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Collaborative Ecosystems for Increasing Automation in Accounting Processes in Small Firms

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Abstract. Automation of accounting processes promises various benefits for firms, such as enhanced productivity, improved customer service and job satisfaction. Despite the enhancements, small firms are often reluctant to undertake accounting process automation projects. This research studies how collaborative ecosystems support small firms in adopting accounting automations. The study draws on the Technology Acceptance Model (TAM) and studies the perceived usefulness and ease of use of automation technology in the context of small firms. In this qualitative research, 12 firms joined a collaborative ecosystem to develop automated accounting processes. A year later, 12 semi-structured interviews were conducted to examine the technology uptake by the firms. Our findings indicate that a collaborative ecosystem provides support in the first steps of technology uptake, especially by adding to the perceived usefulness of the automations. However, it did not increase automation-related skills enough to increase the perceived ease of use of the technologies.

Keywords: Intelligent automation; collaborative ecosystems; collaborative networks; accounting processes; accounting process automation; technology adoption model; small firms, skills; RPA; society 5.0.

1 Introduction

Over the years, accounting work and processes have undergone significant changes due to automation and digitalization. New technologies such as cloud, artificial intelligence (AI), robotic process automation (RPA), big data, and blockchain may lower the burden of accounting-related routines and free up management and employee time [1, 2]. Out of these technologies, AI and RPA are the ones which are used for automating business processes, first, by adopting RPA and then possibly, second, by enhancing it with AI algorithms [3]. However, even though AI solutions in accounting exist, they are not commonly used yet [4]. Siderska et al. [5] present potential technologies and common barriers for adopting AI within RPA systems. Due to the relatively low adoption rate of machine-learning technologies in RPA, the more traditional rule-based RPA has

attracted the attention of accounting researchers during the past years. For instance, prior studies have examined task suitability, implementation, and impact on performance in large firms [6] and Big 4 accounting firms [7], RPA-related technology acceptance in a big oil firm [8] and the impacts of RPA on individual and organisational behaviour in a big service firm [9]. Moreover, RPA has been said to bring cost savings, improve customer service and its quality, increase productivity, and raise job satisfaction because RPA allows for routine tasks to be automated [10],[11]. However, most of the prior research on RPA focuses on large firms, but RPA may be even more important in the context of small firms. In addition, prior research shows that technology adoption, including digital transformation, is often a challenge to SMEs while large firms are forerunners in this area [12]. Small firms may have limited resources such as the skills, time or finances needed for development [13]. Nevertheless, small and medium enterprises (SMEs) play a vital role in most economies, constituting 50% of employment and 90% of firms [14]. Therefore, it is important to examine solutions that could support the small firms in digital transformation such as adopting automations.

We define collaborative ecosystems (CE) as innovation ecosystems that include a collaborative network. An innovation ecosystem is a loosely interconnected network of companies and other entities that co-evolve capabilities around a shared set of technologies, knowledge or skills, as well as work cooperatively and competitively to develop new products and services [15]. A collaborative network is an organisation of a variety of entities (e.g., organisations and people) that are largely autonomous, geographically distributed and heterogeneous in terms of operating environment, culture, social capital and goals; nevertheless, these entities collaborate to better achieve common or compatible goals [16] and are considered as core enablers of the digital transformation of Industry 4.0 [17]. In the European Union (EU), the EU-funded European Digital Innovation Hubs (EDIHs) form innovation ecosystems (i.e. CEs), which aim at enhancing and facilitating digital transformation of SMEs in Europe [18]. Whereas the EDIHs are large, multi-year projects, similar CEs can be created from a dynamic virtual ecosystem where organisations aim to increase and share their knowledge for a short period of time [16] such as an EU-funded project [19] Participating in CEs can benefit firms in several ways [18], [20], however, less is known about how CEs can benefit firms in improving and digitalizing their internal processes, such as accounting processes, or provide support in increasing the skills these technologies require.

