When robots join our team: A configuration theory of employees' perceptions of and reactions to Robotic Process Automation

Lena Waizenegger
Auckland University of Technology, New Zealand
lena.waizenegger@aut.ac.nz

Angsana A. Techatassanasoontorn
Auckland University of Technology, New Zealand

Abstract

Robotic process automation (RPA) as a lightweight automation technology has witnessed an increasing uptake in the industry in recent years. Despite considerable changes in employees' tasks and processes brought about by the introduction of RPA, there is a lack of research that explores how employees react to an RPA implementation. Hence, the goal of this research is to understand employees' perceptions of and reactions to RPA as these affect their interaction with the technology and, ultimately, their adoption and use. To address this research gap, we conducted a case study at a financial institution in New Zealand and interviewed 18 employees of the business units and members of the RPA team. Building on a configurational approach, we developed a mid-range theory and identified four distinct configurations that show how employees' perceived consequences of software robots on their jobs influenced their collaboration with the automation team, their attitude towards the change in work tasks and processes and ultimately their interactions with software robots and attribution of software robots' roles and performance. Our findings may inform implementation and change management strategies and accommodation initiatives to support employees' needs to facilitate adoption, which is crucial for organisations to realise the benefits of RPA.

Keywords: Case study, Configurational approach, Financial institution, Robotic Process Automation (RPA), RPA implementation.

1 Introduction

In the wake of the digitalisation trend that is observed globally, Robotic Process Automation (RPA) has gained increasing popularity as one of the least invasive, easiest, and fastest automation approaches. Organisations jump on the RPA bandwagon in order to cut costs while expecting to improve the efficiency and quality of their processes (Cewe, Koch, & Mertens, 2018; Hofmann, Samp, & Urbach, 2020). In fact, in 2019, 49% of large companies worldwide invested in RPA, and 24% adopted RPA in their work processes. Also, small and mid-sized companies show increasing interest in RPA, with 14% small-sized and 17% mid-sized companies having invested in RPA and 9% of small and 9 % of mid-sized companies having adopted RPA (Statista, 2020).

RPA has been implemented in various industries worldwide, such as telecommunications, finance and insurance, healthcare, and oil and gas, and across multiple processes such as recruitment, payroll, purchasing, healthcare claims, vendor information processing (Ivančić, Suša Vugec, & Bosilj Vukšić, 2019).

RPA is an automation technology that can execute tasks operating on the user interface of other information systems in the same way a human would do (Syed et al., 2020). The IEEE Corporate Advisory Group (2017) defined RPA as "a preconfigured software instance that uses business rules and predefined activity choreography to complete the autonomous execution of a combination of processes, activities, transactions, and tasks in one or more unrelated software systems to deliver a result or service with human exception management" (p. 11). In contrast to other automation techniques, RPA is often regarded as a lightweight solution where an underlying information system remains unchanged (Santos, Pereira, & Vasconcelos, 2019; van der Aalst, Bichler, & Heinzl, 2018). RPA is frequently used to automate rule-based, well-structured, and repetitive tasks such as extracting structured data from documents, transferring data between applications through screen scraping, accounting reconciliation, and automated email query processing (Hofmann et al., 2020; Syed et al., 2020).

One of the drivers of RPA implementation is its potential to reduce mundane and repetitive tasks, allowing employees to work on more value-adding tasks that require social skills, problem-solving capabilities, and decision-making (Institute for Robotic Process Automation, 2015; Penttinen, Kasslin, & Asatiani, 2018; Santos et al., 2019). However, it is common and natural that some employees feel apprehensive and concerned about automation and its effects on their jobs and employment (Fernandez & Aman, 2018; Hallikainen, Bekkhus, & Pan, 2018; Lacity & Willcocks, 2017). Employees might also be more reluctant to change as they enjoy their work tasks, do not have the required skill set, or refuse to learn a new role (Fernandez & Aman, 2018; Hallikainen et al., 2018).

While RPA has received much attention in the industry due to the increasing trend of digitalisation and digital transformation, academic research is lagging and missing an opportunity to provide theoretical insights that are important to inform the development, implementation and adoption of RPA (Hofmann et al., 2020; Ivančić et al., 2019; Syed et al., 2020). In this study, we respond to Syed's et al. (2020) call for research on the implications of RPA to better understand the changes and effects on the human workforce and explain employees' perspectives towards RPA-enabled changes in their work environment.

Employee buy-in is fundamental for the adoption and use of the technology and hence the success of RPA implementation (Plattfaut, 2019), especially against the backdrop that 30-50% of RPA projects fail (Lamberton, Gillard, & Kaczmarskyj, 2016). Existing research on traditional information-technology (IT)-enabled organisational change has shown that employees' perception and emotional reactions to a new IT system and the consequent changes to their work influence their behavioural response ranging from acceptance, deploying workaround and resistance and avoidance behaviours (Bala & Venkatesh, 2015; Beaudry & Pinsonneault, 2005; Bhattacherjee, Davis, Connolly, & Hikmet, 2018).

However, RPA is part of a new generation of workplace technologies that have a more radical and profound impact on the nature of work of human employees and their roles and responsibilities than traditional technologies such as Enterprise Resource Planning systems (Aroles, Cecez-Kecmanovic, Dale, Kingma, & Mitev, 2021; Baptista, Stein, Klein, Watson-Manheim, & Lee, 2020; Klein & Watson-Manheim, 2021). Hence, it is important to explore the effects of this new generation of technologies on human employees and employee perceptions of and reactions to these transformational technologies, including RPA. A better understanding of employees' perspectives will help to inform technology and human

resources policies as well as the design of more effective change management strategies that are crucial for successful RPA implementations (Kyheröinen, 2018).

Therefore, the goal of this research is to explore how employees make sense of RPA technology through their perceptions of and reactions to RPA and software robots. Drawing on a configurational approach (Meyer, Tsui, & Hinings, 1993), we develop distinct configurations of employees' RPA perceptions and reactions to this technology that reflect their perceived consequences of software robots, cooperation with an automation team, attitude toward change in work practices, and view of software robots and their performance. These configurations reflect different employees' perspectives on RPA and hence contribute to the academic discourse on the effects of the new generation of workplace technologies on the human workforce, but also may help change managers to accommodate the needs of employees and facilitate team leaders to better support their employees to maintain job satisfaction and avoid turnover. Therefore, we investigate the following research question:

"What are the distinct configurations of employees' perceptions of and reactions to RPA? and how do these perceptions and reactions reflect their perspectives of RPA?"

In order to address our research questions, we adopt a qualitative research approach (Sarker, Xiao, Beaulieu, & Lee, 2018) and configurational analysis to theorise employees' perceptions and reactions to RPA implementation at a financial institution based in New Zealand.

2 Theoretical Background

The implementation of RPA leads to the full or partial automation of work that was previously executed by human employees and hence often leads to radical changes in the way if, when and how human employees complete their work associated with those processes (Denagama Vitharanage, Bandara, Syed, & Toman, 2020; Eikebrokk & Olsen, 2020; Syed et al., 2020). Yet, research on employees' perception of and reactions to RPA and, in particular, the resulting effects on their work is still nascent. Hence, we first present the insights gained from the established literature on traditional IT-enabled organisational change and the effects on human employees (Bala & Venkatesh, 2013; Morris & Venkatesh, 2010), which informed our research and our theorising on RPA. We then present the state of the art of RPA research and conclude with a justification for using a configurational approach to theorise distinct configurations of employees' perceptions of and reactions to RPA.

2.1 Employees' Perceptions of IT-Enabled Organisational Change and Responses to IT implementations

Implementation of new IT is a major organisational change event that presents significant disruptions to employees' work environment. There is a rich body of work that has examined employees' perceptions and reactions to IT-enabled organisational change, particularly as a consequence of enterprise systems implementation. Despite nuanced differences in research findings, two key insights emerge from this stream of research. The first insight from this literature indicates that employees' perceptions of IT-enabled organisational change are primarily drawn from their perceptions of technology characteristics, perceptions of changes in work practices, and perceptions of changes in job characteristics (Bala & Venkatesh, 2015; Morris & Venkatesh, 2010). For example, Bala and Venkatesh (2013) found that employees' perceptions of technology complexity and the lack of flexibility to adjust system features to

work practices influence their unfavourable perceptions of changes in work practices and significantly increase job demands and decrease job control.

The second insight shows that user responses are varied and complex, depending on how they interpret and perceive consequences from a new IT in their work environment (Beaudry & Pinsonneault, 2005; Bhattacherjee et al., 2018; Wanchai, Díaz Andrade, & Techatassanasoontorn, 2019). User emotional responses as reactions to changes in their work environment from an IT implementation may include excitement, fear, anxiety, frustration, enthusiasm, and happiness that lead to different behavioural responses such as experimentation with IT and modification of work tasks, the use of workarounds and delaying the use of IT (Beaudry & Pinsonneault, 2005; Bhattacherjee et al., 2018; Stein, Newell, Wagner, & Galliers, 2015).

Some users who anticipate that an IT implementation will negatively affect them personally and professionally are more likely to engage in avoidance and resistance behaviours (Bala & Venkatesh, 2015; Lapointe & Rivard, 2005). For example, Boudreau and Robey (2005) found that users developed workarounds to respond to the perceived inflexibility and limitations of the system so that it responded to their needs. In contrast, those employees who see new IT as an opportunity often embrace the technology and enthusiastically explore the IT to find, extend, and/or change features of an IT to complete tasks in creative, novel and improvised ways (Bala & Venkatesh, 2015).

While the literature on IT-enabled organisational change with a focus on previous generations of technology such as enterprise systems has provided significant insights into employees' perceptions and responses, there are conceptual differences between transformations induced by traditional technologies and the new generation of workplace technologies such as the Internet of Things, algorithmic data analytics tools, and RPA (Klein & Watson-Manheim, 2021; Wessel, Baiyere, Ologeanu-Taddei, Cha, & Blegind Jensen, 2021). This is because the new generation of digital technologies has a more transformational and profound impact on the nature of work, the role of human actors, and forms of mutual dependencies among human actors, technical artefacts, and processes (Aroles et al., 2021; Baptista et al., 2020; Benbya, Nan, Tanriverdi, & Yoo, 2020; Klein & Watson-Manheim, 2021).

Despite the call for new ways of theorising consequences of the new class of technologies, including RPA (Wessel et al., 2021), the employee's perspective appears to be under-theorised (Seiffer, Gnewuch, & Maedche, 2021; Staaby, Hansen, & Grønli, 2021). Our study focuses on developing an understanding of employees' experiences with an RPA implementation. We attempt to develop a configurational theory of employee perceptions of RPA-enabled changes and responses to consequences of its implementation in their work environment that offers important groundwork to explain the why and how of employees' RPA experiences. These perceptions and responses to perceived and actual consequences of the introduction of RPA can occur before, during and after the implementation.

2.2 Effects of RPA on the human workforce

The literature on the effects of RPA implementation shows a mix of positive and negative implications on human employees. Based on a literature search, we identify common benefits and drawbacks for human employees and provide illustrative examples and quotes from existing studies presented in Table A1 in the Appendix.

