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Assessment of the impact of automation implementation in the context of business agility in a transnational Fintech company

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Resumen: La agilidad empresarial se ha definido como la capacidad de las organizaciones para detectar y responder rápidamente a los cambios ambientales turbulentos, que pueden ser causados por las necesidades de entrega de productos, la agitación del mercado debido a las cambiantes demandas de los clientes o los avances debidos a las tecnologías emergentes para la transformación digital. Esta investigación tiene como objetivo evaluar el impacto de la implementación de procesos de automatización en el contexto de la agilidad organizacional en una Fintech transnacional con presencia en Costa Rica. Se llevó a cabo la planificación y capacitación de los líderes de más alto rango en la organización y se definió una estrategia para la implementación del modelo ágil, se establecieron flujos de trabajo, tribus, escuadrones, capítulos y gremios. Posteriormente, se identificaron oportunidades de mejora y optimización y se definieron prioridades de acuerdo con el impacto en el ahorro. De las 206 mejoras propuestas, 87 requirieron automatizaciones en uno de los siguientes temas: RPA, automatización de pruebas, integración continua, secuencias de comandos o flujos de trabajo de entrega continua. Se implementaron 23 automatizaciones, generando un ahorro total de 6.052 horas netas de trabajo, lo que corresponde a 32 asociados a tiempo completo. Las mejoras reportadas corresponden a procesos de desarrollo o implementación de software financiero, que representan horas de trabajo capitalizables, afectando positivamente la optimización de la ganancia y eficiencia de la organización. La implementación de un modelo de negocio ágil fomentó la identificación de oportunidades de mejora y se demostró la optimización de entregables e ingresos. Es necesario continuar con el desarrollo del modelo para lograr todos los beneficios y un nivel estable de madurez en los procesos.

Palabras claves: agilidad empresarial, Automatización, RPA (Automatización robótica de procesos), transformación digital, Integración continua, Entrega continua.

Evaluación del impacto de implementación de automatización en el contexto de agilidad empresarial en una empresa Fintech transnacional

Abstract: Business agility has been defined as the ability of organizations to quickly sense and respond to turbulent environmental changes, which may be caused by product delivery needs, market turmoil due to changing customer demands, or advances due to emerging technologies for digital transformation. This research aims to evaluate the impact of the implementation of automation processes in the context of organizational agility in a transnational Fintech with presence in Costa Rica. Planning and training of the highest-ranking leaders in the organization was conducted and a strategy was defined for the implementation of the agile model, work streams, tribes, squads, chapters, and guilds were established. Subsequently, opportunities for improvement and optimization were identified and priorities were defined according to the impact on savings. Of the 206 proposed improvements, 87 required automations in one of the following topics: RPA, test automation, continuous integration, scripting, or continuous delivery workflows. 23 automations were implemented, generating a total saving of 6,052 net work hours, which corresponds to 32 full-time associates. The reported improvements correspond to financial software development or implementation processes, which represent capitalizable hours of work, positively affecting the optimization of profit and efficiency of the organization. The implementation of an agile business model fostered the identification of improvement opportunities, and the optimization of deliverables and revenue was demonstrated. It is necessary to continue with the development of the model to achieve the full benefits and a stable level of maturity in the processes.

Keywords: Enterprise Agility, Automation, RPA (Robotic Process Automation), digital transformation, Continuous Integration, Continuous Delivery.

INTRODUCTION

Organizations face a turbulent, complex, and challenging technological environment. Such reality is due to rapid development of technology in an emerging industrial environment, versatility in customer demands, cybersecurity challenges due to obsolescence, and intense competition in the market. Therefore, the situation has caused a paradigm shift from traditional methods towards enabling emerging technologies for digital transformation, stability, and business continuity (Williams and Olajide, 2020).

Verbaan and Silvius (2012) mention that, when adapting to a dynamic technological environment, organizations must ensure that they can cope with unprecedented changes to survive. This can be done by capitalizing on their adaptation to changes, increasing their level of productivity to maximize efficiency and reducing their level of complexity caused by the development of information technologies (IT) and computer systems (IS). This process is known as Enterprise Agility (EA) (Fayezi *et al*., 2020).

Agility is a common term in IT systems and may seem like the primary competitive means for organizations in an ambiguous technical environment. According to research conducted by Wong (2020), business agility has been defined by various academics and professionals in the field of IT and IS regarding organizational process and performance as the ability of organizations to quickly sense and respond to changes. turbulent environments, which may be caused by market upheaval due to huge increase and change in customer demands or due to advancements due to emerging technologies for digital transformation.

If information and communication technologies (ICT) are used intelligently in companies, this translates into the ability of participants in a value chain to interact fluidly and electronically, thereby reducing manual data processing, as it becomes increasingly obsolete (Wiechmann *et al.,* 2022). In accordance with Wong (2020), the ability to operate in global and digital value chains means that entirely new markets can be opened, which in turn leads to innovations. The interconnection of the above boundaries between production stages and companies allows a constant flow of information, which can provide a benefit. If the intelligent use of technologies is successful, all the measures considered will lead to a digital transformation, an optimization of organizational processes, an improvement in performance, along with the transformation of business processes related to products, supply chains, and operational processes.

Likewise, technologies bring organizational structures and management concepts to the forefront of transformation, which must be specifically controlled and coordinated to ensure the successful integration of digital concepts. This further implies that a structured alignment must be achieved between previous business strategies and future digital solutions. According to Cai *et al.* (2022), in Fintech companies, the most successful strategy, the one associated with a high increase in performance, is the one that manages to align the commercial strategy with the IT strategy. Due to the constant optimization of ICT and global connectivity achieved through standard protocols, companies are using digital

technologies and adapting business infrastructures or restructuring processes to enable multifunctional global working regardless of time or distance.

