Design Principles for Portfolio Agility – A Delphi Study

Joseph Puthenpurackal Chakko\textsuperscript{a*}, Tim Huygh\textsuperscript{b}, Steven De Haes\textsuperscript{a, c}

\textsuperscript{a}Antwerp Management School, Antwerp, Belgium
\textsuperscript{b}Open Universiteit, Heerlen, The Netherlands
\textsuperscript{c}University of Antwerp, Antwerp, Belgium

Abstract

The complexities inherent in modern business environments require enterprises to develop agile capabilities to manage their IT investments. While agile delivery practices at the team level have become ubiquitous, enterprises struggle to scale agility to the strategic level. This paper presents a set of design principles to foster agility at the portfolio level. We conducted a qualitative Delphi study to elicit insights from expert practitioners and derive nine design principles for portfolio agility through a consensus approach. These design principles describe how agile portfolios address the flow of value, information, and capital (resources) within their organizational context. Our results form the basis for creating a comprehensive design theory around portfolio agility and represent guidance rooted in practice to develop a portfolio capability that senses, assesses, responds to, and learns from environmental changes. In addition to identifying principles fostering portfolio-level agility, this study makes a unique contribution through its view of portfolio capability as an enabler of organizational flow.

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* Corresponding author. Tel.: +91-98804-29972
E-mail address: josephpc@yahoo.com
1. Introduction

Portfolio management is a critical IT governance capability to align an enterprise’s business strategies with its execution efforts and derive optimal value from IT investments. However, the increasing volatility and complexities in today’s business environments challenge traditional approaches to IT portfolio management as enterprises look to build capabilities for continuous evaluation and configuration of their options to deliver business value. Portfolio-level agility comprises two aspects – one, the ability to address the implications of adopting agile delivery practices at the team level [1], and two, the ability of the portfolio to sense, assess, rapidly respond to, and learn from change [2]. The success of agile methods within IT delivery functions has prompted enterprises to extend such practices to adjacent business domains to optimize coordination across teams and achieve business agility [3]. Several existing agile scaling frameworks offer practice recommendations for agility across the enterprise [4], including the portfolio level. However, these recommendations lack empirical evidence and robust underlying theories, leading to several implementation challenges [5]. While emerging studies on agile portfolios aim to address the lack of empirical evidence, there is little available by way of explanatory theories or a cumulative research tradition [6].

This study forms part of a broader design science research (DSR) effort to create a practice-oriented framework enabling agility within portfolio management. Through a Delphi study, we aim to address the research question: “What principles apply in designing a framework to foster portfolio agility?” As directional guidelines for enterprises to address the complexities of managing adaptive portfolios, we intend these principles to be non-prescriptive but implementable through practices relevant to the organizational context. Apart from their direct contribution to our ongoing research, these design principles contribute to portfolio management knowledge by offering a holistic set of portfolio agility enablers. Furthermore, these principles allow visualizing an agile portfolio capability as a system that enables “flows” of value, information, and capital (resources) within an organizational context. This contribution is novel, given the limited research available on the role of flow in IS portfolio management.

2. Background

Project portfolio management (PPM) is an enterprise capability to link project delivery efforts to organizational strategies and ensure outcomes that support business success [7]. The focus of PPM has evolved over the past several decades, shifting from managing an enterprise’s project mix through optimal selection, prioritization, and resource allocation mechanisms to being able to address change and uncertainty [8]. Portfolios maintain intricate links with their contexts [9] and find a balance between the enterprise’s deliberate and emergent strategies to achieve portfolio objectives [10]. Drawing from an IT agility conceptualization [11], portfolio agility must support the two dimensions of sensing and responding. In comparison, when viewed through a dynamic capabilities lens, portfolio agility extends to three dimensions – sensing, seizing, and reconfiguring [2]. Developing these capabilities also requires instituting learning routines and feedback processes to build a shared understanding of the “change – action – outcome” linkage [12]. This perspective also reinforces the view that organizational learning enabled by PPM acts as a “second-order” dynamic capability that transforms existing “first-order” dynamic capabilities while addressing operational changes [13]. Combining these perspectives, we conceptualize portfolio agility as an enterprise behavioral construct that allows sensing, assessing, responding to, and learning from environmental changes.