Some studies show that RPA implementations have led to various beneficial outcomes for human employees. Many studies have demonstrated that RPA has the potential to reduce repetitive and mundane tasks and allows employees to take on more complex tasks that require critical thinking, decision-making, problem-solving and human judgment (Castelluccio, 2017; Penttinen et al., 2018). This shift to more value-adding tasks can lead to increased job satisfaction and work meaningfulness for employees (Denagama Vitharanage et al., 2020; Eikebrokk & Olsen, 2020; Staaby et al., 2021). Several case studies have also shown that employees experienced an increase in their work responsibility through RPA implementation (Staaby et al., 2021) that extended their knowledge and skills, especially around automation technologies and process automation (Denagama Vitharanage et al., 2020; Eikebrokk & Olsen, 2020; Lacity & Willcocks, 2016a). Some employees moved to new roles that require more technological skills or roles that allow a company to offer new services to their customers (Eikebrokk & Olsen, 2020; Lacity & Willcocks, 2016b).

Despite numerous benefits of RPA, several studies report a number of negative effects on the existing employees and potential new employees. While many organisations may not lay off their staff, they do not intend to hire new employees but choose to use software robots instead (Eikebrokk & Olsen, 2020). In addition, existing employees are often concerned about possible job loss as they feel threatened by software robots (Fernandez & Aman, 2018; Hallikainen et al., 2018). This is because software robots are usually more productive, make fewer errors and cost less than human employees (Aguirre & Rodriguez, 2017). These concerns are not unfounded, as some studies report redundancies and downsizing after RPA implementation (Eikebrokk & Olsen, 2020; Lacity & Willcocks, 2016a). Although some employees view learning new skills as an opportunity, others are worried and more resistant to adapting to these new challenges (Fernandez & Aman, 2018; Hallikainen et al., 2018). Further, while the reduction of mundane and repetitive tasks is one of the most significant benefits of RPA, some employees experience an increase in workload as they have to cope with more of the same kind of tasks or new tasks (Staaby et al., 2021). Also, while standardisation of work can be perceived as liberating and allowing employees to gain more time, it also affects employees' autonomy, leading to work alienation (Staaby et al., 2021).

Our literature review has shown that those positive and negative effects on employees almost always co-exist in an RPA implementation project, as illustrated in a case study from Fernandez and Aman (2018). Their results show that RPA implementation led to time savings made through the automation of mundane and repetitive tasks that can now be utilised by workers to take on more challenging tasks such as data analysis. Also, the error rate could be drastically reduced. On the other hand, the study also pointed out that workers feared losing their jobs to software robots, and they resisted changes to their work practices that forced them to learn new skills. Additionally, the reduction of employees intensified not only the competition among employees but also the competition between employees and robots.

Based on the conducted literature review, we identified two weaknesses in the existing body of knowledge on RPA that we will address in this study. First, despite the insights into the perceptions, reactions and effects of RPA implementation on employees, the literature on RPA lacks the theoretical foundation and synoptic analysis, which does not allow for actionable insights to improve RPA implementation experiences for the human workforce (Hofmann et al., 2020; Syed et al., 2020). The dearth of research literature on RPA is emphasised by Syed et al. (2020). Their structured literature review highlights that only 36% of the identified research

articles are peer-reviewed, confirming the predominance of grey literature in this field of study. Second, while the existing literature highlights organisational benefits, best practices and provides guidelines for successful RPA implementation or RPA governance (Aguirre & Rodriguez, 2017; Alberth & Mattern, 2017; Lamberton et al., 2016; Plattfaut, 2019; Rutaganda, Bergstrom, Jayashekhar, Jayasinghe, & Ahmed, 2017; Syed et al., 2020), only a few studies take an employees' perspective to highlight their perceptions of and reactions to RPA (Waizenegger & Techatassanasoontorn, 2020; Eikebrokk & Olsen, 2020; Staaby et al., 2021). Further, those studies that outline the benefits or drawbacks for human employees often draw their conclusions from participants of the RPA team, management level or RPA vendors (Denagama Vitharanage et al., 2020; Eikebrokk & Olsen, 2020; Ratia, Myllärniemi, & Helander, 2018). Therefore, little is known about actual employee perceptions of and reactions to RPA. Broadly speaking, our analysis of the literature suggests that there are possible winners and losers in the human workforce from RPA implementation; however, we need to develop a more precise contour and characterisation of what winning and losing from RPA implementation from an employee's perspective looks like.

Against the backdrop of the increasing adoption of RPA in organisations and the lack of empirical research from an employee's perspective on RPA (Denagama Vitharanage et al., 2020), the goal of this study is to develop a more nuanced understanding of how employees perceive and react to changes introduced by RPA implementation. Using a configurational approach as a theoretical framework and method (Hinings, 2018; Miller, 2018) we aim to enhance our understanding of a) the different RPA perceptions and reactions of human employees, b) how and why employees' perception of RPA influences the collaboration with the RPA team and ultimately their interactions with software robots, and c) how and why some employees benefit while others lose from RPA implementation. This understanding allows us to explain how employees' perceptions and reactions affect their interactions with RPA in order to design more customised change management approaches which foster the adoption and ultimately the realisation of RPA benefits.

2.3 Configurational Approach

As novel and advanced applications of IT such as RPA have been increasingly integrated into individuals' work practices, how individuals interact with ITs and their relationships with ITs have become increasingly complex (Hofmann et al., 2020). Consequently, some IS research has begun to use configurational concepts to theorise the relationship between users and IT. For example, Ortiz de Guinea and Webster (2013) suggest that individuals engage in different patterns of IT use in organisations depending on whether they experience problems with IT or find new opportunities to interact with IT. In another study, Wanchai et al. (2019) identify four distinct individual adaptation patterns to enterprise systems in organisations. These patterns represent different configurations of attitudes towards the system, approach to learning how to use the system, level of interaction with the system, exploration of system features, and stance towards changing work practices. Rich insights from these studies suggest that configurational concepts are useful for researchers to present a complex picture of various manifestations of user-technology relationships, which contributes to a deeper understanding of the role of IT and its effects on employees in organisations.

Configurational theories embrace the notion that a phenomenon (i.e., employees' perceptions of and reactions to RPA in this study) depends on a complex arrangement of multiple attributes interacting in a non-linear fashion (Fiss, 2007; Meyer et al., 1993). At a conceptual

level, a configuration is a "constellation of conceptually distinct characteristics that commonly occur together" (Meyer et al., 1993, p. 1175). Configurational theorising focuses on identifying combinations of attributes and logics that orchestrate the interactions of the various attributes and limit their variety (Furnari et al., 2020; Hinings, 2018; Miller, 1996, 2018). Underlying the configurational concept is a configurational approach that aims to identify distinct patterns composed of interdependent attributes. A configurational perspective is theoretically attractive because it enables researchers to organise complex cause-effect relationships into typologies that constitute causal relationships of various factors that make up different configurations (Fiss, 2011). In contrast to other approaches (e.g., linear regression), a configurational perspective stresses that complex causality is often characterised by *nonlinearity, synergistic* effects, and *equifinality* (Fiss, 2007; Meyer et al., 1993; Misangyi et al., 2017). Nonlinearity suggests that relationships among attributes are reciprocal, and attributes "found to be causally related in one configuration may be unrelated or even inversely related in another" (Meyer et al., 1993, p. 1178). Synergistic effects mean that outcomes are the result of the interdependence of multiple conditions. The principle of equifinality is the idea that different configurations may lead to the same outcome.

Hinings (2018) suggested that there are at least three theoretical goals for configurational analysis. First, configurations are a building block of a systematic theory by capturing patterns among key attributes. Much of the early configurational research follows this theoretical goal by developing conceptual typologies or empirically generated taxonomies (Miller, 2018). Second, configurational analysis is used as a classification tool to identify patterns of elements at different levels, such as organisations, groups, and individuals. Configurational theories are a good fit to simultaneously identify similarities and differences among populations across a wide range of phenomena. Third, a configurational approach can be used to understand the degree of coherence among a set of attributes. This study fits with the first two theoretical goals of configurational analysis because we aim to theorise distinct configurations of employees' perceptions of and reactions to RPA and identify constituting attributes underlying these configurations.

3 Methodology

To achieve our research objective, we conducted a case study building on the philosophical underpinnings of interpretivism (Levers, 2013; Myers & Walsham, 1998). In contrast to positivism, interpretivism assumes that knowledge is socially constructed by human actors (Walsham, 1995). We chose a financial institution as these institutions are known for being early adopters of new technologies (Syed et al., 2020), and engaging in process improvement to harness the economies of scale (Vishnu, Agochiya, & Palkar, 2017). With the widespread adoption of virtual banking, banks and financial institutions find themselves in an increasingly competitive and saturated market not only with other financial institutions but also with highly innovative and efficient Fintech companies. To stay competitive, banks and financial institutions need to innovate to provide the best customer experience while minimising their costs, adhering to security standards and following the regulatory and compliance requirements (Rutaganda et al., 2017; Vishnu et al., 2017). Automation, in general, and RPA, in particular, is deemed as a suitable solution to achieve those goals.

From an operational standpoint, financial institutions usually produce vast amounts of documents across their operations through a mix of legacy systems, manual processes, and emerging technologies. Such practice creates various adoption, integration, and information

retrieval challenges, leading to inefficiencies, errors, and high costs due to a large amount of human labour required to collect, input, interpret and transform data (Vishnu et al., 2017). RPA is regarded as a powerful and effective technology that can address these challenges and potentially transform the customer service model and internal operation processes, making the financial industry particularly interesting to study (Met, Kabukçu, Uzunoğulları, Soyalp, & Dakdevir, 2020).

The financial institution in our study has a frontrunner role in RPA implementation in New Zealand. Starting its automation journey in 2016, the organisation included RPA as part of its broader strategy to simplify and optimise business processes. Since then, it has implemented 60 attended and unattended software robots using BluePrism across various business areas and processes, including customer address changes, security alteration approvals, and payments and anti-money laundering management, among others. Before their RPA implementation, employees had to manually perform mundane tasks such as data entry, copying and pasting data from one system to another system and cross-checking the accuracy of data. According to the Head of the Intelligent Automation team, one important driver for RPA implementation was to automate these mundane tasks to improve employees' work experience, which ultimately affects the customer experience. After developing a business case and receiving funding, they started with a proof of concept for the merchant onboarding process through a collaboration with a vendor in India. However, they soon discovered that the offshore model didn't work partly because the process was built very poorly. They then turned to an onshore automation consultancy and developed five additional processes across business units in the following six months to increase the visibility of RPA and spread its benefits throughout the organisation. Based on this expansion of RPA implementation, they saw positive results in saved labour hours, an increase in processing speed and positive reactions from employees. As a result, they further extended their RPA programme across other business units, i.e. organisational entities with a particular focus such as corporate banking, business banking, personal banking, insurance etc. and officially established the Intelligent Automation team tasked with process optimisation and automation, including RPA.

