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The Rise of Automation Democratization: Robots of the People, by the People, for the People

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Abstract

The concept of automation democratization has been a subject of interest to many businesses for some time, however, it has received little attention in academia. This study aims to understand how citizen developers - non-IT experts given the right training and knowledge - experience automation democratization; and to investigate how their perception of automation is shaped by introducing the term "democratization". To do this, we adopted a multi-theoretical lens. First, given the novelty of this topic, we relied on political science literature, as it is the original field of democracy theory. Second, we reviewed and applied democratization of technology literature, which is closely related to our field of research. While academic literature has previously outlined the employees' perception of Robotic Process Automation (RPA) when implemented by IT within an organization, it has not hitherto studied their perception when robots are created and utilized by citizen developers themselves. Our research aims to fill this gap.

We adopted a single-case study approach, wherein data is collected and analyzed in a qualitative manner through in-depth interviews, preparatory ethnography, and related research. Our findings reveal that citizen developers' experience of automation democratization is positive. When citizen developers are directly involved and engaged in the creation of robots, they feel empowered and emancipated, while the process nurtures a sense of belonging that drives the success of automation implementation initiatives. Citizen developers experience automation democratization as an inclusive and participative enterprise that facilitates their personal and professional growth. The program contributes to the emergence of a community, where people freely share knowledge and bots. Our findings demonstrate that citizen developers perceive RPA robots as tools, colleagues, or freshers; not as threats, contrasting with previous academic studies.

This research provides insights into automation democratization and suggests that automation initiatives are likely to be successful when democratization is introduced into that process and citizen developers are empowered to create and consume bots.

Keywords: technology, automation, RPA, democratization, democracy, citizen developer.

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Definitions

Term	Definitions for this study
Automation	Automation can be defined as “the execution by a machine agent (usually a computer) of a function that was previously carried out by a human” (Parasuraman, 1997: p. 231).
Robotic Process Automation (RPA)	RPA can be defined as a type of automation technology that is used to operate in computers replicating the work humans do (Syed et al., 2020). RPA is utilized to automate routinary, rule-based, and repetitive tasks, utilizing software robots (Aguirre & Rodriguez, 2017).
RPA software robot (also referred to as “robot” or “bot”)	In the context of RPA, a software robot is a digital entity that is developed to mimic human activities on a computer (Pramod, 2021). The purpose of a robot is to automate a task that is performed by a human, as it is designed to execute predefined instructions and rules (Willcocks, Lacity, & Craig, 2015).
Democratization of automation	It means giving employees tools, access to technology, and knowledge to develop their automation robots.
Citizen developers	Citizen developers are defined as employees who have gone through an automation democratization training. Most of these employees are non-IT professionals (i.e., business- people), who come from various units such as sales, HR, supply chain, or finance (Lebens et al. 2022). During the course, they are trained to develop bespoke software robots to address their automation needs.
IT department	The information technology (IT) team is a central hub within Organization X. This department includes various units, among them is the automation team. It provides services to all employees of Organization X, in all countries.
Automation team	The automation team, at Organization X, is the organization unit in charge of developing and supporting the automation democratization program. Additionally, this unit develops automation software for other organizational units with diverse automation technologies, such as Low Code, attended RPA, or unattended RPA. To develop these software automation solutions, they rely on IT professionals.
Automation use case	At Organization X, an automation use case is a business process or scenario, where automation technologies can be applied. In other words, it is a process that can be automated.

1. Introduction

1.1 Background

“It makes me feel better if am doing something like this. And being able to develop this bot alone also made me feel quite good.” B

What happens when robots are created by the average business person? How do people experience the independent creation of software assistants that automate repetitive tasks? Is there cooperation between technology and man; and an appreciation of gaining new skills? Or does fear of losing power, agency, and even employment create resistance to leveraging these automation technologies?

RPA is a software-based technology in which a “robot” is a software program or solution (Enriquez et al., 2020), which is developed to perform rule-based, well-structured, and repetitive tasks in a quick and profitable manner (Kokina & Blanchette, 2019; Enriquez et al. 2020; Kregel, Koch, & Plattfaut, 2021). These robots have also been called “bots”, “buddy bots”, or “software agents”. In essence, bots mimic the activities people perform when moving through different computer programs (Syed et al., 2020). Organizations are increasingly motivated to adopt software robots into their business processes to reduce lead times, increase efficiency and eliminate repetitive and mundane tasks. (Sutherland, 2013; Hofmann, Samp, & Urbach, 2020).

Traditionally, when a business unit inside an organization wants to automate a process, it will work with the IT department or outsourced IT specialists to develop an automation solution (Willcocks, Lacity, & Craig, 2015). However, with the growing demand for software solutions, the development teams are under significant pressure and often unable to keep pace with business needs (Hegde, Gopalakrishnan, & Wade, 2018). It is in this context that the concept of ‘Democratization of Automation’ has emerged.

Democratization of automation means that an organization gives its employees access to the knowledge and the means to create and use robots, whether they have prior programming knowledge or not. This is the principle of citizen development, essentially allowing business people to freely create software robots in total autonomy. Although democratization of automation has been a subject of interest among businesses for some time, it is still a new field in academia. Despite the existence of academic literature in the fields of democratization of AI, data, and technology, there is a lack of scholarly work devoted to automation democratization. Last, while the effects of automation implemented by IT experts have been covered in previous literature, the effects of automation implementation when done by business people remain unclear.

RPA solutions are projected to grow at a rate of 32.8% from 2021 to 2028 (Choi, R’bigui, & Cho, 2021). Companies are attempting to implement technology with different strategies and one of them is democratization. Therefore, the following study will explore the experience and the effects of the democratization of automation on so-called ‘citizen developers’ in a global Swedish telecom company, referred to as Organization X.

As Organization X chooses to call this program “democratization”, we believe it is important to understand the democratic aspect of it. Therefore, we have decided to employ political science theory as it is the field that originally defined democratization. Democratization in politics values learning and knowledge. It is liberating as the process dispels the prejudices and ignorance that are the bedrock of all dominations (Ober, 2008).

Democratization of technology aims to empower the people inside an organization, allowing them to expand their skills by providing them with access to tools and systems to develop software applications. A large range of providers have emerged to enable rapid application development, offering low-code and no-code platforms. These platforms have been developed mainly to target business people, meaning the users do not need to take extensive training to develop software applications (Gartner, 2019).

In essence, democratization literature describes the characteristics and measurability of democracy but omits automation as it falls outside of the political scope. In addition, while RPA implementation by IT experts has been widely covered in the literature in recent years, automation by citizen developers, within a democratic process, has not been investigated as such. Last, automation democratization and technology democratization are related fields. Although the latter has been covered in the literature, the outlines and specificity of automation remain to be identified, therefore, warranting further investigation. It is this gap in research that this study seeks to address.

1.2 Purpose & Expected Contribution

The aim of this study is two-fold. First, to provide the reader with a deep and nuanced understanding of how citizen developers experience automation democratization in an organizational context. Second, to understand citizen developers’ perception of automation and how that perception is shaped by introducing democratization. In order to do this, we studied a real-life case of democratization automation, across several departments and took into consideration different international perspectives in a selected organization. This study is the first conducted into automation democratization and will enable organizations to consider how such programs are affecting their workforce. By considering the effects of automation democratization, practitioners can ensure improved engagement and diffusion within organizations.

1.3 Research Questions

Considering the aforementioned research purpose, the following research questions have been formulated:

RQ1: How do citizen developers experience democratization of automation?

RQ2: How does democratization affect citizen developers’ perception of automation?

1.4 Delimitation

A clear boundary was enforced to maintain focus and fulfill the scope of this study. This study investigates one organization, taking a single-case approach. That is, in the absence of prior research, a single-case study must be held to understand the subject fully before a comparative study is conducted (Yin, 2003) The organization selected is a global company and considered a

pioneer in democratization. Moreover, studying one case provides a deeper and more nuanced analysis of the process and its effects on the selected organization. Nevertheless, we acknowledge that the findings in other contexts and industries could be different.

This research looks at the case of democratization of automation through RPA using UiPath, a high-quality automation platform. However, we acknowledge that there are other types of automation democratization programs that utilize other platforms.

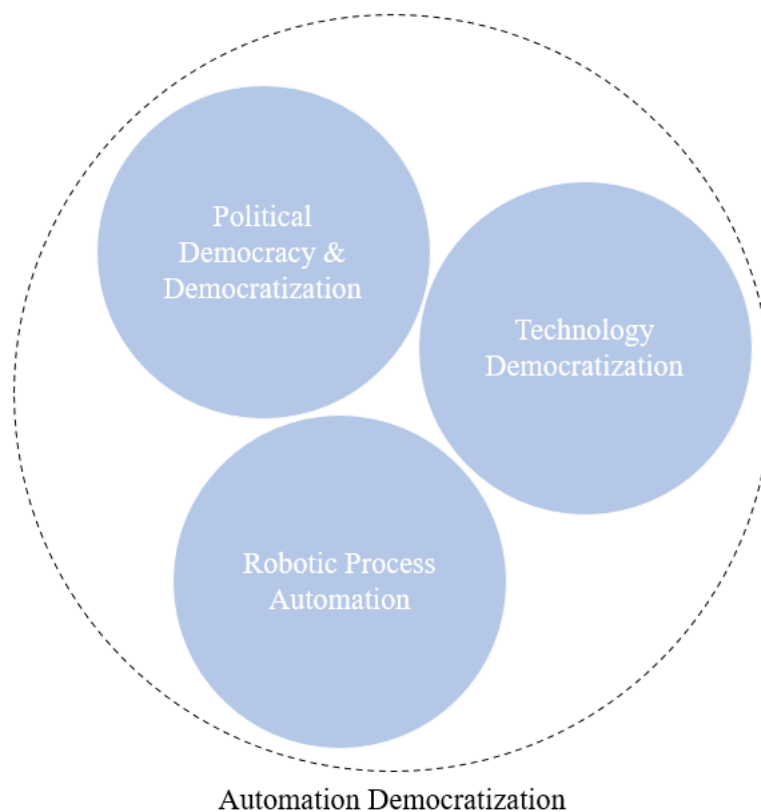
2. Theory

This chapter provides a review of the relevant literature (2.1), after which the theoretical framework developed will be presented and justified while identifying the research gaps (2.2).

2.1 Literature review

Since there is a noticeable lack of academic literature about the democratization of automation, with only business articles addressing the topic, to comprehend and analyze our findings, we have drawn information from three different domains, therefore employing a multi-theoretical lens for our study. The following section outlines these domains: we highlight relevant literature about democracy and democratization, as defined in their original field, political science (2.1.1), technology democratization (2.1.2), and RPA literature is presented (2.1.3).

Figure 1. Multi-theoretical lens



2.1.1 Political democracy & democratization

We will begin by defining democracy in its original context, the political landscape (2.1.1.1). Subsequently, we will distinguish it from democratization, which is the process of transition from a non-democratic state to a democratic one (2.1.1.2), before dwelling on the criteria by which democracies are measured (2.1.1.3). We will then draw a parallel between political democracy

and organizational democracy (2.1.1.4). Although these concepts may seem different from one another, they are fundamental to understanding democratization of automation, which remains undefined by academic literature.

2.1.1.1 What is democracy?

The word "democracy" is derived from the Greek words 'Demos', meaning people, and 'Kratos' meaning power or rule (Davies, 1993). "Democracy" can therefore be translated as: Government of the people or Government of the majority (Davis, 1993). In other terms, democracy, as a state form, is observed when governance belongs to the people, which is the opposite of monarchy, aristocracy, and dictatorship (Davies, 1993).

Defining democracy is not an easy task (Bühlmann et al., 2012). However, the democratic habit makes it possible to recognize a democracy empirically: there is democracy when the power belongs to the citizens (Dahl, 2020); such is the meaning of the statement made by Abraham Lincoln, in his Gettysburg Speech on November 19, 1863: "Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal" (Boritt, 2006, p. 113), "this nation, under God, shall have a new birth of freedom and that government of the people, by the people, for the people shall not perish from the earth" (Boritt, 2006, p. 119). This motto was adopted by many countries, such as France. The Republic stands for "Liberty, Equality, Fraternity" (Langer et al., 2020, p. 1). Its principle is: "government of the people, by the people and for the people" (Boritt, 2006, p. 245)

2.1.1.2 Democratization

Huntington defines democratization as "transitions from nondemocratic to democratic regimes that occur within a specified period of time and that significantly outnumber transitions in the opposite direction during that period" (Huntington, 1993, p. 15). Democratization is empirically determined and measured by access to education, growing per capita income, and degree of military expenditure (McMahon, 2002; Diamond, 1992; Clague et al., 1996). It is a process leading to a more open, participatory, and less authoritarian society (Dahl, 2020). A democratized nation or region is defined as such when its citizens enjoy liberty and equality, and its institutions have the full backing of civil society. The citizens can control and evaluate whether the government is ensuring the objectives of liberty and equality, according to the rule of law (Morlino, 2004).

While democratization takes place at all levels of human society - local, national, regional, and global - its strength lies in the fact that it stems from the people. The commitment of individuals is essential to the fullness of democracy, and in turn, democracy creates the conditions for the development of the individuals. However, participation, like other forms of human activity, is always embedded in a given context, shaped by various elements. These factors include the personalities of the actors, their attitudes, beliefs, values, and interests, as well as a balance between needs, desires, and means. Additionally, the bonds of the social edifice, and the acquired competence and incompetence also play a role (Dahl, 2020).

2.1.1.3 Criteria of democratization

In “Democracy and Its Critics”, Robert Dahl (2008) argues that there are five criteria for evaluating a democratic process. However, ideal democracy remains a utopia and there is no country that fully fulfilled these criteria (Dahl, 2008).

The existence of an electoral body. The first condition of democratization is the existence of an Electoral body that is regularly assembled. Today, in most democratic states, the scope of participation and citizenship is defined by age and capacity, as well as nationality. Before the 20th century, this inclusion criterion was unacceptable to most advocates of democracy (Dahl, 2008).

Voting equality. The second essential criterion is the periodicity of consultations or voting equality (Dahl, 2008). That means once the first criterion is met, citizens must have the right to periodically choose their representatives, who are not assigned indefinitely, *ad vitam eternam*.

Effective participation. The third criterion, mostly observed in participative democracies, is Effective participation (Dahl, 2020), where the citizens have equal and effective opportunities to make their opinion heard as to what policy should be enacted. When not heard, the state can be accused of power abuse which can lead to citizens’ uprising and rejection of their representatives, regardless of whether the political measure is for the “Greater good” (Dahl, 2008).

Enlightened understanding. The fourth criterion encompasses Enlightened understanding (Dahl, 2008). This implies that citizens can make judgments about different alternatives and inform their choice accordingly (Dahl, 2008). The citizens must have equal and effective access to learn about the values and programs of their representatives in order to choose the one that best answers their needs and priorities or that better represents their ideology.

Control of the agenda. Last, Control of the Agenda (Dahl, 2008) must be granted to the citizen in order to decide what matters are to be placed on the agenda. This criterion articulates itself around the notion of co-creation granted by the periodicity of consultation, mentioned above.

2.1.1.4 Organizational democracy

We will briefly introduce organizational democracy as a nexus between political and technological democratization. This approach allowed us to understand the interplay between these two fields and facilitated the analysis of some organizational factors found in this study.

Organizational democracy was first introduced in management literature in 1897 by Sidney and Beatrice Webb (Müller-Jentsch, 2008) and, is often related to enhanced employee participation in their organization’s management and processes (Harrison & Freeman, 2004). Organizational democracy can enhance employee satisfaction and involvement, increase innovation, and improve organizational performance by increasing stakeholder commitment (Harrison & Freeman, 2004).

Many scholars equate organizational democracy with participation and define it on that basis (Weber, Unterrainer, & Schmid, 2009; Yazdani, 2010). Democratization promotes increased participation, responsiveness, and efficiency as well as the organization of a community and the legitimization of public affairs at a national level (Boutros-Ghali, 1996). Similarly, organizational

democracy is a way to reconcile the divergent social interests within the organization. It is a way to promote participation by all and to resolve differences through learning and empowerment. Establishing democratic institutions at an organizational level ensures that the priorities of different groups are considered when formulating strategies and establishing roadmaps (Dahl & Irgens, 2022).

2.1.2 Democratization of technology

This section first defines this concept and draws a parallel between the citizens' democratic rights in the political and technological fields (2.1.2.1). Next, a background of technological democratization is presented (2.1.2.2). The difference between democratization and disintermediation is discussed (2.1.2.3), finalizing with facilitating factors of technology democratization (2.1.2.4).

