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Abstract

We investigate the federated IT governance structure in RPA deployment. Due to the inherent nature of RPA being an exemplary instantiation of lightweight IT, federated governance structure (avoiding fully centralized or fully decentralized modes) is arguably a viable option for governance. However, our case study in Telco with numerous RPA implementations reveals some unexpected problems associated with the federated governance structure. These problems emerge from difficulties in reusing the RPA components and elements across business units as well from difficulties in striking the right balance between centralization and local needs. Our study contributes to the literature on lightweight IT and IT governance by critically assessing the benefits and drawbacks associated with one specific mode (federated) of governing lightweight IT (RPA).

Keywords: governance structure, federated IT governance, Robotic Process Automation (RPA), deployment, case study.

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1. Introduction

Robotic Process Automation (RPA) is an emerging technology that promises high returns for relatively low investments (Hallikainen *et al.*, 2018). RPA is designed to emulate a human worker by interacting with information systems through the existing graphical user interfaces (GUI) (Institute for Robotic Process Automation, 2015; Lacity and Willcocks, 2016). RPA is an exemplary instantiation of a lightweight IT (Bygstad, 2016; Penttinen *et al.*, 2018) that is easy, fast and relatively inexpensive to deploy. RPA is typically implemented on top of the existing organizational information systems, hence it is non-invasive by nature.

Driven by the promise of quick wins, companies are eager to implement RPA (Le Clair *et al.*, 2017). The basic proposition of RPA is rather clear – use simple GUI automation tools to eliminate rule-based, repetitive tasks performed by humans (Asatiani and Penttinen, 2016). However, it is unclear how RPA should be governed and how this technology should be positioned against the traditional information technology (IT) departments. Larger companies that might implement numerous software robots in several distinct business units need to carefully assess the governance structure associated with the development of RPA.

There are several concerns emerging from greater adoption of RPA. Being an instance of lightweight IT that operates on top of the existing IT infrastructure, the decision of implementing and developing RPA could, in theory, be made autonomously within business units, completely bypassing the company's IT department (Willcocks *et al.*, 2015). This type of decentralized governance structure might lead to lack of coherent coordination across the different business units and to RPA development suffering from fragmentation. On the other hand, complete centralization of RPA activities is problematic as escalation cases (where the RPA cannot follow a certain rule and the procedure breaks for some reason) typically cannot be handled by IT specialists but need to be handled by business experts from local units.

Implementing RPA may require giving up partial control over the process to RPA service providers, introducing further challenges to IT governance. Similar concerns have been raised in cloud computing

literature, where affordable, on-demand, service-based model, allowed individual users and business units to introduce a myriad of unauthorized, third-party software into an internal work process (Haag, 2015; Sarkar and Young, 2011). This leads to questions concerning ability of IT departments to govern and ensure security and compliance (Heier *et al.*, 2012; Khajeh-Hosseini *et al.*, 2010).

Motivated by the recent surge in the diffusion of lightweight IT (RPA in particular) and the inherent problems associated with their governance, in this study, we address the issue of IT governance structures in RPA. We seek to answer the following research questions: *How to set up a federated governance structure for RPA? What are the opportunities and challenges associated with the federated governance of RPA?* To answer the question, we study a federated governance structure deployed at a large telecommunications service provider (pseudonym: Telco). Telco has implemented multiple instances of RPA across various business units.

Our contribution is two-fold. First, we provide a detailed description of how a large multi-national corporation has organized its RPA governance and discuss the advantages and drawbacks of the selected mode. Second, we discuss two set of unexpected challenges of the federated governance structure; namely, difficulties in reusing RPA components and elements across business units and difficulties in finding a balance between centralization and local needs.

2. Literature review

2.1. IT governance structures

Weill and Ross (Weill and Ross, 2004) define IT governance as a set of specified decision rights and accountability framework that encourages desired behaviour in use of IT resources. IT governance enables the effective use of IT which has substantial impact on the value generated by IT investments (Weill and Ross, 2005, 2004; Wu *et al.*, 2015). In practice, however, IT governance is a complex set of structures, processes and relational mechanisms (de Haes and van Grembergen, 2009; Grant *et al.*, 2007). IT executives need to make a wide range of decisions to ensure that IT governance helps to align business and IT in their organizations.

