# Integrating Flow into Portfolio Agility – An Exploratory Study

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**Abstract**

While agile practices are widely adopted at the team level, extending agility to portfolio management remains a significant challenge, particularly in enabling continuous value realization within complex and volatile business environments. This paper explores how agility and value delivery within an Information Systems (IS) portfolio can be enhanced by applying the principles of flow and the Theory of Constraints. Through an exploratory single-case study within an Indian fintech organization, we identify a cyclical framework for improvement encompassing flow visualization, constraint identification, constraint-aware resourcing, work-in-progress (WIP) limitations, accelerated learning, and dynamic reprioritization. Moreover, the study highlights foundational enablers, such as flow-optimized funding, metrics, and governance, that collectively support agile portfolio capabilities. The findings indicate that applying flow principles and constraints management at the portfolio level helps to reveal bottlenecks, align resources strategically, enable rapid adaptation, and support system-wide optimization. The proposed conceptual framework advances the understanding of IS portfolio agility and offers actionable guidance for practitioners seeking to enhance the effectiveness and adaptability of portfolio management in dynamic enterprise contexts.

**Keywords:** Portfolio Agility, Flow Principles, Theory of Constraints, Value Delivery, IS Portfolio Management.

## 1. Introduction

Modern enterprise IT functions are increasingly focused on developing effective portfolio management capabilities to enhance their ability to respond to dynamic market conditions and sustain the realization of optimal business value from their information systems (IS) investments. These approaches emphasize continuous strategic alignment, ongoing adaptation to change, frequent feedback loops, iterative delivery, decentralized and autonomous team structures, and close integration with adjacent functional processes [29] to enable flexibility and effectiveness in managing strategic initiatives within complex, unpredictable, and volatile business landscapes. While enterprises have extensively adopted agile delivery practices at the team level, extending agility to the strategic level, particularly in portfolio management, remains an ongoing challenge [1]. Although several large-scale agile frameworks provide portfolio practice recommendations to help align execution efforts with business strategies and ensure smooth delivery of value across all IS investments, empirical studies explaining and validating the effectiveness of these recommendations are scarce [1], [11]. Some recent studies offer causal insights into an IS portfolio capability that senses and responds to environmental changes [7]; however, there has been limited focus on studying the ability to maintain a continuous and efficient flow of value from IS investments while being adaptive to environmental dynamics [19].

Identifying and managing portfolio-level bottlenecks such as resource constraints,

delayed decisions, and interdependencies is crucial to maintaining a sustained realization of value from an enterprise's IS investments. While several practitioner sources signal an increasing focus on enhancing the flow of value within IS delivery, there has been very little academic research into enabling flow within IS portfolios [10]. The principles of flow, with their roots in lean manufacturing, emphasize the importance of enabling a continuous stream of value delivery by minimizing waste and process interruptions [38]. Linked to this notion of flow is the guidance from the Theory of Constraints (ToC), a management approach based on the premise that in any managed system, specific constraints exist that limit performance; improving or eliminating such constraints could lead to significant performance uplifts. We posit that the application of flow principles and ToC to an agile IS portfolio capability complements its adaptive nature and augments its ability to deliver sustained business value. This is consistent with agility conceptualizations that highlight "continual readiness" in addition to the ability to sense, assess, respond to, and learn from emerging changes [6].

In addition to presenting a novel research direction, the dearth of studies on flows within IS portfolio capabilities also indicates a lack of consistent guidance to enterprises to enable continuous delivery and realization of business value from their IS investments. Motivated by this research gap, this paper addresses the research question, "*How can flow and constraints management be integrated to enhance agility and value delivery within IS portfolio management?*" through a case study. While the case reveals how enterprises can integrate flow management practices into their portfolio capability, we believe that the conceptual framework emerging from the study sets forth a research agenda for future investigations into flows within IS portfolio management.

Section 2 integrates existing literature on portfolio agility, flow principles, and ToC in the context of portfolio agility to form the background for our investigation. Section 3 outlines our research design, while Section 4 describes our findings from the revelatory case. In Section 5, we discuss our findings around the conceptual framework for enabling portfolio agility using flow principles, highlight the study's contributions to both theory and practice, and recommend an agenda for future research.

## 2. Background

This section provides a brief overview of the theoretical background for exploring portfolio agility, flow principles, and ToC in the context of IS delivery and management.