2.1.2.1 What is technology democratization?

Democratization of technology encompasses the process of making technological tools available and accessible to everyone (von Hippel, 2006). According to Hoover and Lee (2015), a good example of technological democratization is computing. At first, computers were only available for the IT department. Computing democratization was driven by the development of user-friendly software and low-cost hardware, which in turn enabled the population to have access to Personal Computers at home. This provided everyday people access to tools for personal and professional development (Hoover & Lee, 2015).

Théberge (2004) states that two different approaches to democracy can be distinguished in Macpherson's (1973) essays. One approach highlights that individuals have the immutable right to develop their capabilities while the other emphasizes that citizens, as consumers, have the freedom to choose from any available utilities (Théberge, 2004). Similarly in the context of technology, Hoover and Lee (2015) argue that there are two sides to democratization: creation and consumption. The first relates to giving citizens the freedom to create and the latter refers to the freedom to choose what to consume (Hoover & Lee, 2015).

Technology democratization has been facilitated by software improvements and the price drop in platform usage (von Hippel, 2006; Harkins & Prior, 2022). The power to innovate and create is becoming readily accessible to end-users. This is due to the improvements in computer software, reducing the technical complexity and leading to the creation of easy-to-use tools for innovation and the development of more affordable tools (von Hippel, 2006; Kelly & Farahbakhsh, 2013; Harkins & Prior, 2022). Hence, access to software development tools on personal computers has become possible "for the many, not the few" to paraphrase the title of the Manifesto of the British Labour Party (Middleton, 2019).

Democratization levels the playing field, allowing more people, such as non-IT professionals, to develop their software solutions (von Hippel, 2006). Technology democratization succeeds when it becomes accessible and cheaper to everyday people. Similarly, democracy succeeds if the

distribution of utility and satisfaction is done in an equitable and fair manner (Harkin & Prior, 2022).

2.1.2.2 From a product-centric to a user-centric approach

When it comes to software development, users' needs are highly heterogeneous (Franke & von Hippel, 2003). Software manufacturers tend to produce products that are created to address the needs of the mass market because, only then, they can capture profits from a large segment of the market (von Hippel, 2006). Consequently, mass-produced software solutions rarely meet the specific and authentic needs of everyone. Independent organizations that can monitor and facilitate technology production based on authentic usability are lacking, leading to the creation of an “un-usability culture” (Dotson, 2015).

While trying to address these concerns, researchers advocate empowering end-users to design their own software solutions, a new approach that has been called democratization of technology (von Hippel, 2006; Kelly & Farahbakhsh, 2013). Democratization of technology aims to allow citizens to play an active role in the design and development process of products, ensuring that solutions are created with the public's authentic needs in mind and that the job-to-be-done is clearly defined (Christensen et al., 2016). Not only can democratization of technology bring the technology industry and the public closer, but it also improves usability (von Hippel, 2006; Kelly & Farahbakhsh, 2013).

Technology democratization is analogous to the concept of permissionless innovation. Adam Thierer (2016, p. 1) described it as “the notion that experimentation with new technologies and business models should generally be permitted by default.” It has been argued that, when moving towards a more technologically advanced society, it is essential to recognize the effect of technological innovation through permissionless innovation (Dotson, 2015).

The impact technology has on people can be compared to the impact democracy has in the sense that they both shape the citizens' lives (Dotson, 2015). As technological developments have substantial consequences for communities and individuals, democratization enables all members of an organization to have a voice in the decision-making process that involves improving their work. This approach can help organizations fully realize the potential of technology while improving the lives of their employees and advancing innovation. As a result, scholars claim that it is crucial to extend democratic representation to this realm, allowing citizens to shape their own lives with technologies (Goldman, 1992; Sclove, 1995; Winner, 2012).

2.1.2.3 Democratization and disintermediation

Technology innovation has brought about major changes, notably two connected forces: democratization and disintermediation (Hoover & Lee, 2015). According to Harkin and Prior (2022) the democratization concept in the technology context does not only mean simplifying technology complexity, improving accessibility and affordability but, most of all, a process of flattening and opening up hierarchies of production. The authors claim that when professionals are not the sole manufacturers and knowledge creators, the result is that democratization creates a new

community, in which citizens can create and spread their technical literacy and products with their peers (Durant, 1990). This phenomenon can be explained by disintermediation, which means that the need for middlemen is eliminated, creating the opportunity for citizens to connect with others, assist each other, exchanging information and software solutions (Hoover & Lee, 2015; von Hippel, 2006). In essence, disintermediation removes conventional hindrances to accessing markets and tools (Hoover & Lee, 2015). For instance, disintermediation from IT means that employees no longer need IT support to configure their computers, instead they can do it on their own.

2.1.3 Automation through RPA

We present a brief description of Robotic Process Automation as an automated solution for businesses. The literature review about RPA is relevant as it is the technology used by Organization X in its automation democratization program. We will define RPA as a software and the specificities of its implementation (2.1.3.1). Then, we will focus on selected benefits of RPA, which have been highlighted based on the results of our study and following the principles of the abductive approach (2.1.3.2). Therefore, we will not present an exhaustive list of benefits but rather define the ones that will be further elaborated. Last, we will present the literature findings on the perception of automation and RPA robots (2.1.3.3).

2.1.3.1 What is Robotic Process Automation?

RPA is the application of technology enabling an organization to deploy computer software or a "robot" to carry out business processes. These can include data manipulation, formulating responses, processing transactions, and interacting with other digital systems (Van der Aalst, Bichler, & Heinzl, 2018). Notably, an RPA robot is not a physical object, but a digital or software solution (Lacity, Willcocks & Craig, 2015; Kokina & Blanchette, 2019; Kregel et al., 2021). The main steps in the implementation of an RPA solution are (1) the compilation of the company or department's business needs, (2) the selection of the process to be automated, (3) the configuration of the processes in the RPA tool, (4) the testing and validation of the processes, and (5) the drafting of the various documents related to the automation of each process (Choi, R'bigui & Cho, 2021; Denagama Vitharanage et al., 2020; Axmann & Harmoko, 2021).

An important feature of RPA adoption is its ease of implementation. In fact, RPA software typically resides on a computer or in a cloud, directly interacting with various already-existing applications within the organization (Kregel et al., 2021; Lacity, Willcocks & Craig, 2015). Each robot accesses different systems using a user ID and password in order to perform data entry or manipulation (Willcocks, Lacity, & Craig, 2015). Consequently, RPA adoption does not require the configuration of external application programming interfaces (APIs) (Lacity & Willcocks, 2016). The enabling language of RPA is easy to implement, as it does not require extensive programming knowledge and is adaptable to the evolution of an organization's systems (Willcocks, Lacity, & Craig, 2015).

2.1.3.2 Benefits of Robotic Process Automation

Existing academic literature covers an extensive analysis of RPA benefits (Costa, Mamede, & Silva, 2022; Willcocks, Lacity, & Craig, 2015; Lacity & Willcocks, 2016). However, we will focus on the following aspects for the study's consistency: 1) increased productivity, 2) workforce flexibility, and 3) analytical capability.

Increased productivity. Robots can support employers' productivity as they work 24 hours a day and do not require breaks (Flehsig, Anslinger, & Lasch, 2022; Wewerka, Dax, & Reichert, 2020). The continuous operation of robots through time allows the company to provide services to customers dispersed across different time zones without the need for outsourcing (Lacity & Willcocks, 2016). Moreover, robots support human performance and reduce process time for some formerly manual tasks. According to Lacity and Willcocks (2016), human performance in handling repetitive activities is poorer than machine performance, because humans make mistakes when they are bored, distracted, or tired.

Flexibility of the workforce. RPA allows for the strategic deployment of company resources. A robot can be assigned a sequence of process executions from various departments of the organization, according to a priority order (Willcocks, Lacity, & Craig, 2015). Robots can be quickly assigned to a process where demand has suddenly increased (Lacity & Willcocks, 2016). Organizations and suppliers can orchestrate groups of robots to handle their fluctuating volume of work allowing capacity to match demand (Wewerka, Dax, & Reichert, 2020; Gotthardt et al., 2020; Kokina & Blanchette, 2019; Parker & Appel, 2021).

Analytical capability. RPA software collects data to analyze and optimize the operational performance of the company's activities, data interfaces, and processes (Denagama Vitharanage et al., 2020). This leads to a standardization of the process which increases results accuracy and translates into the employer's performance (Wojciechowska-Filipek, 2019). Robots record a large amount of performance data in the form of key analytics, enabling managers and relevant employees to know what the robots are doing and monitor their performance (Willcocks, Lacity, & Craig, 2015). This creates the possibility for employees to do something more meaningful with their time, by focusing on tasks that require analytical and soft skills, which cannot be covered by robots (Kokina et al., 2021).

2.1.3.3 Perception of automation and RPA robots

Understanding how employees make sense of RPA robots is essential to analyze the citizen developers' perceptions and experiences of democratization of automation.

According to RPA literature, employees often expect robots to take their jobs, as a result, they see them as competitors (Fernandez & Aman, 2018). But the World Economic Forum (2018) claims that an approach to overcome this challenge is to train those people who might be impacted by RPA implementation, educating them about the technologies' capabilities and supporting them.

A study conducted by Waizenegger and Techatassanasoontorn (2022) found that individuals' reactions and perceptions of RPA robots can be classified into four configurations. The quartet

includes: (1) perceiving “software robots as a burden or threat”, leading to evasion and inertia; (2) considering “software robots as a tool”, demonstrating mixed emotional responses and carefully adopting the technology; (3) regarding “software robots as teammates”, anthropomorphizing robots and anticipating active engagement; (4) viewing “robots as innovation enablers”, leading to employees’ proactive cooperation and easily adopting new tasks (Waizenegger & Techatassanasoontorn, 2022). This classification of the perception of robots is established according to the users' experience who did not create their own robot as it was provided to them by the IT department. Our study will focus on the experience of the citizen developers who are both creators and users of their own robots.

2.2 Theoretical framework and research gap

Having conducted a review of existing and relevant literature, democratization of technology can be concluded to be a nascent research area, whereas automation democratization is a new academic field. As a result, this study seeks to answer the identified research questions using the three theoretical lenses portrayed in Table 1. Additionally, we employed organizational democracy theory as a nexus between political and technology democratization, to better understand their implications in an organizational setting.

Table 1. Identified research gaps

Theoretical lens	Researched by the following scholars (non-exhaustive list)	Perceived research gap
Political democracy and democratization	Davies, 1993; Huntington, 1993; McMahon, 2002; Diamond, 1992; Clague et al., 1996; Dahl, 2008, 2020; Bühlmann et al., 2012	Discuss democracy and/or democratization in the political sphere, but they do not study democratization in the automation field.
Democratization of technology	Von Hippel, 2006; Dotson, 2012; Kelly & Farahbakhsh, 2013; Tanenbaum et al., 2013; Hoover & Lee, 2015; Dotson, 2015; Coleman, 2020; Harkins & Prior, 2022	Discuss and/or focus on technology development and implementation by non-IT experts but do not discuss RPA development and implementation by non-IT experts.
Robotic Process Automation	Willcocks, Lacity & Craig, 2015; Pramod, 2021; Van der Aalst, Bichler, & Heinzl, 2018; Denagama Vitharanage et al., 2020; Waizenegger & Techatassanasoontorn, 2022; Costa, Mamede, & Silva, 2022	Discuss RPA implementation and development done by IT professionals; however, they do not study automation democratization (i.e., RPA developed and implemented by non-IT experts).

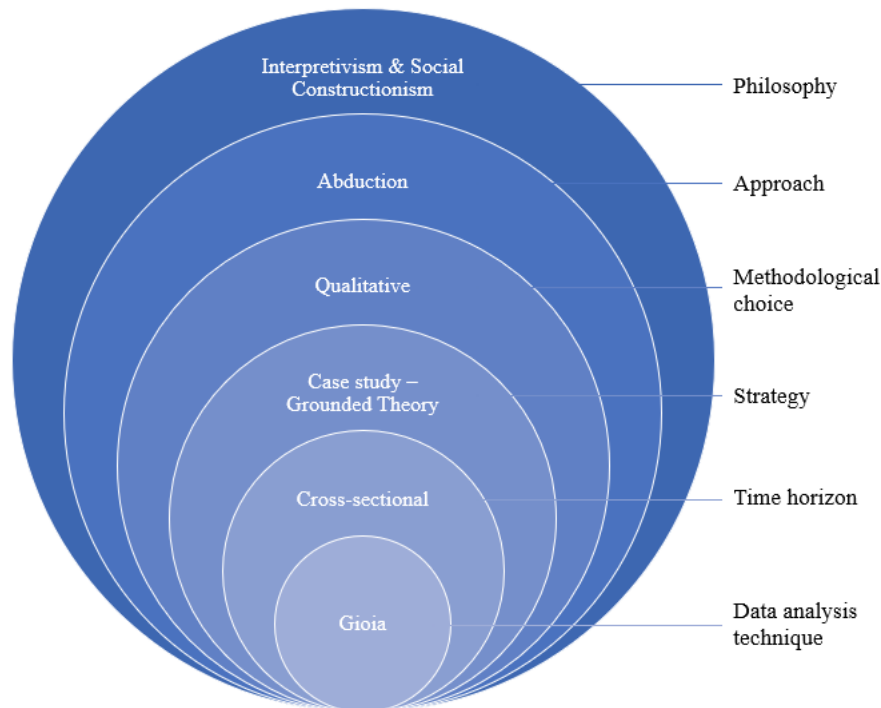
3. Method

This section outlines our methodological choices and explains our motivation for choosing these to answer the research questions. First, the methodological fit is presented (3.1). Second, the research design is described (3.2). Third, the data collection methodology is portrayed (3.3). Fourth, the data analysis procedure and methodology are depicted (3.4). Finally, the trustworthiness of this study is discussed with relevant literature (3.5).

3.1 Methodological fit

To address our research questions systematically, we made sure that our selected method elements were chosen ensuring consistency and coherence. That is, we ensured that our research philosophy, approach, method, and strategy were aligned with our research questions, objectives, data, and constraints. Figure 3, showcases our choices in the form of a research onion, adapted from Saunders, Lewis, and Thornhill (2012)

Figure 2. Research onion, adapted from Saunders, Lewis, and Thornhill (2012)



3.1.1 Research philosophy

The research philosophy we adopted relies on the objective of our study. As we aim to understand automation democratization by studying how citizen developers make sense of this concept, we adopted the interpretive philosophy. *Interpretivism* is best suited for this study since democratization of automation is a complex topic that lies at the intersection of society, politics, and technology. As such, this stand allows us to acknowledge its complexity and make sense of it through individuals' perceptions, experiences, and opinions (Saunders, Lewis, & Thornhill, 2012; Malterud, 2001). This also meant that the ontological assumption we made was that "reality is

socially constructed and subjective” (Saunders, Lewis, & Thornhill, 2012, p. 140). That is, we assumed that the reality of automation democratization is created through the experience and perception of the individuals involved in the program.

3.1.2 Research approach

Exploratory research with an *inductive* approach was initially selected as empirical method as it helps to determine the appropriate research design before conducting a larger study (Saunders, Lewis, & Thornhill, 2012). Thus, we intentionally avoided having a deep understanding of RPA, automation, and democratization literature beforehand, following Gioia et al. (2013, p. 21) approach: “we make the point of not knowing the literature in great detail, because knowing the literature too early puts blinders on and leads to prior hypothesis bias (confirmation bias)”. Nevertheless, as the study advanced, we transitioned from induction to *abduction* as it allowed us to develop our theory by simultaneously drawing from the data gathered through the interviews, as well as structuring it based on existing frameworks and theory (Saunders, Lewis, & Thornhill, 2012). Moreover, as democratization of automation is a complex and uncharted field, we leveraged the advantages of an abductive approach, thereby facilitating an iterative data analysis and theory creation process (Saunders, Lewis, & Thornhill, 2012).

3.1.3 Methodological choice

The nature of our study was primarily *exploratory* as our purpose was to understand and clarify the nature of automation democratization while providing new insights (Saunders, Lewis, & Thornhill, 2012). Due to the lack of academic literature about this nascent research topic (Edmondson & McManus, 2007), we decided to employ a *qualitative* approach to study the concept through the perception and experience of the individuals involved in it (Malterud, 2001; Saunders, Lewis, & Thornhill, 2012; Makri & Neely, 2021). That is, although democratization is a well-defined concept that has been covered by political science literature (Davies, 1993; Huntington, 1993; Dahl, 2008, 2020), with further variations such as democratization of AI (Allen et al., 2019; Montes & Goertzel, 2019; Wolf, 2020), data democratization (Davies, 2010; McLaughlin & Young, 2018; Lefebvre, Legner & Fadler, 2021), and democratization of technology (Kelly & Farahbakhsh, 2013; Hoover & Lee, 2015; Dotson, 2015), automation democratization has not yet been covered by academic literature.