3.1 Data Collection

We conducted 18 semi-structured interviews (Wengraf, 2001) from August to December 2019. Our participants consisted of members of the Intelligent Automation team, including the Head of the unit, business analysts, risk and project managers, change managers, and process controllers, as well as employees from the business units such as team managers, bankers, operations officers, and back-office clerks, who have had direct experiences with software robots and experienced changes in their work processes. Those employees were the end users of the RPA solutions and, depending on the processes they worked on interacted with a variety of different systems such as the customer relationships management system, the workflow orchestration tool that allocates tasks to the employees and bots, registry system, and various applications such as Excel, email services, and smart forms. Depending on their roles in the organisation, they were involved in the various back office and front office tasks such as assessing loan applications, onboarding new customers, advising on insurance packages etc. On the other hand, the members of the Intelligent Automation team worked with several automation tools, RPA being one of them, the systems that employees from the business units were using and a variety of different applications. Depending on their roles, they consulted the business units on various automation solutions, gathered requirements, developed the

script for the software robots, tested the solutions, managed the change in the business units and were responsible for the maintenance and troubleshooting of software robots, among many other tasks.

We first got introduced to the Head of Intelligent Automation team and then used the snowball sampling approach to recruit other interviewees. The participant profiles are shown in Table 1. We achieved demographic diversity by interviewing six men and 12 women from different age cohorts ranging from 25 – 55 years old and from various educational and cultural backgrounds.

Pseudonym	Role	Team	Gender
Interviewee A	Head of Intelligent Automation (IA) team	IA team	male
Interviewee B	Member of the IA team	IA team	male
Interviewee C	Member of the IA team	IA team	female
Interviewee D	Risk manager and former RPA user	Risk team	male
Interviewee E	Member of the IA team	IA team	female
Interviewee F	Member of the IA team	IA team	female
Interviewee G	Change manager	Business team	female
Interviewee H	Change manager	IA team	female
Interviewee I	Member of the IA team	IA team	female
Interviewee J	Member of the IA team	IA team	female
Interviewee K	Manager of RPA users and software robots	Business team	male
Interviewee L	RPA user	Business team	male
Interviewee M	RPA user	Business team	female
Interviewee N	RPA user	Business team	female
Interviewee O	Member of the IA team	IA team	male
Interviewee P	Risk analyst	Risk team	female
Interviewee Q	RPA user	Business team	female
Interviewee R	RPA user	Business team	female

Table 1. Participant profiles

We followed the dramaturgical model of qualitative interviews (Myers & Newman, 2007). We asked the Intelligent Automation team members questions about a) the RPA implementation process from initiation, design, development, testing, controlled production, and production, to post-implementation for 14 of their automated processes, associated challenges and how they were overcome, b) the processes that have been automated and if and how they were redesigned as part of the RPA implementation, and c) the interaction with and reactions to RPA of the employees in the business units. Furthermore, we were able to observe the work of the process controller, who explained how she manages the sixty different robots across the various processes while talking us through the different systems and applications she uses. Additionally, we witnessed a breakdown of one of the software robots, how she consequently interacted with the process owner and her colleague in the RPA team to find the root cause of the issue, and how they ultimately troubleshooted the bot. Being able to observe the bots "in action", seeing the log data, and a typical dashboard that is provided to the process owner, including important key performance indicators such as saved labour hours and straight-through processing rate allowed us to triangulate our data and better interpret the interview data. The interviews with the employees from the business units allowed us to gain further insights into a) the execution of the process before and after the RPA implementation, b) the changes in work tasks and responsibilities due to the RPA implementation, and c) their perceptions, reactions and consequent interaction with the RPA technology. Hence,

conducting interviews with the automation team and the business units allowed us to get a holistic picture of how employees in the business units perceive and use software robots. However, we also remained open to interesting yet not directly related accounts of our participants and probed into those narratives during the interviews if we thought they helped us answer our research questions.

The interviews took between 30 – 110 minutes and were conducted face-to-face at the organisation. The interviews were recorded, notes were taken, and the audio recordings were professionally transcribed.

3.2 Data Analysis

Configurations can be generated inductively or deductively (Ketchen et al., 1997). Previous configurational studies have used various methods, including inductive analysis using qualitative data and quantitative techniques such as cluster analysis, principal components analysis, and, more recently, qualitative comparative analysis (QCA) (Fiss, 2007; Hinings, 2018; Miller, 2018; Misangyi et al., 2017). Techniques such as cluster analysis are theory agnostic, while a new method such as QCA has clear strengths in theory testing. However, some researchers argue that QCA studies emphasise contrasts among configurations without paying enough attention to the nature of configurations and their underlying themes (Hinings, 2018; Miller, 2018). Since our interest is to develop internally consistent configurations, we chose to derive the configurations on employees' perceptions of and reactions to RPA inductively. Qualitative data allows us to characterise derived configurations with the richness required to fully interpret them (Miller, 2018).

We followed Furnari et al. (2020) configurational theorising process that involves three iterative stages: scoping, linking, and naming. Furnari and colleagues noted that the configurational theorising process is not a prescriptive set of analytical steps. But instead, it was designed as sets of heuristics aimed at inspiring "mental stimulation, thinking processes, and verbal articulation in the development of configurational theories" (p. 12). The scoping stage aims at surfacing attributes that explain employees' RPA perceptions and reactions while embracing the tensions between complexity and simplicity. As a theoretical starting point, we drew insights on plausible employees' perceptions and reactions from the IT implementation and RPA literature discussed earlier for our scoping process. Taken together, previous studies in the IT implementation literature found that employees had diverse attitudes and reactions to IT, disparate interactions with IT, and adaptation, particularly for those IT applications that had a significant impact on how they performed their work. The RPA literature hints that there are at least two broad groups of employees; those who are enthusiastic and embrace the benefits of software robots (Denagama Vitharanage et al., 2020; Eikebrokk & Olsen, 2020; Staaby et al., 2021) and those who have a resistance stance and feel threatened by software robots (Fernandez & Aman, 2018; Hallikainen et al., 2018; Lacity & Willcocks, 2016a). Based on this understanding, we conducted a thematic analysis according to the process proposed by Braun and Clark (2006). We first familiarised ourselves with the data again by reading the transcripts and listening to the audio files. Sensitised by the plausible attributes from the literature, we then generated initial codes without any preconceived theoretical lens in mind, which led the patterns emerge from the data in an inductive manner (Thomas, 2003). After this initial coding step, we grouped the initial codes into themes, reviewed the themes, and named them in several iterative cycles in order to achieve a shared understanding of the emerging

patterns in the theorising process. During the coding process, both authors wrote memos and summarised the key insights, which helped us determine the overarching themes.

For example, initial codes of "robot makes mistakes" and "robot does not perform accurately" were merged into a higher-level code of "do not trust software robots' work", which was further refined to "Employees do not trust software robots' work and question their reliability" and was grouped alongside other themes to the overarching theme "Evaluation of robot performance". This approach allowed us to simultaneously subsume the complexity of employees' RPA perceptions and reactions and retain theoretical parsimony. We identified six co-occurring attributes that contribute to employees' perceptions of and reactions to RPA. These are perceived consequences of software robots on their jobs, cooperation with the automation team, attitude towards changes in work processes and practices, view of software robots' role in the work process, level and nature of interactions with software robots, and evaluation of robot performance. To provide insights into our coding process, we illustrate the chain of evidence, including an explanation of the attribute, the initial codes and example quotes for two attributes, namely perceived consequences of software robots on their jobs and cooperation with the automation team in Table 2. To give insights into our coding logic, we numbered the initial codes and added them in square brackets after the respective interviewee statements to showcase how the original voices were codified.

Attribute	Explanation	Initial codes	Data excerpts
Perceived consequences of software robots on their jobs	Perception on how software robots will affect employees' job characteristics including their workload, work performance and job security	1. Availability of other tasks mitigate concerns around RPA taking over jobs 2. Concerns about robots taking jobs 3. Human employee does not feel threatened by robots 4. Negative emotions towards software robots 5. Negative perceptions on the implementation of software robots 6. Positive attitudes of human employees towards software robots 7. Positive emotions towards software robots 8. Software robots save time for human employees	I found that for example, the older employees were much more worried about being replaced by the robots [2, 4, 5], whereas the newer generation employees understood that it just meant that there would be more time for the humans to deal with the actual investigation side of our role, rather than doing the menial tasks [1, 3, 6, 7, 8]. (Interviewee L, RPA user) So I would say there are employees who like to do repetitive work, since they are now experts in that. So some would say: oh so what will I do if I don't do this work, if the robot takes over this? [2, 5] So we tell them you're a person. I mean there has to be people engagement as well, so you will do more productive work, get the relationship built within whatever customer's they are serving. So that's where more time could be utilised [1, 8], because customers, they want things quick and easy nowadays, but they also want that human interaction as well so that they know there's a face behind whatever's happening to their request. (Interviewee C, Member of the IA team)
Cooperation with the automation team	Degree of openness to proactively or reactively collaborate with the automation	9. Buy in from the business is crucial for successful RPA implementation 10. Close collaboration between business teams and the	They're involved. They're helping us understand the process, the solutioning, seeing it getting built, getting questions regarding oh would you do it this way or that way, you know? This system allows you to search for customers on this screen or this screen, what should you do? And they suddenly feel quite involved, so yeah,

	team through sharing information about existing processes	Intelligent Automation team 11. Crucial role of subject matter experts 12. Importance of team mentality between the business and Intelligent Automation team 13. Lacking information provided by the business unit 14. Requires involvement and ownership mindset from business teams 15. RPA success depends on team culture and mindset 16. Intelligent Automation team relies on information from subject matter experts	very, very positive [9, 10, 11, 12] and then we get them involved on the sort of the dare I say ramp up as well, so as they see the volume coming through, see their time getting saved, they love it [9, 14]. (Interviewee A; Head of IA team) Like you need to know your people well in order to know your process, because they are the doers of the process... [10, 11, 12] so if they don't do it correctly and they give you a wrong solution we'll be doomed, because obviously the robot will make a mess.[13, 16]. We rely on them to get that information, and another point is that to overcome that challenge we have to ensure that there is thorough communication with them [12, 15, 16]. (Interviewee C, Member of the IA team)

Table 2. Illustrative coding table

In the linking stage, the aim is to theorise why and how the attributes specified in the scoping stage connect to each other. In other words, linking is about the orchestration logic that explains how different attributes of a configuration relate to one another. Based on our analysis and evidence from the data, we observed that employees' perceptions, attitudes, and views of software robots mutually influence their cooperation stance with the automation team and subsequently shape their interactions with software robots and assessment of software robot performance. Finally, in the naming stage, the aim is to articulate "an overarching narrative that meaningfully communicates complex patterns that constitute each theorized configuration and the configurational theory as a whole" (Furnari et al., 2020, pp. 25-26). Our configurational theory of employees' perceptions of and reactions to RPA is framed around the interplay of employees' attitude towards both changes in work practices and software robots, cooperation stance with the automation team, role and performance of software robots in their work processes, and interactions with software robots. An overarching narrative of the process of employee responses to changes in work practices and the need to collaborate with software robots captures the different configurations to explain how different RPA perceptions and reactions to this automation technology develop throughout the implementation process. The four emerging configurations consisting of six interrelated attributes are introduced in the findings section.

