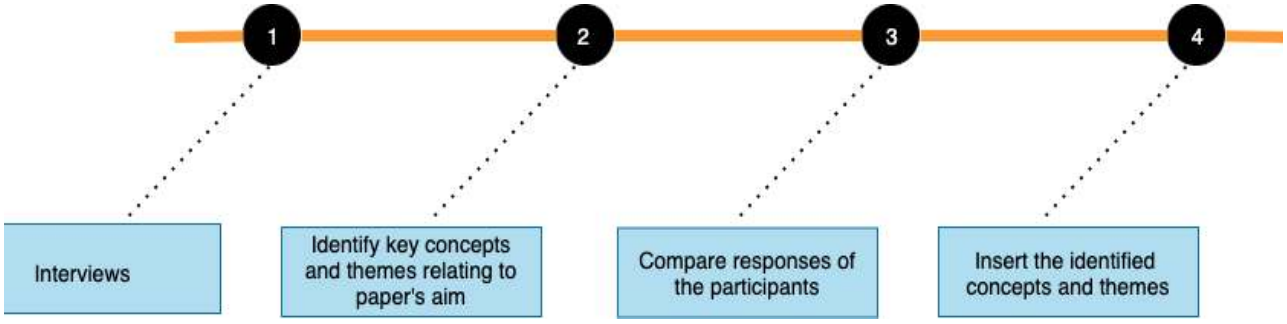


Figure 3. Adaptation of Lichtman's thematic analysis model (Lichtman, 2014).

To enforce the paper with a high level of reliability, one procedure that has been put into notion is that the three antecedents used are researched from each established definition which has been set in the paper. Also, that each definition stays the same and is followed through the writing of the paper. In other words, the "codes" used maintain the same meaning. Furthermore, since the participants' opinion and experience are in focus, the time and setting for the interviewees have been set in places and times where they would feel comfortable in order for them to answer honestly and truthfully (Creswell & Creswell, 2014).

Ethical considerations

A critical component with the usage of qualitative interviews is the ethical considerations. First and foremost, the interviews were done in such a way that to any cost avoid any kind of physical or emotional harm to the participants. The time slots for the interviews were timed at convenient hours and dates for the participants, and at their choosing, to ensure that they would not feel stressed. Furthermore, a friendly environment was chosen to ensure that participants could share as much information as possible without pressure or coercion. If some participants wanted to use Skype, it was conducted in a private room, minimizing distractions, and interference.

Another aspect needed to take into consideration in terms of ethics is the ability to ensure private and personal information to be preserved. Thus, names remain private and are not shared with any person that is not directly involved in the research process [29]. Also, private information as formerly shown was discarded after the completion of the project. To ensure anonymity for the participants their names are not used in the paper. Instead, each are represented by a unique letter (A-G). The interviewees were given the opportunity to withdraw from the interview and paper all together at any point in time. The reason for this lies in the need to ensure voluntary participation without pressure from the individuals themselves or the organization. For this reason, to show evidence of their voluntary participation, the participants were asked to sign a written consent prior to their interview. Confidentiality is another important factor to consider, since who the answers belong to and who will see the participants responses are a matter of privacy and security for the participants. If their employers would be the sole owner and thus see their employees answer it might affect the participants negatively. It could also lead to a reluctant to answers and participant in the interview. Because of this, it was made clear that the property of the interview material would belong to the University, as an extent to the author. And no one else would see the original copies since it

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could jeopardize the participants' answers. Lastly, it is imperative to ensure that the originality of the interviews and the participant's responses are maintained and not lost while notes are taken during the process. For this reason, at the end of the interview session, the key points discussed were brought up to be rechecked by the participant to ensure that nothing had been missed (O'Gorman & MacIntosh, 2014; Yiannis, 2018).

RESULTS

This section will introduce the findings from the qualitative study. More specifically, we present the findings of the implementation of new IS in organization A, and the findings from adding updates to an already implemented IS in organization B.

Analysis of the result for organisaton A

The interviewees consisted of three employees of Organization A, one business controller (participant A), one head of department (participant B), and one budget director (participant C).

