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**Scaling Intelligence: A Framework for Designing Internal Processes in
Technology-Intensive Startups**

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Master Thesis

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‘The only way to win is to learn faster than anyone else.’

Eric Ries, The Lean Startup (2011)

Abstract

This dissertation addresses how technology-intensive startups operating with small teams and informal coordination mechanisms can transition from informal and founder-dependent ways of working toward more structured internal processes, in a way that remains lightweight, sustainable and consistent with their adaptive needs. The study was conducted at Upgraide - Artificial Intelligence as the focal organization, complemented by interviews in two other startups for cross-organization corroboration and followed a Design Science Research approach grounded in Action Design Research principles.

The empirical material, drawn from twelve semi-structured interviews and analyzed through the Gioia methodology, characterizes the informal operating model and its consequences, identifies five challenges that explain why the informal state persists despite consensus that it should change and articulates a set of principles for designing processes without losing adaptability. The most relevant of these challenges, the ideal-versus-as-is trap, identifies the systematic failure mode of prior structuring attempts and motivates the design choice the framework is built around.

The synthesis of literature and empirical material produced nine design requirements, on the basis of which the Adaptive Process Structuring (APS) framework was developed. APS comprises three components: a foundation that establishes minimal organizational preconditions, a per-process cycle of five phases applied iteratively to selected processes and an enabling layer in which artificial intelligence reduces the effort of externalizing a process. Its output is the APS Process Profile, a compact and revisable document that captures the as-is of a process and serves as a shared reference that the team can consult and update as the process evolves. The framework was applied in a preliminary pilot at the focal organization, which surfaced a first reading of its feasibility, usefulness and fit. Further validation across multiple organizations, quantitative impact studies and an extension of the framework to process improvement are identified as directions for future research.

Keywords: adaptive process design; technology-intensive startups; Design Science Research; Action Design Research; Adaptive Process Structuring (APS).

Sumário

A presente dissertação aborda como as startups tecnologicamente intensivas que operam com equipes pequenas e mecanismos de coordenação informal podem transitar de modos de trabalho informais e dependentes dos fundadores para processos internos mais estruturados, de uma forma que se mantenha leve, sustentável e consistente com as suas necessidades de adaptabilidade. O estudo foi conduzido na Upgraide - Artificial Intelligence como organização focal, complementado por entrevistas em duas outras startups para corroboração entre organizações, e seguiu uma abordagem de Design Science Research alicerçada nos princípios de Action Design Research.

O material empírico, recolhido em doze entrevistas semiestruturadas e analisado pelo método de Gioia, caracteriza o modelo operacional informal e as suas consequências, identifica cinco desafios que explicam a persistência do estado informal apesar do consenso de que deveria mudar, e articula um conjunto de princípios para desenhar processos sem perder adaptabilidade. O mais consequente destes desafios, o viés do ideal-versus-as-is, identifica o modo de falha sistemático de tentativas anteriores de estruturação e motiva a decisão central de desenho deste trabalho.

A síntese da literatura e do material empírico produziu nove requisitos, com base nos quais foi desenvolvida a framework Adaptive Process Structuring (APS). A APS é composta por três componentes: uma base que estabelece pré-condições organizacionais mínimas, um ciclo por processo de cinco fases aplicado iterativamente a processos selecionados, e uma camada de suporte na qual a inteligência artificial reduz o esforço de externalizar um processo. O seu output é o APS Process Profile, um documento compacto e revisível que captura o as-is de um processo e serve como referência partilhada que a equipa pode consultar e atualizar à medida que o processo evolui. A framework foi aplicada num piloto preliminar na organização focal, que fez emergir uma primeira leitura da sua viabilidade, utilidade e adequação. A validação adicional em múltiplas organizações, estudos quantitativos de impacto e uma extensão da framework ao melhoramento de processos são identificados como direções para investigação futura.

Palavras-chave: desenho adaptativo de processos; startups tecnologicamente intensivas; Design Science Research; Action Design Research; Adaptive Process Structuring (APS).

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This dissertation closes a chapter of a journey that began without a clear sense of where it would lead. Two different courses later, I have come to understand that there is a quiet beauty in not having everything planned and that the ability to adapt to what is around us and to shape one's own path as it unfolds matters more than any prior certainty. Perhaps it is fitting, then, that this dissertation is itself about a similar question: how to bring structure to what we do without losing the room to keep adapting it. None of it would have been possible without the people who walked with me along the way. My gratitude goes to all of them.

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List of abbreviations

ADR - Action Design Research

AI - Artificial Intelligence

APS - Adaptive Process Structuring

BPM - Business Process Management

BPMN - Business Process Model and Notation

DSR - Design Science Research

DSRM - Design Science Research Methodology

FEDS - Framework for Evaluation in Design Science

FEUP - Faculdade de Engenharia da Universidade do Porto

MESG - Mestrado em Engenharia de Serviços e Gestão

RQ - Research question (used as RQ1, RQ2, RQ3)

1. Introduction

1.1 Project background

Startups are commonly described as organizations that operate under conditions of extreme uncertainty, while at the same time pursuing scalable growth through business models capable of expanding rapidly beyond their initial structure (Graham, 2012; Ries, 2011). As a result, they must manage two demands at the same time: they must create enough structure to support growth, while preserving the flexibility needed to respond to evolving circumstances.

In an early phase, many startups rely on informal coordination, tacit knowledge and strong founder involvement to operate effectively (DeSantola & Gulati, 2017). Although these arrangements can be appropriate in small and uncertain environments, they become increasingly difficult to sustain as the organization grows (Greiner, 1998; Sutton & Rao, 2014). Startups therefore face a transition challenge: how to move toward more structured and scalable internal processes without losing the adaptability and learning capacity that remain essential to operate under uncertainty.

Understanding this transition challenge requires looking more closely at what scaling a startup entails. Beyond increasing size, output, or market reach, scaling brings with it growing internal coordination demands and greater interdependence between activities (DeSantola & Gulati, 2017), as well as increasing difficulty in maintaining consistent execution and quality (Sutton & Rao, 2014). As a result, scaling places the organization under coordination demands that the initial arrangement was not designed to meet.

Within this context, process design becomes especially relevant: more explicit processes, clearer responsibilities and stronger mechanisms for knowledge transfer can help make work more repeatable, visible and scalable (Dumas et al., 2018; Sutton & Rao, 2014). At the same time, structuring and designing processes cannot be treated as equivalent to rigidity. In startup contexts, where experimentation, iteration and responsiveness remain essential (Ries, 2011), excessive structure may create friction or inhibit adaptation (DeSantola & Gulati, 2017). The challenge, therefore, is not simply to design processes, but to do so in ways that support scalable growth without undermining the startup's capacity to learn, adjust and evolve over time (Cimino et al., 2025).

This dissertation is situated at the intersection of these issues. It focuses on how technology-intensive startups can transition from informal and founder-dependent ways of working toward more structured internal processes, while preserving adaptability and supporting knowledge articulation, transfer and continuity.

Rather than defining the target context primarily by firm age or funding stage, this study focuses on technology-intensive startups characterized by informal, small-team coordination, limited process ownership and founder-dependent operational knowledge. The focus on technology-intensive startups is deliberate, because in these ventures, growth is closely tied to digitalizing workflows and embedding software and artificial intelligence (AI) into everyday operations, which amplifies the consequences of process ambiguity and makes the need for explicit, well-

structured processes more pressing than in startups in general (Cimino et al., 2025; Hokmabadi et al., 2025).

1.2 Problem Description

Growing startups commonly face difficulties transitioning from informal practices to more structured processes as they scale. This study addresses this problem by examining how a technology-intensive startup can carry out this transition in a way that is lightweight, sustainable and consistent with its adaptive needs.

According to the literature, the costs of not operationalizing this transition show up in day-to-day work in several interconnected ways. When process definitions and responsibilities are not shared, the same work is carried out differently by different people and execution becomes harder to reproduce. Additionally, operational knowledge tends to remain tied to founders and a few experienced members, leaving decisions and routine work dependent on those individuals being available (Koporcic et al., 2025). As a result, onboarding depends on direct contact with those same few people, which slows new members down and makes continuity fragile when the team grows or changes (Greiner, 1998; Sutton & Rao, 2014).

Although the literature explains why this transition matters and offers principles for managing it, it does not provide a practical, lightweight artifact that technology-intensive startups can use to design processes while preserving adaptability and knowledge continuity. The established field of process management, organized under the umbrella of Business Process Management (Dumas et al., 2018), offers such methods, but in forms developed for larger and more mature organizations (Dallas & Wynn, 2014).

This study addresses that artifact-level gap by developing and beginning to apply the Adaptive Process Structuring (APS) framework, an artifact designed specifically for this context. Its intended contribution is therefore twofold: a practically usable framework for the focal organization and similar startups and design knowledge, in the form of design principles for adaptive process design in technology-intensive startups.

1.3 Research Questions

The study is guided by three research questions, sequenced to move from problem characterization to artifact design:

RQ1: What challenges do startups face when transitioning from informal and founder-dependent ways of working to more structured internal processes?

RQ2: How can internal processes be designed in ways that support scaling while preserving adaptability and supporting knowledge management?

RQ3: What design principles should guide a framework that helps technology-intensive startups design internal processes while preserving adaptability and knowledge continuity?

Informal arrangements are widely recognized as unsustainable as startups grow, yet the transition to more structured processes often does not happen or fails when attempted. RQ1 asks what specifically gets in the way, on the premise that a framework that responds to documented obstacles is more likely to be adopted than one that responds to assumed ones.

Given those obstacles, RQ2 asks what the design of internal processes should look like to support scaling without undermining the adaptability and knowledge continuity that early-stage organizations depend on. The question concerns the qualities a design approach must have, not yet a specific artifact.

RQ3 turns those qualities into a concrete artifact, asking what design principles should structure a framework that technology-intensive startups can apply in practice. The artifact proposed in response to RQ3 is the Adaptive Process Structuring (APS) framework, developed in Chapter 5 and applied in a preliminary pilot whose scope and limits are discussed in Chapter 5 and 6.

1.4 Focal Organization: Upgraide - Artificial Intelligence

The investigation guiding this research was conducted at Upgraide - Artificial Intelligence, Lda, a Portuguese technology-intensive startup founded in 2024. The company develops custom AI solutions for client organizations across multiple sectors, including healthcare, technology, real estate, industry and retail. Its client base spans early-stage ventures and established enterprises, which exposes the company to a range of AI integration contexts that vary in organizational size, technical maturity and regulatory and process requirements.

Upgraide operates as an AI implementation partner. Its service model combines an analytical phase, in which client operations are mapped and improvement opportunities are identified, with an implementation phase, in which tailored AI solutions are developed and deployed against measurable performance outcomes. Engagements are conducted on a project basis and address use cases that range from focused process automation to broader AI-supported workflow redesign.

During the period of this study, the team comprised approximately ten people, a number that fluctuated with new hires and departures. It was organized around three co-founders and additional members whose roles spanned strategy, project delivery, software development, operations and marketing. A more detailed characterization of the organizational context, together with the analytical justification for selecting Upgraide as the focal case, is developed in Section 3.1.

1.5 Report outline

This report progresses from the conceptual framing of the research problem to its empirical characterization, methodological grounding and the development and preliminary application of a practical framework.

The introduction (Chapter 1) presents the project background, the problem addressed, the research questions and the organizational context in which the research is situated. Building on this framing, the literature review, in Chapter 2, examines startups and scaling, reviews the role of process design, adaptability, knowledge management, process visibility and the digital context in supporting scalable growth and concludes by identifying the gap that motivates the design of a framework.

The problem is then grounded empirically in the focal organization (Chapter 3), where preliminary observation of the focal organization shows how informal coordination, weak process design and knowledge dependence are manifested in practice. To address it, the methodological approach, described in Chapter 4, adopts Design Science Research, complemented by Action Design Research principles.

Chapter 5 reports the empirical findings, synthesizes them into nine design requirements, proposes the Adaptive Process Structuring (APS) framework and describes its preliminary application. Chapter 6 concludes by discussing the contributions of the study in relation to the literature reviewed in Chapter 2 and by reflecting on limitations and future research.

2. Literature Review

This section reviews the literature related to the problem defined in Chapter 1. It examines scaling as an internal organizing challenge and discusses how process design, knowledge management and process visibility support more consistent, transferable and scalable forms of work. It then reviews the established field of Business Process Management as the dominant approach to structuring processes in organizations, alongside its limits in early-stage and resource-constrained settings, before considering the additional demands of technology-intensive contexts, where process clarity is also a precondition for digitalization and the effective use of AI. The section concludes by identifying the gap that motivates this study.

2.1 Startups and scaling: process structuring as an organizational mechanism

Startups have been defined as organizations created under conditions of extreme uncertainty, in which learning, experimentation and adaptation are central to survival and growth (Ries, 2011). A complementary perspective defines startups through their orientation toward rapid growth, distinguishing them from other newly created firms that are not structured to scale quickly (Graham, 2012). Taken together, these views suggest that uncertainty and growth are not peripheral characteristics of startups but rather defining conditions of their existence.

This growth orientation makes scaling a central managerial challenge. In early stages, startups often operate effectively through direct communication, founder-led coordination, tacit knowledge and flexible routines. These mechanisms are typically viable in small teams because proximity reduces the need for explicit structures, documentation and formal control (DeSantola & Gulati, 2017; Greiner, 1998). However, Greiner's stage-based model suggests that these informal arrangements become less sufficient as organizations grow, giving rise to crises whose resolution requires more structured managerial arrangements (Greiner, 1998). In fact, practices that initially supported agility can begin to generate variability in execution, coordination failures, slower onboarding and difficulties in preserving quality across a growing organization, which Sutton and Rao describe as the "problem of more" (Sutton & Rao, 2014). Growth should therefore not be understood only as increasing size, output, or market reach, but as the challenge to reorganize internally to cope with increasing complexity.

Entrepreneurial growth has been argued to create pressures to alter organizational design, team composition and culture, with organizational design covering the roles, rights and rules that shape how work is divided, coordinated and controlled (DeSantola & Gulati, 2017). Concretely, the increase in size and complexity creates pressure for clearer responsibilities, more differentiated forms of coordination and a distribution of decision-making authority, rather than its concentration in the founders. The redesign of internal arrangements therefore emerges as an unavoidable response to growth and its trajectory points consistently toward greater explicitness.

Process design serves, in this sense, as the operational vehicle through which this redesign takes effect. It is the mechanism that translates organizational expectations into more explicit roles and responsibilities, clearer accountability over who decides and when escalation is needed and

routines and procedures that make practices sufficiently repeatable to sustain consistency and quality as the organization grows (Sutton & Rao, 2014). Empirical evidence from Portuguese startups is consistent with this trajectory: younger ventures are characterized by lighter and more informal project management practices, while more mature scale-ups show more formal structures and more established practices, indicating that greater explicitness tends to emerge as part of organizational maturation rather than as an external imposition on it (Tereso et al., 2019).

Rather than being treated solely as an administrative feature of more mature organizations, process design can therefore be understood as one of the mechanisms through which startups make growth more operationally sustainable. It is a tool for managing complexity that would otherwise overwhelm informal coordination and a means of distributing what is currently held in the heads of a few. In this sense, process design is not the opposite of startup agility but a precondition for sustaining it as the organization grows. This understanding of process design as an organizational mechanism is most systematically developed within the field of Business Process Management (BPM), reviewed in the next section.

2.2 Process management approaches and their limits for startups

Process design, as discussed in Section 2.1, is one of the mechanisms through which startups translate the demands of growth into explicit roles, responsibilities and repeatable routines. It sits within a broader discipline, Business Process Management (BPM), that systematizes how processes are designed, executed, monitored and improved over time. BPM is defined as the art and science of overseeing how work is performed in an organization to ensure consistent outcomes and to take advantage of improvement opportunities (Dumas et al., 2018). Within BPM, the object of management is not the individual activity but the entire chain of events, activities and decisions that together create value, that is, the process itself. Process design is therefore a constituent activity of process management, not an alternative to it: process design produces the explicit representations of how work flows, while BPM as a whole provides the wider lifecycle, governance and methods within which those representations are created, maintained and revised.

