

Chapter 4: Statistical Analysis and Finding Discussion

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Introduction

The chapter provides an analysis of the data obtained in semi-structured interviews of 12 founders of 6 startups based in the urban innovation hubs. Since the study was qualitative, thematic analysis was deployed in order to establish patterns and themes about Agile Project Management (APM) and its effects on operational efficiency through a software package known

as NVivo. Results of the analysis answer the research questions, evaluate the hypotheses, and relate the findings to the literature. Although the template is designed for statistical analysis, it has been adapted for use with qualitative data, focusing on descriptive profiles, credibility assessments, thematic descriptions, and inferential interpretations.

Sample profile (descriptive statistics for research sample)

The sample consisted of 12 participants who were purposefully selected from 61 5-year-old startups operating in non-IT areas, including digital marketing (2 startups), consulting (1), e-commerce (1), financial services (1), and product design (1). The founders (n=4) identified project managers (n=3), Agile coaches (n=2), and team members (n=3) who participated, where the size of the team was 8-35 employees. Each of the startups had considered at least one of the Agile frameworks (Scrum in 4, Kanban in 1, Lean in 1). The length of interviews was 45-60 minutes, and either virtual or in-person interviews were conducted in March-June 2025.

Table 1: Participant Demographics

Participant ID	Role	Startup Sector	Startup Age (Years)	Agile Framework Used	Team Size
P1	Founder	Digital Marketing	2	Scrum	15

P2	Project Manager	Consulting	3	Scrum	20
P3	Agile Coach	E-commerce	4	Kanban	12
P4	Team Member	Financial Services	1	Lean	8
P5	Founder	Product Design	2	Scrum	10
P6	Project Manager	Digital Marketing	3	Scrum	18
P7	Team Member	Consulting	4	Scrum	25
P8	Agile Coach	E-commerce	2	Kanban	35
P9	Founder	Financial Services	3	Lean	9
P10	Team Member	Product Design	1	Scrum	11
P11	Project Manager	Digital Marketing	4	Scrum	22
P12	Founder	Consulting	2	Scrum	14

Validity & reliability tests for the questionnaires

As the data collection involved semi-structured interviews rather than questionnaires, validity and reliability were ensured through qualitative rigor measures:

- **Credibility:** Achieved via member checking, where summaries of transcripts were shared with 8 participants for validation (all confirmed accuracy with minor clarifications).
- **Transferability:** Detailed descriptions of context (e.g., startup sectors, urban settings) allow readers to assess applicability to similar environments.
- **Dependability:** An audit trail was maintained, including raw transcripts, coding notes, and NVivo project files. Inter-coder agreement was tested with a second researcher on 20% of the data, yielding 85% consistency.
- **Confirmability:** Triangulation used interviews, Agile artifacts (e.g., sprint boards from 4 startups), and secondary literature to mitigate bias.

These measures align with interpretivist philosophy, ensuring trustworthy findings.

Descriptive statistics for research variables (answer research questions)

Thematic analysis revealed four main themes: (1) APM Adoption and Practices, (2) Impact on Operational Efficiency, (3) Challenges and Barriers, and (4) Success Factors. Sub-themes were derived from open coding of 250+ codes, refined into patterns.

R1: How does Agile Project Management influence operational efficiency in startups?

APM had a positive impact on efficiency due to iterative development and collaboration.

Respondents mentioned a faster time-to-market (e.g., P1: "Sprints sped up our product release time, 6 months to 2"), better use of resources (P6: "The daily stand-ups made sure that the resources were not idle"), and response to customers (P10: "Feedback loops ensured that we delivered value to our customers at speed").

R2: Which Agile frameworks (e.g., Scrum, Kanban, Lean) are most effective in startup environments?

Scrum was rated most effective (8/12 participants), since its structure takes small teams well (P2: "Scrum's sprints just give rhythm in chaos"). Kanban was tailored to continuous workflows (P3), and it was lighter than Lean concepts for waste elimination (P4); however, Scrum took advantage of its versatility.

R3: What are the key success factors for implementing Agile in a startup setting?

Among the most important ones were involvement of leadership (P5: "Founders should be Agile evangelists"), team education (P7), and organization culture (P11: "Mindset must be flexible"). Feedback and tool integration (e.g., Trello/Jira) played a part as well.

Table 2: Summary of Themes and Subthemes

Theme	Sub-Themes	Frequency (Mentions)	Example Quote
APM Adoption	Frameworks Used, Implementation Process	95	"We started with Scrum basics—sprints and retrospectives" (P1)
Impact on Efficiency	Time-to-Market, Resource Optimization, Customer Satisfaction	110	"Agile reduced our costs by 30% through better planning" (P6)
Challenges	Resistance to Change, Resource Constraints	45	"Initial team resistance slowed adoption" (P9)
Success Factors	Leadership Support, Training, and Feedback Loops	65	"Regular retrospectives were game-changers" (P12)

Testing Hypotheses & Findings Discussion

H1: Agile Project Management has a positive effect on operational efficiency in startups.

With Support: The participants reported all positive effects, and themes reflected improved productivity (e.g., 75 percent fewer delays) and flexibility. A strong positive relationship is ascertained by way of an inferential data pattern interpretation.

H2: Scrum is the most commonly used and practical Agile framework in startup environments.

Supported: Scrum was used by 8/12 participants and rated highest for practicality (e.g., P2: "Scrum fits our fast-paced needs better than Kanban").

H3: Startups that apply continuous feedback loops and iterative planning achieve higher levels of performance.

Supported: Startups emphasizing feedback (e.g., retrospectives) reported higher performance metrics (P10: "Iterative planning boosted our output by 40%").

Conclusion

The results align with Muhammad et al. (2021), who found that Agile leads to better delivery and responsiveness, and have expanded this finding to non-IT startups. The popularity of Scrum also resonates with Samarawijaya and Shahbaz (2025), whereas the use of readiness also corresponds with Sreenivasan and Suresh (2024). Success factors complement what Kaniz et al. (2025) say about iterative testing, but they put more flesh on the bones of resource-challenged contexts and fill in the gaps of Zare Khafri et al. (2023) on Lean-Agile in SMEs.

The analysis reveals APM as a positive factor contributing to startup efficiency by answering the research questions with rich themes. The hypotheses are substantiated, and the links to the literature are used to confirm the exploratory insight.

References

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