There are two clearly identifiable poles of IT governance structures: centralized and decentralized (Brown *et al.*, 2005; Wu *et al.*, 2015). Centralization refers to the impression of the authority to make an important decision in the head of an organization, while respectively decentralization reflects more autonomy to make decisions locally (Cummings, 1995). Large organizations are under pressure to strike the right balance between centralized IT governance structures, offering cost-efficiency and standardization on a corporate level, and decentralized structures, providing flexibility and agility on a local unit level (Williams and Karahanna, 2013). As a result, rather than opting for either extreme, many organizations choose to leverage advantages of both centralized and decentralized structures, resulting in the creation of a federated structure (Brown *et al.*, 2005; Williams and Karahanna, 2013).

In a federated (or hybrid) IT governance structure, governance rights are shared between senior executives, the IT department and various business units (Weill and Woodham, 2002). The idea behind the federated structure is for IT executives to set an overall direction, in form of policies and guidelines, while allowing individual business units some degree of autonomy (Brown *et al.*, 2005). Typically, in a federated structure, infrastructure and supply decisions are centralized, whereas IT applications and technology usage decisions are decentralized (Peterson, 2004).

The federated structure has the potential to deliver benefits of autonomy and synergy. At the same time, if implemented wrong, the organization runs the risk of setting higher barriers for IT alignment, wasted resources and diseconomies of scale (Strassmann, 2005; Williams and Karahanna, 2013). Therefore, while the federated structure may appear to be the best option, it is not a silver bullet (Luftman and Kempaiah, 2007). Different organizational, environmental and technological contexts need to be taken into consideration when choosing the appropriate structure.

2.2. Governance and RPA

Similar to other lightweight IT, RPA presents unique challenges to IT departments (Lacity and Willcocks, 2016), calling for revision of established IT governance approaches. Willcocks and colleagues (Willcocks *et al.*, 2015) discuss RPA-specific challenges to the IT function. Three challenges mentioned in

their research are particularly relevant to the discussion on IT governance. First, due to its non-invasive nature, RPA could be deployed without any involvement of the IT department. Initial cost-benefit analysis could thus make RPA an attractive proposition to individual business units. However, the spreading of unauthorized, shadow IT solutions could end up being very costly to the organization: it might lose control of architecture (Osmundsen *et al.*, 2019), opening up company's IT to security and legal issues. In addition, these shadow IT implementations often suffer from limited scalability (Bygstad and Iden, 2017).

The second challenge lies in deciding whether RPA is a business project or an IT project (Willcocks *et al.*, 2015). While RPA is often triggered by a business problem, it is, to some degree, responding to some perceived deficiencies in the company's current IT infrastructure. Thus, often, RPA is not strictly confined to either unit (business or IT) and is instead positioned in between the two. Hence, any organization contemplating RPA deployment needs to carefully consider the approach to governance for each RPA project.

Third, RPA initiatives challenge the key components of the IT organization itself (Willcocks *et al.*, 2015). A successful RPA implementation requires development of specific skill sets not available in traditional IT departments. There exists a need to combine and coordinate expertise on business process reengineering, business analysis and IT development. Thus, some of the IT strategy that would traditionally belong to the IT function needs to be opened up to business units.

