BUSINESS ACCELERATORS AS LEARNING ENVIRONMENTS:
A MIXED METHODS INVESTIGATION

By

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A thesis

submitted to the Victoria University of Wellington

in fulfillment of the requirements for the degree of

Doctor of Philosophy

Victoria University of Wellington

New Zealand

2019

Abstract

This thesis is a study of business accelerators, and the efficacy of accelerators as learning environments. Accelerators are increasingly becoming a popular strategy for delivering a more authentic entrepreneurial learning experience. Accelerators provide a time-bound suite of highly structured educational and business development activities that provide learning support to cohorts of competitively selected high-potential entrepreneurial teams. The participants face considerable uncertainty and are exposed to complex learning and business development processes associated with rapidly building, validating, and scaling investable business models. Intense mentorship and entrepreneurial education are core features by which accelerators support this journey. Thus, an implicit assumption embedded in accelerator programme logic is the accelerator learning environment positively shapes learning and development outcomes. Yet little research has investigated *how accelerators influence participant learning and development*. This gap motives the current research.

A multilevel quantitative and qualitative mixed methods approach was adopted to examine participant learning and development at the three levels of participation embedded within accelerator programme design – *cohort, team* and *participant.* Concepts and measures from academic work on accelerators, learning agility, and individual performance behaviour were assembled into a coherent set of investigative tools and lenses. Taken together, they frame the accelerator learning environment as a whole system of actors and elements that operate both independently and interdependently. The research setting is a Global Accelerator Network affiliate programme based in New Zealand. Three strands of data were collected on 29 participants associated with 10 venture teams participating in a single accelerator programme cohort.

Strand 1 applied a multiphase quantitative survey approach to capture a longitudinal understanding of how accelerators influence participant learning and

development at the *cohort* level. Patterns of relationships between the key constructs were identified for each phase. Strand 2 utilised a qualitative observation method to investigate the quantitative findings through a *team* lens. This was done because of the central role teams play in the accelerator programme logic. Each of these stands occurred during the accelerator. Strand 3 used interviews to explore how the accelerator learning environment influenced learning and development at the level of individual *participants*. Interview data was collected six months after the accelerator to capture participant perceptions in retrospect.

The research findings show accelerators do more than shelter emerging organisations; they actively support the development of the new venture, provide an authentic learning environment for the entrepreneurs, and they foster the development of entrepreneurship capacity. However, findings also suggest participant response to the learning environment is dynamic and unpredictable. Specifically, participants perceived the learning and development benefits they received from: a) mentors, as low across all phases; b) managers, as strongest during the middle and last phase of the programme; c) the cohort of participants, as very helpful during all three phases; and, d) accelerator instructional programming was tied closely to the relevance, quality and timing of the resources provided to them. Further, the evidence suggests team composition matters more than the team's business idea, and task-oriented accelerator programme design negatively influences learning and development by limiting the amount of 'free' time participants have for creative interactions, experimentation and reflection. Thus, the availability of accelerator learning opportunities, such as education and mentorship, can both enable and hinder participant learning and development.

This study provides insights for entrepreneurship research focused on supporting the development and success of early-stage enterprises. The presented findings and interpretations offer scholars, organisers and stakeholders a greater appreciation of the importance of participant learning and development in

accelerators. They also suggest the utility of applying learning agility and individual performance concepts as lenses for understanding individual learning processes and their effects in entrepreneurial contexts beyond accelerators. Research limitations, implications for policy and practice, and future research are discussed.

Keywords: accelerator; business accelerator; entrepreneurial learning; entrepreneurship; incubation, individual performance, learning agility; startup assistance; New Zealand.

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List of Definitions

Term	Definition
Accelerator	A time-bound, learning focused, and cohort-based start-up assistance programme designed to help competitively selected high potential entrepreneurs rapidly learn, develop and scale nascent business models.
Adaptive[c]	Behavioural response to changing business requirements.
Agile Learning	Construct operationalised for this study. Behaviours, processes and strategies associated with learning agility.
Cohort[a]	Participants associated with the teams admitted to a single time-bound accelerator programme.
Contextual Performance[c]	Behavioural contributions to the social, psychological and emotional environment where work takes place.
Development	The cumulative effect of behavioural change in participants that occurs through engagement in learning and performance processes.
Environment	The aggregate of social and cultural conditions that influence the life of an individual or community.
Event	A subset of the possible outcomes of an experience.
Experience	Something personally encountered, undergone, or lived through.
Experiential Learning	Learning processes for transforming experience into knowledge.
Experimenting[b]	Learning strategy and behaviour associated with trying out new approaches and ideas to determine what is effective.
Feedback Seeking[b]	Learning strategy and behavior associated with asking others for feedback on one's ideas and overall performance.
Flexibility[b]	Learning strategy and behaviour associated with being open to new ideas, proposing new solutions and acting on ideas quickly.

Funded Team	Team of participants who secured investment funding at the end of the accelerator programme beyond the seed funding initially provided by the accelerator as a condition of participation
Knowledge Seeking[b]	Learning strategy and behaviour associated with using various methods to remain current in one's area of expertise.
Incidental Learning	Learning that occurs as a byproduct of other learning.
Informal Learning	Learning that occurs through self-directed processes.
LAAI	Learning Agility Assessment Inventory.
Learner	Construct operationalised for this study. Reflects study participants.
Learning	Modification of a behavioural tendency by experience.
Learning Agility	Individual willingness and ability to learn new competencies to perform under first-time, tough or different conditions.
Learning Environment	An aggregate of social, cultural and programmatic conditions that influence the learning and performance experience of accelerator participants.
Learning Outcomes	An output of two types of individual performance behavior – task and contextual performance.
Learning Resources	Accelerator programme design affordances made available to participants and intended to support learning and performance. Includes Managers, Mentors and Cohort.
Managers[a]	Professionals administering, organising and delivering accelerator programmes.
Mentors[a]	Experts organised by an accelerator, who support participant learning and development via coaching and consulting.
Non-funded Team	Team of participants who did not secure investment funding at the end of the accelerator programme beyond the seed funding initially provided by the accelerator as a condition of participation
Reflection[b]	Learning strategy and behaviour associated with slowing down to evaluate one's own performance in order to be more effective.
Relational[c]	Behavioral response associated with fostering, supporting and maintaining healthy and productive relationships.
Situation	A set of circumstances in which one finds oneself; a state of affairs.

Start-up	A human institution designed to deliver a new product or service under conditions of extreme uncertainty.
Swiftness[c]	Behavioural response associated with known business requirements.
Task Performance[c]	Behavioural responses associated with supporting a team to achieve its core technical functions and objectives.
Team	The group of accelerator participants associated with and responsible for the outcomes of a business venture.

Notes. a=Learning Resources variable. b=Agile Learning Variable. c=Learning Outcomes Variable.

List of Acronyms

General

Term	Acronym
Global Accelerator Network	GAN
Hypotheses	H1, H2, H3, H4
Learning Agility Assessment Inventory	LAAI
Phases	P1, P2, P3
Victoria University of Wellington	VUW
New Zealand	NZ

Measures

Term	Acronym
Adaptive	AD
Cohort	CHT
Experimenting	EX
Feedback Seeking	FS
Flexibility	FX
Knowledge Seeking	KS
Manager	MGR
Mentor	MEN
Reflection	RF
Relational	RL
Swiftness	SW
Task	TK

Teams

Term	Code
AROVALLEY	ARO
BROOKLYN	BRO
HATAITAI	HAT
KELBURN	KEL
LAMBTON	LAM
MTVIC	MTVIC
NORTHLAND	NOR
PIPITEA	PIP
RONGATAI	RON
THORNDON	THO

Chapter 1 | Introduction

This study is an investigation of accelerators and accelerators as learning environments. It aims to answer a core question: *How do accelerators influence participant learning and development? -* and a supplemental question - *What does learning agility theory add, if anything, to our understanding of participant learning and development in accelerators?* A theory informed rather than a theory testing approach is applied. Concepts and measures associated with accelerator, learning agility, and individual performance research are applied as strategic tools and analytic lenses to deductively examine the relationships between accelerator learning environments and participant learning and participant development.

A multilevel quantitative and qualitative mixed methods research approach is applied to examine the independent and interdependent nature of the relationships between the accelerator learning environment and participant learning and development at the levels of participation explicitly articulated in accelerator programme design logic – *cohort*, *team*, and *participant*. The research is expected to highlight specific *how*, *when*, and *why* factors associated with the accelerator learning environment, and the participants operating within them, that effect participant learning and development. The knowledge generated from this research is expected to benefit both academics interested in accelerators and accelerators learning environments and individuals responsible for designing, funding, and operating accelerators. The research site is a Global Accelerator Network (GAN) affiliate accelerator. Thus, other accelerators operating within GAN may benefit from the findings. The findings may also be relevant to non-GAN accelerators and other startup assistance environments seeking to boost entrepreneurship capacity and business development through learning.

This chapter will introduce the: research area; literature applied; research questions, sample, and approach; and, the structural scheme of the thesis. The next section introduces the challenges and risks entrepreneurs face during venture gestation and the general purpose of start-up assistance programmes like accelerators.

1.1 Case for assistance

Entrepreneurship is widely recognised as a key driver for economic development and job creation at both local and national levels (Badal, 2012; MBIE, 2016a; OECD, 2010; Schumpeter, 1934, 2000; USSBA, 2016; Valerio, Parton, & Robb, 2014). However, research suggests new ventures (i.e., startups) are vulnerable for failure when they lack critical resources held by mature organisations such as knowledge, skills, experience, talent, trust, credibility, advice and funding (Bruneel, Ratinho, Clarysse, & Groen, 2012; Cafferata, Abatecola, & Poggesi, 2009; Choi and Shepherd, 2005, Stinchcombe, 1965). Survivability statistics for both large and small economies highlight the state of vulnerability for startups. For instance, nearly one half of all new ventures (i.e., startups) in the USA and New Zealand fail before their fifth year of operation (MBIE, 2016; USBLS, 2016).

Obtaining assistance early and often may offset some of the risks of being new, and in doing so, increase a startups chance for survival. Consequently, some entrepreneurial teams proactively seek help from start-up assistance organisations and expert outsiders to coach, guide and support business development (Cohen, Bingham, & Hallen, 2018; Bruneel et al., 2012; Chrisman & McMullan, 2004; Isabelle, 2013; Peters, Rice, & Sundararajan, 2004; Rotger, Gortz, & Storey, 2012; Yusuf, 2014). This research examines a new form of startup assistance, the business accelerator (accelerator).

1.2 Accelerators

Accelerators are start-up assistance programmes designed to boost entrepreneurial capacity and venture success for cohorts of competitively selected, 'high potential' entrepreneurs and the ventures they lead (Cohen et al., 2018; Clarysse, Wright, & Van Hove, 2015; Cohen, 2013a,b; Hathaway, 2016; Miles et al., 2017). Purportedly, they help participants navigate the complex processes associated with rapidly building, validating, and scaling investable business models by providing a highly operationalised and time-based programme of supports (Bliemel, deKlerk, Flores, & Miles, 2018; Cohen, Fehder, Hochberg, & Murray, 2019; Hathaway, 2016; Mejia & Gopal, 2015). Intense mentorship and entrepreneurial education are hallmark characteristics of the practice (Bernthal, 2016; Mansoori, Karlsson, & Lundqvist, 2019; Miles, et al., 2017; Pauwels, Clarysse, Wright, & Van Hove, 2016).

Private investors created the first accelerator (Ycombinator) in 2005 (Graham, 2012). Effectively, first-generation accelerators were for-profit businesses, and viewed as a 'high-risk investment model for the support of high-potential new ventures' (Pauwels et al., 2016, p.14). Today, a mix of private, public, corporate, and non-governmental organisations support the delivery of accelerators (Bliemel et al., 2018; Cohen, 2018; Clarysse et al., 2015; Dempwolf, Auer, & D'Ippolito, 2014; Pauwels et al., 2016). In principle, all accelerators must generate positive returns on investments to continue servicing stakeholders. Return on investment will vary based on the objectives of stakeholders (e.g., profit, ecosystem development, and job creation). Therefore, a portfolio investment scheme is still common amongst the various stakeholders (Clarysse & Yusubova, 2014; Cohen & Hochberg, 2014; Miller & Bound). In other words, accelerators provide a structure system of educational and business development supports to a cohort of ventures in hope the successes of a few ventures offset the failures of the many. Participation in an accelerator signals legitimacy for individual entrepreneurs and successful ventures signal legitimacy

for both individual accelerators and the practice of acceleration (Clarysse & Yusubova, 2014; Cohen et al., 2019 Wise & Valliere, 2014).

Today, there are estimated to be upwards of 3000 accelerators worldwide (Hochberg, 2016). The rapid global spread of the practice is likely associated with early high-profile success stories generated by ventures associated with Ycombinator (such as Airbnb, Dropbox and Stripe) and Techstars (such as Digital Ocean, Next Big Sound and PillPack). With growth has come diversification not only in the types of stakeholders involved but also in the regions and industries served. For instance, it is now common to find accelerators operating with a mix of private, corporate and public stakeholders (Bliemel et al., 2018; Dempwolf et al., 2014; Kohler, 2016; Pauwels et al., 2016) in both developed and developing economies (Roberts et al., 2016), and in a range of specialty sectors such as agriculture, biotech, energy, food, finance and government innovation (Clarysse et al., 2015; Miller & Bound, 2011). Commonly, the primary sponsor or stakeholder influences the overall goals and objectives for the accelerator, whether that is pecuniary gain or social and economic goodwill such entrepreneurial ecosystem development (Cohen, Fehder, Hochberg & Murray, 2019; Pauwels, et al., 2016).

For instance, the research site for this study is a New Zealand (NZ) based-accelerator which is a member of the highly exclusive Global Accelerator Network. The first accelerators appeared in NZ in 2013. Their genesis occurred, in part, from the government's need to reconcile its view that high-growth, early-stage businesses are essential drivers of economic and employment growth with the fact that NZ lagged well behind other OECD member countries in the number of high-growth firms it fostered (NZGov 2013a, p.3). Based, in part, on the success of private-sector funded accelerators in the United States, Israel, Finland and Sweden, the NZ government introduced a new hybrid-incubation model in 2013 (NZGov 2013b). The NZ$31.3m investment provided support for existing incubator services and the creation of up to four new technology-focused accelerators (Joyce, 2014). The model blends private and public investment.

The next section introduces characteristics associated with accelerator practice.

1.2.1 Accelerator characteristics

Accelerators, like incubators, provide shared office space, business counselling and administrative support (Bergek & Norrman, 2008; Grimaldi & Grandi, 2005; Hackett & Dilts, 2004a,b; Rothaermel & Thursby, 2005). However, they are considered distinct in both their business model and how they operationalise the services and supports they provide participants (Christiansen, 2009; Clarysse et al., 2015; Cohen, 2013b; Isabelle, 2013; Miller & Bound, 2011).

Accelerator programme designs, business objectives and funding strategies vary (Pauwels et al., 2016; Roberts et al., 2016). However, academic and industry researchers have identified common core characteristics, processes and cultural archetypes underpinning the practice. Core programme features include: a) an open and highly competitive application process; b) cohort of teams that start and end programmes together; c) offer of seed capital (e.g. US$20,000–US$100,000) in exchange for early-stage equity (typically 5–10%); provision of intense, highly targeted, and just-in-time mentoring, education, networking and business development support; and, a 'Demo Day' graduation event wherein teams pitch publicly to investors (Clarysse et al., 2015; Cohen & Hochberg, 2014; Dempwolf et al., 2014; Miller & Bound, 2011; Yitshaki & Drori, 2018). Thus, accelerators are commonly defined as 'a fixed-term, cohort-based program for startups, including mentorship and/or educational components, that culminates in a graduation event' (Cohen et al., 2019, p. 1782).

Accelerators aim to speed up learning and business development processes by providing participants with access to a robust suite of value-adding and just-in-time learning resources, and by creating social conditions for participants to interact frequently with other participants advisors, mentors, managers and

investors. Collectively, these interactions enable participants to short-cut some learning processes by drawing upon the expertise and experience of others (Clarysse et al., 2015; Cohen, 2013a; Gonzalez-Uribe & Leatherbee, 2017; Miles et al., 2017; Smith, Hannigan, & Gasiorowski (2015).

Taken together, the accelerator model appears an intuitive, and conceptually sound strategy for helping startups when the risk of failure, due to a lack of resources, is most significant (Choi & Sheppard, 2005; Stinchcombe, 1965). However, the efficacy of accelerators for supporting participant learning and development remains largely unknown. The next section introduces recent research about the general efficacy of the practice and signals the need for conducting targeted research on focal areas of the practice such as participant learning and development.

1.2.2 Do accelerators work?

Accelerators are a new and rapidly growing phenomenon, and the practice has largely outpaced empirical investigation. Although industry research suggests accelerators are an effective form of start-up assistance, much available data is internally produced by the accelerators themselves. For instance, Techstars reports having admitted over 900+ start-ups, to its 3-month accelerator program, and collectively these teams have raised over $3.0B USD in investment (http://www.techstars.com). Likewise, the Global Accelerator Network (GAN) reports an average acceptance rate of only 3.8% across its 105 affiliate accelerators (http://gan.co). Although these numbers point positive for the rigor and effectiveness of the practice, accelerator outcomes may be related more to the accelerator selection processes than the effectiveness of the accelerator intervention. In other words, accelerators may be selecting teams primed to experience success whether operating inside or outside of an accelerator. Therefore, a bit of scepticism is warranted due to the proprietary nature of the

data, possible motivations for reporting the data, and the limited means for externally verifying the quality of the data (Dempwolf et al., 2014).

Although, there is little empirical information available to indicate 'what is and what is not working' (Roberts et al., 2016, p.30), recent academic research suggests accelerated teams: a) outperform non-accelerated firms as to the speed with which they raise investment, fail the business, and/or exit through acquisition (Smith & Hannigan, 2015); b) reach business development benchmarks sooner than if operating unassisted (Hallen Bingham, & Cohen, 2014; Mejia & Gopal, 2015; Regmi, Ahmed, & Quinn, 2015); and c) help participating ventures protect critical resources by delaying strategy implementation until they are ready and resourced to do so (Cohen, 2013a). In spite of research suggesting accelerators exert positive effects on venture performance not all accepted start-ups achieve performance expectations. For instance, not all ventures secure investment funding at the end of an accelerator programme, experience a successful exit, or even stay in business (Smith & Hannigan, 2015; Wise & Valliere, 2014). Therefore, other factors related to the accelerator experience may influence participant outcomes in general, and their learning and development specifically.

For instance, the quality and effectiveness of interpersonal relationships, the objectives and goals teams set, the levels of psychological and emotional safety team members create within their team, and the demands of the context may all influence how individuals learn. Further, these factors may, in turn, positively or negatively affect the learning and business development outcomes teams achieve within and between programme phases. For example, the risk of failure for accelerated firms reportedly decreases 6.8% with each additional year of start-up experience accelerator managers possess (Wise & Valliere, 2014). This suggests access to knowledge, skills and the experience of others such as managers, mentors and cohort (i.e., participant peers) may be beneficial for participant learning. However, not much is known about what, why, when and how participants learn through accelerators, or for what outcomes. Thus, a key

'black box' of the practice that remains underexplored is how accelerators influence participant learning and development. The next section introduces dimensions of accelerator learning environments.

1.2.3 Accelerators are sources for learning.

Intense entrepreneurship education and mentorship underpin the start-up assistance strategy employed by most accelerators (Cohen, 2013a,b; Hallen et al., 2016; Miller & Bound, 2011). Educational resources help participants access needed knowledge, and mentorship resources help participants apply knowledge and build critical business networks. The inclusion of these design elements suggests participant learning is tied implicitly to accelerator outcomes.

Learning research from other domains – like management and leadership – suggest feedback, coaching, and advice can be beneficial when facing developmental challenges (DeRue & Wellman, 2009; McCall, Lombardo, & Morrison, 1988; McKenna, Boyd, & Yost, 2007). However, beyond stakeholder claims, little evidence indicates which accelerator programme design elements, if any, are most valuable for supporting participant learning and development. For instance, even with 'mentor-driven' accelerators like the 105 GAN affiliate accelerators (http://gan.co/), it remains unclear how accelerator participants learn through interactions with mentors.

Moreover, the time-bound accelerator programme format may affect the extent accelerator participants can process, make sense of, and act upon feedback received. For instance, participants elect to make decisions based on past experiences rather than using readily available and high-value sources of advice to inform their beliefs, behaviours and actions (Parker, 2006). Alternately, entrepreneurs may choose to stay on course because they perceive seeking feedback as a threat to their competence and identity (Grimes, 2018).

Beyond anecdotal evidence, it remains unclear how an accelerator participant learns and develops. It is also unclear how participants learn through interactions with accelerator provided learning resources. Thus, if accelerators aim to deliver outcomes through education and mentorship, the dimensions of the accelerator programme learning logic that require critical examination are the *Learning Environment*, *Learner* and *Learning Outcomes*. This study aims to contribute an enhanced understanding of these critical dimensions of the accelerator learning environment. The relationships between each dimension are described briefly in the next section and at depth in Chapter 2 (Figure 1.1).

Learning Environment	Learner	Learning Outcomes
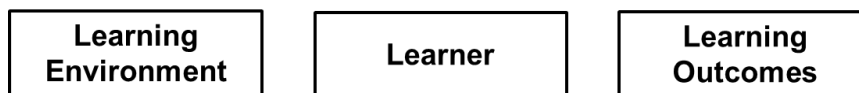
Figure 1.1. Dimensions of accelerator programme logic explored by this study.

Learning environment

Accelerators aim to foster rapid learning and development through social learning processes (Bandura, 1993; Levinsohn, 2015). Although accelerator participants may learn through interactions with a variety of actors, a focus of this research is to know more about the effects of participant learning interactions with three types of accelerator *Learning Resources*; professional management team (Managers), volunteer experts (Mentors) and participant peers (Cohort).

Accelerator Managers are professionals who organise and administer accelerator programmes. Purportedly, they support rapid learning and business development in the selected teams by drawing on real-life experiences, providing participants with valuable just-in-time coaching, and helping participants access business and investment networks (Miller & Bound, 2011; Wise & Valliere, 2014). Managers meet regularly with participants to provide direction and resources, and to assess progress toward accelerator expectations and team outcomes.

Accelerator Managers also develop a network of hand-picked industry experts and previously successful entrepreneurs to provide mentorship to accelerator participants (Hoffman & Radojevich-Kelly, 2012; Miller & Bound, 2011).

The implicit logic underpinning 'mentor-driven' accelerator programme design (www.techstarts.com; www.gan.co) is intense time-limited mentorship speeds learning and business development by exposing participants to a wide range of ideas and feedback, expanding opportunities, and reducing the frequency of trial by error learning (Cohen, 2013a; Pauwels et al., 2016). Mentoring in accelerators is characterised as a 'process of learning and coaching provided by the accelerator to its participating startups by a group of experts with knowledge and expertise in founding and growing new vetures' (Yitshaki & Drori, 2018, p. 58). In accelerators, mentoring may be 'as indispensable as startup capital' (Sanchez-Burk, Brophy, Jensen, Milovac, & Kagan, 2017, p.2) for aiding participant learning and development. Research suggests, access to just-in-time coaching, advice, and technical assistance helps entrepreneurs consolidate and extend prior learning (Sullivan, 2000). Accordingly, accelerators organisers develop and maintain a network of individuals to serve as volunteer Mentors (Bernthal, 2016; Cohen & Hochberg, 2014). Purportedly, the role Mentors play functions both as a lever for learning and as an attractor for participant involvement (Clarysse & Yusubova, 2014).

Competitively selected teams enter and exit the time-bound 'boot camp' styled programme as a Cohort (Cohen & Hochberg, 2014). Accelerators commonly co-locate teams in an open-plan workspace (Miller & Bound, 2011) and this arrangement may provide opportunities for informal and incidental learning to occur (Cohen, 2013a; Hallen, Bingham, & Cohen, 2019; Marsick & Watkins, 2015). For instance, the successes, challenges and failures of others occur in a public arena. Thus, what is experienced by one team may help expedite participant learning and business development processes for other teams.

Accelerator learning environments also include an explicit educational component. Educational workshops, organised by accelerators and delivered by

industry experts, supplement and extend learning opportunities from Managers, Mentors and members of the Cohort (Clarysse et al., 2015; Miles et al., 2017). Further, accelerators employ and teach a range of contemporary learning frameworks designed for start-up environments, such as Business Model Innovation, and Lean Start-up (Mansoori, 2017; Mansoori, Karlsson, & Lundqvist, 2019).

Taken together, accelerators appear to help participants rapidly fill critical knowledge gaps and reduce learning coordination costs by facilitating access to knowledge and experts (Cohen, 2013a). Arguably, each type of learning resource can create conditions of abundance and scarcity. For instance, the time-bound programme design and nature of the learning environment may increase the level of influence some accelerator stakeholders exert over participants and teams during the accelerator, and this may affect participant ability and capacity to learn and perform to expectations. Thus, this research also examines how learners interacts with, and are shaped by, the learning environment.

Learner

The combination of a heavily resourced learning environment and a short duration programme format likely creates conditions which both enable and constrain participant learning. For example, participants meet frequently and intensely with mentors during the first 30 days of the programme (Phase 1) (Cohen, 2013a,b) to 'reinforce learning, challenge assumptions, and guide them on the realities of start-ups' (Miles et al., 2017, p.814). However, participant capacity for processing, understanding and acting may be diminished by having access to an abundance of information and feedback from multiple sources and multiple levels of the accelerator (London, 1995; London & Sessa, 2006). Although, educational sessions, mentoring and networking provide participants with opportunities for receiving feedback which may, in turn, fuel new learning, the social and highly public nature of these learning interactions may also hinder

participant learning. For instance, participants may feel pressured to act before they are ready or to not act when acting would the best option.

Thus, some participants may be better suited than their peers for operating under the time-bound, complex, uncertain and risky conditions associated with an accelerator. Possibly, accelerator participants who can come up to speed quickly in how they make sense of a situation and who can then appropriately adapt their learning strategies and behaviours to match perceived changes in the learning environment may be highly effective at achieving expected *Learning Outcomes*.

Learning outcomes

Entrepreneurship is a process of learning (Minniti & Bygrave, 2001), and the measure of entrepreneurship in accelerators is the development of an enterprise. Thus, it is helpful to examine learning as the source for accelerator outcomes. Although, accelerators set explicit learning and business development milestones for participants to achieve (e.g., validate business model, build prototype), the focus of this research is not the outcomes of these milestones. Rather, this study positions individual performance behaviour as the driver beyond learning and development outcomes.

Arguably, for a team to achieve expected accelerator outcomes, participants need to behave in ways that 'keep the lights on' at the business, advance their business proposition, and maintain a productive working culture and climate (Campbell et al., 1990; Motowidlo & Van Scotter, 1994). Doing all of these things well is likely tough in any startup situation but even more challenging to do in a fast-paced, dynamic, and complex work environment, such as an accelerator. Participant behaviour which supports delivering quickly on known requirements and supports adaptation to changing requirements may enhance team efficacy and contribute positively towards achieving expected team performance outcomes (LePine, Colquitt, & Erez, 2000; Motowidlo, 2003; Pulakos, Arad,

Donovan, & Plamondon, 2000). Moreover, behaviours which influence the psycho-social culture and climate of the work team are a critical dimension of the performance equation (Borman & Motowidlo, 1993; Griffin, Neale, & Neal, 2000). In sum, this study frames *Learning Outcomes* through an individual performance lens and examines behaviours which support the technical core and interpersonal dimensions of the venture, and influence, in aggregate, achieving expected accelerator outcomes.

1.3 Studying Learning and Development in Accelerators

This research aims to contribute to an understudied area of the accelerator learning phenomenon by investigating the relationships between the *Learning Environment*, *Learner* and *Learning Outcomes*. It does so by applying concepts and measures associated with learning agility (Burke, 2016; DeRue Ashford, & Meyers, 2012; Lombardo & Eichinger, 2000; Smith, 2015) and individual performance (Borman & Motowidlo, 1993; LePine et al., 2000; Motowidlo, 2003; Pulakos et al., 2000) research as strategic lenses and tools for investigating how accelerators influence participant learning and development.

These lenses are supplemented by research associated with accelerator learning environments (Clarysse et al., 2015; Cohen, 2013a; Miles et al., 2017; Pauwels et al., 2016; Smith et al., 2015) and general adult learning and entrepreneurial learning (e.g., Corbett, 2005; Cope, 2005; Dewey; 1933; Knowles, 1970; Kolb, 1984; Mezirow, 1991; Merriam, 2001; Minniti & Bygrave, 2001; Honey & Mumford, 1992, Politis, 2005; Rae, 2004; Sexton & Young, 1997; Sullivan, 2000).

Learning agility

Although accelerators are characterised as learning environments (Cohen, 2013b; Hallen et al., 2014; Miles et al., 2017), little accelerator learning research

has occurred. Thus, understanding of how accelerators influence participant learning remains underdeveloped. Learning agility was selected as a conceptual lens for this research because it incorporates and coheres earlier learning concepts such as experiential learning, goal orientation, individual difference, openness to experience, social and situated learning (e.g., Bandura, 1993; Dewey, 1933; Kolb. 1984; LePine et al., 2000; Lewin, 1942; Piaget, 2005); considers learner characteristics and situational factors (De Meuse, Dai, & Hallenbeck, 2010; Lave & Wenger, 1991; McKenna et al., 2007; Mitchinson & Morris, 2014); and, it is measurable (Burke, 2016; Drinka, 2018; Smith, 2015).

Learning agility is defined as the 'ability to come up to speed quickly in one's understanding of a situation and move across ideas flexibly to learn both within and across experiences' (DeRue et al., 2012, pp.262-3). Prior learning agility research, in the domains of education, talent management and leadership development, suggests agile learners demonstrate: an openness to new experiences; an ability and willingness to learn from experience; a propensity to actively and continuously seek out new and challenging learning experiences; a desire for feedback and an inclination for reflection; and low defensiveness (Burke, 2017; De Meuse et al., 2010; Lombardo and Eichinger, 2000; McCall, 2010; Mitchinson et al., 2012a). All of which, appear highly useful learning strategies for operating in complex learning environments like accelerators. Accordingly, learning agility appears a useful lens for generating better understanding of how participants select and deploy learning strategies and behaviours in response to changes in the accelerator learning environment (e.g., mentoring), and how they transfer learning to perform successfully in future learning challenges (De Meuse, 2010; Eichinger & Lombardo, 2004.

Individual Performance

Core criteria for selecting accelerator teams include the potential a team demonstrates for achieving accelerator expectations. Skill, knowledge, and experience influence team potential; however, these resources are brought to

fruition through the actions of participants. This investigation incorporates an individual performance lens to consider how individual behavior influences individual and team-level learning and performance outcomes (Motowidlo, 2003; Campbell et al.,1990). This lens was deemed appropriate because teams are important centres for learning, team environments are where much implicit and explicit business development happens, and team outcomes are achieved through the behavioual contributions of individuals.