4 Findings

Based on our analysis, we identified four distinct configurations of employees' perceptions of and reactions to RPA. We name these four configurations as '*software robots as a burden and threat*,' '*software robots as tools*,' '*software robots as teammates*,' and '*software robots as innovative enablers*.' These names reflect the disparate perspectives that employees attribute to software

robots and RPA. Table 3 presents a summary of these configurations and a description of their attributes. Next, we present each configuration and its constitutive attributes, along with evidence from the interview data.

4.1 Software Robots as a Burden and Threat

The 'software robots as a burden and threat' configuration largely describes a somewhat negative stance towards software robots by some employees due to concerns over their job security and negative reactions to additional responsibility on their work and software robots' performance. In particular, some employees are concerned that software robots will replace their jobs, which manifests in their resistance to cooperate with the automation team throughout the implementation process: *"There would be a lot of resistance there, especially the fear of the robots, all of those movies that we've seen where the robots take over... so they're like I'm going to lose my job over this, you know? It's always that fear."* (Interviewee J, Member of the IA team). An employee in the operations team underlines this point explaining that *"the older employees were much more worried about being replaced by the robots"* and *"Whereas people who perhaps don't really understand computers, I think they would be warier of the change because you know, they think along the lines of like well what am I going to do now"* (Interviewee L, RPA user)

Consequently, these employees are unwilling to share information about their work tasks during the requirement gathering phase or intentionally leave out information about how they perform their work tasks to maintain their edge over software robots: *"It was interesting also in that when we went back to the business, and it's like, oh well we can do it quicker. We can submit it quicker because we have shortcuts... and it's like shortcuts? Well why didn't you tell us about these? You know, suddenly there was more information coming up."* (Interviewee H, Change manager)

After the introduction of software robots, these employees tend to reject the changes introduced to their work processes: *"Once you bring in automation, that's when they are like, I don't understand this. I don't like this. I'm going to go back to doing it myself."* (Interviewee M, RPA user)

In addition, they regard software robots as a burden because the introduction of software robots creates more work or responsibility for them, as explained by one participant whose work tasks are located after a task that is now performed by software robots in the workflow: *"It's good that we've got the system working, but more responsibility lies on us if we don't actually check the memo and something goes wrong, I get the blame too for not rechecking everything. So more responsibility means that we have to go and check each and everything."* (Interviewee N, RPA user)

Perhaps, not surprisingly, these employees do not want to use software robots or, in some cases, only use them when they are told to do so: *"Like we've got data that says these people aren't using that one even though we've made all the benefits and the changes, and every month it's the same users that don't use it and they just refuse to use it."* (Interviewee B, Member of the IA team)

When it comes to their evaluation of software robot performance, these employees maintain their distrust in software robots' work and often question their reliability: *"There was definitely a little bit of, is the robot calculating it correctly? I'm concerned, you know?"* (Interviewee G, Change manager).

4.2 Software Robots as Tools

The 'software robots as tools' configuration mainly describes a yielding stance towards software robots by some employees while maintaining some scepticism over changes to their

work and software robot performance. At the beginning of the implementation process, these employees see some potential benefits of software robots and anticipate that software robots will help them save time and reduce mundane tasks: "*So I think it was an interesting mix between excitement and fear from some of the workers. Like some of them thought oh well this is what I do, what am I going to do now? Whereas others were thinking along the lines of well at least now I don't have to do this really boring thing, because some of those tasks were really, really repetitive.*" (Interviewee L, RPA user)

However, due to potential changes to their work tasks, they are reluctant to fully cooperate with the automation team during the automation process: *"That's part of the agreement that you have a regular kind of meetings that you can voice any kind of frustrations. But sometimes what can happen is that people don't feel comfortable for whatever reason in kind of voicing that and they'll sit on it. And then when you find out that it's a problem, it's grown to a bigger problem."* (Interviewee B, Member of the IA team)

Over time after seeing some initial benefits, these employees hesitantly accept the changes in their work processes without fully trusting software robots after their introduction: *"The approval officer double-checks the information that the robots put in. They do not fully trust the robots because robots do not get it right every time. It's assisting us to some degree… But what I'm saying is we can't rely on the robot for any overdraft account that he's giving us the full picture."* (Interviewee K, Manager of RPA users and software robots)

Once they start working with software robots, these employees take a pragmatic stance and view software robots as additional resources to partially support their work as explained by a manager whose team members have been working with software robots: *"The robot is assisting us in our process of making a decision. So when I talk about robotics, I refer to it as assisted automation, because it's automation that's assisting us to do our job."* (Interviewee K, Manager of RPA users and software robots)

Eventually, these employees accept software robots as a solution or a new tool in their work process: *"The robots are live, they're BAU [Business as Usual]. People have accepted it as a solution. We have a usage of at around 60 per cent... the total volume of [Process A] that we do [here], 60 per cent of that gets done by robot."* (Interviewee O, Member of the IA team)

But they remain vigilant of software robot performance and use various key performance indicators (KPIs) as evaluation metrics such as the number of exceptions or errors that software robots make: *"This is why I refer to it as assisted automation. It's assisting us to some degree. Every week I would say at least - my staff will escalate at least two to three to me to go back to that team, to say why did the robot do this? Why did the robot do that? Robot didn't put this in, robot didn't put that in."* (Interviewee K, Manager of RPA users and software robots)

4.3 Software Robots as Teammates

The 'software robots as teammates' configuration mostly describes an eager stance by some employees in relation to how software robots as their new team members can support their work. At the beginning of the implementation process, these employees enthusiastically expect that software robots will help them reduce their workload: *"We had so much work on, we knew, yeah, we've got other work to do. We knew it wouldn't take our jobs... ...that it would help us."* (Interviewee Q, RPA user)

As a result, these employees work closely in a collaborative fashion with the automation team to continuously improve their teammates and often give the bots a human name like Roby in

to emphasise that they are a true team member: *"I'm always like guys, Roby's feeling sick. Please just be mindful, I've contacted Roby's dad and... I just say hi guys, Roby's broken down. I think he needs some medicine and been overworked. Can you please assist?"* (Interviewee M, RPA user)

In general, these employees willingly adapt to new tasks and responsibilities after the introduction of software robots as explained by one employee who works with RPA at one of the branches of the financial institution: *"We moved the DZT [pseudonym] reporting over to us. We have moved the CX Drafts [pseudonym] over to us as well, so yeah, we were able to take on more work [from] neighbouring teams, so sister teams. So yeah, to summarise the things that it was more like, like I said, it was more of giving the time back to the users"* (Interviewee P, RPA user). In general, the implementation of RPA triggered a reallocation of work, so that mundane and repetitive tasks were outsourced to the software robots and some teams could now focus on more customer-focused tasks or got tasks allocated from other teams as their time got freed up by leveraging the software robot.

Attributes	**Software robots as a burden and threat**	**Software robots as tools**	**Software robots as teammates**	**Software robots as innovative enablers**
Perceived consequences of software robots on their jobs	Employees are concerned that the introduction of software robots will lead to uncertainty about their jobs and job loss.	Employees anticipate that software robots will help them save time and reduce mundane tasks.	Employees expect that software robots will reduce their workload.	Employees trust that software robots will help improve work performance.
Cooperation with the automation team	Employees are not willing to share information about their work tasks.	Employees are reluctant to share information about their work tasks.	Employees closely collaborate with the automation team to improve or fix their "teammate".	Employees proactively suggest how best to incorporate software robots into work processes.
Attitude towards changes in work processes and practices	Employees reject changes to their work processes.	Employees reluctantly accept changes in their work processes.	Employees adapt to new tasks and responsibilities.	Employees enthusiastically take on new roles with more responsibility.
View of software robots' role in the work process	Software robots are regarded as a burden because they create more work or responsibility.	Software robots are regarded as additional resources to partially support work.	Software robots are regarded as super users to help manage workload.	Software robots are regarded as enablers to improve work quality.
Level and nature of interactions with software robots	Employees do not use software robots or only use them when they are told to.	Employees accept software robots as a solution.	Employees consider software robots as members of their team.	Employees embrace software robots and proactively seek out ways to enhance software robot use.
Evaluation of robot performance	Employees do not trust software robots' work and question their reliability.	Employees focus on KPIs to evaluate software robots' performance.	Employees attribute software robots' performance in a similar fashion as they would to a human colleague.	Employees view software robots as highly compliant and high-performing to support their tasks.

Table 3. Configurations of employees' perceptions of and reactions to RPA

In addition, they view software robots positively as super users to help them better manage their workload: *"Our Roby memos out faster to the approvals team and I can continue working, whereas before I'd be stuck on it, finishing that off and then I'd - it wasn't until I completed that, then I was able to move on with the rest of the requests in my inbox. Whereas now quickly fill out Roby, send it off. Okay, move on to my next request. Oh yeah, Roby's come back, forward it, send to approvals, wait for them to send it back."* (Interviewee M, RPA user) Many employees who see software robots as a teammate have a deep appreciation for the technology: *"Very appreciated, yeah. You have no idea how we love Casper."* (Interviewee Q, RPA user) This mainly results from the robot taking over processes that the employees used to hate, which now positively affects their job satisfaction: *"I kind of feel like Casper's taken away that chunky thing they introduced"* (Interviewee R, RPA user) immediately followed by her colleague *"I enjoy my job a lot more. I used to dread doing [Process S] 'cause I hated doing [Process S]"* (Interviewee Q, RPA user).

They also consider software robots as members of their team, similar to the way they think of their human colleagues with whom they would for example, coordinate the time when tasks should get completed*: "We need Roby to wake up earlier, 'cause we've got some staff that start at six in the morning. So I've got one approval officer that comes in at six o'clock, so if she wanted to send a Smart Form to Roby but Roby only wakes up at eight, she's going to sit for two hours before she can do anything."* (Interviewee K, Manager of RPA users and software robots). Some employees even describe the robot as *"Charles [robot name], yes definitely part of the family"* (Interviewee R, RPA user) and even send Christmas cards on the robot's behalf (Interviewee Q, RPA user).