As RPA adoption progresses in organizations, it needs to be incorporated into IT governance (Lacity and Willcocks, 2016) and the challenges identified by Willcocks *et al.* (Willcocks *et al.*, 2015) need to be addressed through research. Recognizing the challenge, Bygstad and Iden (Bygstad and Iden, 2017), propose a framework mapping the possible approaches to lightweight IT governance. The framework expands on the notions of centralized, decentralized, and federated governance structures discussed in the section above. The *central control* and *laissez-faire* models from the framework resemble centralized and decentralized governance structures respectively. However, for the federated structure, Bygstad and Iden (Bygstad and Iden, 2017) propose two concrete models: *bi-modal* and *platform*. In the bi-modal model,

RPA solutions are developed in a separate process, however, they are subject to IT policies and standards once set into production. In the platform model, central IT management strongly encourages RPA initiatives, however, these initiatives are developed independently. Bygstad and Iden (Bygstad and Iden, 2017) take inspiration from mobile application platforms created by Apple and Google, and propose an IT department to create similar ecosystems for RPA projects within an organization. Overall, Bygstad and Iden (Bygstad and Iden, 2017) suggest the models where the effort is distributed between IT and business units, when it comes to lightweight IT projects. Following their trail, we study the case of federated IT structure for RPA development.

3. Method

3.1. Case selection

As RPA is an emerging technology, there are relatively few cases where RPA adoption is mature enough to study its governance structures in depth. For this study, we used purposive sampling to select our case (Patton, 2001). We were looking for an information-rich case of a large company where RPA has been deployed at a scale, projects were beyond the piloting stage, and IT governance structures were developed to manage the technology.

The case company selected for this study is Telco (pseudonym), a large telecommunications service provider operating in Northern Europe. Telco has a solid experience with RPA, being one of the early adopters of the technology in the region. RPA was brought into Telco by individual business units, in Finland, trying to solve specific challenges in their daily work. After successful pilots, Telco decided to deploy RPA first on a country level, and then on a group level. By 2017, RPA was one of the key parts of the overall company strategy to cut costs. Proliferation of RPA throughout the multiple units of the company has led Telco to start developing an elaborate federated IT governance structure to manage the technology and standardize the process of RPA development.

3.2. Data collection and analysis

To gain an access to informants and to establish our credibility within the case company, we used the known sponsor approach (Patton, 2001). Before the start of data collection, we met with the company management to discuss a potential study and identify the key informants for the study. Our contacts in Telco then introduced us to the informants.

In total, eight face-to-face interviews were conducted (see Table 1 for details). We adopted a semi-structured interview design. Interview protocol covered questions on informant background, RPA at Telco, challenges and opportunities of RPA, and governance of RPA. The interview protocol was adjusted to each informant, using follow up questions.

Table 1. Informant profiles

| Informant, length of interview (min) | Job title; responsibilities |
|--------------------------------------|---|
| David (56) | Lead of spoke Centre of Excellence (CoE); Leading business unit's RPA CoE |
| Michael (91) | Business Development Manager of RPA; RPA developer, RPA solution architect, member of spoke CoE |
| John (68) | Head of Robotic Services; Owner of RPA development & maintenance phase, member of spoke CoE |
| James (97) | Group Manager of RPA Analyst Team; Owner of RPA analysing phase, member of spoke CoE |
| Steven (32) | Senior Business Manager of RPA; Spreading RPA to external customers |
| Linda (44) | Business Development Manager of RPA; RPA analyst, member of spoke CoE |
| Mark (56) | Program Manager of RPA; Leading RPA program at group level |
| Susan (54) | Head of Customer and Order Management in IT; IT functions in RPA, member of spoke CoE |

The informants were selected to represent a variety of views from all corners of the company. All informants were deeply involved with RPA development, representing both IT and business sides. Average interview length was one hour. The interviews were audio-recorded and transcribed. In addition, handwritten notes were taken during the interviews. Data collection took place between December 2017 and May 2018.

After transcribing the data, we proceeded with two-stage coding. First, we performed an open coding (Charmaz, 2006), to better understand our data and map the views of the informants. At this stage, we

tagged data based on the codes that emerged from the data, rather than theoretical categories. For the second stage, we performed axial coding (Charmaz, 2006), organizing initial codes into meaningful themes. This stage was conducted in multiple iterations. As we interpreted the data and our understanding improved, we refined the emerging themes.

4. Findings

We report the findings from our case study in three sections. First, we articulate how Telco positions RPA in their toolbox of automation tools and how the responsibilities are divided in the federated governance structure. Second, we report the perceived advantages of the federated governance structure. Third, we outline the challenges related to the structure.