### 2.1. Portfolio Agility

Although portfolio management strives to optimize project selection, prioritization, and resource allocation while maximizing organizational value [5], [9], recent research shows a shift in focus toward adaptability and change readiness within portfolios to cope with the volatility and uncertainty inherent in modern business environments [18]. The close dependence and mutual interaction of project portfolios on the enterprise's internal and external contexts [21] also require the portfolio management capability to balance strategies emerging in response to changing circumstances with existing strategies and capabilities to achieve portfolio success [20]. Portfolio agility encompasses dynamic capabilities to *sense* changes and emerging opportunities, *seize* and exploit them through effective prioritization, and *reconfigure* existing resources, processes, and structures to achieve portfolio objectives [7]. Portfolio agility emphasizes flexibility, iterative planning, and continuous feedback [3] over traditional approaches characterized by linear, top-down, long-term planning and control mechanisms [17].

With enterprise IT functions embracing agile software delivery practices, IS portfolios struggle to reconcile tensions from two perspectives: first, across customer needs identified at the team level and strategies formulated at the enterprise level, and second, across the need to maintain team-level autonomy while addressing dependencies across individually adaptive efforts through coordination and regulation [35]. Agile portfolio management incorporates routines, structures, and values that promote transparent operation, facilitate seamless teaming, foster a commitment to strategic themes, and enable frequent feedback [34]. A deeper understanding of portfolio agility requires a systems-thinking approach,

given the complex and interdependent interactions within and across portfolio components due to agile delivery [29], [35].

While studies apply dynamic capabilities [7] and complex adaptive systems [35] as potential theoretical frames to understand portfolio adaptations to dynamic change, there is limited explanatory work on how portfolios balance adaptation with organizational context and efficient delivery of outcomes [19]. Recent work positions portfolio capability as an enabler of organizational flows around value, information, and resources [30] to open up research avenues around the role of flow principles in portfolio management.

### 2.2. Principles of Flow

The concept of flow originates from lean manufacturing, which focuses on cost reduction and eliminating waste [38]. Flow approaches to software development have emerged in the past decade, aiming to maximize customer value by minimizing waste, tackling variability, ensuring smooth information exchanges, and maintaining a holistic focus on the entire process rather than just localized improvements [25], [27]. Womack and Jones [38] positions the concepts that guide lean thinking as shown in Table 1.

Table 1 - Lean Thinking Concepts – derived from Womack and Jones [38]

| No. | Concept | Description |
|---|---|---|
| 1 | Value | Defined by the customer and guides the selection and prioritization of work |
| 2 | Value Stream | Represents a holistic view of the activities involved in delivering a product or service; this visualization helps identify waste and opportunities for improvement. |
| 3 | Flow | Refers to the continuous stream of work through the development process |
| 4 | Pull | Indicates work being 'pulled' from the queue for action based on customer demand and available capacity, and not pushed based on forecasts or previously determined plans |
| 5 | Perfection | Reflects the relentless focus on improvement through continuous waste identification and elimination |

While several seminal works on the application of lean principles to software delivery emphasize flow, their specific recommendations tend to vary. For instance, Poppendieck and Poppendieck [28] position optimizing the whole, focusing on customers, energizing workers, eliminating waste, enhancing learning, increasing flow, building in quality, and getting better as their guiding principles for lean software development. Reinertsen [31] offers principles of product development flow such as applying an economic outlook to product decisions, actively managing queues, exploiting variability, reducing batch sizes, applying WIP (work-in-progress) limits, using cadences and synchronization, enabling fast feedback loops, and decentralizing control. Tools like Value Stream Maps (VSM), Kanban boards, Cumulative Flow Diagrams (CFDs), and metrics like cycle time, lead time, and throughput are used to visualize, measure, manage, and improve flow [2], [4], [25], [26]. In essence, applying flow principles to software development provides a framework to manage work that prioritizes smooth and continuous value delivery, waste reduction, process visualization, and adaptability in complex IS environments.

Applying flow principles to portfolio management represents an evolution in portfolio thinking. Although certain large-scale agile frameworks adopt some of these principles and tools at the portfolio level (e.g., Lean Portfolio Management offered by the Scaled Agile Framework), empirical research into their implementation effectiveness or potential explanatory theories is conspicuously absent [10]. Flow takes on a systems perspective to the smooth movement of work, value, information, and resources within an IS portfolio capability, aligned with the organizational context [30]. The emphasis on visualizing work progressing through the portfolio system, delivery, identifying and managing constraints and variability, and the limiting of work-in-progress are crucial elements of managing flow within an IS portfolio capability [31].

### 2.3. Theory of Constraints (ToC)

The Theory of Constraints (TOC) provides a systematic approach to identifying and addressing the constraints that limit system performance [14], [16]. From its origins as a production optimization approach, ToC has evolved considerably into areas such as supply chain management, organizational performance improvement, cost/throughput accounting, and product mix management [23]. A continuous improvement cycle referred to as the five

focusing steps is central to the ToC approach: identifying the constraints, exploiting them, subordinating other processes to the constraint, elevating the constraint, and then repeating the process [14]. The ToC thinking process presents a group of logical tools for rigorous, system-wide cause-and-effect analysis that permits a move beyond symptomatic fixes to address core problems [16].