Likewise, they describe software robots' performance similar to the way they talk about their human teammates' performance. That is, software robots may have some good days and bad days: *"Roby's on fire today... ...'cause they're [memos] coming back within five minutes! Yeah. I know one of the other teams calls it Roby… and they're like oh Roby's having a few troubles this morning."* (Interviewee D, Risk manager and former RPA user)

4.4 Software Robots as Innovative Enablers

The 'software robots as innovative enablers' configuration typically describes a forward-looking perspective taken by some employees in relation to the role of software robots, their innovativeness, and benefits to enhance work performance. At the beginning of the implementation process, these employees overwhelmingly believe that software robots will help improve their work performance: *"The other one, like when we explained here's the solution, this is what we're going to do, the room - like there was a standing ovation in the room, 'cause people were so happy that...they'd get their lives back."* (Interviewee B, Member of the IA team)

Therefore, these employees proactively collaborate with the automation team and suggest how best to incorporate software robots into work processes: *"He was very, very good - and maybe that is part of his attitude or his competence in his existing role. He knew the existing process very well as well, that he - he didn't challenge us, but he worked with us to say okay, well what about this, what about this and what about this, what about this.*" (Interviewee B, Member of the IA team)

With regards to changes to their work, these employees enthusiastically take on new roles with more responsibility as described by the risk manager: *"But I would say majority, like 95 per cent of people embraced their new role and just went with it and they were very, very successful at it too."* (Interviewee D, Risk manager and former RPA user)

Unlike those in the previous configuration who put an emphasis on how software robots can help them with work volume, these employees view robots as enablers to help them improve

work quality*: "So if you think of an operations team at the bank, the highest risk an operations team would have is processing error; it's basically we use lots of people, people make mistakes. So one thing that I've seen from that point of view is there's a real - like when robotics is built correctly, there's a really, really reduced amount of risk in processing error."* (Interviewee D, Risk manager and former RPA user)

Therefore, these employees embrace software robots and proactively seek out ways to employ more of them or expand their use, if possible*: "They're like okay, can we have one more robot please? Because they know that robots are there to actually help assist them."* (Interviewee C, Member of the IA team)

Overall, they appreciate software robots as high-performing partners to support their tasks and allow them to do more meaningful work*: "So in this particular instance and the team were delighted with this process right, because they don't want to sit around doing these transactions anyways... and they also don't want to sit around fixing up mistakes. So having such a repetitive manual task taken away from you they thought was really cool, 'cause then they can get on and do much more human add value work."* (Interviewee E, Member of the IA team)

5 Discussion

The literature on IT implementation highlights that the consequences of an introduction of a new IT in a work environment are often perceived in a variety of ways by employees, thus triggering a wide range of reactions and responses among them (Beaudry & Pinsonneault, 2005; Bhattacherjee et al., 2018; Morris & Venkatesh, 2010; Wanchai et al., 2019). Similarly, automation efforts through RPA implementations can transform employees' work environment with deep changes to the nature of work leading to the emergence of new forms of work organising around interdependencies between human actors and digital technologies (Baptista et al., 2020; Denagama Vitharanage et al., 2020; Eikebrokk & Olsen, 2020; Klein & Watson-Manheim, 2021; Staaby et al., 2021). Existing RPA studies often lack a theoretical foundation and synoptic analysis (Hofmann et al., 2020; Syed et al., 2020) and miss the opportunity to explain the employee's perspectives on RPA-enabled changes in their work environment. To address this void, we conducted a fine-grained analysis that recognised that employees' perceptions of and reactions to RPA reflected complex interdependencies among multiple explanatory factors and addressed the research question: *"What are the distinct configurations of employees' perceptions of and reactions to RPA? and how do these perceptions and reactions reflect their perspectives of RPA?"*

With the development of our four distinct configurations, we contribute new insights into the consequences of RPA implementation in organisations by providing a more nuanced picture that shows diverse perceptions of and reactions to RPA as configurations of intertwined attributes that together form distinct perspectives of RPA. These disparate configurations, along with their constitutive attributes, allow us to better explain how employees perceive RPA, how this perception affects the collaboration with the RPA team, why and how employees interact with the technology the way they do, and how their perceptions, attitude and behaviour give rise to distinct views of RPA and software robots.

Based on our analysis, it becomes clear that the initially perceived consequences of software robots affect the extent of employees' cooperation with the automation team and whether they accept the changes to their work processes and practices. For example, employees who perceive software robots as a burden and threat are concerned about the changes RPA will

have on their work practices and their job security, which is in line with the findings of Fernandez and Aman (2018) and Hallikainen et al. (2018). These concerns have repercussions on the way they cooperate with the automation team. In particular, they often hold back important information, which prevents the automation team from implementing the most effective solution. Consequently, the robots often take longer than the employees to complete a task, or their executions generate too many exceptions. This unsatisfactory software robot performance provides these employees who perceive robots as a burden and threat a compelling reason not to use them and reject the changes to their work processes. This behaviour is similar to avoidance and inertia reactions commonly observed in previous IT implementation studies (Bala & Venkatesh, 2015; Boudreau & Robey, 2005), where employees avoid using a system or only use it if they are forced to do so. However, while employees often have to learn how the redesigned processes work and how to use the new IT system to complete their tasks in the case of a previous generation of workplace technologies (Boudreau & Robey, 2005; Yin Yeh & Ouyang, 2010), some employees in RPA projects do not actually need to use software robots to complete their tasks, but their tasks get outsourced to the software robots. Therefore, instead of learning to complete their tasks with a new system, employees in RPA projects often need to learn entirely new tasks, for example, how to send input to the software robots or how to check robots' work and performance. In other cases, some employees are required to shift to new and unfamiliar roles or face redundancies (Asatiani & Penttinen, 2016; Hallikainen et al., 2018; Lacity & Willcocks, 2016a). These various effects explain why employees who see robots as a burden and threat engage in behaviours similar to avoidance and inertia. They are unwilling to cooperate with the RPA team and do not want to use software robots.

On the contrary, employees who perceive robots as innovative enablers are enthusiastic about robots as they are convinced that robots will improve their work performance and lead to the various positive effects that are often highlighted in the literature, such as reduced error rate, reduction of mundane and repetitive tasks, increased speed and productivity improvements (Aguirre & Rodriguez, 2017; Denagama Vitharanage et al., 2020; Staaby et al., 2021). This enthusiasm for the technology explains their proactive collaboration with the automation team and how they embrace new work tasks and responsibilities. This proactive behaviour is in line with the exploration to innovate approach that some employees take, as reported in previous IT implementation studies (Bala & Venkatesh, 2015). When employees follow this approach, they usually explore IT to find new features and ways to help them accomplish their work processes and tasks in innovative ways. In our study, employees who saw software robots as innovative enablers often eagerly learned how the robots worked and suggested further tasks and processes where RPA could be implemented in the future. These employees usually flourished and often took on more responsibilities, moved to different roles where they could apply their newly acquired technological skills and advanced their careers. This is in line with previous IT implementation studies, where those users who explore IT features and engage in innovative use experience an increase in job satisfaction and job performance (Bala & Venkatesh, 2015; Hsu, Yen, & Chung, 2015).

We observe that employees who see robots as teammates anthropomorphise the technology and accept them as members of their team. In line with Seeber et al. (2020) research on machines as teammates, our participants do not simply associate a supporting role with the bots, but expect active engagement in the form of taking (independent) action to complete the work. Anthropomorphism is described as the tendency of humans to associate human-like

characteristics, properties or mental states with non-human artefacts such as IT systems (Epley, Waytz, & Cacioppo, 2007). Prior research has found that technologies with anthropomorphic cues foster users' trust in the technology and increase the likelihood of adoption (Qiu & Benbasat, 2005). Our findings signal a positive relationship between anthropomorphism and an appreciation for the software robot materialised in employees' view of software robots as true team members who take over mundane and often despised tasks. The allocation of tasks to the bots and human employees depending on their skill set alludes to an effective team design (Seeber, Bittner, et al., 2020) which is in turn conducive to successful collaboration between humans and machines. Since employees who perceive robots as their teammates expect the robots to reduce their workload as they often work faster and can process tasks around the clock (Seeber et al., 2020), they are likely to closely collaborate with the automation team. When talking about the interactions with robots or their performance, these employees often use analogical descriptions commonly ascribed to human colleagues, such as robots being sick. While the effect of anthropomorphism is well-researched in the field of AI in general and the field of conversational agents in particular (Schuetzler, Grimes, & Scott Giboney, 2020; Seeber et al., 2020; Sheehan, Jin, & Gottlieb, 2020), there is a lack of research that theorises anthropomorphism in the area of RPA. Similar to the positive impact of anthropomorphism on the adoption of personal intelligent agents (Moussawi, Koufaris, & Benbunan-Fich, 2020), we found that if employees anthropomorphise software robots, they are more likely to have a favourable attitude towards software robots and accept them as true digital colleagues in their teams.

Employees who perceive robots as tools that automate their manual tasks is similar to the way the Association of Chartered Certified Accountants (2015) describes the technology. In contrast to the other configurations where employees display rather uniform responses (either positive in the case of the "software robot as teammates" and "software robots as innovative enablers" configurations or negative in the case of the "software robots as a burden and threat" configuration), employees who perceive robots as tools experience ambivalent affective responses. Emotional ambivalence captures mixed emotions in response to a target, in our case, RPA and refers to an experience that involves positive and negative emotions (Fong, 2006; Pratt & Doucet, 2000; Stein et al., 2015). To be more precise, our participants respond positively to some cues of the new RPA solution but negatively to others. For example, these employees anticipate that robots will help them save time, which they can use for other tasks. However, they share similar concerns, like those who perceive robots as a burden and threat regarding their future employment and drastic changes in their job. These concerns have implications for their collaboration with the automation team. They only reluctantly share information about their tasks and only accept changes to their work tasks after initial hesitations. They eventually accept software robots as an additional resource to support their work. In line with their perception of software robots as tools, they evaluate robot performance according to common key performance indicators such as the number of exceptions (Syed et al., 2020), processing time and the number of cases processed (Aguirre & Rodriguez, 2017). Employees who perceive software robots as tools are cautiously optimistic about the technology and go through a transition process over the course of the RPA implementation project. To some extent, these employees' behaviours are similar to those described in Bala and Venkatesh (2015) where they want to maintain their old work processes and find workarounds to circumvent RPA; however, after realising RPA's benefits, they slowly accept the changes to their work processes and open up to engage with RPA where they accept software robots as

additional resources and a solution. This is in line with Stein et al. (2015) research, which found that users with ambivalent affective responses do not adopt one clear adaptation strategy to interact with the new IT system but display various adaptation behaviours.

5.1 Theoretical Contributions

This study contributes to theory in three ways. First, we developed configurations of employees' perceptions of and reactions to RPA using a configurational approach (Furnari et al., 2020; Meyer et al., 1993) and thereby highlighting different perspectives that employees have towards RPA and software robots. By doing so, we show how the complex interdependencies among multiple attributes across the implementation process orchestrate employees' perspectives of software robots. In particular, we show how their perceived consequences of software robots on their jobs influenced the collaboration with the automation team, their attitude towards the change in work tasks and processes and ultimately their interactions with software robots and attribution of software robots' roles and performance. By highlighting this chain of interdependent attributes that interact and operate together, in contrast to treating the attributes as individual factors working in isolation, we provide exploratory insights to explain complex and nuanced employee's perspectives towards RPA-enabled changes in their work environment.