4.1. Nature of RPA and federated governance structure at Telco

4.1.1. Nature of RPA. We discussed the general features of RPA in Telco, identifying its key characteristics, advantages and disadvantages compared to more traditional forms of IT. The informants considered RPA to be mainly driven by the needs of the business units at Telco. Whereas many of traditional IT projects within the company tend to be technology oriented, RPA requires close cooperation with business experts from the start. There is need for close cooperation among RPA developers, IT and business units. That said, our informants observed similarities with other IT projects in aspects such as change management and personnel development.

RPA was considered to be one tool in Telco's automation toolbox. However, as RPA interacts with the GUI instead of application program interfaces, it was not considered to be optimal in all cases. RPA was seen as a cost-efficient alternative where other methods of automation or system integration were not viable. Therefore, RPA was often seen as the last resort for process development.

The informants indicated that RPA as a technology has been maturing. As a result, companies adopting RPA now would no longer benefit from the first-mover advantage. RPA deployment requires relatively

little investment and could be deployed fast. Therefore, without a long-term strategy a mere implementation of RPA would be limited to tactical benefits.

During the interviews three major concerns emerged regarding RPA. First, there is uncertainty associated with the capabilities of RPA. We observed a lack of understanding as to what kind of processes software robots are suitable for. At operative level, employees try to use RPA in all types of processes without considering the current state of the process and what is the best solution for the process development. At managerial level, managers forecast unrealistic cost savings from RPA without considering the context. Also, due to lack of knowledge on software robots and their purpose, employees might have negative prejudice towards RPA and might also experience fear of losing their job.

Second, RPA is considered as a band-aid on processes that have not been automated using back-end system integration due to financial and/or time limitations. As a consequence, there is strong resistance and low prioritization of RPA by IT departments, resulting in delays of RPA development.

Third, the informants raised concerns about RPA monitoring and maintenance. The software robots need constant monitoring and maintenance because they are vulnerable to failures due to changes in IT systems. Furthermore, there are concerns regarding RPA's security, consistency, and ability to deal with complex processes. Currently, RPA tools do not provide sufficient data to closely track robot's activities. As a result, additional tools must be utilized to fill that gap in order to meet, for example, the European General Data Protection Regulation (GDPR) requirements.

4.1.2. Federated governance structure at Telco. At Telco, RPA governance is distributed between two types of centres of excellence (CoE): hub-CoE on group level and spoke-CoE on local level. Telco thus uses a so-called hub-spoke structure (see Figure 1). On group level, the hub-CoE is responsible for providing policies and guidelines for deploying and managing RPA, software license procurement, personnel training, and maintenance of RPA library (a collection of coded rules for software robots). In addition to the hub-CoE, each country office of Telco has its own spoke-CoE, responsible for working closely with business units on developing and deploying RPA, ultimately making sure that RPA projects

generate value for Telco. While business units can initiate projects, and later track RPA performance, implementation of RPA in production environments is restricted to spoke-CoEs.

Telco articulates four distinct phases in an RPA project: initiation, development, implementation, and operation and maintenance (O&M). The business unit is responsible for the initiation phase. The second phase, development, is realized by the spoke-CoE in close cooperation with the business unit. The hub-CoE is strongly involved in the last two phases, implementation and O&M. The hub implements, maintains and monitors RPA in the production environment. However, the business units are the owners of the process operated by RPA. Hence, the responsibility of the last phase (O&M) is shared between the hub-CoE and the business units.

Telco identified four potential benefits for partial centralization of RPA. First, centralization increases the efficiency of maintaining the technical platform and improving the quality of service. Second, centralization of the RPA library allows RPA components from previous projects to be reused in future deployments. Third, the hub-CoE provides standardized training to all business units across Telco. Fourth, centralized management of software licensing helps the hub-CoE to make sure all licenses are up-to-date and, in addition, increase Telco’s negotiating power over RPA software providers such as Blue Prism.