Drum-Buffer-Rope (DBR) is a scheduling and flow control technique derived from the ToC, where the pace of delivery is set by the limiting constraint (*Drum*), a strategic time or material inventory reserve is maintained before the constraint to protect it from disruptions or upstream variances (*Buffer*), and the flow of work into the system is maintained within constraint limits through a synchronized release mechanism (*Rope*) [16], [36]. Applying the DBR to an IS portfolio of agile efforts involves identifying its primary constraint (often a resource) as the "drum," deploying adequate time or resource "buffers" immediately upstream to protect the constraint, and using a "rope" mechanism like release planning to enforce efforts launches aligned to resource capacity and buffer consumption to prevent constraint overload [22]. This approach, adopted into the project management discipline as the Critical Chain Project Management (CCPM) method, is finding mention in recent portfolio management literature [13], [24].

## 3. Research Design

### 3.1. Method

This study employs an exploratory single-case design to explore how incorporating flow principles and constraints-focus can enhance agility and value delivery within IS portfolio management. The unique setting offered by our purposively chosen case organization to study previously unexplored aspects of flow and constraints management in an IS portfolio management context motivates the choice of a single-case design [8], [39]. The single case approach also offers an appropriate starting point for theory building that can later be extended through additional cases or other methods [12].

Our data collection involved semi-structured interviews with open-ended questions. Although guided by our interview guide, the interviews facilitated a natural conversation flow around the main topics, allowing respondents to share their experiences, express their views, and raise any issues they considered relevant. The primary contact within the case organization helped identify seven respondents across the enterprise to provide a balanced view of the value delivered through the IS portfolio capability. The interviews were conducted as virtual meetings of about 45 minutes. We reviewed additional data sources, including internal reports, planning documents, and dashboards, to clarify and validate the interview narratives. Manual reviews of the auto-generated transcripts and subsequent respondent validation helped mitigate bias and ensure data reliability. Validated transcripts were coded inductively [32] to identify themes and categories from our interview data. We shared preliminary findings and analysis with respondents to confirm our interpretation.

Table 2 - Respondent Profiles

| ID | Role | Years in Org. | IT / Business |
|---|---|---|---|
| R1 | CTO | 4.5 | IT |
| R2 | Head – Engineering | 7.0 | IT |
| R3 | Tech Delivery Lead | 5.5 | IT |
| R4 | Agile Coach | 4.0 | IT |
| R5 | Lead - Value Mgmt. | 2.5 | IT + Business |
| R6 | Product Manager | 6.5 | IT + Business |
| R7 | Head – Core Aggregation. | 7.0 | Business |

We adopt established methodological guidance to ensure trustworthiness and quality in our study [15]. Triangulating interview data with information from other sources, like dashboards and reports, helps enhance the credibility of our research. The validation of interview narratives and interpretations by respondents contributes to confirmability. In contrast, our interview protocol, research notes, and the trail of data collection and analysis steps promote the study's dependability. Although this single case study doesn't offer direct transferability, its detailed narratives provide an ample basis for naturalistic generalization,

permitting readers to recognize similar patterns in their respective organizational contexts.

### 3.2. Case Description

The selected case organization[1] ('FinTechCo') is an Indian fintech company operating as a secure, consent-based intermediary for financial data sharing. Generating revenues of roughly $49M across three business lines with almost 900 employees (including service partners), it serves over 2.2M retail users and more than 180 corporate clients, including banks, non-banking financial services firms, insurance companies, other fintechs, and corporate houses. FinTechCo is among the top account aggregators in India, based on transaction volume, and prides itself on being technology-driven and focused on data security. The IT function, led by the Chief Technology Officer (CTO), has about 160 people (including contractors) and manages an annual budget of $12M. The development teams use Scrum with two-week sprints and employ several technical practices like trunk-based development, automated continuous integration and continuous deployment (CI/CD) practices, test-driven development (TDD), and automated testing. FinTechCo uses a homegrown method to scale delivery efforts to the product level. Product engineering decisions within the IS investment portfolios are managed using Kanban boards and monthly Release & Integration Planning (RIP) reviews. FinTechCo's business environment is highly volatile, marked by intense competition, cost and revenue pressures, emerging regulations, and technical innovations. To continue addressing these challenges while consistently delivering business value, the FinTechCo IT function has actively incorporated flow concepts into its IS portfolio management capability, while nurturing a continuous improvement philosophy rooted in constraint identification and resolution; thus becoming an ideal revelatory case for our study.