To address the gap in previous studies, this paper explores whether a CE can support small firms in automating their accounting processes with RPA and in developing the necessary human skills for this emerging technology. As RPA is a new technology for small firms, this study applies the technology acceptance model (TAM) [21]. TAM is the most widely used framework for predicting information technology adoption [22]. This paper adopts a qualitative methodology, analysing the experiences of 12 small firms which participated in a CE in the form of an EU-funded project called the Center of Intelligent Automation for SMEs (CIPAS) during years 2021-2023. The CE

provided the firms with training, workshops and an RPA technology-based proof of concept (POC) for accounting process automation. One year later, 12 interviews were conducted with the firm representatives about their experiences and understanding of the current state of accounting process automations. Hence, the following research questions were formulated: RQ1: How can a collaborative ecosystem support small firms in accounting automation? RQ2: How is the usefulness and ease of use of accounting automation perceived in small firms?

This study makes three main contributions. Firstly, the study contributes to previous collaborative ecosystems literature by filling the gap concerning the role of CE in supporting small firms in developing their internal processes, specifically focusing on accounting-related automations. Secondly, the study shows the importance of new skills when implementing new technologies in small firms. Thirdly, this study adds to the accounting literature by showing how accounting process automations are perceived among small firms. There has been a call for more empirical studies on the adoption of new internet-related technologies in the field of accounting, especially among small firms [1]. This research responds to this call.

The organisation of our paper is as follows: Section 2 describes prior studies focused on collaborative ecosystems, the technology acceptance model (TAM), benefits of automation and RPA in accounting processes and skills required for automating accounting processes. Section 3 describes the empirical setting and the interviewed firms. The results are presented in Section 4. Section 5 analyses the significance of the results, both in theoretical and practical terms. Section 6 concludes the paper.

2 Prior Studies

Considering that today's collaborative networks are emerging technologies-based ecosystems which can be formed to solve difficult societal problems by using co-creation and focusing on human-centred goals [23] Firms participating in such networks may pilot, test and experiment with digital innovations to support their digital transformation processes [18]. In addition, collaboration may provide a possibility of sharing (R&D) costs, increasing innovative capacity and decreasing dependence on a third party, such as a consulting firm, through the creation of privileged links to firms that possess knowledge and skills. Active participation in collaborative ecosystem seem to yield greater benefits [20]. While not many studies have been done on the role of collaborative ecosystems in accounting, some studies exist on their role in the broader context of knowledge work [24], the importance of collaborative networks between universities and businesses in digital transformation [25] and the creation of collaborative networks for testing blockchain technologies [26]. As Davenport [27] stated, knowledge workers' process automation is not as straightforward as in other types of work. Experts' ways of working are often very dependent on collaborative ecosystems. Knowledge workers typically collaborate through various digital platforms and communication channels with other experts inside and outside of their organisation to exchange ideas, knowledge and experiences. With the advent of recent technological

advancements, some of those human collaborators have been replaced by or augmented with AI [28].

The Technology Acceptance Model (TAM) is the most commonly used framework for predicting information technology uptake in organizations [22]. TAM is based on two factors determining the acceptance or rejection of information technology solutions. The first factor, perceived usefulness, refers to the degree to which an employee believes the technology is beneficial and enhances job performance. The second factor, ease of use, refers to the degree to which an employee believes that the system is easy to use and requires little or no mental effort [21]. In the context of accounting, TAM has been successfully applied to explaining the adoption of integrated accounting and budgeting software [29], the usage of digital accounting systems in SMEs [30], and the adoption of new technologies among accounting professionals [31], among others.