BPM is typically organized as a continuous lifecycle, in which processes are identified, modeled, analyzed, redesigned, implemented and monitored, and it relies heavily on explicit process models, most commonly expressed in the standardized Business Process Model and Notation (BPMN) (Dumas et al., 2018). Understood in this way, BPM operationalizes process design as a deliberate organizational practice: the systematic choice of which processes to make explicit, how to represent them and how to revise them over time. Within this lifecycle, BPM distinguishes between AS-IS modelling, which represents how a process currently runs and TO-BE modelling, which represents how it should run, treating both as legitimate stages of the design effort (Dumas et al., 2018). The discipline also encompasses advanced analytical techniques, such as process simulation, used to compare redesign alternatives against performance indicators before implementation (van der Aalst, 2015). BPM therefore offers a

mature and comprehensive body of methods, notations and tools for making processes explicit, measurable and improvable.

This comprehensiveness is reflected in the way BPM capability is assessed. Rosemann and de Bruin propose a maturity model that evaluates how advanced an organization is in BPM across six core factors: strategic alignment, governance, method, information technology, people and culture (Rosemann & de Bruin, 2005). The model is grounded in the logic of the Capability Maturity Model, originally developed for software engineering, in which organizational capability is understood to progress through staged levels of development, from ad-hoc and fragmented practice to integrated and optimized practice. Framing BPM in terms of maturity makes explicit that it is not a single tool but an organizational capability that is built and consolidated over time and that presupposes dedicated roles, governance structures, established methods and supporting information systems. These are conditions that established organizations can develop, but that early-stage ventures, by definition, do not yet possess.

This raises the question of whether mainstream BPM can be transferred to small and resource-constrained organizations. Examining this question through a case study of a small business, Dallas and Wynn observe that BPM has traditionally been perceived as the domain of larger organizations and that small businesses operate under considerable cost and time pressure, with constrained human resources and limited access to specialized skills (Dallas & Wynn, 2014). They conclude that the conventional ways of adopting BPM, namely engaging teams of external consultants or building dedicated in-house BPM capabilities, are often simply not feasible in such settings. While many mainstream tools and techniques can in principle be applied, they require adaptation toward streamlined, low-cost, self-managed and practical approaches, supported by guides and templates, even at the expense of exhaustiveness and tailored to the agility and flatter structures of smaller organizations (Dallas & Wynn, 2014). On this basis, the authors call for a dedicated stream of BPM research and practice focused specifically on small businesses, less concerned with comprehensiveness and more with practicality and relevance.

Taken together, this literature indicates that BPM provides the foundational logic for structuring processes, namely making them explicit, owned, measurable and improvable, but that its mainstream methods, notations and maturity models were designed for organizations with a scale, stability and dedicated capability that startups do not have. What the field itself calls for and has not yet fully developed is a lighter and more practical way of bringing process structure to small, resource-constrained and fast-changing organizations.

2.3 Structuring without rigidity: balancing standardization and adaptability

Although Business Process Management provides the systematic discipline within which process design operates (Section 2.2), its application in early-stage organizations requires engaging with a complementary body of literature on organizational adaptation, dynamic capabilities and learning under uncertainty. In fact, while growth creates pressure for more explicit organizational arrangements, the literature also suggests that ventures must balance the introduction of structure with the need to preserve flexibility and responsiveness under

uncertainty. In this regard, DeSantola and Gulati highlight a persistent tension in growing ventures between flexibility and efficiency, noting that entrepreneurial firms may struggle both when they delay structural changes for too long and when they introduce them too quickly. This suggests that the challenge of scaling is not simply whether to introduce structure, but how to develop structures that support coordination and consistency without undermining the adaptability required in uncertain environments (DeSantola & Gulati, 2017).

This tension is consistent with broader literature on startup adaptation. Ries frames startup progress as validated learning generated through iterative Build, Measure, Learn cycles, in which evidence from experiments is used to decide whether to persevere or pivot (Ries, 2011). In this perspective, uncertainty is not managed through fixed and rigid planning, but through structured learning processes that allow ventures to adjust course based on real feedback. At the same time, this logic does not imply the absence of structure. On the contrary, experimentation itself depends on routines for building, measuring, interpreting results and translating them into action. Structuring therefore becomes problematic only when it constrains revision, not when it supports disciplined learning.

A similar argument can be developed through the lens of dynamic capabilities. Cimino et al. describe dynamic capabilities as the organizational abilities that enable startups to sense changes, seize opportunities and transform routines and structures in response to shifting conditions (Cimino et al., 2025). From this perspective, adaptation is not external to structuring but partly enacted through it. When ventures translate what they learn into revised routines, clearer structures and modified practices, they are giving structure to adaptation rather than replacing it. This makes such structuring compatible with responsiveness, provided that structures are treated as revisable supports for action rather than as fixed constraints.

The literature on learning from failure reinforces this view. Koporcic et al. argue that failure only becomes a source of organizational improvement when it is recognized, collectively interpreted and translated into adjustments in routines and practices (Koporcic et al., 2025). In this sense, adaptation depends not only on the willingness to change, but also on the existence of organizational mechanisms that retain and operationalize what has been learned. Structuring can therefore contribute to this by making changes explicit and shareable across the organization. Rather than opposing experimentation, it can help ensure that insights do not remain localized in individuals or isolated episodes but become embedded in ongoing work.

This argument is also supported by operational literature on feedback and monitoring routines. Wiese et al. show that adaptation can be sustained through explicit routines for identifying issues, documenting them, prioritizing responses, acting and monitoring outcomes over time (Wiese et al., 2026). Their work is useful because it illustrates that maintaining flexibility does not require purely informal or improvised action. Instead, adaptability often depends on visible and repeatable mechanisms that keep relevant signals actionable in daily work. In startup contexts, feedback loops can therefore be understood as forms of lightweight structuring that preserve the possibility of revision while reducing the risk that important information remains unnoticed or unused.

Taken together, these perspectives suggest that the relevant distinction is not between structuring and flexibility, but between rigid structuring and adaptive structuring. Rigid structuring privileges control and stability in ways that may inhibit experimentation and responsiveness. Adaptive structuring, by contrast, supports coordination and repeatability while keeping routines open to revision in light of new information. Its value in startups lies not in creating bureaucratic stability for its own sake, but in enabling scalable execution under conditions of continuing uncertainty. Startups need sufficient structure to coordinate increasingly complex work, preserve standards and transfer knowledge, but they also need those structures to remain proportionate, revisable and responsive to feedback. The literature therefore supports a view of structuring not as a movement toward bureaucracy, but as the development of organizational arrangements that make growth manageable without eliminating the capacity to learn and adapt (Cimino et al., 2025; DeSantola & Gulati, 2017; Koporcic et al., 2025; Ries, 2011). Process design, understood in this sense, is broader than the act of documenting a procedure: it concerns the choices about which processes to make explicit, how much structure each one requires, who is accountable for keeping them current and how revision is built in. Framed this way, process design becomes the practical lens through which the tensions of standardization and adaptability are jointly resolved in early-stage ventures.

2.4 Process visibility, knowledge transfer and measurement

The literature further suggests that scaling requires not only more explicit processes, but also greater visibility into how work is performed, transferred and evaluated across the organization (Sutton & Rao, 2014). As startups grow, informal coordination becomes less sufficient because activities, responsibilities and dependencies are no longer easily understood through direct proximity alone. Under these conditions, process visibility becomes an enabler of coordination, since organizational members need clearer representations of how work flows, where responsibilities begin and end and how outcomes are followed over time (Greiner, 1998; Sutton & Rao, 2014).

A first dimension concerns the explicit articulation of operational knowledge. In startups, much of this knowledge tends to remain tacit, embedded in founders or experienced employees and transmitted through interaction rather than through formal structures (Koporcic et al., 2025). While efficient in small teams, this becomes increasingly fragile as the organization grows and must integrate new members, coordinate across functions and preserve continuity despite increasing specialization (Sutton & Rao, 2014). Onboarding is the most acute manifestation: when responsibilities, routines and handoffs are insufficiently explicit, integration depends heavily on repeated explanation and informal support from senior members and execution becomes slower and more uneven (Greiner, 1998). Greater process visibility, supported by documentation, process maps and clearer role definitions, reduces dependence on individual memory and makes the transmission of organizational knowledge more reliable over time.

A second dimension concerns defined responsibilities and accountability. As scaling increases the number of people involved in operational processes, work becomes more interdependent

and less easily coordinated through informal assumptions. Process visibility therefore requires not only knowing what activities exist, but also clarifying who performs them, who makes decisions and how handoffs are managed across stages of work. Ambiguity in responsibilities tends to create delays, duplicated effort, execution gaps and continued founder dependence. Explicit responsibility structures contribute to process scalability by making coordination more reliable and reducing the need for constant intervention (Greiner, 1998).

A third dimension concerns the ability to follow and evaluate how processes perform over time. Ries frames startup progress as validated learning, in which evidence is used to decide whether to persevere or pivot, so the purpose of measurement is to support learning rather than control: what matters is that relevant signals are captured and acted upon, not that processes are surrounded by extensive metrics (Graham, 2012; Ries, 2011). The value of measurement therefore lies less in the metrics themselves than in the feedback loops they enable: data becomes organizationally useful when it is embedded in routines that sustain attention and support action over time. What makes a feedback loop different from raw measurement is the structured connection between observation and response: a metric that no one consults, or that is consulted without producing decisions, contributes nothing to organizational learning regardless of how rigorously it is recorded. Wiese et al. show that monitoring and reminders integrated into everyday workflow tools can keep relevant signals visible and actionable without requiring heavy or formal measurement structures, a form of lightweight structuring that connects process execution to ongoing evaluation while remaining proportionate to a small organization's capacity (Wiese et al., 2026).

Taken together, the literature suggests that process scalability depends not only on defining routines, but also on making them visible, understandable and transferable, supported by clear responsibilities and by measurement that remains proportionate to the organization's stage. Research on Portuguese startups shows that as practices become more formal with maturation, the concern with preserving flexibility persists rather than recedes, supporting a view of measurement that remains proportionate to the organization's stage (Tereso et al., 2019). In startups in particular, the priority is to make work visible and knowledge accessible, introducing measurement selectively and only where it clearly supports coordination, learning and continuity.

2.5 Implications for technology-intensive startups

In technology-intensive startups, growth is closely tied to the digitalization of workflows, the integration of organizational tools and the increasing use of automation and AI-enabled support.

The literature on process-aware information systems has long established that automation depends on explicit and stable process models to operate against (Dumas et al., 2018) and the literature on AI adoption in entrepreneurial ventures extends this argument to AI-enabled support specifically (Cimino et al., 2025). Operational effectiveness depends, therefore, not only on human coordination, but also on whether work can be embedded into systems that capture data, route activity and support decision making (Bedoya Sánchez et al., 2026;

Hokmabadi et al., 2025). This makes process clarity not only a coordination concern, but also a precondition for the technology that the organization is building its growth on.

Digitalization and AI adoption depend on the organizational structures in which they are embedded. In fact, their effectiveness depends on well-defined processes, reliable information flows and information systems capable of supporting consistent data capture, traceability and workflow integration. Where these foundations are weak, the alignment between work and the systems that support it breaks down, automation and AI-enabled support become fragile and fragmented, and isolated tools do not translate into sustainable operational value (Bedoya Sánchez et al., 2026; Hokmabadi et al., 2025). The literature on AI adoption reinforces this point: Cimino et al. associate AI adoption with improved technological and economic performance, while emphasizing that outcomes depend on the organizational capabilities required to overcome adoption barriers and to embed technology into routines and decision processes (Cimino et al., 2025). Without these capabilities, automation tends to replicate informality rather than reduce it, producing fragile workflows and unreliable data flows.

Process explicitness in technology-intensive startups is therefore not a different scaling challenge, but a more consequential expression of the same one. The need for explicit workflows, defined responsibilities and consistent data capture is not unique to these firms, but its consequences are amplified when digitalization and AI integration become central to operations. The technology-intensive context therefore reinforces, rather than replaces, the importance of process visibility as a condition for scalable and sustainable growth.

2.6 Synthesis of the literature and implications for framework design

The literature reviewed in this chapter approaches scaling, structure and process design from positions developed for different problems. Stage-based and organizational design perspectives (DeSantola & Gulati, 2017; Greiner, 1998) describe the consequences of growth at the level of the organization, without specifying how individual processes are to be structured. The literature on adaptation and learning (Cimino et al., 2025; Ries, 2011; Wiese et al., 2026) frames structure as something that must remain revisable but does not commit to a particular form for that structure. The knowledge management literature (Koporcic et al., 2025; Sutton & Rao, 2014) treats explicit process knowledge as a condition for continuity but is silent on the cost of producing it in small teams. The literature on digitalization and AI (Bedoya Sánchez et al., 2026; Cimino et al., 2025) requires process clarity as an input, without addressing how that clarity is produced.

The reviewed literature therefore clarifies why process structure matters, but offers little guidance on how small, resource-constrained startups can design lightweight structures without reproducing BPM-style overhead. The field that does offer operational methods, Business Process Management, was developed for organizations with a scale, maturity and dedicated process capability that startups do not have (Dallas & Wynn, 2014; Dumas et al., 2018). What is therefore missing is a method that small, technology-intensive startups can adopt to design

their processes in a form proportionate to their scale and adaptable as they evolve. The framework proposed in Chapter 5 is a first attempt to provide one.

3. Problem Characterization

Building on the literature reviewed in Chapter 2, this chapter grounds the transition challenge in the focal organization. It presents the research setting (Section 3.1), reports a preliminary diagnosis of the organizational context based on the author's direct observation (Section 3.2) and consolidates the problem statement that motivates the empirical and design work reported in the following chapters (Section 3.3).

3.1 Research setting: Upgraide - Artificial Intelligence

The empirical context of this research is Upgraide, the focal organization described in Section 1.4. Internally, Upgraide operates with strong reliance on informal coordination, decentralized knowledge and significant dependence on founders and a small number of key individuals, a configuration that is common among startups of this size and maturity. These characteristics have supported flexibility and responsiveness in the company's early phase, but they also create growing risks as complexity increases, particularly in relation to process consistency, onboarding, coordination and knowledge continuity. As the team and the number of concurrent projects grow, the company is at a stage where there is a practical interest in designing processes and strengthening internal structure, but without creating excessively rigid arrangements that might constrain adaptability and experimentation.

In this sense, Upgraide offers direct access to a setting where informal coordination, founder dependence and an emerging pressure to structure are already visible in everyday work. Within a team of around ten people, the same tasks are executed by different members in different ways, decisions remain concentrated in the founders and previous attempts at documentation have not been sustained beyond the moment of writing. These conditions make the transition problem observable in practice. They do not, however, guarantee that the patterns identified in this organization extend to other startups; the focal case is therefore studied for its capacity to make the problem visible in detail, with the question of broader transferability left to the cross-organization interviews and to future work.

3.2 Preliminary diagnosis of the organizational context

The preliminary diagnosis presented in this section is based on the author's direct involvement in Upgraide as a team member, beginning in September 2025. During this period, the author worked across multiple operational areas, including client projects (analysis, mapping and AI implementation), recruitment, sales and marketing, which provided situated access to the organization's coordination routines, knowledge flows and process-related challenges. The observations were not generated through a formal data collection or analytical protocol; they emerged from participant observation in everyday work, from informal exchanges with team members and from early attempts at internal documentation. They are presented here as a preliminary characterization that motivated the design of the empirical study reported in Chapter 5 and not as analytical findings in their own right.

The diagnosis confirms that the challenges described in the literature are visible at Upgraide in concrete forms. Coordination relies on direct, oral exchange between team members who share the same workspace, with limited recourse to documentation when work is handed off. Execution of similar tasks differs across people and depends on whoever picks the task up. Operational knowledge, including the rationale for past decisions and the conventions for recurring work, sits in the memory of a small number of people and is not currently recorded in a form others can consult. These conditions remain workable while the team is small and physically co-located, but they create observable friction as new members are added and as the number of concurrent projects increases. These conditions surfaced in three patterns, described below.

A first pattern concerns the limited mapping and shared enactment of processes. Although recurring activities exist, they are not consistently documented and similar tasks may be carried out differently by different people. During the period of the study, the author was involved in attempts at more formal process design, including flowcharts and standard operating procedures (SOPs) for several of the company's recurring activities. These artifacts were produced but rarely consulted afterwards in day-to-day work, so that the gap between documented form and actual practice persisted despite the documentation effort. The reasons for this disconnect and the practitioners' own accounts of similar past attempts are examined systematically in Chapter 5.