When introducing a digital transformation strategy, a key point to consider is the use of appropriate technologies and the ability to use them correctly to allow the generation of value (Tortorella *et al*., 2020). A company can create technology standards itself or access standards to use technology to optimize business processes. From the perspective of organizational theory, the term "Agility" refers to a form of robust, flexible, and customer-oriented organizational design.

According to Wong (2020), it is of great importance for a company to determine what prerequisites and foundations are necessary for success regarding the use of agility in production and overall organizational structures. Ozbayrac (2022) explains that, to ensure the existence of an organization, the highly complex task of continuing to maintain the existing business model is needed, while simultaneously applying the concept of flexibility, in a practical sense, and, if necessary, testing and scaling new business models. Consequently, flexibility aims to weigh in which cases the use of agile concepts provides an increase in efficiency, as well as where, when, and to what extent management principles, organizational forms, and agile methods provide added value.

BIBLIOGRAPHIC REVIEW

Organization context

The Fintech Inc. company is a global provider of financial services technology. The company's clients include banks, thrifts, credit unions, stockbrokers, leasing companies, and retailers. In October 2015, American Banker and BAI ranked the company third by revenue among technology providers to American Banks. Fintech Inc. reported total revenue of $5.51 billion in 2016. Additionally, Fintech Inc. has been named Fortune World's Most Admired Company in 2022 and, for the sixth consecutive year, has earned this recognition; as well as nine times in the last eleven years.

The company is proud of its mission to enable clients to achieve best-in-class results by driving quality and innovation in payments, processing services, risk and compliance, customer management, as well as channels, perspectives, and optimization. For its part, the organization's vision is to be a global leader in transaction-based technology solutions. In turn, it has a board of directors, a financial head, and a group of executives from different departments, such as: Administration, Legal, Information, Sales and Digital Services, Investment Services, Human Resources, and Solutions for cooperatives. All the above are also subdivided into smaller business units. For all operations worldwide (excluding the United States), the branches are grouped within the group called "Global Services", which provide distinct types of services to the main business units. That is, Global Services is a decentralized service that addresses several types of business needs. In Costa Rica, the company has operated since 2004 and has more than 600 employees who collaborate with multiple branches of the organization, mostly in the United States, but also in Latin America and Europe.

Importance of financial technology

According to Singh *et al*., (2021), financial technology (FinTech) is an evolving concept that has previously produced little historical evidence or statistically considerable time series data for analysis. However, it has seen tremendous upward growth since 2018 with the influx of global investments reaching a sum of almost $60 billion (Arslanian and Fischer, 2019). Furthermore, according to Bhat *et al.,* (2022), financial transactions through smart wearable devices are also anticipated to exclusively reach $75 billion by 2025. In this context, Fintech offers innovative methods of financial transactions and banking services by adopting modern computer communication technology, data science, networking, and artificial intelligence (AI). Furthermore, Fintech primarily relies on the Internet of Things (IOT), blockchain, AI, data analytics, and 5G, and beyond (B5G) to make financial services easier to use, as well as more secure and efficient.

According to Gupta and Tham (2019), there are two main reasons for the sudden rise of Fintech, firstly, the evolution of new computing and technological paradigms, such as the Industrial Internet of Things (IIOT), smartphone applications, cryptocurrencies, digital twins, 5G, virtual reality (VR) and augmented reality (AR), and AI. These function as a catalyst in the growth of digital finance. Second, these technologies enabled financial institutions to address customer demands in a newer and more efficient way than conventional methods (Butler, 2020). Furthermore, one of the key benefits of Fintech is automation; therefore, compared to traditional financial services, customers will have greater freedom to operate and control their account autonomously by integrating financial data with technology. However, true implementation of Fintech requires highly reliable and secure internet connectivity, a device to support multi-modal data, network scalability, storage, processing, precise localization, intelligent decisions, energy efficiency, and data processing and analysis capabilities, to name a few key factors (Tyagi and Boyang, 2021).

Likewise, Kowalewski and Pisany (2022) confirm that FinTech companies may encounter obstacles to their development in the quality and rigor of regulations. Furthermore, they explain that the technological adoption of countries is important, since technological advances, the quality of research and the level of collaboration between academia and industry are positively related to the development of organizations at the local and regional levels.

Organizational agility

Currently, companies operate in a very changing environment, which requires them to find quick, creative, and innovative solutions to adapt to said environment, this leads to the idea of modeling towards an agile organizational form. In today's competitive and fast-moving business environment, it is necessary to react quickly to changing market conditions (Reinhardt, 2020). Agility represents a promising option to overcome these challenges. The path to an agile organization represents a development process that requires consideration of countless levels of the company. For their part, organizations must have high speed in decision-making, flexibility,

and adaptability. However, they must also have a workforce that is highly qualified, creative, responsible, and capable of working well as a team. All aspects listed above are attributes of organizational agility (Wiechmann *et al.,* 2022).

If information and communication technologies (ICT) are used intelligently in companies, this translates into the ability of participants in a value chain to interact fluidly and electronically, reducing manual processing of data, rendering it increasingly obsolete. According to Gonçalves *et al.* (2021), the ability to operate in global and digital value chains means that completely new markets can be opened, which in turn leads to innovations. The interconnection of the above boundaries between production stages and companies allows for an uninterrupted flow of information and it is essential to benefit from the continuous provision of this (Ridwandono and Subriadi, 2019). If the intelligent use of technologies is successful, all the measures considered will lead to a digital transformation, an optimization of organizational processes and an improvement in performance (Hoonsopon and Puriwat, 2021).