Robotic Process Automation (RPA) is a technology that allows software programs to mimic human actions as they interact with computer applications to perform necessary tasks. Configuring RPA is thought to be easy, as the new low-code/no-code solutions allow users just to drag, drop and connect functions with the corresponding code generated automatically. Additionally, the implementation of RPA requires little knowledge [32], and it is relatively easy to implement as it does not require customized software or deep systems integration [33]. Such an easy technology to use is the best way to start the process of automation development in firms, particularly in small firms. Once this technology is well in use, more advanced technologies can be implemented.

TAM model has been enhanced with other explanatory factors depending on the domain of the research [34] In an accounting and RPA context, the perceived usefulness could mean cost reduction, productivity enhancement, revenue growth, improved customer service, and the attraction of new clients, as well as improved opportunities for meeting customer expectations, aligning firm behaviour with that of competitors, and fostering higher job satisfaction [11], [31]. On the other hand, barriers for acceptance could be the cost of the hardware or its implementation, upgrades and the licensing of automation tools, management or staff support, or even lost billable hours. Automation might not work for all processes, and thus the benefits of using such could remain low [31].

Perceived ease of use in RPA-based accounting automations can be viewed from the point of view of skills. New technologies require new skills be acquired by employees [35], which indicates that missing skills might prevent the adoption of technologies. For this reason, in this study, the perceived ease of use is combined with the skills required. Using new technologies requires evaluation, implementation, maintenance, and risk evaluation [36], [28]. Also, when letting new technologies such as AI or RPA take care of the routine work, employees might need to do more challenging work, which can also require that they learn new skills [37]. In addition, interdisciplinary skills, IT skills and the skills and abilities to use digital tools easily are seen as important [38]. Automation may also lead to deskilling, as automated solutions can result in

individuals losing the ability to perform the tasks in question [1]. In summary, in this study, the TAM model's perceived usefulness and ease of use are thus combined with the literature on RPA and accounting automation (Table 1).

Table 1. TAM theory combined with benefit and skill factors from RPA and accounting automation literature.

TAM factor	Factor related to accounting automation	Supporting literature
Perceived usefulness	Cost reduction; Productivity enhancement; Improved customer service; Higher job satisfaction.	[11], [31]
	Revenue growth; Attracting new customers; Meeting customer expectations; Aligning with competitors.	[31]
Perceived ease of use	Skills and ability to use digital tools easily.	[38]
	Recognition of new automated processes; Control over the system: Implementation, Maintenance and Risk evaluation skills; New skills when transitioning from routine tasks to those requiring more expertise; Deskilling.	[1]
	IT skills which support ease of learning	[38], [21]
	Collaborative ecosystem support, skills, and knowledge.	[17]

3 Research Design and Method

This research applies a qualitative methodological [39] approach to interview data. It focuses on understanding businesses' views and perspectives by adopting an interpretative approach [40] The research subjects were selected by purposeful sampling [41] from firms participating in an EU-funded CIPAS project during 2021-2023. The project delivered automation-related training and workshops to over 50 small- and medium-sized enterprises (SMEs). Among these firms, 17 SMEs received additional consulting from project specialists and potentially an automation proof of concept (POC) via a 'test before invest' approach. These firms were also able to collaborate with each other in the workshops. Out of the 17 firms, 12 small firms were selected for this research due to their size and activity in the CE. This sample size is considered a sufficient number of research subjects for a qualitative study [42]. A year later, these 12 firms were contacted for interviews and all agreed. The characteristics of firms participating in this research are presented in Table 2. To simplify reporting of the results part, the firms are coded as Firm 1 to Firm 12 (F1 to F12).

Table 2. Characteristics of firms that participated in the research.