Second, we build on Stein et al. (2015)'s research on ambivalent affective responses toward new IT implementations. In line with their findings that ambivalent affective responses can lead to various adaptation strategies, we show that employees who perceive robots as tools display a mix of positive and negative emotions, eliciting a variety of responses to RPA. For example, while they are hesitant to share information with the automation team and only reluctantly accept changes in their work processes, they anticipate that the bots will save them time and reduce their work tasks and ultimately accept them as a solution. The insight that employees can experience ambivalent affective responses (Fong, 2006; Pratt & Doucet, 2000) in response to RPA implementations extends existing research on employees' perceptions of and reactions to RPA, which predominantly highlights uniform emotional responses which are either positive or negative (Denagama Vitharanage et al., 2020; Eikebrokk & Olsen, 2020; Fernandez & Aman, 2018; Hallikainen et al., 2018; Syed et al., 2020). However, our research has shown that individuals can experience mixed emotions in response to different cues of RPA, which triggers a variety of different responses. Further research is needed to explore why some employees experience uniformly positive or negative emotions while others exhibit ambivalent emotions, how they react to different cues of RPA, and how those affective responses impact RPA adoption and (continued) use as the latter is crucial to reap the benefits of the technology.

Third, our approach to identifying coherent configurations of employees' perceptions of and reactions to RPA is an important step in developing rigorous insights in this emerging research area on automation and work (Baptista et al., 2020; Benbya et al., 2020; Klein & Watson-Manheim, 2021; Wessel et al., 2021). As argued by other scholars, a theory-based classification afforded by a configurational approach is central to theorising for all organisational phenomena (Miller, 2018). By following the theorising process from Furnari et al. (2020), we manage to achieve theoretical parsimony of six intertwined attributes that contribute to four distinct views of software robots. Our configuration theory suggests that employees' encompassing view of RPA can be better understood via the identification of the distinct, internally consistent set of elements derived from employees' perceptions, attitudes, and

behaviours. These configurations can be used as a building block for future research to systematically theorise and extend our understanding of employees' perceptions of and reactions to RPA as the process of transformative change unfolds (Baptista et al., 2020).

Fourth, we show that anthropomorphism is an important explanatory factor in employees' perceptions of and reactions to RPA. This is particularly true for the "software robots as teammates" configuration where employees partially anthropomorphised the robots. Partial anthropomorphism implies that these employees attribute some human traits to the robots and interpret them using a human schemata without perceiving the robots fully as literally human (Aggarwal & McGill, 2007; Guthrie, 1993). We theorised the ripple effect of anthropomorphism on employees' collaboration with the RPA team, their interactions with the robots and ultimately, the inclusion of software robots in their team. While research has shown that anthropomorphism has a positive effect on user experience in the field of AI in general and conversational agents in particular (Moussawi et al., 2020; Sheehan et al., 2020), the effects of anthropomorphism in the context of RPA have not been explored and are therefore not well understood. We, therefore, encourage further research in this area of anthropomorphism and employees' experiences of RPA and the social dynamics between software robots and human employees. We also call for future research to investigate drivers of anthropomorphism in the context of RPA (Epley et al., 2007).

5.2 Managerial Implications

Besides our theoretical contributions, our findings may inform RPA implementation and change management strategies. Knowing about the different configurations of employees' perceptions of and reactions to RPA allows change managers and line managers to better respond to the needs and concerns of employees, especially those who see software robots as a burden and threat or those who see them as tools. In particular, organisations should proactively address the myths around RPA and explain the consequences of RPA on employees' work and how the technology either allows them to do their work faster and better or to discuss possible avenues for re-and up-skilling to transition some employees into jobs that require more decision-making, human judgement and empathy (Institute for Robotic Process Automation, 2015; Santos et al., 2019). Bringing employees on the RPA journey early on allows organisations to establish better collaboration between employees and the automation team, which ultimately leads to a smoother implementation process as well as more accurate processing of the robots and a higher straight-through processing rate, which reduces the number of exceptions and therefore the workload of employees. The insights from our findings also allow line managers to better support their employees on the job as they are aware of how employees perceive robots, the effects on their work processes and how they evaluate robots' performance, which determines the extent to which they interact with the robots. Supporting employees on their needs, especially those who see robots as a burden and threat and those who perceive them as tools, can lead to increased interactions with the robots and subsequently the realisation of the benefits of RPA.

6 Conclusion

This study develops four distinct configurations as constellations of six interrelated attributes of employees' perceptions of and reactions to RPA. With our mid-range theory of employees' perceptions of and reactions to RPA, we contribute to the body of knowledge on IT-enabled organisational change in general and RPA-enabled organisational transformation in particular

with the focus on the effects on the human workforce based on the narratives of employee perceptions and reactions to an RPA implementation.

Our research has two limitations that need to be acknowledged. First, when developing the configurations, we had to rely on the perspectives of the automation team members and not only on the opinions of RPA users. This, however, allowed us to get a holistic perspective and access to data logs that triangulate if the employees use the robots or not. Second, in two interviews with three employees from the business units, a member of the automation team was present, which might have biased their responses. However, despite the presence of the member of the automation team, the interviewees also talked about their negative perceptions and reactions and one dramatic incident, which allows us to conclude that they didn't feel pressured to alter their responses to please the automation team member.

As stated above, the field of RPA is still widely under-researched (Hofmann et al., 2020; Syed et al., 2020); we know particularly little about the implications of RPA implementations on the human workforce. Our study was a first attempt to address this gap; however, we encourage further research on: a) if and how the different configurations evolve over time, b) the occurrence of ambivalent affective responses and the consequences for RPA adoption and (continued) use, c) the effects of RPA implementation on employees' work processes and practices, and d) the relationship between anthropomorphism and employees' attitude towards RPA and software robots. Future studies that follow a configurational approach may want to consider QCA, a set-theoretic approach that uses Boolean algebra to evaluate which combinations of attributes combine to result in an outcome (Fiss, 2007; Misangyi et al., 2017; Ragin, 1987, 2008). Another valuable direction for future research is to look deeper into employees' adaptation behaviours across different configurations of employees' perceptions of and reactions to RPA.

References

Aggarwal, P., & McGill, A. L. (2007). Is that car smiling at me? Schema congruity as a basis for evaluating anthropomorphized products. *Journal of Consumer Research, 34*(4), 468-479. doi:10.1086/518544

Aguirre, S., & Rodriguez, A. (2017). Automation of a business process using robotic process automation (RPA): A case study. In L.-S. E. Figueroa-García J., Villa-Ramírez J., Ferro-Escobar R. (Ed.), *Applied Computer Sciences in Engineering. WEA 2017. Communications in Computer and Information Science* (Vol. 742, pp. 65-71). doi:https://doi.org/10.1007/978-3-319-66963-2_7

Alberth, M., & Mattern, M. (2017). Understanding robotic process automation (RPA). *Journal of Financial Transformation, 46*, 54-61.

Aroles, J., Cecez-Kecmanovic, D., Dale, K., Kingma, S. F., & Mitev, N. (2021). New ways of working (NWW): Workplace transformation in the digital age. *Information and Organization, 31*(4), 1-11. doi:10.1016/j.infoandorg.2021.100378

Asatiani, A., & Penttinen, E. (2016). Turning robotic process automation into commercial success – case OpusCapita. *Journal of Information Technology Teaching Cases, 6*(2), 67-74. doi:10.1057/jittc.2016.5

Association of Chartered Certified Accountants. (2015). The robots are coming? Implications for finance shared services. 11-14.

Retrieved from https://www.accaglobal.com/us/en/technical-activities/technical-resources-search/2015/september/robots-and-the-future-of-finance.html

Bala, H., & Venkatesh, V. (2013). Changes in employees' job characteristics during an enterprise system implementation: A latent growth modeling perspective. *MIS Quarterly, 37*(4), 1113-1140.

Bala, H., & Venkatesh, V. (2015). Adaptation to information technology: A holistic nomological network from implementation to job outcomes. *Management Science, 62*(1), 156-179. doi:10.1287/mnsc.2014.2111

Baptista, J., Stein, M.-K., Klein, S., Watson-Manheim, M. B., & Lee, J. (2020). Digital work and organisational transformation: Emergent digital/human work configurations in modern organisations. *The Journal of Strategic Information Systems, 29*(2), 1-10. doi:10.1016/j.jsis.2020.101618

Beaudry, A., & Pinsonneault, A. (2005). Understanding user responses to information technology: A coping model of user adaptation. *MIS Quarterly, 29*(3), 493-524. doi:10.2307/25148693

Benbya, H., Nan, N., Tanriverdi, H., & Yoo, Y. (2020). Complexity and information systems research in the emerging digital world. *MIS Quarterly, 44*(1), 1-17.

Bhattacherjee, A., Davis, C. J., Connolly, A. J., & Hikmet, N. (2018). User response to mandatory use: A coping theory perspective. *European Journal of Information Systems, 27*(4), 395-414. doi:10.1057/s41303-017-0047-0

Boudreau, M.-C., & Robey, D. (2005). Enacting integrated information technology: A human agency perspective. *Organization Science, 16*(1), 3-18. doi:10.1287/orsc.1040.0103

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. doi:10.1191/1478088706qp063oa

Castelluccio, M. (2017). Artificial intelligence in business. *Strategic Finance, 98*(10), 55-57. Retrieved from https://sfmagazine-com.ezproxy.aut.ac.nz/post-entry/april-2017-artificial-intelligence-in-business/

Cewe, C., Koch, D., & Mertens, R. (2018). Minimal effort requirements engineering for robotic process automation with test driven development and screen recording. In W. M. Teniente E. (Ed.), *Lecture Notes in Business Information Processing. Business Process Management Workshops. BPM 2017. Lecture Notes in Business Information Processing* (Vol. 308, pp. 642-648). doi:https://doi.org/10.1007/978-3-319-74030-0_51

Denagama Vitharanage, I. M., Bandara, W., Syed, R., & Toman, D. (2020). *An empirically supported conceptualisation of robotic process automation (RPA) benefits.* In the Proceedings of 28th European Conference on Information Systems (ECIS2020). https://aisel.aisnet.org/ecis2020_rip/58

Eikebrokk, T. R., & Olsen, D. H. (2020). *Robotic process automation and consequences for knowledge workers; A mixed-method study.* In the Proceedings of Responsible Design, Implementation and Use of Information and Communication Technology: 19th IFIP WG 6.11 Conference on e-Business, e-Services, and e-Society, Skukuza, South Africa https://dx.doi.org/10.1007/978-3-030-44999-5_10

Epley, N., Waytz, A., & Cacioppo, J. T. (2007). On seeing human: A three-factor theory of anthropomorphism. *Psychological Review, 114*(4), 864–886. doi:https://doi.org/10.1037/0033-295X.114.4.864

Fernandez, D., & Aman, A. (2018). Impacts of robotic process automation on global accounting services. *Asian Journal of Accounting and Governance, 9*, 123-132. doi:10.17576/ajag-2018-09-11

Fiss, P. C. (2007). A set-theoretic approach to organizational configurations. *Academy of Management Review, 32*(4), 1180-1198. doi:10.5465/amr.2007.26586092

Fiss, P. C. (2011). Building better causal theories: A fuzzy set approach to typologies in organization research. *Academy of Management Journal, 54*(2), 393-420. doi:10.5465/amj.2011.60263120

Fong, C. T. (2006). The effects of emotional ambivalence on creativity. *The Academy of Management Journal, 49*(5), 1016-1030. doi:org/10.5465/amj.2006.22798182

Furnari, S., Crilly, D., Misangyi, V. F., Greckhamer, T., Fiss, P. C., & Aguilera, R. (2020). Capturing causal complexity: Heuristics for configurational theorizing. *Academy of Management Review, 46*(4), 1-50. doi:https://doi.org/10.5465/amr.2019.0298

Guthrie, S. (1993). *Faces in the clouds: A new theory of religion*. New York: Oxford University Press.