Considering the topic’s early-stage development, we deemed necessary a method that could provide versatility and flexibility as the study progressed. Qualitative methods allow researchers to modify and adjust their strategy, question, and design, as the research progresses, adapting their study to emerging insights (Yin, 2003; Saunders, Lewis, & Thornhill, 2012). This ensured the continued relevance of our study of automation democratization as it permitted us to adapt as new challenges, trends, and opportunities surfaced.

3.1.4 Strategy

We followed Makri and Neely’s (2021) proposal, which claims that for emergent research topics, it is best to adopt the grounded-theory approach. This method is also best suitable to study how

individuals make sense of reality (Suddaby, 2006). This study sought to shed light on the experiences of citizen developers of democratization automation. By conducting an in-depth analysis of the individuals' points of view, we allowed for the discovery of new constructs that explain the impact of democratization on the perception of automation, but also the analysis of some of the key constructs highlighted in the literature (Edmondson & McManus, 2007). While constructs are developed during a study to understand the research topic, concepts are the foundation to help formulate theory and constructs (Gioia, Corley, & Hamilton, 2013).

3.2 Research design

We decided to focus on a single-case study as it appears to be the most rationale to perform an in-depth analysis of the topic (Darke, Shanks & Broadbent, 1998) and apprehend the layers and complexities as well as the underlying factors of automation democratization (Yin, 2014). Furthermore, since democratization of automation is a new field for which there is a lack of academic literature, companies are less likely to share their internal insights on this topic with the public, thus creating challenges in data collection for multiple-case studies (Yin, 2003). Nevertheless, as demonstrated by Easton (1995), a single-case study is sufficient for the development of theoretical frameworks. Our case company is at the forefront of implementing democratization of automation, further supporting our choice of a single-case study as, according to Yin (2003), the latter is appropriate when choosing a *revelatory* case example. Last, our aim was to conduct an in-depth study of the perceptions and experiences of citizen developers who were directly connected to democratization of automation, and according to Flyvbjerg (2006), this can be facilitated by single case studies.

Gioia's methodology was considered to be the most appropriate for this study since this research is based on a single-case study in which we aimed to develop theory by understanding the individuals' lived experiences of automation democratization without imposing our prior knowledge (Gehman et al, 2018). Gioia's methodology allowed us to not only perform systematic and rigorous research on the subject but also identify underlying relationships and patterns among the themes (Gioia, Corley, & Hamilton, 2013). To stay true to the Gioia methodology, during our interviews, we assumed that our interviewees are "knowledgeable agents" and that the "organizational world is socially constructed" (Gehman et al, 2018, p. 8). This essentially implies that employees of an organization can proficiently understand and explain their perceptions, experiences, feelings, and actions (Gehman et al, 2018). Thus, our study materialized in a research frame centered on personal experience and retrospective expression of this experience. This was translated into two open-ended questions, that we aimed to answer through interviews and observations, collected from ethnographic-inspired research and internal documents.

The field study started with preparatory work, such as document review, internal meetings, and an ethnography focused on the democratization training, which is one of the key components of the automation democratization program. After this, we conducted 20 semi-structured interviews, which were followed by interview data analysis as well as the creation of a data model. Finally,

we conducted follow-up interviews to corroborate our findings. Due to time constraints, our study can be viewed as cross-sectional (Saunders, Lewis, & Thornhill, 2012).

3.2.1. Selection of case company

In order to research democratization of automation, we chose to conduct a single-case study of a Swedish multinational, Organization X. In the absence of literature on a nascent topic, the selection of a suitable case is critical to the accuracy of the research, as it requires rich and available data (Edmondson & McManus, 2007). Organization X launched the democratization program in 2016 and has, thus far, passed the pilot stage. Since the program's beginning, close to 10% of its employees have been part of the democratization of automation, including people from 95 countries, in every continent. Organization X can be seen as an exemplary case, not only due to the large number of employees onboarded into the program but also due to their diverse backgrounds. In the last 7 years, the democratization program's strategy has gone through many iterations and has incorporated citizen developers' feedback collected through the years to better tailor it to their needs.

It is worth noting that we were employed by Organization X throughout the study, and one of us was part of the organizational unit in charge of the automation democratization program. This enabled us to collect data directly while investigating the case from the inside, which has been argued to be important for uncovering novel insights (Daft, 1983). By being part of the organizational reality, we not only had access to the program, but we were also able to build trust instantly with the employees, who saw us as peers that understand the organization's reality (Saunders, Lewis, & Thornhill, 2012). However, we acknowledge that, as humans and employees of Organization X, we cannot fully disentangle our judgment and own evaluations, despite applying the methodology rigorously (Morgan & Smircich, 1980).

3.3 Data collection

3.3.1 Preparatory work

Initially, we engaged in discussions and meetings with company representatives, where we were introduced to the program and its details. Subsequently, we received access to company documents and reports that further provided insights about the program and its development over time. Lastly, we conducted ethnography-inspired research, participating in automation democratization training. The training spanned one week, including 10 hours of online training sessions, alongside 26 other participants. The insights obtained from this preparatory work were utilized to refine the research questions and develop an interview guide.

3.3.2 Semi-structured interviews

Our primary data collection method consisted of semi-structured interviews. This methodology was chosen since it allows us to gain a deeper understanding of the subject of the study (Saunders, Lewis, & Thornhill, 2012). The structure of the interviews was based on previously prepared open-ended questions and extra time was planned to accommodate follow-up questions. Semi-structured interviews are utilized in research because they can enhance the fluidity and flexibility of the

conversation while allowing identification of the most significant factors for those being interviewed (Saunders, Lewis, & Thornhill, 2012). Therefore, we considered semi-structured interviews as the most suitable tool for this study. These enabled us to tease out the subjective experiences of the interviewees with follow-up questions, while having numerous discussions that were outside of the previously prepared questionnaire. See the interview questionnaire in Appendix 8.2.1.

3.3.3 Sampling of interviewees

Gioia and Corley (Gehman et al, 2018) claim that to study a concept with the Gioia methodology, theorists need to gather a broad range of perspectives from those who experienced and lived the phenomenon. Since Organization X's program of democratization of automation is available to everyone working for the company, regardless of their background or location, we aimed to collect as many varied perspectives as possible. The criteria to decide who to include as an interviewee were established at the outset of the study through *purposive sampling*, including individuals based on their significance to the research subject (Bell, Bryman & Harley, 2022). The inclusion criteria were the following: (1) employees of Organization X, (2) individuals who had taken the automation democratization training (i.e., citizen developers) in the last four years, (3) diversity of involvement with democratization, where we aimed to have an equal split among those who created robots after taking the training and those who did not, (4) diversity of country of residence, aiming to get varied perspectives impacted by culture, (5) diversity of role, background and organizational unit, to gather diverse experiences. As a result, we interviewed citizen developers from 10 different countries, 14 different units, and 20 different roles. Half of those interviewed were active robot users, while the other half were not. See the interview summary in Appendix 8.2.2.

While the criteria for inclusion were decided beforehand, the number of participants was not. Instead, the number of interviews was dictated by theoretical saturation (Saunders, Lewis, & Thornhill, 2012). In other words, we continued to sample until the conceptual codes were developed and the relationships among these emerged, sampling stopped once no further insights appeared to emerge (Strauss & Corbin, 1998). After the 16th interview, a few new insights emerged but, after the 19th it was clear that no additional discoveries were achieved. It was then that we decided to conduct the final interview and conclude that saturation was reached.

3.3.4 Interviews

20 interviews were conducted with employees who had experienced the automation democratization program. After conducting the preparatory work, we performed two pilot interviews to have a first understanding of the citizen developers' experiences and perceptions, as well as to evaluate the effectiveness of the interview questions. The interviews were conducted between February and March and consisted of 40 to 60 minutes discussions. All the interviews were recorded and both authors were present, taking different roles in each interview while remaining in a consistent setting of interview/note-taker. In other words, for each interview one of us was the note-taker and the other was the interviewer. However, both of us were allowed to ask

follow-up questions during the interviews, facilitating a more engaging conversation and leveraging our diverse backgrounds. Afterward, the interviews were transcribed manually. This process assured constant objectivity, which supported our later analysis against any type of bias when making sense of the data (Eisenhardt, 1989).

Even though we tailored the interview questions to the participants to enhance their relevance, the structure of all interviews was similar. In the first minutes, each of us introduced ourselves and the purpose of the study. This was usually followed by a brief casual conversation that was aimed at establishing rapport and trust with them. Subsequently, we asked for permission to record the interview and informed the interviewees that their private information would not be revealed in our study. We then proceeded to delve into the questionnaires' questions, which often led to follow-up questions. In the end, we asked the interviewees if any significant detail or pertinent information regarding democratization was inadvertently missed.

All interviews were conducted through MS Teams due to the participants' geographical spread. Since the aim of our study was to understand the diverse perspectives of the citizen developers, we considered it necessary to perform the interviews through videoconferences. According to Irani (2019), this approach can be a time-saving and cost-effective tool for studies that have certain constraining circumstances, such as ours. Since we only had one semester to work on the study and a limited budget, traveling to meet interviewees in different parts of the world was not feasible. However, Irani (2019) further claims that in-person interviews are only slightly better than videoconferences, reassuring us that our interview design would help us achieve our objectives.

3.4 Data analysis

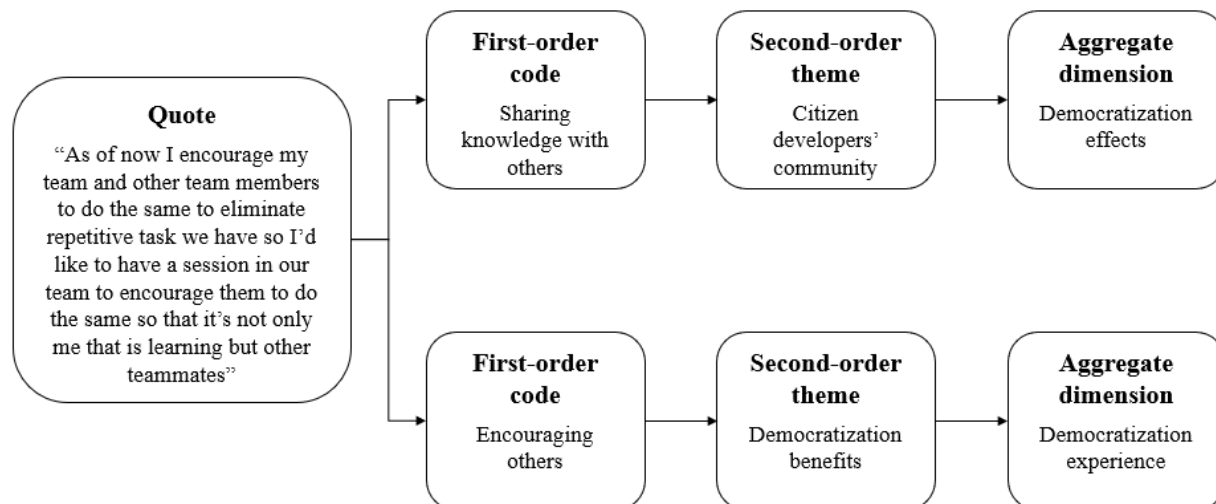
For each interview, notes were taken. After the interview, both of us utilized the notes to assess the main emerging insights. We aimed to transcribe the interviews in less than 24 hours, right after the interviews were finished. Interview transcription was done manually, without changing the interviewees' exact words. It was critical for us to listen to the interview recordings repeatedly to perform a deep analysis of the responses and to look for potentially overlooked insights, reassessing the ones gathered during the interviews.

The analysis was done based on the interview transcriptions and insights gathered. We chose to use the Gioia method (Gioia, Corley, & Hamilton, 2013) to provide a reliable framework for our qualitative study. This approach involves utilizing the data to develop interviewee-centric first-order codes and researcher-centric second-order themes (Gehman et al., 2018). For our study, this meant that each of us went through all the interview transcripts and looked for commonalities and differences among the responses and insights. We created labels for each of these categories, consciously trying to use the interviewees' words, not ours, to help us understand their experiences and perception of democratization of automation. Finally, we arrived at our first-order codes. After this, we met to compare the codes, looking for similarities and inconsistencies before arriving at a common understanding of the emerging findings. The step that followed was developing second-order themes. To do this, we connected the first-order codes that were similar to each other and that were related due to their characteristics, properties, or theoretical theme. We kept asking

ourselves: “Is there some deeper structure or process here that I can understand at a second-order theoretical level?” (Gehman et al., 2018, p. 3). Several iterations of this process were performed, meaning that once we arrived at our final first- and second-order concepts, the first-order codes had been developed four times and the second-order themes three times.

According to Gioia (Gioia, Corley, & Hamilton, 2013), the second-order themes are research-centric, which means that these do not need to be expressed with the interviewees’ words. Instead, these need to be characterized either with theory or with terms used by academia. Therefore, as we analyzed the data, we alternated between assessing relevant literature and data processing. This was done to ensure that our study would yield findings that would be relevant not only to practitioners but also to researchers, ultimately leading us to adopt an abductive approach. Last, the second-order themes were finally grouped into increasingly abstract dimensions, called aggregate dimensions.

Figure 3. Example of code-creating process



The next step was creating a data structure (Figure 5), which is essentially created to show that there is enough evidence to support the codes and themes previously developed (Gehman et al., 2018). The data structure not only demonstrates the progression from data to themes, but also showcases rigor (Gioia, Corley, & Hamilton, 2013). This step was crucial to our study as it enabled us to reassess the importance and validity of the codes once again, as well as to explain and answer our research questions. The data structure includes short definitions of the first-order codes and second-order themes as well as quotes supporting the validity of these.

Finally, the “Grand Shazzam” (Gioia, 2004) moment happened when we tried to create the data model. According to Gioia (2013), grounded theory can only be developed by explaining the relationship between the emerging concepts. The data model consists of boxes and connecting arrows. The concepts are the second-order themes, which in the model are presented as boxes. The arrows represent the dynamic interrelationship between the themes. Our grounded theory model went through dozens of iterations until we reached the final one, presented in this document (Figure

theories, and data sources (Saunders, Lewis, & Thornhill, 2012). Therefore, we conducted pilot, semi-structured, and follow-up interviews as well as ethnographic-inspired research. Additionally, we analyzed internal automation democratization documentation and previous surveys, had discussions with subject matter experts within Organization X, and reviewed extensive literature. Since there is no academic literature about this topic, we studied democratization literature focused on different angles, namely democratization of innovation, technology, and politics. Second, taking an abductive approach allowed us to focus on the relevant aspects of democratization, continuously adapting and challenging our assumptions. As such, we employed *persistent observation* as described by Lincoln and Guba (1985) and increased the credibility of our findings while gaining a deeper understanding of automation democratization.

3.5.2 Transferability

Transferability refers to the external validity of the study (Lincoln and Guba, 1985). The aim of our study was to generate theory that explains democratization of automation and that can be transferrable to other settings and domains. According to Gioia, Corley, and Hamilton (2013), the concepts and their dynamic interrelationships that derive from grounded theory ought to be transferrable to various domains. Despite researchers' claims that a single-case study's findings cannot be generalized, Gioia, Corley, and Hamilton (2013) argue that by being highly systematic and providing evidence for the analysis a study can develop transferrable concepts and principles. As such, we offered a thorough description of our research design, and data analysis and made sure to be transparent about our research procedure. Moreover, we did our utmost to understand and follow Gioia's methodology to conduct a rigorous qualitative study. Part of our research findings, particularly the challenges experienced by the citizen developers, were company-specific. Therefore, these were excluded from the final study due to a potential lack of transferability.

3.5.3 Dependability

To ensure the dependability of our study we relied on two factors recommended by Lincoln and Guba (1985), specifically stepwise replication and inquiry audit. The interviews were conducted by both of us under similar conditions and we communicated regularly, ensuring that stepwise replication was achieved. The inquiry audit was enabled by two supervisors, one from Organization X and one from our university. Both examined and questioned our research design, process, and findings. Moreover, to enhance the dependability of the study, we kept extensive records of the research process and distinguished between our interpretation and the facts. The records of the process can be found in the appendices.