Workload

In our paper, the responses for the IS' impact on workload are unanimous. It becomes clear that the system has a reach that is not limited to a certain area within the organization. Rather, Organization A's new IS has made an impact on the workload (among other antecedents) seen in several different sectors, which is evident from the positions and answers of the interviewees. As can be seen in Table 3, one key aspect to note from the participants' answer is interviewee B's, who acknowledge the fact that the workload has been made better through the system and that the output is greater, but because of the effectiveness of the IS, the expected level for approved output has increased as well.

Table 3. Findings regarding Workload in Organization A

Participant	Response
Participant A	*"*[The IS] i*s definitely making it easier and more efficient to work and deliver more qualitative results. Instead of having isolated documents like we did before, everything is now available for everyone. The system provides the infrastructure needed to make our processes easier to oversee and follow up, both on the individual lever (i.e., my everyday work) as well as on a meta lever (i.e., the organization as a whole)."*
Participant B	*" I absolutely think that* [that the workload has improved as a result of the IS]*! Previously, a lot of work was involved to gather different information with several different origins within the organizing. I think that in the long run, overall, in the organization, that our workload will decrease* […] *The quality has become much better.* [...] *"I think the system creates a good condition for us to produce a better output. And it has. As I said in the beginning, our way of working is better because of the system since we can reach out to all our coworkers, no matter where they are in the organization, and forward the decisions of [the board] and the committees' budgets to each branch head, which means the conditions for reaching each employee increases a lot. [...] it has helped the administrations have a common conceptual apparatus.* […] *The system has contributed to a standardized way of working with business control and follow-up."*
Participant C	*"We have much faster handling. We have a higher accuracy in the system since we can more clearly communicate about what information we are looking for, which has greatly affected our workload. It is much better!* […] [The IS] *makes it possible to get more accurate data. So, the effectiveness and accuracy result in a higher quality since we get a lot of reports from all the administrations and companies.* [...] *The workload was high during the implementation phase and a little while after that, but as it has progressed as our coworkers have become more familiar with the system, it has as a whole it made everything much easier. For example, it has become much easier and faster to complete reports, make budgets, and do analyzes. So, we clearly have a positive development of the system."*

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The participant A, as well as B and C, acknowledge that the workload has decreased as a result of the IS and their answers regarding workload indicate that the implementation have decreased the workload significantly, while improving staff effectiveness and accuracy. Their findings show that there are a lot of positive thoughts on the IS and its impact on the organization as a whole. Furthermore, all three participants acknowledge that through the implementation of the new IS their output has improved a lot. This is the result of better communication and the ability to get a better overview over management and the tasks at hand, which is made possible by the IS.

System reliability

Organization A's old way of working held a much lower degree in sophistication, complexity, and overall usage. The findings presented in Table 4 show a distinct opinion through all respondents in regard to system reliability and overall usage. A keynote to bring up from the findings is that both participant B and C emphasized greatly on how they worked before and the vulnerabilities that came with it and how the current IS have provided a more secure way of operating tasks. Participant C responded that a compatible comparison between the IS and how they previously worked, with Word and Excel-sheets, are not possible since, in terms of system reliability, the two ways differentiate too much and function at such different levels. The interviewees answered accordingly:

Table 4. Findings regarding system reliability in Organization A

Participant	Response
Participant A	*"*[The IS' reliability is] *Very good. Reliable, easy to use. User friendly and logical. Its efficiency and reliability lie within the system's openness and ability to be used by a great many people at the same time. All posts / follow-ups can also be tracked, so you can see who has written what and thus contact them if you need help or more info. Also, since the system is cloud-based, nothing can disappear if any G-directory crashes."*
Participant B	"Before, when we worked with Word documents and Excel files, it was very unstable. *[…] We had vulnerabilities and that, in the overall way, is not something you wish for, and that can't count as a stable or reliable way of working. From a purely systemic perspective, Word didn't crash."*
Participant C	*"The stability and reliability in the system are outstanding! But I can't compare it to our previous way of working since they are nothing alike."*

In contrast to participant A, participant C cannot make a compatible comparison between the IS and their previous way of working. Since, as participant C explains in the beginning of the sub-section, Organization A used Word template and Excel-files to complete their tasks, a question of reliability and how it may have changed is not as easy to answer as for Organization B, who compares to different versions of the same system. This is also added by participant B. However, seen to the IS's reliability, all participants unanimous agree that it is great. Furthermore, participant B states that the system does not crash, "It does not happens now but I guess it can happen in [the IS] as well", which means that the limitations of the IS have not been met as of yet. Furthermore, in order to resolve reliability problems, organizations need to understand the value of investing heavily on IS, which is compatible to their needs.