## 4. Findings

We begin this section by describing the agile portfolio capability at FinTechCo to highlight the organizational context for this study. We identify six conceptual elements that form a reinforcing cycle, enhancing value delivery and portfolio agility. Furthermore, our findings encompass three additional conceptual elements that are foundational to supporting the above cycle.

### 4.1. Portfolio Capability in FinTechCo

FinTechCo manages its IS investments across multiple portfolios (three aligning to the business lines and a fourth supporting internal capabilities, like end-user services, Human Resources, Finance, and Supply Chain Management) with clear product orientation. The company translates its business strategy into investment maps, which are reflected in the annual product roadmaps. The strategic initiatives are spread across three time horizons: (a) core, where the focus is on tactical delivery, (b) growth, looking for incremental growth, and (c) explore, covering bets aiming to scale and transform existing business models. Kanban boards are used to track the progress of initiatives across the five stages of Concept, Backlog, Build, Deploy, and Release. These Kanban boards serve as information radiators and dashboards, providing stakeholders real-time visibility into current and future work, as well as resource capacity.

The Value Delivery Council (VDC) is the primary governance structure for directing and monitoring IS efforts within FinTechCo, comprising the CEO, CTO, CFO, the heads of Operations, and the three business lines. They are responsible for the annual product roadmaps and formally review the progress of their strategic initiatives at the quarterly Horizon meetings. The IT function coordinates a monthly Release & Integration Planning (RIP) meeting that includes the Tech Delivery Leads and Product Managers to review and resolve any shared dependencies, emerging constraints, and future plans.

Delivery teams and managers review metrics like cycle time, lead time, aging in state, and flow distribution to ensure that their delivery efforts represent a smooth flow of work. The focus on constraint-driven continuous improvement is exemplified through initiatives

[1] We use the anonymized term FinTechCo to refer to the case organization for privacy, compliance, and ethical reasons.

like the 'flow police', a volunteer-driven team that analyses flow metrics to identify 'waste' in the form of rework, delays, resource constraints, process inefficiencies, or technology debts. WIP limits established at the team and portfolio levels promote focused delivery and reduce context-switching. FinTechCo's release cadence is driven by product and business priorities, while its business planning follows the 90-day cycle of the quarterly Horizon meetings. We find that additional portfolio cadences are introduced to synchronize delivery around the pace of constrained resources. Additionally, strategic portfolio buffers are placed within the delivery flow to handle unplanned work and emergent opportunities.

### 4.2. Integrated view of portfolio agility

Based on the findings from this case, we present a conceptual framework for portfolio agility, integrating flow principles and ToC into a portfolio management capability. There are two parts to this framework (See Figure 1). The first part outlines a self-reinforcing improvement cycle that enhances the flow of work and value through an IS portfolio. The second part shows the foundational elements that support flow-based portfolio capability.

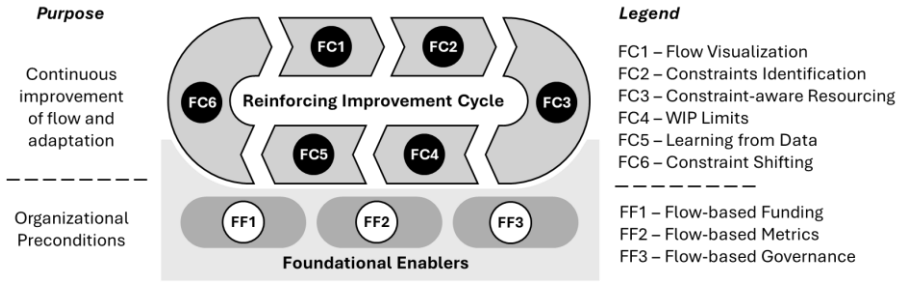


Figure 1 - Conceptual framework for portfolio agility

The following sections describe our findings, structured around the six improvement cycle elements (FC1 to FC6) and the three foundational enablers (FF1 to FF3).

### 4.3. Integrating flow and constraints management

The following six conceptual elements emerged from the interview narratives and are seen operating cyclically to enhance portfolio agility and value delivery.

#### *Flow Visualization (FC1) to reveal constraints*

Kanban-based management systems implemented at the portfolio level give visibility into work patterns and queues. Flow visualization helps teams and leadership see the work progress from ideation through release, and improves their ability to identify delays, bottlenecks, and inefficiencies within the system. Table 3 describes aspects relating to this area that emerged from the interview narratives.