3.5.4 Ethical considerations

During the research process, our primary ethical concern was to safeguard the confidentiality and anonymity of both the interviewees and Organization X. Thus, names, organizational units, and expertise were not disclosed. Furthermore, all interviewees were informed beforehand about the aim of the study and asked for permission before recording the interviews. The video recordings remain confidential, saved inside of Organization X's servers and only those who were part of the

interview have access to them. As it was of critical importance for Organization X to keep its democratization strategy confidential to the public, we did our utmost effort to study this concept without revealing details of it in our paper. We have signed a thesis writing agreement and an NDA with Organization X. Finally, the company has an established thesis protocol and process that we were part of.

4. Empirics

First, a brief introduction of the company and the automation democratization program are presented (4.1). Then, the data structure is displayed (4.2). Next, the findings from 20 semi-structured interviews are displayed, highlighting first-and second-order codes and themes (4.3). Finally, our data table is introduced to provide further evidence for our findings (4.4).

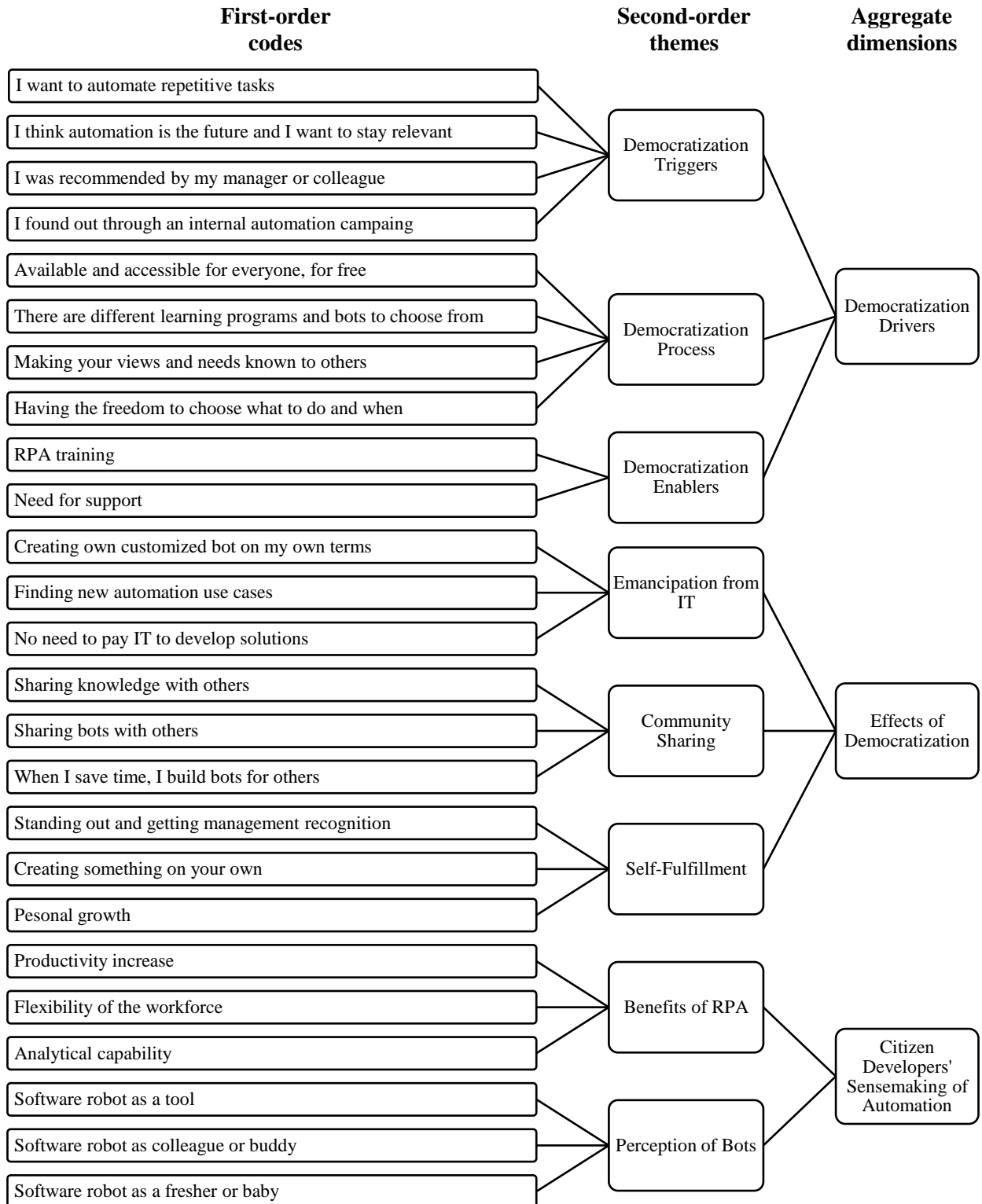
4.1 The Case Company: Organization X

Organization X is a B2C tech multinational, whose *modus operandi* is centered on empowering an intelligent, sustainable, and connected world. The organizational structure is composed of multiple Market Areas, divided geographically, and Business Areas, catering to product and service development and maintenance. Although the company is known to attract engineer profiles, teams consist of employees with different skill sets depending on the scope, ranging from highly tech-oriented knowledge to business people.

As mentioned, in 2016, Organization X launched its Automation Democratization program as part of its strategy to drive the power of automation through its employees. The program aims to empower employees by automating repetitive tasks, thereby unlocking their creativity, and increasing productivity. By decentralizing IT knowledge, the organization has given everyone the opportunity to become citizen developers, with the belief that employees may know best what they need in terms of software support and should, therefore, allowed to build it themselves. While several employees became citizen developers throughout the years, we sought to comprehend the role of democratization in such a program as well as the way it has been received so far by citizen developers.

4.2 Data structure

Figure 5. Data structure



4.3 Democratization Drivers

4.3.1 Democratization Triggers

4.3.1.1 *I want to automate repetitive tasks*

One of the initial catalysts to partake in the automation democratization program was the need to streamline repetitive tasks and reduce the risk for manual errors. Interviewees reported that they were driven by the desire to save time in mundane tasks to then focus on more meaningful and creative work activities. As explained by the participants, this motivation stemmed from recognizing that automation can standardize processes and improve efficiency.

“I really like that standardization. In other words, I am the enemy of having a job without formulas. So, I feel the repetitive jobs are always a good opportunity to both improve and standardize.” F

“I hoped to have more time to do other tasks more creatively. To not spend time in repetitive work. It is the idea. To have more time in general because these days you have to do so much in a short time, and we have deadlines, and it is better to have some help like the bot that we have in the kitchen.” I

4.3.1.2 *I think automation is the future and I want to stay relevant*

Interviewees expressed a desire to stay relevant in their fields by recognizing the importance of automation for the future of work. Some highlighted their concern about becoming obsolete and the need to update their knowledge to remain competitive within their teams. Their ambition “to be part of the future” was explained as a consequence of perceiving the adoption of automation technologies as both crucial and inevitable. Therefore, the participants perceived technology adoption as an essential step towards their future success at work, while securing a place in their teams.

“I think actually I feel so enthusiastic because it’s the future for everything, every work, all over the globe so we have to have this knowledge and adapt it to our daily tasks as it will help us in our roles.” F

“It is a trend that everybody is talking about RPA, and it is inevitable.” B

4.3.1.3 *I was recommended by my manager or colleague*

Many interviewees highlighted that they were recommended to join the democratization program by managers or colleagues. According to the participants, their managers encourage them to learn about automation, highlighting and recognizing RPA’s potential benefits and opportunities for efficiency and standardization. Similarly, interviewees were encouraged by other colleagues who had already taken the training. These colleagues recommended them to join by sharing their positive experiences with the training. In some cases, managers presented the opportunity of taking the training during the annual performance review.

“I was recommended to join the program since one of my colleagues did, who was also in the team. So, yeah. She told us about it and said that we could do that as well.” S

“My first approach to this was thanks to my manager. Yes, it was my manager who told me that there was a program called UiPath that helped standardize and automate repetitive tasks to be more efficient.” F

4.3.1.4 I found out through an internal automation campaign

Participants found out about automation democratization through several company channels, such as internal company emails, posts on internal company platforms, or company announcements. Moreover, interviewees mentioned that they were aware of Organization X’s strategy to encourage employees to embrace automation. One individual said that, within her team, even though partaking in automation initiatives was not mandatory, it was seen as a way of being an excellent employee. In other words, interviewees were aware of the company’s focus and emphasis on making training accessible and developing employees’ skills and knowledge to adapt to the rapidly changing work landscape.

“Everything is changing within the organization and the focus is not on doing things manually, so I know it is important to develop your skills for the company and now we are in a process where we are automating everything.” Q

“I found out through a company email; everyone was talking about the bots. It was like a revolutionary tool. It would be for everyone. It would be so easy, and everyone would be able to use it.” L

4.3.2 Democratization Process

4.3.2.1 Available and accessible for everyone, for free

During the interviews, it was found that one of the highlighted characteristics of the democratization process is that all employees are welcome to participate, without the need for advanced technical skills, prior managerial approval, or any financial obligation. According to some interviewees, allowing people to develop automation applications has long been kept only for those who work with automation, i.e., software engineers or technical people. One interviewee argued that this program was the first one he saw as a drastic change at Organization X since it not only allowed everyone to join for free, but also allowed everyone to be more efficient, working with software robots.

“I never thought that Organization X was doing things like this. That you open it up and everyone can participate with automation. That was new to me, I thought it was specific to a group and that it is not shared outside. But when I look at the initiative and that it is something where they want everyone to be aware of automation, I felt good and said let’s do it.” O

4.3.2.2 There are different learning programs and bots to choose from

A notable feature of the democratization process is the ability for individuals to choose from different courses to match their needs. This is an important factor for the interviewees since they possess diverse academic and professional backgrounds and operate across various time zones. Additionally, interviewees highlighted the importance of having the possibility to choose from a

wide range of robots. These are available on a marketplace that provides detailed information and that is available to everyone.

“I know that I can progress in this by watching the tutorial that we have on our portal and by watching my platform learning and, on the academy, UiPath. There are so many links that I have to go to and find out more.” I

“There are so many bots that we can use for multiple activities that are for the closing and deadlines and so on” Q

4.3.2.3 Making your views and needs known to others

According to the interviewees, another crucial characteristic of democratization the democratization process is the capacity to communicate their requirements and perspectives to others. In other words, citizen developers claimed that being able to discuss automation concepts and ideas with their peers and ambassadors was necessary to enhance their knowledge. Moreover, they emphasized the importance of the opportunity to request and receive in-depth explanations of their inquiries from the support team.

“We have asked many questions to the trainer and those questions were always answered. When we need time, they asked us to come back with questions for them to answer. After that training also, we reached them and said that we needed their support and they helped.” M

“I think it is good to have a community because you can exchange experiences with others” F

4.3.2.4 Having the freedom to choose what to do and when

This code highlights the autonomy of the participants to select the activities they perform and their timing. Some interviewees emphasized that when they become citizen developers, they are not obliged to utilize or create robots. Instead, they can pursue their preferred interests at their own pace. The interview participants expressed appreciation for the opportunity to learn step-by-step, where their expertise develops depending on their own dedication, engagement, and time availability.

“It depends on the familiarization to begin with, then the sky is the limit then depending on your interest and usage you can further learn and then put it to good use. I think it is one step at a time rather than expecting that you would be the expert of this without any effort.” P

4.3.3 Democratization Enablers

4.3.3.1 RPA training

It was found that the training sessions were considered valuable for those who want to have an introduction to automation. Interviewees mentioned that the training sessions were helpful since they provided a foundation for using and understanding UiPath. While the training sessions cover important features of the platform and automation, they also encourage citizen developers to further develop their skills beyond the initial courses. However, citizen developers reported some

difficulties attending the sessions because of time zone limitations, whereas others mentioned that the training is quite condensed and requires commitment.

“It’s very useful (the training), at least if you’re not aware of all the functionalities that UiPath could offer I think a very good training and offers most information that you need to learn about the tool. It’s extensive of course but still the most important things you need to know from the very beginning. After that, you have to go and see what else you can find and so on but it’s a very good start at the beginning.” N

“If you’re not the type who asks questions in class like me you might be lagging behind because there is no time to practice between each session.” I

4.3.3.2 Need for support

Support was considered crucial for all interviewees as it allowed them to get help while building or using robots as it fostered independence. Assistance from the automation team’s experts ensures that citizen developers can overcome challenges encountered since none of them were experts in using the UiPath platform. According to most interviewees, this backing contributed to not only the development and implementation of software robots but also to further advance their knowledge of automation.

“Actually, I am happy building the bot by myself but of course in the middle of building it, you need support from them, so their assistance and support are appreciated.” G

4.4 Effects of Democratization

4.4.1 Emancipation from IT

4.4.1.1 Creating own customized bot on my own terms

As stated by some interviewees, working with solutions that have been developed by the IT department has its drawbacks. Namely, these disadvantages are either having to wait for the IT department to develop the solutions, risking that the solutions will be either migrated or decommissioned, or having to use solutions that do not meet the requirements of the commissioning department. Therefore, the interviewees perceive automation democratization as a program that allows them to create their own robots, which can be customized to their requirements.

“We were told (by IT) that look it will come in very handy. Most of these things that don’t have a roadmap eventually end up and then we migrate to a newer tool. Then there are promises made. So, I think that the best help is self-help. The best thing would be for us to at least if these things can help” P

“If anyone of my colleagues asks me anything about UiPath to help them and support them I can do that. I feel independent, if I can’t do something on my own, I can just build my own bot and he will do it.” J

4.4.1.2 Finding new automation use cases

The interviewees perceived automation democratization as a way of giving employees the opportunity to learn about RPA capabilities. By understanding the tool and automation, citizen developers found that they can now identify automation use cases in their daily work and further explore process improvements. In other words, prior to the training, the interviewees were unaware of which tasks could be automated, but the course enabled them to identify these. Ultimately, they argued that raising awareness about the existence of this tool, its simplicity and accessibility as well as its potential use cases are essential for this program.

“They also say that supply creates its own demand so once you understand how automation work, you know with a few examples then you start trying to engage as to how it can be applied in your work settings.” P

“It’s like a hammer. Although I don’t know how to use a hammer, if I have seen someone use it to drive a nail, I know that I can hold this painting with a nail. And there I can ask someone to nail it to the nail. If I have never seen a hammer, I will never know that it can be held with a nail and the painting will remain on the ground.” L

4.4.1.3 No need to pay IT to develop solutions

Within Organization X, when a team or employee wants to automate a process, they need to contact the automation team to ask for a quotation on the cost of the automation. If the quotation is accepted, the department is expected to pay for it. As explained by some interviewees, building a robot after taking the UiPath training does not require the department to pay for the automation software anymore. The only cost associated with the process is the time invested by the citizen developer.

“We originally reached out to the automation team, and they suggested that we would go through this (democratization program) because it wouldn’t be worth the expense for something as simple as what I was asking for.” D

4.4.2 Community Sharing

4.4.2.1 Sharing knowledge with others

Adopting automation democratization led many interviewees to become automation ambassadors, sharing knowledge while encouraging their colleagues to join the program and helping them to create bots. Moreover, many participants reported offering their peers support to install the platform and assisting them to develop and troubleshoot robots. They also claimed that by helping others and encouraging them to look for automation possibilities, their knowledge of automation has improved. Some citizen developers hold meetings with employees from various locations to exchange knowledge and create a network of “robot owner back-ups”, ensuring continuous functionality of the robots.

“As of now I encourage my team and other team members to do the same to eliminate repetitive task we have so I’d like to have a session in our team to encourage them to do the same so that it’s not only me that is learning but other teammates” G

4.4.2.2 Sharing bots with others

According to citizen developers, democratization of automation enables them to create robots that can be shared with others, benefiting not only the developer but also positively impacting others. For example, one interviewee mentioned that a bot she designed could affect the work of 2,400 people. This bot brought her joy by simplifying the work process, while positively impacting the work of her teammates. As highlighted by the participants, the introduction of a robot that can be used simultaneously by many other employees around the globe. This makes the organization and the impacted users more efficient, which allows them to innovate in their work.

“About 2,400 people who work in Spain doing this process every month is an incredible amount of time. If it is implemented, what will give me the most joy is not having to enter this application and not doing it. If my teammates benefit, then that's great. Most of all, I don't want to do it myself because I hate that kind of homework.” L

4.4.2.3 When I save time, I build bots for others

Interviewees reported that by utilizing robots, they can save time in performing their tasks. As a result of this, some of them reinvest their time in creating bots for their peers, further enhancing productivity and efficiency in their teams. As two participants mentioned, the saved time allowed them to develop several bots for their colleagues and themselves, further creating a virtuous circle.