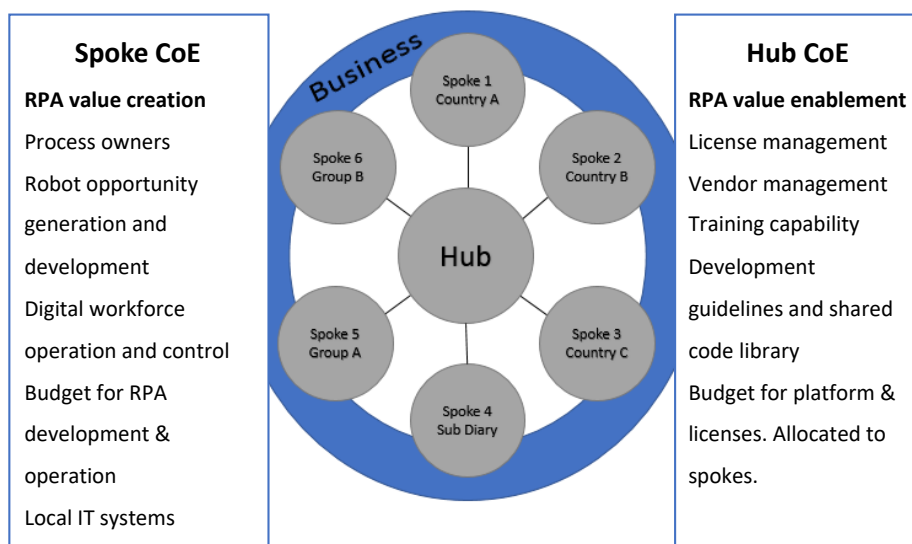


Figure 1. Telco’s federated governance structure

4.2. Advantages of the federated governance structure

All the informants highlighted the advantage of knowledge sharing in the current governance structure. The hub-CoE offers RPA best practices to every spoke-CoE and corresponding business units. All the business units can benchmark the offered best-practices against its own practices to improve their RPA performance. In addition to benchmarking, the best practices serve as a proof of value assessment to business units willing to experiment with RPA. Thus, the best practices provided by the hub-CoE encourages the adoption of software robots across the organization.

“The hub offers best practices for several RPA functions, for example, incident management, change management, problem management, configuration management, event management, request fulfilment, common platform templates, robotics playbook, and development guidelines.” Mark, Program Manager of RPA.

Another side of knowledge sharing is communication between spoke-CoEs where the hub acts as a facilitator. The federated governance structure has enabled the creation of RPA communities among the business units. These RPA communities are encouraged to learn from each other and solve common problems together. As a result of this type of knowledge sharing, every spoke-CoE can benchmark its RPA activities against other units’ best practices, leading, hopefully, to improvements in RPA performance. These communities also enhance problem management as all the key stakeholders from every country, the hub, and the platform provider are included in the conversation.

“The hub brings the best-practices that we can benchmark here in the spoke. Also, this structure enables common events for the exchange of views and best practices. I see that this exchange of experiences is a clear benefit in this structure when we get a community that has same objectives and problems.” Steven, Senior Business Manager of RPA.

“The current governance structure offers a community where we have all RPA developers from each spoke, the hub representatives, and the platform provider representatives. This encourages knowledge sharing and problem-solving.” David, Lead of spoke CoE.

The other advantage of the federated structure was economies of scale. The company believes that centralized management of RPA software procurement enhances Telco's negotiation position with vendors. For example, Telco can push for lower RPA license and infrastructure fees, as well as better service-level agreements. The benefits of economies of scale extend to RPA platform management within Telco. Interviewees highlighted that the structured approach to license management emphasizes cost-efficiency and optimization of RPA usage.

"The [federated] governance structure enables economies of scale on the platform side: operations, license management, cost level, and gives better visibility to other countries' actions." John, Head of Robotic Services.