In addition to the transformation of business processes related to products, supply chains and processes, the introduction of digital technologies brings organizational structures and management concepts to the forefront of transformation. Organizational transformation must be specifically controlled and coordinated to ensure the successful integration of digital concepts. In turn, the independent factors of digital transformation led to complexity that must be coordinated. A structured alignment must be achieved between previous business strategies and future digital solutions (Gonçalves *et al.*, 2021). The most successful business strategy, which is associated with a high increase in performance, appears to be aligned with the IT strategy (Goswami and Mansi, 2022). Due to the constant optimization of ICT and global connectivity achieved through standard protocols, companies are using digital technologies and adapting business infrastructures to the digital age, or restructuring processes to enable multifunctional global working, regardless of time or distance (Liu *et al*., 2022).

When introducing a digital transformation strategy, a key point to consider is the use of appropriate technologies and the ability to use them correctly for the purpose of enabling value generation. According to Kumkale (2022), a company can create technological standards itself or access standards to use technology to optimize business processes (Hoonsopon and Puriwat, 2021). From the perspective of organizational theory, the term "Agility" refers to a form of lean, flexible, and customer-oriented organizational design (Kumkale, 2022). As Walter (2020) explains, it is vitally important for a company to determine what prerequisites and foundations are necessary for success with respect to the use of agility in production and overall organizational structures. Likewise, to ensure the existence of an organization, the highly complex task of continuing to maintain the existing business model ("exploitation"), but at the same time applying the concept of ambidexterity, in a practical sense; and, if necessary, test and scale possible new business models, they must be mastered. Consequently, ambidexterity aims to weigh in which cases the use of agile concepts increases efficiency; as well as where, when and to what extent

agile management principles, organizational forms and methods provide added value (Miller and Kirkpatrick, 2021).

According to Ozkan *et al.* (2020), agility at scale goes beyond adding more agile teams and practices at the level of work groups, as the broader operating model, the connective tissue between teams, also needs to be transformed. Therefore, organizations that drove highly successful agile transformations ensured they did so by creating an effective and stable backbone. This means optimizing the entire operating model through strategy, structures, processes, people, and technology, seeking flat and fluid structures built around high-performance multifunctional teams, by instituting more frequent prioritization and resource allocation processes, thereby building a culture that enables psychological safety and decoupling technology stacks. Business agility is therefore a paradigm shift away from multi-layered reporting structures, rigid annual budgeting, compliance-oriented culture, separation of business and technology, and other traits that have dominated organizations over the last hundred years. If this is true, and not just an exaggeration, a discontinuity of this magnitude should provide an opportunity for organizations to turn their operating models into a competitive advantage, as early adopters of Lean did in the 1990s (Walter, 2020).

Organizations that are highly successful in scaling business agility have taken some actions that, according to Eilers *et al.* (2022), can favor the performance of the model. Accordingly, it should be iterated in short-range stages with increments that allow progress to be generated without unbalancing daily work. The first step is to ensure teams are ready to increase their chances of success by 15 percent. Before launching, it is important to ensure that there is a thorough understanding of what agility is and what it is not. This is important to obtain deep buy-in from the entire group of leaders and prepare them to manage change. A deep understanding can be achieved in several practical ways, such as visiting other organizations, talking to colleagues about agile working, and understanding enterprise-level concepts through simulations.

In the second iteration, the organization must be intentional and find the value to give itself an additional 25 percent boost. This means making a concerted, delegated, and sustained effort from the top, and clarifying how the organization creates value, where and how agile it could help (for example, to enable working across functions), and then capturing the opportunities. There are many ways to be intentional: some organizations do it all at once and others execute the transformation in waves. Larger organizations tend to train their leaders in different business units to execute localized transformations. In all cases, senior leaders must model behaviors and mindset changes and dedicate sufficient time to the transformation. Research by Miler and Gaida (2019) shows evidence that following an unstructured, overly exploratory, bottom-up approach, without clear direction and leadership commitment, hurts their chances of success. It is not possible to pilot your way to scaled agility. While a general enthusiasm, however agile, rarely translates into scalable impact without decisive leadership and action from the top.

The organization must go beyond agile teams, it must build the connective tissue by driving change in all five elements of its operating model to add an additional 15 percent of momentum to its chances of success. Enterprise-wide agility is about more than just more agile teams; changes are required across the entire operating model to accelerate teams and bring all parts of the new configuration together to reinforce each other. Unfortunately, many attempts to make incremental changes by reconfiguring their operating model, for example focusing on ways of working, changing reporting structure, or adopting new technology. However, what distinguishes the most successful ones is that they see their operating model as a system and reconfigure all its parts: strategy, structure, process, people, and technology.

In the next iteration, you should maintain high speed and use the highest-performing teams to increase another 20 percent. Highly successful transformations tend to complete the main phase in less than eighteen months (Mordi and Schoop, 2020). For larger organizations, the journey may consist of several stages, each covering a specific part of the business (for example, a single country or business unit), each executed in less than eighteen months. Those who take much longer increase their chances of success. Additionally, successful transformations tend to launch top candidates early, for example, moving the first hundred people to agile teams early in the transformation to signal commitment and begin the learning that informs iterative improvement.