“Then I got to work on other things like developing another bot for myself and for my team member.” B

4.4.3 Self-Fulfillment

4.4.3.1 Standing out and getting recognition

Many interviewees highlighted that participating in automation democratization has led to increased visibility and positive recognition from their managers and colleagues. For some of them, due to their participation and engagement in the program, they have become the automation reference point within their team both locally and globally. This allowed them to not only stand out but also contribute meaningfully to their team. One interviewee highlighted that this recognition enabled one of her colleagues to transition to a new role as an Automation Subject Matter Expert. Moreover, participants reported feeling valued and acknowledged due to their contributions to automation initiatives, sharing knowledge, and robots within their teams.

“My manager recognizes and appreciates everything I do in automation and digitalization and considers me as one of our team. I already joined the team for automation and digitalization. I worked on these macro files, SAP scraping, and now I’m trying to learn more of UiPath.” O

4.4.3.2 Creating something on your own

The experience of creating, innovating, and developing something independently has led citizen developers to feel accomplished and satisfied with themselves. As highlighted by some interviewees, despite the time invested, the challenges experienced, and, all the failed trials, they felt that the end result was highly rewarding. For some participants, creating bots and automating processes is a rewarding hobby, while for others this process motivates them to explore automation possibilities in their personal lives. Overall, the interviewees felt that these newly acquired skills boosted their confidence by allowing them to innovate and be self-sufficient.

“I think that it will be an occasion to learn more things and create. It is a feeling like you do something on your own.” L

“I also use this at home on my own laptop because I have the license from the community that is free of charge so I can also use it at home for my own purpose as a hobby and I can use it in multiple scenarios let’s take a very good example is to extract the information for the pricing of company’s share and see if something is going up or down very fast and I put the robot on to extract these numbers every day and also to have some reviews in the changes from yesterday to the day and based on that I get some notifications. Also, at some point, I was thinking on buying some very pricy IT things and I could review the prices if it would go up and down before some periods that could have discount so that changes also some things in my life.” N

4.4.3.3 Personal growth

Citizen developers experienced a sense of personal growth and increased work satisfaction as a result of automation democratization. Some interviewees mentioned that automation allows them to handle more complex tasks, be more precise and, implement changes to their work processes, making them feel better at work. Furthermore, several participants reported that automation democratization has allowed them to open their minds and broaden their perspectives. This happened as a result of the training, building, and working with robots as well as due to discussing automation use cases with others. This eye-opening experience not only enables them to embrace automation at work but also in their personal lives, allowing them to feel upskilled and to find innovative ways to incorporate automation into their lives.

“Yes, I like it a lot. It’s a lot of time to invest in it, and patience and trial, and error and almost frustration. But when you see the end result is wonderful.” F

“This helps you to open your mind more, to investigate, to ask, to see that there are more things besides what we see commonly.” P

4.5 Citizen Developers’ Sensemaking of Automation

4.5.1 Benefits of RPA

This category relates to the benefits of automation mentioned in the theory. These benefits are general for most organizations and were also found as benefits of democratization of automation.

4.5.1.1 Productivity increase

Among other things, interviewees highlighted that working with robots has improved the quality of the work they do, saved time, introduced new standardized processes, improved accuracy, and increased efficiency. According to citizen developers, robots save time by performing tasks that would have been otherwise handled manually, such as creating reports or extracting invoices. Moreover, they claim that robots commit fewer errors than humans. Since these robots save them time and maintain high-quality output, citizen developers' productivity has increased.

"With the audit bot, definitely. It will help us with the quality of automation. Because sometimes when we build some bots, we forget some minor things but when we run it and we got to know

"Oh this is something!" M

"Invoicing bot. Because the task that I already had, which is extracting 500 invoices from SAP and each one will take around 3 minutes or more, 3 to 5. So, I used to spend a lot of time extracting these invoices." J

4.5.1.2 Flexibility of the workforce

Software robots enhance citizen developers' flexibility, as these can be assigned to handle their tasks, freeing up their time to focus on other activities. According to some interviewees, if work demand increases, they employ robots to ensure productivity and reach their goals before the deadlines. As a result, citizen developers achieve enhanced work-life balance while improving efficiency.

"Yes. Because during my breaktime for instance I can just leave the bot running instead of extending time where I have to do it manually the bot can just do it during my break." G

"Yes, I have more time for thinking and do other stuff and it gives me more flexibility in time." N

4.5.1.3 Analytical capability

It was found that robots improve and standardize processes, allowing citizen developers to decrease time spent on a task and reduce the risk of human error. As a result, robot users can shift from performing repetitive and simple tasks to handling more interesting and complex work duties. Interviewees claimed that these changes enabled them to focus on in-depth analysis of their work, leading to better decision-making and enhanced work experience.

"We were doing more simple tasks and we have been able to do more complex because we have the bot. That makes the task very quick and very efficient. It has changed because we can be more specific." L

"The processes have changed for the better. What happens at the time of having a bot is that you reduce the risk of error, decrease the time, and have a more standardized process in all sites in the world. So that's a plus. The reports of certifying are the same worldwide." F

4.5.2 Perception of Bots

The perception of software robots among the interviewees varied greatly, ranging from them being a tool, a buddy or colleague, and a fresher or baby.

4.5.2.1 Software robot as a tool

Interviewees that perceive robots as tools, claim that these facilitate their daily work, handling undesirable tasks, saving time, and making their work easier. However, they perceive them as tools due to their limitations and potential errors, since when robots break, human intervention and a plan B are required. Moreover, according to one interviewee, a robot cannot be seen as a buddy because it is not friendly or easy to use. She argues that when robots commit errors, she does not know how to fix them and then, she needs the help of a colleague to update them. According to another interviewee, she cannot expect much from the robot because it needs to teach it everything she knows, that is, program it to work in the way she wants. Therefore, she perceives robots as tools that need to be programmed to handle her tasks.

“I understand that a buddy is someone friendly, but for me it is not. It is not easy for me to use it. I have more buddies that help me do things every day than the bot. Because I have to run the bot once a month and Karl is sometimes out of office. That is an issue for me because if I make any error, I need Karl almost always. Karl and the bot are very buddies. I am buddy with Karl.” L

A differing view of the category software as a tool is the one presented by interviewee K. The robot she was utilizing was named after the god of knowledge: Apollo. However, she did not perceive it as knowledgeable god or person. Instead, she argued that it was neither a person nor God because it had no attitudes. She also claimed that the robot was only performing a simple task (i.e., fill out a template) because if it had been performing a critical task and made a mistake, the effects would be “catastrophic”.

“We trusted Apollo because it was not a critical operation either, it was simply to transfer information. If something hadn't worked, it wouldn't have been catastrophic, but it saved us a lot of time and made our task much easier.” K

4.5.2.2 Software robot as a colleague or buddy

Some interviewees perceived software robots as colleagues or buddies due to the support and assistance they offer. One of the participants regards robots as colleagues as they deliver information promptly. Another participant perceived robots are buddies because they help him to check for improvements three to four times a week. Some interviewees argued that robots are exceptional colleagues because of the amount of work they do. Overall, those who perceive software robots as colleagues or buddies label them this way as they appreciate the support they provide at work.

“If it is one colleague, I would have to give it 10 because he is doing a lot of work. If some employee can do the same thing, I assume it would take a lot more time and maybe lower accuracy.” B

The perception of robots as colleagues is further explained by the high level of trust and reliability, they place in these software solutions. As one participant mentioned, she felt that the robot was a friend and she wished it could join her for a morning coffee. According to her, robots are reliable and capable of performing tasks error-free. She argued that humans can make mistakes because when people create reports, many variables can be wrong, but robots do not make these mistakes. Therefore, she believes that robots can be trusted more than their human counterparts.

“It is like a friend who can help you do your work. I do feel like it is my friend (...) I am so sad I have no bot to join me to the coffee in the morning”. I

4.5.2.3 Software robots as a fresher or baby

Citizen developers perceived robots as fresher or babies due to their level of development and the necessity to teach them how to perform activities. One interviewee referred to her robot as a “baby bot” since it was not fully developed, it behaved disobediently and performed tasks unexpectedly. Another participant likened the bots to inexperienced colleagues, or freshers, who need to be trained and guided to handle tasks efficiently. Overall, the bots in this category are perceived to be at a low development level and may need constant direction to deliver the expected outcomes

“They are baby bots. I have three, two are in production and for one I was waiting for the tester to see if she needs to change something, and I don’t know one of these bots only went to a web application and took some screenshots it’s not so obedient” S

4.6 Data table

The data table below is presented to provide additional support to the empirics, offering supplementary quotes to the first-order codes.

Table 2. Data table

Data supporting interpretations	
First order codes & short description	Second order themes & representative quotations
Second order: Democratization triggers	
I want to automate repetitive tasks	“For me everything that can be automated or done easier is something personal for me.” K
<i>Employees join the program due to their desire to benefit from automation</i>	“I work in finance, and I have so many tasks that are repetitive and I want to automate some of them. Like statistics and I have daily rate to introduce to our subsystem and I do repetitive tasks every day and I want to automate them.” I
I think automation is the future and I want to stay relevant	“Yes, if you talk of democratization, it will be helpful for us for the future also. RPA industry is doing very well, it is a market need. And within Organization X we have noticed so many processes are being automated.” M
<i>Employees think automation is the future and want to remain competitive</i>	“I think that IT and technology in general are enablers for how we will work in the future. And I think that it is a necessary and crucial way that we will include in our work.” S
I was recommended by my manager or colleague.	“My whole team got to know that there are some trainings going on about UiPath so my manager asked us to join this training and see if it is helpful within the team and it will be a good chance for you to explore new things.” M
<i>Employees were recommended by their managers or peers</i>	“The IoT team told me about this program. They put us in communication some of the bot teams and they gave us the link and instructions to sign up for the class and these sorts of things.” D

I found out through an internal automation campaign	“This is not part of my job. It’s good to have but last year, in 2022 it was like if you want to be an excellent employee, it’s good to be part of this project. It’s not mandatory but it can help.” R
<i>Employees found out about the program through internal automation campaigns</i>	“I think using that Yammer (internal community platform) page, I think there was an email sent out about that UiPath training, I think this was through Yammer and Email, global email.” O

Second order: Democratization process

Available and accessible for everyone, for free	“I felt absolutely that they had a bigger picture in mind rather than training people, I think they want to see everyone in Organization X adapted from that perspective I think they are making every effort to make the resources available to adapt to it. I think that from that perspective they are doing a good job to be honest. I mean, this is the first time I see something this drastic that they decide to do something this way because most of the other times you see that the trainings are restricted to the group, or they put a price tag on it, or they make it tougher to the people to go to the training and you need manager approvals and all that. But I think this one, they did a very good job, that is my opinion.” O
<i>Everyone is able to participate, free of cost, no requirement of previous programming knowledge, no approvals needed</i>	“Look you don’t need to be a software developer; you don’t need to be software savvy. You just need to have been using your PC for the last X many years, it is simple and there are certain commands that will teach you and all the repetitive work you can assign to your bot.” P
There are different learning programs and bots to choose from	“In Organization X we have a few portals to learn things and I also learned manually I mean by myself I learned I’d say. It’s good that Organization X is giving good training only and divided into basic and advanced. For basics they have given us whatever we need.” N
<i>Knowledge of alternatives, each member has equal effective</i>	“Yes, so the SharePoint they put together was pretty self-explanatory. The Studio X and the regular Studio and one more about I don’t how you say it but manual automation not automation, automation.” C

<i>opportunity to choose from different bots and trainings</i>	“When you create a bot, it’s not just yours it’s everybody’s. So, you also have access to any bot in the Organization that you find helpful or interesting” Q
Making your views and needs known to others	“Yes, the instructors and the layout are good and learning with a group. So, you could bounce ideas at each other, and you realize you’re not the only one having those issues.” D
<i>Bouncing ideas with others/ Co-creation, effective participation, control of the agenda, all members have equal and effective opportunities to make their views known to others</i>	“I had also a very specific problem with some website that I couldn’t take information from and the session after they came up with a solution and explained how to apply it and how to deal with that. As long as you’re open to ask, they come up with help and support both during the project or after that they also give some help.” N
Having the freedom to choose what to do and when	“It depends on the familiarization to begin with, then the sky is the limit then depending on your interest and usage you can further learn and then put it to good use. I think it is one step at a time rather than expecting that you would be the expert of this without any effort.” P
<i>When you take the training, you are not mandated to build and use bots, you may do whatever you want afterwards. You can continue your learning path at your own pace</i>	“For now, I think the things that I did were fine, and it was just my decision not to go into details with this program.” N

Second order: Democratization enablers

RPA training <i>People who took the training thought it was basic, however, they also saw it as a good start for understanding more about automation</i>	<p>“It was good but it’s just basic. I guess I don’t know what you came automate only with that part and then I and then I took the studio X” R</p> <p>“It was good, I thought it was very good because it was the basis for me to start using the program.” F</p>
Need for support <i>People like to have the independence to build bots but since they are not experts, they need support sometimes.</i>	<p>“Luckily, we have mentors that whenever we have questions that we cannot figure by ourselves we can reach out for their support” B</p> <p>“Without their help I couldn’t have learned or developed 10 bots. They help lots. Before this I didn’t know anything and then the professor suggested this new training, so people are helping.” E</p>
Second order: Emancipation from IT	
Create own customized bot at own terms <i>Feeling independent from IT to develop your own bot, customized to your needs</i>	<p>“Because I had an idea in my mind. Because the project that I was working on and the bot that was developed is customized to my requirement. Which is not happening with anybody else.” C</p> <p>“PowerApps, those kinds of things I do but if there is anything specific to like HR support, or IT support, someone from IT does it. But if it is more related to my project or my flow, that kind of automation I do it on my own.” O</p> <p>“I would have that code deployed in my own machine, running in it. And as per my need I can run it so that it can perform the task on my behalf.” C</p> <p>“I think if I build it, I will know everything about my bot because if I find any error, I can manage it and enhance it very quickly.” J</p>
Finding new automation use cases	<p>“Once we understood what this was for then we understood that “Oh perhaps these things that we have to do could be done by the bot”. But</p>

<i>About learning what can be automated and looking for use cases everywhere on your own</i>	<p>it is because we did the course, if not we wouldn't have known what to use the bot for." L</p> <p>"You get to know the capabilities of what you can automate, right? There might be people thinking that these things cannot be automated and that we do not have tools, that we might not have tools or environment to do this automation. But this proves that a lot of these tools are available, it is just that we need to identify the process and get the team involved and we can do it." O</p>
<p>No need to pay IT for solutions</p> <p><i>IT costs are reduced as bots can be created internally</i></p>	<p>"I feel like before when we needed to automate something we had to do a cost benefit analysis and then get funding for the development but now at least we can create bots without asking for funding." Q</p> <p>"Wouldn't be originally reached out to the bot team they suggested that we would go through this (training) because it wouldn't be worth the expense for something as simple as what I was asking for." D</p>

Second order: Community Sharing

<p>Sharing knowledge with others</p> <p><i>Talking to other members of the organization about the program in order to enroll them</i></p>	<p>"As of now I encourage my team and other team members to do the same to eliminate repetitive task we have so I'd like to have a session in our team to encourage them to do the same so that it's not only me that is learning but other teammates." G</p> <p>"I try to make them come back I have some meetings where I present how what is right back to how it's working what training" R</p> <p>"I help my colleagues to install it to make all configurations and so on and when they got the new error, I'm the first see then try to solve it." R</p>
<p>Sharing bots with others</p> <p><i>Democratization allows you to create bots that can be shared with others and impact them positively</i></p>	<p>"About 2,400 people who work in Spain doing this process every month is an incredible amount of time. If it is implemented, what will give me the most joy is not having to enter this application and not doing it. If my teammates benefit, then that's great. Most of all, I don't want to do it myself because I hate that kind of homework." L</p> <p>"Because this bot is not only used by our team it can also be used by other teams that need the same use." G</p>

When I save time, I build bots for others	“At least now all the things that have to be done, and took a lot of time when extracting, are now automated, and I’m still looking for new processes to help colleagues as well.” N
<i>Those who save time because of using robots, create bots for others</i>	

Second order: Self-fulfillment

Standing out and getting management recognition	“It was also an opportunity for the Mexico site to be seen, because well GAC is in Madrid, there was in China, there is in Bucharest, in India and good in Sweden. So, it was an opportunity for the Mexico site to be seen and have things to offer in addition to the daily work.” F
<i>Experience growth and appreciation from peers and management</i>	“Well, I can tell you that the impact has been positive because you become a point of reference both in your local team and in the other Sites.” F
Creating something on your own	“Yes, I like it a lot. It's a lot of time to invest in it, and patience and trial and error and almost frustration. But when you see the end result is wonderful.” F
<i>Being able to develop something on your own to create and innovate, making them feel good</i>	<p>“It makes me feel better if am doing something like this. And being able to develop this bot alone also made me feel quite good.” B</p> <p>“Motivation was that look, if you can automate, you also learn in the process. If there are some repetitive tasks, how you can automate them, then the automation would be quite emancipating, right? Or setting you with a lot of time to do more constructive things.” P</p>
Personal growth	“I think I have grown a lot ever since I took the training and started investing time in developing bots.” B
<i>Experience personal growth and satisfaction,</i>	“It helps me grow as well. I myself feel upskilled and I am impacting others as well” B