Table 3 - Flow Visualization

| No. | Emerging Aspects | Supporting Narrative |
|---|---|---|
| 1 | Work visualization | • *"Once teams saw the entire stream of work, including upstream requests and downstream value metrics, it was like we switched the lights on*" [R1]<br>• "*A shared language to discuss demand and capacity*" [R4]<br>• "*Visualizing work in terms of problems to solve and outcomes to deliver*" [R6]. |
| 2 | Making the invisible visible | • *"Visualization helped us see the invisible load, like ad-hoc tasks and support tickets, that ate into delivery time*" [R2]<br>• "*Surfaced invisible work, especially security and infra dependencies*." [R4] |
| 3 | Planning maturity | • *"Turned planning from wishful thinking into constraint-aware sequencing*." [R3]<br>• "*That visualization linking strategy to work is what lets us manage from intent, not just effort*." [R7] |

#### *Constraints Identification (FC2) enables strategic focus*

Once critical factors impeding overall flow and value delivery are identified, FinTechCo prioritizes and allocates resources to minimize the impact of the constraints. The relentless focus on identifying constraints also induces a more strategic approach, shifting from broad improvements and local optimizations to more targeted interventions offering system-wide benefits. We also find that cross-functional (non-IT functions) involvement in constraint

framing leads to systemic impacts. Table 4 shows the aspects of constraint identification that we observed through our interviews.

Table 4 - Constraints Identification

| No. | Emerging Aspects | Supporting Narrative |
|---|---|---|
| 1 | Broader systemic focus | • "*Most of our flow stoppages were waiting for architecture approvals or security reviews. So we decentralized a lot of that and built in automated compliance gates*" [R1]<br>• "*Even if the tech is ready, if those upstream steps lag, value delivery gets delayed*." [R7]<br>• "*Our biggest bottleneck was always integration environments … treated it like a systemic constraint … introduced environment-as-a-service. That alone cut our average lead time by 25%*" [R2] |
| 2 | Cultural pivots | • "*When we get jammed up, we don't immediately reach for a process fix. We ask what's slowing us down?*" [R3] |
| 3 | Constraints across functions | • "*The constraint wasn't always dev capacity, it was often in decision latency. A feature would sit in funding approval purgatory longer than it took to build*" [R5]<br>• "*I learned the hard way that approvals from our legal and compliance folks could stall work for weeks. We now map that as part of our delivery flow. It's not just a dependency, it's a constraint we actively manage*" [R6] |

### *Constraint-aware Resourcing (FC3) optimizes throughput*

Strategic allocation based on resource or funding constraints has improved throughput across FinTechCo's entire portfolio. Resolving constraints includes protecting scarce (or constrained) resources by implementing appropriate buffers (in the form of resources, time, or capital) to maintain consistent flow through the system bottlenecks. We observe that FinTechCo deploys strategic and specialized buffers (See Table 5) to address unpredictable demand.

Table 5 - Constraint-aware Resourcing

| No. | Emerging Aspects | Supporting Narrative |
|---|---|---|
| 1 | Buffer allocations | • "*Capacity buffers … planned under-utilization at the portfolio level"*[R4]<br>• "*Identified our 'drum' teams - the ones pacing the rest - and built buffers around their cadence.*" [R4]<br>• "*Buffers used to look like inefficiency. Now we model them as strategic reserves. That mindset shift took time, but it's enabled more agility than any process tweak*." [R5] |
| 2 | Specialized buffers | • "*Not as slack, but as recognition that emergent work will come. It protects high-value bets from getting cannibalized by firefighting*" [R1]<br>• "*Design debt buffer … helped reduce frustration and quality drift*" [R2] |

### *WIP Limits (FC4) accelerates feedback and learning*

Constraints management intentionally limits work-in-progress (WIP) at the portfolio level to retain focus on strategic objectives and accelerate the delivery flow. By reducing multitasking and context switching, WIP limits free up cognitive and organizational capacity, shortens cycle times, and improves visibility into outcomes. This creates faster and more focused feedback loops that strengthen organizational learning and enable timely adaptation. Table 6 shows the themes emerging around WIP limits.