Automation in the software development industry

According to Donald (2020), intelligent automation allows business and technology to work together for a common goal, instead of working against each other. Robotic process automation, continuous delivery automation, and *software testing*, as well as artificial intelligence, are considered the main axes, which are applied cohesively with business process management to achieve strategic objectives (Wyatt, 2019). While robotic process automation involves the use of *software robots* to handle high-volume, rule-based repetitive tasks, artificial intelligence enhances the user's ability to solve business problems by simulating human cognition using different algorithms, e.g., machine learning, natural language processing and computer vision (Jędrzejka, 2019; Hoda, 2019; Bhat *et al*., 2022). Finally, automation in continuous *software delivery* allows an approach to redesigning action mechanisms to improve the efficiency and quality of processes and eventually contribute to the agility of organizations (Syed *et al*., 2020). For this purpose, elements that are grouped in the DevOps or DevSecOps philosophy are used, as explained by Salameh and Bass (2020).

According to Murinde *et al*. (2022), technology trends in FinTech are clear: automation, artificial intelligence, robotics, and integration technologies will change the way knowledge-based work is done. The technology that is powering this new reality is related to: the automation of tasks, the unlocking of data, the collection of information to help in decision making, and, in general, the simplification of doing business with a bank (Jędrzejka, 2019). All this is aimed at providing benefits to both banks and clients, such as greater efficiency, better customer experience, as well as reduced risk and decreased onboarding times.

Barroso and Laborda (2022) establish as a general prediction for the financial sector that disruptive technologies will replace workers. However, the trend within the customer lifecycle management space is less about replacing people and more about leveraging the experience of bank employees to complement the benefits that newer technologies can provide. For example, in a creator and verifier scenario, bots become the creators, and the human becomes the verifier through supervised learning of user actions (via machine learning) instead of an engine. of static rules (Gonçalves *et al*., 2021).

The key difference between "traditional" fintech investments and "new" ways of introducing technology into finance, according to Murinde *et al*., (2022), is that older technology implementations focused on creating more streamlined operations profitable and achieving efficiencies through automation, while FinTech is more aimed at rethinking everything: business processes and introducing new business models in finance. Brunton (2019) mentions that some commentators and authors have described FinTech as the "Research and Development function of financial services in the digital world." Another key feature of recent growth in the FinTech industry has been the particular attention that entrepreneurs and investors, outside of financial services (and mostly from the technology world), have paid to the financial industry to take advantage of existing inefficiencies and "disrupt" the status quo (Zachariadis, 2020).

Likewise, the benefits of financial automation are numerous, Pedersen (2020) lists some aimed at greater accuracy, better customer service, and reduced costs. These are the main benefits of automation in the financial industry:

1. Time saving
   Account reconciliation and variance analysis are two manual activities that can require a lot of time and effort. However, it is no longer necessary to perform tasks manually thanks to modern accounting systems. However, the movement of components and supplies for these systems, as well as their processing flows, may not be in a complete state of digitization or automation.
2. Ensure greater consistency
   Despite widely accepted best practices, many people on the finance team have unique methods for accomplishing tasks. Even common practices, such as double-entry accounting, can vary from person to person. Process automation improves team cohesion and reduces the likelihood of errors and information gaps.
3. Error reduction
   By automating data collection, it is possible to have a complete view of all the moving parts of financial pipelines, such as contracts, invoices, and supplier data, without having to switch between multiple programs or manually sort data.
4. Improved collaboration
   The focus should be on making it easy for anyone to submit a request and making tracking, viewing, and reporting even easier. Your operations will be more consistent with custom forms, and you will have less to worry about every day with emails and enabled notifications.
5. Simple implementation
   New-age automation solutions are noticeably easier to install compared to complex systems that require a dedicated workforce. For example, the

AI-powered RPA solution that works without code, making it extremely easy to set up.

According to Sironi (2021), well-informed financial institutions understand the strategic importance of adjusting their business models to put customers (humans, in a broader and ethical perspective) and not products or transactions at the real center of the new commitment model. So financial services are incorporated into non-banking contexts to expand the relevance of offerings, initiating new design thinking processes based on customer needs as opposed to traditional bankers' perspectives. This is why automating *software delivery* implies ease of implementation of continuous improvement, since processes are automated and complemented with data analysis models, thus creating competitive advantages for the FinTech sector in the following years.

METHODOLOGY

This research has a mixed approach, where data is collected, integrated, and analyzed qualitatively and quantitatively (Tracy, 2019; Aityan, 2021; Schindler, 2021). Likewise, the elements implemented to achieve organizational agility are qualitatively described through workshops with company leaders and the dimensions on which work groups are defined are documented. Subsequently, the organizational changes required to achieve the defined objectives are documented and the contribution of automation projects is quantitatively evaluated with a view to achieving business agility.

Components of organizational agility

To determine the components required at the organizational level, work groups were defined made up of leaders and experts in different technical and operational areas of the organization such as: Customer Service, Professional Services, Data Analysis, Software Development, Implementations, Infrastructure, and Automation. At the same time, they focused on evaluating training needs in agile work methodologies through analysis workshops. Subsequently, a plan was defined to implement the necessary training, so that all high-level leaders in the organization (vice presidents, directors, and senior managers) were involved. Once the learning stage of the upper leadership layer was completed, an organizational strategy was defined by forming work groups and a baseline was defined for each work domain. Changes in methodologies and processes required to capitalize on the proposed improvements were documented.

To deliver the necessary training, a general list of associates was built and, according to the criteria of the high-level leaders trained in the first stage, each of the logical work groups was prioritized and trained in Agile methodologies, Fundamental DevOps, DevOps Product Owner, Scrum@Scale, and Business Agility. Subsequently, the training process began in groups until all the associates involved were included.