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Time-saving

The interviewees consisted of three employees of Organization A, one business controller, an acting CFO (chief finance officer), and the budget director. Their responses to how time-saving has been affected by the new IS were very similar and show that there is a common view between the interviewees in terms of the system's impact on time-saving. From the findings of all participants, shown in Table 5, it becomes clear that the change from their previous ways to the implementation and usage of their IS has led to an increased effectiveness in their work and saves them a lot of time. Participant B's answer highlights that their journey with the transition from "Word templates and Excel-files" towards the IS have greatly made their work more efficient and easier to share with others. Overall, participant A, B, and C are in interplay in the regards that the IS have had a positive impact on time-saving. Participant B, however, brings up that the general time in the system is not that much different compared to when they did not use the system, since the ambition level has increased as the system got implemented. Nor participant A or C brings up this point of view.

Table 5. Findings regarding time-saving in Organization A

Participant	Response
Participant A	*"Time-saving has improved. Much easier to deliver and to get an overview. Everything is "open data".* […] *It provides a transparent platform for analyzing a wide array of parameters, to follow up how the processes are carried out* [...] *My feeling is that it has improved and made* [it] *more efficient, all of the above (time of processing, delivery of service, and response to customers/clients)."*
Participant B	*"There are many features that have become better. It's almost that you, you don't want to admit how we worked before.* […] *Before we used Word templates and Excel-files that we would send between us.* […] *So, if we compare it, it has become a 100% improvement […] When I have made a change in the system, my colleague, who works in the same document, sees the changes in an instant. It is a function that has been very important. […] If we had maintained the same level of ambition as before, then compared to that, the IS saved us a lot of time. But I think in many cases we have also raised our level of ambition through the system. We saved time with* [the IS]*, I am absolutely convinced of that!"*
Participant C	*"*[The IS] *is a great system. It has helped a great deal to speed up our flows with reporting, guidance, and follow-up and control. So, it's a great system and it's very easy to use. [..] we always get the reports, usually earlier than expected. So, I see it as an indication that things are getting better and better. And that also indicates that we are saving time and money on this ongoing.".*

Concluding remarks

To conclude, the implementation of a new IS in the organization has, from the participants' response, been much appreciated, and has been beneficial in saving time, reducing the workload for those using the system. Furthermore, the information system is new, and its reliability has not been an issue. However, since the organization did not use another system before the current one, participant C, and B to a small degree, did not find it compatible to compare the two different work ways. However, all three participants acknowledge that the reliability is great. Furthermore, both participant C and B put a lot of emphasis on the previous ways of working, and, through the IS, it has changed comprehensively. They are more efficient and have a great output and level of workload. Seen to the output, all participants acknowledge that the system allows for higher quality output at a faster rate than before.

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Analysis of the results for organization B

The interviewees consisted of four employees of Organization B, one coordinator (participant D), two administrator officers (participants E and F), and one lawyer (participant G).

Workload

Seen to the IS' impact on workload, and in turn effectiveness, there was a clear, unanimous response from all participants. However, the interviewees also displayed a great understanding of management and its relationship with the IS, and their role in impacting the overall effectiveness in the organization. As indicated in Table 6, all participants acknowledge the fact that the current version has decreased the workload significantly, compared to older versions of the system. Furthermore, their productivity and output have increased compared to previous versions. However, participant E said that the workload is a matter of the influx, and participant G stated similarly that the influx is a large part of how good the workload is. With this in mind, it becomes apparent that the current IS version is not, on its own, the one and only contributor to create a better or worse workload for the employees. Seen to Organization B's IS it becomes clear from the answers gathered that there is a great need for a better developed IS which can meet the specific requirements for Organization B. In this case, in regard to handling the influx better or even becoming automatic, as participant D suggests.