<i>eye-opening experience</i>	<p>“Since I developed this buddy bot, I have taught others how to develop automation. So, it is a basic software skill that I have learned and taught, which is a personal growth for me.” C</p> <p>“And something important too, this helps to open the mind.” F</p> <p>“I found it very useful because it opened our eyes to what most of us did not know” K</p>
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Second order: Benefit of RPA

<p>Productivity increase</p> <p><i>Good quality of work and less errors. Saves time as work continuously, in different times zones and teams</i></p>	<p>“They are way more helpful. They increase productivity.” O</p> <p>“If I run the bot for all America, MELA, and MANA companies, it takes about 40 minutes and is like 37 companies. And when we did it manually it took us about 15 or 20 minutes per company because we did it individually. Who was the owner of the company, made this report. So now it is easier for a single person to run the bot for all companies in America.” F</p>
<p>Flexibility of the workforce</p> <p><i>Bots are assigned tasks and perform them better</i></p>	<p>“I think it changed my perspective as now I can do a lot of things at the same time. If I take one hour in this task, I can also delegate it to the bot and do something else.” J</p> <p>“For the other ones, I could say one of them is really really good. We have one thing called Ivar existing that registers all cars that have one entity. So many entities have so many cars and each month we receive changes (imagine that one car goes from Santiago to someone else), manually this is horrible, horrible, horrible I get so lost but now the bot does it and it is so amazing. The idea of automation is so good.” M</p>
<p>Analytical capability</p> <p><i>Process Improvement, more insightful work, standardization</i></p>	<p>“Feels amazing. Basically, I think people feel better when they think they are doing something meaningful rather than repeating simple actions” B</p> <p>“So, the bot just (at least in this case) could only help you to put some clarity in the information you want to review and not spend time on extracting information and putting more time in doing that. And, if you have repetitive tasks, you can automate them, and the bot will just</p>

	help you not to spend a lot of time and also have time for other things.” J
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Second order: Perception of bots

Software robot as a tool	“With a colleague we can have different expectations. We cannot expect that much from that buddy bot.” C
<i>Perceived as providing support on basic tasks with less risk, while not having any human attribute. Low level of trust</i>	“It's excellent. I think there are more pros than cons of bots. I think that sometimes when bots fail, I feel that the team members get stressed but as I told you before. We can't depend 100% on that. We must be trained and always have a plan B in case it does not work. If it doesn't work, we should think "I do it manually and the bot makes my job easier.” F
Software robot as a colleague or buddy	“I can depend on the buddy bot in urgent situation if I can't find any support from any of my colleague.” J
<i>Perceived as a colleague or someone you can trust. A reliable helping hand</i>	“It is like a friend who can help you do your work. I do feel like it is my friend.” “I am so sad I have no bot to join me to the coffee in the morning”. This bot was for the settlement process, and we run the development every month every Monday, Wednesday, and Friday in the morning with my coffee. I consider that was a buddy too to join me to the coffee.” I
Software robot as a fresher or baby	“They are baby bots. I have three, two are in production and for one I was waiting for the tester to see if she needs to change something, and I don't know one of these bots only went to a web application and took some screenshots it's not so obedient” S
<i>Acknowledgment of the level of the bot. Perceived as needing further development and teaching to progress</i>	“I would not say that the bot is a colleague because I have to teach everything to the bot. But a colleague is an experience person. Maybe we can call it is a fresher” C

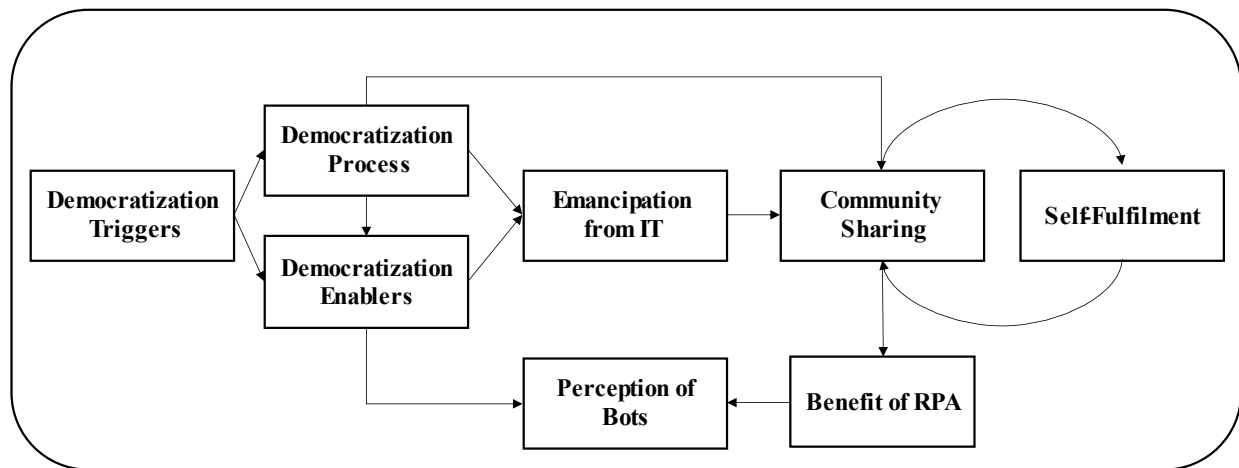
5. Analysis

This section presents our analysis of the findings, presented according to the structure of our framework. Starting from Triggers to Self-fulfillment and finalizing in Perception of bots. To do this, we define and analyze the second-order themes (boxes) and explain their interrelationships (arrows). Although we recognize the existence of potential additional connections among these themes, our analysis is focused on the portrayed interrelationships.

5.1 Data model

Figure 6. Data model:

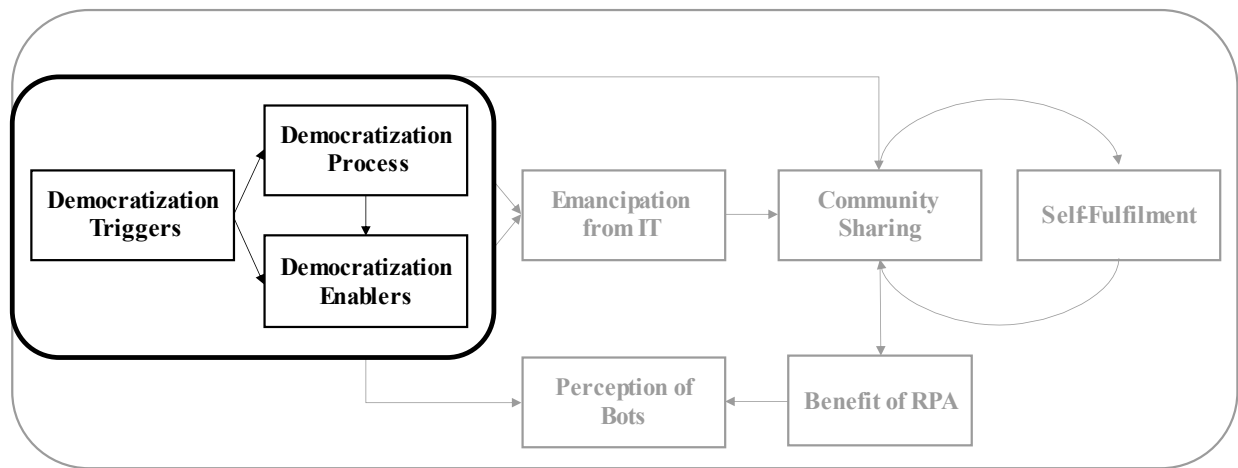
Citizen developers' experience and perception of democratization of RPA



5.2 Democratization drivers

This aggregated dimension illustrates and explains three second-order themes: Triggers, Enablers, and the Process of democratization, wherein employees embark on the automation journey and become citizen developers. We first analyze these three themes separately before examining their interrelationship.

Figure 7. Data model - Democratization drivers



5.2.1 Democratization triggers

The majority of the interviewees exhibited prior motivation to participate in the automation democratization program. In other words, before starting the democratization process, citizen developers already had motivations and reasons to be part of the program. Two primary categories were identified: intrinsic and extrinsic motivation.

Intrinsic motivation was the first underlying catalyst expressed by interviewees, driven by their need to automate repetitive tasks and avoid errors in their work environment. They conveyed their interest in updating their knowledge in order to stay relevant. Participants not only reported concerns about becoming obsolete but also stated their interest in new automation tools that can enhance efficiency and fulfill their aspiration to “be part of the future”. Consequently, subjects perceive automation technology adoption as obligatory or inevitable. For example, one interviewee says: “*I took the program as I understood that it would be very user-friendly, that it would be very useful, and it would be the future.*”

Our findings align with Dotson’s (2015) claims, which suggest, that when a product or technology has become normalized by the widespread usage of society, individuals tend to feel that their own success relies on its adoption. Thus, as a technology achieves a certain momentum, it fosters a sense of inevitability among individuals, driving them to adopt it or risk feeling powerless.

While the majority of the interviewees stated their interest in automation, it became evident, when analyzing how they practically partook in the program, that they were often also influenced by external factors, namely **extrinsic motivation**. Within this theme, interviewees mentioned three

main factors: hierarchy (manager recommendation), a colleague (or ambassador), or organization X's internal communication campaigns. Participants shared examples of colleagues who succeeded in completing the program and relayed their positive experiences, encouraging the interviewees to enroll as well. Other interviewees also reported managerial support when taking the program. For example, one interviewee heard about automation democratization during the annual performance meeting with her manager. Moreover, the interviewees were aware of Organization X's strategy towards automation due to the Intranet. Some interviewees had utilized bots within their department, prior to their enrollment in the democratization program and, were aware of UiPath and Blue Prism solutions, among others. Winner (1997) argues that individuals must be willing to adapt to new approaches to reach their goals while challenging their own assumptions. Those unwilling to adapt are at risk of slowing progress and modernization (Dotson, 2015). This was evident as most citizen developers were not "tech savvy" before the training and felt the need to take the training due to a mix of both extrinsic and intrinsic factors.

5.2.2 Democratization process

As Organization X chooses to call this program "democratization", we believe it is important to understand its democratic nature of it. Since there is no existing theoretical framework to assess the automation democratization process' democratic aspects, we found political democratization theory to be the most suitable tool for our analysis. As a result, we employed Dahl's (2008) five criteria to evaluate a democratic process as a means to evaluate our findings regarding the automation democratization landscape.

The existence of an electoral body. Respondents indicated that the automation democratization initiative was available to all employees of Organization X. The sole prerequisite for participation is to be part of the company. Moreover, interviewees reported the convenience of the absence of a coding skill requirement, which makes the program inclusive to everyone, allowing it to be a choice or a right, rather than a privilege demanding extra capabilities. This naturally delimitates the electoral body scope, analogous to how countries define a citizen as "a member of the society" (Turner, 1990).

Enlightened understanding. This criterion was met as all respondents were aware of the availability of the programs and bots and had access to registration content, and application requirements, enabling them to select the one that best suited their needs. The mechanics of democratization of automation implicitly allow for enlightenment understanding, as citizen developers can quickly create software robots with little or no coding knowledge (Masili, 2023). Citizen developers have access to choose from a wide range of available robots and they are free to choose the one that best aligns with their priorities and needs.

Effective participation. Although all the subjects witnessed and experienced effective participation throughout the program, the training primarily exemplified their involvement. The interviewees unanimously reported the ability to communicate their opinions freely about all matters related to the automation program. Moreover, they were able to hear others' opinions about automation, during the training and within their department, to develop their understanding of bots.

Last, citizen developers were positive about the opportunities they had to express their difficulties when building bots, by asking for support (cf.: democratization enablers); to learn from one another (during and post-training by reaching out to community members). This suggests that effective participation is achieved from the learning standpoint. However, it remains inconclusive whether it is met throughout the whole democratization process.

Control of the agenda. Several elements were reported by interviewees that translate their ability to control their automation democratization journey. For instance, one interviewee mentioned the learning focus on use cases relevant to her field, while another one appreciated the ability to build his own personalized bot for his individual needs. Generally, participants transitioned from using pre-existing bots to having control over the agenda by creating their own bespoke robots to address their specific needs. This approach promotes trust, as they argue that their customized bots are built to satisfy their interests (von Hippel, 2006) – thereby reinforcing the findings of von Hippel (2006), who states that an important factor of democratization is to give citizens the opportunity to create, learn, and innovate.

5.2.3 Democratization enablers

Not only did the respondents express their appreciation of Organization X and management's backing throughout the automation democratization process, but also emphasized the importance of the support provided by the automation team. This support was evident both during the learning and bot development phases.

Training. Interviewees highlighted the accessible and comprehensible training content for beginners, as well as the teacher's effective pedagogy, fostering the citizen developers' first entry into automation. Respondents praised the interactive nature of the learning session and appreciated the teacher's adaptability to their needs regarding content, notably by use case examples that resonate with their role and department. The possibility of reviewing the course and practice in parallel thanks to the video recordings of the sessions was highly praised, as it provided participants with more flexibility.

However, interviewees raised some concerns regarding the condensed training schedule, as the sessions were held one after the other, requiring commitment. It was also highlighted that the time slots constrained active participation, as the citizen developers live in different time zones. As a result, some participants had to wake up early to attend the courses. Finally, it was reported that class homogeneity impacted content adaptability and use case examples. For instance, if all participants of a learning session were from similar departments or hold similar roles, the use cases and content could be more easily tailored. However, this is not currently the case as most participants have different backgrounds and work in different units.

Support. Respondents unanimously praised the availability and reactivity of the automation team, which supported them at every stage of the bot's development, from design to deployment. Moreover, participants expressed their appreciation for the instructors, during bot development and, even after the course was over.

RPA literature emphasizes the importance of these enablers in the implementation of this technology. In fact, the success of RPA implementation depends on, among other factors, two crucial elements: training and support (Fernandez & Aman, 2021). Training employees can mitigate employee resistance to collaborating and working with software robots (Fernandez & Aman, 2021). Support from the automation department is a key success factor in RPA implementation, since employees need access to automation information and knowledge when working with RPA robots (Asatiani & Penttinen 2016; Hallikainen, Bekkhus, & Pan, 2018; Moffitt, Rozario, & Vasarhelyi, 2018; Fernandez & Aman, 2021).

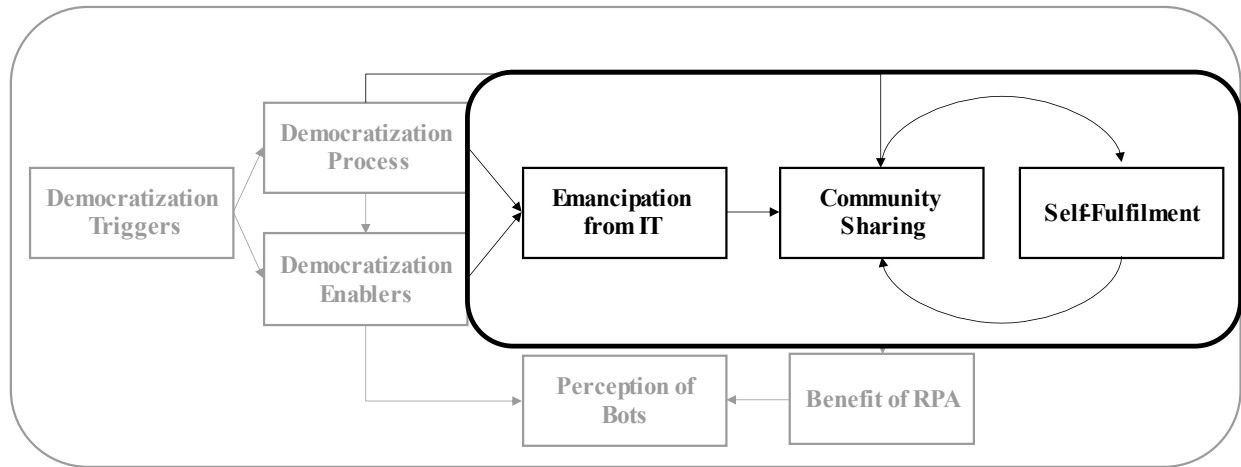
5.2.3.1 Virtuous cycles among the drivers of democratization

Our analysis of the three drivers, both individually and collectively, demonstrates their dynamics when citizen developers participate in the program. First, citizen developers' motivation emerges from their pre-existing perception of RPA. Second, the motivation to act by joining the program stems from the organizational support for automation, which strengthens Dhal & Irgens' (2022) findings on organizational democracy. Third, the democratization process was positively perceived by the interviewees, who expressed feeling like "part of the program" or "co-creators". This confirms that the democratic aspects of the program as outlined in Dahl's (2008) framework enable accessibility, inclusion, effective participation, and control of the agenda. Last, our findings suggest that citizen developers experience democratization as an enabler, allowing them to participate and contribute to developing and using automation software. Thus, the democratic process impacts both learning and support, as democratization of automation is not perceived as a regular organizational program but as a radical organizational initiative that belongs to all.