This research examines two independent but related types of participant behaviour which, in aggregate, influence organisational outcomes. *Task performance* is characterized by individual behaviours which contribute to maintaining a teams' core technical business functions and which enable it to convert resources into goods and services (Campbell, McCloy, Oppler, & Sager, 1993; Motowidlo, Borman, & Schmit, 1997). Task *performance* behaviours are often linked to the nature of the work and the role an individual possesses within the work environment (Griffin et al., 2000). *Contextual performance* behaviours are characterised by individual actions which foster and promote social and psychological climate and culture of the team work environment (contextual performance) (LePine et al., 2000; Motowidlo, 2003). Performance behaviours are thought to be motivation-based, and affected by situational forces (Borman & Motowidlo, 1993). In other words, participants may share information about mistakes if they feel mutual respect and support from their team members and withhold it they feel doing so may put them under threat of risk or harm. Thus, it is possible, the accelerator environment may influence the type of Contextual performance behaviours participants demonstrate.

In sum, the startup context is characterised as uncertain and risky; accordingly, some ventures will succeed, and others fail. Accelerators may reduce the 'liability of newness' (Stinchcombe, 1965) by speeding up learning and business development processes through the provision of education, mentoring, and capacity building resources.

This research aims to generate better understanding of accelerators as learning environments by investigating how accelerators influence participants learning and development. Concepts and measures associated with accelerator, learning agility, and individual performance literature are applied as strategic tools and lenses for helping answer two research questions:

- How do accelerators influence participant learning and development?
- What does learning agility theory add, if anything, to our understanding of participant learning and development in accelerators?

1.4 Research Approach

This investigation adopts a research approach that is both multilevel (Dansereau, Yammarino, & Kohles, 1999; Hitt, Beamish, Jackson, & Mathieu, 2007; Molina-Azorin et al., 2019, Rousseau, 1985, 2011) and multimethod (Creswell, 2014; Mertens, 2010; Morse, 1991; Morgan, 2014). Specifically, this study examines how accelerators influence participant learning and performance at the three levels of participation embedded in accelerator programme design – *cohort*, *team*, and *participants*. This is possible and important because accelerator cohorts are comprised of teams and these teams are comprised of participants. Thus, each level is assumed to influence learning and development at other levels.

This study employs three strands of data collection. Each strand examines participant learning and performance from a different level of the accelerator learning environment. Strand 1 (multiphase quantitative survey) examines participant learning and performance at the cohort level. Strand 2 (qualitative field observation) examines participant learning and performance at the team level. Strands 1 and 2 occur during the accelerator. Strand 3 (qualitative interview) examines participant learning and performance in retrospect, and at an individual level. The qualitative methods (observation in situ and retrospective interviews) added depth of understanding to the quantitative survey findings.

The research site is a Global Accelerator Network affiliate accelerator based in New Zealand. This study draws primarily upon the experiences and perceptions of participants associated with a single accelerator programme cohort. Researcher field notes, and accelerator feedback notes from managers and mentors compliment participant generated data. The research reports findings from both independent and integrated analyses. The next section overviews the thesis structure.

1.5 Thesis Structure

Chapter One presented the reader with a basic understanding of the research context, problem, conceptual lenses, research questions and design. The next section outlines the presentation scheme and contents included in each remaining chapter.

Overview Chapter 2 – Literature review

Chapter 2 develops the theory and hypotheses for the investigation. First, the chapter introduces accelerators as a new form of start-up assistance. It frames accelerators as social learning contexts and provides an overview of the types of resources accelerators provide to participants in an attempt to scaffold and speed learning and development. Secondly, the chapter introduces an argument for applying learning agility theory as a lens for studying participant learning processes and behaviours. Characteristics of agile learners, extant research and recent studies informing this study are presented. Third, individual performance research is introduced as a lens for examining how participant performance behaviour influenced participant, and team, learning and performance outcomes. Last, the chapter provides a brief introduction to the research model, questions, hypotheses and design.

Overview Chapter 3 – Methodology and data

Chapter 3 presents the multilevel mixed methods research design, an overview of the research site and participants and the techniques applied for capturing, analysing and interpreting longitudinal, quantitative survey, in situ qualitative observation, and retrospective interview data. The chapter closes with a discussion of how ethical issues were managed as well as the strengths and limitations of the selected research approach.

Overview Chapter 4 – Quantitative survey findings

This chapter presents quantitative findings from the survey method (Strand 1). A repeated-measures survey strategy was applied to capture a longitudinal assessment of how a cohort of twenty-nine accelerator participants experienced learning and performance Analysis targeted individual performance and learning agility behaviour at the cohort level of participation. Inferential and descriptive techniques were applied to identify test four hypotheses. To increase the explanatory power of the survey research, the identified patterns of relationship were explored through supplemental qualitative studies.

Overview Chapter 5 – Qualitative observation findings

This chapter presents qualitative findings from the observation method (Strand 2). Qualitative data were collected to chronicle participant learning experiences during the accelerator. Data sources included field notes, qualitative survey responses, managers' and mentors' notes, participant learning logs, documents provided by accelerator organisers and retrospective participant interviews. Analysis targeted individual performance and learning agility behaviour at the team level of participation.

Overview Chapter 6 – Qualitative interview findings

This chapter presents qualitative interview findings (Strand 3). Interview data were collected from twenty-nine participants some six months after the accelerator ended. This was done to examine learning in retrospect. Analysis examined participant learning agility and performance behaviour at the individual level of participation and focused on the effects of learning interactions with Managers, Mentors and Cohort.

Overview Chapter 7 – Discussion

This chapter provides an integrated summary of the quantitative and qualitative findings generated through this three-strand mixed methods study. Each level of the study examined participant learning and development at a different level of participation associated with the accelererator learning environment (cohort, team, and participant). Prior research, and this study's research model, questions and hypotheses provide the foundation for reporting the collective findings.

Overview Chapter 8 – Conclusion

This chapter provides a summary of the research, offers theoretical contributions, policy implications, discusses methodological implications, notes limitations and signals opportunities for future research.

1.6 Chapter Summary

This chapter introduced accelerators as the context for this research, characterised accelerators as intense multilevel learning environments, and introduced three key dimensions of the accelerator programme logic - *Learning*

Environment, *Learner*, and *Learning Outcomes.* The research questions, research approach, and an overview of the thesis structure were provided.

The next chapter presents relevant literature, concepts and measures underpinning this multilevel investigation of participant learning and development in accelerators.

Chapter 2 | Literature Review

Entrepreneurship is a process of learning, and a theory of entrepreneurship requires a theory of learning (Minniti & Bygrave, 2001, p. 7).

Researchers have begun to examine what accelerators do, how they do it, and to what effect. However, few studies have explored accelerators as learning environments. Specifically, a key feature of the practice - *participant learning and development* - remains understudied. Accordingly, the aim of this multilevel quantitative and qualitative mixed methods study is to add theoretical, empirical, and practical understanding of how accelerators influence participant learning and performance. The research questions investigated are: *How do accelerators influence participant learning and development? -* and - *What does learning agility theory add, if anything to our understanding of participant learning and development in accelerators?*

This chapter further explores the three focal dimensions introduced in the preceding chapter - *Learning Environment*, *Learner*, and *Learning Outcomes*. Relevant literature and research are examined, and hypothetical relationships proposed. The chapter begins with a general review of organising and operational features of accelerators. An argument for accelerators as multilevel *Learning Environments* is developed, key features identified, and the scant body of accelerator learning research examined. Next, the *Learner* dimension is framed through a learning from experience perspective, and learning agility is proposed as the conceptual lens for examining accelerator learning phenomenon in this study. Individual performance literature is operationalised as a lens for the participant *Learning Outcomes* dimension. The chapter closes with a review of the research questions, research model, and hypothesised relationships tested.

2.1 Start-up Assistance – The Rise of the Accelerator

The risk of failure is high for start-up ventures during the early stages of business development because they lack resources (e.g., human and financial capital) held by mature organisations (Cafferata et al., 2009; Stinchcombe, 1965). Resource deficits, whether self-identified or identified by others, such as customers, investors, mentors, and the media, can become catastrophic for ventures if left unaddressed. Choi and Shepherd (2005) describe the processes for overcoming the 'liability of newness' as 'the actions and learning that the management team and employees must undergo to overcome the major challenges of adaptation to the internal and external environments of new organizations' (p. 575). Although some entrepreneurial teams elect to go it alone when navigating the start-up process, many seek out assistance from experts to guide the development of their nascent business model. Business incubators and accelerators are two similar yet distinct start-up assistance programme models that can help entrepreneurs navigate, and possibly overcome, the challenges of being new. A brief overview of each practice precedes introducing accelerators as the subject of this research.

2.1.1 Similar but different: Are accelerators merely Incubation 2.0?

This section provides a brief overview of incubators and accelerators and then introduces accelerators as the subject of this research.

2.1.1.1 Incubator overview

Business incubators are business entities designed to enhance the success of other businesses. They do so by providing participating ventures with a 'strategic, value-adding intervention system (i.e., business incubation) of monitoring and business assistance' (Hacket and Dilts, 2004b, p.57). The first incubator, Batavia Industrial Center, was created in the United States in 1959 (NBIA, 2013a,b) and, as of late 2012, there were over 1,250 incubators in the

United States and over 7,000 globally (NBIA, 2013c) with the four most common hosts being universities, corporations, non-profits and for-profit businesses (Grimaldi & Grandi, 2005).

In general, incubator business models revolve around the provision, at a subsidised rental rate, of shared office space and business support services such as administrative, counselling, education and industry networking to tenant firms (AL-Mubaraki & Busler, 2014; Bergek & Norrman, 2008; Hacket & Dilts, 2004a,b; Peters, et al., 2004). Incentives and services offered to tenants, such as subsidised rents and administrative support, may reduce some of the risks that contribute to failed enterprises (Grimaldi & Grandi, 2005). However, this same support may increase the extent to which tenants rely on incubators to insulate them from competitive market conditions and in doing so inadvertently prolong the business life of weak ventures (Hackett & Dilts, 2004a,b; Rothaermel & Thursby, 2005; Tamasy, 2007).

2.1.1.2 Accelerator overview

Chapter 1 introduced accelerators as a new form of start-up assistance. In general, accelerators provide a suite of resources and services – business advice, counselling, mentorship and workspace – similar to those offered by incubators. In contrast to incubators, accelerators are time-bound and resource-rich programmes that aim to help nascent businesses identify as soon as possible if they have a viable, scalable, and investable business proposition (Christiansen, 2009; Miller & Bound, 2011). The time-bound strategy means accelerators can trim resources quickly from the weak and concentrate them on the strong. Moreover, accelerator participants are competitively selected and admitted as cohort classes that begin and end programmes together (Miles et al., 2017). Consequently, accelerators can provide educational and business development resources in a just-in-time manner thereby upskilling participant knowledge, skills and entrepreneurial competencies when needed most (Cohen, 2013a; Hallen et al., 2016).

The general business model for most accelerators is an investment scheme, where investment is made early in a portfolio of hand-selected, high-potential entrepreneurial teams. Accelerators provide participating ventures access to a range of targeted business development resources in exchange for early-stage equity in each venture. Accelerators aim to facilitate rapid validation of each venture's business model, so they may be best staged to secure follow-on investment at the end of the programme. This increases the possibility organisers will boost their return on investment when the business secures further investment or exits through a sale (Pauwels et al., 2016).

2.1.1.3 Differences between accelerators and incubators

In many ways incubators and accelerators provide similar resources and services to participating ventures. However, research suggests associated business models and programme elements differ. Table 2.1 provides a comparative overview of areas of resonance and contrast between incubators and accelerators.

As indicated by Table 2.1, line 1, accelerators and incubators operate from distinctly different business models, and these differences highlight the essential features of accelerators. For example, an accelerator invests money in participating ventures at the outset (lines 12–13) whereas incubators do not. As Pauwels et al. (2016) have suggested, accelerators are a 'high-risk investment model for the support of high-potential new ventures' (p.14). Therefore, actively supporting the learning and development of participating ventures is a way to protect stakeholder investment. The time-bound, high-stakes programme structure may pressure accelerator participants to succeed or fail, quickly. Thus, accelerators aim to validate or fail business models as quickly as possible to help entrepreneurs advance or move onto another project.

Table 2.1.

Characteristics of Accelerators and Incubators.

Start-up Assistance Form	Accelerator	Incubator
<u>Characteristics</u>		
1. Business model	Investment based	Rent based; Grant
2. Admission process	Open; competitive	Open; non-competitive
3. Cohort focus	Admits cohort of ventures	Rolling admission
4. Duration	Time-bound (3-6 months)	Varies (1-5 years)
5. Educational support	Core feature; highly structured	Ad hoc feature
6. Business counseling	Formal; on-going	As needed
7. Business mentoring	Curated; on-going	As needed
8. Business networking	Curated; on-going	As needed
9. Investment networking	Curated; on-going	Varies
10. Shared business services	Typical	Typical
11. Shared office	Typical	Typical
12. Seed funding for ventures	Typical	Uncommon
13. Equity exchange	Typical	Uncommon
14. Organised demo day	Typical	Uncommon

Note. Information is author-generated from the following sources: Bergek & Norrman, (2007); Clarysse, et al. (2015); Cohen (2013a, b); Hacket & Dilts, (2004a); Miller & Bound (2011).

Accelerators competitively admit high-potential ventures into cohorts for time-bound programmes typically three to six months in duration (Miller & Bound, 2011). Conversely, incubators accept ventures for one to five years and as space permits (Pauwels et al., 2016; Cohen et al., 2019). This distinction is important because the process for on-boarding, supporting, and graduating cohorts of participants is more uniform in accelerators and more ad hoc in an incubator.

The co-location of teams and the structured programme format creates a highly interactive context that enables formal and informal learning interactions (Hallen et al. 2016). For instance, participants may learn by observing the successes and challenges of others (Marsick & Watkins, 2001). Further, because participating firms pursue similar business development benchmarks, the accelerator learning context is high pressure and intense. Cohen (2013a) referred to the accelerator learning context as 'coopetitive'. In other words, participants may work hard

towards their goals because they are competing against others to secure follow-on funding from the shared pool of investors.

Lastly, differences exist in the learning and development focus of the two entities (Table 2.1, lines 5–8). Incubators provide mentors, counselling, networking and educational opportunities as needed and often for a fee. In contrast, accelerators provide participants with uniform access to a highly structured and time-boxed programme of targeted learning opportunities, namely feedback, new perspectives and the prior experiences of others. Thus, accelerators reduce learning-coordination costs for participants by serving as brokers of the right resources for the right time (Cohen, 2013a).

2.1.2 Key characteristics of accelerators

Even within clusters of researchers, the names and characteristics used to describe accelerators vary. For example, the terms *accelerator* (Cohen & Hochberg, 2014); *business accelerator* (Clarysse & Yusubova, 2014); *innovation accelerator* (Dempwolf et al., 2014); *seed accelerator* (Fehder & Hochberg, 2014; Pauwels, et al., 2016); and *start-up accelerator* (Hathaway, 2016; Miller & Bound, 2011) have all been used to describe the phenomenon in empirical research and industry reports. Recent studies have helped move the research community to identify common characteristics of accelerators (Christensen, 2009; Cohen, 2013a; Cohen et al., 2018; Dempwolf et al., 2014; Fishback et al., 2007; Hathaway, 2016). Specifically, qualitative research conducted by Miller and Bound (2011) developed an early and often referenced taxonomy of the accelerator movement. Through analyses of both interviews with accelerator organisers and participants and available industry data they proposed five programme features that characterise accelerators as distinct from other forms of start-up assistance like incubators, angel funds and business development centres. They are (p. 3):

- an open and highly competitive application process;

- provision of pre-seed investment, usually in exchange for equity;

- a focus on small teams, not individual founders;

- time-limited support comprising programmed events and intensive mentoring; and

- cohorts or 'classes' of start-ups rather than individual companies.

Cited regularly by media, industry, and academics, this basic taxonomy helps to distinguish between accelerators that contain the five programme features and those that do not. For example, gener8tor (http://www.gener8tor.com/) based in the United States operates an accelerator programme that provides pre-seed investment to five competitively selected start-up ventures who then participate in a twelve-week accelerator programme. Based on the criteria established by Miller and Bound (2011) they are an accelerator. By contrast, other businesses, such as the New Zealand based Innovate Business Accelerator (http://www.innovatenelson.com/business-Accelerator/), do not fit the criteria because in each admission cycle they admit only one venture rather than a cohort. Table 2.2 illustrates differences in programme characteristics between six accelerators based in London, United Kingdom that meet Miller and Bound's (2011) criteria.

Notably, Table 2.2 indicates that programme characteristics are not uniform across the listed accelerators. Significant differences exist in the amount of pre-seed investment available to each venture, and one of the programmes is nine months longer (line 4). Consequently, it is difficult to compare empirically outcomes between ventures which were accepted to Entrepreneur First for a 52-week programme and received 10–25K pre-seed investment and a venture from Barclays Accelerator (line 1) which received a 120K pre-seed investment for participating in a 13-week programme.

Table 2.2.

Programme Characteristics of Six London-based Accelerators.

	Open Application	Pre-seed Investment	Team Focus	Time-limited	Cohort-based
Programme elements					
1. Barclays Accelerator	Yes	120K	Yes	13 weeks	Yes
2. Bethnal Green Ventures	Yes	20K	Yes	12 weeks	Yes
3. Emerge Education	Yes	40K	Yes	13 weeks	Yes
4. Entrepreneur First	Yes	10/25K	Yes	52 weeks	Yes
5. Start-up Bootcamp	Yes	15K	Yes	16 weeks	Yes
6. Techstars London	Yes	20K	Yes	12 weeks	Yes

Note. Information is author-generated using Miller & Bound's (2011) criteria for accelerators.

1. Barclays Accelerator http://www.barclaysAccelerator.com.

2. Bethnal Green Ventures https://bethnalgreenventures.com.

3. Emerge Education http://emerge.education.

4. Entrepreneur First https://www.joinef.com/london/.

5. Start-up Bootcamp https://www.start-upbootcamp.org/Accelerator/fintech-london/.

6. Techstars London http://www.techstars.com/programs/london-program/.

Interview and case study research conducted by Clarysse and Yusubova (2014) on a sample of managing directors from 13 European accelerators identified similarities and notable differences between accelerator features and practices. Applying an institutional theory lens, they examined accelerator selection processes, general characteristics, and strategies for organising networking and mentoring interactions, and other value-added support services provided to accelerator participants. Many of their findings echoed prior research. However, they added contemporary understanding and clarity by further categorising accelerators into four types: generic, specific, private and public. Generic accelerators accept any types of ventures with the capacity to validate and scale a business model during the programme period. Specific accelerators accept only those ventures developing products or services for a pre-defined industry or industry vertical, for example social media software and applications. The terms *public* and *private* reference stakeholders responsible for funding, organising, and delivering accelerator programmes.

Another study, conducted by Pauwels et al. (2016), identified five design elements (programme package, strategic focus, selection process, funding structure and alumni relations) and 17 sub-construct characteristics of contemporary accelerator programmes. Using an inductive activity system design, case history and interview techniques, Pauwels and colleagues (2016) subsumed the identified design elements underneath three overarching design themes – ecosystem builder, deal-flow maker and welfare stimulator – representative of accelerator stakeholder business objectives. This work is valuable because it expands understanding beyond the programme elements associated with early, privately funded accelerator programmes. Importantly, the research makes explicit the diverse range of objectives, supporters and programme elements contained within the accelerator phenomenon.

Table 2.3 synthesises and extends prior categorisation schemes. It offers five accelerator models and five features associated with each. The scheme facilitates easy identification of accelerator type, whom they serve, and for what purposes. Notably, each accelerator model has a different reason to exist. For example, decisions made within an investment model accelerator will account for the return on investment expectations of funders and organisers; and, in contrast, corporate models seek to increase return on investment indirectly (Table 2.3, lines 1–2). In other words, supporting ventures which aim to develop products and services that enhance the corporation's core customer offering (e.g., software applications that extend the usability of corporate products to new users). Table 2.3 also suggests accelerator models appeal to different types of start-ups, and at different points in their business development journey.

Private investors and investor networks – for example, Ycombinator and Techstars – created and championed early accelerators (Christiansen, 2009; Miller & Bound, 2011). However, hybrid models are gaining traction as a public policy entrepreneurship strategy that blends the objectives of multiple stakeholders (Pauwels et al., 2016). For example, New Zealand recently overhauled its incubator funding and support scheme (MBIE, 2013). Having

observed the success of private-sector led, technology-focused accelerators located in the United States, Israel, Finland, and Sweden, New Zealand moved toward a hybrid-incubation model. The policy shift included a NZ$31.1m four-year investment targeted towards the creation of up to four new technology-focused accelerators (MBIE, 2013). In 2016, the appropriation for the accelerator/incubator model was NZ$8.3m per annum (MBIE, 2016b). Although a variety of accelerator models exist, education and mentorship are central features in all programme designs.

The next section details the characteristics and literature relevant to the accelerator learning environment.

Table 2.3.

Summary of Common Accelerator Models, Key Features, and Examples for Each.

Features \ Model	Investment	Ecosystem	Corporate	Hybrid	University
1. Stakeholders.	Private investors (e.g., individuals and angel clubs).	Governments; NGOs.	Corporate sponsors.	Private investors; governments; NGOs	University community (students, alumni and administration.
2. Business Models	Distribute investment & risk across a diverse portfolio of hand-picked start-up ventures to maximise return.	Foster & support start-up activity that generates regional economic growth and job creation.	Indirectly increase corporate financial return by supporting start-up ventures to develop add-on products and services for core customer offering.	Pluralistic model designed to accommodate stakeholders; integrates program elements of investment and ecosystem focused models.	Subsidised by university administrative and student fee funding schemes.
3. Target ventures	Select top mid to late-stage start-ups from specific verticals; and, those with customers and strong validation.	Select early-stage start-ups (e.g., mix high and low tech) servicing a range of industries.	Select mid to late-stage start-ups with customers and significant validation in the corporate sponsor's vertical.	Selection varies by business model. May accept ventures from early to late stage and from all industries.	Select early-stage start-up teams founded by undergraduate and graduate students.
4. Value proposition for ventures	Access to mentorship, counseling and education; rapid validation of business model; office space; increased social capital, branding, & networking with investors; and, access to early-stage equity in exchange for seed funding.	Access to mentorship, counseling & education; rapid validation of the business model; office space; increased social capital, branding, and networking; and, access to seed funding (varies).	Bridge gap between corporation and start-ups by providing access to industry-specific mentorship, counseling, and education; access to corporate client network; and, access to seed funding (uncommon).	Access to mentorship, counseling and education; rapid validation of the business model; office space; increased social capital, branding, and networking with investors; and, access to seed funding (varies).	Applied learning beyond- the-classroom; access to mentorship, counseling and education, and facilities; proof-of-concept opportunities; seed funding and/or competitive awards; and, free publicity.

Table 2.3 (Continued)

Summary of Common Accelerator Models, Key Features, and Examples for Each.

Features \ Model	Investment	Ecosystem	Corporate	Hybrid	University
5. Programme elements	Time-bound; cohort-based; co-location of ventures (common); curated access to specialist experts (e.g. mentorship, business counseling, educational seminars); graduation, demo-day pitch event; and, alumni network.	Time-bound; cohort-based; co-location of ventures (varies); access to general mentorship, business counseling, educational seminars; graduation, demo-day pitch event; and, alumni network.	Varies by sponsor's business model; elements associated with investment focus models are common; however, support services may be limited to in-house experts and corporate networks.	Varies by stakeholder objectives; elements associated with investment & ecosystem models common.	Varies by sponsoring institution's business model, and possibly tied to course credit. However, features commonly mirror those offered by investment accelerators.
6. Examples	Bethnal Green Ventures;, Collider; Seedcamp; Techstars; and, Ycombinator.	Climate-KIC, K-Startup; Grand Challenge; USAID; and, UAE Government Accelerator.	AT&T Aspire Accelerator; Barclays Accelerato; Disney Accelerator; and, Google Launch Pad Accelerator.	Dubai Future Accelerators; Lightning Lab; R9 Accelerator; and, Start-Up Chile.	University of Arizona State University, SparkLabs Frontier; and, Massachusetts Institute of Technology (MIT), delta v.

Note. Sourced from Bliemel et al., 2018; Clarysse et al., 2015; Cohen, 2013a,b; Cohen et al., 2019; Dempwolf et al., 2014; Gonzalez-Uribe & Leatherbee, 2017; Hochberg, 2016; Miller & Bound, 2011; Pauwels et al., 2016.

2.2 Learning Environment

This section addresses the first of the three accelerator learning dimensions addressed by this thesis research (Figure 2.1). It details key characteristics and practices associated with the accelerator *learning environment*.

Learning Environment *Accelerator Learning Resources*	Learner *Agile Learning Processes*	Learning Outcomes *Task & Contextual Performance*
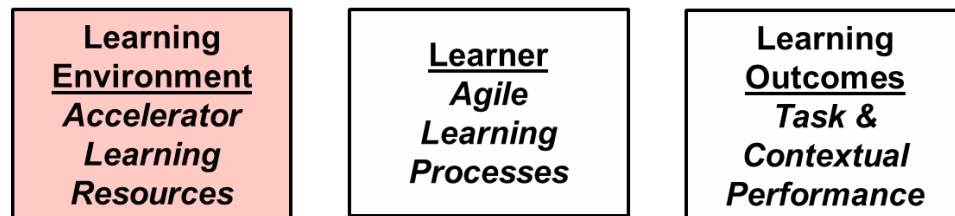
Figure 2.1. Learning Environment: Research dimension covered in Section 2.2.

2.2.1 Learning as the cornerstone for acceleration

Arguably, learning is the fuel that powers the engine of entrepreneurship. For instance, some authors have suggested 'the knowledge required to be successful cannot be known in advance or deduced from some set of first principles' (Kerr, Nanda, & Rhodes-Kropf, 2014, p. 25). Moreover, others posit that 'when the assumption-to-knowledge ratio is high, there is a huge amount of uncertainty, and one should prioritize learning fast, at the lowest possible cost' (McGrath & MacMillian, 2009, p.8). It is claimed that accelerators aid participants in navigating these critical learning processes by helping them to actively scan *outward* and *forward* for opportunities that can help ensure the growth and success of nascent ventures (Cope, 2005).

Accelerators are *hothouse* learning environments designed to increase the speed with which entrepreneurs discover and exploit opportunities (Shane & Venkataraman, 2000; Venkataraman, 1997), during the critical stages of venture gestation. Purportedly, they do so by scaffolding and guiding opportunity recognition processes (Hallen et al., 2017), building entrepreneurial

competencies (Miles et al., 2017), and speeding up learning processes by providing participants targeted education and mentorship (Cohen, 2013a; Miller & Bound, 2011). Moreover, they employ a cohort-based and time-bound programme design to create robust conditions for informal and incidental learning to take place (Hallen et al., 2016; Levinsohn, 2015).

Rapid learning through experimentation and frequent feedback may help accelerator participants look beyond current conditions. Experiments generate immediate feedback thus helping participants to generate insight and knowledge quickly. Regardless of an experiment's outcome, both success and failure influence what and how participants learn (Cope, 2011; Minniti & Bygrave, 2001). The time-bound, multi-phase accelerator programme design may mean learning occurs at different points and in different ways. Collectively, participants learn through interpersonal interactions with accelerator *Learning Resources*.

Common characteristics of the accelerator learning environment suggest learning occurs through a synthesis of experiential (Cope, 2005; Cope & Watts, 2000; Gibb, 1997; Kolb, 1984; Minniti & Bygrave, 2001), and socially-situated (Bandura, 1993, Cope, 2005; Lave & Wenger, 1991; Vygotsky, 1978) processes. Although accelerators offer an array of highly specific and targeted *Learning Resources*, it appears accelerator participants learn primarily through self-directed efforts (Caffarella, 1993, Hiemstra, 1994, Knowles, Holton, & Swanson, 2015; Merriam, 2001).

Because learner needs vary (MacKeracher, 2004), ultimately, what is learned, when and how is controlled by each learner (Marsick & Watkins, 2015). Consequently, this research assumes accelerator participants do not engage with *Learning Resources* in the same ways nor achieve the same results. The next section details the features of the accelerator learning environment along with three specific types of *Learning Resources* embedded in the accelerator model.

2.2.2 Accelerator phases of business development

In principle, accelerators attempt to optimise the match between available *Learning Resources* and the anticipated developmental needs of participating ventures. Accordingly, accelerators use a multi-phase programme design for helping participants learn and develop business models rapidly (Miles et al., 2017). For instance, the first 30 days of an accelerator will often include events and experiences designed to help socialise participants to cultural norms and expectations. In contrast, during the last 30 days, Accelerators aim to help participants prepare to court investors. Consequently, the type, intensity and timing of resources – for example, education and mentorship – vary by phase.

Rich social and cultural norms and contemporary social, cognitive and behavioural practices for generating fast feedback through experimentation compliment the overarching learning-based approach (Blank, 2013; Cohen, 2013a; Maurya, 2012; Ries, 2011). A just-in-time strategy for providing education and mentorship means accelerators aim to scaffold participant learning and development when it is needed the most. Moreover, this practice may help participants generate better learning and performance outcomes than when operating independently.

Table 2.4 presents business development components common to accelerators utilising a 90-day Techstars archetype. The model reflects an 'ideal path' through an accelerator. The time-bound nature of the programme design suggests a need to be both fast and flexible. In other words, participants must meet deadlines and remain open to alternative perspectives, approaches and opportunities. In general, similar business development expectations exist for all teams. However, the outcomes achieved by each team of participants are typically unique.

Table 2.4.

Accelerator Programme Timeline, Business Development Focus and Learning Resources by Phase.

	Phase 1	Phase 2	Phase 3
Time	• Days 1–30	• Days 31–60	• Days 61–90
Focus	• Problem/Solution	• Product/Market	• Investment
Common Business Objectives	• Socialisation & expectations • Idea/ customer validation	• Develop/test/refine goods or services	• Customer acquisition • Preparation for Demo Day investment pitch
Learning Resources	• Formal mentoring • Formal/informal manager meetings • Formal/informal peer interactions • Educational workshops • Networking with industry experts	• Ad hoc mentoring • Formal/informal manager meetings • Formal/informal peer interactions • Specialist advice • Educational workshops • Networking with industry experts	• Ad hoc mentoring • Formal/informal manager meetings • Formal/informal peer interactions • Specialist advice • Educational workshops • Networking with industry experts • Investor interactions

Note. Information is author-generated from https://hax.co/accelerator/; http://www.lightninglab.co.nz/programme-overview/; http://www.oxygenaccelerator.com/accelerator/programme/; https://www.techstars.com/start-up-accelerator-benefits/.