Hallikainen, P., Bekkhus, R., & Pan, S. L. (2018). How OpusCapita used internal RPA capabilities to offer services to clients. *MIS Quarterly Executive, 17*(1), 41-52.

Hinings, C. (2018). Why should we bother? What are configurations for? *Strategic Organization, 16*(4), 499-509. doi:10.1177/1476127018804796

Hofmann, P., Samp, C., & Urbach, N. (2020). Robotic process automation. *Electronic Markets, 30*(1), 99-106. doi:https://doi.org/10.1007/s12525-019-00365-8

Hsu, P.-F., Yen, H. R., & Chung, J.-C. (2015). Assessing post-implementation success at the individual level: Revisiting the role of service quality. *Information &Management, 52*(8), 925-942. doi:10.1016/j.im.2015.06.009

IEEE Corporate Advisory Group (2017). *IEEE guide for terms and concepts in intelligent process automation.*

Institute for Robotic Process Automation. (2015). Introduction to robotic process automation: a Primer. 1-34. Retrieved from https://www.businesssystemsuk.co.uk/uploads/attachments/Papers/Robotic-Process-Automation-June2015.pdf

Ivančić, L., Suša Vugec, D., Bosilj Vukšić, V. (2019). Robotic Process Automation: Systematic Literature Review. In R. G. C. Di Ciccio, L. García-Bañuelos, T. Hernaus, R. Hull, M. Indihar Štemberger, A. Kő, M. Staples (Eds.), *Lecture Notes in Business Information Processing* (Vol. 361, pp. 280-295): Springer, Cham. https://doi.org/10.1007/978-3-030-30429-4_19

Ketchen, D. J., Combs, J. G., Russell, C. J., Shook, C., Dean, M. A., Runge, J., . . . Lamoureux, S. (1997). Organizational configurations and performance: A meta-analysis. *Academy of Management Journal, 40*(1), 223-240. doi:10.5465/257028

Klein, S., & Watson-Manheim, M. B. (2021). The (re-)configuration of digital work in the wake of profound technological innovation: Constellations and hidden work. *Information and Organization, 31*(4), 1-15. doi:10.1016/j.infoandorg.2021.100377

Kyheröinen, T. (2018). *Implementation of robotic process automation to a target process–a case study.* (Masters Thesis). Aalto University, Aaltodoc.

Lacity, M., & Willcocks, L. (2016a). Robotic process automation at Telefónica. *MIS Quarterly Executive, 15*(1), 21-35.

Lacity, M., & Willcocks, L. (2016b). Robotic process automation: The next transformation lever for shared services. *The Outsourcing Unit Working Research Paper Series*, 1-35.

Lacity, M., & Willcocks, L. P. (2017). A new approach to automating services. *MIT Sloan Management Review, 58*(1), 1-16.

Lamberton, C., Gillard, A., & Kaczmarskyj, G. (2016). Get ready for robots - why planning makes the difference between success and disappointment. 1-9. Retrieved from https://www.ey.com/Publication/vwLUAssets/Get_ready_for_robots/$FILE/ey-get-ready-for-robots.pdf

Lapointe, & Rivard. (2005). A multilevel model of resistance to information technology implementation. *MIS Quarterly, 29*(3), 461-491. doi:10.2307/25148692

Levers, M.-J. D. (2013). Philosophical paradigms, grounded theory, and perspectives on emergence. *Sage Open, 3*(4), 1-6. doi:10.1177/2158244013517243

Met, İ., Kabukçu, D., Uzunoğulları, G., Soyalp, Ü., & Dakdevir, T. (2020). Transformation of business model in finance sector with artificial intelligence and robotic process automation. In U. Hacioglu (Ed.), *Digital Business Strategies in Blockchain Ecosystems. Contributions to Management Science.* (pp. 3-29). doi:https://doi.org/10.1007/978-3-030-29739-8_1

Meyer, A. D., Tsui, A. S., & Hinings, C. R. (1993). Configurational approaches to organizational analysis. *Academy of Management Journal, 36*(6), 1175-1195. doi:https://doi.org/10.5465/256809

Miller, D. (1996). Configurations revisited. *Strategic Management Journal, 17*(7), 505-512. https://www.jstor.org/stable/2486729

Miller, D. (2018). Challenging trends in configuration research: Where are the configurations? *Strategic Organization, 16*(4), 453-469. doi:10.1177/1476127017729315

Misangyi, V. F., Greckhamer, T., Furnari, S., Fiss, P. C., Crilly, D., & Aguilera, R. (2017). Embracing causal complexity. *Journal of Management, 43*(1), 255-282. doi:10.1177/0149206316679252

Morris, & Venkatesh. (2010). Job characteristics and job satisfaction: Understanding the role of enterprise resource planning system implementation. *MIS Quarterly, 34*(1), 143-161. doi:10.2307/20721418

Moussawi, S., Koufaris, M., & Benbunan-Fich, R. (2020). How perceptions of intelligence and anthropomorphism affect adoption of personal intelligent agents. *Electronic Markets, 31*, 343–364. doi:https://doi.org/10.1007/s12525-020-00411-w

Myers, M. D., & Newman, M. (2007). The qualitative interview in IS research: Examining the craft. *Information and Organization, 17*(1), 2-26. doi:doi.org/10.1016/j.infoandorg.2006.11.001

Myers, M. D., & Walsham, G. (1998). Exemplifying interpretive research in information systems: An overview. *Journal of Information Technology, 13*(4), 233 - 234.

Ortiz De Guinea, A., & Webster, J. (2013). An investigation of information systems use patterns: Technological events as triggers, the effect of time, and consequences for performance. *MIS Quarterly, 37*(4), 1165-1188. https://www.jstor.org/stable/43825786

Penttinen, E., Kasslin, H., & Asatiani, A. (2018). *How to choose between robotic process automation and back-end system automation?* In the Proceedings of European Conference on Information Systems, Portsmouth, UK. https://aisel.aisnet.org/ecis2018_rp/66

Plattfaut, R. (2019). *Robotic process automation–process optimization on steroids?* In the Proceedings of International Conference on Information Systems, Munich, Germany. https://aisel.aisnet.org/icis2019/practice_is_research/practice_is_research/3/

Pratt, M. G., & Doucet, L. (2000). Ambivalent feelings in organizational relationships. In S. Fineman (Eds.), *Emotion in Organizations* (pp. 204-226). London: Sage Publications.

Qiu, L., & Benbasat, I. (2005). An investigation into the effects of text-to-speech voice and avatars on the perception of presence and flow of live help in electronic commerce. *ACM Transactions on Computer-Human Interaction (TOCHI), 12*(4), 329-355. doi:10.1145/1121112.1121113

Ragin, C. C. (1987). *The comparative method: Moving beyond qualitative and quantitative strategies.* Berkeley: University of California Press.

Ragin, C. C. (2008). *Redesigning Social Inquiry: Fuzzy sets and beyond.* Chicago: University of Chicago Press.

Ratia, M., Myllärniemi, J., & Helander, N. (2018). *Robotic process automation - value by digitalizing work in the private healthcare?* In the Proceedings of International Academic Mindtrek Conference, Tampere, Finland https://dx.doi.org/10.1145/3275116.3275129

Rosso, B. D., Dekas, K. H., & Wrzesniewski, A. (2010). On the meaning of work: A theoretical integration and review. *Research in Organizational Behavior, 30*, 91-127. doi:10.1016/j.riob.2010.09.001

Rutaganda, L., Bergstrom, R., Jayashekhar, A., Jayasinghe, D., & Ahmed, J. (2017). Avoiding pitfalls and unlocking real business value with RPA *Journal of Financial Transformation, 46*, 104-115.

Santos, F., Pereira, R., & Vasconcelos, J. B. (2019). Toward robotic process automation implementation: An end-to-end perspective. *Business Process Management Journal, 26*(2), 405-420. doi:doi:10.1108/bpmj-12-2018-0380

Sarker, S., Xiao, X., Beaulieu, T., & Lee, A. S. (2018). Learning from first-generation qualitative approaches in the IS discipline: An evolutionary view and some implications for authors and evaluators (part 1/2). *Journal of the Association for Information Systems, 19*(8), 752-774. doi:10.17705/1jais.00508

Schuetzler, R. M., Grimes, G. M., & Scott Giboney, J. (2020). The impact of chatbot conversational skill on engagement and perceived humanness. *Journal of Management Information Systems, 37*(3), 875-900. doi:10.1080/07421222.2020.1790204

Seeber, I., Bittner, E., Briggs, R. O., de Vreede, T., de Vreede, G.-J., Elkins, A., . . . Söllner, M. (2020). Machines as teammates: A research agenda on AI in team collaboration. *Information & management, 57*(2), 1-22. doi:https://doi.org/10.1016/j.im.2019.103174

Seeber, I., Waizenegger, L., Seidel, S., Morana, S., Benbasat, I., & Lowry, P. B. (2020). Collaborating with technology-based autonomous agents: Issues and research opportunities. *Internet Research, 30*(1), 1-18. doi:10.1108/INTR-12-2019-0503

Seiffer, A., Gnewuch, U., & Maedche, A. (2021). *Understanding employee responses to software robots: A systematic literature review.* In the Proceedings of International Conference on Information Systems, Austin, Texas.
https://aisel.aisnet.org/icis2021/is_future_work/is_future_work/5

Sheehan, B., Jin, H. S., & Gottlieb, U. (2020). Customer service chatbots: Anthropomorphism and adoption. *Journal of Business Research, 115*, 14-24. doi:10.1016/j.jbusres.2020.04.030

Staaby, A., Hansen, K. S., & Grønli, T.-M. (2021). *Automation of routine work: A case study of employees' experiences of work meaningfulness.* In the Proceedings of the 54th Hawaii International Conference on System Sciences.
http://hdl.handle.net/10125/70629

Statista. (2020). Robotic process automation (RPA) adoption and investment rates worldwide in 2019, by organization size. *Technology & Telecommunications - Software.* Retrieved from https://www.statista.com/statistics/1017027/worldwide-robotic-process-automation-adoption-investment-rates-organization-size/

Stein, M., Newell, S., Wagner, E., & Galliers, R. (2015). Coping with information technology: Mixed emotions, vacillation, and nonconforming use patterns. *MIS Quarterly, 39*(2), 367-392. doi:10.2307/26628358

Syed, R., Suriadi, S., Adams, M., Bandara, W., Leemans, S. J., Ouyang, C., . . . Reijers, H. A. (2020). Robotic process automation: Contemporary themes and challenges. *Computers in Industry, 115*, 1-15. doi:10.1016/j.compind.2019.103162

Thomas, D. R. (2003). *A general inductive approach for qualitative data analysis.* University of Auckland, Auckland.

van der Aalst, W. M. P., Bichler, M., & Heinzl, A. (2018). Robotic process automation. *Business & Information Systems Engineering, 60*(4), 269-272. doi:10.1007/s12599-018-0542-4

Vishnu, S., Agochiya, V., & Palkar, R. (2017). Data-centered dependencies and opportunities for robotics process automation in banking. *Journal of Financial Transformation, 45*(1), 68-76.