In addition, the current structure supports the common approach to operating RPA at the group level and ensures that all RPA issues are considered in a broader context. In other words, the governance structure enables the creation of a group level strategy. Furthermore, when all business units use the same RPA tool, components and elements of the RPA robots from the common library can be reused between business units. This would not be possible if all countries used different RPA tools. However, the reusability of software robots' components and elements has not produced the desired benefits, because every business unit's IT landscape differs radically.

"It is good that we can create a common strategy for RPA on group level. We can utilize experiences of other countries when we have standardized approaches." David, Lead of Spoke CoE.

"The common RPA usage enables us to reuse components across business units. However, we have found only one component which has been used in another country." John, Head of Robotic Services.

"We have a common RPA library from which every country can reuse components and elements, but every country has own IT legacies. In practice, no one is able to reuse components and elements made by another country." James, Group Manager of RPA Analyst Team.

Reduced responsibilities of business units turned out to be an advantage of the current governance structure. The spoke-CoEs did not have to build know-how of platform maintenance, as the hub takes

responsibility for discussions with platform and infrastructure vendors. The hub also allocates the budget for platforms and grants licenses to the spokes. This was considered to be as a positive development by the interviewees. The reduced responsibilities leave more time to value-generating actions by the business units which, in turn, accelerates the deployment of software robots.

Furthermore, the hub's control over the maintenance of software robots and quality control were seen as beneficial. Some informants even argued that the quality of service would be higher if the hub also controlled the input into the RPA platform. Some informants indicated that the structured approach to RPA helped with change management. These added legitimacy to the dominant role of the hub-CoE in implementing and maintaining the RPA platform.

“Change Management is at best when it is well controlled, and we make a clear process for it.” Mark, Program Manager of RPA.

On the other hand, flexibility afforded by the federated structure allowed for efficient development of the RPA platform. Local business units have autonomy over selection of processes to be automated with RPA. The challenges of IT legacy systems and process specificities can be investigated and tackled locally, instead of escalating them to the group level. The business units also have the ability to develop a business case based on the local context and find the best match between RPA affordances and local business processes.

“Our business units are significantly different. When we look at a single process, the execution of it varies a lot because every business unit has its own IT landscape. Because we have the federated governance structure for RPA, the value creation prioritization happens in the correct place, in the country in other words. The business case lies in the country and it is a clear benefit resulting from this governance structure.” Mark, Program Manager of RPA.

4.2. Disadvantages of the federated governance structure

All the informants stated that the hub-CoE has had technical challenges with RPA that it had not been able to address fast enough. These technical challenges were related to the building of the common RPA

production environment. Moreover, the hub's capability to respond quickly enough to the spokes' requests had been a challenge at the operative level. For example, one of the spokes was worried about its capabilities to respond to the business units' service requests for developing RPA if the hub's activities are too slow. Another fear emerged in the maintenance phase where one component of a software robot needed to be modified in a cooperation between the hub and a spoke. Due to the slowness of the hub, the spoke was uncertain as to how to respond to the service-level issues originating from the local business units.

“The hub's response time has been a problem regarding the robots' production environment. The spoke responds to the hub's request in a few hours, but the hub's response takes a couple of days.” David, Lead of Spoke CoE.

The federated governance structure has presented challenges in moving software robots from development to the production environment. The process has been inflexible and complex. Developers at the spoke-CoEs have restricted rights on the platform, limiting their abilities to test certain RPA functionality. As a result of these restrictions, the RPA robot has to be moved between the spoke and the hub several times before it can be transitioned from the development environment to the production environment. This, in turn, damages the agility and speed of RPA deployment. Furthermore, spoke developers are not aware of the hub-CoE's RPA implementation schedule, which causes unnecessary ad-hoc planning.

“The spoke's RPA developers cannot test RPA robots in the pre-production environment. We always need to ask the hub to test our RPA robot. Then the hub informs that something needs to be modified in the robot and we can fix it in a couple of hours. After that, we wait for days to be able to test it again. We definitely have challenges in the software robots' development process.” John, Head of Robotic Services.