Table 6 - WIP Limits

| No. | Emerging Aspects | Supporting Narrative |
|---|---|---|
| 1 | WIP limits | • "*WIP limits aren't about slowing things down, they're about focus. When everything's a priority, nothing moves*." [R7]<br>• "*Infra engineers were working on eight parallel infra-as-code projects. All critical. All stuck. We paused half, focused on finishing the top three*" [R3]<br>• "*Helped us avoid self-inflicted pressure. When we overcommitted, we made poor trade-offs just to hit timelines*" [R6] |
| 2 | Context switching | • "W*hen you hit your limit, don't pull more—swarm, unblock, or escalate … prevents death-by-context-switch for engineers*[R2]<br>• "*I learned the hard way that approvals from our legal and compliance folks could stall work for weeks. We now map that as part of our delivery flow. It's not just a dependency—it's a constraint we actively manage*" [R6] |

### *Learning from Data (FC5) drives evidence-based prioritization*

FinTechCo complemented their accelerated feedback and learning cycles with (automated) processes to collect the empirical evidence required to inform portfolio reprioritization and enact data-driven decisions around value creation. Flow metrics and value measurements from existing delivery practices contribute to responsive portfolio adjustments that align

with emergent strategic opportunities. Table 7 lists the related aspects identified.

Table 7 - Learning from Data

| No. | Emerging Aspects | Supporting Narrative |
|---|---|---|
| 1 | Flow metrics | • "*We track four core metrics: flow velocity, load, time, and efficiency. But here's the trick … we look at trends, not snapshots*" [R1]<br>• "*Look at flow load … because when that spikes, burnout's not far behind. Those indicators spark much better conversations than just sprint burndown charts*" [R4] |
| 2 | Integrated learning | • "*After-action reviews not just on delivery misfires, but on product decisions—like pricing, feature uptake, and channel performance*" [R6]<br>• "*Portfolio reviews … the whole leadership layer reflects on what slowed us down, what surprised us, and what we'd never do again*" [R1] |
| 3 | Prioritization drivers | • "*Feature fade" metric … to identify where we overestimated value. That data feeds straight into prioritization for the next cycle*" [R6] |

### *Constraint Shifting (FC6) through dynamic reprioritization*

As portfolio priorities shift in response to new learning, emerging value, constraints, and organizational context, FinTechCo finds its system constraints also shifting to different parts of the value delivery system. We also observe that implementing WIP limits drove more frequent and dynamic portfolio reprioritization (the WIP limit itself being an induced constraint). Thus, as part of their continuous improvement process, FinTechCo addresses system constraints as they emerge, rather than treating them as fixed bottlenecks.

Table 8 - Constraint Shifting

| No. | Emerging Aspects | Supporting Narrative |
|---|---|---|
| 1 | Dynamic constraints | • "*We've institutionalized a 10% 'strategic buffer' in our delivery capacity. It's reserved for emergent opportunities …. That space is what keeps us agile at a business level*" [R1]<br>• "*We run quarterly retros on the system, not individual initiatives, on how the whole thing is working … identified friction between legal review timelines and agile delivery. That led to a fast-track path for low-risk features*" [R4]<br>• "*When a feature flops, I can pivot resources. If something's gaining adoption, I can double down without waiting for the next annual cycle.*" [R5] |
| 2 | WIP limits driving reprioritization | • "*We've set a rule: each strategic investment theme can only carry a max of two active initiatives. That's forced better prioritization and clearer trade-offs*" [R7]<br>• "*Now we enforce a strict 'one major, one minor' work-in-progress policy. We finish more, learn faster, and avoid that half-baked syndrome*" [R6] |
| 3 | Non-obvious constraints | • "*Time-in-queue analysis across domains and realized test environment contention was a huge blocker. That wasn't anyone's 'ticket'—but it was everybody's problem.*" [R6] |

## 4.4. Foundational elements

We derive three insights from the interview data that establish foundational support for the cyclical process of enhancing flow, agility, and value delivery within IS portfolios.

### *Flow-based Funding (FF1) enables responsiveness*

Traditional portfolio funding processes often become constraints themselves by locking resources into predetermined initiatives. Implementing flexible budget processes, such as dynamic budget cycles and stream-based funding, permits FinTechCo to pivot faster and (re)allocate resources more readily in response to emerging constraints and opportunities. Table 9 showcases the funding practices observed at FinTechCo.

Table 9 – Flow-based Funding

| No. | Emerging Aspects | Supporting Narrative |
|---|---|---|
| 1 | Dynamic budget cycles | • "*Moving away from annual budgets to rolling forecasts. It's not 'beyond budgeting' yet, but it's definitely 'budgeting with a learning loop'*" [R5]<br>• "*Rolling funding tied to traction and learning. If a feature flops, I can pivot resources. If something's gaining adoption, I can double down"* [R6] |
| 2 | Stream-based funding | • "*One change I appreciated was the shift to funding product areas, not just projects. That gave us more freedom to re-sequence based on what's working or what's urgent*" [R3]<br>• "*Assess 'fuel burn' per initiative: money spent vs. value hypothesis progress. If the hypothesis stalls, funding pauses until there's clarity.*" [R1] |
| 3 | From controller to strategic partner | • "*Finance now participates in our quarterly portfolio reviews. That's been a game-changer - they understand context, not just numbers*" [R6] |

### *Flow-based Metrics (FF2) to enhance portfolio agility*

In contrast to traditional portfolio metrics that focus on resource utilization as a primary performance measure, flow-based metrics reflect the portfolio's ability to deliver value

rapidly. These measures offer transparency into the actual delivery capability rather than a theoretical capacity based on resource availability, signaling an increased shift in thinking from efficiency to effectiveness. Table 10 indicates the aspects of portfolio management enabled by flow-based metrics.