Firm	Size	Industry	Turnover kEUR	Automation
Firm 1	sole entrepreneur	accounting services	100	Task digitalization
Firm 2	micro	accounting services	700	POC
Firm 3	micro	other services	50	POC
Firm 4	micro	accounting services	250	POC
Firm 5	micro	trade	500	Process development
Firm 6	micro	other services	2,600	POC
Firm 7	micro	accounting services	150	POC
Firm 8	micro	trade	500	POC
Firm 9	micro	accounting services	250	POC
Firm 10	micro	accounting services	200	POC
Firm 11	sole entrepreneur	real estate management	40	POC
Firm 12	sole entrepreneur	other services	50	POC

An interview guide[1] was created to conduct semi-structured interviews with the 11 entrepreneurs and one employee of the 12 firms. Interview questions were formulated based on the theoretical framework [43] presented in Table 1. First, the experiences with the CE were discussed, followed by an examination of the perceived usefulness and the skills gained. Interviews were done by phone during May 2024. The interviews were conducted by the first author in Finnish, with a translated interview guide. The length of the interviews varied within 11-35 minutes, with the average length being 20 minutes. If the firm had deployed the POC or created more automations, the interview lasted longer as there were then more questions to answer in comparison to those for firms who had not deployed any automations. Notes from the interviews were entered into an Excel spreadsheet, after which they were analysed with NVivo [44] which is a qualitative data analysis software. In NVivo, the interview data were coded into eight codes: Collaborative ecosystem, Expectations, Use or not, Ease of Use, Usefulness, Benefits, Constraints, and Skills.

4 Results

4.1 Collaborative Ecosystems Supporting Small Firms in Automation

During the interviews, interviewees were asked whether joining the CE was beneficial for the implementation of accounting automations. If the CE was seen as beneficial, then the interviewees were asked to specify the types of benefits they had gained by joining the CE. Half of the interviewees were unaware of office automations before joining the CE, leading to an increase in general knowledge of the subject. Nine of the interviewees reported that participating in the CE was beneficial, whereas for three (F2,

[1] Interview guide can be accessed via: https://shorturl.at/Vaa3P.

F6, F7) it was not. F2 and F7 participated least in CE activities due to time constraints, and F6 had technical challenges in using the automation tools with their operating system (Mac).

When it comes to the trainings, all participants acquired the skills to identify tasks or processes suitable for automation and learned that automations could be done by themselves with no-code/low-code automation tools (MS Power Automate or UiPath). Interviewees especially praised the one-day workshops as that setting allowed entrepreneurs to not only learn how to use automation tools but also to collaborate with other entrepreneurs and share experiences. In small firms, the lack of colleagues to collaborate with in the firm makes networking with other firms important. F6 expressed willingness to share automation experiences with the CE, whereas F2 wished more opportunities for collaboration had been provided.

Initially, an RPA-based automation POC was made for 10 firms (Table 2). The remaining two firms received consulting support for process digitalization and advice on how to develop their existing processes, as the processes were not mature enough to be automated. Nine of the automation POCs were made using MS Power Automate [45] and one with the open-source automation technology Robocorp [46]. As the project provided POC based on the 'test before invest' idea, it was thought that deploying the POC into a production environment required the firms to use an external consultant. However, the consultant cost was lower because the cost of the automation coding had already been completed.

Only three firms (F1, F3, F10) had deployed the POCs developed in the project. F3 had paid consultants to deploy the automation, whereas F1 and F10 had deployed them on their own. Nine firms had created more automations, meaning that even though not all firms deployed the POC developed in the project, they still developed alternative solutions, either independently or with external assistance. Five firms (F3, F4, F6, F9, F10) had been able to develop the automations themselves whereas four firms (F1, F8, F11, F12) had found someone within their networks to assist with the automations. F7 found the POC interesting, but they had expected the project to deploy it for them.

In summary, a CE can support small firms in increasing technology-related knowledge and skills even in firm internal process development. In this study, the acquired skills were knowledge of automation possibilities, skills to recognize potential automations and, in some cases, even the skills to develop automations. Solutions to engage entrepreneurs and address their lack of time should be identified, as active participation in the CE appeared to enhance the perceived benefits of participation. Consulting and the 'test before invest' concepts were seen as important, as they increased practical knowledge of new technologies. Getting all these services free of charge was a huge benefit for the small firms with limited resources. Interviewees also valued the collaborative aspect of the ecosystem: small firms want to learn and share knowledge

with each other. Even though some of the firms were from the same industry, they did not consider their accounting processes as a competitive factor.