5.3 Effects of democratization

The following subsection outlines the major themes identified by the analysis as the constructs and concepts stemming from the above-mentioned drivers of automation democratization. By considering the most relevant themes, we were able to identify one concept outlined in academic literature, namely community sharing, and develop two constructs: emancipation from IT and Self-fulfillment.

Figure 8. Data model – Effects of democratization



5.3.1 Emancipation from IT

This section presents emancipation as an abstract construct perceived by citizen developers and developed by our interpretations of the findings, originating from their democratization experience. Next, the interrelationships between Democratization process and Enablers to Emancipation from IT are analyzed (5.3.1.2 & 5.3.1.3)

5.3.1.1 Emancipation from IT: Empowerment through Freedom and the Right to Create

Interviewees noted that prior to democratization, the IT department had to spend considerable time to understand the automation use cases requested by the commissioning departments. Often, the automation software created by IT professionals failed to address the department's specific needs, due to the IT department's limited knowledge of their business processes. Moreover, before democratization, it was not feasible to update robots internally and employees remained heavily dependent on the IT department for debugging.

Interviewees have expressed the feeling of emancipation, as an experience of freedom and autonomy, resulting from democratization. They perceived increased bot accuracy and relevance as they hold decision-making power, enabling them to create bots on their own terms and according to their specific needs. They also highlighted the possibility to identify innovative automation use cases, achieved only due to their newly acquired automation knowledge. As proposed by Hoover and Lee (2015), when citizens develop their own software, they do not need to hire and wait for an IT expert to design, produce, and deliver it.

Citizen development eliminates the need for individuals or departments to invest time, effort, and money in explaining the specific automation use case and waiting for a professional to develop the automation software. Interviewees reported that when IT professionals develop automation software, the commissioning department will need to fund its development and make sure that the use case is well-defined and explained. According to von Hippel (2006), due to misunderstanding and/or funding issues, commissioning departments can perceive that the solutions created are seldom developed as per the original requirements. Hence, our findings strengthen von Hippel's (2006) argument, namely that if citizens want a solution tailored to their specific needs, the best result can be achieved by self-development.

The findings also reinforce the theory regarding demand heterogeneity, which can be tackled by empowering citizens to create their own solutions rather than pushing one-size-fits-all products (von Hippel, 2006; Hoover & Lee, 2015). Democratization ensures that citizens have the freedom to develop, emancipating them from the IT department. As Tom Wheeler expressed when discussing democratization of innovation (Dotson, 2015, p. 108): "My proposal assures...the rights of innovators to introduce new products without asking anyone's permission".

5.3.1.2 Democratization Process and Emancipation - Interrelated Ideas

The relationship between democratization and emancipation found among interviewees corroborates Hoover and Lee's theory on the future of innovation (2015), which is built around two connected forces: democratization and disintermediation. On one hand, democratization is a powerful force that empowers citizens to become creators (Hoover & Lee, 2015). The power of democratization is realized when citizens' underlying human needs of creating, communicating, and connecting are satisfied (Hoover & Lee, 2015). On the other hand, disintermediation relates to eliminating barriers that stand in the way of accessing tools (Hoover & Lee, 2015). When these are removed, citizens are given the opportunity to innovate and share their creations with others (Hoover & Lee, 2015). Ultimately, citizen developers' perceived emancipation is the intended outcome of the freedom to choose and create as well as the empowerment provided by democratization.

RPA literature additionally corroborates our findings, as scholars argue that when employees have access to and work with robots, they have the freedom to focus on more intellectually stimulating activities (Kokina et al. 2021). Often, employees who adopt RPA enhance their skills, and transition to other roles or broaden the scope of their positions in the company (Denagama Vitharanage et al, 2020; Costa, Mamede, & Silva, 2022). In this case, employees who used to perform repetitive tasks have expanded their responsibilities by becoming citizen developers and automation ambassadors.

5.3.1.3 Democratization Enablers and Emancipation - A Relationship of Liberation & Interdependence or an Engineered Experience of Freedom

Organization X's citizen developers reported that democratization enables them not only to better utilize robots created by professionals but also to develop their own personalized robots. Thus, citizen developers' sense of emancipation also emerged from acquiring automation knowledge and

skills, allowing them to create and utilize robots and better understand automation capabilities. This aligns with Hoover and Lee's argument (2015) that there are two sides to democratization: creation and consumption. It also supports Théberge's (2004) analysis of Macpherson's (1973) essays, which claims that democracy gives individuals the right to develop their own capabilities while providing the freedom to choose from any available utilities as consumers.

Dotson (2015) warns that when the word "democratic" is added to a phenomenon, citizens are given a false sense of agency and freedom. He states that often democratization participants have the freedom to choose only among a limited number of opportunities. As is the case in our study, wherein interviewees reported having the choice only between a limited number of training options. However, this does not limit them from feeling empowered to create (Dotson, 2015). According to Dotson (2012), some technological experiences can even be felt as liberty-enhancers. Therefore, when citizen developers learn about and experience automation first-hand, they perceive democratization as emancipating, giving them the tools and opportunities to create.

Briggle and Mitcham (2009) make a similar claim to that of Dotson (2015). They say that "the experience is one of freedom and autonomy. The reality is one of interdependence." (Briggle & Mitcham, 2009, p. 380). That is, even though democratization enhances citizen developers' freedom, in reality, they depend on their robots and the automation department. As explained by one interviewee: "This buddy bot is important for everyone and the health of the structure." If their robot malfunctions, they will need to either fix it or work manually. Therefore, they need the robots to continuously function. Organization X automation department ensures that every citizen developer gets continuous support, learning, and access to the platform. Without these three factors, the success of the democratization program would be impaired. Thus, citizen developers depend on the automation department as well. As a result, democratization could also be seen as an engineered experience of freedom (Dotson, 2015).

5.3.2 Community Sharing

This section outlines the concept of community sharing in automation democratization and then, explains the interrelationship between this concept and Self-fulfillment (5.3.2.2).

5.3.2.1 Community Sharing - the flattening of the production hierarchy and elimination of the middlemen, gives rise to a community of equals that freely share knowledge and tools

The interviewees described their experience of democratization as one where citizen developers engage freely and voluntarily, and where they develop a sense of belonging. Employees are autonomous and choose the activities they wish to undertake. Subjects report the organic emergence of an informal community, bringing together people with a common interest in automation. Subjects expressed their satisfaction with the opportunity to share ideas and knowledge, but most importantly to share their robot with others.

Sharing bots. Automation democratization enables users to take an active part in designing and developing their own solutions. In fact, interviewees reported that most robots that are created by citizen developers are deployed and uploaded into a marketplace, where other users can have

access to them for work. Some of these citizen-created robots are used by more than 100 users, enhancing the efficiency of the program. This is in line with Hoover and Lee's (2015) argument that democratization of innovation empowers people to freely share knowledge and innovations with others, creating a community that benefits not only creators but also consumers. With the rise of a community, citizens do not need to reinvent the wheel. Instead, as observed at Organization X, they can benefit from utilizing the creations of other members. Moreover, freely sharing innovations may lead to further development of the solutions due to improvement suggestions made by other users (Raymond, 1999).

Sharing knowledge. Interviewees shed light on a community of practice built around knowledge sharing. Citizen developers sharing common interests or concerns get in touch with each other in order to consolidate their knowledge, develop their expertise, and know-how, and support their peers through the democratization process. However, these communities are formed organically, during the training, or within the same organizational unit. For instance, one interviewee highlighted her country's automation best practices and her eagerness to share those with the rest of Organization X. When citizens create and share in collaborative groups, rather than benefiting from individual creativity they benefit from social creativity (Procter et al. 1999).

5.3.2.2 Democratization process and Community sharing

The democratization process, which is characterized by inclusivity, accessibility, effective participation, and control of the agenda, nurtures the formation and development of a collaborative ecosystem. Our findings showcase that it fosters the development of instrumental elements of a community, such as active engagement and a sense of belonging. Moreover, control of the agenda empowers citizen developers to decide the direction of the community.

5.3.2.3 Community sharing enhances reputation and increases social welfare (Self-fulfillment)

Citizen developers at Organization X expressed that sharing knowledge and robots with other community members led to outcomes such as "Standing out and getting management recognition". In other words, citizen developers benefit from enhanced reputation due to the positive network effects stemming from the diffusion of their knowledge and robots. These traits of the automation democratization community are analogous to those existing in the information community, known as "open science" (David, 1992; Partha & David, 1994; von Hippel, 2006). Scholars in academia often publish their findings (Daft, 1983), freely divulging information and knowledge with the aim of improving their reputation and standing among their colleagues (von Hippel, 2006). Therefore, in both cases, community sharing has a similar effect.

From a societal standpoint, these dynamics benefit social welfare (Merton, 1973), as sharing and collaborating benefit both the developer and the bot user, who receive assistance, tools, and support from their peers. A virtuous cycle of knowledge creation and diffusion can fuel more innovation and ultimately benefit the community further (von Hippel, 2006). This became evident as citizen developers argued that their automation knowledge and bots were enhanced through increased knowledge sharing.

5.3.3 Self-fulfillment

Citizen developers expressed that democratization yields significant implications on a personal level. The findings generated a second construct, namely self-fulfillment, analyzed in sections 5.3.3.1 and 5.3.3.2. Its relationship to Community sharing is presented in section 5.3.3.3.

5.3.3.1 Self-fulfillment – Feeling satisfied and developed, more creative and interested in automation

Interviewees highlighted the impact of democratization in increasing their curiosity and interest in automation. Some interviewees reported that democratization was an eye-opening initiative, a lever that could assist in their career development. We find that democratization increases the cognitive flexibility of citizen developers and their openness towards complexity, which favors their inclination to discover new use cases. For example, one interviewee created a bot to monitor the value of his personal investments.

When citizens are empowered to utilize their minds to explore and create, the net effect is the development of new technologies that can transform and enrich people's lives (Thierer, 2016). This strengthens the concept of permissionless innovation outlined in the literature, as individuals are allowed to express their innate creativity and curiosity. Similarly, citizens' welfare is enhanced not only because they can design and create exactly what they need but also because, in the process, they can improve other people's lives by sharing their innovations and knowledge (von Hippel, 2006).

5.3.3.2 Personal growth and satisfaction

The findings showcase that most interviewees would rather develop their own bots than ask the automation team to develop them. Studies made on individuals who volunteered in the development of popular software solutions, widely utilized by the public, revealed that these contributors were driven to collaborate by the satisfaction gained during the process (Hertel, Niedner, & Herrmann, 2003; Lakhani & Wolf, 2005). Therefore, it is not strange that citizen developers were found to be highly satisfied with democratization, a process that allowed them to innovate. These findings strengthen Weber's theory on organization democracy, claiming that employee participation impact job satisfaction, involvement, and social behavior at work (Weber, Unterrainer, & Schmid, 2009; Yazdani, 2010).

Several studies on RPA can also explain the feeling of "personal growth" experienced by citizen developers. Research suggests that with RPA implementation, employees develop automation knowledge and skills that contribute to their personal growth and professional development (Denagama Vitharanage et al., 2020; Eikebrokk & Olsen, 2020; Lacity & Willcocks, 2016).

5.3.3.3 Self-fulfillment and Community sharing – Achievement and satisfaction foster increased willingness to share

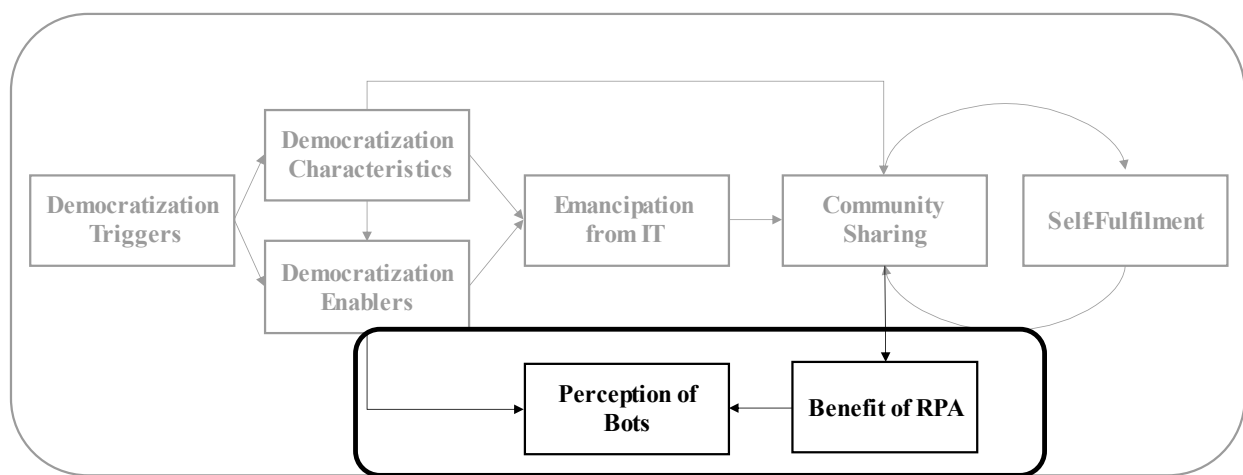
An interviewee's feeling of accomplishment is legitimized when they act as ambassadors or champions of democratization: ambassadors encourage employees to become citizen developers and, champions become the first point of contact within their team for issues related to automation.

One interviewee said: “I think I have grown a lot since I took the training and started investing time in developing bots. I got to be exposed to more opportunities and I think it helped. For example, I can now develop other bots for my team members which helps simplify processes, so we have more time to focus on more important stuff.”

5.4 Citizen developers’ sensemaking of automation

This section outlines the impact of democratization on citizen developers' perception of automation. We present the findings regarding the Benefits of RPA (5.4.1) and its relationship to Community sharing (5.4.1.1), followed by the citizen developers’ perception of bots (5.4.2) and its interrelationship to Benefits of RPA (5.4.2.3)

Figure 9. Data model – Citizen developers’ sensemaking of automation



5.4.1 Benefits of RPA

The results show that the benefits of RPA identified by the interviewees are the same as those listed in the literature. These include “increased productivity”, “flexibility of the workforce”, and “analytical capability”. Similar to the literature, the benefits of RPA are not limited to these, however, these are the most emphasized benefits as they seem to be directly related to democratization. For instance, one respondent emphasizes the flexibility that the bot provides as it gives him the time to help other colleagues in their democratization process. Whereas another interviewee said that a bot can complete a task in 3 minutes, while it used to take him 4 hours to execute the same task manually. This same respondent also mentioned stress relief thanks to the bot as the latter also avoids mistakes which can be a source of stress when deadlines are important for the deliverables.

5.4.1.1 Benefits of RPA and Community sharing - a way of profiting from innovating and sharing

Every innovation has two sides to it: the user and the manufacturer (von Hippel, 2006). Manufacturers (in this case, IT professionals or citizen developers) profit from their innovations, by “selling” it to potential users. In this study, citizen developers, who share robots or create robots for others, profit from increased management recognition and enhanced reputation. Conversely,

users benefit from an innovation by making use of it (von Hippel, 2006). Employees can benefit from democratization by making use of citizen developers' robots. This relationship underscores the significance of sharing robots, as it ensures that more employees of Organization X reap the benefits of RPA.

5.4.2 Perception of bots

In this section, the configurations found when citizen developers speak about their robots are presented, along with the relationship between Democratization enablers and Perception of bots (5.4.2.1). The degree of humanization of bots when they are developed by citizen developers is emphasized (5.4.2.2). The relationship between the Perception of bots and Benefits of RPA is explained (5.4.2.3).