IT functions have increasingly adopted agile practices to be responsive to ongoing change and meet shrinking time-to-market expectations [14]; however, extending agile practices across the enterprise requires suitable adaptations to team-level practices [3]. Managing portfolios within agile environments must consider the implications to strategic alignment, continuous delivery, adaptive planning, learning through feedback, financial processes, and performance indicators [15]. Characteristics of agile portfolio management include transparency in resourcing and work efforts, collaboration within and across teams, leadership commitment to portfolios aligned to business strategies, and team-level persistence [16]. Despite the current limited research output, agile portfolio management presents opportunities for further investigations into its best practices and linkages to other organizational capabilities, like governance [6]. Enterprise-wide agile transformation efforts include maturing portfolio capabilities from having basic portfolio prioritization capabilities to a best-in-class level supporting innovation and business competitiveness [17].

Mechanisms such as the Scaled Agile Framework (SAFe) and Disciplined Agile (DA) have emerged in recent years to help practitioners scale agility across the enterprise [4]. Both mechanisms offer portfolio-level practices that
support enterprise agility and share several implementation success stories on their websites. However, objective studies about their foundational theories or empirical evidence on their contribution to portfolio agility are lacking. Moreover, SAFe and DA claim that their recommendations accelerate the flow of value within the enterprise. The concept of flow originates from lean manufacturing principles and is described as the means to deliver a smooth, continuous stream of value [18]. Although recent practitioner sources have several anecdotal references to flow, academic research on the role of flow in IS development, particularly on how it relates to IS portfolios, remains sparse.

The lack of explanatory theories to guide practice inhibits enterprises looking to develop agile portfolio capabilities specific to their contexts. Motivated by this knowledge gap, we embarked on a design science research (DSR) effort to design and investigate a framework to enable portfolio-level agility. A DSR approach is ideal for utilizing existing knowledge to create new solutions and extending the current state of practice and research in portfolio agility. The present study, deriving design principles, is part of the broader effort and aims to describe the approach and concepts to guide the design and implementation. We found two recent DSR studies on agile portfolios [19, 20] that offer design guidance on portfolio capabilities. While both studies have unique approaches to portfolio agility, they recommend strong IT and business collaboration, iterative and incremental approaches, and adapting to changing needs and requirements. However, they appear to focus on building responsiveness within agile portfolios, with no explicit direction for portfolios to sense change or create abilities to learn from inherent feedback mechanisms. Considering our extended conceptualization of portfolio agility, this lack of support for sensing and learning constrains the design theory in holistically guiding enterprises to portfolio agility.

3. Research Methodology

Design principles represent the “form and function” (the causa formalis) of a design theory [21] by describing the general rules, guidelines, or recommendations to guide the artifact toward achieving its intended goals. Practitioner insight into real-life success criteria and implications of practical instantiation complements the limited prior theory on portfolio agility to form the justificatory knowledge supporting the design process [22].

This study uses a Delphi method to elicit and distill input from selected expert practitioners to derive the applicable design principles. The Delphi method is a structured group communication process designed to solve complex problems by reaching a consensus among experts in a particular area [23]. This technique involves iterative anonymous surveys, controlled feedback, and statistical aggregation to assess consensus among participants [23, 24]. This method has found application in studies where the field of inquiry has intricate links to practice [25], precise analytical approaches are ineffective, instead requiring expert judgment coupled with alternate perspectives [23], and there is limited empirical evidence available [26]. Several IS studies have adopted the Delphi method for its inductive approach to building theory from experiential knowledge [24, 26]. Since the panel of experts for our study consisted of busy professionals from diverse geographies who needed much flexibility to ensure effective participation, the Delphi method presented a valid and pragmatic approach.

3.1. Research Design

The expertise and judgment of the participating experts are critical to the validity of a Delphi study [24-26]. Our target experts come from two categories: (i) industry practitioners in a CIO (or a similar) or portfolio leadership role from organizations employing formal portfolio management processes to govern their IT investments and utilize agile delivery practices within their IT functions, and (ii) experts from the IS consulting space with extensive experience in driving large-scale enterprise-wide agile transformations. We identified over 30 potential panelists who met our selection criteria and were willing to participate in our study by leveraging CIO and IT leader communities (e.g., CIONet) and professional networks (e.g., LinkedIn). Since the recommended panel sizes range from 10 to 18 participants [25], we chose 12 participants with expertise and experience in agile delivery environments, representing diverse industry sectors, geographies, business domains, and operating models. Throughout the study, we maintain anonymity within the panel to eliminate potential biases during selection and subsequent interactions with panel members. Table 1 shows a demographic distribution of the 12 experts who participated in this study.
We believe the relatively higher representation from the financial services domain is due to their inherent rigor in managing IT investments and their tendency to adopt modern technologies and delivery approaches. Similarly, many organizations have portfolio approaches adapted from existing organizational structures and processes.