Phase 1: Problem/solution focus

During Phase 1 teams socialise and acculturate to the processes and expectations of the accelerator. Relationship-building with Managers, Mentors and the Cohort and the development of new knowledge and skills occurs. The business development objective for this phase is to achieve an optimal problem/solution fit for their business model, one that the venture can technically achieve within the confines of the time-bound programme design.

Change is the implicit theme during Phase 1. Feedback received from accelerator Managers, Mentors, Cohort, industry experts and customers can inform changes to a team's business models. Accelerators support participant

learning by enabling interactions with participant peers and Mentors and by providing educational seminars and workshops led by industry experts. Educational programmes may focus on lean start-up and agile frameworks, networking, team building customer and engaging with expert advisors.

Phase 2: Product/market focus

During Phase 2 each team aims to build on early learning and validation. Since an accelerator operates a time-bound programme, tension may arise for participants between the need to remain flexible and open to alternate possibilities and acting quickly to meet expectations. Consequently, participants work closely with accelerator Managers to address business challenges and to further relationships derived from the 'mentor dating' process. Moreover, they seek to advance the emerging business models and learn rapidly through iterative cycles of building, testing and measuring assumptions.

During Phase 2, participants self-initiate interactions with Managers, Mentors, and Cohort of peers, external networks and cultural artifacts to address knowledge and skill deficits. Educational workshops covering topics like product development, customer development, financial modelling and governance provide opportunities for informal and incidental learning.

Phase 3: Investment focus

During Phase 3, participants prepare to court investment. Thus, the primary focus of the last month is to craft a unique and compelling investment story. Participants aim to develop and report data that demonstrate their business model is a compelling investment opportunity for generating a significant return on investment. Teams conduct practice investment presentations daily to an audience of Managers, Mentors, and the Cohort.

Intensive feedback from multiple stakeholders supports rapid learning and development. Each team must work quickly to refine their business model before pitching for investment. Thus, in this phase, participants must move fluidly between the processes associated with taking the experience in, making sense of it, and acting upon insights gained along the way. Consequently, a tenuous balance between reflection and action exists throughout Phase 3.

Each phase of an accelerator appears to place unique learning demands on participants (Table 2.4). Thus, participants may engage differently with the learning experience across the duration of the accelerator. For example, during Phase 1 participants are bombarded with a high-volume of feedback from mentors. Consequently, they must distil, process and make sense of the feedback before acting. These processes likely take time. However, in an accelerator, the clock keeps ticking. Thus, participants may experience tension between the need to be both fast and flexible.

To advance a business model rapidly, participants may need to possess the willingness and ability to make sense of, learn from and adapt to changing contextual cues. Further, not all accelerated ventures are successful at raising follow-on funding. One inference is that differences exist in how participants approach the learning demands and resources available in the accelerator.

The multi-phase programme format helps participants progressively learn. However, as noted in Table 2.4, each phase of the accelerator is distinct; therefore, matching the learning need with an appropriate learning strategy is essential. Participants need to engage in different learning behaviours at different times and at different frequencies throughout the accelerator.

Individuals who adapt learning behaviours in response to emerging learning demands will likely also use accelerator *Learning Resources* well and perform

better. The teaching and learning practices of accelerators are therefore critical to an accelerator's success. The next section introduces the learning approaches and frameworks embodied by the accelerator movement.

2.2.3 Learning resources: People and practices

In accelerators, participants access advice and counselling through learning interactions with accelerator management team and volunteer experts. Peer interactions provide another mechanism for informal and vicarious participant learning. The next section details the role of each.

Managers

Researchers use different terms for the full-time professionals who administer the day-to-day operations of an accelerator, those directly responsible for developing selected ventures (e.g., founding directors and managing directors). This thesis applies the term *Managers* (Managers).

Managers operate on-site for the duration of an accelerator. They are heavily involved in the day-to-day learning and business development of each venture (Hallen et al., 2017). Managers with lots of prior start-up experience can significantly influence the speed and developmental trajectory of participating ventures by sharing in-depth knowledge of processes associated with starting, building and exiting start-ups (Wise & Valliere, 2014). Transference of learning between Managers and participants occurs through informal interactions, regular counselling sessions such as weekly team meetings, and ongoing performance evaluations (Pauwels et al., 2016). A key role for Managers is to shepherd time and resources for participants (Cohen, 2013a). For instance, scheduling participant interactions with mentors and educational presenters saves time for

participants and concentrates access to learning when they are presumed to need it most.

Mentors

Accelerator *Mentors* (Mentors) play a key, albeit limited, role in the accelerator programme learning logic. Handpicked by accelerator organisers, Mentors are short-term volunteers that provide just-in-time expert coaching and advice to participants (Clarysse et al., 2015; Cohen et al., 2019; Hoffman & Radojevich-Kelly, 2012). Purportedly, intense time-bound mentoring 'speed [s] up market interactions in order to help nascent ventures adapt quickly and learn' (Cohen, 2013a, p.21). Research suggests Mentors assist participant learning by challenging individuals to question critically pre-held cognitive biases (Hallen et al., 2016); by creating access to business networks (Miller & Bound, 2011); by providing just-in-time expert coaching and advice (Cohen, 2013a; Wise & Valliere, 2014); and by sharing relevant business and life experiences, warts and all.

Claims about the efficacy of Mentors for promoting learning are common. For instance, Clarysse and Yusubova (2014) asserted 'the most valuable aspects of *Accelerator* programs, and the main reason why start-up companies participate in *Accelerators* is the mentorship opportunity' (p.8). Accordingly, participant interactions with accelerator Mentors may help participants stretch towards and break through developmental edges faster than if they were operating independently (DeRue & Wellman, 2009; Vygotsy, 1978). However, few researchers have investigated participant learning interactions with Mentors. The understanding of how, and to what effect, Mentors aid participant learning and development is correspondingly sparse.

Cohort

Accelerators are social learning environments (Levinsohn, 2015). Participants interact regularly with participant peers (Cohort). They work alongside each other in a shared workspace, meet as a group with mentors and managers, attend guest presenters, make pitches and updates to the Cohort, and attend networking events. Based on his inductive, mixed method learning research, Cohen (2013a) has suggested these informal interactions create a 'coopetitive' context that can provide participants with a sense of support, encouragement, and a fair bit of rivalry. Unlike outright competitive contexts such as sporting events, success for one team is not directly at the expense of another. Instead, successes achieved by some participants may provide critical learning opportunities for others. In other words, the experiences of a few may provide learning for many.

Although accelerators regularly organise both social and learning events for participants, the type, form and timing of learning exchanges that occur between peers are likely emergent and ongoing. Moreover, the type and quality of relationships between peers may influence the net value of participant learning interactions.

Learning practices

Accelerators apply a range of streamlined, adaptable, and experiential approaches for aiding rapid learning and business development. It is held that they apply a suite of learning practices and resources prevalent in contemporary start-up ecosystems (Cohen, 2013a; Miles et al., 2017). These 'leaner' approaches contrast starkly to traditional approaches for business modelling, those that 'inhibit entrepreneurial response to changes in the environment' (Gibb, 1997, p.23).

For instance, lean start-up is a practice-focused learning approach for rapidly testing, modifying and validating emergent start-up business models (Blank, 2013; Eisenmann, Ries, & Dillard, 2012). Although developed and championed primarily by entrepreneurs (Maurya, 2012; Ries, 2011), lean start-up appears implicitly informed by general learning through experience theories (e.g., Dewey, 1938; Jarvis, 1987; Kolb, 1984). Integral and integrated processes associated with lean start-up are curiosity, feedback, reflection and experimentation.

Reis (2011) advocates for entrepreneurs to test assumptions through cyclic engagement in learning experiments. He suggests learning from one set of experiments can inform new learning and enhance decision-making. Conducting frequent small-scale experiments can limit the impact of failed assumptions (Blank, 2013; Maurya, 2012; Ries, 2011) and better inform critical business decisions, such as maintaining the current direction (*persevere*), changing direction (*pivot*), or failing the business model (*perish*). Possibly, frequent small-batch experimentation shortens the amount of time between sourcing an idea, testing it and receiving feedback. Access to quick feedback may also keep the volume of feedback participants need to process to a reasonable and manageable level. In other words, not tipping the balance between being able to use the feedback and ignoring or being paralysed by it (De Rue & Wellman, 2009; Parker, 2006).

Lean start-up proponents suggest the process of designing and testing ideas early and often through the administration of small-scale experiments reduces waste by increasing the speed to which ventures identify critical next steps (Eisenmann et al., 2012). Thus, a lighter investment of resources, such as time and money, provides access to fast feedback or fast failure. Moreover, social interactions around cultural archetypes such as lean start-up practices may help entrepreneurs, like accelerator participants, develop a common learning language. This would enable individual and collective sensemaking and learning transfer from one set of experiences to others.

2.2.4 Accelerator learning experience

According to Gartner (1985, p.698), new ventures (i.e., start-ups) reflect more than the individual entrepreneurs who champion them. He suggested start-ups manifest and persist (or not) through multidirectional interactions between four dimensions. These dimensions include (a) the uncertain business context in which the start-up is developed; (b) the type and focus of the start-up (e.g., manufacturing or software development); (c) the dynamic operational processes involved with evolving the start-up; and (d) the characteristics and behavioural propensities of the entrepreneur(s) leading the start-up.

In general, Gartner's (1985) four dimensions reflect a process-based perspective of entrepreneurship. Entrepreneurs operate at the nexus of multiple complex social systems. Whether singularly or collectively, each dimension exerts influence over others. Thus, emergent and evolving properties of each system influence how, when, and to what extent entrepreneurs both learn and evolve start-ups.

The relevance of taking a holistic and process-based perspective of entrepreneurship is apparent when applied to the relationships between accelerators and the start-ups they seek to assist. Arguably, accelerators explicitly address the first three dimensions identified by Gartner (1985). They appear to scaffold and speed up learning and business development by integrating *Learning Resources* designed to help start-ups 'correct known and unknown flaws and gaps in their initial business plans and identify unexpected possibilities for improvement' (Hallen et al., 2016, p.27). Although *Learning Resources* appear helpful for accelerator participants, not all adults learn from experience in the same way. Thus, as MacKeracher (2004, p. 5) pointed out, 'learning is something done *by* the learner rather than something done *to* or *for* the learner.' Therefore, the mere provision of accelerator *Learning Resources* may not enhance participant learning and development uniformly.

Although intense mentorship and education are promoted as valuable sources for learning in accelerators (Hallen et al., 2016) and are a reason many participants choose to apply (Clarysse & Yusubova, 2014), the extent to which participant interactions with Mentors, Managers and Cohort influence learning is underexplored. Three recent studies, however, contributed partial understanding of how accelerators may indirectly influence participant learning.

Applying a mixed method (statistical and narrative analysis) matched sample approach Hallen et al. (2017) explored the extent to which accelerators improve venture performance by accelerating the speed to which participating ventures reach key success milestones. By analysing data from participants who had been accepted, as well as those who were nearly accepted, to nine US-based and four international accelerators, these authors argued that learning from others is a valuable mechanism for influencing accelerated venture outcomes because the learning fills critical knowledge gaps and challenges cognitive biases, especially those biases which inhibit objective assessment and the use of feedback. Although Hallen at al. (2017) suggested indirect learning is an essential mechanism for learning in accelerators, the research did not identify which norms, interactions and practices are most valuable for stimulating shifts in learning behaviour and learning strategy. Thus, much is still unknown about how interactions with accelerator *Learning Resources*, like Mentors, specifically influence participant learning.

Inductive case-based mixed method research by Cohen (2013a) explored how accelerators 'accelerate' learning in participating ventures. Applying a venture level of analysis and drawing primarily on interviews with accelerator Managers, Mentors and Cohorts of participants associated with nine separate accelerators, Cohen (2013a) suggested time-compressed access to a large and diverse group of expert advisors delays ventures from engaging in learning by doing. In other words, the mentoring process helps to slow down the ventures from committing to strategic commitments prematurely. This research made explicit the value of vicarious learning for nascent ventures, yet it did not measure the effect of

participant-level learning interactions with Managers, Mentors, and Cohort. Consequently, much remains unknown about how they influence participant learning and development.

Lastly, quantitative survey research by Miles et al. (2017) explored accelerators as authentic learning experiences. This research, in contrast to the studies above, applied a participant level of analysis to investigate if participant perceptions of entrepreneurial competency, operationalised as opportunity recognition and assessment, became more realistic after participation in an accelerator. The research applied a pre/post survey approach and employed select entrepreneurial competency items from Morris, Webb, Fu, & Singhal (2013) and the authentic learning framework developed by Herrington and colleagues (Herrington & Oliver, 2000; Herrington, Reeves and Oliver, 2014). Results suggested accelerators do help participants self-identify and overcome competency gaps through learning. Moreover, accelerators help participants to do so before scaling their commitment to their start-up business model.

These studies appear to provide partial support to normative assertions that accelerators provide mentoring and education to aid participant learning. However, it remains unknown which accelerator *Learning Resources* are most useful, when, and under what conditions, for aiding participant learning and development.

Thus, the characteristics and behavioural propensities of entrepreneurs – Gartner's (1985) fourth dimension – may have a more significant influence, positive or negative, on individual performance and potential than accelerator-provided *Learning Resources*. For instance, research suggests learning is a selective and self-directed process (Ileris, 2010; Knowles et al., 2015; MacKeracher, 2004). Therefore, the *what*, *why* and *how* of learning is generated and maintained internally by the individual (Ileris, 2007, Marsick & Watkins, 1990; Merriam, 2001). Thus, the rich developmental challenges accelerators offer may

decrease in value if participants become cognitively and behaviourally overloaded. In other words, the need to process multiple competing stimuli may overwhelm individuals and in doing so decrease the developmental value inherent in the experience. However, learning and entrepreneurial research suggest individuals navigate learning challenges better when they work with experts capable of providing feedback, guiding and assisting their development (Chrisman & McMullan, 2004; DeRue & Wellman, 2009; Yusuf, 2014).

Accelerators appear to support participant learning and development in three key ways. Firstly, participants learn by drawing on experiences of expert others, for example managers and mentors. These interactions provide participants with insight on experiences others have had but which they may have not yet had, feedback on what they are currently doing, and coaching for things they need to do. Secondly, participants informally and incidentally learn through social interactions with peers (Cohen, 2013a; Hallen et al., 2017). Observation and guided interactions with the cohort appears to help participants make sense of their experiences. For instance, some participants may share insights gained from working through business challenges with other participants thus raising the possibility that the participant experiences episodes of informal and vicarious learning (Hallen et al., 2014; Watkins & Marsick, 2001). Lastly, the structured learning frameworks and practices introduced by the accelerator appear to provide means for fast learning and development because they appear to be both fit for purpose and applied in a just-in-time manner. Thus, interactions with accelerator *Learning Resources* should, in principle, speed up participant learning and development.

2.2.5 Hypothesis 1: Learning resources positively predict learning outcomes

Taken together, participant interactions with accelerator *Learning Resources* (i.e., Managers, Mentors and Cohort) may help them achieve *Learning Outcomes* not easily or quickly accessible independently. Accordingly, it is

expected that participants will interact with *Learning Resources* that offer high value for learning and less with those that offer low value for their learning needs. Moreover, if participants' learning needs vary then it is also likely the nature of their relationships to available *Learning Resources* will vary between phases as well. Thus, Hypothesis 1 aims to help answer Research Question 1 – How do accelerators influence participant learning and development? – by identifying which *Learning Resources* are most influential for participant learning and development, and when.

Hypothesis 1, and the corresponding concepts that were investigated are

> Participant interaction with *Learning Resources* (managers, mentors, cohort) positively predicts enhanced participant *Learning Outcomes* (task, relational, adaptive and swiftness).

Although accelerators are highly structured and feedback-rich contexts, the *Learning Resources* provided may not be enough to effectively and appropriately scaffold learning for all participants. The level of developmental challenge may exceed all participants' ability to adjust to changing demands. Specifically, participants may not learn the right things at the right time. Moreover, participants may lack the willingness and ability to learn and transfer experiences. Therefore, some learners may be better suited to learn and excel in the uncertain, complex, and risk-laden accelerator learning environment if they have the ability, motivation and wherewithal to adapt learning strategies and behaviours in response to situational changes in both the learning and business development environments.

Learning agility, a construct that considers a mosaic of personal and social learning processes and behaviours may help better explain how participants learn and develop in accelerators.

2.3 Learner

The previous section suggested accelerators employ an assortment of learning-focused practices, cultural archetypes and *Learning Resources* to support rapid learning and business development. But how, when, and why participants engage with accelerator *Learning Resources* and the effect those resources have on participant learning and development outcomes is largely unknown. Learning agility may help explain individual-level variance in participant engagement with accelerator *Learning Resources*.

This section introduces learning agility theory as the conceptual lens for this research. It provides definitions and characteristics of agile learners, factors related to the learner that influence participant learning and development, and reviews relevant conceptual and empirical research. Figure 2.2 reflects how this section relates to the other two dimensions explored in this study.

Learning **Environment** *Accelerator Learning Resources*	**Learner** *Agile Learning Processes*	Learning **Outcomes** *Task & Contextual Performance*
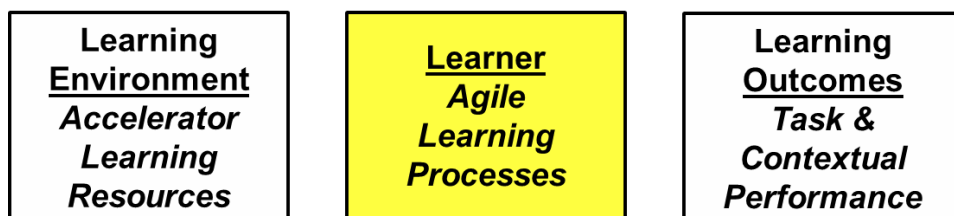
Figure 2.2. Learner: Research dimension covered in Section 2.3.

2.3.1 Learning agility

Seminal research by Lombardo and Eichinger (2000) defined learning agility as the 'willingness and ability to learn new competencies in order to perform under first-time, tough, or different conditions' (p.323). Learning agility is not a stand-alone theory for learning. Instead it draws upon and conceptually extends general learning from experience theories (Dewey, 1938; Jarvis, 1987; Kolb, 1984; Lewin, 1942; Piaget, 2005) by integrating a range of concepts such as openness to experience (LePine et al. 2000), goal orientation (Dweck & Legget,

1988; VandeWalle, 1997), and self-efficacy (Bandura, 1993). Learning agility is not considered an end state or cumulative by-product of physical and cognitive maturation (De Rue et al., 2012; Lombardo & Eichinger, 2000; Mitchinson et al., 2012a). Nor is it something that happens just once. It is still an emergent construct but has been heavily, possibly over-adopted, by the consulting industry. Nevertheless, it does seem relevant to the accelerator experience. It embeds, incorporates, and coheres several disparate learning theories that seem to illuminate better how individuals, like accelerator participants, may learn through experience.

Researchers generally characterise learning agility as a multifaceted and fluid collection of personal learning strategies and behaviours that enable individuals to adapt effectively and appropriately to changes in the learning context (DeRue et al., 2012; McKenna et al., 2007; Mitchinson, et al., 2012b). Both personal characteristics and situational factors affect how people approach and learn from experience (McKenna et al., 2007; Mitchinson & Morris, 2014). For instance, how willing and able individuals are to learn new things and, possibly more importantly, unlearn ways of thinking and acting when they prove contextually inappropriate (DeRue et al., 2012; McCall et al., 1988). Research suggests that individuals can demonstrate 'more of' or 'less of' the characteristics associated with *Agile Learning* and, under the right conditions, learning agility may be able to be developed (DeRue et al., 2012; De Meuse et al., 2010; Lombardo & Eichinger, 2000; McKenna et al., 2007).

Learning agility is a powerful influencer of individual long-term performance, career outcomes and leadership development (Connolly & Viswesvaran, 2002; De Meuse et al., 2010; Dries, Vantilborgh, & Pepermans, 2012; Eichinger & Lombardo, 2004; McCall et al., 1988; McKenna et al., 2007; Mitchinson & Morris, 2014; Silzer & Church, 2009). Individuals high in learning agility:

- see challenge and adversity as an opportunity for learning and growth (Dweck & Leggett, 1988; De Meuse et al., 2010; VandeWalle, 1997);

- actively pursue and use feedback as a source for learning (Ashford, 1986; Ashford & Cumming, 1983);

- engage in reflective practices to question not only what they know but how they know it (Argyris 1976; Mezirow, 1991; Weick, Sutcliffe, & Obstfeld, 2005);

- use processes of experimentation as a source for knowledge creation (De Meuse et al., 2010; DeRue et al., 2012; Kolb, 1984);

- adapt appropriately to changing contextual cues (McCall, 2010; Ployhart & Bliese, 2006; Pulakos et al., 2000); and

- demonstrate low levels of defensiveness (Mitchinson & Morris, 2014; Smith, 2015).

Taken together, agile learners 'continuously seek out new challenges, actively seek feedback from others to grow and develop, tend to self-reflect, and evaluate their experiences and draw practical conclusions' (De Meuse et al., 2010, p. 120). Moreover, they quickly and flexibly take stock of learning tasks and either apply what they already know or decide to engage in new learning (Burke, et al., 2016; Lombardo & Eichinger, 2000). Accordingly, individuals high in learning agility appear well positioned to perform strongly when they face complex, uncertain and ambiguous learning challenges such as those accelerator participants might routinely face. In contrast, accelerator participants who demonstrate low levels of learning agility may be more defensive and prone to hold onto ideas and practices that are not, even in the face of contrary evidence, relevant to the current situation (DeRue et al., 2012; Mitchinson & Morris, 2014; Parker, 2006; Smith, 2015).

The next section explores how learning agility theory may help enhance our understanding of how participants learn and develop in accelerators.

Agile Learning behaviours appear particularly relevant for start-up entrepreneurs like those participating in accelerators. For example, accelerator participants and their teams are subject to a barrage of stakeholder feedback. It is quite likely that not all feedback is consistent and well-aligned with learner needs. Participants may need to sift through the feedback rather than merely follow the proffered advice verbatim. Similarly, novel changes in the business environment (for instance, the loss of a supplier), may signal a need to re-evaluate existing routines to ensure they are still contextually and strategically appropriate. Improperly assessing and adapting to changes in a high-stakes environment like an accelerator may lead to undesired performance outcomes.

Individuals vary in the extent to which they perceive, approach and draw upon experiences as a source for learning (Cope, 2005; McCall et al., 1988; Venkataraman, 1997). Individual-level variance partially influences the extent to which people are either high or low in learning agility (DeRue et al., 2012; McKenna et al., 2007). Moreover, variance may be relevant as to how individuals approach learning in a time-bound learning context like an accelerator. For instance, the agile learner may be better suited to manage the complexity associated with hitting deadlines, managing and processing multiple streams of competing stimuli, as well as managing interpersonal conflict. In contrast, those low in agility may fail to recognise and adapt behaviours that negatively affect relationships or slow down progress toward objectives.

Much learning agility research, however, is associated with commercial interests (e.g., De Meuse, Dai, Hallenbeck, & Tang, 2008; De Meuse, Dai, & Wu, 2011; Eichinger & Lombardo, 2004; Eichinger, Lombardo, & Raymond, 2004). Moreover, it is quantitative and often fails to consider how situational features such as job and organisational characteristics influence how learning agility is assessed. Despite the commercial appeal of this concept, learning agility appears to be a valuable addition to learning from experience research.

Specifically, it offers an intuitive and theoretically grounded way to consider how individuals operating in complex entrepreneurial learning environments, like accelerators, learn through engaging in the experiential processes of doing (Cope, 2005; Corbett, 2005: Kolb, 1984; Minniti & Bygrave, 2001).

Learning agility theory may shed light on why, when and for what reason participants engage with accelerator learning resources such as mentoring. Personal characteristics and situational factors can both help and hinder the extent to which individuals learn within and between experiences (De Meuse et al., 2010; DeRue et al., 2012; McKenna et al., 2007). Thus, elevating understanding of the nature and effect of these learning interactions is likely to be of value to accelerator organisers. Moreover, the application of learning agility to an accelerator may suggest which elements of the programme design help and hinder participant learning.

The next section introduces common conceptualisations and definitions for learning agility.

2.3.2 Learning agility – Theoretical base

Learning agility is a relatively recent concept introduced, and commercialised, by Lombardo and Eichinger (2000). Their seminal research argued that organisations need to identify and develop leaders who demonstrate the potential to learn new ways of thinking and behaving when old approaches are insufficient or inappropriate for current contextual and situational demands. These authors argued that 'changing circumstances call for rapid learning and fresh skills' (p.323). Moreover, high-potentials, unlike high performers, successfully navigate changing demands because they are high learners. In other words, they have the potential for 'learning new skills (or honing current ones) in order to perform in first-time situations' (p.322).

Lombardo and Eichinger's (2000) learning agility research spurred interest in the concept and provided the impetus and means for developing a popular commercial measure of learning agility. Although Lombardo and Eichinger (2000) referenced a list of twenty books, technical reports and articles about leadership and management related to learning they did not make explicit a conceptual link between learning agility and other adult and experiential learning research (e.g., Knowles, 1970; Kolb, 1984; Mezirow, 1991; Merriam, 2001). Lombardo and Eichinger (2000) stated their research is 'somewhat based on' a series of studies associated with the Center for Creative Leadership and that a review of 'relevant literature on learning strategies' occurred (p. 323). Thus, it remains unclear which theoretical foundations, or which implications from the Creative Leadership material they studied, informed their measures of learning agility (e.g., Lindsey, Homes, & McCall, 1987; McCall et al., 1988).

Recently, more scholarly extensions and other characterisations of learning agility have been presented. For instance, conceptual research by De Meuse et al. (2010) suggested learning agility is a meta-competency. These authors argued that individual attributes and processes like goal orientation and adaptability, self-awareness, prior experiences, and personal strategies for handling complexity inform learning agility theory. Consequently, they posited that learning agility can be developed rather than being a stable personality trait such as IQ level.

In building on the Lombardo and Eichinger (2000) definition of learning agility, De Meuse et al. (2010) added the word 'successfully' to describe the type of performance agile leaders demonstrate (p.120). Adding a success dimension arguably enhances the intuitive and commercial appeal because it makes explicit the type of outcomes agile learners may produce. However, the mixing of inputs (motivation and ability) and outputs (successful performance in tough conditions) can reduce definitional clarity. It may also delimit learning agility to specific performance episodes under specific conditions because it references the type of situation ('first-time') where learning is applied (Lombardo & Eichinger, 2000,

p.322). Thus, inferring learning agility may not occur, nor be of value, in other situations.

Despite these limitations, learning agility appears to offer value for understanding how individuals learn through experience as it brings together so many seminal theories into a coherent construct. However, independent non-commercial research into this appealing concept is sparse. Consequently, practice-focused research agendas have left learning agility theory 'ill-defined and poorly measured' (DeRue et al., 2012, p. 258).

Applying a more scholarly and academic lens, DeRue et al. (2012) account for factors that enable and constrain *Agile Learning* and situate it conceptually alongside related constructs. These authors define learning agility as the 'ability to come up to speed quickly in one's understanding of a situation and move across ideas flexibly to learn both within, and across, experiences' (DeRue et al., 2012, pp. 262-3). By placing the focus on speed and flexibility, DeRue et al. (2012) partially removed the input (motivation), and output (performance) elements explicitly embedded in other learning agility definitions (e.g., De Meuse et al., 2010; Lombardo & Eichinger, 2000). A simplified version of their learning agility model (Figure 2.3) and a brief discussion of each dimension follows.
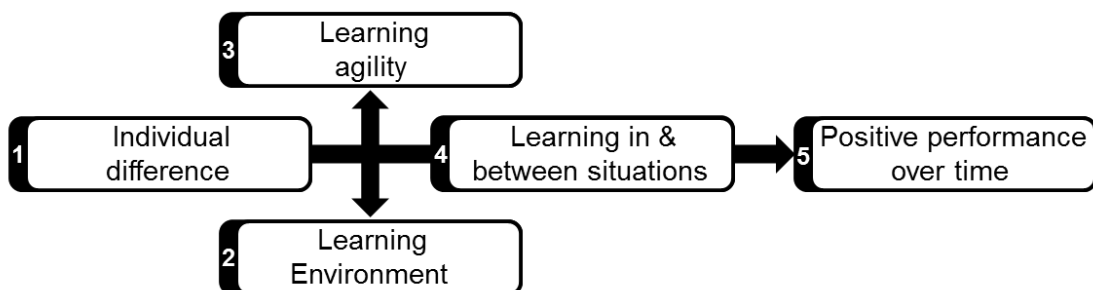
Figure 2.3. Simplified learning agility model (adapted from DeRue et al., 2012).

1. *Individual difference*

DeRue et al., (2012) argued that how, when, and to what extent individuals demonstrate learning agility is related firstly to a range of suspected personal-level antecedents. Table 2.5 provides an overview of literature informing learning agility. Specifically, concepts suspected to be antecedent to learning agility. In other words, individual characteristics in addition to baseline learning ability that support agile learning.

For instance, learning agility may be affected by an individual's general learning orientation (Elliot & Dweck, 1988; VandeWalle, 1997); metacognitive abilities (Flavell, 1979; Ford, Smith, Weissbein, Gully, & Salas, 1998); openness to experience (LePine et al., 2000, McCrae & Costa, 1997); adaptability (Borman & Motowidlo, 1993; Pulakos et al., 2000); and, orientation toward experiential learning (Jarvis, 1987; Kolb, 1984). Thus, how individuals learn within and between experiences (learning agility) may be influenced more by their individual abilities, mindsets and experiences (Burke, 2017; Lombardo & Eichinger, 2000; De Meuse, 2010; DeRue et al., 2012; Mitchinson & Morris, 2014) than more stable learning functions and processes such as intelligence and personality (Connolly, 2001; Eichinger & Lombardo, 2004). By extension, heterogeneity or difference in levels of learning agility may also exist amongst accelerator participants.

The competitive selection process accelerators use suggests participants possess the requisite knowledge, skills and abilities to excel in an accelerator. However, even within a group of high-potential, start-up entrepreneurs, individual levels of learning agility may influence how participants approach and respond to learning within and between experiences.

Table 2.5.

Suspected Antecedents of Learning Agility.