Change in organizational culture

The key elements that can facilitate an agile transformation throughout the company were defined according to the following practices (Miller & Kirkpatrick, (2021):

- Development of a shared purpose that groups clients in a functional way and not following artificial hierarchies, in such a way that the greatest value is provided to clients.
- Implementation of an agile team culture that increases communication within teams and decreases communication between groups.
- Adopting a product mindset versus a project mindset to facilitate incremental progress and faster learning.
- Identifying ways to include more perspectives at the start of new projects, making it easier for all associates to train in all roles.
- Creating a business development workflow that allows a team to deliver value in small increments.

Likewise, virtual groupings were defined as ones that reflect interest groups and not lines of organizational command to strengthen work areas with common problems and solutions. This virtual organization was assigned the objective of identifying the cultural changes required by identifying opportunities, as well as the corresponding actions to implement the necessary adjustments. The leaders of each of these virtual groupings constitute the governance workflow. To define the virtual groupings and the workflow, the "Spotify" model was applied, as documented by Salameh and Bass (2020), which consists of the formation of squads, tribes, chapters, and guilds, described below. In Spotify's model, each squad will be aligned with a mission, product strategy, and goals. Additionally, alignment will be created by product to facilitate the creation of expertise in specific areas. Likewise, alignment can be generated by using an adaptive structure, which is based on a two-dimensional matrix; While the vertical structure is represented in the squad and tribe communities, the horizontal structure is represented in the chapter and guild communities (Ridwandono and Subriadi, 2019). This is highly beneficial to create the necessary momentum in the organization to aim towards common delivery objectives despite working with various products, since the practices can be adapted to each need.

Squads

A squad is described as the most basic development unit and is the most familiar to PMs who have worked in "typical" agile teams. Each squad is designed to function independently, with all the skills necessary to build a product (design, testing, engineering, etc.). Teams organize themselves and each squad can choose the framework that best suits them, which could be Scrum, Kanban, or whatever fits the group's interests. This allows teammates to work in a way that best suits them, maximizing their productivity and making their work lives easier.

Each squad has its own long-term mission and owns a particular portion of the overall product. While leadership does not dictate how squads work toward that

goal, squads are encouraged to employ lean product principles like A/B testing and MVP publishing. Additionally, squads have agile coaches to help them understand how to build the right way, as well as a product owner who helps their teammates prioritize their tasks.

Tribes

Squads are designed to function on their own, but that does not mean they work in isolation. Squads are organized into relevant tribes based on the part of the product they are working on, for example: back-end infrastructure. While there is no official hierarchy, the tribe leader is assigned to each tribe and makes sure everyone has what they need to thrive. In turn, tribes are designed to include large groups of people to keep the organization manageable, and informal meetings are held regularly so that everyone has a chance to stay up to date with what other squads are doing. It is important to note that crossover between squads is inevitable, which creates certain dependencies, which slow down teams, something the model aims to reduce as much as possible. This helps eliminate development bottlenecks and keeps things moving at high speed.

Chapters

Members of different squads with similar skills or working on similar problems form cross-squad chapters. Chapters will meet regularly for the purpose of staying up to date on what they have been working on, as well as to share solutions to common problems. This frequent knowledge sharing ensures that there is useful communication between squads and helps their members to innovate together.

Guilds

The guilds are a little less organized. Where chapters are based on an individual's official role within their squad, guilds are more general areas of interest. For example, testing, automation, infrastructure, etc. Everyone directly involved in testing will join the guild, but even those who do not need it for their daily work, but are simply interested in it, can also join to learn.

To evaluate the penetration of the methodology, a count of collaborators who participated in the training corresponding to business agility and their involvement in related activities was conducted on a scale of zero to five. So, the minimum value represented no participation, one represented very low participation, two implied a low level of participation, three and four represented a medium level, and five represented involvement in three or more initiatives with results accounted for and verified. Additionally, the implementation phase of the process, in which these initiatives are located, was qualitatively documented: discovery, design, execution, testing, adoption, queued, discarded.

Evaluation of critical automation projects

Once the virtual work groups were formed, the opportunities for improvement in performance were listed and classified according to the value assigned based on the business interest declared by the customer as highest impact. From this group of options, all initiatives that required automation were chosen and classified according to the topic of interest. In addition, a complexity analysis and benefit weight were defined and applied to each proposed initiative to define priorities. Subsequently, work squads were formed within the automation union and assigned according to the defined topic and the identified priority. For each initiative, the impact on operations was documented, for which the reduction in effort of work hours (which can easily be converted into cost) or the increase in efficiency in the process of interest was recorded.

The general hypothesis proposed is defined below: There is a significant positive impact of automation projects given the context of business agility. The measurement and data collection were conducted directly, by recording the automation issue and the reduction on hours of savings in the recorded process.

ANALYSIS OF RESULTS

The organization's leaders were trained in business agility models and once the training and workshops process was completed, the workflow structure to be used in the organizational agility implementation process was defined (Figure 1). Likewise, the following workflows were identified: Governance, Culture, Organization and Processes, Training, Communications and Data, and Information. Subsequently, four tribes were defined: Implementations, Professional Services, Customer Service and Operations for a total of 29 products or services. In addition, four guilds were defined: Automation, Innovation, Architecture/Cloud and Data, and Information.