A second pattern concerns ownership and accountability. Responsibilities for maintaining, improving, or standardizing processes do not appear to be clearly assigned, which seems to weaken continuity and make it harder to sustain process improvement over time. The same ambiguity is also visible at the task level: specific responsibilities within day-to-day work are not always clearly attributed, which leads to occasional duplication of effort or, conversely, to tasks being left undone because each member assumes another is handling them. During the observation period, the recruitment process surfaced a clear instance of this pattern: on more than one occasion, two members of the team independently reached out to the same candidate, because no single owner was tracking the active pipeline. The same dynamic appeared in development requests, where different team members would independently direct requests to the same developer with no shared view of who had already asked what, creating intermittent overload on individual capacity. In this sense, the diagnosis suggests that the issue is not only insufficient structuring, but also limited process ownership to sustain it.

A third pattern concerns the centrality of informal communication as a coordinating mechanism. Much of the day-to-day functioning appears to depend on direct interaction and ad hoc clarification between individuals. The integration of new members illustrates this clearly: in the absence of a written reference for how recurring activities run, recent joiners spent significant time in shadowing arrangements and in clarification conversations with senior members, with the same questions resurfacing across successive joiners and the answers being reconstructed each time from memory. The same dependence on direct, undocumented exchange was visible at function boundaries: the transition from sales to product development sometimes required client meetings to be repeated because information communicated in earlier

conversations had not been carried over in a form the receiving team could act on. While informal coordination supports flexibility and speed in a small team, it also seems to increase dependence on specific individuals and to make coordination more vulnerable as the number of people and parallel activities grows, with implications for onboarding and knowledge continuity.

Overall, the preliminary diagnosis suggests that the core challenge in Upgraide is not simply the lack of documentation, but the absence of process structures that are sufficiently shared, intuitive and aligned with actual work practices to support coordination, knowledge transfer and scaling. At this stage, the problem can therefore be characterized as a gap between informal, individually enacted work and the need for more explicit, collectively usable and adaptable process structures. This characterization provides the empirical motivation for the study and points toward the kinds of design requirements that the framework will need to address.

3.3 Problem statement

The problem addressed in this study is how startups can change their internal structure in ways that support more explicit processes without losing adaptability and without failing to retain and transfer operational knowledge. More specifically, the study focuses on how startups can reduce dependence on informal, founder-centered coordination by developing clearer process structures, while still preserving the capacity to learn, adjust and evolve those structures over time (DeSantola & Gulati, 2017; Koporcic et al., 2025; Sutton & Rao, 2014). Upgraide is used as the focal case for the development and initial application of the framework that responds to this problem, while the study also seeks to inform similar startup contexts beyond the focal organization (Gregor & Hevner, 2013; Sein et al., 2011).

4. Methodology

4.1 Choice of methodological approach

The methodological approach must fit both the nature of the research problem and the type of contribution intended. The research problem defined in Chapters 1 and 3 is at once analytical and prescriptive: it requires an in-depth understanding of how process ambiguity, tacit knowledge and informal coordination are experienced in practice and it requires a practical response in the form of a framework that supports that transition. The study therefore combines two contributions: interpreting the problem and designing an artifact that addresses it.

Design Science Research (DSR) is, in this sense, the appropriate methodological approach for this combination of needs. DSR is oriented toward generating prescriptive knowledge through the design of artifacts such as constructs, models, methods, or frameworks and treats artifact creation as a central form of research contribution in its own right (Gregor & Hevner, 2013). It connects problem understanding with solution design, translating empirical insights into an artifact that is both conceptually informed and practically relevant and producing design knowledge that may inform contexts beyond the immediate case. Because the study relies on interviews and observation to characterize the problem and to inform the design of the framework, DSR is supported here by a qualitative base; the qualitative methods used are described in Section 4.2.

Action Design Research (ADR) complements DSR by specifying how the artifact is developed and confronted with practice. Where traditional design approaches separate building from evaluation, ADR treats building, organizational intervention and evaluation as mutually informing, with the artifact shaped through interaction with its context (Sein et al., 2011). This fits the present study, in which the framework is not designed in isolation and applied later, but informed by the focal context, by the perspectives of organizational members and by an initial pilot application, so that observation, interviews, analysis and preliminary application all contribute to its development.

The study therefore adopts Design Science Research as its primary methodological approach, supported by qualitative methods and informed by Action Design Research. This combination fits the nature of the problem and the intended contribution: a framework grounded in empirical analysis and refined through engagement with the focal context. The following section explains how this orientation is operationalized through the research design, data collection and analysis.

4.2 Research Design

Having justified the choice of Design Science Research as the overarching methodological approach (Section 4.1), this section explains how it was operationalized in the present study. This approach was operationalized through the Design Science Research Methodology (DSRM) proposed by Peffers et al. (2007), which organizes a design study into six activities: problem identification and motivation, definition of the objectives of a solution, design and

development, demonstration, evaluation and communication. Following a problem-centered entry point, the dissertation maps onto these activities as follows.

Problem identification and motivation are addressed in Chapter 1 and deepened, in the focal context, through the preliminary diagnosis in Chapter 3 and the empirical findings of Chapter 5. The objectives of a solution were defined based on the literature reviewed in Chapter 2 and the preliminary observation reported in Chapter 3. Design and development correspond to the consolidation of design requirements and the construction of the proposed Adaptive Process Structuring framework in Chapter 5, drawing on the empirical findings of that chapter. Demonstration corresponds to the preliminary application of the framework in the focal case (Chapter 5) and evaluation to the feedback gathered from that context, with a fuller evaluation identified as future work. Communication is achieved through this dissertation and its public presentation.

The "focal context" and "focal case" referenced throughout this mapping correspond to a single organization: Upgraide - Artificial Intelligence, the main case setting of the study. Upgraide is particularly relevant because it represents a technology-intensive startup in which the challenges identified in the literature, namely informal coordination, process ambiguity, tacit knowledge dependence and the need for greater structure without loss of adaptability, are already visible in practice. The company therefore serves as the focal empirical context for both problem diagnosis and the development of the proposed framework.

To ensure close alignment between artifact development and organizational reality, the study also followed the principles of Action Design Research (ADR), which emphasizes the development of artifacts through iterative interaction with the organizational setting in which they are intended to be used (Sein et al., 2011). For this reason, the six DSRM activities were treated not as a strictly linear sequence but as an iterative process, in which design, demonstration and evaluation inform one another through ongoing engagement with the focal organization. The framework is therefore intended to emerge not as a purely abstract model, but as a practically grounded response to the concrete difficulties faced by a startup in transition.

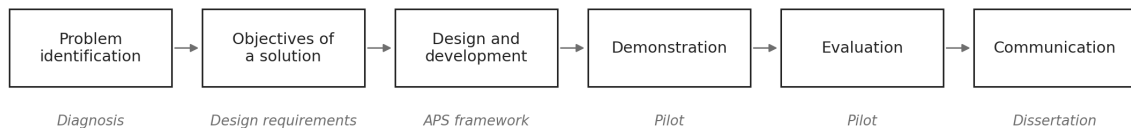


Figure 1 - DSRM (Peffers et al., 2007)

4.2.1 Data collection

Data collection combined multiple sources to support both diagnosis and framework design. First, the study drew on direct observation of the organizational context, already reported in its preliminary form in Chapter 3. The author's involvement at the focal organization spanned a range of operational areas during the research period, including client projects (analysis, mapping and AI implementation for external organizations), recruitment, sales and marketing. This breadth of involvement gave situated access to coordination routines, handoffs, knowledge

flows and emerging process-related difficulties across different functions of the company, surfacing the organizational bottlenecks that the study addressed: inconsistent execution, dependence on informal communication, limited process ownership, fragmented knowledge and gaps between the attempted process design and actual day-to-day practice. Direct observation therefore informed both the diagnosis of the problem and the design of the framework.

Second, the study included semi-structured interviews with members of Upgraide, particularly founders and team members involved in operational, coordination and cross-functional activities. These interviews deepened the diagnosis of current practices and captured participants' perceptions regarding process design, adaptability, knowledge transfer, onboarding and organizational learning. They also helped establish whether the challenges observed in practice are broadly recognized across the organization and how previous attempts at structuring processes had been experienced.

Third, the empirical scope was broadened through semi-structured interviews with representatives of other startups. The purpose was not to displace the centrality of the Upgraide case, but to enrich the investigation with perspectives from other startup contexts facing similar challenges of process design, growth and knowledge management. The two external interviews were intended to test whether the patterns identified in the focal case extend to other startups of comparable size, while recognizing that two interviews do not establish transferability and serve primarily as a corroboration of recurrent patterns.

The interview sample was purposive, selected for relevance to the phenomenon rather than for statistical representativeness and comprised twelve participants: ten members of Upgraide, the focal case and two members of other startups. Within Upgraide, the participants ranged from the company's three founders to members who joined around four months ago and spanned its various areas, namely strategy, project delivery, software development, operations and marketing, so that the diagnosis captured both the perspective of those who set direction and hold client relationships and that of those who execute delivery and have joined most recently. Four of the ten Upgraide participants also brought prior experience from other startups, which added a comparative perspective from within the focal case. The two external participants, one in a leadership role and one a more recent member, extended that comparison to other startup contexts facing similar challenges of process design, growth and knowledge management. The full composition of the sample, including role labels, tenure ranges and prior startup experience, is detailed in Table 1.

Table 1 - Interview sample

ID	Org	Role	Tenure at organization	Relation to process structuring	Prior startup experience
P1	Focal	Co-Founder	~2 years	Decision-maker *	No
P2	Focal	Co-Founder	~2 years	Decision-maker	No
P3	Focal	Co-Founder	~2 years	Decision-maker	Yes
P4	Focal	AI Engineer	~2 years	Executor	No
P5	Focal	AI Engineer	~1 year	Executor	Yes
P6	Focal	Software Development	~1 year	Executor	Yes
P7	Focal	Marketing & Client Ops	~6 months	Executor	Yes
P8	Focal	Intern (Software Development)	~4 months	Executor (recent joiner)	No
P9	Focal	Intern (Operations)	~4 months	Executor (recent joiner)	No
P10	Focal	Intern (Operations)	~4 months	Executor (recent joiner)	No
E1	Startup A	Chief Product Officer	~1 year	Decision-maker	No
E2	Startup B	Business Analyst	~10 months	Executor	No

*Owner of the recruitment process, used in the pilot application reported in Section 5.4.

All interviews followed the same semi-structured script (Appendix A), organized in five blocks covering the current work context, processes and structuring, adaptability, knowledge and onboarding and a final reflection on internal change and framework design. Interviews lasted between fifteen and forty-five minutes, were audio recorded with consent and were transcribed for analysis. Data collection proceeded iteratively alongside analysis, consistent with thematic saturation.

These sources played complementary roles in the study. Direct observation primarily informed the preliminary characterization of the problem in the focal context (Chapter 3), while the semi-structured interviews provided the systematic empirical evidence that is coded and reported in the findings (Chapter 5). Together, they triangulated the diagnosis, combining situated observation of how work is actually enacted with participants' own accounts of process design, adaptability and knowledge management.

4.2.2 *Data analysis*

The analysis followed a qualitative and iterative logic, consistent with both Design Science Research and Action Design Research and was oriented not only toward understanding the problem context but also toward deriving design requirements for the framework (Gregor & Hevner, 2013; Sein et al., 2011). Interview data were analyzed through thematic content analysis, supported by computer-assisted qualitative data analysis software (NVivo), which was used to organize the transcripts, develop the coding scheme and retrieve coded material in a transparent and traceable way.

Coding proceeded in an iterative sequence that combined deductive and inductive reasoning. A first, deductive frame was derived from the interview guide and the literature review, providing initial categories such as informal coordination, founder dependence, tacit and decentralized knowledge, process ambiguity, prior design attempts, onboarding difficulties, the tension between design and adaptability and perceived needs for greater structure. This frame ensured that the analysis remained aligned with the research questions. In parallel, an inductive, open coding pass was conducted to capture concepts that emerged directly from the participants' own accounts and that were not anticipated by the initial frame. This inductive step surfaced the more context-specific findings of the study, including the barriers that explain why informality persists even when its costs are recognized.

The coding was then organized following the logic of the Gioia methodology, which supports systematic inductive concept development by moving transparently from informant-centered terms to higher-order theoretical themes (Gioia et al., 2013). Concretely, the analysis progressed through three levels. First-order concepts retained the participants' own terms and expressions. These were grouped into second-order themes, which are researcher-level constructs that interpret and consolidate the first-order material. The second-order themes were then aggregated into a small number of aggregate dimensions, which provide the theoretical structure of the findings. The resulting data structure makes the chain of evidence visible, from raw informant language to the abstract categories used in the analysis and it is presented in the empirical chapter as the central figure summarizing the findings. Throughout this process, the coding scheme was refined iteratively: codes were merged, split and relabeled through constant comparison across transcripts and analytical memos were kept for each emerging dimension in order to record interpretive decisions and to support the later derivation of design requirements.

To examine the distribution of themes across participants, NVivo matrix coding queries were used to cross-tabulate codes against participants, which allowed the prevalence of each theme to be reported as the number and the proportion of interviews in which it appears. Prevalence counts are reported in the findings as a measure of how widely shared each theme is, while recognizing that, in a small purposive sample, the analytical weight of a theme does not depend solely on its frequency. Some findings raised by a single participant, in particular the direct proposals for what a framework should contain, were retained and reported as distinct contributions rather than treated as marginal.

As described in Section 4.2.1, the sample was purposive and oriented toward relevance to the phenomenon under study. Data collection and coding proceeded iteratively rather than as separate sequential stages, which is consistent with the principle of thematic saturation, namely the point at which additional interviews cease to produce substantively new themes and with the iterative logic of Design Science Research and Action Design Research. Several core themes reached saturation early, being evidenced across all interviews analyzed.

In line with the confidentiality commitments adopted in the study, the only name disclosed is that of the focal organization, Upgrade, and only with its agreement. No individual is named, whether from Upgrade or from the external startups that took part. Quotations are attributed using anonymized participant identifiers (P1-P10 for the focal organization and E1-E2 for the external startups). The role is referenced where it is analytically relevant, for example to distinguish the perspective of a founder from that of a developer. Because the interviews were conducted in Portuguese, quotations included in the findings are translated into English, with care taken to preserve the participants' meaning and, where a phrase functions as an in-vivo code, its original wording.

Finally, the analysis was explicitly oriented toward the derivation of design requirements for the framework. Recurring problems and needs identified through the literature, observation and interviews were translated into implications for design, so that issues such as process ambiguity, weak ownership, unstructured onboarding and difficulties in knowledge transfer were analyzed not only as empirical findings but also as indications of what the framework must be able to support. This analytical move provides the bridge from the empirical diagnosis to the design and evaluation of the artifact, which is central to the logic of Design Science Research (Gregor & Hevner, 2013; Sein et al., 2011).

4.2.3 Evaluation approach

As an artifact, the proposed framework requires evaluation, which in the Design Science Research Methodology corresponds to the demonstration and evaluation activities (Peppers et al., 2007) and, in Action Design Research terms, to the organizational intervention through which the artifact is confronted with practice (Sein et al., 2011).

To select an appropriate evaluation strategy, the Framework for Evaluation in Design Science (FEDS) proposed by Venable, Pries-Heje, and Baskerville (2016) was applied. FEDS organizes evaluation along two axes: a functional axis (formative versus summative: whether the goal is to improve the artifact during development or to confirm its effectiveness after it is in place) and a paradigmatic axis (artificial versus naturalistic: whether the evaluation is conducted in controlled, abstracted settings or in real organizational contexts with real users). The intersection of these axes defines four evaluation strategies, illustrated in Figure 2: Human Risk and Effectiveness (naturalistic and primarily formative, focused on the artifact's interaction with people in real settings), Quick and Simple (low cost and low rigor, suited to artifacts with low expected social and technical risk), Technical Risk and Efficacy (artificial and progressing from

formative to summative, suited to high-uncertainty technical artifacts) and Purely Technical (entirely artificial and summative).