Table 10 - Flow-based Metrics

| No. | Emerging Aspects | Supporting Narrative |
|---|---|---|
| 1 | Transparency & decision support | • "*We track concept-to-cash across streams. And we correlate that with defect escape rate and engineering rework. That gives us a much more holistic picture of flow health*" [R2]<br>• "*Pairing flow data with value realization curves. It helps us tell if faster delivery is actually resulting in faster impact or if we're just shipping more stuff with no lift*" [R5] |
| 2 | Exposing system constraints | • "*Flow distribution metrics … uncovered that nearly 40% of work was unplanned, bug fixes, production issues, ad-hoc asks*." [R4] |
| 3 | Adaptive prioritization | • "*If a team validates a strong signal from an MVP, we reallocate without a multi-week approval process.*" [R1]<br>• *We use Monte Carlo simulations … teams shift from date-driven to probability-informed planning. Way better for managing stakeholder expectations - and sanity*" [R2] |

### *Flow-based Governance (FF3) enhances value throughput*

Replacing traditional portfolio control mechanisms with flow-based governance systems that feature lightweight practices coupled with adaptive guardrails enables smooth value flow while maintaining appropriate oversight. The concept of 'value' is crucial to flow-based systems, and FinTechCo anchors its definition of value on product usage and customer feedback. Spreading IS efforts across multiple flexible investment horizons, with appropriate governance focus, helps create balanced throughput. Themes around flow-based governance observed in FinTechCo are described in Table 11.

Table 11 - Flow-based Governance

| No. | Emerging Aspects | Supporting Narrative |
|---|---|---|
| 1 | Lightweight processes | • "*Governance used to mean gates. We reframed it around guardrails and feedback loops.*" [R4]<br>• "*We've built a lightweight 'value canvas' that teams fill out before major investments. It links outcomes, assumptions, and leading indicators. It's not a rigid business case—it's a living hypothesis that we can test and evolve*" [R5] |
| 2 | Value focus | • "*We maintain a 'value signals dashboard' usage metrics, customer feedback, sales trends, ops load. It gives us a living picture of product health*." [R6] |
| 3 | Investment horizons | • "*We categorize all investments across three horizons: core, growth, and explore. But here's the kicker- we assign different evaluation cadences to each. Horizon 3 gets faster, lighter reviews to encourage experimentation*" [R1]<br>• "*That lets us balance short-term results with long-term evolution, and avoid getting stuck in just keeping the lights on*" [R7] |

## 5. Discussion

The findings from this study at FinTechCo reveal several insights into how portfolio agility can be enhanced by integrating flow principles and the Theory of Constraints into an IS portfolio management capability. We examine how these findings support and extend the existing literature in this space and outline their contributions to theory and practice.

### 5.1. Conceptual Elements

The cyclical process identified in this study, consisting of flow visualization, constraint identification, constraint-aware resourcing, WIP limitations, accelerated learning, and dynamic reprioritization, emerges from an integration of flow principles and the Theory of Constraints thinking into an enterprise IS portfolio capability. This process also represents the systemic evolution and continuous adaptation within the portfolio capability.

The emphasis on work visualization across the portfolio stresses the importance of transparency in improving flow and aligns with the principles of Lean and Kanban in the software engineering context [4], [28]. FinTechCo moved from static roadmaps to Kanban boards to overcome concerns with the project-centric view in portfolio management [3]. The study demonstrates how visualization tools were adapted to provide real-time insights into strategic themes and facilitate more productive discussions on prioritization. While FinTechCo's focus on seeking out and resolving constraints that limit portfolio flow aligns strongly with the Theory of Constraints [14], their conscious effort to minimize "decision fatigue" brings up a behavioral angle to ToC and acknowledges how cognitive constraints

can impact flow. The constraint-aware resource management practices of establishing a portfolio cadence around system constraints and provisioning buffers within the delivery workflow indicate FinTechCo's ability to manage portfolio flow within known constraints [22]. The incorporation of WIP limits at the portfolio level is similar to current practice recommendations for team-level WIPs [31]; however, portfolio WIP limits should consider WIPs applied at different levels and be framed as flow-enablers. The use of flow metrics like cycle time, lead time, and flow distribution at the team is well-discussed in literature [2], [10], but the details of portfolio-level flow metrics layered to form a "metrics stack" lack current research support.