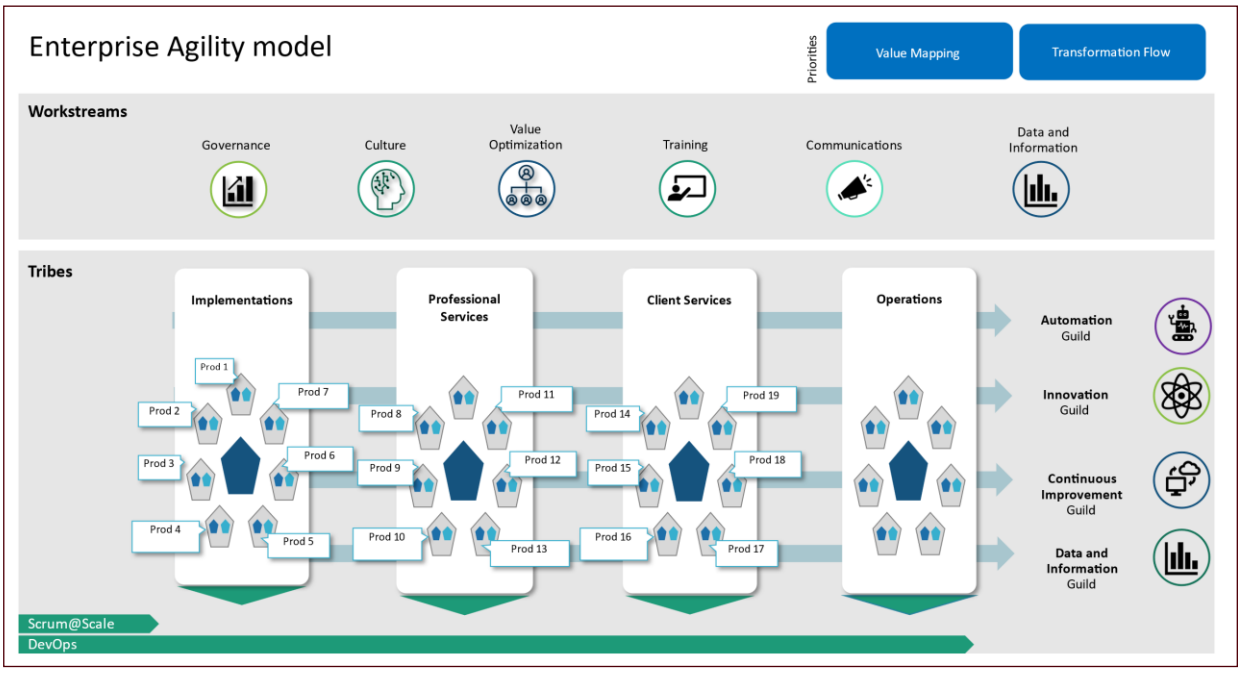

Figure 1. Definition of workflow, tribes, and guilds for implementation of organizational agility in a Fintech company. Source: self-made.

A total of 26 business units with a total of 481 associates at the time of preparation of this report were considered for this study. Of those, 170 had completed DevOps Fundamentals training; 101, DevOps Product Owner and 399, Scrum@Scale and business agility (Table 1).

Table 1
Distribution of participants in business agility training in a Fintech company during the year 2022.
Source: own elaboration.

Unit of business	Total associates	DevOps Fundamentals	%	DevOps PO	%	Scrum at Scale	%
APBS	5	3	60 %	2	40%	5	100%
APCUS	12	8	67%	5	42%	10	83%
A.N.	31	18	58%	9	29%	20	65%
C.S.	9	3	33%	3	33%	5	56%
CSTO	7	1	14%	2	29%	5	71%
CSI	5	1	20%	1	20%	5	100%
CBSD	12	10	83%	4	33%	10	83%
CBSPS	16	3	19%	6	38%	14	88%
CRLITCUCS	24	6	25%	8	33%	14	58%
DLO	10	5	50 %	4	40%	8	80%
DSCOASPDCCS	10	3	30%	3	30%	8	80%
DSAI	24	7	29%	7	29%	12	fifty %
DSCOASP	8	3	38%	2	25%	8	100%
DSCOASPPD	6	2	33%	1	17%	6	100%
DSDC	71	17	24%	14	20 %	62	87%
DSMCOMO	14	2	14%	3	21 %	12	86%
DSSS	5	4	80%	1	20 %	5	100%
ECMMS	12	6	50 %	3	25%	12	100%
FCR	2	2	100%	1	50%	2	100%
FCR	4	2	50%	1	25%	4	100%
FTSFTS	97	43	44%	15	15 %	85	88%
GSCRMT	22	18	82%	6	27%	22	100%
HRCR	5	3	60%	1	20 %	5	100%
M.D.	eleven	7	64%	4	36%	10	91%
PRSEP	23	12	52%	5	22%	20	87%
PRSFRMS	36	30	83%	10	28%	30	83%
Total	**481**	**170**		**101**		**399**	

Regarding the level of penetration, the highest value was found in CBIS-DEV with a value of five and the lowest was shared between DSDC and PS-FRMS (Table 2).

Table 2

Degree of involvement (Count of areas of participation of an associate) by work group within the business units. Scale evaluated from zero to five, where zero is the lowest degree of involvement and five is the highest. See methodology for more details. Source: self-made.

Workgroup	Degree of involvement
A.N.	4.50
C.S.	2.67
CBIS Dev	5.00
CBS PS	2.00
CS-IT	2.14
DLO	4.00
DS-COASP	3.00
DSAI	3.00
DSDC	2.00
DSMCOMO	2.00
DSSS	4.00
FTS	3.50
GM-CR	2.00
HRC	3.00
M.D.	2.00
PS-epayments	3.36
PS-FRMS	2.00
G.T.	2.99

A total of 206 process transformation and improvement initiatives were recorded throughout the organization (Figure 2a), of which 33 are in the execution phase and 58 have been adopted. Likewise, a total of 87 automation initiatives are reported, which corresponds to 42% of the total.