3.2. Data Collection & Analysis

Our study relies less on existing theories and knowledge on portfolio agility, instead focusing on deriving design principles from practitioner expertise and insights, thus preventing theories from becoming ‘blinders’ to the research process [27]. We conducted the data collection and analysis in three phases: brainstorming, narrowing down, and consensus analysis [24-26].

3.2.1. Brainstorming

The primary researcher presented each panelist with a brief introduction to the Delphi process, a background to our research objectives, and a conceptual overview of enabling agility at the portfolio level to address changes in business expectations. An open-ended interview followed this introduction, where each expert reflected on their knowledge, experiences, and the background information provided to describe how enterprises address agility at the portfolio level across two dimensions: (i) managing implications from the use of agile delivery practices within IT teams, and (ii) addressing the frequent changes in requirements from business partners. Participants required occasional guidance in rephrasing their input to focus on principles and guidelines rather than specific practices, processes, or frameworks. Each participant’s input was individually captured as statements, and the participant had the opportunity to review, validate, and make any updates necessary. We had 113 statements across all participants after removing duplicates and aggregating semantically similar comments.

3.2.2. Narrowing Down

We coded these 113 statements and created a hierarchy of concepts to arrive at 19 themes. Each expert panelist received these themes and the complete list of statements for review and feedback on whether these 19 themes adequately represented their ideas. We received comments on the mapping for 12 themes and no comments on four, while several experts rejected three. Based on this feedback, we developed the initial list of 10 design principles for further assessment.

3.2.3. Consensus Analysis

This phase of the Delphi method, often requiring multiple iterations, aims to achieve consensus among the experts on the items assessed [24-26]. Through a web-based questionnaire, participants were requested to review each design principle (randomly ordered) and provide any feedback on the description of the principle. In addition, participants had to rate the principle for its relevance in fostering agility at the portfolio level using a 5-point Likert scale. Given the nature of our rating data, we assess the level of consensus by computing Krippendorff’s Alpha ($\alpha_K$) as a measure of agreement across the ratings from the different experts [28]. As a rule of thumb, an $\alpha_K > 0.8$ indicates strong agreement, $0.67 \leq \alpha_K \leq 0.8$ indicates moderate agreement, and $\alpha_K < 0.67$ indicates low agreement among the raters. The process repeats for each subsequent iteration until we obtain consensus (i.e., $\alpha_K > 0.8$) or a maximum of three iterations are conducted. (See Table 2)
Table 2 - Delphi Round and Consensus Level

<table>
<thead>
<tr>
<th>Delphi Round</th>
<th>No. of Design Principles</th>
<th>Krippendorff’s Alpha (α&lt;sub&gt;K&lt;/sub&gt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round 1</td>
<td>10</td>
<td>0.3349</td>
</tr>
<tr>
<td>Round 2</td>
<td>12</td>
<td>0.6337</td>
</tr>
<tr>
<td>Round 3</td>
<td>9</td>
<td>0.8379</td>
</tr>
</tbody>
</table>

In the first iteration, with ten design principles, the α<sub>K</sub> value indicated low agreement among the participants. We reworked the design principles having the most rating divergence based on the qualitative feedback and arrived at a revised list of twelve principles. In the second iteration, with the twelve principles, the α<sub>K</sub> value was slightly below the threshold for a moderate level of agreement. A vital feedback from this round was the suggestion that the principles could be clustered into appropriate thematic groups, leading to the design principles being further refined, rephrased, and reorganized. The third iteration received an α<sub>K</sub> value that indicates strong agreement among the participants.

4. Findings

As senior IT leaders managing enterprise portfolios in large-scale agile environments, our panel of 12 experts represents diverse, in-depth knowledge of portfolio management and agility in practice. Based on the Delphi study, we derive nine principles clustered under four categories to guide the design of a framework fostering portfolio agility.