Antecedent	Relevant Research
1. Adaptability & Job Performance	Campbell et al., 1990; Campbell et al., 1993; LePine et al., 2000; Mitchinson et al., 2012a; Motowildo et al., 1997; Ployhart & Bliese, 2006; Pulakos et al., 2000; Smith, 2015.
Relevance for learning agility: An ability to adapt learning mindsets, strategies, and behaviors to fit changing demands is important for: managing ambiguity, uncertainty, and complexity, solving problems creatively; managing stress well; being open-minded to ideas, situations, and people; investing in and managing interpersonal relationships; and, maintaining current capacity while still striving to develop new knowledge, skill, and ability. Agile learners demonstrate high levels of adaptability.	
2. Defensiveness	Argyris, 1977; Argyris & Schön, 1978; De Meuse, et al., 2010; Gibb, 1961; McCall et al., 1988; Mitchinson & Morris, 2014; Smith, 2015.
Relevance for learning agility: Experience can be a powerful teacher. However, in contrast to openness to experience, poor in-role performance and diminished long-term potential is regularly associated with a need to 'protect'. Defensive behaviors inhibit learning from experience and are commonly observed in incidences of career derailment. They may include: avoidance of critical feedback and new people, experiences, and challenges; low levels of self-awareness, responsibility, and trust; and, frequency of engagement in reflective processes. Agile learners may demonstrate low levels of defensiveness.	
3. Goal Orientation	Button et al., 1996; Colquitt & Simmering, 1998; De Meuse, et al., 2010; DeRue, et al., 2009; Dweck, 1986; Dweck & Leggett, 1988; Elliott & Dweck, 1988; Mitchinson et al., 2012; VandeWalle,1997.
Relevance for learning agility: Individuals vary in how and why they pursue goals. Goal orientation research suggests individuals who perceive challenging experiences as opportunities for novel learning and mastery possess a learning goal orientation. These individuals believe they can improve with effort. Successes and setbacks are viewed as opportunities for growth. In contrast, individuals with a performance and reward orientation may perceive successes as external validations of their capabilities and setbacks as threats to their identity. Agile learners may demonstrate high levels of learning goal orientation.	
4. Metacognition	Argyris, 1976; Denison et al., 1995; De Meuse, et al., 2010; DeRue et al., 2012; Flavell, 1979; Ford, et al., 1998; Metcalfe & Shimamura, 1994; Veenman et al., 2004.
Relevance for learning agility: Whereas cognitive abilities are helpful when tasks demand and boundary conditions are familiar, metacognitive abilities are necessary for novel, ambiguous, and complex learning experiences. Metacognitive processes are characterized by the self-awareness individuals develop and the processes they employ to: plan, monitor, and assess their own thinking and sensemaking before, during, and after learning, and performance episodes. Agile learners may demonstrate high levels of metacognition.	
5. Openness to Experience	Costa & McCrae, 1992; DeRue et al., 2012; Eichinger & Lombardo, 2004; McCall et al., 1988; McCall, 2010; McKenna et al., 2007; McCrae & Costa, 1997; Mitchinson & Morris, 2014.
Relevance for learning agility: In general, openness to experience is a fairly stable, yet developable, mindset demonstrated by individuals who are curious about and apt to seek out new experiences, ideas, and perspectives. Individuals open to new experiences demonstrate high levels of self-awareness, creativity, innovativeness, and ability and willingness to adapt. Agile learners may demonstrate high levels of openness to experience.	

Source. Author.

2. Learning environment

Experiences that are complex, challenging and demanding can be both powerful and limiting factors for learning and development (Benjamin & O'Reily, 2011; Cope, 2005; McCall & Lombardo, 1983a; McCall et al., 1988). Because human learning occurs through experiential, social and situated processes (Kolb, 1984; Lave & Wenger, 1991; Watkins & Marsick, 1993) environmental factors influence individual learning (DeRue et al., 2012). Environmental factors such as developmental challenge and complexity can create opportunities for learners to stretch and grow; yet, they can also overwhelm individuals and shut down their capacity to learn (McCall et al., 1988), especially if the learning environment feels psychologically or physically threatening (De Meuse et al., 2010; DeRue et al., 2012; Motowildo et al., 1997).

Learning contexts that provide access to developmental feedback, mentoring, coaching and role models may, for some, offset the threats associated with learning in complex and challenging learning environments like accelerators (DeRue & Wellman, 2009; London, 2003; McCall et al., 1988; McKenna et al., 2007). Access to intense mentorship and education along with a cultural ethos advocating fast learning through experimentation may also reduce the threat of failure for some learners thereby helping them to feel more comfortable about taking learning risks and learning by doing.

3. Learning agility

Learning agility consists of both cognitive and behavioural processes (DeRue et al., 2012). Cognitive processes include visualising future scenarios by integrating prior experience, considering possible alternate outcomes for past events as a strategy for learning in the present, and scanning for patterns and making connections between events and experiences. Behavioural learning processes identified in both general and experiential learning research include experimenting, seeking feedback, and reflecting (Ashford, 1986; Daudelin, 1997, Knowles, 1970; Kolb, 1984; London, 2003; MacKeracher; 2004; Merriam, 2001).

The ability to move quickly, flexibly, fluidly, and appropriately between cognition and behaviour is a hallmark of individuals high in learning agility (Mitchinson & Morris, 2014). Being both fast and flexible in thought and action would seem highly relevant and helpful in a fast-moving learning environment like an accelerator. The time-bound programme format suggests a need to deliver quickly and consistently on personal, venture, and programme-level expectations. Being able to move quickly and fluidly between thought and action may also allow individuals to swiftly make sense of situations, adapt behaviours and thinking appropriately in response to contextual cues, and transfer learning from one set of experiences forward to others.

4–5. Learning in and between situations and positive performance over time

Learning agility conceptually captures how people learn within an experience and how they perform successfully in future novel experiences by appropriately transferring prior learning (De Meuse et al., 2010; DeRue et al., 2012; Lombardo & Eichinger, 2000). Using prior knowledge and skills can reduce the amount of time and energy spent pursuing new learning. However, drawing on prior experiences may also come at the expense of not identifying new or better opportunities and approaches. Accelerator participants high in learning agility may demonstrate a better ability to manage fluidly and effectively the tension between being fast and being flexible. In other words, they may be less likely to get stuck either in a narrowing mindset to be fast, but risking missing opportunities, or a widening mindset to stay open, but missing deadlines (DeRue et al., 2012).

Although DeRue et al. (2012) model is theoretical they advocate for its use in cognitive and behavioural empirical investigations of learning agility. For fast-paced learning contexts like accelerators, measuring the discrete thinking underlying observed behaviour may be difficult. Consequently, this research

applied a behavioural learning agility lens to delimit measurement to observable behaviour (Mitchinson et al., 2012a; Mitchinson & Morris, 2014).

2.3.2 Summary

As presented, learning agility is not a novel stand-alone concept. Rather it embodies and builds upon a variety of individual-level elements embedded in other learning-related literature. For instance, learning agility scholars have noted a partial overlap of concepts associated with prior experience, developmental challenge, openness to experience, learning orientation, general and metacognition, leadership flexibility, adaptability; and experiential learning (e.g. Elliot & Dweck, 1988; Flavell, 1979; Ford et al., 1998; Kolb, 1984; LePine et al., 2000; McCrae & Costa, 1997; McCall et al., 1983b; Pulakos et al., 2000; VandeWalle, 1997). In general, studies across these literatures share a learning focus implicitly premised around development, growth and change over time.

Several concepts (goal orientation, experiential learning, and metacognitive ability) appear to be particularly relevant for how accelerator participants may vary in their levels of learning agility and are discussed next.

2.3.2.1 Learning from prior experience

The desire to identify and develop individuals who have the capacity and willingness to learn and adapt from experience is a key source of motivation for learning agility scholars and practitioners. Learning agility theory builds on a large body of research that investigates how managers and leaders learn from challenging developmental experiences (e.g., Benjamin & O'Reily, 2011; De Meuse et al., 2010; Freedman, 2011; Hill, 1992, 2004; McCall et al., 1998). A common theme across the literature is that leaders often underestimate the scope and nature of developmental challenges. As a consequence, these types

of developmental experiences often feel novel, complex, pressure-filled and risky because they 'render existing routines and leadership behaviours inadequate' (De Meuse et al., 2010, p.119).

Although conceptually consistent, researchers refer to developmental challenges differently. Other terms for developmental challenges include critical incidents (Cope & Watts, 2000; Knowles, 1970), transitional and discontinuous events (Bridges, 2002, 2004; Boyatzis, 2006; Cope, 2003), and trigger events or tipping points (Cope, 2003; Gladwell, 2000). Taken together developmental challenges are (a) unique, thus beyond current routines; (b) complex, uncertain, and ambiguous; and (c) powerfully somatic, cognitive and emotional. In other words, they are 'felt' experiences that require conscious sensemaking for generating understanding (Weick et al., 2005). At their core, developmental challenges are about change and transition.

Bridges (2002, 2004) made a clear distinction between the parts of developmental experiences that occur external to an individual (changes) and those that are person-based (transitions). Changes are things that happen to people. In an accelerator, changes may include a failed business model, someone quitting the team, or the loss of an investment opportunity. In contrast, transitions are an individual-level phenomenon that is process-based, multi-stage, and psychological (Bridges, 2004). Transitions require individuals to adapt how they relate to themselves and the world around them. In other words, they engage in the process of 'letting go of what no longer fits' (Bridges, 2002, p. 128), coming to terms with what is, making a commitment and moving towards the future. In this way what is initially an internal process becomes observable to others.

An inability to effectively deal with the stressors associated with change and transition can be a source of derailment (Hogan, Hogan, & Kaiser, 2010). Derailment describes being 'involuntarily plateaued, demoted, or fired below the

level of anticipated achievement or reaching that level only to fail' (Lombardo, Ruderman, & McCauley 1988, p. 199).

Interview analysis of executives by McCall and colleagues (1988) identified challenging interpersonal relationships, dealing with problems under pressure, and 'jobs that demand dealing with sudden, unexpected changes or that call for skills the manager doesn't have' offered the most opportunity for growth (p.58). Research on derailed managers suggests the mere presence of opportunities for growth may not be enough to make it occur. For instance, derailed managers often lack the necessary interpersonal skills for instilling trust, motivating and developing others and for making decisions under conditions of high complexity and ambiguity (Lombardo et al., 1988).

In a study of early-career developmental challenges experienced by MBA graduates, the graduates expressed the need to 're-evaluate and often adjust the very things that had made them successful to date' (Benjamin & O'Reily, 2011, p.457). In other words, the nature of the developmental challenge prompted the leaders to reflect upon and adapt how they managed themselves and related to others.

These studies suggest that learning from developmental challenges does not come easily nor is it guaranteed (McCall et al., 1988). Individuals, such as accelerator participants, may learn either the right things or the wrong things from experience. However, the learning does not always happen in the moment and often occurs separately from, and much later than, the initial experience (Cope, 2005, 2011). For instance, it may take time to process the raw emotional stress associated with a challenging developmental experience before being able to access and make sense of the learning opportunities embedded in experience.

Experience can be a strong teacher. However, not all individuals are willing, ready, and able to learn the lessons made available through experience. Strategies that appear to help individuals learn from challenging experiences include actively seeking feedback, making time to reflect, experimenting to learn and, importantly, remaining open to new information (Benjamin & O'Reilly, 2011; Cope, 2011; Hogan et al., 2010; Lombardo et al., 1988; McCall, 2010). Low awareness about a situation or self can lead to derailment. Thus, leaders need the wherewithal and ability to dampen behaviours that detract from their effectiveness. In other words, the thinking and actions that brought success in one context often need modifications in order for individuals to experience similar successes in other roles, contexts and situations.

The developmental challenge literature is valuable for identifying the characteristics of powerful learning contexts like accelerators and some of the personal characteristics and learning strategies individuals demonstrate to extract learning from experience. However, in general, the literature presented here does not examine the individual mindsets and processes underpinning how individuals learn from experience.

Although accelerators are challenging and developmental learning environments, it is not known how individuals perceive and value the types of learning experiences they encounter in them. The next section introduces goal orientation theory as a means for considering the mindset individuals have towards learning experiences.

Learning/goal orientation

Learning agility researchers suggest individuals differ in how they perceive and act on learning opportunities (De Meuse 2010; DeRue et al., 2012; Mitchinson & Morrison, 2014). How a person 'shows up' and engages with an opportunity is likely associated with their level of self-efficacy, their motivation for learning, and

their desire and ability to learn, develop, and grow from challenging experiences. This difference is referred to commonly as *goal orientation* (Button et al., 1996; Colquitt & Simmering, 1998; Dweck, 1986; Elliot & Dweck, 1988; VandeWalle, 1997). In general, individuals develop either a learning goal orientation or a performance goal orientation.

Accelerator participants with a learning goal orientation may see successes, challenges and setbacks as opportunities to gain new knowledge or master an existing skill (Button et al., 1996; Dweck, 1986; VandeWalle, 1997). In other words, an opportunity to learn and grow. In contrast, participants with a performance goal orientation may approach learning experiences from a risk or reward perspective. For instance, they may exert more effort towards activities, relationships, and behaviours that have generated past success, and avoid ones – such as practices taught by the accelerator – whereby a lack of knowledge or skill may be exposed. VandeWalle (1997) described these differences respectively as a 'proving' goal orientation or an 'avoiding' goal orientation.

Goal orientations are individual mindsets that influence how individuals make sense of and approach current and future learning experiences. The goal orientation literature does not make explicit which learning strategies and behaviours individuals engage in, when, for what reasons and with what outcomes. Experiential learning theory partially informs the thinking and doing elements associated with learning through experience.

Experiential learning

According to Kolb (1976) success in the face of change may be less about what someone knows or does than about this or her ability to learn through experience. He offered experiential learning theory as a macro-level theory of learning and defined it as a dynamic, whole person, cyclic learning process

'whereby knowledge is created through the transformation of experience' (Kolb, 1984, p.41).

Although conceived as a cycle, Kolb suggests individuals develop a propensity to approach learning experiences through either a grasping (Concrete Experience and Abstract Conceptualisation) or transforming (Active Experimentation and Reflective Observation) mode. In practice, individuals may operate primarily in a preferred mode, vacillate between modes (e.g., experience and reflection) or jump prematurely between modes (MacKeracher, 2004). Accordingly, individuals may create imperfect assumptions about the world by not engaging in all learning modes. Similarly, moving into action prematurely from either an under-informed or a mal-informed perspective may prove risky for learners.

Kolb's (1984) conceptualisation of experiential learning builds on early learning theorists such as John Dewey, Kurt Lewin and Jean Piaget and his conceptualisation of learning from experience has been adopted by a wide range of learning scholars. Specifically, it appears in management education and entrepreneurship learning research (e.g., Cope, 2005, Corbett, 2005; Deakins & Freel, 1998; Kolb & Kolb, 2009; Mainemelis, Boyatzis, & Kolb, 2002; Minniti & Bygrave, 2001; Pittaway & Cope, 2007; Politis, 2005). It is useful for considering how individuals may experience and process learning stimuli. However, Kolb's (1984) model appears to offer limited insight on how situational factors, such as social interactions with other accelerator participants, may or may not influence, learning within and between experiences. Nor does it address how individuals select appropriate learning modes for the situations they face (MacKeracher, 2004), or move between strategies as conditions change. Thus, experiential learning theory provides a necessary, although insufficient, lens for understanding how accelerator participants learn through experience.

The next section introduces how thinking about thinking may help individuals be agile learners.

Metacognitive ability

In general, research characterises agile learners as self-aware individuals who engage in metacognitive processes. In other words, they engage in multi-level thinking to identify connections between related and non-related things, question existing frames of reference (theirs and others), and shift perspectives and strategies accordingly (Argryis, 1976; Flavell, 1979; Metcalfe & Shimamura,1994; Veenman et al., 2004).

Metacognition is significantly associated with knowledge and skill acquisition processes, self-efficacy, task performance, and transfer between experiences (Ford et al., 1998), all of which appear necessary for learning quickly when operating in complex and challenging learning conditions like those inherent in accelerators. For instance, an ability and propensity to 'think about thinking' (Flavell, 1979) may help inform what accelerator participants attend to, how they process and make sense of individual and collective experiences, and how they select and engage in behaviours and strategies that facilitate the achievement of expected outcomes. In other words, metacognitive processes may help inform decisions to either stay the course or moderate behaviours and learning strategies to enable further learning and development.

The next section will briefly introduce key learning behaviours and strategies supporting the conceptualisation of learning agility applied to this research.

2.3.2.2 Agile learning strategies and behaviours

Active and purposeful engagement in learning behaviours and strategies such as seeking feedback, experimenting and reflecting may help accelerator participants discover and exploit entrepreneurial opportunities more easily. Specifically, an ability to learn fast and remain open to different ideas and possibilities may be a key differentiator between the types of outcomes participants achieve.

Learning agility is can be researched by examining cognitive (e.g., counterfactual thinking and pattern recognition) and behavioural (e.g., reflecting and experimenting) processes (DeRue et al., 2012). This thesis adopts a behavioural conceptualisation of learning agility (Burke, 2017; DeRue et al., 2012; Mitchinson et al., 2012a; Mitchinson & Morris, 2014).

A behavioural approach supports the use of self and multi-rater assessments because respondents do not need to possess prior knowledge of the learning agility construct (Mitchinson et al., 2012a; Smith, 2015). The next section discusses the core learning strategies and behaviours underpinning the current research. They are *feedback seeking*, *knowledge seeking*, *experimenting*, *reflection* and *flexibility*.

Feedback seeking

Feedback seeking is a learning strategy that may partially mitigate some of the limitations of challenging experiences, like accelerators, because it can help direct and motivate individuals to behave and think in new ways (Ashford, 1983; Ashford & Cummings, 1986; Kolb, 1984; London, 1995, 2003; MacKeracher, 2004). For instance, receiving feedback may prompt introspection, promote self-awareness and efficacy, provide a sense of control over outcomes, and help guide future actions for accelerator participants as well as encourage individuals to improve relationships (London, 2003; London & Sessa, 2006). Importantly, feedback seeking provides a means of assessing outcomes against expectations (MacKeracher, 2004). A predisposition for feedback seeking may also help accelerator participants acknowledge personal biases and modify behaviours to navigate better and learn from the developmental challenges they face.

Although, feedback is a valuable resource for learning some individuals rely more on personal experience than advice from others. From a sample of seven hundred self-employed British entrepreneurs, Parker (2006) found participants

overwhelmingly relied on their prior beliefs for making decisions rather than acting on valuable new information. This research suggests entrepreneurs become subject to cognitive biases when belief systems become rigid. An alternate explanation may be that in feedback-abundant environments, individuals reach a tipping point whereby the relationship between the challenge and development ceases to add value (Cope & Watts, 2000; DeRue & Wellman, 2009; McCall et al., 1988) and begins to inhibit new learning and development (Cope, 2005, 2011; McCall et al., 1998). Moreover, individuals cling to old ways of being and doing. Individuals high in learning agility may be better positioned to acknowledge and overcome personal biases and appropriately modify strategies and behaviours in response to feedback received.

Knowledge seeking

In general, *Agile Learners* are characterised as individuals who actively pursue novel learning opportunities and experiences as the means to know more about themselves and the world around them (Lombardo & Eichinger, 2000; Mitchinson & Morris, 2014). For start-up entrepreneurs, learning is a critical survival strategy because individuals rarely hold ample and adequate knowledge, skills and abilities at the outset of their venture (Stinchcombe, 1965). Thus, prior knowledge and experience can only take start-up entrepreneurs so far when operating in complex, uncertain and rapidly changing business contexts such as those that accelerator participants may face.

Knowledge seeking characterises the learning strategies and behaviours individuals use and the various methods they proactively apply to remain current in their areas of expertise (Mitchinson et al., 2012a; Smith, 2015). Accordingly, participant engagement in knowledge seeking processes may involve a wide range of learning strategies and behaviours such as reading, talking with a colleague, requesting feedback from mentors, and experimenting to test assumptions.

Experimenting

Researchers posit that individuals high in learning agility use experimenting as a strategy for generating access to quick feedback from which future decisions are made. In practice, learning experiments narrow the gap between assumption and reality by generating feedback from which a learner can decide to amplify thoughts and actions that are appropriate and dampen those that are not. Lean start-up practitioners advocate using numerous, small scope, learning experiments to validate or invalidate business assumptions (Maurya, 2012; Ries, 2011). Similarly, safe-to-fail experiment strategies enable rapid learning in fast-paced, volatile, unpredictable, complex and ambiguous contexts (Berger & Johnston, 2015; Snowden & Boone, 2007). Taken together, learning experiments are an effective strategy for reconciling and reducing discrepancies between prior and current experiences (Kolb, 1976, 1984; MacKeracher, 2004).

Reflection is another key learning strategy *Agile Learners* use to help understand, distil, make sense of, and operationalise feedback generated through experiments.

Reflection

Reflection – a natural learning process 'done by' someone rather than something being 'done to' someone (Nesbit, 2012) – is a critical ingredient for learning from experience. It is primarily an intrapersonal process. However, social interactions with others may both prompt and promote its occurrence (Ashford, 1986; Daudelin, 1997). Shifts in perspective, behaviours and actions are common *Learning Outcomes* derived from reflection (London, 2003; Merriam, 2001, Mezirow, Nesbitt, 2012). However, not all types of reflection, produce the same types and levels of learning (Argyris, 1976; Jarvis, 1987). Thus, alignment between the outcomes pursued and reflective processes may be important for learning in general (Daudelin, 1997) and specifically under the intense and time-bound conditions accelerator participants face.

An ability to effectively and appropriately use two distinctly different forms of reflection may be helpful for learning in accelerators. Moreover, participants who are *Agile Learners* may be better at distinguishing when to use each reflective strategy. Single-loop learning is analogous to a backward glance whereby individuals make sense of experiences tacitly through existing mental schemes (Argyris, 1976). By contrast, double-loop learning is evidenced by individuals questioning the very 'cognitive rules or reasoning they use to design and implement their actions' (Argyris, 1991, p.4-5). Accordingly, single-loop learning involves having an appropriate strategy for decision-making when past experiences closely mirror present conditions.

However, double-loop learning may be better suited for operating in uncertain, complex and novel contexts like accelerators because the past cannot predict the future (Argyris, 1976; Jarvis, 1987; Snowdon & Boone, 2007; Schön, 1987). Depending on desired learning outcomes, accelerator participants may benefit from reflecting individually, under guidance, and alongside others (Daudelin, 1997). Accelerator participants who are also agile learners may be effective at discerning and engaging in the most appropriate forms of reflection for their needs.

Flexibility

Striking a balance between making time to learn and delivering on performance expectations is challenging under most conditions. Risky, uncertain and ambiguous contexts, such as those faced by accelerator participants, may make this even harder. An inability to manage the tension between being open to new ideas and opportunities and delivering quickly on tasks may influence how participants interact with accelerator *Learning Resources* and the learning and performance outcomes they achieve during each phase of the programme.

It is held that individuals high in learning agility demonstrate speed of thought and action and attentiveness and openness to other possibilities (Mitchinson & Morris, 2014; Mitchinson et al., 2012b; Smith, 2015). In other words, they can quickly, flexibly and appropriately recalibrate how they think and react to changes (LePine et al., 2000; Pulakos et al., 1999). Specifically, DeRue et al. (2012) offered the terms *speed* and *flexibility* to define two complementary, yet dialectical, processes. Notably, each comprises both cognitive and behavioural elements. For example, speed describes how quickly individuals notice and make sense of change *and* how they adapt behaviour to meet new demands.

In contrast, flexibility describes how individuals quickly consider a range of options before jumping into action (Burke, 2017). Smith (2015) combined the concepts of speed and flexibility into one concept as they are interrelated and interdependent learning strategies. The next section introduces key research supporting the measurement of learning agility.

2.3.3 Learning agility – Measures

Since its initial introduction by Lombardo & Eichinger (2000), learning agility research has generated both academic and applied interest. However, in practice, interest largely exceeds evidence. What evidence does exist is primarily accessible through white paper or technical reports (e.g., De Meuse et al., 2008; De Meuse et al., 2011). Thus, a fair bit of skepticism is appropriate because applied research primarily aims to strengthen the value and appeal of commercially available, yet proprietary, measures. Therefore, there are still questions about what learning agility is and how best to measure it.

This next section will first introduce some commercial learning agility assessments, namley research associated with the most widely adopted commercial measure (Choices Architect®), and a recently developed open-

source academic measure of learning agility (Learning Agility Assessment Inventory).

Common learning agility measures

Five firms promote commercial yet proprietary, measures of learning agility. The name, type and commercial source for each assessment is noted in Table 2.6. Although each assessment applies a different definition of learning agility, commonalities between the assessments exist which suggests they are assessing similar constructs. In general, the definitions suggest agile learners demonstrate an ability, readiness and motivation for proactively approaching and learning from challenging experiences. Moreover, agile learners consciously transfer learning between experiences. A focus on assessing the potential for leadership, self and interpersonal awareness are common threads across the presented measures.

Notably, only the Choices Architect® and viaEdge ™ are designed to be specific measures of learning agility. In other words, the facets measured in some assessments are used to infer the presence of learning agility rather than measure it explicitly (e.g., Prospector®). Thus, a lack of alignment between theory and measurement may exist. Moreover, it is difficult for external researchers to assess validity and reliability claims because of the proprietary nature of commercial learning agility measures.

Table 2.6.

Common Learning Agility Measures.

Assessment Name	Type	Source
Proprietary		
1. Choices Architect®	Multi-rater survey	Korn/Ferry International
2. Growth Factors Inventory	Multi-rater survey Self-assessment survey	Hay Group
3. Leadership Agility 360 ™	Multi-rater survey	ChangeWise
4. Leadership Potential Inventory	Multi-rater survey	Development Dimensions International (DDI)
5. Prospector®	Multi-rater survey	Center for Creative Leadership
6. viaEdge ™	Self-assessment survey	Korn/Ferry International
Non-Proprietary		
7. Learning Agility Assessment Inventory ™	Self-assessment survey	Teachers College Columbia University

Note. Sourced from www.kornferry.com; www.kornferry.com/haygroup/; www.changewise.biz; www.ddiworld.com; www.ccl.org
Number 7, The Learning Agility Assessment Inventory (LAAI) is now called the Burke Learning Agility Inventory™ and is distributed by http://www.easiconsult.com/

Choices Architect®

Another commercial tool is the Choices Architect® (Table 2.6, line 1). It is an 86-item multi-rater survey assessed individual performance, the potential to perform, and propensity to get into trouble (Lombardo and Eichinger 2000). The four factors are (a) *People Agility*: individual self-awareness, and openness to ideas and feedback; (b) *Results Agility*: individual performance under challenging conditions; (c) *Mental Agility*: individual ability to address complexity and communicate ideas; and (d) *Change Agility*: individual curiosity and willingness to experiment and engage in skill-building activities and new challenges (p. 324). Overall, Lombardo and Eichinger (2000) asserted that the Choices Architect® is a valid and reliable measure of learning agility. Other researchers have found it has reasonable psychometric properties (see Connolly 2001; De Meuse et al. 2008; Eichinger & Lombardo, 2004). However, it is limited as a research tool for several reasons (a) its proprietary and commercial nature of Choices Architect®;

(b) the lack of external review; (c) a lack of alignment between measures and the learning agility definition provided; and (d) the extent to which questions are double-barrelled making it unclear what is being measured. Consequently, a fair bit of skepticism is warranted. The next section introduces an alternate framework for measuring learning agility that was used for the current research.

Learning Agility Assessment Inventory (LAAI)

The LAAI is an open-source, theoretically grounded, behaviourally based self-report measure of learning agility (Burke, 2016, 2017; Drinka, 2018; Mitchinson & Morris, 2014; Mitchinson et al., 2012; Smith, 2015). Conceptually, the measure integrates both early learning agility theory (Lombardo & Eichinger, 2000) and the recent characterisation of learning agility by DeRue et al. (2012) as a balance between learning speed and learning flexibility. Experiential learning (Kolb, 1984), goal orientation (Dweck, 1986; VandeWalle, 1997), and job adaptability (Pulakos et al. 2000) literature form the theoretical roots of the LAAI (Mitchinson et al., 2012a). Key research associated with the development of the LAAI is included in summary Table 2.7. A brief narrative of key results for each study follows.

Three exploratory studies conducted by Mitchinson and colleagues (2012a) resulted in the development of a 38-item, theoretically meaningful, and interpretable five-factor LAAI model (Table 2.7, lines 1–3). A concurrent criterion validity study of the five-factor LAAI model (Table 2.7, line 4) found acceptable levels of reliability. Moreover, this research identified a positive association between executive performance assessment grades (other-rated) as a proxy criterion for executive performance and LAAI scores derived from self-rated participant responses (Smith, 2015). A split-sample confirmatory, factor-analysis strategy to the nine-factor LAAI model (Table 2.7, line 5) suggests it also indicated a good model fit for each group (Burke, 2017).

Table 2.7.

Empirical Learning Agility Assessment Inventory Research.

Reference	Objective	Sample	Dimensions Measured
1. Mitchinson, et al. (2012a)	Develop a behaviorally-based measure for learning agility.	*n*=204 Online Convenience sample	Innovating, Performing, Reflecting, Seeking, Defending

Key learnings: Pilot study of developed 36 item measure of learning agility. High inter-correlations between some items resulted in the removal of 5 items. Principle component analysis of remaining items suggested a theoretically meaningful 5-factor solution that demonstrated acceptable levels or reliability.

2. Mitchinson, et al. (2012a)	Further, develop, and test a revised version of LAAI	*n*=331 Working professional	Innovating, Performing, Reflecting, Seeking, Defending

Key learnings: a 29-item version of LAAI was subjected to additional principal component analysis. Three additional items were removed to achieve a theoretically meaningful 5-factor solution. Alpha coefficient for overall scale (.88) and five subscales (.74–.89) was acceptable.

3. Mitchinson, et al. (2012a)	Two-part assessment of convergent and discriminant validity for 26-item LAAI against personality and goal orientation measures.	*n*=86 Graduate students/ *n*=134 Leadership participants	Innovating, Performing, Reflecting, Seeking, Defending

Key learnings: Sample 1, the alpha coefficient for overall LAAI scale was .81 with subscales ranging between .63–.81. Only moderate correlations were observed between LAAI sub-scales and measures from Saucier's (1994) Mini-Markers personality and VandeWalle's (1997) Work Domain Goal Orientation Instrument. Thus, the authors concluded LAAI was not a duplicative measure. Sample-2, the alpha coefficient for LAAI subscales ranged between .69–.89. Correlation analysis between LAAI subscales and the Workplace Big Five Profile 4.0™ indicated individuals high in overall learning agility were also open to new experiences, extroverted and comfortable with low levels of stability.

4. Smith (2015)	Concurrent criterion validity study of LAAI (5-factor model)	*n*=134 Financial executives	Feedback Seeking, Information Seeking, Experimenting, Reflecting, Agility

Summary key learnings: Examined, as part of a larger study, the reliability of the LAAI (5-factor; 38 item version). Cronbach's Alpha scores: Feedback Seeking (.646), Information Seeking (.747), Reflecting (.682), Experimenting (.762), and agility (.831) suggest moderate to acceptable reliability. The learning agility scale (factors combined) was also reliable (.831).

5. [a]Burke, 2016, 2017	Split-sample confirmatory factor analysis of LAAI (9-factor model)	*n*=393, Executive education participants	Feedback Seeking, Information Seeking, Performance Risk Taking, Interpersonal Risk Taking, Collaborating, Reflecting, Speed, Flexibility

Summary key learnings: Analysis (chi-square test, comparative fit index, root-mean-square error of approximation, and standardised root-mean-square residual) indicated a good model fit for a 9-factor version of LAAI. Cronbach alpha scores (.78-.88) for each subscale suggested satisfactory levels of reliability.