“At the moment, we do not see which server the hub works on and which robot it schedules. We have had to redesign our processes so that it works with every robot and server. We need to request all the user IDs for every robot because we do not know what robot the hub schedules. We need to do a lot of extra planning.” Michael, Business Development Manager of RPA.

Other commonly raised challenges were related to the lack of cooperation between key stakeholders and the lack of clarity in roles and responsibilities. Communication between the hub and the spokes has not been sufficient. This has weakened the development of RPA robots and crippled developers' ability to address technical problems. In some cases, the hub and the spoke duplicate development work due to lack of communication and real-time collaboration. The schedules of the hub and the spokes are mismatched, which makes joint work on technical problems difficult.

“The lack of communication is a big challenge. In some cases, the hub has tested the same robot for five weeks after us, but we have already made the same tests.” Linda, Business Development Manager of RPA.

“At the moment the hub can serve poorly local technical needs. We tried to tackle this with a technical meeting, but we have only managed to organize two meetings out of 20 attempts. Susan, Head of Customer and Order Management in IT.

The development has suffered from unclear roles and responsibilities. People involved in the process do not clearly know what their roles and responsibilities are. This leads to confusion, resulting in tasks with no owner. In addition, the findings uncovered problems with lack of involvement of local IT departments in RPA development. This resulted in RPA developers having to focus on traditional IT infrastructure planning, support, and security, which would normally be handled by a local IT department.

“Nowadays assignment of roles and responsibilities is improving. Previously, there were not clear responsibilities and roles between local IT and the hub which led to the omission of tasks.” David, Lead of Spoke CoE.

The centralized RPA platform slows down some aspects of software robot development. When the hub needs to introduce new features, requested by the spokes, to the *golden image* (the centralized virtual desktop infrastructure for the RPA robot development), all RPA environments have to be tested against these changes. This brings complexity in responding to requirements of local business units. Developers at

spoke-CoEs also do not see the benefit of having to incorporate their features to the main RPA platform, or being exposed to the changes implemented by other spokes.

“A concrete example of the standardized, common platform comes from the golden image changes. When it is planned, it causes a big test episode in the development, the preproduction, and the product environment, and tests of completed robots. It takes a lot of time.” John, Head of Robotic Services.

“I do not see benefits of including all RPA components in the development environment. It is very chaotic. In addition, this has caused unexpected challenges when local IT change has impacted on other country’s RPA robot’s functionality and it has broken their processes.” Michael, Business Development Manager of RPA.

Another disadvantage has arisen from centralized RPA training. The hub enables common RPA training to all the business units. The group has outsourced the RPA training to a third party, which provides non-customer specified RPA training. Thus, the outsourced training often fails to fit local contexts. The generic training does not provide enough details on RPA operations.

5. Discussion on the unexpected challenges in benefit realization

Based on our analysis of the interview data, we identified some unexpected challenges in benefit realization of the federated governance structure at Telco. We next report these challenges and discuss how the company addressed them.

5.1. Difficulties in reusing RPA components and elements across business units

The decision to centralize RPA management on the IT policy level enables strategic unification and governing at the group level. In the decentralized approach, this may be difficult as standards can become fragmented and difficult to impose (Willcocks *et al.*, 2015). Standardization should allow for greater alignment at the strategic level and enable a company to reuse components of RPA in different projects. This was an expected advantage from the federated governance structure at Telco. However, this has not materialized at the level that Telco had estimated. The spoke-CoEs have noticed that it is very difficult to

reuse RPA components across business units, as IT legacy systems, and practices vary widely from one business unit to another.

In addition, over time, a centralized RPA library accumulates a lot of RPA components that are useless to most RPA developers in a company. This makes it even harder to find useful components that could be scalable. That said, our case company did succeed to scale some of the features developed in local business units. The challenge is to develop an RPA library management system that would help developer to efficiently navigate and identify the components that would be useful.

5.2. Difficulties in striking a balance between centralization and local needs

The core idea behind the federated governance structure is the improved capability to react to local needs compared to the centralized structure (Lewis, 2004; Weill and Ross, 2005). Thus, RPA being sensitive to the local needs of the business units should be benefiting from the federated structure. However, our case study has presented a mismatch between centralized policies and local needs. This has manifested in three issues.