The present study adopted the Human Risk and Effectiveness strategy because the framework is a socio-technical artifact whose value depends on whether it is actually usable and adopted by people in their organizational context. Accordingly, the evaluation was naturalistic, taking place in the real organizational setting with real users and primarily formative, aimed at assessing the artifact's feasibility and perceived utility and at surfacing refinements, rather than providing a summative, long-term measure of impact (Venable et al., 2016).

The evaluation was operationalized as a pilot application of the framework to a process within Upgrade, namely its recruitment process. Recruitment was selected because it is recurring, bounded enough to be addressed within the available time and already enacted in practice while remaining largely undocumented, which makes it a suitable target for structuring. It was also identified by the founders as a current priority for the company, which added organizational salience to this choice. In a working session with the process owner, the framework was applied through its per-process cycle to co-construct a single APS Process Profile, which constituted the demonstration that the framework can be used to produce its intended output.

Evidence for the evaluation was gathered from two complementary sources. First, the researcher recorded structured observations of the application itself, noting how feasible and how effortful each phase was, what was easy or difficult, the time required and any points of friction or ambiguity. Second, structured feedback was collected from the participants against a set of evaluation criteria derived from the design goals and from the literature on artifact evaluation (Peppers et al., 2007): the usefulness of the framework and of the resulting profile; its usability and the effort it demands; its fit with the startup context, in terms of lightness and adaptability; its adoptability and the participants' intention to continue using and maintaining the profile; and the perceived completeness of the resulting profile as a representation of the process. The instrument used to collect this feedback, referred to as the Process Pulse, is a short questionnaire administered before and after the session, covering the five dimensions listed above on a 1-5 Likert scale. The results of this pilot and the refinements it produced are reported in Chapter 5. Given that the pilot was a single application, generalized conclusions cannot be drawn from it, as discussed in more detail in Section 6.2.

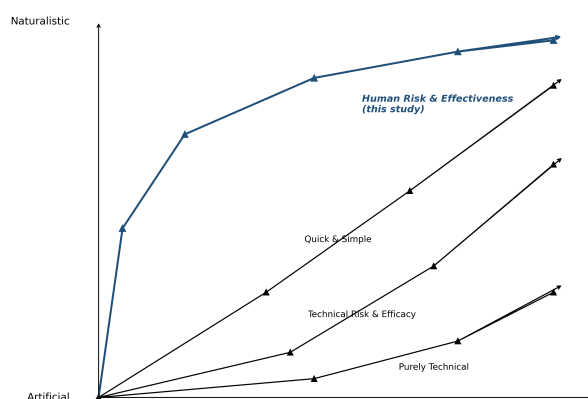


Figure 2 - The FEDS Matrix (Venable et al., 2016)

4.2.4 *Trustworthiness, reflexivity and ethics*

The study was conducted from an insider position, with the author directly involved in the focal organization throughout. This position carries advantages and limitations that cannot be fully resolved through procedural safeguards alone and combined with the qualitative nature of the analysis, required particular attention to reflexivity, trustworthiness and research ethics.

On one hand, the insider position allowed situated access to routines, coordination practices and process-related challenges that are difficult to observe from outside. It also supported the capacity to engage with the organization in the iterative, intervention-oriented logic of Action Design Research. On the other hand, it created a risk of bias and over-familiarity (the researcher's prior assumptions shape what is noticed), a risk of asymmetric access (participants are also colleagues, which may shape both questions asked and answers given) and a facilitator effect during the pilot application (the author's prior knowledge of the context may have reduced the effort that the framework appeared to require).

The first two risks were partly mitigated by treating the author's preliminary observations as provisional rather than as findings and by the broader credibility mechanisms described in the next paragraph. The facilitator effect is discussed as a limitation in Section 6.2 and identified as a target for future evaluation with external facilitators.

Beyond these mitigations, the qualitative analysis was assessed against the criteria of credibility, transferability, dependability and confirmability (Lincoln & Guba, 1985). Credibility was supported by triangulating the author's observation with internal participants and members of other startups, by informal member-checking with members of the focal organization, by reviewing emerging interpretations with the supervisor at FEUP and by actively seeking divergent accounts. Transferability was supported by a detailed description of the focal context and of the additional startup contexts, which allows readers to judge the applicability of the findings to other settings through analytical rather than statistical generalization (Flyvbjerg, 2006). Dependability was supported by a transparent and documented analytical process, combining a deductive frame with inductive open coding, analytical memos and matrix coding queries in NVivo. Confirmability was supported by maintaining a visible chain of evidence, from first-order, informant-centered concepts to second-order themes and aggregate dimensions, so that the interpretations remain traceable to the participants' own accounts.

Finally, the study followed standard research ethics. Participation was voluntary and based on informed consent and interviews were audio recorded only with the participants' agreement. The focal organization, Upgraiide, is identified by name with its agreement, given its central role in the study, while individual participants are not identified. They are referred to by role only where this is analytically relevant and their quotations are anonymized and translated from Portuguese.

5. Results

This chapter reports the results of the work conducted at Upgraid - Artificial Intelligence as the focal organization, complemented by interviews in two additional startups for cross-organization corroboration. It presents the empirical findings (Section 5.1), synthesizes them into a set of design requirements (Section 5.2), introduces the proposed framework, Adaptive Process Structuring (APS) (Section 5.3) and reports its preliminary application and evaluation in the focal organization (Section 5.4).

5.1 Empirical findings

This section presents the empirical findings of the study, drawn from the thematic content analysis described in Chapter 4. The findings are organized around the data structure shown in Figure 3, which traces the chain of evidence from first-order, informant-centered concepts to second-order researcher themes and to four aggregate dimensions: the informal operating model and the culture of informality that sustains it, the challenges of running informally, the challenges of moving toward designed processes and the principles for adaptive process design that participants converge on.

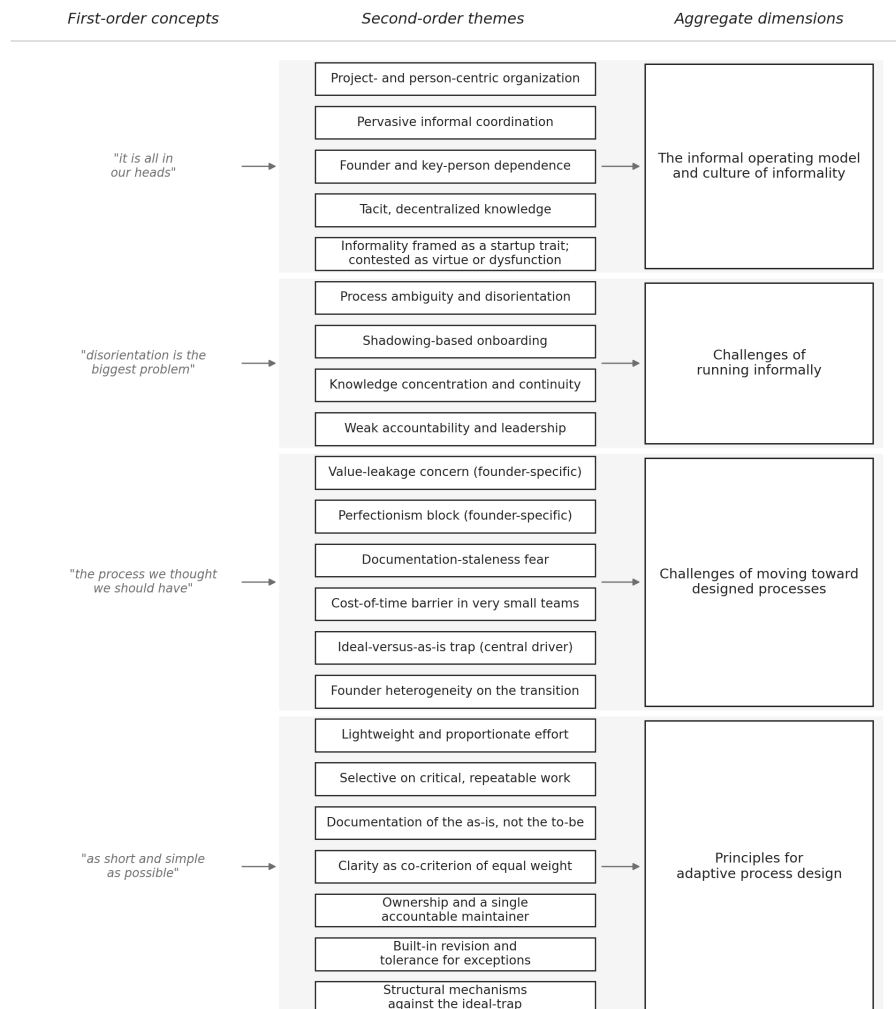


Figure 3 - Data structure from first-order codes to aggregate dimensions

5.1.1 *The informal operating model and the culture of informality*

The interviews provided consistent evidence that work in the case organization is coordinated informally and organized around individuals and projects rather than around defined processes, confirming the problem framing established in Chapter 3. A founder (P3) described the first year of the company as one in which work was "disorganized, not very formal, very startup style, with no clear definition of who does what". He also added that decisions were concentrated in the founders and tasks were distributed to "whoever was free" (P3). A recent joiner (P9) described the same dynamic from the perspective of someone trying to learn the work: "I see different people doing the same task in different ways and whoever leads each thing decides more or less how it will be done." A participant (P6) described the same baseline: "we are about twelve people and most things happen because everyone sits in the same room and talks a lot; there is no clear definition of who does what, in any written form."

The strongest formulation of the informal operating model came from another participant (P4), who, when asked which activities still depend on informal coordination, answered "at this stage, it is everything." P6 articulated the operational cost of this state: "everyone does a bit of everything and that looks nice at first, but in practice we end up with two people working on the same thing without knowing, or, worse, nobody on something because everyone assumed someone else was doing it."

Participants also consistently described knowledge as tacit and decentralized. A founder (P1) summarized the state plainly: "it is all in our heads." Another participant (P6) said the same with more precision: "the vast majority of how it is done here is in the memory of four or five people." These accounts establish the condition that the knowledge management literature identifies as increasingly fragile under growth.

The descriptions of how work runs are accompanied by an equally consistent reading of why it runs that way. The informal organization is framed as a feature of being a startup at this stage. The founder (P1) who described the first year as "very startup style" associated the absence of structure with the speed and uncertainty of the moment. A recent joiner (P9) made the connection between absence of process and flexibility explicit: "we are super flexible, but that is precisely because there is no standardization of processes."

The informal operating model identified at Upgraid was corroborated by both external startups, at different points along a maturity spectrum. The first external startup (E1) described a coordination model that runs largely on shared awareness rather than designed processes: few processes are formally defined and those that exist are consistently followed. The second external startup (E2), more mature, reported that "things are reasonably structured for a growing startup, with each person's role well defined," yet still suffered from leadership bottlenecks and undocumented daily work.

5.1.2 Challenges created by informality

While participants recognized the advantages of informality in the early phase, they described a set of recurring challenges that this informality produces as work and headcount grow. These challenges constitute part of the empirical answer to RQ1.

The most prevalent challenge was process ambiguity and the disorientation it causes, raised across all ten case-organization interviews. A recent joiner (P8) named it directly: "disorientation is the biggest problem." An engineer (P5) described having to reconstruct the work from scratch, explaining that "without guidelines we always end up either improvising a bit or simply forgetting and that always costs time."

Onboarding emerged as a particularly acute manifestation of these challenges, raised across every case-organization interview, with shadowing described as the dominant mode of knowledge transfer. A founder (P1) described the approach explicitly: "sit next to me, watch what I am doing and I will pass things on as we go." Another founder (P2) summarized this as "everything by osmosis: the new person sits next to someone, watches how it is done, asks and learns; it works, but it is slow and it consumes weeks of the time of people who are already overstretched; it is a form of transmission that does not scale." A recent joiner (P9) echoed the same point from the perspective of someone going through it: "they always put us in a situation where we have to figure out everything we need to do. If it were minimally defined and within that we had to explore and find our own way, it would be much better."

A related concern, raised across all case-organization interviews, was knowledge concentration. One participant (P4) articulated the stakes most sharply: "if the people who are here now leave and there is no transfer of knowledge about the processes, the company is left with nothing." One of the engineers (P5) acknowledged that, working largely alone, "I do not have things detailed enough for someone to pick up."

Participants also identified weak accountability and an absence of clear leadership structure as a challenge in its own right. One participant (P4) stated: "there is a huge lack of responsibility and it has to exist." One of the founders (P3) identified the same gap from the leadership side: "there was never anyone responsible at the technological level for making sure nothing goes wrong."

Both external startups confirmed the central elements of this set of operational challenges. The first external startup (E1) experienced them less acutely, while the second (E2) still reported leadership bottlenecks and undocumented daily work, despite roles being clearer at the formal level.

5.1.3 Challenges of moving toward designed processes

A distinctive contribution of the empirical material is that it explains why the informal state persists even though participants broadly agree it should change. Five challenges of moving toward designed processes emerged.

The first challenge is the value-leakage concern, articulated by one founder (P1): "if we have everything documented and accessible to everyone, the value of our company also becomes more transferable to everyone." The concern is that documented processes make the firm's accumulated know-how more easily transferable outside its current team.

The second is a perfectionism block, in which the perceived imperfection of the current process becomes a reason not to record it at all. The same founder (P1) described this as an error of his own, reframed in retrospect: "we made the error of assuming that because the process would evolve, it was not worth documenting and, today, I think that was a mistake." Another participant (P7), drawing on prior startup experience, explicitly rejected this framing: "it is better done badly than not at all, at least that way we can improve. If we have nothing done, we will just keep running into the same wall." This counter-position prefigures the principle, articulated in the following subsection, that documentation should default to the as-is even when imperfect.

The third is a documentation-staleness fear, which emerged across two interviews, one internal and one external. The binding worry is that a document written today may no longer match reality in three months, which makes the effort feel wasted. A participant (P6) formulated this most directly: "my biggest worry is spending a week designing a beautiful process and then a person changes role and everything I wrote stopped making sense; the feeling is, I lost a week." The participant from one of the external startups (E2) made the same point in scaling terms: "a two-year-old startup will not be writing processes in stone, because a year later it may be pivoting." This challenge is particularly design-relevant because it makes the response to it, namely planned revision and tolerance for exceptions, core requirements of the framework, not secondary considerations.

The fourth is a cost-of-time barrier in very small teams, surfaced in one external startup (E1) as a judgment that the effort of designing processes is disproportionate to the team's capacity to absorb it: "the time lost documenting and figuring out how to put the process into practice is not worth the effort."

The fifth is the ideal-versus-as-is trap, articulated with particular sharpness by a founder (P2) with prior experience of failed attempts at designing processes. The trap is the systematic tendency, when sitting down to document a process, to write what it should look like rather than what it actually looks like. The participant (P2) described a previous attempt in which the team spent an entire afternoon documenting the company's sales process, producing "a beautiful document, organized, with well-defined phases," and observed that "nobody opened that document again." When he went back to ask why, he discovered that "what we wrote that afternoon was not our sales process; it was the sales process we thought we should have." This trap is the central concern of the framework presented in Section 5.3, because it identifies the failure mode of past structuring attempts.

Although the literature anticipates a tension between explicit structure and adaptability (DeSantola & Gulati, 2017; Ries, 2011), this tension did not materialize in the participants' accounts. Only one participant strongly expressed the fear that designing processes leads to

rigidity. The dominant view, captured by P6, was the opposite: "A documented process that describes what you already do does not take any agility away from you; it only takes away your excuse for not knowing what you do. And when you need to change, you change the document. There is no intrinsic rigidity in documentation."

Taken together, the five challenges and the observation about rigidity converge on a single reading: the binding constraint in this context is the absence of designed processes, not their excess. The challenges identify the specific reasons documentation is felt to be costly, risky, or futile, and the ideal-trap names the systematic failure mode of past attempts that the framework must be built to resist. Together with the principles articulated in Section 5.1.4, these findings ground the design requirements derived in Section 5.2.

5.1.4 Principles for adaptive process design

When asked how processes could be designed without losing adaptability, participants converged on a coherent set of principles. These constitute the empirical answer to RQ2 and, notably, express in the participants' own terms the literature's distinction between rigid and adaptive arrangements.