5.4.2.1 The perception of bots is affected by the learnings gained during the training

This study indicates that the citizen developers' perception of robots differs from the configurations found in the literature. Our interviewees perceived software robots as tools, colleagues, or freshers. Even though Organization X's citizen developers did not explicitly describe their robots as "innovation enablers", the characteristics of this configuration, as explained by Waizenegger and Techatassanasoontorn (2022), were all described during our interviews. Therefore, the difference between the literature and our findings is that the interviewees did not perceive software robots as a threat and a new configuration emerged, namely robots as a "fresher".

According to RPA literature, employees usually expect robots to take their jobs and, therefore, they see them as competitors (Fernandez & Aman, 2021). But the World Economic Forum (2018) claims that an approach to overcome this challenge is to train those people who might be impacted by RPA implementation, educating them about the technologies' capabilities and supporting them. The Democratization Enablers, which includes RPA training, can explain why none of the interviewees perceived robots as a threat. When people are trained and utilize robots, their automation knowledge and skills are enhanced (Denagama Vitharanage et al. 2020). Thus, they learn how to leverage these technologies instead of fearing them.

While some interviewees categorize bots as tools or buddies, a new category that has not been covered by the literature has been found, "bot as a fresher or baby". This construct can be explained by the robots' level of development. Subjects know that the robots are underdeveloped because they were the ones who created them. They refer to them with these words because they are evolving and improving, just like a newly hired employee or a newborn baby. As a fresher requires training and guidance, a newly created robot requires further development and work to reach its full potential. Similarly, just as a baby requires care and attention, a "baby bot" requires resources and time to set up and properly function.

5.4.2.2 Anthropomorphism

It was observed during the interviews that when some citizen developers described their interactions with robots, they used words generally utilized to characterize humans' interactions

such as “not being obedient” or “having a coffee with him”. Furthermore, some interviewees employed analogies often reserved to describe people, like a robot being a “baby” or naming a robot “Apollo”. This is in line with prior research on anthropomorphism, claiming that people tend to give IT software human-like traits, qualities, and cognitive abilities (Epley, Waytz, & Cacioppo, 2007). Qui and Benbasat (2005), argue that people trust technology and are more willing to adopt it if they identify anthropomorphic features in it. Similarly, citizen developers who described robots utilizing anthropomorphic cues had a more positive perception of them than those who did not. Overall, they trusted robots and their performance, and they not only adopted robots but also wanted to help their colleagues to create and utilize them.

5.4.2.3 Perception of bots and Benefits of RPA

The citizen developers’ perception of bots is interrelated to the RPA benefits they gain from them. For instance, if a bot significantly enhances the citizen developers’ productivity, their perception is likely to be positive. Where the individuals perceive the potential of bots, yet simultaneously recognize the necessity for ongoing time commitment for their maintenance and development, their perception is less favorable. In these cases, they see them as tools or freshers.

5.5 Summary of analysis

The discussion showcases citizen developers’ experience of automation democratization within Organization X. It appears that the experience of democratization created a new way to adopt and develop automation software. That is, a citizen-led approach to designing and developing often leads to the emergence of new solutions that hitherto were unavailable or inconceivable (Hoover & Lee, 2015). This program was evaluated according to democratization criteria, mentioned in political science literature, to explore the accuracy of the term “democratization” in such a context. Our first findings establish the framework of the automation democratization program, by examining the democratization approach employed by Organization X.

The findings allowed us to develop new constructs, such as Emancipation and Self-fulfillment, and further develop concepts mentioned in democratization of technology, such as Community sharing. In line with von Hippel (2006), we found that citizens are better able to understand authentic user needs and translate those into actionable and useful software solutions (i.e., robots). Furthermore, as citizen developers benefit from their own solutions, they are more likely to adopt and freely diffuse them, which contrasts with user behavior with manufacturer-created software (von Hippel, 2006). The perception of bots was analyzed, showcasing that robots are no longer perceived as threats when introduced by democratization as opposed to being implemented by IT. They also enjoy a human characterization from citizen developers due to the knowledge acquired through the learning, which demystifies their fear of automation.

6. Conclusion

This study sought to take an interpretative approach to answer the research questions while assessing citizen developers' experience of democratization and its implication on their perception of automation, thus aiming to close the research gap. (6.1). Next, we discuss the theoretical contributions of our study (6.2) as well as its practical implications (6.3). Last, we address the limitations of our study (6.4), followed by suggestions for future research (6.5).

Q1: How do citizen developers experience democratization of automation?

Q2: How does democratization affect citizen developers' perception of automation?

6.1 How do citizen developers experience democratization and how does this affect their perception of automation?

Our findings provide valuable insights to help understand the democratization of automation and this enabled us to create a theoretical model. This framework, based on our empirical findings, provided a structured representation of key concepts and the constructs at play, and their interrelationship. Our study shed light on two new constructs in the automation democratization literature, namely Emancipation from IT and Self-fulfillment. The concept of community sharing also emerged as a key finding.

Regarding the first research question, we find that citizen developers experience automation democratization as an empowering and inclusive initiative. This program fosters a sense of emancipation, as it allows them to independently create and utilize customized robots. It facilitates the organic emergence of a community, where citizen developers freely share knowledge and bots. This community benefits both robot creators and consumers, as employees can select the automation solutions that most effectively address their needs.

Democratization also contributes to improving citizen developers' knowledge and skills, thereby facilitating their personal and professional growth. Consequently, they feel self-fulfilled and empowered, perceiving self-robot development as a means to create more useful and accurate automation solutions. We acknowledge that some of the effects of democratization, such as community sharing and personal satisfaction, may be experienced in an organization outside a democratic process, or due to the inherent benefits of RPA implementation.

Addressing the second research question, this study finds that democratization has a positive impact on citizen developers' perception of automation. Individuals feel empowered by the program, experiencing autonomy and freedom. However, citizen developers acknowledge that they rely on their bots and the support team for the efficiency of the program. Therefore, we conclude that citizen developers have a false sense of freedom and autonomy (Dotson, 2015). The findings demonstrate that participants perceive RPA robots as tools, colleagues, or freshers, but not as threats, which contrasts with previous academic literature (Waizenegger & Techatassanasoontorn, 2022). This perception shift can be attributed to the newly acquired automation knowledge provided by the democratization program. Robots as freshers is a construct

and a key finding in this study, and it showcases the impact of democratization in the bot creation process. Finally, our findings revealed that citizen developers who anthropomorphize robots have a more favorable perception of automation solutions.

We adopted a political science framework for our study to better understand the significance of using the word “democratization” in an organizational context. Given the novelty of the subject, we relied on political science literature, as it is the original field of democracy theory. Critical democratization characteristics, such as inclusiveness, availability, accessibility, effective participation, and control of the agenda, play a significant role in the experience of citizen developers. Involving and engaging non-IT professionals in the diffusion of automation can empower employees and nurture a sense of commitment and cooperation that drives the success of initiatives to implement automation. Of course, we acknowledge the challenges of applying political theory to the automation domain, considering the distinct differences between these two fields.

6.2 Theoretical contributions

Our study addresses the identified research questions in a new research field by adopting a multi-theoretical lens, examining both the experience of citizen developers during automation democratization, as well as its effects on their perception of automation itself. By doing so, we identify areas that previously were not covered by scholars, thereby extending the understanding of democratization of automation in an organizational context. Our framework provides structure to a new research field that is yet to be explored. By subscribing to a multi-theoretical lens, our study was able to understand the notion of democratization of automation to better capture its dynamic nature.

Our study reinforces several existing theories. First, it confirms anthropomorphic theory, demonstrating that when individuals attribute human-like characteristics to software solutions they tend to trust and adopt these technologies (Epley, Waytz, & Cacioppo, 2007; Qui & Benbasat, 2005). Second, it adds weight to the research conducted by the World Economic Forum (2018) that training can help remove employees’ fear of adopting automation technologies. Third, we validate Dotson’s (2015) claim, arguing that when the word “democratic” is added to a concept, individuals are given a false sense of agency and freedom. Fourth, we support von Hippel’s (2006) proposition that self-development can mitigate the challenge of demand heterogeneity, by creating customized solutions. Last, we confirm Hoover and Lee’s (2015) theory, as we illustrate that, within a democratic context, individuals freely share knowledge and resources, benefiting both creators and consumers.

Contrary to existing academic literature, suggesting that employees fear losing their jobs to automation (Fernandez & Aman, 2021), our findings suggest that citizen developers do not perceive robots as a threat. We discovered a new configuration for the perception of software robots (Waizenegger & Techatassanasoontorn, 2022), namely robots “as freshers”.

6.3 Practical implications

The results of this study have various implications for practitioners who seek to adopt and apply a democratized approach to automation implementation. These insights can aid business leaders to formulate a strategy for automation, ensuring successful adoption of RPA technology and robots, while simultaneously nurturing a favorable perception of automation among employees:

Training and organizational support: the findings emphasize the importance of an effective automation team in delivering training and support to citizen developers. To support automation democratization, organizations need to allocate resources to training initiatives. This empowers employees to leverage automation technologies, which also alleviates the fear of job loss.

Addressing training challenges: potential difficulties in the delivery of training must be tackled, such as condensed training schedules, time-zone restrictions, and homogeneous class composition. To enhance the overall learning experience, organizations should provide flexible and adaptable training content, which can cater to various learning styles and needs.

Highlighting Emancipation and Self-fulfillment: promoting and underscoring these positive effects of democratization can help organizations drive the adoption of the program. Granting individuals autonomy and freedom to create and utilize robots can foster a feeling of personal development and an increase of job satisfaction, resulting in enhanced productivity and innovation.

Trust and anthropomorphism: incorporating human-like characteristics and traits to robot solutions can aid organizations by improving employee adoption and implementation of RPA technologies. Organizations should acknowledge the significant role of anthropomorphism in fostering trust and engagement. Organizations that consider these practical implications can improve the adoption of automation initiatives.

6.4 Limitations of the study

As with any research, ours is subject to certain limitations. In line with our objective of an in-depth study of the practice, we chose a real-life case, examining a pioneer organization in automation democratization. However, this naturally narrows the interviewee sample to Organization X, which itself is still in the process of adopting such practices. This may have led us to overlook alternative standpoints. The sample was as representative as possible within the Organization X democratization program, though this narrows down the representative sample per country and per department, overlooking other specificities.

We should also acknowledge that the perception of democratization is rather personal and subjective. Subjective interpretation of citizenship and democracy from a national standpoint, based on cultural perspectives is inevitable. However, we carefully sought to remain faithful to the general meaning of the concept. In that sense, Dahl's theoretical framework and the methodological design were relevant to filter interviewees' biased narratives. Our follow-up interviews allowed us to test the model and verify the meaning of each concept to avoid subjective interpretation.

6.5 Future research

Democratization of automation is of increasing interest and gaining momentum as a business practice. As the subject is further examined, it will require reference to in-depth analysis such as the one provided in this study. We hope that this multi-theoretical research will offer insights into the interconnection of political science, organizational development, and technology adoption. In order to overcome the limitations of this study, it would be appropriate to test the relevance of the developed model in other organizational contexts that are also applying democratization programs. A broader interview sample and a longer investigation period would allow a study into the effects of democratization over time.

While grounded theory is the most appropriate method when investigating a nascent research field (Gioia, Corley, & Hamilton, 2013) a comparative study using Eisenhardt's comparative case method would enable us to develop a deeper understanding of the topic. Future research on automation democratization should explore further the identified relationships between the second-order themes and constructs.

Our initial ethnography study indicates that learning and personal development are key aspects of democratization enablers. Therefore, a cross-study of automation democratization, applying education democratization theory might shed further light on the above-mentioned concepts. Additionally, it would be interesting to investigate what anthropomorphic features are important in gaining the trust of citizen developers in bots.

7. References

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8. Appendices

8.1 Preparatory work

8.1.1 Meetings and discussions

Meeting objective	Role	Date (2023)
Introduction to the program	Automation democratization's program manager	09-Dec
Defining the scope of the thesis	Head of operations	14-Dec
Reviewing security and compliance	Compliance manager	20-Jan
Program deep-dive	Program manager	26-Jan
Meeting with management	Head of automation platforms	30-Jan

8.1.2 Ethnography-inspired research – Data collected

Type of data collected
Personal responses to recording fieldnotes
Specific facts
Specific numbers
Specific details of what happens
Questions from the participants
Sensory impressions
Specific words
Specific phrases
Specific summaries of conversations
Specific insider language

8.1.3 Ethnography-inspired research – Training sessions

Training session	Date (2023)	Duration
1	06-Feb	2 hours
2	07-Feb	2 hours
3	08-Feb	2 hours
4	09-Feb	2 hours
5	10-Feb	2 hours

8.2 Main study

8.2.1 Interview questionnaire template

Background

- Short introduction about interviewee and ourselves
- Explanation of the purpose of the study
- Inform about confidentiality and ask for permission to record

About the program

- How did you come across the automation democratization program?
- Were you aware of other options or alternatives while enrolling to the program?
- Did you take the training? When did you take it?
- Why did you decide to participate in the program?
- What do you think of the program?
- Would you change anything? Describe
- In your opinion, were your personal needs considered throughout the whole process? Could you elaborate?
- How would you describe your participation in the program? Did you partake in the process of your own learning at any point?

About the usage of robots

- How often do you use robots?
- Why do you use robots?
- Before joining, how did you expect robots to influence/affect the work you do?
- Did your perception change after building bot?

About the robots' impact on their work

- Did your work processes change once you adopted a bot?
- How did you feel about the changes?

About the program's impact on their lives

- How are you feeling on a personal level since you are using or developing bots?
Describe
- How are you feeling on a professional level since you are using or developing bots?
Describe

About the citizen developers' perception of robots

- Describe the robots you work with; how do you perceive them? Why?
- Have you named your robots? What's their name?
- On a scale of 1 to 10, how would you evaluate the performance of the bot you use?
Why?
- If you had to evaluate the bot's performance, just like a manager evaluates their employees, how would you do it?

About the automation team

- Have you had contact with the automation team? For what reasons?
- How would you describe the engagement from the automation team? Would you like something to change?
- Would you want them to build robots for you instead?

About the democratization program

- How would you describe your contact with other citizen developers?
- Would you like to have more contact with them?
- What is your overall impression of the democratization program?

Outro

- Have we missed anything? Is there anything you would like to highlight that we might have missed?
- Can we reach out to you in case we have follow-up questions in the future?

8.2.2 Interviewee list #1

The interviewees' information has been divided into two different tables to ensure confidentiality.

Code	Role	Date (2023)
R	General Ledger Coordinator	14-Feb
S	Strategy & Business Operations Analyst	17-Feb
B	SME Business Excellence	06-Mar
C	Business Analyst	07-Mar
D	SAP & WCS Superuser	07-Mar
E	Implementation Lead	08-Mar
F	General Ledger Senior Specialist	08-Mar
G	Senior Intercompany Specialist	08-Mar
J	Project Finance Accountant	09-Mar
H	Sr. RPA Developer	09-Mar
I	General Ledger Accountant	09-Mar
K	Sales Enablement Learning Partner	09-Mar
L	Finance & Compliance Analyst	09-Mar
A	Developer	09-Mar
O	Program Line Manager	10-Mar
M	Team Lead	10-Mar
N	Tax Manager	10-Mar
P	Senior Contract Manager	13-Mar
Q	General Ledger Specialist	13-Mar
T	Product Management	13-Mar

8.2.3 Interviewee list #2

Location	Training date	Owns bots	Builds bots	Uses bots
India	2022	Yes	Yes	Yes
India	2022	No	Yes	No
India	2022	Yes	Yes	No
India	2022	Yes	Yes	Yes
India	2022	No	Yes	Yes
Sweden	2020	No	No	No
Sweden	2019	No	No	Yes
China	2020	Yes	Yes	Yes
US	2022	No	No	Yes
Mexico	2022	Yes	Yes	No
Philippines	2019	Yes	Yes	Yes
Romania	2023	No	No	Yes
Egypt	2023	Yes	Yes	Yes
Spain	2019	No	No	Yes
Spain	2021	No	No	Yes
Romania	2022	Yes	Yes	Yes
Canada	2023	No	No	Yes
Qatar	2022	No	No	No
Spain	2022	Yes	Yes	Yes
Romania	2020	Yes	Yes	Yes

8.3 Follow-up interviews

8.3.1 Interview participants

Participant	Date
J	26-Apr
C	28-Apr
O	28-Apr

8.3.2 Questionnaire template

Introduction

- Inform about confidentiality of the meeting
- Ask for permission to take notes

Questions

- Present the findings – first-order codes
- Present the framework
- What are your thoughts about this framework?
- Would you change any of these concepts? Describe
- In what way do you think these concepts can be improved?
- Which one of these interests you the most?
- How do you think these concepts can be applied to improve the experience of other citizen developers?

Outro

- Is there anything you think we have missed?