Table 6. Findings regarding Workload in Organization B

Participant	Response
Participant D	*"We only see the increasing workload and the need to hire more coordinators.* […] *(and it) has not resulted in an increased automatization.* […] *When an update has made a command possible it has not been updated further to make that command work more smoothly or better* […] *The best would be if the system were optimized for all tasks and could perform them all and be more automatic."*
Participant E	*"In terms of productivity, there has not been a change between the versions but gradually between the versions. If you compare the first version with the one, we are on now, it is a huge difference. Then output is not entirely excluded based on* [the IS] *but also on directives from the management* […] *Our workload does not lie at a good level, which is a result of the influx. This system compared to previous ones allows us to handle workload better but not at a good level."*
Participant F	*"Yes, yes it (the IS) is more efficient to work in today than compared to previous versions. It requires less hands-on effort* […] *However, the workload is the same. Much of the workload, in the current system, depends on the influx of documents, not the system. But we can handle the influx in a much better way than before, which helps keep the workload "low"."*
Participant G	*"The workload is affected by the influx and what is happening in society and not the system, but we are constantly working to increase efficiency. I can produce more but if a new computer system was built then I could work a lot better. The present one is old and outdated.* […] *Compared to previous versions, now in hindsight, has it become apparent that the output has become greater and the system can handle a larger workload."*

System reliability

All four participants in Organization B declared that IS' reliability has become better as the system has gotten new updates. Furthermore, as can be seen from Table 7, they all agreed that system reliability was a key factor to increase effectiveness in their work, but also to create a good work environment. Despite the fact that three of the four interviewees have worked with the system since it first got launched, they had not reflected as much on the system's progress in this area. Participants D, E, and G, when asked if the current IS is more stable/reliable to work with compared to previous versions, they agree that there is a big, positive, difference in system reliability. Although participant

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F also felt the system had gotten more reliable, it was only a minor, small difference compared to older versions the participant had worked with.

Table 7. Findings regarding system reliability in Organization B

Participant	Response
Participant D	*"The System Reliability has become much better. In the beginning,* [the IS] *could be down several times a week, and for much longer periods of time. That doesn't happen as often. Sure, it still goes down at times but not to the extent as before.* [...] *The system has truly been built up. It was not made for the tasks we use it for. When first implemented the change was huge but after that, even though new versions have come out and it has been updated the system has not yielded any significant changes to quality in service. Even though our tasks are basically the same."*
Participant E	*"As I said before, you don't see that much of a difference from one version to another, rather it is when compared in the long run from let say the first version and this version. Then the reliability has been improved a lot!"*
Participant F	*"Absolutely [the IS's reliability has changed], but in terms of Reliability there's a lot to be improved, it could be more stable just simply. For one, it could be updated so you won't get as much, or never get, an error message. Which can slow down the system Sure it's better now than previous versions but it's still swaying."*
Participant G	*"It has become much better!* [...] *I would like that we got a new system since I think the current one is old and can't handle the stress that we who work in it put on the system* […] *It's outdated."*

It is clear from the response from the participants that as the system has been updated, its reliability to work has improved, which has a direct correlation to employees' effectiveness to tasks being done through the IS. Despite the fact that all 4 participants identified the reliability to have increased, it was only the 3 employees who had worked with the system since it first got implemented who stated that there has been a significant improvement. Furthermore, as indicated by respondents D and E, there has never been an immediate, noticeable improvement in reliability and stability, rather it is apparent when comparing and reflecting older versions with the current one. Also, none of the participants responded to be too satisfied with the current version, as can be especially indicated by the response from participant F, who straight away provides examples with improvements for further updates. Even though updates and add-ons have been implemented over the years, there are still reliability issues with the current version. Even though the system has become better than previous versions, as all participants acknowledged, there is still a lot to be desired, which can be seen partially by the answer from participant F, but also, the answer from participant G. Furthermore, it becomes apparent with the responses from participants D, E, F, and G that the system reliability has become a lot better than other, previous versions, which means that the limitations of the IS has, through the updates, been moved further and further as users strain the system to a greater degree.