Note: [a] LAAI, re-named Burke Learning Agility Inventory in 2016

These studies suggest that the five-factor models of the LAAI are valid, reliable and useful for measuring learning agility (Mitchinson & Morris, 2014; Mitchinson et al., 2012a; Burke, 2017, Smith, 2015). Table 2.8 briefly introduces each LAAI dimension along with a corresponding description.

Table 2.8.

Dimensions and Definitions for the 5-Factor Learning Agility Assessment Inventory.

Dimensions	Code	Definition
Feedback Seeking	FS	Asking others for feedback on one's ideas and overall performance
Knowledge Seeking	KS	Using various methods to remain current in one's area of expertise
Experimenting	EX	Trying out new behaviours (i.e., approaches, ideas) to determine what is effective
Reflection	RF	Slowing down to evaluate one's performance in order to be more effective
Flexibility[a]	FX	Being open to new ideas, proposing new solutions, and acting on ideas quickly so that those not working are discarded, and other possibilities accelerated

Note. Information sourced from Smith (2015).
[a] *Flexibility* was called *Agility* in Smith's (2015) research. It was renamed in this study to reduce reader confusion between the name of the Agility measure and the name of the overall measure called Learning Agility.

2.3.4 Hypothesis 2: Learning resources positively predict agile learning

As a 'mind set and corresponding collection of practices that allow leaders to continually develop, grow and utilize new strategies' for learning (Burke, 2016, p.2), individuals high in learning agility are likely both flexible and fast in how they think, act, and pull learning forward to other novel experiences (DeRue, et al., 2012). Notably, individual differences and situational factors may influence the mosaic of cognitive and behavioural processes individuals engage in to learn, or not learn, through experience (De Meuse et al., 2010; Eichinger & Lombardo, 2004; McKenna et al., 2007; Mitchinson & Morris, 2014). Thus, learning agility appears to be an appropriate theoretical and practical lens for assessing how

individuals learn in complex, uncertain, and time-bound entrepreneurial contexts like accelerators. Specifically, it may better inform how entrepreneurs learn through experiential processes of doing (Cope, 2005; Corbett, 2005: Kolb, 1984; Minniti & Bygrave, 2001) and how they adapt learning strategies and behaviours to respond quickly and flexibly to changes in the learning context (DeRue et al., 2012; Mitchinson et al., 2012a).

Participant-level learning variance may matter for accelerator organisers because the *Learning Resources* are, to a great extent, provided uniformly (Hoffman & Radojevich-Kelley, 2012; Miller & Bound, 2011). Increasing understanding in these areas may help accelerator organisers refine the types and timing of *Learning Resources* provided to participants thereby optimising the effectiveness of accelerator learning programme designs. Hypothesis 2 examines, longitudinally, the relationships between participant interactions with accelerator *Learning Resources* and their engagement in *Agile Learning* strategies and behaviours.

Hypothesis 2 aims to help answer Research Question 2 – What does learning agility theory add, if anything, to our understanding of participant learning and development in accelerators? – by identifying which, and to what extent, accelerator *Learning Resources* influence participant engagement in *Agile Learning* strategies and behaviours. Hypothesis 2, and the corresponding concepts investigated is:

> Participant interaction with *Learning Resources* (Managers, Mentors, Cohort) positively predicts the frequency of participant engagement in *Agile Learning* strategies and behaviours (feedback seeking, knowledge seeking, experimenting, reflection, and flexibility).

The next section introduces how this research operationalises *Learning Outcomes*.

2.4 Learning Outcomes

The next section details how this research operationalises *Learning Outcomes*. Figure 2.4 depicts how this section aligns with those previously presented.

Learning Environment *Accelerator Learning Resources*	Learner *Agile Learning Processes*	Learning Outcomes *Task & Contextual Performance*
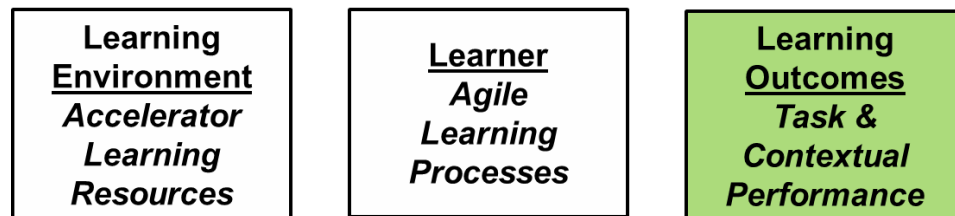
Figure 2.4. Learning Outcomes: Research dimension covered in Section 2.4.

2.4.1 Outcomes for accelerators – Participants

Rapid learning and enhanced performance appear to be implicit outcomes for accelerator participants and the ventures they lead. Usage of an open and competitive application process may suggest accelerators seek to select participants and ventures already primed for success. Moreover, selection may allow organisers to assess the strength of each team's business model as well make general assumptions around the relational health and business functionality of teams (Clarysse et al., 2015) such as determining whether a team will behave in ways that enable it to develop an investable venture during the programme. For example, organisers would explore whether a team can a team work together, manage stress and learn under fire.

Although the accelerator selection process appears rigorous other factors beyond knowledge, skills, and abilities appear to be in play because not all ventures achieve expected performance outcomes. Such factors may include securing follow-on funding, remaining a viable business or achieving a speedy venture exit (Fehder & Hochberg, 2014; Smith & Hannigan, 2015; Wise & Valliere, 2014). Therefore, there a need exists to research accelerators from a

process perspective rather than merely through an economic lens. Research on learning is arguably a way to build an improved understanding of the phenomenon.

Many factors influence how accelerator participants achieve learning and performance outcomes. Although individual technical expertise and knowledge affect team outcomes, general person-level characteristics are possibly equal, if not greater, contributors to personal and team performance outcomes. Specifically, individual and team performance outcomes are influenced by how participants behave individually and collectively (Sonnentag & Frese, 2002).

Motowidlo (2003, p. 39) offers an individual-level behavioural perspective of performance. He defines it as 'the total expected value to the organisation of the discrete behavioural episodes that an individual carries out over a standard period of time' (p.39). This definition is helpful when considering how accelerator teams perform because it separates performance from results and ties the assessment of performance to a unit of time rather than an overall condition. Further, individual behaviours, in aggregate, help or hinder team performance. Moreover, behaviours which support high team performance in one accelerator phase may hinder performance in others. Figure 2.5 details conceptual elements of individual performance and causal mediators affecting overall performance.

Individual-level differences like commitment, knowledge, skills, and abilities influence how accelerator participants respond to situations and opportunities (Figure 2.5, item 1). Behavioural responses can influence overall performance outcomes in two ways (items 2–3). Individuals can influence the functionality of their team's technical core (Task Performance) by doing things like servicing and maintaining processes and resources or by working in ways that affect the organisational social, psychological environment where work occurs (Contextual Performance). Either way, individual behavioural responses generate changes

(item 4) within performance systems that help or hinder how an organisation achieves expected performance outcomes (item 6).
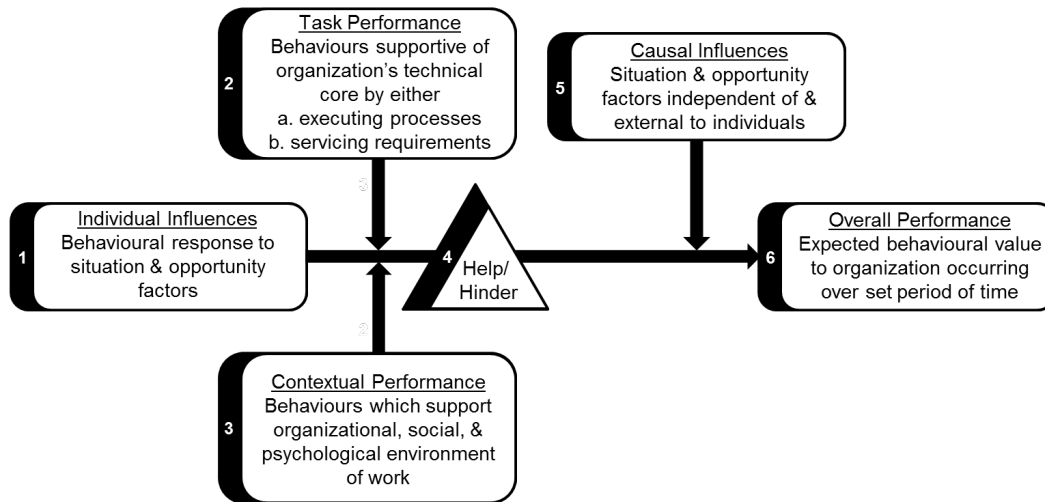
Figure 2.5. Graphic representation of individual performance constructs (Borman and Motowidlo, 1993; Motowidlo, 2003; Motowidlo & Van Scotter, 1994).

Expected *Learning Outcomes* are directly affected by episodes of individual behaviour (Figure 2.5, items 2–3), and by a multitude of causal influences external to the individual, such as regulatory changes in the industries accelerator teams operate in which also play a mediating role in the achievement of performance outcomes (item 5). Notably, and of relevance to the current research, empirical evidence suggests Task and Contextual Performance are related but independent contributors to overall job performance (Motowidlo & Van Scotter, 1994).

The next section introduces definitions and dimensions of Task and Contextual Performance, their relevance for accelerators, and how this research operationalises each concept.

Task performance

Task Performance behaviours contribute value to organisations in one of two ways. First, individuals can demonstrate behaviours that maintain the core conditions that enable an organisation to do its work (Borman & Motowidlo, 1993). For instance, accelerator participants may perform operational functions like hiring, or conducting financial transactions. Secondly, Task Performance relates to the conversion of resources into goods or services (Motowidlo, 2003). For instance, software developers in accelerators use 'raw materials' such as knowledge, skills, experience and intellectual property to code the architecture underlying their team's proprietary software package.

Each form of Task Performance behaviour appears distinct and necessary to contribute value, positively or negatively, towards achieving expected organisational outcomes (Motowidlo et al., 1997). Beyond influencing performance outcomes through the application of knowledge, skills, abilities and experiences, individuals can also behave in ways that influence the social dimensions of work environments.

Contextual performance

Contextual Performance behaviour 'promotes the viability of the social and organizational network and enhances the psychological climate' (Motowidlo et al., 1997, p.76). In other words, individuals behave in ways that support the social environment where work takes place. For instance, the open sharing of information in an accelerator team may help promote rapid learning and achievement if participants feel feedback was well-intentioned. Alternatively, negative feedback exchanges may inhibit the degree to which participants feel safe to learn by taking risks. Thus, it is possible that poor interpersonal skills may affect the overall capacity of teams and reduce their ability to achieve expected outcomes.

The distinctions between Task and Contextual Performance are helpful for considering how participants perform technically (that is, in terms of applying their knowledge, skills, abilities, and experiences) and behave in ways that support the psych-social climate and culture of the work environment (Griffin et al., 2000; Motowidlo et al.,1997; Sonnentag & Freese, 2002).

This research operationalises Contextual Performance further by considering how participants (a) develop and maintain healthy and productive interpersonal relationships (Relational); (b) adjust to changes in the performance environment (Adaptive); and (c) work quickly to meet known objectives (Swiftness). Each facet is presented in Table 2.9 and described briefly in the next section.

Relational

As noted in Section 2.3, accelerators are highly social and interconnected learning environments. Participants frequently interact with their team members, Managers, Mentors, Cohort, and customers. Thus, how well individuals interact with others may influence performance outcomes. For instance, patterns of interpersonal behaviour may build or break feelings of honesty, trust and commitment.

The quality and effectiveness of participant learning and performance may be related to the type and quality of interpersonal interactions. Attitudes and behaviours associated with openness, engagement and support may serve to build strong relational ties. These types of behaviours may be demonstrated by offering feedback and checking for understanding. Conversely, displays of arrogance, defensiveness, and protective behaviours may threaten relationships and damage the psychological safety of the work environment. Thus, how individuals relate interpersonally matters for team outcomes in an accelerator.

Adaptive

The fast pace of change in an accelerator means that different tasks and different roles require individuals to demonstrate more of some behaviours and less of others at different times. In other words, the nature of a task environment can affect behavioural demands (LePine et al., 2000). Individuals able to notice situational demands and adjust their behaviours and strategies to match needs are valuable in complex and uncertain work environments like accelerators. Members of a team might have to respond to crisis situations; conditions of complexity and uncertainty; interpersonal and cultural differences; new work tasks; technologies, and procedures; and their overall health and affect (Pulakos et al., 1999). Thus, an ability to shift gears in between how one makes sense of and responds to situations enhances the value of the contribution accelerator participants make to expected team-level outcomes. In sum, accelerators are inherently complex and uncertain. Consequently, high levels of adaptive performance are likely helpful in accelerators.

Table 2.9.

Task and Contextual Performance as Operationalised for this Research.

Construct	Code	Definition
Task Performance		
1. Task	TK	Participants behave in ways that add value for achieving expected business development objectives and accelerator expectations, either by executing technical processes or maintaining and servicing technical requirements.
Contextual Performance		
2. Relational	RL	Participants develop and maintain healthy and productive interpersonal relationships.
3. Adaptive	AD	Participants approach, assess, and adjust to changes in the performance environment.
4. Swiftness	SW	Participants approach, assess, and execute quickly to meet known business objectives.

Note. Dimensions operationalised by thesis author from the following conceptual sources: Borman and Motowidlo, 1993; LePine et al., 2000; Motowidlo et al., 1997; Pulakos et al., 1999.

Swiftness

Accelerators are short-duration business development programmes (Miller & Bound, 2011). Time constraints leave little time for being idle. A lack of timely action may result in not achieving a team's expected outcomes. However, with little time available, each task needs to be done quickly. For instance, customer validation requires processes of data collection, analysis, sensemaking and understanding before deciding on next steps. Therefore, individuals must discern tasks that require fast execution and act accordingly. Delivering quickly on known objectives is a valuable contribution towards achieving expected team outcomes and is important in accelerators. Acting quickly under known conditions may create time savings for situations which require more time such as interpersonal interactions and adaptability.

2.4.2 Hypothesis 3: Agile learning positively predicts learning outcomes

Performance is a matter of how individuals behave over time in response to events and experiences and how episodes of behaviour add value for expected organisational outcomes (Borman & Motowidlo, 1993). Task Performance behaviours relate to executing technical requirements and processes (Motowidlo & Van Scotter, 1994) and Contextual Performance behaviours influence social, psychological and organisational elements of human performance environments (Motowidlo et al., 1997). This research operationalises Contextual Performance in three ways: Relational, Adaptive, Swiftness. Both Task and Contextual Performance appear highly relevant for the time-bound and intense nature of an accelerator.

Although accelerators provide participants with a similar set of *Learning Resources* it appears that not all accelerator teams achieve similar outcomes. How well participants contribute (positively and negatively) toward expected performance outcomes for their team may be related to the individual learning

strategies and behaviours they demonstrate during each accelerator phase and overall. Moreover, teams consist of multiple individuals. Thus, the learning strategies and behaviours demonstrated by one participant may influence others and vice versa. Consequently, it is near-impossible to predict end-of-programme *Learning Outcomes*, and levels of Task and Contextual Performance, at the outset.

Participant responses to changing cues may both help and hinder how well a team meets its performance goals during each accelerator phase. An ability to remain attentive and responsive to changes in the performance environment may signal the need to engage others to gain their ideas and perspectives. Participants that develop and maintain healthy and productive interpersonal relations may also adapt better than participants who work independently. A proclivity for seeking out and being open to feedback may help participants work more quickly towards known targets. The same characteristics may help them to explore opportunities by adapting their learning strategies.

Hypothesis 3 aims to help answer Research Question 2 – What does learning agility theory add to our understanding of participant learning and development in Accelerators? – by investigating which, and to what extent, *Agile Learning* strategies and behaviours enhance participant *Learning Outcomes.*

Hypothesis 3, and the corresponding concepts examined are:

> The frequency of participant engagement in *Agile Learning* strategies and behaviours (feedback seeking, knowledge seeking, experimenting, reflection, and flexibility) positively predicts enhanced participant *Learning Outcomes* (task, relational, adaptive, and swiftness).

The next section introduces the research model supporting this investigation of participant learning and development in accelerators.

2.5 Research Model and Questions

This section introduces the conceptual framework and research questions guiding the investigation, and an overview of the research design, methodology and methods supporting the research. An in-depth discussion of the research methodology occurs in Chapter 3 – Research Design.

2.5.1 Research model

The implicit learning logic embedded in accelerator programme designs suggests participants are expected to engage in learning throughout and that performance outcomes beyond securing investment are expected. Thus, this mixed methods research investigates the relationships over time between Learning Environment (*Learning Resources*), Learner (*Agile Learning),* and Learning Outcomes (*Task and Contextual Performance*). The research model (Figure 2.6) operationalises key constructs, dimensions and relationships.
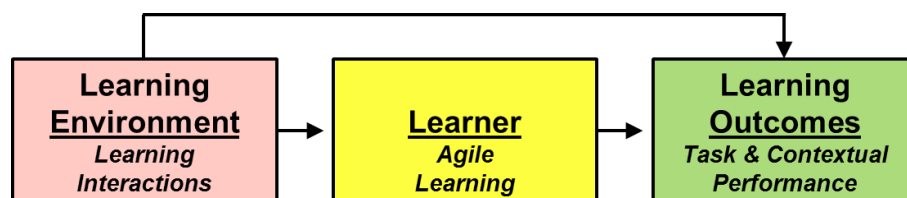
Figure 2.6. Research model.

Section 2.2 provided an overview of the Learning Environment and introduced the three *Learning Resources* examined in this research (Managers, Mentors, and Cohorts). Section 2.3 provided an overview of the Learner and introduced the five *Agile Learning* measures examined in this research (Feedback Seeking, Knowledge Seeking, Experimenting, Reflection, and Flexibility). Section 2.3 introduced the Learning Outcomes construct and the four performance measures examined by this research (Task, Relational, Adaptive, and Swiftness).

A summary of the research questions and hypotheses and the research design occurs in the next section.

2.5.2 Research questions and hypotheses

The preceding sections introduced the three research constructs investigated (*Learning Resources, Agile Learning* and *Learning Outcomes*). Although, organisational learning lenses have been applied to study learning within accelerators (e.g., Cohen, 2013a; Hallen et al., 2016), participant level theories of learning have not. As such, how accelerator participants select and deploy learning behaviours and strategies, to positive and negative effect, is under-explored.

This study seeks to improve understanding of how accelerators and accelerators as learning environments. Specifically, it seeks to better understand how accelerators influence participant learning and development. Concepts and measures associated with accelerator, learning agility, and individual performance research are applied as strategic tools and analytic lenses to deductively examine the relationships between the accelerator learning environment and participant learning and participant development.

This research aims to answer these two questions:
    (RQ1) How do accelerators influence participant learning and
    development?
    (RQ2) What does the theory of learning agility add, if anything,
    to our understanding of participant learning and development
    in accelerators?

This chapter presented concepts and research that supported the development of three hypotheses (see the summaries for sections 2.2; 2.3; 2.4). Figure 2.7

illustrates the relationships between these hypotheses, provides the structure and direction for relationship testing, and indicates the concept of time as tested (i.e., three phases).
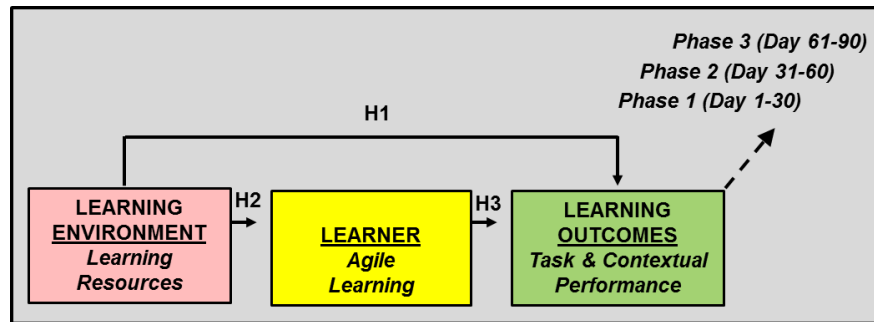
Figure 2.7. Research model including Hypotheses 1–3 and time.

Although this study does not seek to measure the economic success of accelerator participants explicitly, the availability of public information about the funding outcomes for each team enables consideration of team-level differences. In other words, to what extent did participants from *Funded* and *Non-funded* teams differ in how they engaged with and learnt from the accelerator experience. Identification of participant difference may enhance understanding of which resources are best for whom and when as well as helping to identify the learning behaviours and learning strategies they elicit in participants. This research defined Funded team as teams which secured investment funding at the end of the accelerator which was in addition to the seed funding they received from the accelerator as a condition of participation.

Hypothesis 4, and the corresponding concepts, examined are:

        Participants from *Funded* and *Non-funded* teams will
        demonstrate a difference in measures of *Learning Resources*
        (managers, mentors, cohorts), *Agile Learning* (feedback
        seeking, knowledge seeking, experimenting, reflection, and

flexibility), and *Learning Outcomes* (task, relational, adaptive,

and swiftness) over the three phases.

In total, the research tests four hypotheses. Table 2.10 depicts the relationship
between each hypothesis and the research questions. Each hypothesis is
examined across the whole of the accelerator programme and at multiple points
during the programme. The next section will provide a brief overview of the
research design. Chapter 3 offers a detailed overview of design and methods.

Table 2.10.
Research Questions and Hypotheses.

RQ1: How do accelerators influence participant learning and development?

RQ2: What does learning agility theory add, if anything, to our understanding of participant learning and development in accelerators?

RQ	H	Hypothesis
RQ1	H1	Participant interaction with *Learning Resources* (Managers, Mentors, Cohort) positively predicts enhanced participant *Learning Outcomes* (Task, Relational, Adaptive, and Swiftness).
RQ2	H2	Participant interaction with *Learning Resources* (Managers, Mentors, Cohort) positively predicts the frequency of participant engagement in *Agile Learning* strategies and behaviors (Feedback Seeking, Knowledge Seeking, Experimenting, Reflection, and Flexibility).
RQ2	H3	The frequency of participant engagement in *Agile Learning* strategies and behaviors (Feedback Seeking, Knowledge Seeking, Experimenting, Reflection, and Flexibility) positively predicts enhanced participant *Learning Outcomes* (Task, Relational, Adaptive, and Swiftness).
RQ1 & RQ2	H4	Participants from funded and non-funded teams will demonstrate a difference in measures of *Learning Resources* (Managers, Mentors, Cohort), *Agile Learning* (Feedback Seeking, Knowledge Seeking, Experimenting, Reflection, and Flexibility), and *Learning Outcomes* (Task, Relational, Adaptive, and Swiftness) over the three phases.

Note. Author is source.

2.6 Research Design

A mixed methods research design was selected to generate, at breadth and
depth, a more complete understanding of how accelerators influence participant
learning and development at three levels of participation embedded in

accelerator programme design (cohort, team and participant) (Creswell & Plano Clark, 2011; Morgan, 2007; Teddlie & Tashakkori, 2009). The choice to collect both quantitative and qualitative in a single study was three-fold. First, to exploit the natural structure and programme logic of the accelerator. The structure and logic are evidenced characteristics of accelerator program design like having selection criteria, making participants enter and exit the time-bound programme at the same time, and by having explicit performance benchmarks. Second, the researcher secured unrestricted access to the research site and participants. Third, weaknesses of one method could be offset by strengths of others (Johnson & Onwuegbuzie, 2004; Morgan, 2014). Lastly, the separate sets of findings could be integrated to generate a fuller understanding of accelerators as learning environments and how they influence participant learning and development (Bryman, 2008; Creswell & Plano Clark, 2011).

The research design incorporated three strands of data collection. Strand 1, a multiphase repeated measures survey method, and Strand 2, a supplemental qualitative field method, took place during the accelerator. Strand 3, supplemental qualitative interview method, occurred six months after the accelerator. The quantitative survey method was assigned priority and focused on participant learning and performance in the Cohort. The quantitative method was supplemented by two qualitative methods. Each was selected to add an explanatory function. The observation method focused on participant learning and performance in teams and the interview method examined the same concepts but did so for participants. Collectively, the three strands of data collection were incorporated to generate a more complete understanding of how accelerators influence participant learning and development.

2.7 Chapter Summary

This study investigates how accelerators influence participant learning and development. Accordingly, Chapter Two examined literature relating to the three

dimensions of accelerator learning environments this research aims to investigate - *Learning Environment*, *Learner*, and *Learning Outcomes.* The chapter introduced: the focal concepts and measures associated with accelerator, learning agility, and individual performance literature; the research model and questions; and the hypothesised relationships to be examined. Chapter Three introduces the multilevel research approach, methodology, strategic concepts, techniques, and analytic lenses adopted to deductively examine the relationships between the accelerator learning environment and participant learning and participant development.

Chapter 3 | Methodology

This chapter introduces the research approach, design, methodology, methods, priority, timing and levels of investigative focus associated with this study. The questions investigated are: *How do accelerators influence participant learning and development? -* and *- What does learning agility theory add, if anything to our understanding of participant learning and development in accelerators?*

The objective of this study is to investigate how accelerators influence participant learning and participant development at the levels of participation embedded in accelerator program logic (cohort, team, and participant). The relationships between the accelerator learning environment and participant learning and participant development are deductively examined through literature informed analytic lenses. In other words, a theory informed rather than a theory testing approach is applied. Specifically, this study integrates and applies concepts and measures from accelerator, learning agility, and individual performance literature to strategically investigate the research questions and corresponding hypotheses (see Figure 2.8 and Table 2.10).

Although accelerator and learning agility research reports rarely make explicit the worldviews of their authors (Creswell, 2014), the chosen research designs, methods, and reporting styles suggest the generation of objective evidence is a common goal. For instance, accelerator researchers commonly examine the phenomenon through economic and performance lenses (Roberts, 2016; Bliemel et al. 2018; Fehder & Hochberg, 2014; Regmi et al., 2015; Smith & Hannigan, 2015) and learning agility researchers primarily use quantitative survey methods to identify causal relations (e.g. Connolly, 2001; De Meuse et al., 2008; Drinka, 2018; Eichinger & Lombardo 2004; Smith, 2015). Thus, this research's application of a structured and deductive approach for data collection and analysis is largely consistent with prior accelerator research.

Figure 3.1 depicts the research design and general presentation scheme for this chapter. A brief introduction to and rationale for the multilevel and multistrand mixed methods research approach is offered. The level of participation each study strand investigates and corresponding quantitative and qualitative methods and techniques for data collection, analyses, and reporting are discussed. The research site, teams, and participants associated with the study sample are presented. The chapter closes with a brief discussion of the research limitations and ethical considerations related to the study

Research Design *Mixed Methods*	QUAN Method *Strand 1: Survey Focus: Cohort*	Qual Method *Strand 2: Observation Focus: Teams*	Qual Method *Strand 3: Interview Focus: Participants*
	During Accelerator		**Post Accelerator**
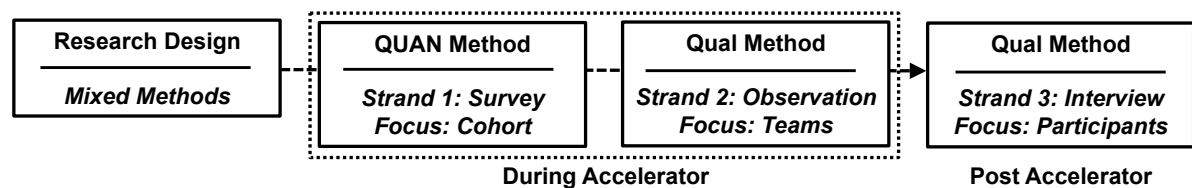
Figure 3.1. Research design, methodology, methods, priority, timing and focus.

3.1 Accelerators, by design, are multilevel environments

The implicit accelerator programme design logic suggests a need for participants to operate independently and interdependently and within and between levels. For instance, strategies and behaviours demonstrated by participants will likely influence both team and cohort outcomes (bottom up effect), and these relationships of influence may also work in reverse (top down effect) (Costa, et al., 2013; Rousseau, 1985). Accordingly, a single level of analysis (e.g., team) was determined insufficient for answering the research questions because it would fail to consider the levels of participation nested in accelerator learning environments.

Multilevel research approaches are a useful strategy for organizational and management research because they enable researchers to examine complex interpersonal interactions occurring in hierarchical and nested organizational

structures (Dansereau et al., 1999; Hitt et al., 2007; Mertens, 2010; Rousseau, 1985; 2011). For instance, a university learning environment may include organizational levels such as administration, faculty, school, unit, lecturer, and student. Thus, analyses of different organizational levels (micro, meso, and macro) can: aid in the identification of patterns of influence which span level boundaries; illuminate theoretical and empirical gaps in understanding; and, because research findings are better contextualized, narrow 'science-practice' gaps (Costa, et al., 2013; Molina-Azorin, et al., 2019).

The multilevel research approach (Dansereau et al., 1999; Rosseau, 2011) used here to examines the same phenomenon (participant learning and performance) at the explicit levels of participation embedded in accelerator learning environments (cohort, team, and participant). It aims tease out subtle-but-important levels of relational nuance inherent to accelerator learning environments that effect participant learning and performance. In doing so, it accepts Colombo et al. (2018) challenge to apply multilevel investigation strategies in accelerator research.

The next section describes the selected research design supporting this multilevel investigation of participant learning and development.

3.2 Research Design

3.2.1 Research designs associated with prior accelerator learning studies

As noted in the previous chapters, only a few studies have explored accelerator learning phenomena, and to the researcher's knowledge, individual-level learning and performance concepts have not been applied. Although some monomethod deductive research, such as Miles et al. (2017) quantitative survey investigation

of accelerators as authentic learning environments, has been produced much accelerator learning research is inductive and multimethod in nature. For instance, Cohen (2013a) applied a multimethod and multilevel qualitative case study approach to explore how accelerators speed organizational learning during new venture gestation. Her data sources included a mix of interview, electronic correspondence, and archival data. Likewise, Levinsohn (2015) applied a multimethod approach to explore social entrepreneurial learning in accelerators. He employed an interpretative case-study methodology and collected both qualitative interview, observation, and focus group primary data as well as supplementary quantitative survey data.

This PhD research follows the general practice of using multimethod strategies for data collection when researching accelerator phenomena (e.g., Hallen et al., 2017; Miller & Bound, 2011; Roberts et al., 2016), and specifically, as noted, for studying accelerator learning phenomena. Consistent with other accelerator learning research (Hallen et al., 2017; Levinsohn, 2015; Miles, et al., 2017), this study applied a theory informed rather than a theory testing research strategy. However, in contrast to the inductive and qualitative exploratory multimethod approaches adopted by Cohen (2013a) and Levinsohn (2015), this study applies a deductive explanatory approach. The next section introduces mixed methods research and provides an overview of this study's multilevel, multiphase, and multimethod research design.