The foundational elements supporting this flow-based portfolio adaptation, comprising aspects of funding, metrics, and governance, form the organizational enablers for portfolio agility. Although agile funding approaches like dynamic budgets, rolling forecasts, and funding product areas (value streams) are finding support in recent literature [33], [37], there is no research on aligning funding models to flow-based progress within an IS portfolio. Similarly, there are studies on adaptive portfolio governance [35]; however, there is no guidance for implementing flow-based governance systems.

Existing literature acknowledges several paradoxical tensions within an agile portfolio management capability [35] and we examine how the proposed framework, integrating flow with portfolio agility, addresses them. The bi-directional feedback loops created through the use of flow visualization (FC1 and FC2), along with dynamic reprioritization (through FC5 and FC6), promote visibility of delivery realities at the strategic level while enabling rapid pivots at the team level in response to emerging priorities. Similarly, constraint identification (FC2) and WIP limits (FC4) safeguard local autonomy while offering system-wide awareness of constraints for active management. Finally, we observe that flow-based funding (FF1) and flow-based metrics (FF2) support "planned emergence" [20], by balancing the traditional emphasis on planned value with a focus on emergent value through ongoing adaptation to change.

### 5.2. Contribution to Theory

While studies into the adoption of flow and constraints thinking are prevalent at the team level, there is scant research on their application at the portfolio level. This study is one of the first to investigate these concepts applied to portfolio management and their role in enhancing agility within IS portfolio management, and offers three crucial contributions to the existing theories around portfolio agility. Firstly, the conceptual framework presented here represents a novel approach, integrating flow principles and the Theory of Constraints into IS portfolio management, and thereby adding depth to our understanding of portfolio agility. Secondly, the self-reinforcing improvement cycle (FC1 to FC6) represents the reframing of portfolio agility as a dynamic system evolving through recursive adaptation to shifting constraints and contextual feedback. The framework acknowledges the temporal nature of constraints to reveal a granular view of how portfolio agility is operationalized in real organizational contexts, thus aligning with and extending current conceptualizations of portfolio agility as a dynamic capability [7] or a complex adaptive system [35]. Thirdly, the foundational elements representing the organizational preconditions for sustaining the improvement cycle highlight that portfolio agility extends beyond its procedural aspects and is also shaped by the design of its control systems, resource models, and performance measures.

### 5.3. Contribution to Practice

The study shows how flow visualization catalyzes portfolio agility by exposing previously invisible work commitments and constraints. Enterprises seeking enhanced IS portfolio capabilities should begin their transformation efforts by implementing tools to provide transparent visibility into the flow of work and value within their IS portfolios. We identify various approaches to buffer management, such as capacity buffers, strategic reserves, sunset funds, and design debt buffers, that practitioners can implement within their unique contexts to protect portfolio flow through constrained resources. Our findings emphasize the importance of identifying and addressing cross-functional constraints to overcome any

systemic impediments. We recommend that practitioners actively explore alternative funding approaches, like stream (or product) based funding and rolling forecasts that enhance portfolio agility and enable flexible resource (and capital) allocation. Finally, the study identifies lightweight governance practices, such as value canvases and differentiated review cadences across investment horizons, to facilitate adequate oversight without disrupting the flow of value.

### 5.4. Limitations and Future Research

Although this revelatory study presents several insights into integrating flow principles and constraints management with portfolio agility, we acknowledge a few limitations. Firstly, the single-case design limits our findings to the unique context of our case company. We suggest future research to explore how these principles apply across enterprises in diverse contexts. Secondly, this study centered on practices and structures that manifest at the portfolio level. We recognize the opportunity to study the impact of organizational cultures and leadership approaches on these practices. Thirdly, we believe that longitudinal studies can provide insights into the long-term sustainability and evolution of these practices, especially when facing emerging challenges and opportunities. Lastly, the role of existing performance management practices and metrics in supporting a flow-based portfolio capability presents an opportunity for further exploration.

## 6. Conclusion

This study demonstrates how portfolio capabilities integrated with flow principles and constraints management can enhance portfolio agility in IS organizations. The proposed cyclical process of identifying and addressing flow constraints offers a novel approach to portfolio management focused on system-level optimization and continuous adaptation. The foundational enablers for this cycle represent organizational conditions necessary for enhanced portfolio agility. Together, these elements establish a comprehensive framework for rethinking portfolio management in dynamic environments.

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