Time-saving

Findings from the interviews, presented in Table 8, informed of the significance of time-saving and how it depends on the job role the individuals have. But even between the two administrator officers the impact the IS have is divided. It is obvious from the feedback of participant D, F, and partly G that the current version of the system, and the system in general, has had an impact on the time the participants save doing their tasks. Furthermore, as participant E concludes, as well as participant G, other parts of the organization and the influx of applications may very well be a reason for how they work, which impacts how much or if there is any time-saving done. Even though the current version of the IS has been updated several times before, there is still much that is in need to

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be improved in order for the participants, and employees in general in Organization B, to be able save time and work more efficiently with their tasks. Interviewees D and E are less convinced in their answer that the system has had an effect on time savings, where participant E thinks it depends more on the directives from management. While participants F and G are in their response radiates a much greater conviction of the system's impact on time-savings. The difference in what the underlying reason for the increased time-saving in the current version compared to previous is thus becomes a bit unclear. Some participants highlighted that management might be the, or a, reason for the increasing time-saving. However, on the other hand, participant F emphasizes that the system is the reason, as does participant G. On the other hand, participant D states a small but noticeable improvement that adds up "in the long run".

Table 8. Findings regarding time-saving in Organization B

Participant	Response
Participant D	*"Seen to time-saving: Our tasks are for the most part the same. Sure, we have gotten several new ones added. The main difference between this version, or current version, and older is that now we can do things in the system that were not possible before. We also have a lot of tasks that uses tools besides [the IS], and those tasks have not been affected by the updates of the system."*
Participant E	*"Don't really know. I think it depends more on the directives from our bosses than the system. And also, on the influx."*
Participant F	*A little better. The current system is better than previous versions in saving time and the amount of output I can create in the hours I work compared to earlier versions."*
Participant G	*"Yes, the current version allows me to work more efficiently. I have a higher output capacity than before, and that is, to a large extent, because of [the IS]. But it can of course have its ground in other parts as well, example from the management. The time-saving is apparent."*

Concluding remarks

The overall opinions on the current IS from the participants are that it is in every way more beneficial to the selected antecedents than the previous version. However, to which degree differentiates between the job role, but also between individuals. The IS has improved effectiveness compared to previous versions, but it is not often seen right away. Rather, it becomes visible when the participants compare different versions that are separated by a length of time. Furthermore, the participants, all of them, states that the current system can improve significantly on several fronts. And some of the interviewees put a lot of focus in their response that a new, modern system, adapted to the organization's hand-holding and tasks, should replace the current one.

Comparison analysis across the two organizations

In this section we provide a comparative analysis of the three explored antecedents related to Organization A and B. Table 9 integrates the feedback from the participants of both organizations with regard to workload, system reliability and time-saving. We use the "+" sign to indicate the positive attitude of participants towards IS implementation, the "?" sign indicates that the participant is neutral, whereas the "-" implies that a particular participant shows a negative attitude.

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Table 9. Overall feedback from participants (positive, neutral, negative)

	Organization A	**Organization B**
Participants	*A B C*	*D E F G*
Workload	+ + +	- - ? -
System Reliability	+ + +	+ + - -
Time-saving	+ + +	? ? + +

Comparing impact on workload

Looking at the findings of workload, the responses from Organization A's employees are indicating that the new IS has been a primary factor to decrease the workload, as well as providing the tools to create a higher quality output. Both participant A and B indicate from their answers that the IS has led to an improved workload. Participant C points out that they have gotten a better higher accuracy and better communication by the IS. Seen to Organization B, their answers showcase that system also allows for a better workload and higher productivity.

The difference in answers in Organizing B shows that there are not overlapping, unanimous answers whether the system does or does not help with the workload. However, as can be told by participants E and F, the system has improved when compared to other, previous versions. Compared to Organization A's responses, which show more unanimous answers, it can be concluded that the newly implemented IS has provided a better workload compared to the older one. Also, if comparing the response from participant E, Organization B, with any of the participants of Organization A, it becomes apparent even at the "first version-stage" of Organization A and B's systems, the first has resulted in a much better outcome seen to the workload. Furthermore, as both participant D and G in Organization B say in their interviews, they would benefit more from a new system or a system that was "*optimized for all tasks and could perform them all and be more automatic.*" With that in mind and the fact that both have worked with the system since it first got implemented, one conclusion that can be drawn is that Organization B's IS was not at the same level as Organization A's system, in terms of function and objectives when first introduced. After a time, with different updates, new functions were added making sure the system could carry out its and its users' objectives. Rather than, as with Organization A, "all" or any of the functions are already in the system, and that is the reason for why the IS was chosen. This could be one reason why, as participant E from Organization B states: "*If you compare the first version with the one, we are on now, it is a huge difference*."