3.2.2 Mixed methods research design

Mixed methods research is increasingly recognised as the 'third methodological or research paradigm, along with qualitative research and quantitative research' (Johnson, Onwuegbuzie, & Turner, 2007, p. 112). Characteristics of mixed methods research include: collecting both quantitative and qualitative data to investigate the same phenomenon in a single study (Creswell, 2014; Johnson et al., 2007; Onwuegbuzie & Leech, 2006; Teddlie & Tashakkori, 2009); selecting methods to ensure the weaknesses of one method are offset by strengths of

others (Johnson & Onwuegbuzie, 2004; Mertens, 2010); explicitly addressing, during design and reporting, issues about priority and timing of methods (Bryman, 2008; Morgan, 2014); and, integrating individual sets of findings to generate collective, fuller and richer understandings of the phenomenon (Creswell & Plano-Clark, 2011; Morgan, 2014; Teddlie & Tashakkori, 2009). Taken, mixed methods research approaches use processes 'of induction (or discovery of patterns), deduction (testing of theories and hypotheses), and abduction (uncovering and relying on the best set of explanations for understanding one's results' (Johnson and Onwuegbuzie, 2004, p.17). Further, the approach appears useful for exploring conceptually related phenomena, such as learning and performance.

The pairing of quantitative and qualitative methods in a single study can yield more understanding than a mono-method approach (Morgan, 2014; Teddlie & Tashakkori, 2009). Accordingly, the practice of combining quantitative and qualitative data collection into a single study is common in the social sciences (Greene, 2008; Greene, Caracelli, & Grahm, 1989; Morgan, 2007; Teddlie & Tashakkori, 2009), and increasingly, as evidenced by journal acceptance rates, viewed as an effective and valid strategy for studying complex management phenomena (Bryman & Bell, 2011; Molina-Azorin, 2009).

From a practical and intuitive perspective, mixed methods approaches are appealing. However, they require more knowledge, skill, time and resources for data collection, analysis and reporting than traditional mono-method research designs (Morgan, 2014; Teddlie & Tashakkori, 2009). Further, researchers must consider the needs and receptivity of their audience as not all readers will perceive a study's value or understand the processes underpinning mixed methods research (Creswell & Plano Clark, 2011).

In the context of this study, the researcher perceived the complexity and challenge associated with a mixed methods research approach as an opportunity

to build a more robust suite of research skills than could be achieved through conducting a mono-method study. Further, as noted previously, multimethod strategies are commonly employed by researchers investigating accelerators (e.g., Cohen 2013a, Hallen et al., 2017; Levinsohn, 2015; Miller & Bound, 2011; Roberts et al., 2016). Thus, it was assumed the outputs from this study would appeal to, and be in a familiar format, for expected consumers of research. Last, and most important, a mixed methods research design paired well with the aim of this study.

The next section provides an overview of mixed methods research design selected for the current study.

3.2.3 Overview of selected mixed methods research design

This research heeded the advice of Teddlie & Tashakkori (2009). Specifically, they suggest selecting a research design that is appropriate for the research objectives, and if one cannot be found then combine elements or create new approaches to ensure research questions can be effectively and efficiently answered (p.163). Accordingly, this research adapted an explanatory sequential mixed methods research design (Creswell, 2014) to better fit the research aims of this study. Both parallel and sequential elements were integrated in the design to better conduct a multilevel and multiphase examination of participant learning and performance.

Figure 3.2 features the specific methods associated with each study strand and the point of integration. Specifically, the dotted line highlights the parallel elements employed to capture data during the accelerator and the path of the arrow points toward the sequential interviews which occurred post accelerator.

Priority was assigned to Strand 1 (Green), a repeated-measures quantitative survey method (QUAN), because it both provided the conceptual and structural framework for the whole study (Morgan, 2014; Morse, 1991; Teddlie & Tashakkori, 2009), and examined participant learning and performance at the highest level of participation featured in accelerator programme design logic, the Cohort (Miller & Bound, 2011). Existing accelerator, learning agility, and individual performance concepts, along with the application of a valid and reliable survey instrument, provided the backbone of the study. The survey method included a pilot survey of the *Agile Learning* measures and three surveys which examined all three research constructs (*Learning Resources, Agile Learning, Learning Outcomes*). Data collection occurred during the accelerator with each survey occurring approximately 30 days after the previous survey.
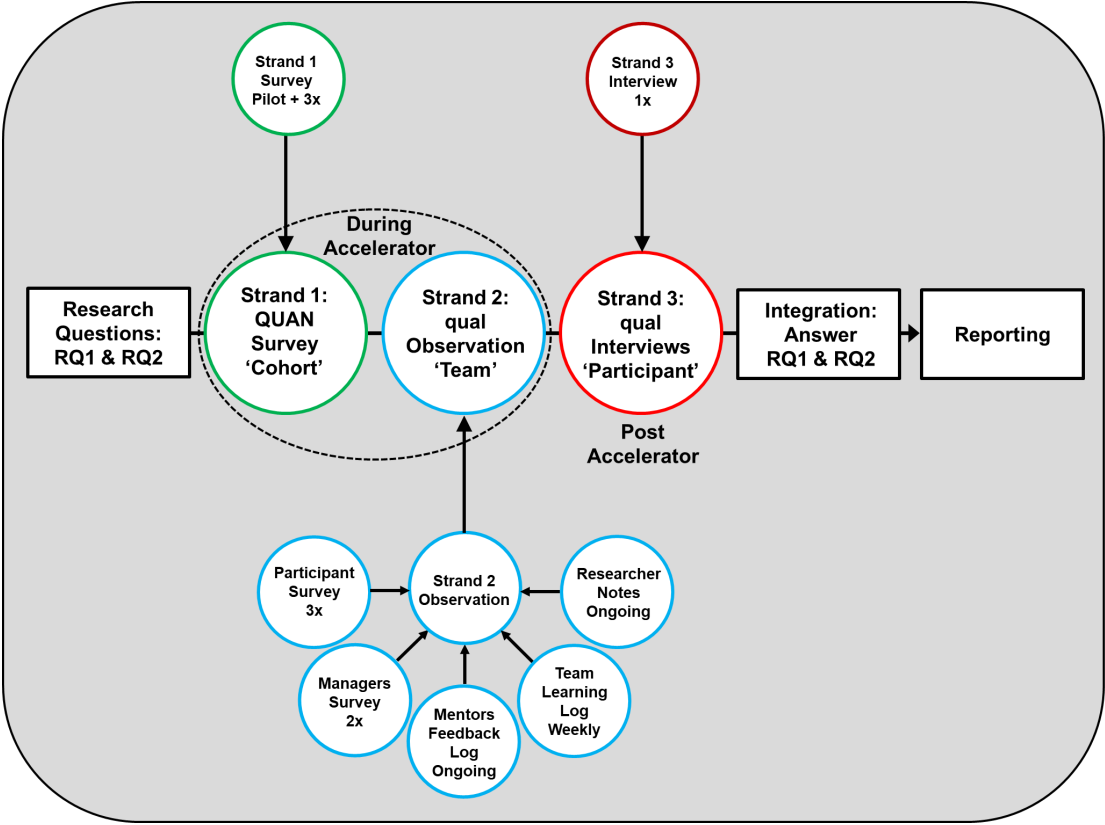
Figure 3.2. Quantitative and qualitative mixed methods research design, strands, methodology, priority, methods, levels of analysis and timing.

Strand 2 (Blue), a qualitative field observation method (qual), occurred during the accelerator. The observation method was included to examine participant learning and performance at a mid-level of participation, the Team. The choice to focus on participant learning and performance in teams was influenced by both the central role teams play in accelerator programme design logic and that much team activity is observable. For instance, accelerators accept teams not individual participants and the cohort is comprised of teams of participants. Sources of qualitative data included (a) qualitative survey completed by participants; (b) qualitative survey completed by accelerator managers; (c) feedback logs completed by mentors after meeting with participants; (d) weekly team learning log entries completed by each team's CEO; and (e) researcher generated field notes.

Strand 3 (Red), a qualitative interview method, post accelerator. The interview method was included to examine participant learning and performance at the base unit of participation articulated by accelerator programme design logic, the Participant. It was necessary to also explore participant learning and performance at the individual level was because participant actions influence both team and cohort outcomes. The interview method consisted of individual semi-structured qualitative interviews with each accelerator participant. Interviews were conducted some six months after the accelerator finished. The objective was to capture participant learning and performance experiences in retrospect.

The analysis and reporting of each set of findings occurred in isolation (Figure 3.2). Preliminary findings from Strand 1 and Strand 2 informed the structure and objectives of Strand 3. Integration of the three sets of findings occurs in the discussion (Chapter 7). General indicators, patterns and themes are presented collectively and in relation to the research questions and hypotheses.

The next sections introduce the three-strands of this study. The methods and analytic strategies associated with each strand are presented.

3.3 Research Site

Population of interest

The population of interest is accelerator participants associated with the highly exclusive and heavily curated Global Accelerator Network (GAN). GAN accelerators aim to speed entrepreneurial capacity, business development, and investor readiness for cohorts of high potential early-stage startups. They provide startups with access to intense mentorship, entrepreneurship education, networking, and a battery of human and financial supports. In 2018, the total GAN community, included 105 accelerators. Collectively, GAN accelerators operate in 163 different locations, in 100 cities, and on six continents. Collectively, GAN members have supported the development of over 9,400 startups (www.gan.co).

GAN's stringent selection criteria ensures only top accelerators are admitted into the network (www.gan.co). For instance, GAN accepts accelerators that: offer cohort-based short-term residential programmes (i.e., 3-6 months); provide seed capital, often in exchange for equity (e.g., 6%-10%); are run by strong management teams; have successfully operated accelerators; and have financial assets to support multiple programmes. Membership benefits include access to exclusive accelerator industry data, programme frameworks, guidelines and practices, mentors and investors, and consultation services. Taken together, each GAN accelerator meets its established programme, operations, financial, and investment criteria. Moreover, each accelerator both benefits from and contributes to GAN knowledge, intellectual property and practices.

2018 – Global Accelerator Network
105 - Total GAN accelerators
163 - Locations
100 - Cities

Locations by Continent
93 - North America
 5 - South America
34 - Europe
 2 - Africa
23 - Asia
 6 - Australasia

Research Site – New Zealand
 1 - GAN member accelerator
 1 - Cohort of participants
10 - Teams
29 - Participants

Note. Figure adapted from GAN infographic
https://www.gan.co
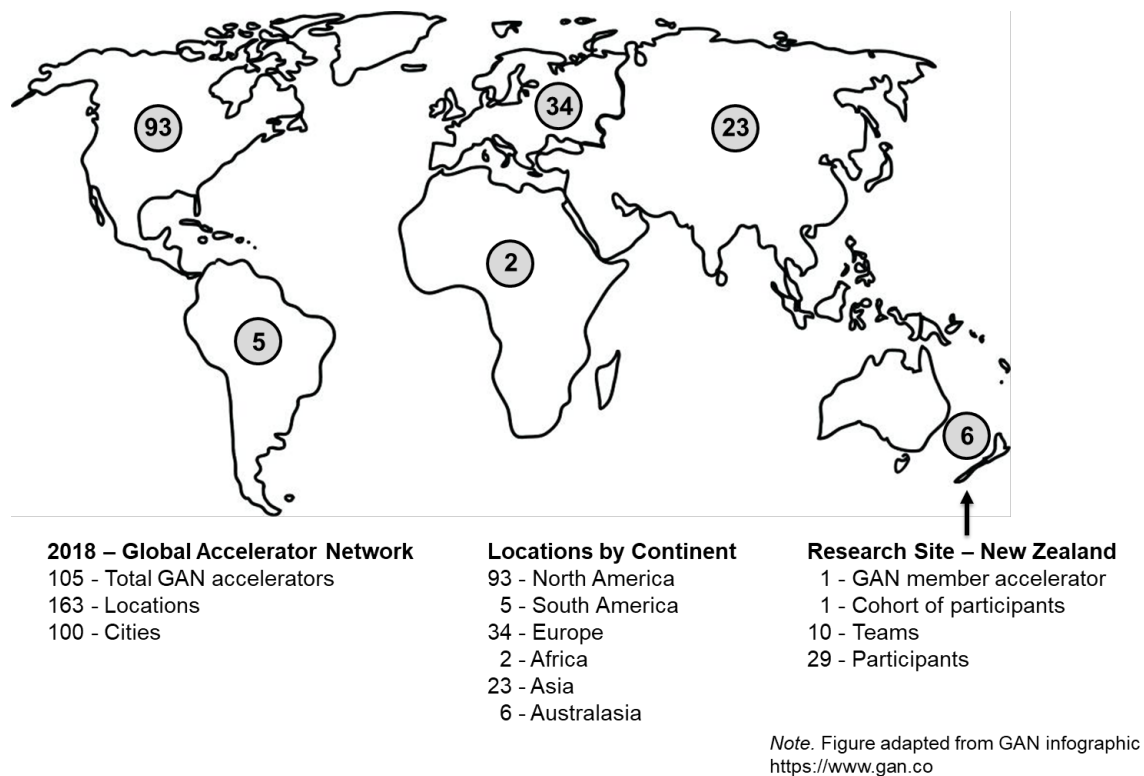
Figure 3.3. Geographic Distribution of Global Accelerator Network Membership and Research Site.

From a participant perspective, getting into a GAN accelerator is not easy as indicated by the low acceptance rate (3.8%) and the high number of teams applying for their chance to be developed (35,055). In 2018 alone, the GAN community supported the delivery of 140 programmes (cohorts) and graduated 1,344 startup. Figure 3.3 depicts the global distribution of GAN accelerators and the location of the GAN accelerator programme featured in this research (adapted from https://www.gan.co/data/2018-infographic/).

Sampling frame

The sampling frame for this research is limited to participants associated with a GAN accelerator based in New Zealand called the *Lightning Lab*. This research deemed the accelerator site 'prototypical' of other GAN accelerators. It passed

the stringent selection criteria for acceptance into GAN and, importantly, it adheres to the GAN operational, financial, and programme design logic. Moreover, its core strategies for building entrepreneurship capacity and promoting rapid business development are entrepreneurship education and intense mentorship. Consequently, this research considers the accelerator programme studied, and the participants therein, a *sample* accelerator learning environment drawn from all possible accelerators in the GAN network (i.e., population).

Lightning Lab accelerator characteristics

The Lightning Lab accelerator was founded in 2013 by an existing incubator service as a strategy for quickly developing innovative technologies, founders, and companies capable of driving economic growth for New Zealand (www.creativehq.co.nz; www.lightninglab.co.nz). The Lightning Lab is headquartered in Wellington New Zealand. However, it delivers accelerator programmes nationwide. Between 2013-2019, Lightning Lab delivered 17 accelerator programmes to startup, corporate, and government stakeholders.

The Lightning Lab runs several cohorts a year, each comprising up to 10 startup teams. It utilises the prototypical GAN 3-month accelerator programme design and applies criteria for selecting cohorts similar too other GAN accelerators. Throughout each programme, participants have access to intense mentorship, entrepreneurship education (e.g., startup methodologies and customer engagement, product strategy, design and development). An assortment of administrative and financial supports compliment provided learning resources. Close to 1,000 founders and over 200 companies have worked with the accelerator since its inception (www.lightninglab.co.nz).

In sum, the research site is a GAN member, and it is viewed as a representative accelerator drawn from all possible GAN accelerators because it meets GAN

membership criteria, and it utilises prototypical GAN operational and programme design practices. Consequently, this research considers the cohort of participants contributing data to this mixed methods study to be a *sample*. Therefore, the boundaries for the generalisations are suggested to apply to the GAN.

Sample characteristics

The twenty-nine individuals who participated in each strand of the study were part of a single cohort class from a GAN accelerator. All participants voluntarily contributed to each strand of the study (i.e., survey, observation and interview). The next section presents participant and team characteristics.

Cohort characteristics

The twenty-nine participants were distributed unequally across ten teams of entrepreneurs participating in a single New Zealand accelerator programme. All study participants were 19–46 years of age, and over half were 20–26 years of age (58.6%). Nearly 90% of participants (89.6%) had a tertiary level degree. The cohort was disproportionately male (96.6%).

Although most participants possessed prior work experience few had expereince as either a founder of a startup or a member of a startup team. Moreover, no one had previously participated in an accelerator programme.

Team characteristics

The twenty-nine participants were distributed unequally between the ten teams. Table 3.1 provides the pseudonym applied to each team, team code, and number of team members. The pseudonyms were assigned randomly to the

teams. Each team name references a suburb of Wellington New Zealand, the country's capital city.

Table 3.1.

Team Characteristics.

#	Team Name[1]	Team Code	# members
1.	AROVALLEY	ARO	3
2.	BROOKLYN	BRO	3
3.	HATAITAI	HAT	3
4.	KELBURN	KEL	3
5.	LAMBTON	LAM	3
6.	MT VIC	MTV	2
7.	NORTHLAND	NOR	4
8.	PIPITEA	PIP	3
9.	RONGOTAI	RON	2
10.	THORNDON	THO	3

Note. [1]Team names are pseudonyms. Information is author-generated.

In general, from both a business and a membership perspective, the teams were new ventures. At application, 50% of the selected teams were less than ten months old. The other half of the teams had been working on their business between 11–30 months. Many teams experienced membership changes between selection and the start of the accelerator. In total, over 60% of the firms added extra founders between application and the start of the accelerator. Four founders were recruited to serve as developers and another three fulfilled marketing roles. In sum, the teams were nascent ventures, few participants had prior experience leading and working for startups, and most teams were in the early stages of team formation when they entered the accelerator.

Taken together, this study applies a multimethod and multiphase mixed methods research design to investigate how accelerators influence participant learning and performance at the three levels of participant embedded in accelerator programme design logic (cohort, teams and participants). This research occurs

at a GAN accelerator and the data collected and findings reported pertain to a single cohort of twenty-nine participants. All three strands of this study are components of a single study, and each level of analysis is incorporated to inform better understanding of the research sample. Generalisations made from this research are suggested to apply to GAN member accelerators. The next sections describe the methods and analytic techniques associated with each strand of this study.

3.4 Strand 1 – Survey Method

Strand 1 is a multiphase quantitative survey approach. The aim of the survey research was to capture a longitudinal understanding of how accelerators influence participant learning and development. The Cohort was the focus of Strand 1. All twenty-nine participants described in section 3.3 took part in all phases of the survey research. Table 3.2 provides a summary of the research questions and hypotheses introduced in Chapter 2.

Table 3.2.

Summary Research Questions and Hypotheses.

RQ1: How do accelerators influence participant learning and development?		
RQ2: What does learning agility theory add, if anything, to our understanding of participant learning and development in accelerators?		
<u>RQ</u>	<u>H</u>	<u>Hypothesis</u>
RQ1	H1	Participant interaction with Learning Resources positively predicts enhanced participant Learning Outcomes.
RQ2	H2	Participant interaction with Learning Resources positively predicts the frequency of participant engagement in Agile Learning strategies and behaviors.
RQ2	H3	The frequency of participant engagement in Agile Learning strategies and behaviors behaviours positively predicts enhanced participant Learning Outcomes.
RQ1 & RQ2	H4	Participants from funded and non-funded teams will demonstrate a difference in measures of Learning Resources, Agile Learning, and Learning Outcomes over the three phases.

Note. Adapted from Table 2.9.

The next section details the instrument and procedures for the pilot survey and the three surveys conducted during the accelerator. Then it introduces the techniques used for generating descriptive and inferential statistics. The survey results are presented separately in Chapter 4.

3.4.1 Survey design

A repeated measures quantitative survey approach was applied (Fink, 2012) to assess the three research constructs (*Agile Learning, Learning Resources*, and *Learning Outcomes*). Data were collected at three points during the accelerator (Phase 1, Days 1–30; Phase 2, Days 31–60; and Phase 3, Days 61–90). In addition, participants responded to several qualitative open-ended questions (see Section 3.5).

Measures of Agile Learning

The Learning Agility Assessment Inventory (LAAI) provided the conceptual anchor for the survey research. The 38-item, five-factor version of LAAI was used to measure participants' frequency of engagement in *Agile Learning* strategies and behaviours (Smith, 2015). The LAAI has previously demonstrated acceptable levels of reliability in multiple studies (see Table 2.6). Table 3.3 presents the question prompt and an example item for each LAAI variable.

The learning behaviours and strategies assessed include feedback seeking, knowledge seeking, experimenting, reflection, and flexibility. Collectively, these five factors contribute to an overall measure of learning agility. The LAAI uses Likert scales to assess, from low to high frequency, individual levels of engagement in *Agile Learning* strategies and behaviours (1=not at all; 3=occasionally; 7=frequently). Appendix C presents the individual survey questions. The next section introduces the *Learning Resources* and *Learning Outcomes* measures developed specifically for this study.

Table 3.3.

Example Questions for Agile Learning Measures.

Variable	Items	Example Question
Question prompt: *Below you will find a list of behaviours that people perform at work. Thinking back over the past 30 days, please consider how often you have engaged in each behaviour while working in the accelerator.*		
Feedback Seeking	5	Directly asked others for their thoughts on how I could improve my performance
Knowledge Seeking	5	Read trade journals, newspaper articles, books, or other sources to stay informed
Experimenting	9	Experimented with unproven ideas by testing them out
Reflection	9	Critically evaluated work-related events with others in order to understand what happened
Question prompt: *Below you will find a list of behaviours that describe how people perform their work. Please evaluate how well each statement describes how you engaged your work during the past 30 days in the accelerator.*		
Flexibility[1]	10	Consider many different options before taking action

Note. The source for this table was the 5-factor LAAI (Smith, 2015).
[1]Smith (2015) used the term *agility* for this variable. For this thesis, the variable was renamed to reduce confusion between the name of the variable (Agility) and the name of the overall scale (Learning Agility).

The learning behaviours and strategies assessed include Feedback Seeking, Knowledge Seeking, Experimenting, Reflection, and Flexibility. Collectively, these five factors contribute to an overall measure of learning agility. The LAAI uses Likert scales to assess, from low to high frequency, individual levels of engagement in *Agile Learning* strategies and behaviours (1=not at all; 3=occasionally; 7=frequently). Appendix C presents the individual survey questions. The next section introduces the *Learning Resources* and *Learning Outcomes* measures developed specifically for this study.

Measures of Learning Resources

Prior research suggests accelerator participants may learn through interactions with accelerator managers, mentors, and the cohort of participants (see Section 2.2). Accordingly, the survey research aimed to identify which accelerator *Learning Resources* were most influential for participant learning, and when.

To address accelerator-site governance concerns that complex language and non-general learning concepts would be to too abstract for already cognitively loaded participants, common language was purposefully used to formulate the questions. Thus, accelerator and general learning concepts were explicitly integrated into the language of the learning interaction items (for example, Mentors and Experimentation). A similar approach was used in the item design of the *Learning Outcomes* variables.

Twelve items were developed to assess the influential effects managers, mentors, and cohort exert on participant learning and performance. The items were distributed equally across three scales (Managers, Mentors, and Cohort). Table 3.4 presents the question prompt and an example item for each *Learning Resource* variable. Appendix C includes all *Learning Outcomes* survey items.

Likert style scales were used to assess levels of agreement (1=strongly disagree to 7=strongly agree). For each item, only the learning behaviour and the resource changed. Aggregate scales were created for each *Learning Resources* construct (Managers, Mentors, and Cohort). Appendix C includes a list of all survey questions.

Table 3.4.

Example Questions for Learning Resources Measures.

Variable	# items	Example Question
Question prompt: *I learnt a huge amount by…*		
Managers	4	Experimenting with concepts provided by accelerator managers
Mentors	4	Seeking knowledge from accelerator mentors
Cohort	4	Reflecting on my interactions with participants on the other teams

Source. Author.

Measures of Learning Outcomes

This research operationalised *Learning Outcomes* through an individual performance lens *(*see Section 2.4). Specifically, Task and Contextual performance concepts influenced the construction of the *Learning Outcomes* measures*.* Items were constructed to assess perceptions of enhanced performance. The measure 'task' assessed Task Performance behaviours. The measures 'relational', 'adaptive', and 'swiftness' assessed Contextual Performance behaviours. Table 3.5 provides example questions for each variable along with the question prompt. Notably, the underlined section of each question is what changed for each item. Appendix C includes all *Learning Outcomes* survey items.

Table 3.5.

Example Questions for Each Learning Outcomes Variable.

Variable	# items	Example Question
Question prompt: *Please reflect on your experiences over the past 30 days in the Accelerator and indicate your level of agreement with the following statements.*		
Task Performance		
Task	4	Overall, I became better at meeting business requirements by acquiring knowledge from others
Contextual Performance		
Relational	4	My relationships improved by reflecting on my experiences
Adaptive	4	I became more flexible in meeting changing business requirements by experimenting to validate my ideas
Swiftness	4	I became faster at meeting known business requirements by seeking feedback from others

Source. Author.

A common language and common item construction scheme was applied when developing the *Learning Outcomes* items. Only the performance dimension and learning strategy changed. The purpose of this format was to support the creation of aggregate scales for each *Learning Outcomes* construct. Likert scales

were used to assess levels of agreement (1=strongly disagree to 7=strongly
agree).

3.4.2 Survey procedure

A pilot study, during week one, assessed the appropriateness of using the 38-
item LAAI as a measure of *Agile Learning* in accelerators. After that, participants
completed a 66-item survey at the end of each business development phase.
Each phase was approximately 30 days apart (Phase 1, days 1–30; Phase 2,
days 31–60; Phase 3, days 61–90). The repeated measures research design
enabled a longitudinal examination of how the relationships between constructs
evolved. Table 3.6 details the study variables, codes and the timing of data
collection.

Table 3.6.

*Study Constructs, Variable Names, Codes, and Timing of Data Collection
Activities.*

Construct	Variable Name	Code	Data Collected [a]
Learning Resources [b]	Manager	MGR	Phases
	Mentor	MEN	1, 2, 3
	Cohort	CHT	
Agile Learning [c]	Feedback Seeking	FS	Pilot & Phases
	Knowledge Seeking	KS	1, 2, 3
	Experimenting	EX	
	Reflection	RF	
	Flexibility	FX	
Learning Outcomes [d]	Task	TK	Phases
	Relational	RE	1, 2, 3
	Adaptive	AD	
	Swiftness	SW	

Note. [a] Pilot data collected during the first week of the Accelerator: Phase 1 (days 1–30); Phase
2 (days 31–60); Phase 3 (days 61–90).
[b] Learning Resources measures (author).
[c] Agile Learning measured with five-factor LAAI (Smith, 2015)
[d] Learning Outcomes measures (author).

Participation in the electronic survey research was voluntary. All respondents acknowledged informed consent before completing each survey. A participant code scheme allowed respondents to respond confidentially. Participants could stop at any point by closing their internet browser. Accelerator organisers sent out an email invite for each online survey. Outsourcing this function created a partial separation between the researcher and participants. Surveys were accessible to participants for seven days. Accelerator organisers sent a reminder email before each survey closed.

3.4.3 Data: Descriptive statistics

Pilot study

Firstly, the content validity of each scale was examined to ensure the wording of each scale tested aligned with both the theory and intent of the research (Field, 2013). Cronbach alpha scores were then calculated to assess the internal reliability of each *Agile Learning* scale (Berman & Wang, 2018; Field, 2013). This was done to check the levels of covariance between items in each scale, that is the degree to which they measure concepts related but also distinct. A low score (near zero) would indicate the items were unrelated. A high score (near one) would suggest the items were duplicative in that they measured the same thing. A commonly used Cronbach alpha cut-off point is 0.70 (Berman & Wang, 2018). Thus, scores higher than this suggest a scale demonstrates acceptable levels of reliability.

The Cronbach alpha scores reported in Smith's (2015) concurrent criterion validity study of the LAAI provide additional support for the validity and reliability

of the LAAI as means for measuring the learning agility construct. Smith's (2015) findings were compared with the findings from this pilot study (Table 3.7).

In general, the pilot survey indicated acceptable levels of reliability for four scales (feedback seeking, experimenting, reflection, and flexibility) and the scale for overall *Learning Agility*. Cronbach Alpha scores for these scales ranged from 0.785–0.841. Although, some research has suggested it may be reasonable to accept alpha scores lower than 0.70 (Berman & Wang, 2018; Nunnally, 1978) the score for knowledge seeking (0.509) was noted as a concern and re-assessed alongside data analysis for the full survey research.

Table 3.7.

Comparison of Cronbach Alpha Scores Between the Pilot Survey and Prior Research for the 5-Factor LAAI.

Agile Learning[a]	Pilot Study	Smith (2015)	
Factors	Cronbach Alpha Scores		
Feedback Seeking	.796	.646	
Knowledge Seeking	.509	.747	
Experimenting	.785	.762	
Reflection	.841	.682	
Flexibility	.688	.830	
Overall Learning Agility	.771	.831	

Note. n=29. Reported means and standard deviations are for the entire sample.

[a] *Agile Learning* measured with 5-factor LAAI (Smith, 2015)

Core survey research

The quality, reliability, and consistency of the survey measures across the three phases of the study were examined (Bryman & Wang, 2018; Field, 2013). All twenty-nine participants responded to each question on each survey. The 100%

response meant no data was missing. Table 3.8 provides the calculated mean scores, standard deviations and alpha scores for each scale and at each phase.

Table 3.8.

Reliability and Descriptive Analysis of Scales by Phase (n=29).

Measures	Phase 1 (Days 1–30)			Phase 2 (Days 31–60)			Phase 3 (Days 61–90)		
	M	*SD*	α [a]	*M*	*SD*	α	*M*	*SD*	α
Learning Resources [b]									
Manager	5.15	1.09	.828	4.73	1.41	.949	4.76	1.54	.967
Mentor	5.65	1.10	.892	5.22	1.52	.955	5.09	1.70	.974
Cohort	5.14	1.32	.894	4.87	1.29	.938	4.71	1.27	.922
Agile Learning [c]									
Feedback Seeking	3.57	.878	.602	3.87	1.18	.797	3.77	1.19	.764
Knowledge Seeking	5.81	.817	.736	5.63	1.03	.734	5.29	.894	.713
Experimenting	5.90	.599	.733	5.78	.728	.832	5.75	.714	.825
Reflection	5.41	1.03	.865	5.39	.787	.805	5.45	.949	.860
Flexibility	5.61	.621	.771	5.52	.787	.883	5.58	.744	.864
Learning Outcomes [d]									
Task	5.34	1.09	.870	5.55	.936	.850	5.11	1.01	.849
Relational	5.35	.857	.820	5.12	.960	.775	5.01	1.04	.800
Adaptive	4.69	1.35	.919	4.72	1.28	.942	4.28	1.39	.911
Swiftness	5.42	.678	.617	5.21	.869	.858	5.07	1.15	.902

Note. n=29 for each Phase. Reported means (*M*), standard deviations (*SD*), and Cronbach Alpha Scores are for the entire sample.
[a] α =Cronbach Alpha score.
[b] Learning Resources measures (Author).
[c] Agile Learning measured with 5-factor LAAI (Smith, 2015)
[d] Learning Outcomes measures (Author).