First, participants believe the design of processes should be lightweight and proportionate. One participant (P4) argued that "processes should be as short and simple as possible, as agile as possible," while another (P5) reduced the requirement to its minimum: "it is one paper; it does not need to be super detailed, just a small guide for someone who has not picked it up yet," and a founder (P2) added a friction-reduction principle: "the framework must make this work fast; if documenting a process takes a week, no one will do it; if it takes an hour, maybe. The friction must be very low, because we are competing with everything else people have to do in a startup." A participant from one of the external startups (E1) expressed the same concern through the lens of knowledge sharing: "we prefer to share one-page, short messages, because the problem with corporates is accumulative information without relevance, a ten-page document."

Second, the design effort should be selective, targeting the work that is critical and repeatable while leaving sporadic work free. A recent joiner articulated this most fully, calling for "a mapping of the company, to understand our core, identify which actions or processes are repetitive and can follow a defined structure and where things are sporadic or hard to predict, leave freedom for creativity." A participant in the external startup added a concrete prioritization criterion, namely, to begin with the sensitive, repetitive bureaucratic areas of the company (salaries, leave, reimbursements, time tracking) and only later address the daily work.

Third, designing processes should default to documenting the current state, even when that current state is imperfect. This principle was evidenced across every case-organization interview. An engineer (P5) saw it as the starting point, "start from documentation, written and well detailed," a founder (P2) reframed his own earlier reservation as a prescription, "document the current process, even if it is not the one we always imagined doing," and a participant (P6) articulated the strongest version of the principle, namely that documentation must capture the

as-is, not the to-be: "documenting the ideal in place of the real is the worst of both worlds. Start with what you do today, even if it is ugly, even if you are ashamed of some parts. Only after you have that does it make sense to talk about improvements." He added a co-criterion of equal weight: "a truthful but unreadable process is as useless as an idealized one. It must be both: real and clear. A document that needs someone to explain it has failed; it must stand on its own."

Fourth, the design of processes requires clear ownership and a single accountable maintainer. A founder (P1) described an emerging practice in which "there is a person responsible for the process, not the one doing the operational work but one who validates at the end," combined with the need for "a master responsible for everything, who reviews what people do and chases what is missing." A participant (P6) articulated the same in a leaner form: "an owner per area, not per document; someone whose name is attached to the process and who knows that in three months someone will ask, is it still like this?"

Fifth, designed processes must remain adaptive, with built-in revision and tolerance for exceptions. A founder (P2) insisted that "there has to be a person responsible for ensuring the process evolves, so that if reality no longer matches what is documented, it gets updated." A participant (P6) articulated the explicit principle that the framework should assume documentation will go stale and design from there, with a quarterly check on whether the document still matches reality and a signal in the absence of any consultation over a period of months. The participant from one of the external startups (E2) framed the same point pragmatically: "a young startup will not write processes in stone, because a year later it may be pivoting."

A sixth and final principle emerged with particular weight in one of the interviews: that as-is faithfulness must be structurally enforced, not merely declared. The framework cannot rely on the goodwill of participants to resist the ideal-versus-as-is trap, because the trap is systematic; it must embed mechanisms that make slipping into the idealized version visibly harder than describing the real one. Three such mechanisms were named: questions that force describing exceptions ("when this step fails, what happens? When this condition does not hold, what is the alternative path?"), because "the truth lives in the exceptions"; the request for concrete examples for each step ("give me three real cases from the last six months in which this happened"); and clarity verification, ideally by someone who was not present during the writing.

Taken together, these principles describe adaptive process design rather than rigid arrangements and they sharpen it on a specific axis: the framework should externalize what already happens, accurately and readably and should keep that externalization revisable rather than freeze it. A complementary observation from the more structured external startup reinforces the gap that the framework addresses, namely that no model for designing processes specifically tailored to startups appears to exist. This supports the rationale for the artifact proposed in Section 5.3.

5.2 Synthesis of findings and identified design requirements

This section synthesizes the findings of Section 5.1 into a set of design requirements for the framework. The synthesis is organized around the four aggregate dimensions of the analysis, each contributing one component to the empirical answer to RQ1 and RQ2 and to the specification of the artifact developed in response to RQ3.

First, the findings confirm what the preliminary diagnosis (Chapter 3) and the literature reviewed in Chapter 2 had each described: work in the case context is informal, organized around projects and individuals and reliant on tacit, decentralized knowledge. Participants frame this informality as appropriate to the startup stage but also recognize that it produces a set of operational challenges as the organization grows (Table 2).

Table 2 - Challenges produced by the informal operating model

ID	Challenges produced by informality
I1	Process ambiguity and disorientation
I2	Weak and not scalable onboarding
I3	Knowledge concentration and continuity risk
I4	Weak accountability

Second, the findings identify five challenges that explain why the informal state persists despite consensus that it should change (Table 3). These constitute the empirical answer to RQ1: the specific obstacles a framework must address rather than assume away. The main challenge is the ideal-versus-as-is trap, which names the failure mode of past attempts in the focal organization: when documenting a process, people tend to write the version they wish they had rather than the one they actually run, producing documents that no one opens and reinforcing the perception that documentation is decorative.

Table 3 - Challenges of moving toward designed processes

ID	Challenges of moving toward designed processes
C1	Value-leakage concern
C2	Perfectionism block
C3	Documentation-staleness fear
C4	Cost-of-time barrier
C5	Ideal-versus-as-is trap

Third and most directly relevant for design, participants converged on a coherent account of what good process design would look like in their context (Table 4). These principles constitute the empirical answer to RQ2: the qualities a design approach must have to support scaling without undermining the adaptability and knowledge continuity that early-stage organizations depend on.

Table 4 - Principles for adaptive process design

ID	Principles for adaptive process design
P1	Lightweight and proportionate
P2	Selective targeting
P3	Document the current state
P4	Clear ownership
P5	Adaptive with revision
P6	As-is structurally enforced

Fourth, the two cross-organization interviews are consistent with the diagnostic patterns reported by the focal case, with one interview confirming the informal-coordination configuration, and the other reporting that, even with explicit role definition, leadership bottlenecks and undocumented daily work persist (Section 5.1). One of the external participants also observed that they had not encountered a model for designing processes specifically tailored to startups. While this single observation does not establish the absence of such a model in general, it is consistent with the systematic absence reported in the literature review (Section 2.6) and with the gap the framework is proposed to address.

5.2.1 Design requirements

Based on the synthesis above, a set of design requirements for the framework was defined. Table 5 lists each requirement together with its empirical basis in the themes summarized in Tables 2 to 4, the number of case-organization interviews in which it was evidenced and the corresponding literature anchor. Each requirement is developed below.

Evidence counts in Table 5 are based on the ten case-organization interviews. The two external interviews, integrated throughout Section 5.1 as cross-organization corroboration, are consistent with R1, R2, R5, R6 and R8.

Table 5 - Design requirements

	Requirement	Empirical anchor	Evidence (N=10)	Literature anchor
R1	Application to selected critical and repeatable processes	P2. Selective targeting	7	Not all processes require equivalent structure (synthesis of DeSantola & Gulati, 2017)
R2	Lightweight, concise and readily usable structures	P1. Lightweight and proportionate	7	Adaptive rather than rigid design (DeSantola & Gulati, 2017; Ries, 2011)
R3	Designated process owner and a single accountable maintainer	P4. Clear ownership	6	Decision rights and accountability (DeSantola & Gulati, 2017; Greiner, 1998)
R4	Faithful capture of the as-is, with clarity as a co-criterion of equal weight	C5. Ideal-versus-as-is trap; P3. Document current state; P6. As-is structural	10	Knowledge continuity (Sutton & Rao, 2014)
R5	Built-in revision routines and tolerance for exceptions	P5. Adaptive with revision; C3. Documentation-staleness fear	7	Dynamic capabilities (Cimino et al., 2025); feedback loops (Wiese et al., 2026)
R6	Defined reflection or review cadence	P5. Adaptive with revision; C3. Documentation-staleness fear	5	Build-measure-learn cycles (Ries, 2011)
R7	Team-wide participation, consistent with the constraints of a small organization	Inductive (structural property of small team)	1	Inductive - not anticipated by the literature
R8	Tooling and AI support, oriented to the reduction of structuring effort	C4. Cost-of-time barrier	10	Digitalization as a precondition for scalable execution (Hokmabadi et al., 2025; Bedoya Sánchez et al., 2026)
R9	Prior resolution of identity, vision and basic organizational structure	P4. Clear ownership	5	Structure precedes process (Greiner, 1998)

R1. Application to selected critical and repeatable processes: This requirement derives from principle P2 (selective targeting), evidenced in seven of the ten case-organization interviews. This requirement is established in the literature from two directions. Sutton and Rao (2014) treat scaling as the challenge of standards under growth, which presupposes a prior judgment about which standards matter. DeSantola and Gulati (2017) argue that the structures that emerge under growth are not uniform across roles or activities but elaborated where they matter for coordination. Dallas and Wynn (2014) make the parallel argument from the opposite direction, noting that comprehensive process modelling is not feasible in small, resource-constrained settings, which makes selectivity not a preference but a constraint. What the empirical material adds is the criterion participants use to make this judgment in practice: a process is worth designing when it is recurring, important for coordination or continuity and currently undocumented or under-documented.

R2. Lightweight, concise and readily usable structures: This requirement translates principle P1 (lightweight and proportionate), evidenced in seven of the ten case-organization interviews. This requirement is consistent with several strands of the literature. DeSantola and Gulati (2017) describe a persistent tension in growing ventures between flexibility and efficiency, in which heavyweight structures introduced too early can undermine the responsiveness that small teams depend on. Ries (2011) frames startup progress as iterative learning, which is incompatible with structures whose maintenance cost is high relative to the cycles of revision they need to support. Dallas and Wynn (2014) make the same case for small business BPM, calling for "streamlined, low-cost, self-managed and practical approaches, supported by guides and templates, even at the expense of exhaustiveness." The empirical material refines this further by specifying an operational threshold for what "lightweight" means in this context: a single process should be designable in hours rather than days, captured in a participant's articulation that "the friction must be very low, because we are competing with everything else people have to do in a startup."

R3. Designated process owner and a single accountable maintainer: This requirement derives from principle P4 (clear ownership), evidenced in six of the ten case-organization interviews. This requirement is also well established in the literature. Greiner (1998) frames the crises of growth as crises of coordination and control, resolved through clearer decision rights and accountability structures. DeSantola and Gulati (2017) explicitly include role structures as one of the dimensions of organizational design that must be elaborated under growth. The BPM literature treats process ownership as a foundational construct, with Dumas et al. (2018) defining it as a precondition for sustained process management. The empirical contribution at this level is the distinction the material draws between two ownership roles: a process owner who is accountable for the document being current, clear and updated and a maintainer or steward at the company level whose name is attached to the structuring effort as a whole. This distinction matches the literature's general call for explicit accountability but operationalizes it in a form that participants explicitly considered feasible in a ten-person team.

R4. Faithful capture of the as-is, with clarity as a co-criterion of equal weight: This requirement combines two principles, P3 (document the current state) and P6 (as-is structurally

enforced) and addresses the ideal-versus-as-is trap (C5) identified as the most relevant of the challenges. It was evidenced across all ten case-organization interviews. The empirical specification is that documents capturing the to-be in place of the as-is are not used and documents capturing the as-is but unreadable on their own are also not used; both conditions must hold simultaneously. The literature offers partial anchors. The knowledge management literature (Sutton & Rao, 2014; Koporcic et al., 2025) argues that operational knowledge must be made explicit if it is to be transferred but treats as-is faithfulness as an implicit precondition rather than a design requirement. The BPM literature distinguishes between AS-IS and TO-BE modelling but emphasizes the model as a basis for improvement, not the fidelity of the AS-IS as an end in itself. The literature on resilience engineering articulates a system-level gap between "work as imagined" and "work as done" (Hollnagel, 2014). The empirical contribution at this level is the identification of a distinct mechanism, the ideal-versus-as-is trap: the systematic tendency of designers who set out to capture the as-is to slip into the to-be without realizing it. It operates at the level of cognitive practice during the act of designing and is identified as the central failure mode of prior structuring attempts in the focal context, making it both descriptive and actionable for design.

R5. Built-in revision routines and tolerance for exceptions: This requirement translates principle P5 (adaptive with revision) and addresses the documentation-staleness fear (C3), evidenced in seven of the ten case-organization interviews. Participants articulated that designed processes must assume their own obsolescence, with the response being explicit revision rules and the formal allowance of tolerated deviations. This is consistent with the literature on dynamic capabilities (Cimino et al., 2025) and learning from failure (Koporcic et al., 2025), both of which frame adaptation as dependent on mechanisms that translate experience into revised routines. The data refines this with the specification of two design choices: the revision rule must be stated explicitly in each process document and exceptions must be allowed by design rather than treated as breakage. A signal of obsolescence also emerged: the absence of consultation of a document over a period of months is itself evidence that it may no longer be serving anyone.

R6. Defined reflection or review cadence: This requirement extends principle P5 (adaptive with revision) by specifying a cadence, also addressing the documentation-staleness fear (C3). Evidenced in five of the ten case-organization interviews, it represents a more specific articulation of the broader revision requirement (R5). The literature anchor is Ries (2011), whose build-measure-learn cycle prescribes a cadence of structured reflection on outcomes. The empirical contribution at this level is the identification of two equally supported cadence types: temporal (for example, a quarterly check) and event-based (revision tied to the next execution of the process). The pilot reported in Section 5.4 confirms event-based revision as appropriate for processes whose natural rhythm is re-execution.

R7. Team-wide participation, consistent with the constraints of a small organization: Although evidenced in only one case-organization interview, this requirement is derived inductively because it captures a structural property of small organizations that the entire sample shares by design but does not articulate explicitly. The author's direct involvement at

Upgraide (Chapter 3) provided first-hand evidence of this property: in a ten-person team, the knowledge required to populate a process design lives across multiple people, which means the distinction between a process owner and the executors holding the operational knowledge collapses to a practical observation about where the content sits. The connection to the literature is indirect but consistent. Dallas and Wynn (2014) identify team-based, self-managed approaches as a defining feature of streamlined BPM in small businesses. DeSantola and Gulati (2017) discuss the implications of a flat structure for how design decisions are made. The requirement therefore prescribes team involvement not as a value in itself but as the only way to capture the as-is faithfully in a small team.

R8. Tooling and artificial intelligence support, oriented to the reduction of structuring effort: This requirement addresses the cost-of-time barrier (C4) and was evidenced in all ten case-organization interviews, treated by participants as a precondition for the design effort to be feasible at all. The literature on AI adoption and digitalization in SMEs and startups establishes the case in one direction. Hokmabadi et al. (2025) and Bedoya Sánchez et al. (2026) argue that digitalization and AI integration depend on well-defined processes and reliable information flows. Cimino et al. (2025) frame AI adoption as dependent on the organizational capabilities required to embed it in routines. The BPM literature itself (Dumas et al., 2018) has long argued that process-aware information systems require explicit and stable process models to operate against. What the empirical material adds is an inverted use of this relationship: where the literature treats process structure as a precondition for AI, the participants in this study describe AI as a precondition for process structure, by reducing the friction of producing it. A recorded session processed by a general-purpose AI tool can produce a draft process design in minutes rather than days, which collapses a binding constraint that the literature on startup structuring has not been able to relax.

R9. Prior resolution of identity, vision and basic organizational structure: This requirement captures a foundational precondition that the design of individual processes presupposes, evidenced in five of the ten case-organization interviews. Participants articulated that the design of processes presupposes a foundation, namely a minimum of role clarity and organizational identity, without which structuring single processes is premature. The literature treats this requirement as foundational. Greiner (1998) argues that structure precedes process: each phase of organizational growth begins with the resolution of a structural question and the elaboration of process-level arrangements is one of the things that resolution makes possible. DeSantola and Gulati (2017) frame the role structures that emerge under growth as the necessary basis on which roles, rights and rules can be specified. The empirical contribution at this level is the treatment of the foundation as a precondition rather than as a step in the per-process cycle: the cycle is applied to processes only after the minimum of role clarity is in place.

Taken together, the nine requirements describe what the framework must produce, under what conditions it can be produced sustainably and what organizational arrangements must be in place for it to operate. These requirements provide the foundation for the framework presented in Section 5.3.