Comparing impact on system reliability

System reliability, the last efficacy-antecedents investigated, showed a change in patterns compared to the previous subsections. None of the participants in Organization A found any problems with the IS's reliability. However, as participant C pointed out and described in-depth, before the current IS they worked with Word templates and Excel-files. For this reason, it was difficult for the participants to answer accordingly. This is why participant C responded to the question that a comparison between the two ways of working is not compatible. However, all participants thought that the new system, seen to its usage, etc., is very stable and reliable, which can be understood from the responses from participant A and C. The change in patterns comes when comparing Organization

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B's answers. Seen to system reliability, all correspondents said that the reliability has become better compared to previous versions, which compared to their previous answers on the other antecedents, was unusual.

Their unanimous answers indicate that the updates have been a main reason for the improvements in reliability. Compared to previous answers regarding different factors, at least one of the participants indicated that the system, in some way or another, did not play a role or it was to a small degree. Rather it was other factors, such as the influx or management that did the most impact. However, likewise to the workload-factor, the fact that Organization B's system had problems already at the beginning of its implementation shows an underlying problem with the system, seen to its objective and its ability to handle those with precision and accuracy with multiple users active. Why that's the case is a ground for another study. However, comparing the two systems "first-version" with each other it is clear that Organization A's IS is better equipped to handle its users and objectives. Moreover, as the starting-point compared and a conclusion has been made from it, looking into the future, to a hypothetical X-version of Organization A's IS compared to an equivalent of Organization B's, the conclusion to be made is that the first one has a better starting point and will most likely work better then as well. Thus, Organization A's new IS has better reliability than Organization B's.

Comparing impact on time-saving

As can be seen from the findings presented in the sections above, is that there are differences in how the systems impact the two organization's effectiveness. When it comes to time-saving, all participants in Organisation A highlight that there has been a great improvement in their work and the time they save. However, compared to the participants in Organization B, there is a clear distinction that, in terms of time-saving, Organization A's new IS has yielded a better result in saving time for the employees. Through participant D's answer, in Organization B, the conclusion can be drawn that further improvements of the system is not a priority, which can be referred back to why the participants did not draw, for the most part, overall comparison to the system and time-saving. Participant E related it to mostly being a result of the "*the directives from our bosses than the system. And also, on the influx*". While participant F answered that there has been a bit of improvements, and that the time-saving is better in the current version than previous. Participant G is the one who is most convinced that the IS is the direct result of him/her working more efficiently and has a higher output.

From the findings, it can be concluded that the newly implemented IS has had a better outcome of saving time for its users than the older systems. In their answers, the participants of Organization B showcase that small updates have been made which have generated a more efficient workplace than before. But as can be drawn from the response from participant D, that when an update has been made it has not been updated further, the motivation for helping the system's user to save more time has not been a priority. In contrast, every answer from Organization A's participants has been in direct line with the IS and how it has helped them save time.

DISCUSSION

In this section we discuss the result and provide a comparative analysis of the three explored antecedents. The section starts to discuss the new IS implementation in Organization A based of the findings presented above, which is then followed by discussion of the current IS in Organization B and general reflections.

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New IS implementation (organization A)

Identified from the findings in the previous section, it becomes clear that a newly implemented IS has a higher impact on the organization's effectiveness on the chosen facts, compared to an older IS which gets upgraded. Furthermore, the outcome of the findings in the section above shows that even though the older IS's current version is better in terms of all antecedents studied, compared to previous versions, there are still a lot of improvements to be made.

The findings of Organization A's IS also showcase that, in their case, the IS implemented within the organization met the critical factors that are needed for the system to be productive for its users. Hence, Organization A's IS is in line with [16] as it provides a higher quality output and better workload. Furthermore, participant B brings up that even though the system allows for increased quality in their output, new tasks have been added since the system makes it possible for further activities to be reported and added into the system. This aspect is something that neither [15, 13, 14], nor [16] brings up in their studies.