In general, the overall level of reliability for each *Agile Learning* subscale was good. However, the second item of the five-item Knowledge Seeking scale significantly reduced the alpha score for each phase. The question in the second item asked participants how often during the past 30 days they had engaged in behaviours associated with updating their knowledge and expertise through formal training or education.

Field observations indicated few participants engaged in formal learning outside of the accelerator during the program (e.g., university coursework). Consequently, this item was dropped. As reported in Table 3.9. reliability scores

for Knowledge Seeking increased significantly in all three phases with the removal of the item (α=0.736; α=0.734; α=0.713). After item removal, the reliability scores for all *Agile Learning* variables ranged from α=0.713 to α=0.883.

The *Learning Resources* subscales demonstrated acceptable levels of reliability for all three Accelerator phases. Cronbach alpha scores ranged between 0.828–0.974. Aside from Swiftness (α=0.617) during Phase 1, the *Learning Outcomes* subscales demonstrated acceptable levels of reliability across the three accelerator phases (α=0.775–α=0.942). The survey research aimed to identify the relationships between variables across the three phases. Therefore, the lower reliability score for Swiftness was examined in light of observed levels or reliability in the other phases. Because the Cronbach alpha score for Swiftness increased significantly in subsequent surveys (α=0.858 and α=0.902), it was deemed an acceptable measure and no further action was taken. This decision was also consistent with suggestions by some that Cronbach alpha scores lower than 0.7 are, at times, acceptable in exploratory research (Berman & Wang, 2018; Field, 2013; Nunnally, 1978).

The descriptive analysis indicated each of the twelve scales possessed content validity as well as acceptable levels of reliability. Per Table 3.9, the mean participant scores for each scale (12) and phase (3) were assessed. In total, 33 out of the 36 measures assessed were observed to be above the midpoint of the 7-point scale. The range of mean participant scores for the 35 measures was from *M*=4.28 to *M*=5.80. Thus, indicating participants, in general:

- perceived interactions with all three *Learning Resources* scales (Managers, Mentors and Cohort) over all three phases as valuable for their learning;
- engaged frequently in four out of the five scales for *Agile Learning* strategies and behaviors (Knowledge Seeking, Experimenting, Reflection and Flexibility) over all three phases; and,

- experienced enhanced *Learning Outcomes* for all four scales (Task, Relational, Adaptive and Swiftness) over all three phases.

Only one scale, *Feedback Seeking*, was consistently below the mid-point over all three phases. The range was from *M*=3.57 to *M*=3.87 (Table 3.9). On 33 out of the 36 (92%) measures, accelerator participants responded positively; only Feedback Seeking was below the midpoint.

The next section introduces the statistical techniques and procedures used for analysing the survey research.

3.4.4 Data analysis strategy for inferential statistics

Correlation and regression analyses tested Hypotheses 1–3. Hypothesis 4 investigated if mean participant responses differed between participants associated with teams that received investment funding at the end of the accelerator (Funded) and those that did not (Non-Funded). Each hypothesis was introduced in section 3.4 (Strand 1 – Survey Method). The next section provides a brief overview of the processes and considerations associated with each form of analysis.

3.4.5.1 Correlation analysis

A two-tailed Pearson correlation analysis technique was applied to test Hypotheses 1–3 (see Table 3.2). Specifically, the tests sought to examine the strength of linear associations between variables (Berman & Wang, 2018; Elliot & Woodward, 2007; Field, 2013). In general, the data met the six assumptions for correlation analysis: continuous level of measurement, related pairs, the absence of outliers, the normality of variables, linearity and homoscedasticity. Cohen's (1992, p.99) classification scheme for Pearson's *r* was applied to assess the strength of bivariate association between variables (Weak = 0.1 < │ *r* │ ≤

0.3; Moderate = 0.3 < │ r │ ≤ 0.5; Strong = │ r │ > 0.5). Chapter 5 presents, in narrative form, the results of the correlation analysis. Appendices H1–H3 provide correlation matrices for each analysis.

3.4.5.2 Multiple linear regression analysis

Correlation analysis helped identify the nature and strength of relationships between variables. Multiple regression analysis was included to identify if, when, and to what extent selected variables exerted significant influence on others. Doing so may, for instance, identify which accelerator *Learning Resources* are most predictive of participant engagement in certain *Agile Learning* behaviours like Feedback Seeking.

Hypotheses 1–3 were also assessed through a multiple linear regression analysis to assess (a) the collective influence a series of explanatory variables had on a single outcome variable; and (b) the degree to which each explanatory variable exerted unique influence on the outcome variable (Field, 2013; Weinberg & Abramowitz, 2008). For example, accelerator and *Agile Learning* theory informed the selection and development of the survey variables. Consequently, each regression model contained all variables of interest.

Statistical assumptions for regression analysis were tested to ensure selected techniques were both mathematically and theoretically appropriate for the research aim and type of data collected (Berman & Wang, 2018). Specifically, tests for normality, independence of errors and multicollinearity, linearity and homoscedasticity were performed.

Assessment for normality

Visual inspection of histograms, frequency distributions, Q-Q plots, and skew and kurtosis scores provided a well-informed and multidimensional perspective of the nature of the dataset (Field, 2013; Fox, 2008). In general, analyses suggested approximate normality in all phases. However, in some instances, outlier observations contributed to moderately non-normal distributions.

Assessment for the independence of errors and multicollinearity

The rationale for assuming independence of errors was two-fold. Participants are unique actors thus their engagement with *Learning Resources* and in *Agile Learning* behaviours should not impact others. Moreover, although data were collected at multiple points in time, the analysis only examined one time-period at a time.

The Variance Inflation Factor (VIF) for each model and predictor was below the suggested cutoff of 5 (Field, 2013), thus suggesting multicollinearity was not an issue.

Assessment for linearity and homoscedasticity

Linearity and homoscedasticity were checked by assessing a scatterplot of predicted values and model residuals for each regression model (Field, 2013). A few instances of nonlinearity and moderate heteroscedasticity were noted. Removal of outlier observations may have enhanced the overall validity of the regression results; however, the researcher decided a biased representation of the sample would result if respondent data were discarded from an already small sample. Therefore, a robust regression technique was applied to maintain the integrity of the sample.

Bootstrap analysis

The decision to apply a bootstrap technique for the multiple linear regression analyses was rooted in the desire to reduce the impact of observed outliers, ensure the stability and reliability of regression models and maintain the integrity of the sample (Field, 2013; Fox, 2008; IBM, 2013).

Bootstrapping is a computationally intensive technique that supports making 'more accurate inferences when the data are not well behaved or when a sample size is small' (Fox, 2008, p.587). The technique is used to construct an approximate sampling distribution for the statistic of interest by resampling (with replacement) from the original sample (Field, 2013; Fox, 2008; Freedman, 2009; Mooney & Duval, 1993).

Before applying a bootstrap to a nonprobability sample, it is necessary to ensure the original sample represents the full range of responses possible from the respondents (Mooney & Duval, 1993). For the current research, a focused examination of the raw dataset, computed statistics and graphic representations of the statistics confirmed the observations collected for each phase reflected a full, and reasonable, range of responses. In other words, the observations likely reflect the types of responses other groups of participants may generate. Based on this assessment, an estimated sampling distribution was created by mathematically resampling with replacement 1,000 bootstrap samples, from the original sample (Field, 2013).

The bootstrapped results produced slightly fewer statistically significant observations than the non-bootstrapped sample. Thus, the estimated sampling distribution was assumed to offer a more accurate and more conservative statistical representation of the research sample (Fox, 2008; Mooney & Duval, 1993).

3.4.5.3 Differences between participants by team

A research assumption was participants would differ in how they responded to the survey items, and these differences may be related to end of programme funding outcomes. The small sample size limited statistical testing of Hypothesis 4 (see Table 3.2). Consequently, to examine for differences between participants by team, the researcher conducted descriptive analyses and comparisons of mean scores. Participants were separated into teams by the team's end of programme funding outcomes. This was possible because this research assigned each respondent a participant code. Teams that secured secure investment funding at the end of the accelerator programme beyond the seed funding initially provided by the accelerator as a condition of participation were deemed *Funded*. Teams that did not were deemed non-f*unded*

3.4.5.4 Presentation strategy for survey results

Chapter 4 presents key survey results from the descriptive and inferential analyses for the Cohort. The analyses generated a high volume of findings. To facilitate review, a consistent scheme was developed for reporting each hypothesis test. When appropriate, the narrative report is supplemented with tables and figures. Findings not presented in Chapter 4 are included as appendices.

The patterns and indicators identified in the survey data were explored further through two supplemental qualitative studies. The observation method explores participant learning and performance at the level of teams and the interview method does so at the level of participants.

3.5 Strand 2 – Observation Method

Strand 2, a qualitative observation method, was designed to supplement and extend the understanding generated through the multiphase quantitative survey. It does so by stepping down one level of accelerator participant to examine learning and performance through a team lens. Including this mid-level of accelerator participation was necessary because of the central role teams play in the accelerator programme logic. Data collection for Strand 2 (observation), as was the case for Strand 1 (survey), occurred during the accelerator. Figure 3.4 depicts the sources of observation data. The same twenty-nine participants that responded to the quantitative survey research contributed to the observation research (section 3.3). The next section describes the role the researcher assumed and provides a brief overview of types of data associated with the observation method.
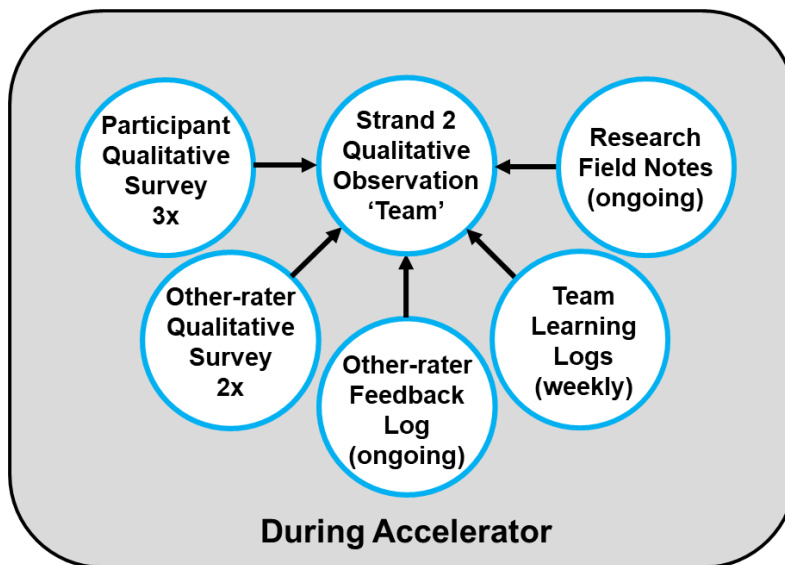
Figure 3.4. Strand 2 field study methods and number of respondents for each method (excerpt from Figure 3.2).

Researcher role

In general, researchers can approach fieldwork from a variety of roles. The degree of interaction between the researcher and participant distinguishes each

type of observation. For instance, researchers can be complete participants (e.g., a member of a venture team), pure observers (watching from a distance), covert observers (undercover operative) and, in the case of this research, participant as observer (Bryman, 2008; Easterby-Smith et al., 2008; Flick, 2006; Teddlie & Tashakkori, 2009).

For the current research, the researcher was located onsite for the duration of the accelerator (103 days) and utilised multiple methods for data collection (Creswell, 2014). The researcher chose the participant-as-observer role to to make their role known to participants and to invite participants to engage in spontaneous, non-structured and informal interactions (Easterby-Smith et al., 2008; Flick, 2006). In contrast to action research methods (Lewin, 1942) the objective for assuming a participant-as-observer role was not to work with accelerator participants, to help them problem-solve, or influence the outcomes they aspired to achieve.

Formal data collection was limited to specific weekly events scheduled by accelerator organisers (Figure 3.5). These events were selected because accelerator organisers expected all participants to attend these events. Limiting the number of points at which the researcher formally collected data was a strategy selected to promote consistency with the type and format of data captured. Moreover, it signaled to participants when the researcher was formally collecting data.

At the start of the week (Figure 3.5, Blue), the CEO of each team provided a team-level progress update and goals for the week. Managers also provided an overview of general goals the teams were expected to strive towards each week. At midweek, (Purple), each team provided a pitch of either their current business model or demo of their product. Each team also met midweek one-on-one with managers (Purple and Green). At the close of the week (Yellow), each team provided a progress update to their cohort of peers.
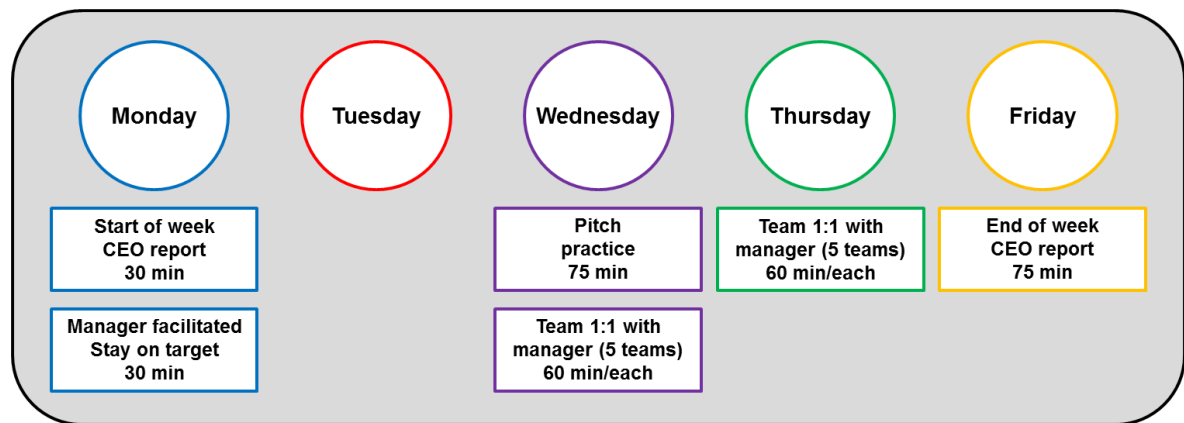
Figure 3.5. Weekly field data collection events.

The researcher collected field notes at each of these sessions. The objective was to produce a chronology of the business development and learning trajectories demonstrated by each team. Table 3.9 (line 1) provides an example of a research field note. Qualitative data drawn from accelerator participants, Mentors and organisers supplemented research field notes. Information on these methods and respondents follows the table.

Participant qualitative survey

All three quantitative surveys included two to four qualitative open-ended items. An example of a two-part question follows:

- Please share the most significant things you have learned over the past 30 days in the accelerator?
- How did you learn these things?

Participants provided a total of 232 qualitative survey responses. Table 3.9 (line 2) provides an example of a participant survey response.

Table 3.9.

Observation Data Type, Characteristics, Collection Method and Example Statements.

Type	Characteristics	Collection Method	Example Statement
1. Researcher field note	Description of event context and behavioural observations	Direct quote captured during weekly all team update meetings	We realised we were going into our validation process with biases ... so we just saw what we wanted to see. When we went back to the notes, we were shocked. There were several glaring themes that we clearly missed (BRO9).
2. Participant qualitative survey question	Participants indicate their greatest learning for that phase	Electronic survey	Decisions are made fast within an accelerator but are changed even faster. If the communication process within the team breaks down in any way the decisions quickly become inaccurate (KEL6).
3. Managers qualitative survey question	Accelerator managers and business techs indicate team's greatest learning for that phase	Electronic survey	This team began working on a completely new idea with 35 days to go in the programme. They were able to put together prototypes and learn very quickly – much quicker than they had in the first two thirds of the programme (MGR7).
4. Mentors feedback log	Notes entered in accelerator database by mentors after meeting with teams	Accelerator organisers provided researcher proxy access	This team is clearly still in the storming phase (phase 2 in the life of a team). The current team configuration has only been in place for about two weeks … there seem to be some leadership challenges based on the CFO seeming to be the somewhat informal leader, while the CEO is in the formal role (MEN23).
5. Team learning journal	Notes entered in accelerator database by CEO at end of each week	Accelerator organisers provided researcher proxy access	Personally, I'm feeling fairly ineffective at defining achievable weekly goals and ensuring we complete them as a team. I feel like we are at risk of getting left behind on the path to demo day if we don't (RON7).

Note. Information is author-generated.

Managers qualitative survey

Members of the accelerator management team also completed surveys. Managers responded at a team level. In other words, they provided an aggregate assessment of the participant engagement, progress and learning occurring within each team. By design, they responded to the same qualitative survey

questions as participants. However, the language for each question was modified to reflect a team-level response. In total, the managers contributed 120 qualitative survey responses. Table 3.9 (line 3) provides an example survey response.

Mentor feedback log

Mentors provided a rich source of data on team engagement, progress and learning. Accelerator organisers scheduled Mentors to meet regularly and intensely with participants during the first half of the programme. Mentors provided participants with feedback, advice and coaching during these daily exchanges. After each meeting, Mentors added feedback into an electronic database maintained by the accelerator. Accelerator organisers provided the researcher with access to this electronic data source. In total, the researcher collected 386 qualitative passages from the Mentors' feedback log. Table 3.9 (line 4) provides an example of a Mentor's feedback response.

Team learning journal

Accelerator Managers expected teams to reflect upon and electronically chronicle their learning experience. The intent of the journal was to help teams take stock of their learning, business development progress, challenges, and personal or professional needs. Moreover, it was intended that these weekly reflections with their Mentors and advisors would be shared. Access to the Mentor database was maintained by the accelerator. Although completion was an expectation, not all teams fully adopted the weekly practice. Table 3.9 (line 5) provides an example of a team learning journal entry.

In sum, the observation research drew upon five sources of qualitative data. Researcher-generated field notes complemented the data collected from participants and others professionally associated with the accelerator. The next section presents the strategy applied to analyse this data.

3.5.1 Qualitative analysis

Several schemes were applied to process, analyse and interpret the qualitative data associated with the observation (Strand 2) and interview (Strand 3). Some of the analytic techniques applied to the observation data and interview data were common across methods. Thus, they are presented jointly next.

Template analysis

Template analysis, a pragmatic and theoretically agnostic multi-stage coding process technique was used because it supports usage of a priori codes whilst also allowing for emergent ones (King, 2014; Waring & Wainwright, 2008). The objectives and procedures associated with analysing the observation and interview data differed. Thus, they are presented separately.

Template analysis – General overview

In template analysis the researcher-developed, a priori, coding template to help accelerate the sorting and organising process associated with analysing and interpreting large and diverse qualitative datasets (Brooks, McCluskey, Turley, & King, 2015; King, 2014). Although, there are similarities and overlaps with other qualitative approaches like grounded theory (Bryman, 2008), thematic analysis (Flick, 2006), and framework analysis (Richards, 2009; Richie & Spencer, 2002), template analysis appears a relatively agnostic technique because it can be 'adapted to the needs of a particular study and that study's philosophical underpinning' (Brooks, et al., 2015, p.205). Thus, template analysis is not bound to a single epistemology or set of rigid practices and procedures (King, 2014; Waring & Wainwright, 2008).

3.5.1.1. Template analysis – observation data analysis

A variety of authors have detailed several procedural steps commonly associated with template analysis (Brooks et al., 2015; King, 2014; Waring and Wainwright, 2008). Drawing inspiration from these resources, the researcher developed an initial coding template. The process included (a) reviewing concepts characterised in accelerator and learning agility literature; (b) becoming familiar with accounts targeted for analysis; (c) reflecting on observations made during the accelerator and following the interviews; and (d) considering the relationships and patterns noted in the survey findings.

The objective for analysing the observation data was to identify relevant and central themes and then organise them into a logical and hierarchical code structure from which higher-level takeaways could be extrapolated. Both electronic spreadsheets and hand-coding techniques were employed for data organisation, coding and analysis. This process enabled the organisation and examination of the data both in part and in whole.

An initial template of a priori codes was developed to help 'impose shape and structure on the analytic process' (King, 2014, p.269). The process of analysis was purposefully recursive. This process included reading and rereading transcripts to gain a feel for the participants' experiences and how they attributed perceptions to events. The analysis included considerations for both local (to an individual or team) and general (similar perception of events and experiences distributed across transcripts) representation of themes.

Passages were highlighted and coded per the a priori coding template. Successive passes through the dataset supported modification, addition and deletion of a priori codes. From a pragmatic perspective, the researcher deemed analysis complete, or saturated, when no new themes emerged. Thus, the assessment and decision-making processes were ongoing until the researcher reached a point of analytic saturation or, in other words, when additional data

ceased to provide alternate perspectives (Richards, 2009). The next section presents the specific strategy applied to analyse observation data.

Whereas the survey research examined participant learning and performance at the cohort-level, the observation method examined each at the team-level. It did so by considering the behavioural contributions – the levels of Task and Contextual Performance – each participant made to their team (see 2.4 Learning Outcomes). This form of analysis was possible because individual actions influenced team outcomes. Moreover, it aligns with the objective of the observation method: to understand better how participant learning and development manifested in the accelerator through the perceptions of multiple actors.

Based on this implicit logic, a coding template was developed to identify levels (high/low) of Task and Contextual Performance. Figure 3.6 depicts an example of the 2x2 matrix on which findings were plotted, and the template coding scheme applied to analyse the observation data. This scheme was applied uniformly to the five streams of qualitative data. The objective of the analysis was to produce:

- a graphic portrayal of how each team evolved along a low to high continuum for both Task and Contextual Performance;
- several representative team narratives; and
- a cross-team discussion of key themes.

In total, the four performance dimensions (Task, Relational, Adaptive, and Swiftness) were coded onto the 337 passages of qualitative data (26,000+ words) generated by accelerator participants and other individuals associated with the programme (Managers and Mentors).

Contextual Performance
Low ← → High

Task Performance
High / Low

Task Performance
- Participants possess needed knowledge, skill, ability and resources (Task)
- Participants help team meet its business development benchmarks (Task)
- Participants help team meet its expectations and benchmarks (Task)

Contextual Performance
- Participants interact with others in ways that support team task achievement (Relational)
- Participants work quickly to help team meet known requirements (Adaptive)
- Participants adapt well to help team address changing requirements (Swiftness)

Figure 3.6. Coding template for task and contextual performance.

The next section introduces the verification strategies used to enhance the credibility and validity of the observation findings.

3.5.1.3 Observation method verification strategies

A process of triangulation was applied to identify points of resonance and contrast present between the multiple streams of observational data (Creswell & Plano Clark, 2011; Morgan, 2014). Coded data were triangulated against researcher observations and field notes. The aim was to supplement, corroborate, challenge and make explicit researcher-held perceptions about observed events.

The output of the analysis was two-fold. Firstly, a comparative assessment of each team's performance was developed. This assessment was cross-checked with accelerator managers to gain other perspectives on participant levels of Task and Contextual Performance. Managers were provided with both the evaluative criteria (Figure 3.6) and a draft version of the 2x2 matrix introduced in Chapter 5 (Figure 5-2).

At the outset of the dialogue, a common level of agreement was shared by the researcher and Managers (90%). Subsequent discussion supported creation of the 2x2 matrices presented alongside the qualitative observation findings in Chapter 5. Secondly, a representative team narrative was written for both a team displaying differing levels of Task Performance and high levels of Contextual Performance.

In sum, the objective for the qualitative observation method (Strand 2) was to supplement and extend the survey findings. A template-analysis technique was applied to five sources of qualitative data to consider how individual learning behaviours and strategies influenced, in the aggregate, team Contextual and Task Performance. Qualitative findings are presented in Chapter 5.

3.6 Strand 3 - Interview Method

Strand 3, a qualitative interview method, examined the final level of accelerator participation targeted by this study, the participant. Including this final level of accelerator participation was necessary for generating a more complete understanding of how accelerators influence participant learning and performance. The method is included to supplement and extend the survey findings. The same twenty-nine participants who volunteered to take part in the quantitative survey (Strand 1) and the in-depth qualitative observation method (Strand 2) contributed to data. Interviews were conducted six months after the accelerator. The purpose for separating this strand from the other two was to capture any participant reflections on learning and performance which had occurred retrospectively (Cope, 2005, 2011). The interview method qualitatively examined the same concepts explored in both the survey observation research. Participation was voluntary, and consent was obtained before each interview. Section 3.3 provides characteristics of the sample associated with all three strands of this thesis research. The next section provides an overview of the interview research.

3.6.1 Interview approach and instrument

Interview formats vary along a continuum from highly structured formats that tightly bind the discussion around a topic or theory to informal conversation (Bryman, 2008; Flick, 2008; Punch, 2006). This research applied a semi-structured interview approach to access participant perceptions and meaning-making schemes; this enabled a structured, yet flexible style (Bryman, 2008; Easterby-Smith et al., 2008).

The interview method provided a supplementary platform for investigating in depth the patterns, relationships and indicators which surfaced in the survey data (Strand 1). Preliminary survey findings, as well as concepts drawn from accelerator, learning agility and individual performance literature informed the development of an interview checklist, also called a guide or protocol (Flick, 2006; Punch, 2005). Checklists help researchers structure the investigative content and processes used for interviewing respondents thus providing consistency between interviews (Bryman, 2008).

The checklist which was developed included declarative statements about voluntary participation, the process for withdrawing, confidentiality, the general interview format, the researcher's intention to record the conversation, and expectations for follow-up by the researcher (Bryman, 2008). Beyond the interview frame, the checklist also included investigative themes, sample questions, and probes and prompts. The checklist was modified after the first few interviews to ensure that, at a minimum, all respondents answered the same three questions (see Section 3.7.2).

3.6.2 Interview procedure

All twenty-nine accelerator participants provided written consent before participating. The interviews were conducted between four and six months after

the accelerator programme ended. This allowed participants time for reflection and for the results of the accelerator to be made known to both participants and the researcher. Such information included which teams discontinued, which ones continued without additional funding or which ones received follow-on investment funding.

Participants were contacted electronically several days before each scheduled interview. At this time, participants were provided with an overview of the interview process including information on location, timing, objective, consent, withdrawal and confidentiality. Moreover, participants received several intellectual prompts to prime the conversation. Participants were asked to reflect on (a) key learnings – when they occurred and the factors that influenced their occurrence; (b) the things that aided or hindered their learning; and (c) the 'so what' and 'what now' of their accelerator experience. The researcher explicitly stated to each participant that the interview format was intended to be purposefully conversational. Thus, the conversations were unique to each participant.

Twenty-five interviews occurred face-to-face and another four were conducted virtually via a videoconferencing application. Interviews ranged in length from 45–120 minutes in duration. The average interview length was 70 minutes. The researcher digitally recorded all interviews on two devices.

An interview checklist was developed to help anchor the semi-structured interview approach to the concepts under investigation (Bryman, 2008). Notably, all participants answered the same three questions. One question was asked at the outset: 'What did you learn being part of an accelerator and how did you learn it?' The other two questions were asked at the close of the interview: 'What would you tell a friend if they asked you these two questions, (a) What can I do to get the most out of being in an accelerator? and (b) How can I maximise my learning in the accelerator?' In between these two points, the researcher followed

the natural flow of the conversation and explored areas of interest expressed by respondents. As appropriate, the researcher applied probes and prompts to explore themes relevant to the research constructs (Bryman, 2008).

3.6.3 Data preparation

Although each interview explored the focal research themes differently, usage of an interview protocol provided consistency across the interviews. The audio file for each interview was electronically archived and transcribed verbatim. Transcript lengths ranged from approximately 6,000 to 14,500 words. Once transcribed, interviews were standardised for coding by grouping relevant responses into thematic groups based on the interview checklist (Table 3.10).

An example of an analytic prompt (item 2) and corresponding participant response are, 'In what ways, and how, did accelerator expectations influence participant learning and development in the accelerator?'

> By the end, I greatly resented being there. I didn't particularly enjoy the start-up community and the creed that they had for how you should live your life and how you should work. And, I saw people making sacrifices in their lives quite flippantly because they were convinced that what they were doing was maybe in service of some higher purpose. Entrepreneurship is not a religion; it's just a thing (KEL8).

An example of a participant response coded to the question (item 7) 'In what ways, and how, did interpersonal dynamics within teams influence participant learning and development and overall performance in the accelerator?' is:

> I learnt a lot around how you keep the team motivated and how you work together. Like you learn a lot more about each other

and like what would make each person happy or make each person sad and then how you use that … [to] kind of keep the team going and along and to be sure that everyone stays real psyched about it (MTVIC7).

Table 3.10

Analytic Prompts Used for Preliminary Sorting of Semi-structured Interview Data.

Item	Analytic Prompt
1.	What personal learnings did participants pull from their accelerator experience?
2.	In what ways and how did participant interactions with Managers influence their learning and development in the Accelerator?
3.	In what ways and how did participant interactions with Mentors influence their learning and development in the Accelerator?
4.	In what ways and how did participant interactions with their peers (Cohort) influence their learning and development in the Accelerator?
5.	In what ways and how did participants experience learning and development through interactions with accelerator artifacts (e.g., practices, culture, physical/psychologic space)?
6.	In what ways and how did accelerator expectations influence participant learning and development in the accelerator?
7.	In what ways and how did interpersonal dynamics within teams influence participant learning and development and overall performance in the accelerator?
8.	In what ways and how did participants select and employ learning strategies and behaviours in response to situational changes?
9.	In what ways and how did participants learn within and between experiences?

Note. Author is source.

Passages unrelated to either the research objective or questions, were excluded from the groupings.

In total, 233 key passages were identified from the complete dataset. The number of passages per question were as follows: #1(27); #2(17); #3(39);

#4(36); #5(35); #6(17); #7(31); #8(19); #9(12). The refined dataset, approximately 27,000 words, was analysed with a template analysis technique.

3.6.4 Interview analysis strategy

Interviews were analysed with a similar technique as Strand 2; however, a different a priori coding template was developed for coding and analysis of the interview dataset. In contrast to Strand 2 which examined multiple sources of data to generate an assessment of each team's level of Task and Contextual Performance, Strand 3 utilised participant interview data to identify general learning outcomes and processes.

The objective of the analytic process was to answer the research questions by building upon themes which surfaced in the survey and observation findings, and themes present in and across the accelerator and learning agility literature (see Chapter 2). In drawing on these sources, an a priori taxonomy of codes was developed (King, 2014) and applied to the interview data. Although a pre-established code structure was created, some initial codes were retained and others modified or merged; in some instances, new codes were added (Brooks et al., 2015; King, 2014; Waring & Wainwright, 2008).

In total, 540 segments of coded data related to an overarching theme called Participant Learning Characteristics and Strategies. in addition, another 196 segments of coded data were assigned to a category that considered the situational and contextual features present in the accelerator experience which affected participant learning.

3.7 Integration

The three-strands of findings are reported separately in Chapters Four through Six. The findings are integrated and reported collectively in Chapter Seven to answer the research questions - *How do accelerators influence participant learning and development?* - and - *What does learning agility theory add, if anything to our understanding of participant learning and development in accelerators?* The four research hypotheses provided the structural scheme for integrating the cohort, team and participant level findings.