5.3 Proposed Framework: Adaptive Process Structuring (APS)

This section presents the Adaptive Process Structuring (APS) framework, developed in response to the design requirements derived in Section 5.2 and informed by the literature reviewed in Chapter 2. The framework combines elements from process design and Business Process Management, adapting them to the constraints of technology-intensive startups identified in the empirical material.

APS is structured around the design and externalization of existing processes, rather than their improvement. It externalizes the process as currently enacted, without assuming that the as-is is optimal or proposing modifications to it. This delimitation follows directly from the ideal-versus-as-is trap identified empirically as a recurrent failure mode of past structuring attempts.

The framework follows four design commitments, each grounded in the requirements of Section 5.2. Structuring is kept selective and proportionate (R2). The framework captures the as-is rather than an idealized version (R4) and prioritizes clarity in the representation produced (R4). Revision and tolerance for exceptions are embedded so the structure remains adaptive over time (R5).

These commitments are realized through three parts, illustrated in Figure 4: a foundation that establishes the organizational preconditions for structuring, a per-process cycle applied iteratively to each chosen process and an enabling layer of AI assistance that reduces the effort of producing each process design.

Section 5.3.1 positions the framework relative to existing approaches to process design. Sections 5.3.2 to 5.3.4 then describe the three parts in turn: the foundation, the per-process cycle and the enabling layer. Section 5.3.5 closes the presentation with the mapping of the framework's components to the design requirements derived in Section 5.2. Lastly, the preliminary application of the framework is reported in Section 5.4.

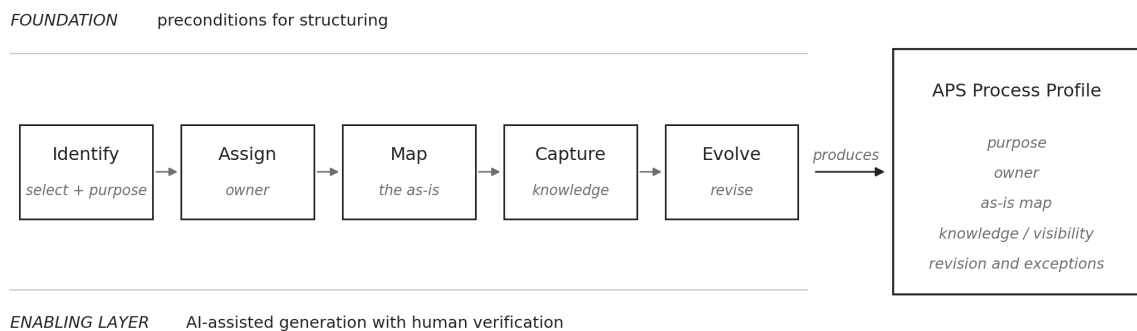


Figure 4 - APS Framework Architecture

5.3.1 Positioning relative to existing approaches

The framework draws on two established traditions in process design. The first is Business Process Management (BPM), which contributes the discipline of treating processes as identifiable, definable and revisable units, with explicit lifecycles, ownership structures and governance mechanisms (Dumas et al., 2018). The second is lean documentation based on Standard Operating Procedures (SOPs), which contributes the emphasis on lightness, repeatability and operational usability that makes documentation applicable in day-to-day work (Liker, 2004).

The framework operates at a different level of abstraction from either of these traditions. BPM and SOPs are representation choices: they specify how a process is documented whether as a BPMN diagram or a prescriptive step-by-step document. APS is a methodological guide that wraps around the representation. It specifies who is responsible for the structuring effort (the steward), what mindset principles must be in place, what cycle each process goes through, what structural prompts must accompany the capture and how the friction of producing the documentation is reduced through AI-assisted capture.

The representation produced within APS can, in principle, use any of the available notations. A team comfortable with BPMN can produce a BPMN diagram. A team that prefers prose can produce an SOP-style document. A team already operating in Notion can use a Notion page. APS does not displace the choice of representation; it adds a methodological layer above it, comprising the diagnosis-driven structural prompts that address the ideal-versus-as-is trap identified in Section 5.1, a designated role responsible for the structuring effort, mindset principles addressed to the team and an AI-enabling layer that reduces the friction of producing the documentation.

5.3.2 Foundation: preconditions for structuring

The foundation is established once and revisited as the company grows. It comprises two elements that the empirical findings showed to be prerequisites rather than assumptions: the establishment of a minimal organizational structure with role clarity (R9) and the designation of a framework steward (R3). Together, these two elements ensure that the organization is structurally and culturally ready to begin applying the framework to its processes.

Minimal structure and role clarity (R9) aims to ensure that, before any process is structured, the team has made explicit a minimum of organizational structure, namely who has decision-making authority over what and to whom each person reports. This is not a full organization chart or a heavy hierarchy, but the smallest amount of role clarity needed to assign process owners.

The second element is the designation of a framework steward (R3), the role participants described as a "master". At the company level, the steward is accountable for two things: ensuring that the framework is adopted by the team and that it is used accordingly across the organization's processes. The role is distinct from the per-process owners introduced in the

cycle (Section 5.3.3): the steward does not focus on a single process, but on driving adoption, prompting owners and keeping profiles alive across the organization. It responds to the diagnostic finding about why an earlier structuring attempt failed, namely that "there were no owners and no accountability", ensuring that someone is responsible for the structuring effort as a whole.

The steward role is supported by four adoption principles addressed to the team. These principles correspond to four of the five challenges identified in the empirical material as obstacles to the transition from informal to designed processes (Section 5.1.3): the perfectionism block, the ideal-versus-as-is trap, the documentation-staleness fear and the value-leakage concern.

The first principle responds to the perfectionism block by stating that a revisable baseline is more useful than no record, even when the process is not yet stable, so the team should document processes despite their imperfections. The second addresses the ideal-versus-as-is trap by requiring that documentation describe how the process actually unfolds, not an idealized version of it. The third responds to the documentation-staleness fear by treating revision as a continuous activity rather than a one-time effort, so that the document evolves alongside the process. The fourth addresses the value-leakage concern by calibrating access so that material reaches those who need it for their work, while content with strategic value is appropriately protected. The fifth challenge, the cost-of-time barrier, is not addressed at the mindset level but operationally, through the friction-reduction principle of the enabling layer (Section 5.3.4).

5.3.3 The per-process cycle

With the foundation established, the framework's per-process cycle is applied to each process selected for structuring. The cycle is enacted in a working session that brings together the steward, the people who execute the process and the relevant decision-makers, who together work through five phases, following the detailed session script provided in Appendix C. Identifying these participants is enabled by the minimal structure and role clarity established in the foundation, which makes decision-making authority and reporting lines explicit. The cycle is presented as an iterative loop rather than a one-time sequence: a first pass produces a usable baseline quickly and later passes deepen it.

1. Identify (R1): Recognize the process to structure and state its purpose in one line. Selection must be targeted at processes critical for coordination, continuity, onboarding, quality, or growth.

2. Assign (R3): Define the process owner, conceptually distinct from the executor. The owner is accountable for the process existing as a shared structure, remaining clear and accessible, and being updated as needs change. The steward ensures owners are named and held to this.

3. Map (R4): Design the process as it is actually enacted, representing the as-is rather than an idealized workflow: who executes it, what inputs are required, how activities unfold, what outputs are produced and what exceptions are tolerated. This is the point at which tacit, person-

bound work becomes shareable. To resist the ideal-versus-as-is trap, three structural mechanisms are embedded in this phase: questions that force the description of exceptions at each step, requests for concrete examples to ground each claim and clarity verification by a reader who was not present during the writing. The Map can take whatever form the team prefers: a step table, a flowchart, a plain-language work instruction, or any combination of these. This is also the phase where the enabling layer adds the most value (R8): from a single recording of the working session, the AI can produce these representations at low marginal cost and with consistency guaranteed by the shared source.

4. Capture (R4): Define what information the process depends on and where it should live. The focus is on listing the supporting materials needed (templates, evaluation rubrics, message banks, candidate or client databases) and the location they will occupy in the chosen workspace, not on producing the content itself. After the session, the enabling layer (Section 5.3.4) is used to generate drafts of these materials from the recording, so that the team ends with both the Process Profile and the scaffolding of the supporting materials.

5. Evolve (R5, R6): Keep the structure adaptive. The profile records the conditions under which the process should be reviewed and who is responsible for updating it, and it explicitly allows exceptions by design, so deviation is anticipated rather than treated as breakage. The revision rule can be temporal (for example, quarterly) or event-based (for example, at the start of each new execution of the process); the empirical material suggests that event-based rules are more naturally enforced in small teams. A signal of staleness is also defined: if no one consults the profile over a period of months, that is itself a sign that it may no longer be serving anyone and warrants review.



applied iteratively per process; each pass enriches the APS Process Profile

Figure 5 - APS Per-Process Cycle

The output of the cycle is a single APS Process Profile (Appendix B), a lightweight document organized in five sections that mirror the five phases. Identify records the process name, purpose and scope; Assign records its owner, executors and steward; Map records the step-by-step as-is, with the responsible role, inputs, outputs, tools and tolerated exceptions for each step; Capture records the workspace, supporting materials inventory and items pending refinement; and Evolve records the revision rule (temporal or event-based), the owner of revision, the tolerated exceptions and the signal of staleness. The profile is the consolidated artifact that the team consults, revises and shares.

5.3.4 *Enabling layer: AI-assisted generation with human verification*

The enabling layer operates across all phases of the per-process cycle. Its function is to lower the friction of producing the profile to a level an early-stage team can sustain (R8). AI is used in two ways. The first is the generation of a draft Process Profile from a recorded session: the recording is processed by a general-purpose AI tool with a structured prompt to produce the Process Profile. The second is the generation of supporting materials, such as databases, templates, rubrics and message banks identified during the Capture phase, with a single prompt. The framework does not prescribe a specific workspace. Notion, Drive-based document collections and Obsidian all appeared in the empirical material as viable options and the AI prompts (Appendix D) adapt to the conventions of each.

A central part of the enabling layer is human verification. All AI-generated output is treated as a draft: the process owner must review it in full, ensuring that the Profile and the supporting materials accurately reflect the process before being adopted by the team.

The use of AI carries four risks that the framework addresses through specific safeguards. Confidentiality is preserved by obtaining participant consent for recording, by running processing under the team's data protection policies and by selecting an AI tool that meets the organization's confidentiality requirements. The risk of hallucination, namely that the AI may introduce content not present in the session, is mitigated by two structural choices. First, the prompt in Appendix D was developed with explicit constraints and detailed structural context about what each phase of the profile must contain, which limits the room for the AI to extrapolate beyond what was said. Second, all AI-generated output is treated as draft material output passes through the human verification step described above. Loss of tacit nuance, since AI processing captures what was articulated rather than what was implied, is addressed by reviewing the draft profile with the owner and routine executors so nuances absent from the session can be added in revision. Tool dependence is avoided because the framework is model-agnostic: the prompts (Appendix D) do not depend on tool-specific features.

5.3.5 *Mapping of components to design requirements*

The framework incorporates the design requirements in different forms across its three parts: the foundation, the per-process cycle and the enabling layer. Table 6 summarizes the traceability of the framework to the design requirements derived in Section 5.2, mapping each requirement to the component of the framework that addresses it.

Table 6 - Mapping design requirements to framework components

Design requirement (Section 5.2)	Where it is addressed in APS
R1. Application to selected critical and repeatable processes	Identify (with the one-line statement of purpose for each process)
R2. Lightweight, concise and readily usable structures	Iterative cycle (fast first pass producing a usable baseline; later passes deepen it) Process Profile intentionally compressible into a few pages
R3. Designated process owner and a single accountable maintainer	Assign (per process) and the steward (company level)
R4. Faithful capture of the as-is, with clarity as a co-criterion of equal weight	Foundation (as-is over to-be principle) Map, with structural mechanisms against the ideal-trap;
R5. Built-in revision routines and tolerance for exceptions	Foundation (revision is routine principle) Evolve (revision rule and tolerated exceptions)
R6. Defined reflection or review cadence	Evolve (revision rule, either temporal or event-based; signal of staleness)
R7. Team-wide participation, consistent with the constraints of a small organization	Per Process Cycle: Session includes steward, executors and relevant decision-makers
R8. Tooling and AI support, oriented to the reduction of structuring effort	Enabling layer: AI-assisted generation of the Profile from a session recording and of supporting materials in the chosen workspace
R9. Prior resolution of identity, vision and basic organizational structure	Foundation: minimal structure and role clarity

5.4 Preliminary application and evaluation of the framework

The framework's foundation (R9) had been a recognized priority at Upgraide for some time. From the start of the author's involvement, there had been broad agreement within the team on the importance of formalizing a minimal role structure and designating someone responsible for process design, but the actual decisions had been repeatedly deferred. The author worked throughout the study to keep the question active in the team and to reinforce the underlying principles (Section 5.3.2) in day-to-day operational work. In parallel, in all interviews conducted for this study, participants raised the need for more clearly defined responsibilities and more structured processes, which accelerated the discussion within the team. One of the founders was subsequently designated for the role and assumed the corresponding responsibilities. The minimal role structure required by the foundation was also defined during this period, providing the preconditions for the per-process cycle reported in the subsections that follow.

With these preconditions in place, the framework was applied as a pilot to a recurring process at Upgraide, namely its recruitment process, in a single working session on 2026-06-02. The session is reported as a preliminary application, intended to surface a first reading of the framework's feasibility, usefulness and fit, consistent with the Human Risk and Effectiveness evaluation strategy described in Chapter 4. Accordingly, the pilot should be interpreted as a demonstration of use and a formative evaluation of the artifact, not as a summative validation of APS effectiveness across contexts.

5.4.1 Setup and baseline observation

Recruitment was chosen because it is bounded enough to be addressed within the session, already enacted in practice while remaining largely undocumented and was identified by the founders as a current priority. From the author's prior involvement in the organization, it was also evident that the process was undocumented and not enacted uniformly across cases, depending heavily on whoever was conducting it at the time. The session involved the process owner, who is also one of the founders, and ran for approximately thirty minutes, from opening to a fully drafted APS Process Profile. The compactness of this duration reflects the cycle under specific conditions, namely the enabling layer in use and a facilitator already in possession of organizational context. Under different conditions, a longer working block should be planned.

A short Process Pulse questionnaire was administered before any framing of the framework, capturing the owner's perception of the process along five dimensions on a one-to-five scale. It surfaced a sharp and internally consistent pattern: the owner rated the process as highly clear to himself (4/5 on overall clarity, 5/5 on ownership) and considered the information accessible (4/5), but gave the lowest possible score (1/5) to the question of whether someone new could follow the process today without his support and a 2/5 to whether it was clear how to revise the process or accommodate exceptions. These ratings support the reading that the process is internally clear and confidently enacted by its owner but tacit and non-transferable beyond him.

5.4.2 Application and outcome

The five phases were carried out as a single, uninterrupted conversation, audio-recorded with the owner's consent and guided by the script in Appendix C. The recording was subsequently processed by a general-purpose AI tool with a structured prompt (Appendix D), which produced a draft Process Profile (Identify, Assign, Map, Capture, Evolve) and an inventory of supporting materials to capture in the team's workspace (in this case generated for Notion by the same AI tool with a follow-up prompt).

The session opened with the Identify phase, in which the owner stated the purpose of the process in a single sentence and confirmed the scope. The Assign phase clarified ownership and named the routine executors. The Map phase was the longest and was analytically the most relevant. The owner described the process from its trigger forward in a linear, scenario-aware mode: "the trigger is this, the first step is this, then this happens and if it goes this way then this and if it

goes that way then that." This walk-through mode was natural to him and produced, within twenty minutes, a complete description of the process with approximately nine steps, two branching decisions, three rejection end states, one acceptance end state and one tolerated exception for top-tier candidates with strong referrals. The structure was captured first as a sequence and then translated by the AI tool, from the recording, into a flowchart and a step-by-step work instruction. The AI outputs were reviewed by the process owner before being committed to the profile.

The session also followed a specific methodological emphasis. It was conducted with an explicit instruction to capture the as-is, not an idealized to-be, in line with the framework's central design principle. The owner was asked to describe what is currently done, not what should be done and was encouraged to include exceptions and protocol asymmetries (for example, the communication channel that differs by candidate origin, which depended on his memory to be applied). The framework's prompts for forcing the description of exceptions and asking for concrete examples were used and were effective in surfacing details that the owner had not anticipated articulating. The session deliberately did not discuss any improvement to the process. The purpose of the application was to externalize what already happens, not to propose modifications to it. Improvement, if any, would be a separate exercise on the basis of the now-externalized representation.