4.2 The Perceived Usefulness and Ease of Use of the POC Automation

The firms were asked whether they found the automation POCs useful, and all of them acknowledged their usefulness (Table 5). When asking why they were useful, the responses varied. For F1, a paper-based process had been digitalized but no real automation or RPA-based POC had been created due to the firms lacking the IT skills of the entrepreneurs. One respondent, a soon-to-retire entrepreneur, perceived the new process as a way to improve productivity and job satisfaction by reducing working hours. Due to the respondent's plans to retire, the firm had not looked for new customers to fill in the working hours saved through participation. The billings remained the same, so even the automation saved time, and it did not reduce the revenues. In F3, an external consulting firm had been recruited to deploy the automation in F3's production environment. For F3, the original goal was to automate mundane, time-consuming tasks and to use the extra time for customer service and acquisition. The automation did exactly what was expected: it saved time. So far, the entrepreneur had used the time for creating new automations. In the end, the entrepreneur saw that once the planned automations were in place, the revenues would increase because of new customers. F3 was a sole entrepreneur, service firm, but its size did not prevent the firm from enjoying the benefits of automation. F10 had also put the automation in use and developed new automations. Automations had improved the quality of customer service but also reduced the prevalence of boring, routine work.

Table 5. Perceived usefulness of the automation POCs according to the firms under study. The factor of perceived usefulness is presented by [11] [47]

Factors of perceived usefulness	Firms
Automation was seen useful	All firms
Productivity enhancement	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Higher job satisfaction	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Higher customer satisfaction	3, 6, 9, 10, 11
Revenue growth	4, 12
Developing firm	4, 12
Rejection: Lack of time	7, 8, 11
Rejection: Fear of automation costs	2, 7, 9

There were several reasons why some firms did not adopt the POC-related automations. For F4, the POC aimed to use the tax authorities' user interface (UI) more efficiently. As the CIPAS project had a representative from the national tax office in its steering

group, the information about this need was forwarded to their development department, and in the end, the improvement was done directly to the UI by tax authorities, making the automation unnecessary. Although minor manual work remained, F4 had not seen the need to automate it yet but did report considering the idea of making the change. However, they had created other, simpler automations themselves. F6 believed that the automation from the POC would have enhanced their productivity, job satisfaction, and customer satisfaction. Unfortunately, since the automation was related to a type of project they currently did not have, it was not deployed. F9's automated task was done only once a year, and they felt that the deployment would have taken more time than the manual work. Additionally, the entrepreneur was intimidated by the costs of automation. On the other hand, even the POC had not been deployed; it had inspired F9 to create other automations to eliminate routine work. F12 had not deployed the POC either, as they had put a new accounting system in use, but they had created other automations which saved a day of work per month. This automation allowed the firm to take new customers, and thus revenues had increased as a result. The developed automation was an innovation which could even be sold as a service if developed further. F5 was the other firm that did not receive an RPA, POC in the project. Instead, they were given recommendations for how to improve their processes before considering automation. F5 had done some improvements, which provided savings in both accounting costs and time spent, but the firm had been sold during summer 2023. Finally, F2, F7, F8 and F11 had not put the automations in use even if they considered the automations to be useful. F2 believed automation would be useful to enhance productivity, improve job satisfaction and align the firm with the technology utilized by its competitors. Despite this, F2 feared the costs of automation. F7's employees were frustrated with the manual process, but due to a lack of time, they had not found out the deployment cost, which would then need to be passed on to the customer. Also, F8 and F11 did not have time for deployment, though they believed automation would enhance productivity and improve customer service and employee satisfaction.