Table 3 - Design Principles

<table>
<thead>
<tr>
<th>ID</th>
<th>Design Principle</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DP1</td>
<td>Recognize the organizational orientation</td>
<td>Adapting portfolio management to drive sustained agility requires a deep understanding of the organization’s context, including its business strategies, operating models, and cultural orientation. Given the intricate links portfolio practices have with the enterprise’s strategic planning activities, sustained leadership focus and commitment from top management are crucial in a culture of collective responsibility. As portfolio management activities often cross existing team boundaries and power structures in the organization, it is necessary to understand and adapt organizational structures, decision rights, and control mechanisms to support agile portfolios.</td>
</tr>
<tr>
<td>DP2</td>
<td>Form collaborative governance structures</td>
<td>Portfolio processes and organizing logic (e.g., business/technology service hierarchy) should enable effective governance of the value streams delivered through the portfolio(s). Portfolio structures must engage stakeholders across business, IT, and other shared functions that influence (or are influenced by) the value stream(s) represented by the portfolio(s). Initiatives and delivery efforts within the portfolio(s) are jointly reviewed, prioritized, resourced, and tracked for benefits realization while balancing the enterprise-wide vision and strategic directions with autonomous decision-making.</td>
</tr>
<tr>
<td>DP3</td>
<td>Center around business value</td>
<td>Portfolios must signal customer-centricity and focus on delivering desired customer outcomes and business value. Solutions driven by customer value propositions help foster a sense of shared accountability between business and IT stakeholders and form the basis for prioritization, progress tracking, and benefits measurement.</td>
</tr>
<tr>
<td>DP4</td>
<td>Prepare to pivot effectively</td>
<td>Structuring work efforts within portfolios into smaller units enables frequent delivery and rapid feedback to assess the potential impacts of changes in the strategic or operational environment. Shorter planning and review cycles across stakeholder groups ensure opportunities to adapt to emerging changes in business strategies and expectations. Portfolios should maintain sufficient resource buffers to accommodate unanticipated changes in delivery priorities.</td>
</tr>
<tr>
<td>ID</td>
<td>Design Principle</td>
<td>Description</td>
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<tr>
<td>DP5</td>
<td>Sustain the flow</td>
<td>The portfolio process manages the flow of business value from ideation to benefit realization within each customer value stream. Portfolios require relentless “cost vs. value” prioritization to balance inbound demand with available capacity and maintain sustained value flow. By making “work visible,” portfolios allow teams to pull work from a prioritized backlog and ensure highlighting and remediating any impediments to the flow of value. Portfolio practitioners provide the crucial business relationship interface, acting as the “front door” for feature and service requests and collaborating to progress them to their delivered outcomes.</td>
</tr>
</tbody>
</table>

**Principles of Information Flow**

| DP6 | Link strategy and execution | Portfolios should reflect a transparent alignment of strategic business objectives and the IT function’s delivery efforts. Portfolio-level investment themes help translate the broad strategic goals as the stated priorities, targets, and resource commitments to specific initiatives, delivery efforts, and associated product and service roadmaps in the portfolio backlog. Strategic portfolio reviews help continuously align emerging business priorities with current and future IT capabilities, guide investment decisions, and sustain portfolio objectives. The inherent feedback process enables organizational learning, innovation, and continuous improvements. |
| DP7 | Communicate transparently | Portfolios are the means to cascade business objectives, strategic roadmaps, and emergent changes to delivery teams with utmost clarity. They highlight information from IT delivery efforts on their current/future capabilities and the potential opportunities/challenges impacting business strategies. Collaborative approaches for portfolio updates, selection and prioritization of work efforts, team capability reviews, and resource allocation are essential to establish shared responsibilities and strengthen feedback loops. Timely dissemination of information through appropriate and consistent reporting mechanisms is an essential aspect of portfolio communications. |
| DP8 | Sense and assess change | Close partnership with business teams and enablement functions throughout the organization allows early sensing of changes. Portfolio practices should include formal and informal interactions to gather and assess potential opportunities and threats from the business, regulatory, and technology environment. Portfolios must leverage the enterprise’s internal and external partnerships and interactions with the business and technology ecosystems. Systemic feedback loops facilitate continual organizational learning by embedding experiences with past environmental changes to better assess future changes. |

**Principles of Capital (Resource) Flow**

| DP9 | Enable agile funding practices | Enterprises should fund persistent portfolios (and capacity) based on their investment themes instead of individual efforts. Performance of the iterative outcomes and emerging business risks and opportunities drive the funding for longer-term initiatives, allowing efficient adaptations and change responses. Participatory budgeting practices among beneficiaries enhance shared accountability and transparency. Portfolio budgets are spread over multiple investment horizons and aligned to the business’s strategic roadmaps. Finally, the financial performance of portfolios is continuously monitored through frequent reviews. |

Although these nine principles collectively represent an approach to achieving portfolio agility, we believe there are certain interdependencies among them. Similarly, several statements of the experts on our panel acknowledge the impact of a portfolio’s complex interactions with its internal and external contexts in sustaining agility.