The Capture phase produced a second analytically relevant observation. The owner identified the team workspace as the intended location for the profile and the supporting materials, but the act of listing what would have to be there to enable a new person to execute the process made visible that much of the necessary supporting material did not exist: message templates by contact channel, an interview script, a bank of challenges with evaluation criteria, an evaluation rubric per phase and a candidate pipeline database. The AI tool was used in a second step, with a follow-up prompt, to generate the structural foundations of these materials directly in the chosen workspace, including database schemas, table templates and skeletons of message templates ready to be personalized. This was done within the same session, so that the session ended with both the profile and a draft scaffolding of the Capture layer.

The Evolve phase produced a revision rule that the owner formulated himself: rather than a fixed temporal cadence (for example, quarterly), the profile is to be reviewed at the start of each new recruitment cycle. This event-based rule is naturally enforced by the cadence of hiring and was preferred by the owner. The framework accommodates both temporal and event-based rules; the choice in this case is one of fit to context.

The session produced a baseline APS Process Profile that did not exist before. The profile comprises a one-sentence statement of purpose, a clarified ownership structure, a step-by-step map of the as-enacted process with branching and exception logic, an inventory of supporting materials to capture in the team's shared workspace and an explicit event-based revision rule. The session also produced, as a by-product of the AI-assisted generation, the structural scaffolding of the Capture layer in the chosen workspace, including database schemas and templates ready to be populated.

This result is consistent with the friction-reduction principle that motivated the enabling layer's design: a single recorded session, processed by AI, produced in hours what previous attempts had described as taking days. In fact, the session produced both the Process Profile and the scaffolding of the supporting materials. Subsequent work involved only the personalization of the generated materials and their iterative refinement.

5.4.3 Participant feedback and reading of the application

The owner's immediate feedback at the end of the session was unambiguous. He found the mapping exercise easy to engage with and the framework's prompts (trigger, first step, scenarios, exceptions) natural to follow. He rated the output, both the profile and the capture scaffolding, at 5/5 in clarity for someone joining the team, contrasting it with the pre-session score of 1/5 on the same dimension. The act of walking through the process step by step was also useful to him personally: even though he had rated his own clarity at 4/5 pre-session, making the steps and the decision points explicit clarified them further and the generated capture scaffolding reduced the effort required to act on the profile.

The owner also acknowledged that, despite knowing the process well, the absence of a record had led him to forget steps that should have been performed (in his example, sending a particular type of rejection message). This is a direct illustration of why externalization is valuable even to the person who holds the process in mind: tacit knowledge does not protect against omission, but a referenceable baseline does.

The follow-up Process Pulse, administered approximately two weeks after the working session, structured the owner's evaluation of the framework against the five criteria defined in Section 4.2.3: usefulness, usability, fit, adoption and completeness. The owner rated the framework as maximally useful (5/5), highly usable (5/5) and well-fitted to the startup context (5/5). Adoption received a score of 4/5, reflecting a clear intention to continue using and maintaining the profile, while acknowledging that the strength of that intention has not yet been confirmed by sustained use across multiple recruitment cycles. Completeness received the lowest score, 3.5/5, with an explicit qualification by the owner: the structure of the profile and the scaffolding of the supporting materials are in place, but several content-level items, namely message templates, the interview script and the bank of supporting materials, still need to be populated with content he had not transferred in full during the working session. The profile will become more complete as those items are progressively filled in through actual use; each new recruitment cycle is expected to add templates, worked examples and refinements that turn the scaffolding into a fully populated reference. These scores are read as the preliminary perception of an internal sponsor and are not equivalent to validation by an independent user; this limitation is discussed in Section 6.2.

The owner's qualitative feedback reinforces this reading. He observed that the supporting materials are present as scaffolds and require his own content to be inserted, that the process itself was correctly captured, and that the overall organization of the profile is good. The direct confirmation that the process is correctly captured is analytically the most significant of these

observations, because it is consistent with the as-is faithfulness principle from the perspective that matters most, namely the person whose process was captured. The structural mechanisms in the Map phase, namely the questions forcing exceptions, the requests for concrete examples and the clarity verification, succeeded in producing a representation that the owner recognizes as the process actually runs.

The application supports two of the framework's main design decisions. The separation of design from improvement was respected throughout: the session externalized the process without changing it and the owner's feedback confirmed that the value lay in producing a referenceable baseline rather than in proposing changes. The friction-reduction principle of the enabling layer was also confirmed, with the combination of a recorded conversation and AI-assisted generation producing both the Process Profile and the scaffolding of supporting materials within a single working session.

The application also surfaced two refinements that have been integrated into the framework. The Capture phase, originally limited to identification, is now paired with post-session AI generation of materials. The Evolve phase, originally tied to a temporal cadence, now formally supports event-based revision rules for processes whose natural rhythm is the rhythm of their re-execution.

5.4.4 Adoption and organizational reception

The completion of the foundation discussed earlier had visible impact through the steward's active role and through the team's growing internalization of the adoption principles. Beyond this and beyond the pilot's direct effects reported in Section 5.4.3, broader signs of organizational adoption were visible during the period of analysis and in the weeks that followed.

The supporting materials identified in the Capture phase were populated with the data already available at the organization. Although no full recruitment cycle (from need identification to contract signing) took place during the period of analysis, individual recruitment activities such as candidate interviews and evaluations were conducted using the profile as a reference. The absence of a complete cycle means a before-and-after comparison cannot be drawn quantitatively. The application is therefore visible primarily in the existence of a transferable artifact where none existed before and in its use to structure these individual activities. After using the profile, the process owner expressed interest in applying the framework to other processes at Upgraiide and requested the session script (Appendix C) for reuse.

A broader reception was also evident in the period that followed: an increased awareness across the team of process structuring as an organizational concern and an explicit intention to make it a focus area of the company going forward. The framework was received not as a one-off intervention, but as a starting point for a longer effort on process structuring across the organization.

The evaluation in this study was qualitative. The framework's foundation was completed and the per-process cycle was successfully applied to recruitment, with the AI layer effectively producing the profile and supporting materials. The owner's feedback throughout was consistently positive, demonstrating the framework's acceptance and the owner's intention to continue using it across other processes. A quantitative evaluation was not conducted in this study and is identified in Section 6.2 as a direction for future work.

6. Conclusion and future research

This dissertation set out to develop a practical framework that enables technology-intensive startups to design their critical processes without sacrificing the adaptability that early growth requires. The work followed a Design Science Research approach grounded in Action Design Research principles and was conducted at Upgraide - Artificial Intelligence as the focal organization and complemented by interviews in two other startups for cross-organization corroboration. The findings provide direct responses to the three research questions guiding the study.

In response to RQ1, the empirical material identifies a stable diagnostic pattern. Work is usually organized around projects and individuals rather than processes and is coordinated informally, dependent on a small number of key people, with knowledge held tacitly and onboarding running on shadowing. This pattern was corroborated by the two external startups, which supports its transferability to similar early-stage contexts. Beyond these recurring symptoms, the study identifies five challenges that explain why the informal state persists despite consensus that it should change: the value-leakage concern (exposing the firm's strategic value through documentation), the perfectionism block (reluctance to record processes that are not yet stable), the documentation-staleness fear (worry that records become outdated and the effort feels wasted), the cost-of-time barrier (effort disproportionate to capacity in very small teams) and the ideal-versus-as-is trap. This trap, identified inductively from the empirical material, names the systematic failure mode of past attempts at process design in this context.

In response to RQ2, which asked how internal processes can be designed to support scaling while preserving adaptability and supporting knowledge management, the empirical material articulates six principles: lightweight and proportionate structure, selective targeting of critical work, faithful capture of the as-is with clarity as a co-criterion, clear ownership and a single accountable maintainer, built-in revision and tolerance for exceptions, and structural mechanisms to enforce as-is faithfulness against the ideal-versus-as-is trap. Together, these principles reframe the structure-adaptability tension. At this stage, the limiting factor for startups is the absence of designed structure suited to the context: one that promotes coordination and knowledge continuity but enables adaptation and learning.

In response to RQ3, which asked what design principles should guide a framework that helps technology-intensive startups design internal processes, the synthesis of literature and empirical material produced nine design requirements (Section 5.2). On their basis, the Adaptive Process Structuring (APS) framework was developed. APS comprises a foundation of minimal organizational preconditions, a per-process cycle of five phases applied iteratively to selected processes and an enabling layer in which artificial intelligence reduces the effort of externalizing a process. Four design commitments govern the framework: structuring is kept selective and proportionate, captures the as-is rather than an idealized version, prioritizes clarity in the representation produced and embeds revision and tolerance for exceptions. Its output is the APS Process Profile, a compact and revisable document. The framework was applied in a preliminary pilot at the focal organization, which surfaced a first reading of its feasibility, usefulness and fit (Section 5.4).

6.1 Contributions

The study makes four kinds of contributions: empirical, theoretical, prescriptive and practical. Empirically, the study identifies and characterizes the challenges and barriers that participants associate with the transition from informal to designed processes in technology-intensive startups. Five challenges were identified, of which three (the value-leakage concern, the perfectionism block and the documentation-staleness fear) had been partially identified in the literature, while two (the cost-of-time barrier in very small teams and the ideal-versus-as-is trap) emerged inductively from the empirical material.

Theoretically, the study contributes to the BPM literature by naming the ideal-versus-as-is trap: a cognitive failure mode that occurs during process design, in which the team's documentation substitutes a cleaner, idealized version of the process for the way it actually unfolds. The trap was identified by participants on the basis of previous failed attempts at process design in the focal organization. It is distinct from the as-is/to-be distinction in BPM (Dumas et al., 2018), which treats current-state and future-state modelling as separate analytical stages of the design effort, and from the work-as-imagined/work-as-done gap in resilience engineering (Hollnagel, 2014), which operates at the level of complex sociotechnical systems rather than at the level of process design itself. The trap explains the failure mode of previous process design attempts in the focal context and serves as the target for the structural mechanisms embedded in the framework (Section 5.3).

Prescriptively, the study derives nine design requirements for adaptive process design in technology-intensive startups (Section 5.2). Two of these are particularly central: R4 (faithful capture of the as-is, with clarity as a co-criterion) specifies what the framework must produce, while R8 (tooling and AI support oriented to friction reduction) specifies the conditions under which producing it remains feasible. Together, they articulate the framework's central commitment, which is to produce a faithful and readable externalization of existing practice at a level of effort that a startup can sustain. The remaining requirements specify the conditions, roles, cadences and organizational preconditions that make this move operational.

Practically, the study produces the Adaptive Process Structuring framework together with its output, the APS Process Profile, the session script and the AI prompts provided in the appendices, which together constitute a reusable artifact that technology-intensive startups can apply to their own processes. The framework's enabling layer uses AI to lower the effort of producing process documentation: a recorded working session can be processed by a general-purpose AI tool with a structured prompt to produce a draft Process Profile, a flowchart, a step-by-step work instruction and an inventory of supporting materials, with low user interaction. The contribution does not lie in claiming that elements such as ownership, documentation, or revision are individually novel, but in their combination into a framework that is light, focused on the as-is and supported by AI to remain feasible for technology-intensive startups.

6.2 Limitations and future research

The empirical material is drawn from a single focal organization. Two external startups were included for cross-organization corroboration, but two interviews do not establish transferability and are reported only as consistency checks. The design therefore does not support statistical generalization and any extension of the findings beyond the focal context rests on analytical inference from a small sample. Additionally, the study was conducted from an insider position. This was chosen for the access it provides to routines and process-related challenges that are difficult to observe from outside, but it carries a risk of bias, over-familiarity and asymmetric access to participants who are also colleagues. Reflexivity, triangulation with external participants and a transparent analytical process were used to mitigate this risk, but cannot fully eliminate it.

A further limitation concerns the role of the researcher as facilitator during the pilot application. Because the researcher was embedded in the focal organization and had prior knowledge of the organizational context, the application of APS may have benefited from contextual familiarity that an external or first-time facilitator would not possess. This may have reduced the perceived effort of the session and supported the translation of participants' accounts into the APS Process Profile. To mitigate this risk, the framework was codified through a session script, a fixed Process Profile structure and reusable AI prompts, so that its use does not depend solely on the researcher's tacit knowledge. Nevertheless, future evaluation should explicitly test whether APS can be applied by other facilitators, including users without prior involvement in the organization.

The evaluation of the framework is also preliminary, comprising a single working session at the focal organization, complemented by pre- and post-session Process Pulse measurements against the five evaluation criteria, with the feedback of the process owner. The evaluation captures the perspective of a single participant who is the process owner and a co-founder of the organization, which combines operational knowledge of the process being structured with structural authority over the framework's adoption. The resulting feedback is therefore a measurement of the framework's reception by its intended sponsor rather than by an independent user. Evaluation with non-owner participants, in particular new joiners attempting to follow the documented process without prior context, is identified as a complementary direction for future work.

The framework also operates within two deliberate scope decisions. First, it presupposes that the process to be structured has been identified a priori by the team as critical, recurring and worth designing. While the literature anchors R1 in selectivity criteria, namely coordination, continuity, onboarding and growth, the operationalization of these criteria into a systematic procedure for selecting processes lies outside the framework's present scope. Second, the framework is restricted to process design, not process improvement, as discussed in Section 5.3. These limitations open four directions for future research.

First, additional validation of the framework in other startups is needed to strengthen the transferability of the design beyond the focal case. The two external interviews conducted in

the present study provide cross-organization corroboration of the diagnosis and of several of the design requirements, but the application of the framework itself was carried out only at Upgrade. Further application sessions in startups of different maturities, in different sectors and with different organizational cultures, would provide a more robust basis for assessing the framework's adoptability and the conditions under which its design principles hold. A multi-case study, with the framework applied to the same type of process across several organizations, would allow comparison of how the as-is faithfulness principle, the friction-reduction principle and the structural mechanisms against the ideal-trap perform in contexts other than the focal case.

Second, quantitative impact studies would extend the evaluation of the framework beyond its present formative and qualitative scope. The Human Risk and Effectiveness strategy adopted in this dissertation (Venable et al., 2016) is appropriate at this stage, where the framework is new and the priority is to surface refinements rather than to make summative claims of impact, but a subsequent evaluation could test, quantitatively, whether the application of the framework effectively supports the transition that the dissertation set out to address. Plausible measures include the proportion of recurring processes that have a current Process Profile, the time required to onboard a new team member into a process, the consistency of execution across executors before and after designing the process, the rate at which profiles are consulted and the rate at which they are revised over time. A longitudinal design, with measurements before the application and at several points in the months that follow, would allow the effect of the framework to be distinguished from the effect of other organizational changes occurring in parallel.

Two further extensions of the work are the development of an instrument for process improvement on top of the present framework, and the operationalization of process prioritization within the Identify phase. Both would address questions that the present framework deliberately sets aside (Section 5.3) and would build on the externalized representation that this dissertation produces.

The dissertation set out to address a specific operational difficulty, namely how technology-intensive startups can move from informal and founder-dependent ways of working toward more structured internal processes, in a way that does not undermine the adaptability that early growth requires. The work produced a framework that responds to this difficulty, an empirical characterization of the challenges that explain why past attempts have repeatedly failed, and a preliminary pilot application that confirms the framework's feasibility in the focal context. The central finding of the study is that process design fails when it documents the to-be in place of the as-is. The framework embeds this principle through the structural mechanisms of the Map phase and the pilot application provides a first confirmation that the approach is feasible. Whether the principle holds across a wider range of startups and whether the framework supports the transition it was designed to address in a measurable way are the questions that the next stage of this research will need to answer.

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APPENDIX A: Interview Script

[PT]

Dados iniciais

- Função na organização
- Tempo na organização
- Experiência anterior em startups ou contextos semelhantes
- Envolvimento em coordenação de trabalho, processos ou gestão de equipes

Bloco 1, Contexto de trabalho atual

- Como descreveria a forma como o trabalho é atualmente organizado na empresa?
- Que tipo de tarefas ou atividades dependem mais de coordenação informal?
- Em que situações sente maior dependência de founders ou de pessoas específicas?