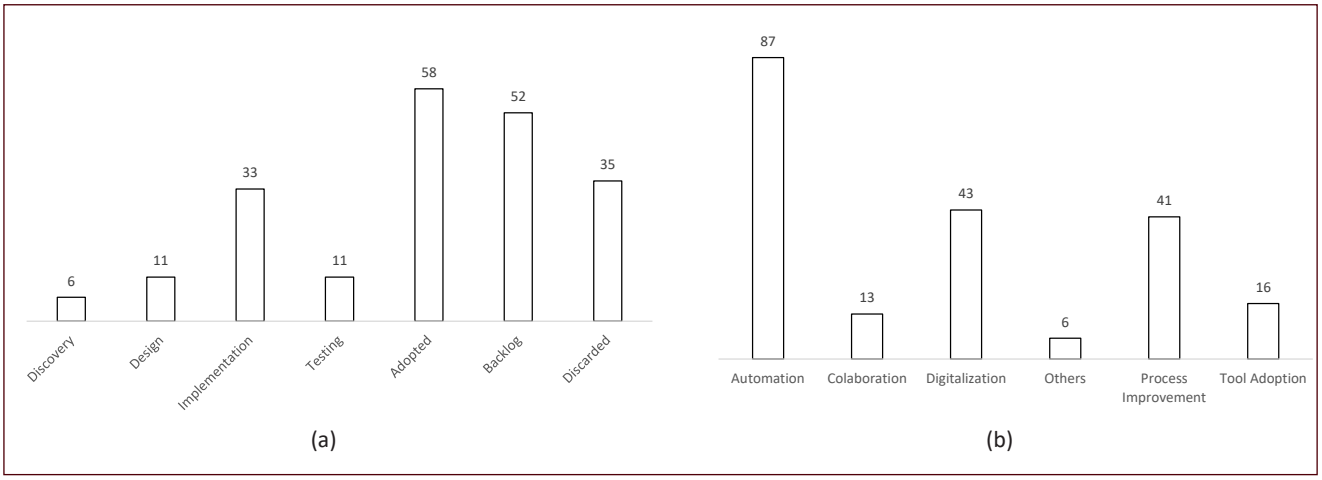

Figure 2. (a)Distribution of process transformation and improvement initiatives according to work progress at the time of report preparation during the implementation of organizational agility in a Fintech company. (b) Status distribution of improvement and transformation initiatives grouped by theme. Source: self-made.

In accordance with the provisions, after identifying and prioritizing the defined initiatives, the assigned squads began the construction of the 23 automations with the greatest impact according to the interests identified by the tribes. Table 3 summarizes the impact generated by the savings reported after implementing and adopting the corresponding automation.

Table 3

Savings reported in hours and full-time employees (FTE), distributed by automation issues after implementing the first stage of organizational agility in a Fintech company during the year 2022. Source: own elaboration.

Issue	time (h)	FTEs
Continuous delivery	2 100	1.12
Continuous integration	480	0.26
RPA	15 955	8.49
Script Automation	18 964	10.09
Test Automation	22 553	12.00
Total	**60 052**	**31.94**

DISCUSSION OF THE RESULTS

As explained by Luz *et al*., (2019), agility needs to be able to evolve quickly: speed, agility, responsiveness. In addition, it requires a stable base, a platform that facilitates response dynamics. It is this stable backbone that becomes a springboard for the company, an anchor point while many other variables constantly change. Training those involved is essential in the process of separating what is agile from what is not. In this study, an 83% participation at the time of writing this report in training on Scrum@Scale and a 100% participation of the selected population in training related to any of the elements of agility were fundamental to the success of this initiative, starting with the leaders of the organization.

Large-scale projects are challenging, as multiple teams work closely together to launch a specific product. Some challenges identified in Agile at this level include maintaining team autonomy and aligning self-organizing teams. The concept of self-organization (i.e., autonomy) has been recognized as one of the key principles of agile development since the introduction of the Agile Manifesto (Wong, 2020). Agile teams can manage workload and shift work between them as needed. In addition, they have mutual trust and respect, and a sense of responsibility for the work committed and for organizing themselves. Self-organization directly influences team effectiveness because it transfers decision-making authority to the operational level (Sironi, 2021). This, in turn, increases the speed and accuracy of problem solving. However, previous researchers such as Williams and Olajide (2020) identified some barriers to self-organization of autonomous teams in large-scale Agile. For example, providing an environment conducive to self-organization increases external autonomy. For its part, high individual autonomy seemed to make members prefer their own goals over the team's goals. Additionally, aligning autonomous teams is challenging as there are varying degrees of alignment of stakeholder

expectations. This is why appropriate organizational coordination is essential, without it becoming a parallel hierarchy that eventually ends up condemning the model to failure. Although it is true that in this exercise a basic organization has been defined, illustrated in Figure 1a, it has not been authoritatively imposed, but rather evolved from the needs perceived in work groups by the experts and leaders of each area of business.

The model used, also known as "Spotify" is an example of a large-scale adaptation of agile methods through the creation of squads and which has developed its own culture and agile model, for which it adapted Lean and Scrum (Salameh and Bass, 2020). However, squads can adapt their own agile practices as they are loosely coupled. Squad autonomy is manifested in the ability to minimize dependencies between squads and bypass management levels when making internal decisions and acting accordingly. To enable effective autonomy, squads will align with common product development goals (Salameh and Bass, 2019).

The professionals in our case study reported the benefits of increased creativity and productivity thanks to the ability to develop their own agile practices. Additionally, this heterogeneous tailoring approach mitigates the risk of being forced to adopt a shared practice that does not meet the needs of a particular squad. Additionally, professionals reported mitigated risks of divergence from shared development objectives through alignment practices, this is evidenced by the number of identified opportunities for improvement (n=206), as well as the high number of initiatives that were executed and adopted or that are in the process of execution (n=91) (figure 2a).