One thing that needs to be taken into consideration is the fact that Organization A did not use an IS before the implementation of the current one. For this reason, their experienced effect the system has on their work may be greater than if they had replaced another IS with the current one. Also, the paper does not have a gradable sense to distinguish how much better or worse the implementation of each IS, and its upgrade, rather it has taken the form of how the users acknowledge the systems. For this reason, we cannot clearly provide clear indications as to how much better the new IS and the upgrades have impacted the organizations. Even so, the investigation and findings have assisted greatly to make a path to a better understanding of the concepts studied in the paper and that IS implementation has, in both cases, an impact on effectiveness that is noticeable.

The current IS with updates (organization B)

The findings from the interviews indicate that the continuous usage of an older IS is not optimal for an organization. The bare effectiveness it may achieve through updates is not compatible nor in the range of the capability and impact, a new IS will have. Even though Organization B's IS is functional and can operate, it can be argued that it should be discontinued in favor of the development of a new IS. The IS's performance of Organization B has, as the interviews show, improved. However, as can be gathered from the findings, the system was not designed to accomplish the tasks at hand. It has been added and updated over time, which is a fatal flaw according to [22]. For these reasons, seen to an organization's effectiveness, the arguments to still operate the older system as Organization B is doing is not valid. Seen to an overviewing level in an organization, the findings make it clear that the investment of a new IS is far better than the continues of an older one, as seen to effectiveness.

Evidence from the findings is that the effectiveness in Organization B has improved a lot from previous versions (read as the first version). Furthermore, the response displays that the experience with the IS differentiates, times a lot, between them even though they share the same tasks. Other times, all participants reveal a shared view. The participants mentioned that the IS provides a better workload for them which has resulted in a higher output, indicating that the findings from Organization A and B reinforce [21] and [14] findings, i.e., the implementation of an IS is beneficial for organizations in saving time when performing tasks. However, Antono's et al. [21] findings did not include if the same result would be found in an organization that already had an IS of sort, which got updates.

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Moreover, it can be discussed that from the findings an unbeknownst factor has emerged that would increase the effectiveness, especially in Organization B. A factor (antecedent) that was not chosen or considered to be studied in the paper, namely, *automatization*. Both participant D and G responded in their interviews that a more automatic procedure or full automatization would benefit the organization's effectiveness to a larger extent than the continuance of the current IS. Their answers indicate another factor that could be explored and investigated further in the future. Automatization was not chosen, or rather considered, to be one of the chosen effectiveness antecedents as it was seen to be too large of a process to implement well, be too costly for organization to consider. But also, when reflecting, choosing automatization as one of the antecedents would stray away from the user experience and more into the realm of computer science and technology. However, that notion of automatization brings up an important segment of the studied IS and IS in general. That is, when does the human-interaction in IS become redundant considering its impact on effectiveness compared to an automated process.

General reflections

The findings from Organization A reinforce the existing research work of Chao et al. [13], which shows that the implementation of IS decreases the workload significantly while improving staff effectiveness and accuracy, and which the findings from the interviews also confirms. However, as some participants in Organization B highlight, other factors play a large role in determining the level of the workload, such as *influx* and *management*. To which degree it may play a part was not investigated further, but it challenges the assumption that an IS would be the main reason to get a better workload. It becomes clear from [13], and the findings that the implementation and usage of an IS within an organization is much more complex than thought before and several underlying factors, which may not be visible at first, interact with the IS, and its functions, and plays a big part of the workflow, effectiveness, and workload in organizations.

Compared to Organization A, Organization B brought up external, and to some extent internal factors, as to which they impacted the effectiveness antecedents, in some cases more than the IS itself. Whether this is a result of the two organizations' different organizational design or market can only be speculated. However, the focus some of the participants gave external and internal factors in their responses highlight a crucial error in the design of their information system. The influx, which was the main external factor participants of Organization B emphasized, has not been affiliated within the IS nor has new functions that more easily keep the influx at a more even level through been added. This would indicate that (1) the IS' foundation it is built upon is not capable of handling the added stress and complexity it would take to cope with the influx, or (2) that the external factor, in its core, cannot be properly handled through the IS. Participants of Organization A did not highlight similar problems, which could be led to believe that (1) the organization does not have the same problems with external factors as Organization B, or (2) that the system is still in its early beginning which has led to these kinds of factors has not yet been brought up. But it can also mean (3) that their IS is better suited for the objectives it was implemented for and the tasks that organizations and users have.