First, while the local units have independence when it comes to initiating a project and specifying requirements, the hub-CoE holds control over the licence acquisition, technical implementation, and maintenance of the central systems. This may result in a mismatch between the speed of development at hub-CoE and project progress at local units. Based on our findings, the hub-CoE often became a bottleneck due to the slow response times to requests from local business units. This damages local projects and undermines the benefits of centralized control over the technical aspects of RPA.

The second issue was information asymmetry between the hub-CoE and local units. The hub-CoE did not interfere with local projects in order to avoid restricting spoke-CoEs and local business units. The hub-CoE also did not consider that they would have sufficient knowledge of ongoing projects to manage them closely. An unintended consequence of this strategy was a diminished level of collaboration between business units and the hub-CoE, as well as an increase in the confusion regarding the division of responsibilities. This has resulted in work duplication and project implementation delays. The information

asymmetry also contributed to the challenge discussed in Section 5.1.1. above, as the informants argued that there was a lack of awareness of what different components of RPA did, and how they changed as the RPA project progressed. Earlier research has highlighted the importance of IT department's involvement in the RPA development (Willcocks *et al.*, 2015), but Telco has been relatively unsuccessful in the buy-in of the local IT departments. As a result, local IT does not take enough role of the traditional IT tasks and this was seen as hindering the development of RPA. This challenge was not expected at this level in the case company and the finding underlines the existence of the stakeholder buy-in risk, which was also pointed out by Hindle *et al.* (Hindle, J., Lacity, M., Willcocks, L., Khan, 2018).

The third issue was related to centralised training. The centralized RPA training offered by the hub-CoE has not brought the expected benefits. The hub has outsourced the RPA training to a third party, which provided generic training on RPA development. This training often disregarded the context and the specific needs of the local units. The training was also perceived too intensive and too short for personnel to be able to understand and apply the acquired information in practice. As a solution, the business units had to provide their own RPA training that fitted better into their local context, was less expensive, and of higher quality.

6. Conclusions, limitations and further research

In this paper, we set out to study how to set up a federated governance structure for a lightweight IT tool such as RPA and to shed light on the advantages and disadvantages associated with it. To this end, we conducted a case study and reported how Telco organized around RPA (Section 4.1.) and identified advantages and drawbacks (Sections 4.2. and 4.3.).

Our findings lend support to earlier studies that argued for the federated approaches to use standardized shared services in situations where they can provide economies of scale (Weill and Ross, 2005). Telco's approach to RPA governance was similar to the bi-modal model mentioned in earlier literature (Bygstad and Iden, 2017). Our informants viewed that their approach increases cost-efficiency and negotiation power through the centralized purchasing and license management, while giving flexibility of customizing RPA

on the unit level. The federated governance structure did not come without its challenges. We discussed two unexpected problems in benefit realization: the inability of Telco to reuse the RPA components despite the federated governance structure geared towards reusability, and Telco's challenges in striking the right balance between centralization and local needs.

Like most empirical studies, ours is not without its limitations. First, through this single case study, we were only able to provide a snap shot of the benefits and challenges associated with the federated IT governance structure in one company. Further research could investigate whether the challenges outlined in this study emerge in companies operating in different geographical contexts and industries over time. Second, our case company employed one brand of RPA: Blue Prism. Further research could investigate whether these advantages, disadvantages and unexpected problems in benefit realization are tool-agnostic, i.e. investigate whether the RPA system provider selection has an impact on the outcome. Third, while our empirical data corpus is limited to eight interviews, we feel confident that we found the relevant informants within our case study. Further research could attempt to provide a more holistic view by interviewing executives, managers, and operative employees. Finally, there are many forms of federated governance and the conceptualization of federated governance is prone to be context specific. Further research could investigate the nuances of the concept of federated governance in RPA and distinguish different types of federated governance and these types are associated with outcomes (such as performance) from RPA deployment.

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