Although Agile and DevOps are widespread and different concepts, they can be combined and offer relevant benefits to organizations. Companies have problems in the process of implementing and launching new *software versions* because most of the time this is a process that is conducted manually. Furthermore, this approach leads to a considerable number and frequency of errors (Reinhardt, 2020). To reduce the incidence of problems and increase flexibility and automation, resources can be used in non-operational and non-production environments.

The combined adoption of Agile and DevOps allows the developer to gain greater control over the environment, infrastructure, and applications (Mordi and Schoop, 2020). This approach leads to simplification and automation of the model processes to make them more rational and efficient. A classic example of this benefit highlights the reduction of delivery cycles by giving small development packages previously unrecognized value. We must also highlight the role of orchestration, which consists of automating tasks to optimize the process and reduce repetitive steps that contribute little to the development or implementation cycle. Finally, automated testing along the Agile and DevOps chain enables the reuse of tests across environments and makes them more sustainable (Ozkan, 2020, Akbar *et al*., 2022). The above is reflected in the fact that 42% of the improvement initiatives, given the implementation of organizational agility, have to do with some automation project (figure 2b).

When it comes to developing secure applications and environments, automation is critical to success and helps reduce the risks associated with human error, as well as the vulnerabilities and downtime that are related to them (Plant, 2022). Overall, the strategic goal of DevOps is to obtain the best possible return on investment

while ensuring high-quality *software* and meeting customer demands. Therefore, it is not surprising that the largest amount of savings was found in the *software testing area* with a total of 12 FTE (table 3). A saving of 60,052h (approximately 32 FTE) is notable, which represents a saving of 7.8% of the total installed capacity in the first round of implementation. However, it is expected that this number will tend towards stability as the search for initiatives progresses.

Script automation and RPA ranked second and third in the amount of effort saved in the operation during this study with 10 and 8 FTE reported respectively, which is consistent, given that they are alternatives to traditional automation (integrated, complete). Traditional automation requires programmers and *software vendors* to develop dedicated *software* and integrate it into existing systems. Various applications may need to be modified so that they can exchange information in a universally accepted format. The potential benefits of traditional automation are greater, but implementation is more difficult and requires spending a lot of effort, time, and money (Butt *et al.,* 2022). Meanwhile, RPA and scripting can be implemented as a non-invasive technology solution without unwanted interference with existing infrastructure, offering multi-functional and multi-system operations.

According to Gradim and Teixeira (2022), the cultural element focuses on instilling a culture of empathy, shared responsibility, and support among *software development teams and operations*. This is achieved by making communication between development and operations less formal and fostering mutual respect and support for working together in a blame-free environment, as well as sharing responsibilities when a problem or incident occurs (Salameh and Bass, 2019). This dimension also places emphasis on using production feedback to drive development decisions, improvements, and system changes.

Some authors such as Tortorella *et al.,* (2020) and Tyagi *et al*., (2021) express that RPA is not as good as *back-end* process automation solutions and that it is only an interim step between human work and process reengineering and redesign. Organizational strategy must address both the direct effects of software robot automation processes *and* their indirect impacts on the organization. However, scalability is one of the key advantages, as robots can easily be cloned at times of peak workload and deactivated afterwards. However, unattended RPA requires more time and effort to implement. The solution can also be further advanced to integrate other mechanisms that allow robots to adjust their actions based on varying conditions and learn from experience (Kaya et al., 2019).

CONCLUSIONS AND RECOMMENDATIONS

After examining the impact of automations on the organizational agility model implemented in a Fintech company in Costa Rica, it is concluded that the company reflects a young state of maturity in this work methodology, with a large volume of opportunities for improvement, which leads to making prioritization decisions based on the volume of needs. This is clearly reflected in the number of automation projects and the high capitalization of savings derived from each initiative. It is recommended to complete the training process for your associates and establish a continuous learning program that allows for extended training and, therefore, continuous improvement.

It is essential for the organization to have implemented business agility in a structured way, starting with the company leaders towards operations, but maintaining a balance in governance, in which hierarchies are not imposed, but rather the logical functionality of operations through virtual roles that free up collaborators and teams; in a way that empowers them to make decisions and experiment freely and little by little learn from the mistakes and successes that occur. Furthermore, allowing the organization of the groupings defined in the model to evolve according to needs is a key pillar to advance the maturity of the model by providing training in the basic foundations of the ideas and mechanisms that allow building a culture. agile. It is recommended to maintain a permanent commission made up of the owners of the products and the leaders of the tribes, as well as workflows that analyze the evolution of the groups and their results, in such a way that adjustment is allowed in a fluid and agile way.

Regarding the impact of automation on the organizational agility model, this is positive: 7.8% overall savings on installed capacity. This reflects considerable progress towards business agility, supported by an operational and governance model that, although incipient, presents the correct means for the flourishing of a positive restructuring of the organization towards agile efficiency and maturity. Furthermore, the need for improvement and review of processes is visible, it is recommended to maintain scrutiny and prioritization of automation opportunities, as well as evaluate the possibilities of implementing hyper automation or native automation when possible.

Robotic process automation is having a profound effect on all aspects of organizations. In the longer term, RPA means that people will have more interesting work that will rely on human emotional or cognitive virtues for decision making, instead of filling out forms, sheets, and documents, as they will migrate towards more immersive roles in the process. complete, thereby adding more value to the organization with a better set of skills. It is recommended to expand this review to a general analysis by comparing baselines with the individual and group progress of the tribes, and workflows in the context of organizational agility, defining metrics that allow evaluating the detail of this transformation not only of the optimization of processes but of the roles played by the associates.

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