Additionally, the ease of use was discussed in the interviews. As presented in the theoretical section, ease of use is related to the skills the user has, and thus those skills were assessed. According to the interview results, only F1 and F10 perceived the automations as easy to use (Table 6). F1 was given a very simple automation, but its maintenance relied on external expertise. F10 used the POC and had created some of its own automations. The firm was able to develop the automations with the help of a project consultant who had been able to create more automations.

Table 6. Perceived ease of use of the automation as seen by the firms. The assessment is based on the skills of the user as presented in [1], [38] [17].

Factor	Firms
Automation was seen easy to use	1, 10
Recognizing new processes to automate	1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Developing own automations	3, 4, 6, 9, 10, 12
Maintaining automations and preparing for risks	3, 4, 6, 9, 10, 12

F3, the firm that deployed the POC, faced numerous challenges before the automation was fully operational in the production environment, despite having received assistance from an external consultant. Perhaps due to the struggles, the firm's skills in automation had increased, and it was able to develop new automations. For F3, practically all automation-related skills were increased during the project: evaluation of new automations, creation of own automations, maintenance of automations, and preparation for possible risks. As the automation was addressing very simple tasks, no deskilling was recognized.

Five firms (F4, F5, F6, F9, F12) did not take the POCs into use; they started to make their own automations or developments with the skills they either previously had or that they had acquired from the project, or with some help from their own network. They saw the project gave them the first prompt to question existing processes. The rest of the firms (F2, F7, F8, F11) did recognize the need for automation and tasks which could be automated, but they were not able to do it on their own.

5 Discussion

In general, collaborative ecosystems (CE) are important in increasing small firm's knowledge on new technologies. The findings of the paper show that the CE inspired small firms and provided the first initiatives on automations. The skill of recognizing automation possibilities increased, and the possibility to test new technologies in practice without investment was seen as beneficial. This is in line with the European Union's objectives to provide digital innovation hubs to support SME digitalization [18]. By providing proof of concepts (POC) the CE shared costs and decreased the need for third party consulting before implementing the POC, which is in line with previous studies on benefits of collaborative networks [20].

According to our study, the main challenge is increasing the technology-related skills of employees when the entrepreneurs are very busy and have no time to participate in CE activities. The finding that small firms typically lack the resources and skills for adopting automations is in line with the research of [12] on the challenges that small firms face when implementing digitalization opportunities. The lack of resources is typically demonstrated by the lack of time or lack of possibility to resort to the support of external consultants. In these cases, SMEs typically can receive support from publicly funded initiatives undertaken by both academic and non-academic institutions [12]. The collaborative ecosystem in which the firms of this study participated is an example of such an ecosystem. In addition, perceived benefits of collaborations are greater when firms participate more actively [20], which was also seen in this study.

Collaborative ecosystems can also have an impact on the national level. One of the firm's automation POCs was built in the national tax authorities' user interface (UI), and the automation would serve all of the over 6000 accounting firms in Finland. Even the POC was created in the project, the project had a representative of the tax authority in the steering group, and at the end the development, it was made into the tax UI. Based on this experience, we suggest considering the inclusion of public authorities in the ecosystems. Mueller and Hopf [48] present a somewhat similar initiative in Germany, targeting the digital transformation of SMEs. The collaborative ecosystem consisted of five partners from both academic and other organizations. The EDIHs (European Digital Innovation Hubs) also represent a somewhat similar competence centre for SMEs, and they also typically consist of a consortium of both academic and non-academic partners [49]. However, public authorities seem to be missing from the consortia quite often.