Waizenegger, L., & Techatassanasoontorn, A. A. (2020). "Y*ou have no idea how much we love Casper" – Developing configurations of employees' RPA implementation experiences."* (2020). In Proceedings of the Australasian Conference on Information Systems 2020.
https://aisel.aisnet.org/acis2020/21

Walsham, G. (1995). The emergence of interpretivism in IS research. *Information Systems Research, 6*(4), 376-394. doi:https://doi.org/10.1287/isre.6.4.376

Wanchai, P., Díaz Andrade, A., & Techatassanasoontorn, A. (2019). IT adaptation patterns to enterprise-wide systems. *Communications of the Association for Information Systems, 45*(1), 226-250. doi:10.17705/1CAIS.04515

Wengraf, T. (2001). *Qualitative research interviewing: Biographic narrative and semi-structured methods*. London: Sage.

Wessel, L., Baiyere, A., Ologeanu-Taddei, R., Cha, J., & Blegind Jensen, T. (2021). Unpacking the difference between digital transformation and IT-enabled organizational transformation. *Journal of the Association for Information Systems, 22*(1), 102-129. doi:10.17705/1jais.00655

Yin Yeh, J., & Ouyang, Y. C. (2010). How an organization changes in ERP implementation: A semiconductor case study. *Business Process Management Journal, 16*(2), 209-225. doi:10.1108/14637151011035561

Appendix

Table A1. Possible effects of RPA implementation and use on human employees

Effects	Explanation	Illustrative examples or evidence from existing studies
Positive effects		
Focus on higher-value work	RPA can change the nature of employees' work so that employees can now focus on tasks that require judgment, critical thinking, and problem-solving capabilities.	The implementation of RPA in the purchase to pay process of the company Basware allows employees who monitor the process to focus on tasks that require judgment-based decision making (Castelluccio, 2017). Penttinen et al. (2018) explored a process at a Telco's Corporate Customers unit, focusing on the availability check of the fibre-Ethernet product. Due to the implementation of RPA, employees could drop all tasks related to the availability check and now focus on processing the bids that require expert judgment. They receive the availability check results from the software robot, and then accept or reject the bid, determine the pricing for the accepted bids and answer the customer.
Reduction of mundane and repetitive tasks and workload	RPA takes over mundane and repetitive tasks from human employees.	Based on a mixed-method study of organisations in the public and private sector, Eikebrokk and Olsen (2020) found that the reduction of mundane tasks is particularly common in public and financial companies. For instance, a participant from the public sector explains: "It has been a change in tasks where those

		tasks we still do are those that need human judgement, but we have got rid of those boring tasks […] so we can concentrate on new and unsolved tasks." (Eikebrokk & Olsen, 2020, p. 122).
Higher accuracy and fewer errors	Software robots can perform tasks more accurately and make fewer errors than humans.	Payroll employees at OpusCapita, a Finnish business process outsourcing provider, were delighted after realising that software robots performed the tasks faster and more accurately than human employees (Hallikainen et al., 2018).
Time savings	The reduction of manual and repetitive tasks leads to time savings for employees.	The Vice President of the Finance and Accounting unit at an oil and gas company explains that RPA leads to time savings for human employees due to the reduction of manual and repetitive tasks (Fernandez & Aman, 2018).
New roles for employees	The implementation of RPA leads to the creation of new roles for employees.	Based on their literature review, Syed et al. (2020) confirm that RPA could lead to the creation of new roles for employees. At Telefonica O2, UK-based employees were redeployed to other service areas after the implementation of RPA (Lacity & Willcocks, 2016a). A robotic manager from Eikebrokk and Olsen (2020) study explains: "Cutting costs can be done in many ways. Everybody thinks immediately that people will be fired as the only way of cutting costs. This is totally wrong because you might rather use their time to do tasks that you so far have not been able to do in the company, including new services and tasks that have been neglected for a long time. You can simply do more with the same workforce and thus save money" (p.122).
Outsourcing non-value-adding tasks to allow employees to focus on customer interactions	Employees can now focus on interactions with their customers.	A qualitative study exploring RPA potentials in the private healthcare sector in Finland found that due to RPA, administrative and manual work could be outsourced to software robots so that the clinical staff, including doctors and nurses, can focus more on the interactions with patients and therefore create more value for patients. For example, inputting data can be outsourced to RPA in the visit records management process (Ratia et al., 2018).
Increase in job satisfaction	Employees experience an increase in job satisfaction due to the change in the nature of their work.	The payroll employees at the Queensland University of Technology (QUT) experienced an increase in job satisfaction as they a) could focus on analytical and problem-solving skills instead of swivel-

		chair tasks and b) didn't have to work overtime and on the weekend anymore (Denagama Vitharanage et al., 2020).
Increase in work meaningfulness	RPA can facilitate work meaningfulness which is "work experienced as particularly significant and holding more positive meaning for individuals" (Rosso, Dekas, & Wrzesniewski, 2010, p. 95).	Staaby et al. (2021) found that all three case organisations in their study created initiatives to increase employees' work meaningfulness. For example, the audit unit in the consultancy achieved an increase in work meaningfulness among their employees by providing them with more autonomy and the opportunity to engage in more complex tasks. Another example is the employees of the administrative unit in a housing cooperation felt important with their new responsibility to operate software robot, which, in turn, had a positive effect on their work meaningfulness (Staaby et al., 2021)
More social relationships inside and outside an organisation	RPA implementation facilitates collaboration within and across units in an organisation as well as increases the interactions with clients.	The implementation of RPA led to the establishment and fostering of interpersonal relationships that was enabled through the participation in RPA-related task forces that involved working with employees and managers from other departments and offices than their own (Staaby et al., 2021). In Eikebrokk and Olsen (2020) study, the CEO from a wholesale company states "In our case, workers work more with sales tasks which leads to better market relations and increased sales – this is what makes a salesperson valuable" (p. 122) which implies that sales people can focus more on interactions with their clients and other stakeholders to build and foster relationships after RPA implementation.
Job crafting	RPA allows employees to engage in job crafting, which involves changing their work and jobs to enhance their skill sets and job opportunities.	The employees of the audit unit in a consultancy organisation engaged in job crafting. For example, one of the implementers developed programming skills that he leveraged to develop digital solutions for accounting practices within his department (Staaby et al., 2021).
Enhancement of knowledge and skills	The involvement in the RPA projects allows employees to extend their skill set and broaden their knowledge on automation technologies and process improvement.	The employees who worked on the payroll process at QUT learned about automation that they wouldn't have without the implementation of RPA (Denagama Vitharanage et al., 2020). At Telefonica O2, back-office staff members received training in the RPA software, Blue Prism, and were able to upskill within three months so that they could automate

		end-to-end processes independently (Lacity & Willcocks, 2016a). A respondent from Eikebrokk and Olsen (2020) highlights, "They [workers] do other and newer tasks because it [RPA] frees up capacity to prioritize differently and learn from new insight into process and technology" (p.122).
Negative effects		
Actual job loss	Employees face redundancies due to the implementation of RPA.	A process rationalisation initiative at Telefonica O2, which involved process elimination, simplification and optimisation, led to the reduction of the back-office headcount by 10% (Lacity & Willcocks, 2016a). Based on the mixed-method study conducted by Eikebrokk and Olsen (2020) in Norway, downsizing was more common in the private sector than in the public sector. Financial companies report more downsizing than companies in other sectors. One of the strategic managers of a bank states: "Yes, there is a lot of [downsizing] in the finance industry. There are severance packages three times a year" (p.120).
No new recruitments	Instead of hiring new employees, organisations choose to use software robots.	A strategic manager at a Norwegian bank highlights that his bank doesn't hire new people anymore, but that they employ RPA instead (Eikebrokk & Olsen, 2020). Another participant from the supplier industry explains that "We grow without [hiring] new people. […] RPA is a way to handle a part of the growth." (Eikebrokk & Olsen, 2020, p. 121)
Concerns about job insecurity	Employees fear that they will lose their job to RPA.	The operational manager of an oil and gas company reports that the accountants fear losing their jobs due to the implementation of RPA. The human resource manager of the same company states that due to the reduction of employees, the competition increases not only between human employees but also between employees and robots (Fernandez & Aman, 2018). OpusCapita, a Finnish Business process outsourcing provider, implemented RPA internally and then started to provide RPA services to clients. In their pilot project, they focused on payroll production and automated the "new employment relationships" process as well as the "changes in employee payment details" process. When payroll employees learned

		about the implementation of RPA they feared to lose their jobs to robots (Hallikainen et al., 2018)
Necessity to learn new skills	Employees are forced to learn new skills due to the changes in their work processes.	The operational manager of the oil and gas company states that accountants are worried about having to learn new skills due to the RPA-induced changes to their work processes (Fernandez & Aman, 2018). The payroll employees at OpusCapita had to learn new daily work practices such as how to read and interpret the reports from the software robots (Hallikainen et al., 2018).
Increase in workload	Employees perceive an increase in workload either of the same kind of tasks or different tasks.	Due to the implementation of RPA at an administrative unit in a housing cooperation, the employees reported that they have to complete an increased amount of the same type of work that they receive from the regional office (Staaby et al., 2021).
Superiority of software robot performance	Human employees are usually less productive, slower, make more errors, and cost more than software robots.	The implementation of RPA in a payment receipt generation process showed that the group with RPA could handle 21% more cases than the group without RPA. Further, the group with RPA was 9 seconds faster than the group without RPA and the human-robot team was more productive because the software robots could perform several cases at the same time. This highlights the superiority of software robots over employees (Aguirre & Rodriguez, 2017).
Work alienation due to standardisation	Standardisation affects employees' autonomy negatively which can result in work alienation.	Standardisation can have a negative impact on the autonomy of employees as highlighted in the case of an audit unit at a consultancy organisation. A manager of this unit highlights that his employees are knowledge workers and not assembly line workers and that they want to work autonomously. As a result, they react negatively to standardisation of work, which could result in work alienation (Staaby et al., 2021).

doi: https://doi.org/10.3127/ajis.v26i0.3833