The findings showed a clear remark in system reliability. Organization B stated that the reliability was better than before, but not great. Organization A did not previously have an IS and had problems comparing and analyzing the reliability. Even so, did every one of the participants think that the stability and reliability in the system are great. However, their answers may be too early to tell since

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the IS has only been operational around 2 years, and not every section within the organization has started to use it as of yet. Compared to Organization B, who have had 10 years and several different versions to work in and compare, it may be that Organization A is still too immature to fully see the system work at maximal capacity and if it would affect the reliability.

Another important issue worthy of emphasizing is the fact that no participant in Organization A brought up any negative aspects of their system. This can be the result of several reasons. For one, it may be that the system is still too young and needs to be used for a longer period of time until negative aspects are brought up by the users. When more departments are included in the IS and work in it, then the system's capacity would be put to its limits and it would be easier to acknowledge issues with the IS. Another reason could be that the participants are not used to working with the IS, and IS, in general. With the current IS they have 1-2.5 years of experience and before the implementation Word templates and Excel-files were the norm. With the new system operating it may be difficult for the participants, as of now, to acknowledge issues with the IS since they do not have much experience working with it and information systems in general. Compared with the participants of Organization B, which all have at least 4 years' experience, and most have 10 years they are used to working with IS and can therefore easily differentiate issues and progresses with the system.

CONCLUSION

In this paper we have studied the impact of two different IS implementation approaches on effectiveness, across two different organizations. We used a qualitative thematic analysis to investigate *workload, system reliability* and *time-saving* as antecedents of IS effectiveness. Our investigation yielded that the usage of an older IS that gets updates is functional and helps increase the effectiveness within the organization, but at a satisfactory level at best, compared to the earlier versions. Also, the majority of the participants felt that the system needed to be discounted and replaced in favor of a new system, as the current one did not improve or assist the user with their assignments. It is also important to mention that some discrepancies were identified in the responses, particularly by the participants of Organization B. Some did not focus on the information system and its impact on the selected factors, rather management and influx. However, this was not seen as staying away from the questions, but rather highlighting, from the participants, that there are several other factors that play a part in effectiveness within the organization. The findings from the interviews also revealed that the implementation of a new IS had a greater impact on the organization compared to an older system. Participants of Organization A, which had a new system implemented, all indicated, on all factors, that the switch to the current IS has improved their effectiveness a lot.

This paper's contribution begins with its aim as there has not been, to the best of the authors' knowledge, any previous studies that have investigated and compared an older and a new implemented IS and its impact on effectiveness. Furthermore, former studies regarding effectiveness often focused on a single IS, using antecedent, and how it impacted its user and host organization. On the other hand, this paper focuses on two different ISs. This work tried to fill this gap and highlight how different IS usage approaches, continuing operating an older IS versus implementing a new one, impact organizations' effectiveness.

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Limitations and future studies

It is worth mentioning that the paper relies on users' interpretations of the respective ISs, and therefore a limitation of the findings, and the paper as a whole, is that it cannot be backed up by any objective data, such as performance-related data gathered from the two organizations. That could have been used in the paper to provide a more nuance and clearer picture of the actual situation of the ISs to the reader as well as the interviewees. Another limitation is that by various reasons technicians and individuals that work on the back-end of the ISs could not participate in the study in order to give their view, from a more data-driven point of view. This limits the paper to rely its findings being accurate on data from front-end users only and not from both front-end and back-end users. This could have resulted in changes in the findings but also in the discussion, since front-end- and back-end users might have different, or the same, views of the systems.

The findings can be explored further to see how Organization A's IS has progressed as it has been active for several more years, and whether or not another conclusion can be drawn. Also, incorporating back-end users would further give a future study a more nuanced and well-anchored base. Additionally, future research can be further developed by doing the same or similar research with other organizations. This would thus create a greater overview of the research area and thereby, maybe, a common conclusion can be drawn which can coincide with a general pattern of the implementation of a new IS or the continuous use of an older system. Moreover, as this paper focuses on three distinct factors in order to investigate effectiveness, further research can use other, or more factors, internal and external. This would make it possible to determine different patterns between different factors that may or may not interact with each other and thus impact the effacing the system helps generate.

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