The Technology Acceptance Model (TAM) was used to explain the adoption of the new technologies. This paper has demonstrated that all firms considered the automations useful, especially for enhancing productivity and increasing job satisfaction when routine, time-consuming tasks are automated. However, the automations were so specific and rarely done that the firms did not see any real cost-savings. This is partly in line with the findings in Kedziora et al. [11] who studied larger firms. For two firms, the automation was seen as a possibility for generating bigger revenues, and this result was also recognized in Jackson et al. [47] The automations were not seen as easy to use. Every firm felt they had increased their knowledge about the benefits that automations would give them, but only a few had increased their skills in implementing, maintaining and thus controlling the automations. Learning takes time, which the small firms do not have. We agree with Moll and Yigitbasioglu [1] that new digital technologies, automation, and IT should be among the skills which are learnt in universities' accounting programs, so future accountants are able to automate their work. The lack of relevant skills has been identified as a barrier in the adoption of RPA in organizations, see e.g. Flechsig et al. [50] and Siderska [51]. However, there is a lack of studies concentrating on SMEs and small firms.

This paper adds to the existing accounting literature by showing that small firms can adopt new technologies in their accounting processes even though they do have challenges. However, the automations in small firms can be much simpler than among big firms and thus complicated development processes are not needed, as was documented in Zhang [6] focused on two big firms. In addition to process improvement, the interviewed firms expected the automations to give more job satisfaction. This is in line with the studies conducted in big firms, where despite the fear of losing jobs, automations eventually improved workers' work-life balance [7].

6 Conclusions

This paper examined how a collaborative ecosystem supported small firms in adopting accounting automation technologies (especially RPA) to lessen manual work in accounting processes. More precisely, the Technology Acceptance Model (TAM) was applied to study the perceived usefulness and ease of use of automation technology in the context of small firms. In total, 12 firms participating in the automation-related CIPAS project during 2021-2023 were selected for the study. The project provided training, consulting, and RPA automation proof of concepts (POC) or automation consulting for the firms. One year after the project had ended, semi-structured interviews were conducted with the firms' representatives. The results show that collaborative ecosystems are important for small firms when implementing new technologies. By joining the CE, the firms were able to increase their knowledge of new technologies and get inspired to automate their processes. Also, in the CE, the small firms were able to learn from each other's experiences. However, only a few of the firms had deployed the POCs, but those that did were using them regularly. These firms had even advanced their automations further. Regarding the non-implemented POCs, some were no longer relevant to the firms, but they had automated other tasks instead. Nevertheless, some firms remained dependent on third parties for automation, implementation, and maintenance, so their automation skills had not increased enough.

This study makes three primary contributions. Firstly, it addresses a gap in the existing literature by highlighting the role of collaborative ecosystems in supporting accounting-related automations in small firms. Secondly, it enriches the accounting literature by illustrating how small firms can benefit from accounting process automations. Thirdly, it shows the importance of acquiring new skills when implementing new technologies in small firms.

More research should be conducted on how skills such as evaluating, implementing, and maintaining new technologies in the field could be increased in small firms in order for them to stay competitive and effective. In general, collaborative ecosystems are important in increasing small firms' knowledge of new technologies, but they require active participation and time. Another track for future research is that of a wider investigation of the collaborative ecosystem. The current work focuses on only one stakeholder: the small firms for which the POCs were created. Other stakeholders that had potentially great benefits from the innovation ecosystem were the firms performing IT-consulting and the academic partner. More research on the forms and digital platforms of collaboration among the different stakeholders of the network would shed light on what type of collaborative networks and practices are beneficial when adopting automation in the domain of accounting services.

This paper has some limitations by virtue of being a qualitative research project focused on 12 very small firms. In a qualitative study, understanding the terms of a certain context is important, and therefore it may not be generalized to the larger population but rather considered as a pilot study. In addition, a limitation is that the research was

conducted in Finland, which is advanced in digitalisation. Hence, the results could be relevant for similar developed countries but probably not for less developed ones. This study also focused on RPA solutions, whereas other technologies such as AI are also very relevant for accounting processes (or will be in the future). However, the CIPAS project concentrated on RPA solutions and thus gave the setting for this research. More studies on AI in automating small companies accounting processes should be conducted.

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