5. Discussion

We identified nine design principles through a rigorous Delphi process in response to our research question. They form the guidelines enabling enterprises to achieve portfolio-level agility supported by collective insights from several expert practitioners from diverse industries and geographies. The principles are organized as enablers of value, information, and capital (resource) flows linked through the organizational context.

We find significant conceptual support from existing literature for these nine design principles. Since portfolio capabilities translate enterprise strategies to executed outcomes, their relationship to the enterprise’s internal and external context is undeniable [9]. Agile portfolios are characterized by close collaboration across practice domains [16], with associated governance mechanisms balancing the need for control with team-level autonomy [6, 19]. Portfolios within agile delivery environments focus on customer value and deploy visual management methods,
allowing teams to “pull work” from the backlogs and manage work-in-progress limits [15]. Transparent sharing of strategies, work items, and resource plans is a characteristic of agile portfolios [16]. Recent agile portfolio literature refers to financial methods like Beyond Budgeting, multi-horizon planning, funding persistent teams to avoid overheads of team switching, shortened review cycles, and customer-oriented metrics to define value [15].

We compare the design principles derived in this study with two recent DSR studies on portfolio agility identified earlier [19, 20]. Horlach et al. [19] iteratively build six design principles from literature and practitioner input; these principles map closely in intent to the design principles derived from this study. Our study confirms that enterprises must adapt their portfolio management capabilities considering their unique processes, structures, and information flows. Hoffmann et al. [20] use an activity theory perspective to create nine generic principles to support alignment, agility, and efficiency. Both studies describe how principles based on cross-functional collaboration, iterative and incremental approaches, and feedback loops help an agile portfolio respond to changes; they only implicitly reference the abilities to sense change and to learn and build capability. Our findings extend these studies with a more explicit elaboration of the role of sensing change and establishing learning routines (DP 8).

We recognize components of flow and lean thinking [18] in the design principles derived, thus emphasizing that the portfolio is a mechanism to enable the flow of value, information, and capital (resources) across the organization. The view of delivered value is fundamental to flow and closely relates to organizing around customer value streams (DP3). The notion of flow within a portfolio capability helps to enable continuous value delivery (DP5) instead of discrete outcomes. Structuring work efforts into smaller units (DP4) allows frequent adaptations to accommodate emergent strategies. We see this empirical evidence as a step toward further conceptualization of flow in portfolio management.

6. Contributions and Future Research Opportunities

This paper makes two contributions to portfolio agility knowledge. Firstly, it offers nine design principles to foster portfolio agility built on practitioner expertise and experience. These design principles are well-supported by existing literature and holistically address how portfolios can sense, assess, respond to, and learn from change. Secondly, our grouping of design principles portrays portfolio capability as a mechanism to optimally manage the flows of value, information, and capital (resources) within the organizational context, revealing the role of flows within a portfolio capability. This exemplification of portfolio-level flow in IS delivery environments is a novel and unique contribution to knowledge on portfolio management. Viewing a portfolio as a “flow-enabler” helps explain how agile portfolios can provide sustained enterprise value by facilitating a continuous stream of delivered customer outcomes from IT functions.

These design principles represent a toolkit to guide portfolio practitioners in designing optimal portfolio capabilities specific to their organizational context. In addition, these principles can also be applied to diagnose the effectiveness of existing portfolio practices in fostering agility.

Since the study is limited to deriving design principles from the collective experiences and insights of several expert practitioners, the effectiveness of these principles needs additional investigation. We expect these design principles to form a crucial part of the design theory supporting portfolio agility; along with the related testable propositions under development, these principles will inform the further efforts within our DSR effort. Our study establishes a practitioner focus on managing flows at the portfolio level; however, further research and reflection are required to theorize the role of flow in IS portfolios.

7. Conclusion

Our Delphi study derives nine design principles for a framework fostering portfolio agility based on practitioner expertise and insights. These principles demonstrate portfolio agility as a strategic capability managing flows of value, information, and capital (resources) across the enterprise, intricately linked by the organization’s unique context. This study contributes to the knowledge around portfolio-level agility and opens avenues for future research on flow within IS portfolios.