Bloco 2, Processos e formalização

- Existem processos já definidos ou documentados? Quais?
- Já tentaram formalizar processos anteriormente? Se sim, em que contexto?
 - O que motivou essa tentativa de formalização?
 - Como foi feita essa formalização? Foi através de documentação, ferramentas, definição de responsabilidades, rotinas, ou de outra forma?
 - Essa tentativa correu bem? Porquê ou por que não?
- Que dificuldades surgem quando os processos não estão claros?
- Em que áreas faria mais sentido formalizar processos?
- Que receios associa à formalização? Existe o risco de rigidez excessiva?

Bloco 3, Adaptabilidade

- Como é que a empresa lida atualmente com mudanças, ajustes ou novas necessidades?
- Na sua perspectiva, como se pode estruturar melhor o trabalho sem perder flexibilidade?
- Que características deveria ter uma abordagem de formalização para continuar compatível com um contexto de startup?

Bloco 4, Conhecimento e onboarding

- Como é que o conhecimento é atualmente transmitido dentro da empresa?
- Que dificuldades existem quando entram novas pessoas?
- Que tipo de conhecimento tende a ficar mais concentrado em certas pessoas?
- O que ajudaria a tornar esse conhecimento mais acessível e reutilizável?

Bloco 5, Reflexão final

- Que mudanças internas considera mais importantes para apoiar o crescimento da empresa?
- O que deveria incluir uma framework ou ferramenta para ajudar startups a formalizar processos sem perder adaptabilidade?

[EN]

Initial data

- Role in the organization
- Time at the organization
- Prior experience in startups or similar contexts
- Involvement in work coordination, processes, or team management

Block 1, Current work context

- How would you describe the way work is currently organized in the company?
- What kinds of tasks or activities depend most on informal coordination?
- In what situations do you feel greater dependence on founders or specific people?

Block 2, Processes and formalization

- Are there processes already defined or documented? Which ones?
- Have you previously tried to formalize processes? If so, in what context?
 - What motivated that attempt at formalization?
 - How was the formalization carried out? Through documentation, tools, the definition of responsibilities, routines, or in some other way?
 - Did the attempt go well? Why or why not?
- What difficulties arise when processes are not clear?
- In which areas would it make most sense to formalize processes?
- What concerns do you associate with formalization? Is there a risk of excessive rigidity?

Block 3, Adaptability

- How does the company currently deal with changes, adjustments, or new needs?
- In your view, how can work be better structured without losing flexibility?
- What characteristics should an approach to formalization have to remain compatible with a startup context?

Block 4, Knowledge and onboarding

- How is knowledge currently transmitted within the company?
- What difficulties arise when new people join?
- What type of knowledge tends to be concentrated in certain people?
- What would help make that knowledge more accessible and reusable?

Block 5, Final reflection

- What internal changes do you consider most important to support the company's growth?
- What should a framework or tool include to help startups formalize processes without losing adaptability?

APPENDIX B: APS Process Profile

A fillable Markdown template of the profile is available in the supplementary repository at <https://github.com/ritagp/aps-framework>.

APS PROCESS PROFILE

five sections, one per phase of the per-process cycle

Identify

process name · one-line purpose · scope

Assign

owner · executors · steward at company level

Map (as-is)

*step-by-step sequence with role, inputs, outputs, tools,
tolerated exceptions, end states*

Capture

workspace location · supporting materials inventory · examples

Evolve

*revision rule (temporal or event-based) · owner of revision ·
tolerated exceptions · signal of staleness*

APPENDIX C: APS Session script

This appendix provides the script used to conduct an APS working session for the design of a single process. It operationalizes the per-process cycle of the framework (Section 5.3.3) and is designed to be used by a facilitator with one or more participants who execute the process. The session captures the as-is, not the to-be and is intended to produce an APS Process Profile at version 0.1 (baseline). The cycle is designed to fit within a single working block. Its length depends on two factors: whether the enabling layer is in use (audio recording with subsequent AI processing of the profile and supporting materials) and whether the facilitator already has prior context of the organization. In the pilot application reported in Section 5.4, where both factors were in place, the session lasted approximately thirty minutes from opening to a fully drafted profile. When the facilitator requires a context-setting block with the team before entering the cycle, or when the profile and supporting materials must be drafted manually during the session rather than generated from the recording afterwards, a longer working block should be planned. When neither factor is in place, the working block should accommodate both context-setting and in-session capture.

The script is generic and process-agnostic; the prompts apply to any organizational process the team chooses to design.

Before the session

- Identify the process to design and ensure it meets the selectivity criterion (R1): recurring, important for coordination or continuity, currently undocumented or under-documented.
- Invite the process owner and at least one routine executor; if onboarding is a known pain, also invite a recent joiner.
- Schedule a single working block, with length adjusted to the conditions described above
- Confirm the workspace where the Process Profile and supporting materials will live (Notion, Drive, Obsidian, or other).
- Request consent to audio-record the session if the AI-assisted enabling layer is to be used.
- Open a blank document for the Process Profile with the five fields ready: Identify, Assign, Map, Capture, Evolve.

Session structure

Opening (3 minutes)

Frame the session in clear terms. Read or paraphrase the following: "The purpose of this session is to externalize the process we are about to discuss into a single shared document. We are not redesigning the process; we are capturing it as it happens today, including the

parts that feel imperfect. The goal is that someone joining the team next month can read the document and follow it. We will go through five phases of about five to twenty minutes each. I will be asking some questions that may sound repetitive; that is intentional, because the truth of a process lives in its exceptions. If you say a step is always done in a certain way, I will ask for examples. If you cannot give examples, we will write that you are not sure. We will not pretend the process is cleaner than it is."

If the session is to be recorded, state this explicitly and obtain verbal consent on the recording itself.

Identify (5 minutes) - purpose and scope (R1)

Prompt: "In one sentence, what is this process for? What result is it supposed to produce, in terms that would be useful to someone new to the team?"

Follow-up: "Are we talking about one process or several? If it is several, which one are we focusing on now?"

Notes for the facilitator:

- Accept a short sentence. If it stays abstract ("hire people"), ask for the underlying goal ("hire to guarantee what?").
- Confirm scope. If subprocesses are mentioned, choose one and note the others for separate sessions.

Capture in the Profile: process name, one-line purpose, scope.

Assign (5 minutes) - owner and roles (R3)

Prompt: "For this process to remain alive and current, who is the owner? Not the person who runs it every time, but the person who is accountable for it existing as a shared document, being clear and being updated when reality changes."

Follow-ups:

- "Who are the routine executors?"
- "Is there a steward at company level, distinct from this owner?"

Notes for the facilitator:

- Distinguish owner from executor in plain language if they are conflated.
- If two names emerge for the owner role, force a single accountable name.
- If the executors and the owner are the same person, that is acceptable but must be noted.

Capture in the Profile: owner, executors, steward.

Map (20 to 25 minutes) - the as-is (R4)

Opening prompt: "Now let us describe the process as it actually happens today, not as we would like it to be. What triggers the start of this process?"

After the trigger is named, conduct the walk-through with the following sequence of prompts:

- "What is the first step?"
- "And then?"

- "If [the previous step] succeeds, what happens? If it fails or has a different outcome, what happens?"
- "Who does that step?"
- "What goes in? What comes out?"
- "What tool or channel is used?"
- "Is there a decision here? Who takes it?"

Repeat until the process reaches its end states.

Exception forcing prompts, used at every step where the response sounds clean:

- "When this step fails, what happens?"
- "When this condition does not hold, what is the alternative path?"
- "Has there been a case in the last six months where this step did not go as you just described?"

Concrete example prompt, used when a step is described in abstract or principled terms:

- "Give me three real cases from the last six months in which this happened. What did you do in each?"
- "If you cannot give examples, we will record that this step has not actually occurred in this form."

As-is anchoring, used when the participant slips into the to-be:

- "That is how it should work. We will note it. What actually happens today?"
- "Are we describing the current process or the one we would like to have? We are doing the current one in this session."

Notes for the facilitator:

- Be descriptive, not prescriptive. If someone says "it should be like this," reply "let us fix what it is first and we will mark what they want to change."
- If two different versions of the same step emerge ("I do it this way"; "I do it that way"), record both and mark the divergence; this is itself useful empirical evidence.
- Mark any point where the participants hesitate or disagree; that goes to the observation sheet.

Capture in the Profile: sequence of steps, each with role, inputs, outputs, tool, exception and notes; plus end states and the tolerated exceptions to the standard flow.

Capture (5 to 10 minutes) - knowledge and visibility (R4 in its accessibility dimension)

Prompt: "Where does the information for this process live today? What information must be recorded for someone new to be able to execute the process? What concrete examples are worth keeping?"

Follow-ups:

- "Where do we want the Process Profile and the supporting materials to live? Notion? A shared drive? Somewhere else?"
- "What templates or worked examples are reusable? Message of first contact, interview questions, evaluation rubric?"
- "What is missing today that, if it existed, would make this process obvious to a newcomer?"

Notes for the facilitator:

- It is normal at this stage to discover that much of the supporting material does not exist. List what is needed; the AI-assisted enabling layer can then generate the scaffolding in the chosen workspace.
- Distinguish what must be shared from what can be access-controlled, if value-leakage concerns are present.

Capture in the Profile: workspace location, inventory of materials needed, examples and templates to add, the gap relative to what exists today.

Evolve (5 to 10 minutes) - revision and exceptions (R5, R6)

Prompt: "Under what conditions should this process be reviewed? Who is responsible for the review? What exceptions do we expect and how do we want to deal with them?"

Sub-prompts:

- Cadence: "On a temporal cadence (quarterly, semi-annually), or event-based (at the start of each execution, when a defined trigger occurs)?"
- Responsibility: "Does the owner do the review, or someone else?"
- Tolerated exceptions: "What cases may legitimately deviate from the standard flow and what is the rule for them?"
- Signal of staleness: "If no one consults this document for a defined period (for example, three months), do we treat that as a signal that it may no longer be serving anyone?"

Capture in the Profile: revision rule (temporal or event-based), owner of revision, tolerated exceptions, signal of staleness.

Closing and spontaneous reactions (3 minutes)

"The Profile is now drafted. Before I ask for the written feedback, three quick reactions: what was useful? what was missing? what would you change?"

Immediately after the session

- Save the Process Profile draft, version 0.1.
- If the session was recorded, process the recording with the AI prompt (Appendix D) to generate the formatted Profile, the flowchart and the work instruction.
- Generate the scaffolding of the Capture layer materials in the chosen workspace, with the follow-up prompt in Appendix D.
- Personalize the generated materials with the team's actual wording, links and rubrics.

Notes for the facilitator

- Resist the urge to redesign the process during the session. Any improvement idea that arises is noted in a separate "to discuss later" list, not in the Profile. The Profile is the as-is.

- Be alert to the four founder-level barriers identified in the empirical material (value-leakage, perfectionism, obsolescence, ideal-trap) and address them with the framework's adoption principles (Section 5.3.2).
- If the participants slip into describing how a process should work, the facilitator anchors back with the as-is prompt.
- If the recording option is used, state the use clearly, request consent on the recording itself and confirm where the recording is stored and for how long.

APPENDIX D: AI Prompts for Automated APS Generation

This appendix specifies the prompts used to operationalize the friction-reduction principle of the enabling layer (Section 5.3.4). Two prompts are used in sequence. Prompt 1 transforms the audio recording (or transcript) of a working session conducted with the script in Appendix C into a draft APS Process Profile, a flowchart of the as-is and a step-by-step work instruction. Prompt 2 takes the resulting profile and generates the structural scaffolding of the supporting materials in the team's chosen workspace.

The appendix specifies the structure of each prompt's output and the design requirements it operationalizes. The verbatim prompt texts in English and a Process Profile template are available in the supplementary repository at <https://github.com/ritagp/aps-framework>.

D.1 Prompt 1 - APS Process Profile from the session recording

Prompt 1 receives the audio recording (or transcript) of an APS working session and, optionally, the participants' role labels (owner, executor, recent joiner, facilitator). It produces a Process Profile at version 0.1 (baseline) in five sections, summarized in the table below.

Three principles govern the output. As-is faithfulness requires that only what participants describe as actually happening today be captured; aspirational content is recorded in a separate section. Exceptions are part of the process, so alternative paths and tolerated deviations are included in the Map rather than flattened into a linear flow. The clarity criterion requires the output to be readable on its own, in plain language, by someone who was not in the session.

The profile is produced in plain Markdown. Within the Map section, the as-is is rendered in three complementary representations: a step table, a Mermaid flowchart and a numbered work instruction, required to be consistent with one another when more than one is used.

Section	Content produced	Design requirement
1. Identify	One-sentence purpose; scope (included and excluded)	R1
2. Assign	Owner; routine executors; explicit exclusions	R3
3. Map	Trigger; step-by-step table (step, role, input, output, tool, decision, exception, notes); end states; tolerated deviations; divergences; Mermaid flowchart of the as-is (up to fifteen nodes, decisions as diamonds); numbered work instruction with who, when, what, output and references to materials in Capture	R4
4. Capture	Information locations; minimum information to record; inventory of supporting materials with existence flags	R4

5. Evolve	Revision rule (temporal or event-based); owner of revision; tolerated exceptions; signal of staleness	R5, R6
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D.2 Prompt 2 - Capture-layer scaffolding in the chosen workspace

Prompt 2 receives the Process Profile produced by Prompt 1, in particular Section 5 (Capture), together with the name of the workspace where the supporting materials should live. It produces the structural scaffolding of those materials (schemas, templates, skeletons) without personalized content; personalization is done by the team afterwards. The prompt is parameterized by the workspace and adapts its output to each, as summarized in the table below.

For each material category identified in the profile's Capture section (databases or pipelines, message templates, guides and scripts, evaluation rubrics, administrative materials), the prompt generates the corresponding scaffolding in the conventions of the chosen workspace. Where the profile names a material but not its content, only the skeleton is generated. Where the profile implies a set of statuses or categories without enumerating them, the prompt proposes a small set marked as suggested for review.

Workspace	Output produced
Notion	Single Notion AI prompt that creates subpages, databases with property schemas and views and template page skeletons
Excel	Workbook description with one sheet per database, typed column headers and validation rules and one sheet per text template
Word	Document outline with one section per supporting material and template skeletons as sub-sections
Drive	Folder structure with subfolders, file names and content skeletons for each file
Obsidian	Note hierarchy with frontmatter and templates including wiki-style cross-links

D.3 Use and reproducibility

The two prompts are used in sequence after a session conducted with the script in Appendix C. Prompt 1 typically transforms the recording into the profile in one to three minutes of AI processing; Prompt 2 generates the Capture scaffolding in one to two minutes. The personalization of the scaffolding by the team takes one to several hours depending on the number of supporting materials, but is decoupled from the working session itself, so that the session ends with a complete profile and the foundation of the Capture layer ready to populate.

The prompts have been tested with general-purpose AI tools that accept audio input or pasted transcripts and were used in the pilot in their Portuguese form. They are model-agnostic, do not depend on any tool-specific feature and are designed to be modifiable. Teams that wish to design a different type of process can use the same prompts without modification, since the

structure of the profile is the same across processes. Teams that wish to use a workspace not listed in Prompt 2 can extend the conditional clause at the start of the prompt with the conventions of the additional workspace. The use of the prompts presupposes that consent for recording has been obtained from the session participants and that the recording is processed in compliance with the team's data protection policies.

APPENDIX E: Declaration on the use of Large Language Models

The development of this dissertation made use of two Large Language Models (LLMs) at different stages of the work, each with a different role.

Claude (Anthropic) was used as a support tool throughout the writing process, including brainstorming around the framing of the problem and the structure of the argument, ideation support for the design of the interview script, drafting and editing assistance for the written text across all chapters and iterative discussion of how to present findings, framework components and analytical decisions.

ChatGPT (OpenAI) was used as a review tool, by submitting drafted sections of the dissertation for critical feedback and by soliciting alternative formulations and structural suggestions.

The substantive content of the dissertation, including the direct observation of the focal organization, the twelve semi-structured interviews, the analysis of the interview material, the design of the Adaptive Process Structuring framework, the pilot application and the analytical interpretation throughout, was developed by the author. All text included in the dissertation, including any drafted with LLM assistance, was reviewed, revised and validated by the author. LLMs were not used to fabricate data or to replace the author's analytical judgment.