A triangulation strategy was incorporated at the integration stage (Richards, 2009). This process was chosen to reduce biases, such as those originating from the researcher, method or data source, and to better identify patterns of support and contradictions across data sources (Creswell, 2014; Johnson et al., 2007; Morgan, 2014). The researcher compared-and-contrasted the different sets of findings to tease out themes and evidence relating to the relationships articulated in the hypotheses and relating the themes back to extant literature.

3.8 Ethical Considerations

Before commencing, the researcher met with the accelerator management team to discuss opportunities, and concerns associated with the planned data collection activities. As result of these key conversations with informants (Bryman & Bell, 2011), the initial research design was modified slightly to align the electronic distribution of each survey with the end of a business development phase (approximately day 30, 60, 90). To address concerns of confidentiality, programme participants received a respondent code from the management team; thus, they were able to voluntarily contribute, or not, to the research (O'Leary, 2017).

Victoria University of Wellington Human Ethics Committee approved this research (Applications #20518 & #20721).

3.9 Chapter Summary

Chapter Three reviewed the research aims and research questions in light of the explanatory multilevel mixed methods research approach adopted for this study. The three strands of data collection (survey, observation, and interview) were discussed as well as the levels of participant learning and performance each targeted (Cohort, Team, and Participant). Strategies and techniques for data preparation, analysis, and reporting, and corresponding limitations for each method were covered. The research site, teams, and participants associated with the research sample were presented. The chapter closed with an overview of the strategy for integrating the three stands of findings and a brief discussion of ethical considerations. The findings for each strand of this study are presented in separate chapters and integrated in the discussion chapter. Chapter Four presents survey findings for the cohort. Chapter Five presents observation findings for the teams. Chapter Six presents interview findings for participants. Chapter Seven integrates and relates the collective findings to the four hypotheses.

Chapter 4 | Quantitative Survey Findings

Chapter Four presents the first set of findings generated through this three-strand quantitative and qualitative mixed methods study. This chapter begins with a brief review of the research approach, design, questions, hypotheses, site, sample and methodology introduced in Chapter Three. Then it proceeds to present the survey findings in two parts. First key results for the hypothesis tests focused on the cohort are provided (H1-3). A summary of the collective results from these tests is included to bridge from the cohort analysis to team analysis (H4). The chapter closes with a summary and interpretation of all quantitative findings, suggests possible implications, and provides a transition to the qualitative team study. Figure 4.1 highlights the methodology, method, priority, timing and focus of Strand 1, and its relationships to the other two strands.
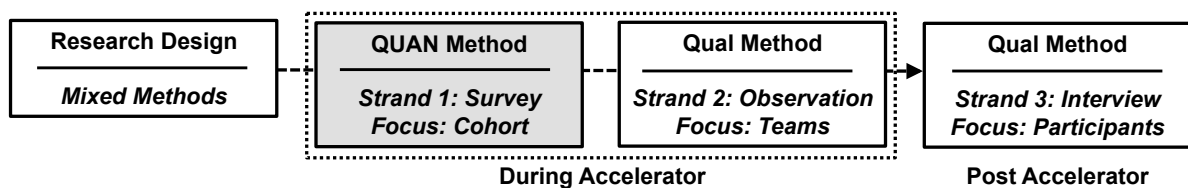
Figure 4.1. Research design, methodology, method, priority, timing and focus of Strand 2

4.1 Review Research Approach, Design and Questions, Method, Site and Sample, and Analytic Approach

4.1.1 Review of multilevel research approach

A multilevel research approach (Costa et al., 2013; Dansereau et al., 1999) was employed to examine three levels of participation articulated in accelerator programme design (Cohort, Team, and Participant). Participants are assumed to function both independently and interpedently at each level. This study applied

different methodologies and methods to examine each level. The findings from each strand are presented separately, and then the three sets of findings are integrated in the discussion chapter. Collectively, the multilevel research approach offers a more robust understanding of participant learning and performance because knowledge generated at each level contributes further understanding of the research sample. Research contributions target both academics interested in accelerators and accelerators as learning environments and accelerator organisers and stakeholders associated with GAN member accelerators

Strand 1, the quantitative survey, investigates both the core and supplemental research question at the cohort level of participation.

4.1.2 Review of research design and research questions

The survey research aims to answer, in part, the following two research questions: *How do accelerators influence participant learning and development? - and - What does learning agility theory add, if anything to our understanding of participant learning and development in accelerators?* Four hypotheses were developed and tested to inform these research questions (Table 4.1). The constructs, variables, hypotheses and phases examined are detailed in an adapted version of the research model (Figure 4.2). The multiphase survey design was incorporated to examine the relationships between variables at the end of each business development phase.
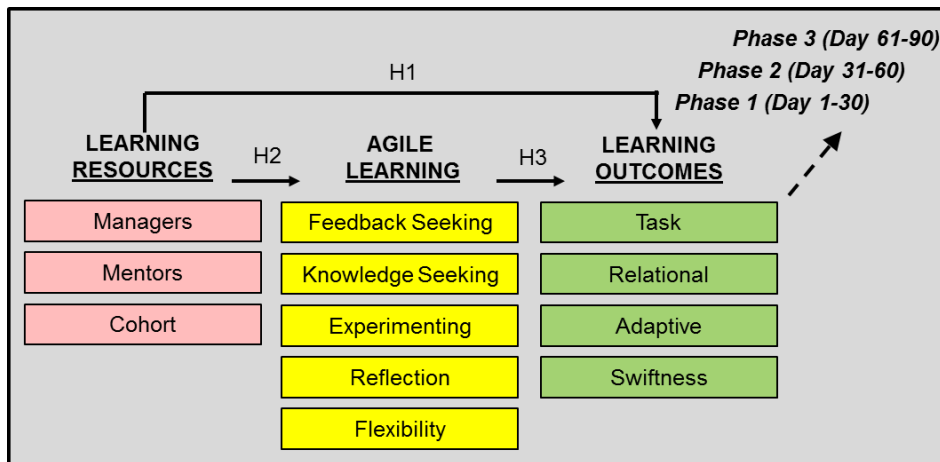
Figure 4.2. Elements of research model (constructs, variables, time and hypotheses) investigated with a quantitative survey method (adapted from Figure 2.7).

4.1.3 Review of survey method

The approaches for analysis and reporting are described briefly in the following sections (see Chapter Three for a detailed overview). The assumed relationships between variables were operationalised into four hypotheses (Table 4.1) and tested at each phase. The primary analytic approach included correlation and regression analyses (Hypotheses 1-3), and to support a link between the cohort investigation and the team investigation (Strand 2, observation method), tests for difference were also performed.

Survey data collection included administering a pilot of the learning measures and the same version of the full survey was administered at three different points in time during the accelerator. The full survey included items designed to quantitatively measure different dimensions of the three focal constructs (*Learning Resources, Agile Learning,* and *Learning Outcomes*), and several open-ended qualitative questions. Each survey was administered electronically. Although it was unexpected, the response rate was 100% for each survey.

Table 4.1.

Summary of Association Between Testable Hypotheses and Research Questions.

RQ1: How do accelerators influence participant learning and development?		
RQ2: What does learning agility theory add, if anything, to our understanding of participant learning and development in accelerators?		

RQ	H	Hypothesis
RQ1	H1	Participant interaction with Learning Resources[a] positively predicts enhanced participant Learning Outcomes[b].
RQ2	H2	Participant interaction with Learning Resources positively predicts the frequency of participant engagement in Agile Learning[c] strategies and behaviours.
RQ2	H3	The frequency of participant engagement in Agile Learning strategies and behaviors positively predicts enhanced participant Learning Outcomes.
RQ1 & RQ2	H4	Participants from funded and non-funded teams will demonstrate a difference in measures of Learning Resources, Agile Learning, and Learning Outcomes over the three phases.

Note. Author is source (adapted from Table 2.9).
[a]Learning Resources variables include Managers, Mentors and Cohort.
[b]Learning Outcomes variables include Task, Relational, Adaptive and Swiftness.
[c]Agile Learning variables include Feedback Seeking, Knowledge Seeking, Experimenting, Reflection and Flexibility.

4.1.4 Review of research site, sample and sample characteristics

In brief, the research site for this study is a prototypical GAN accelerator based in New Zealand (see Section 3.3). All study data is derived from a single accelerator programme cohort associated with this accelerator. The same twenty-nine individuals participated in all phases of the survey research, and all strands of the study. Participants were, on average, within an age range of 20-26 years old, male, and university educated.

4.1.5 Analytic Approach

The analyses included descriptive, correlation, regression techniques.

Hypotheses 1–3: Correlation and regression analysis

Two-tailed Pearson product-moment coefficients were calculated to identify the strength of the association between research variables (Field, 2013; Weinberg & Abramowitz, 2008). The assumptions for correlation analysis (normality, linearity and homoscedasticity) were largely met (Berman & Wang, 2018). However, a few of the bivariate relationships included outlier and influential observations. Accordingly, bootstrap estimates for correlations were calculated based on 1,000 samples with replacement. These are reported using Cohen's (1992, p. 99) strength of association scheme for Pearson's r (Weak = 0.1 < │ r │ ≤ 0.3; Moderate = 0.3 < │ r │ ≤ 0.5; Strong = │ r │ >0.5.

A series of multiple, linear regression analyses for each phase explored the hypothesised collective and the unique predictive effects predictor variables exerted on outcome variables. The regression equation for the GAN population is:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

The specific relationships tested (H1–H3) are detailed in Table 4.1. By way of example, the estimated regression equation derived from this sample for H1 has the form.

$$\widehat{Y} = a + b_1 X_1 + b_2 X_2 + b_3 X_3$$

The dependent variable (Y) is represented by one of the four *Learning Outcomes* variables (Task, Relational, Adaptive, and Swiftness). Each dependent variable is regressed separately on the three *Learning Resources* variables (Managers, Mentors and Cohort). The three predictor variables are represented in the formula as X_1 = Managers, X_2 = Mentors, and X_3 = Cohort. The estimated coefficient for each predictor (b_1, b_2, b_3) is included along with the intercept (a). The sample size was twenty-nine (n=29) for all analyses. The estimated regression equation is similar too the other hypothesis tests. In each, only the number of predictor variables changes.

The assumptions for multiple linear regression (normality, independence of errors, multicollinearity, linearity and homoscedasticity) were largely met for each hypothesis test (Berman & Wang, 2018). The results identified a few outlier and influential observations. Instead of removing or transforming outlier observations from the small sample, a robust regression technique was applied to preserve the totality of the sample (Berman & Wang, 2018). Specifically, a bootstrap multiple linear regression technique, based on 1,000 samples with replacement, was used to generate critical values (Field, 2013; Fox, 2008).

To account for both the number of independent variables and sample size, the *Adj. R²* is reported to better reflect how each model generalises beyond the sample (Field, 2013). An aim of the survey research was to identify which predictors offered the most impact on selected outcome variables, and when. Thus, more emphasis is placed on the analysis and interpretation of robust regression coefficient estimates than regression models. The process above was applied consistently for each hypothesis test (H1–H3) and is described here once rather than alongside each set of results.

Hypothesis 4: Comparative analysis of non-funded and funded teams

Hypothesis 4 looked for differences, based on group association, in responses to each survey variable for each phase (36 in total). Due to the small sample and the large number of comparisons required, statistical tests were not conducted for Hypothesis 4. Instead, mean team scores were calculated, grouped according to funding/investment outcome, graphed and interpreted. Results from this simple, yet insightful, comparative analysis provide a conceptual bridge to the qualitative methods (Chapter 5).

Reporting results

Key findings are reported for each hypothesis and each accelerator phase. A combination of narratives, tables, and figures are incorporated to do so. The results from all analyses not included in Chapter 4 can be found in the Appendices (D-M.3). The next section provides a description of key correlation and regression results for Hypothesis 1.

4.2 Hypothesis 1 – Learning Resources Positively Predict Learning Outcomes

Hypothesis 1 states that participant interaction with *Learning Resources* positively predicts enhanced participant *Learning Outcomes* (Tables 4.1). Reported results and interpretations aim to answer, in part, the primary research question, 'How do accelerators influence participant learning and development?'

Building and scaling a start-up is challenging because new ventures lack critical resources (Stinchcombe, 1965). These challenges may be magnified under accelerator-inspired time constraints. An implicit assumption underpinning accelerator programme logic is that learning is critical for achieving expected performance outcomes (Hallen et al., 2014; Miles et al., 2017). To help participants learn quickly, accelerators provide participants with access to an assortment of intensely targeted and concentrated *Learning Resources*. For instance, participants receive coaching from accelerator Managers, expert industry advice from Mentors, and opportunities to learn alongside and with other participants in their Cohort (Clarysse et al., 2015; Hoffman & Radojevich-Kelly, 2012). Purportedly, these interactions aid participant *Learning Outcomes*. However, it is unknown which *Learning Resources* are most valued by participants for aiding learning and at what points during the accelerator programme.

It is likely that both researchers and accelerator organisers would benefit from a better sense of which *Learning Resources* offered the greatest benefits for participants for learning and when. Enhanced knowledge in these areas may help focus future accelerator learning research. Practically, enhanced understanding may help confirm/disconfirm accelerator stakeholders' perceptions as to which learning-focused elements are most critical for supporting participant learning and development. This would enable accelerator organisers to tailor programmes more accurately to fit participant needs by adding more of some resources and less of others.

Figure 4.3 indicates the relationships and variables tested in Hypothesis 1. Survey items requested participants to indicate the extent they perceived interactions with each *Learning Resources* variable was helpful for learning. They also responded to *Learning Outcomes* items which, broadly assessed perceptions of enhanced Task and Contextual performance (Motowidlo, 2003). Both correlation and regression analysis techniques were applied to test Hypothesis 1 at each phase.
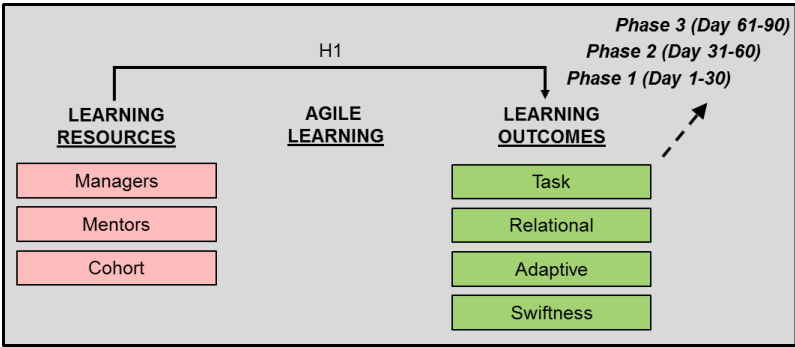
Figure 4.3. Aspects of research model tested by Hypothesis.

As per Table 4.1, Hypothesis 1 states:

> Participant interaction with *Learning Resources* (Managers*,*
> Mentors*,* and Cohort) positively predicts enhanced participant
> *Learning Outcomes* (Task, Relational, Adaptive, and
> Swiftness).

The next section presents key results for Hypothesis 1. The narrative is supported by summary figures and tables. See Appendices H–I.4 for full results.

4.2.1 Hypothesis 1 results: Correlation

A robust two-tailed Pearson correlation technique was applied (Field, 2013) to test the nature and strength of the bivariate association between *Learning Resources* and *Learning Outcomes* variables. Table 4.2 provides a graphic summary of each bivariate relationship by accelerator phase. The orange ($p<.01$ level) and grey ($0.01<p<0.05$ level) squares reflect statistically significant relationships. The white squares indicates non-significant relationships ($p>0.05$). In total, 28 out of 36 bivariate relationships were statistically significant at a 5% level of significance. See Appendices H.1–H.3 for full results.

Table 4.2.

Summary of Bivariate Correlation Coefficients for Hypothesis 1.

	Task			Relational			Adaptive			Swiftness		
	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
Managers	.42	.59	.38	.38	.39	.51	.32	.65	.47	.37	.35	.43
Mentors	.57	.48	.41	.50	.43	.39	.11	.46	.41	.47	.45	.16
Cohort	.49	.33	.70	.59	.45	.61	.74	.85	.74	.37	.29	.51

Note. n=29. Data summary generated from results of 2-tailed Pearson correlations. Critical values calculated using a bootstrap technique based on 1000 samples with replacement. Degrees of freedom = twenty-seven.
Learning Outcomes variables (X-axis); Learning Resources variables (X-axis).
P1=Phase 1 (day 1–30). P2=Phase 2 (day 31–60). P3=Phase 3 (day 61–90).

p<.01	*.01<p<.0*	*p*>.05=n

Hypothesis 1 – Key findings for correlations

In all three phases, Managers, Mentors and Cohort demonstrated moderate to strong positive relationships with at least one *Learning Outcomes* measure, and in many instances two. The exceptions to this pattern were between Swiftness and both Cohort and Managers where each only demonstrated one significant relationship across the three phases with each occurring in Phase 3. Although the relationship remained positive, it is notable the magnitude of effect between Mentors and each *Learning Outcomes* variable decreased over time. Taken together, 77% of all bivariate correlations demonstrated statistical significance.

Moreover, in all instances where statistical significance was observed, increased interactions with *Learning Resources* were positively associated with participants' perceptions of enhanced *Learning Outcomes*. Thus, a one-unit increase in one variable corresponded to a positive increase in the other. The next section presents the regression results for Hypothesis 1.

4.2.2 Hypothesis 1 results: Multiple regression

This section builds on the correlation analyses for Hypothesis 1 specifically with a view to investigating if observed relationships continued to demonstrate significance when controlling for other variables.

In accelerators, participants are responsible for maintaining core business functions and rapidly advancing business development. Both must occur during the time-boxed window of the programme. An assumption underpinning this study is that accelerator participants will interact with *Learning Resources* differently and the effect of these interactions on *Learning Outcomes* will vary in nature, strength and direction over time. In other words, some *Learning Resources* may offer more benefits than others for participants and these benefits may be realised at different phases in the accelerator.

A bootstrap, multiple linear regression technique was applied to test Hypothesis 1 for each outcome variable (Task, Relational, Adaptive, and Swiftness) and at each phase. It was hoped to identify whether the three *Learning Resources* collectively exerted a positive predictive effect on each *Learning Outcomes* measure and which one demonstrated a unique predictive effect when controlling for others. A better understanding of both these relationships may benefit future research and may help inform decisions accelerator organisers make concerning which *Learning Resources* they provide participants, and when. Multiple linear regression results for Hypothesis 1 follow.

4.2.2.1 Hypothesis 1 results: Regression models

Hypothesis 1 – Learning outcomes regression results: Task predictors
The results from Hypothesis 1 highlighted a strong, positive, predictive relationship between *Learning Resources* and *Learning Outcomes*. Specifically, participant performance was enhanced through interactions with Managers, Mentors and Cohort. Table 4.3 shows nearly all models were statistically significant at a 5% level. Notably, some explain the variation in *Learning Outcomes* better than others. For instance, a few models (lines 3, 7, and 11) explain a lot of the variance in Task, Relational, Adaptive and Swiftness (>50%). Apart from the model for Swiftness (Phase 2), Managers, Mentors and Cohort explain approximately 20–75% (Adj. R^2 0.191–0.757) of the variance in Task, Relational, Adaptive and Swiftness in all phases.

Overall, this set of results aligns with a priori assumptions about the collective impact accelerator *Learning Resources* might play on participant learning and performance outcomes. In other words, the perceived usefulness of the interactions is related to *Learning Outcomes.* Further, these results may suggest participants do not enter accelerators with the end-state competencies needed to move ventures rapidly from gestation to investment. Thus, they value learning interactions with Managers, Mentors and Cohort as a source of gaining needed knowledge, skills and abilities. The next section presents estimates for the effect

of learning resources for each for each separate test of Hypothesis 1 and each phase.

Table 4.3.

Summary of Multiple Regression Models for Hypothesis 1.

Phase	Learning Outcomes (Y)		F	Adj. R²	p
1	(1) Task	1	6.38	.366	.002**
1	(2) Relational	1	7.11	.395	.001**
1	(3) Adaptive	1	12.41	.550	.001**
1	(4) Swiftness	1	3.20	.191	.040*
2	(5) Task	2	5.20	.311	.006**
2	(6) Relational	2	3.22	.192	.040*
2	(7) Adaptive	2	30.06	.757	.001**
2	(8) Swiftness	2	2.34	.126	.097
3	(9) Task	3	9.42	.474	.001**
3	(10) Relational	3	7.36	.405	.001**
3	(11) Adaptive	3	12.47	.551	.001**
3	(12) Swiftness	3	4.19	.255	.016*

Note. n=29. *F*=F test statistic; *Adj. R²* = Adjusted R². *p*=p-value.
Degrees of Freedom for all analyses = 25. Force entry method.
Each dependent variable (Task, Relational, Adaptive, and Swiftness) regressed separately against independent variables (Managers, Mentors, and Cohort).
** *p* < 0.01. * .01< *p* < 0.05

4.2.2.2 Hypothesis 1 results: Coefficient estimates

In general, the coefficient estimates suggested participant *Learning Outcomes,* when controlling for the other predictors, were affected by their interactions with only some of the accelerator *Learning Resources.* Moreover, these predictive relationships varied between phases. Figure 4.4 presents a composite summary of predictor level results.

Notes. Positive *p*<.01 ** ⟶   Positive .01< *p*<.05 * ------→
n=29. Critical values calculated using bootstrap technique, based on 1000 samples with replacement.
▢ Outcome variables (Y): TK=Task; RL=Relational; AD=Adaptive; SW=Swiftness.
▢ Predictor Variables (X): MGR=Manager; MEN=Mentor; CHT=Cohort.
Phase 1: Adaptive predicted by Cohort (*b*= .779, t(25)= 5.49, *p*= .001).
Phase 2: Task predicted by Managers; (*b*= .325, t(25)= 2.30, *p*= .047); Adaptive predicted by Cohort (*b*= .709, t(25)= 6.33, *p*= .001).
Phase 3: Task predicted by Cohort (*b*= .494, t(25)= 4.02, *p*= .005); Relational predicted by Cohort (*b*= .380, t(25)= 2.82, *p*= .022); Adaptive predicted by Cohort (*b*= .700, t(25)= 4.47, *p*= .001).

Figure 4.4. Hypothesis 1: Composite Graphic of Collective Results Generated from 12 Separate Robust Multiple Linear Regression Tests for Learning Outcomes by Phase.

For each test, a single *Learning Outcomes* variable (Y) was regressed separately against the three *Learning Resources* measures (X). Each outcome variable and the assumptions and characteristics of measurement for each *Learning Outcomes* variable is provided alongside results. The characteristics of each *Learning Resources* variable (Managers, Mentors and Cohort) were described in Chapter 3. In brief, the *Learning Resources* measures assessed participant perceptions regarding the usefulness of their interactions with Managers, Mentors and Cohort for their learning.

In Figure 4.4, solid lines represent positively predictive relationships observed at a 0.01 level of statistical significance. Furthermore, dashed lines reflect positively predictive relationships observed at a 0.01<*p*<0.05 level of statistical significance. As indicated, only Managers and Cohort are uniquely predictive of *Learning Outcomes.* Contrary to expectations, Mentors did not exert significant unique influence on participant *Learning Outcomes.*

The next sections provide support and interpretation of the results featured in Figure 4.4. The full model and predictor results are included in table format in Appendices I.1–I.4.

Hypothesis 1 – Learning outcomes regression results: Predictors for task

Task is a composite scale (four items) designed to assess participant perceptions of overall enhanced performance. It aims to assess participant behaviours assumed to contribute value towards maintaining both base business functions and advancing business development (Motowidlo, 2003). An example item is,

> Overall, I became better at meeting business requirements by acquiring knowledge from others.

Task was regressed against Managers, Mentors and Cohort. The regression analysis aimed to identify, for each phase, the unique predictive effect each variable demonstrated – while controlling for the others – on participant perceptions of enhanced Task Performance.

Results suggest the regression model for Task was statistically significant at each phase (P1, p=0.002; P2, p=0.006; P3, p=0.001). However, only two *Learning Resources* (Managers and Cohort) demonstrated a statistically significant predictive effect on Task (Figure 4.4).

Managers was predictive of Task in Phase 2 (b=0.325, t(25) = 2.30, p =0.047). This result suggests participants felt they were better at getting tasks done because the interactions they had with Managers were helpful for their learning. During Phase 2, participants need to generate significant business development progress. Therefore, participants may have relied more explicitly on Managers to

help them achieve performance goals because they lacked access to the intense mentoring they experienced in Phase 1. Moreover, because Managers worked onsite at the accelerator, participants may have found their accessibility helpful because they may have received support shortly after asking for it.

During the last phase of the program (P3) Cohort was the sole statistically significant predictor of Task (b=0.494, t(25) = 4.02, p =0.005). An inference from this result is that participants may draw not only on their own experience for learning but also upon the experiences of their peers. For instance, participants may have appropriated, synthesised, and applied feedback offered to others as a way of speeding up their learning and performance. See Appendix I.1 for full results.

Hypothesis 1 – Learning outcomes regression results: Predictors for relational

Likely, *Learning Outcomes* are enhanced if participants cultivate and maintain productive interpersonal relationships with accelerator Managers, Mentors and members of the Cohort. Ineffective relationships may counteract the assumed relational benefits of the accelerator learning environment. For instance, poor relationships may inhibit access to some *Learning Resources* such as Mentors. Relational is a composite scale (four items) which aims to assess participant perceptions of enhanced interpersonal performance. An example item is:

My relationships improved by seeking feedback from others.

To test Hypothesis 1, Relational was regressed against Managers, Mentors and Cohort to identify which factors demonstrated a unique predictive effect, while holding others constant on participant perceptions of enhanced interpersonal relations. These relationships were examined for each phase.

As noted in Table 4.3, F-test statistics for the Relational regression models were statistically significant in all three phases (P1, p=0.001; P2, p=0.040; and P3, p=0.001). However, as also reflected in Figure 4.4, only Cohort demonstrated a unique predictive effect on Relational (b=0.380, $t(25)$ = 2.82, p =0.022). This observation occurred in Phase 3 when the stresses associated with completing the programme were high. The result may suggest participants turned to their peers for support because they seemed 'more like them' and therefore easier to connect with than experts such as Managers and Mentors. See Appendix I.2 for full results.

Hypothesis 1 – Learning outcomes regression results: Predictors for adaptive

Purportedly, accelerators are dynamic and unpredictable business development environments. Consequently, as business development and learning requirements change so must participants. For instance, teams may receive poor customer feedback about a feature of the product they are developing. Alternatively, a Mentor may provide feedback on how to better approach conversations with customers. In both instances, adapting poorly, or not at all, to prompts for change may contribute to subpar *Learning Outcomes* and contribute to business failure.

Adaptive is a composite scale (four items) which aims to assess participant perceptions of improvement in meeting changing business requirements. An example item is:

> I became more flexible in meeting changing business requirements by reflecting on my experiences.

To test Hypothesis 1, Adaptive was regressed on Managers, Mentors and Cohort to identify the unique predictive effect each exerted on Adaptive while holding the others constant.

The regression models for Adaptive were statistically significant at a 0.01 level in all three phases (Table 4.3). The Adjusted R^2 for the three models ranged between 0.550–0.757. Thus, a lot of the variance in Adaptive can be explained by participant interactions with Managers, Mentors and Cohort. At the coefficient level of analysis, participant perceptions of enhanced Adaptive performance were predicted at a 0.01 level by participant interactions with Cohort (Figure 4.4). The predictive effect of Cohort on Adaptive was strong in all phases but decreased over time (P1, (b=0.779; P2, b=0.709; P2, b=0.700). Results suggest that, at a minimum, participants experienced a 70% increase in their ability to adapt to changing business requirements with each unit of increase in learning they gained from interactions with other participants.

These findings suggest participants perceived their peers as an important source of learning and that these interactions helped them adapt better when faced with changing requirements. A plausible explanation is that participants became more adaptable in how they approached learning and business development tasks by observing others navigate, successfully and unsuccessfully, similar challenges. See Appendix I.3 for full results from these analyses.

Hypothesis 1 – Learning outcomes regression results: Predictors for swiftness

In accelerators, it is helpful to be able to adapt to changing requirements. Working quickly towards achieving known business development benchmarks is also regarded as important. *Swiftness* is a four-item composite scale that assesses the extent participants felt they had become quicker at doing the things they knew they needed to do. An example item is:

I became faster at meeting known business requirements by experimenting to validate my ideas.

As presented in Table 4.3, the regression models for Swiftness demonstrated statistical significance at a 0.05 level in both Phase 1 (p=0.040) and Phase 3 (p=0.016). In no phase were Managers, Mentors and Cohort uniquely predictive of Swiftness (Figure 4.4).

This set of findings are counterintuitive. It was expected that in each phase participants would feel they achieved known tasks faster due to formal and informal interactions with expert others such as Managers, Mentors and Cohort. For example, it was assumed participants would become faster if they knew how to do something. Observing others wrestle with and solve issues similar to those they faced was assumed to be one way they would become faster at delivering on known tasks (Cohen, 2013a; Hallen, 2017; Levinsohn, 2015). However, for the current study, this assumption was invalidated by the results. A plausible explanation for these results is that participant interactions with Managers, Mentors and Cohort provided access to higher levels of feedback, some of which may have been good and some bad. It is possible it took time for participants to sort out and make sense of feedback before it became a useful resource. See Appendix I.4 for full results.

Hypothesis 1 – Overview of regression results

Robust correlation and regression techniques were used to test the relationships between the influence of accelerator *Learning Resources* on participant learning and participant perceptions of enhanced *Learning*. Hypothesis 1 was partially supported as evidenced by 75% of bivariate correlations demonstrating positive associations at a 0.05 level statistical significance. Moreover, 90% of regression models also demonstrated statistical significance at a 0.05 level. The findings

contribute, in part, to answering Research Question 1: 'How do accelerators influence participant learning and development?

In general, observed results align with normative accelerator industry assertions that participant *Learning Outcomes* are related to interactions with Managers, Mentors and Cohort. However, when examining for the unique predictive effect (when controlling for others), only Managers and Cohort demonstrated statistically significant levels of influence on *Learning Outcomes.* Overall, the results suggest participant interactions with Managers and Cohort enhanced participant Task Performance. Also, participant interactions with their peers (Cohort) enhanced their interpersonal relationships (Relational) and helped them to respond better to changes in the business environment (Adaptive).

Notably, participant interactions with Mentors did not enhance their performance on any of the *Learning Outcomes* variables. This set of findings is in contrast to the normative thinking that accelerators are mentor-driven programmes (Hoffman & Radojevich-Kelly, 2012; Miller & Bound, 2011). Moreover, the findings are counterintuitive because accelerators schedule participants to meet intensely with a battery of industry experts for mentoring, coaching and advice during Phase 1. Another set of findings contrary to prior assumptions was that participant interactions with the accelerator Managers and Mentors did not enhance their interpersonal relationships (Relational). This set of results was unexpected because other research suggests accelerators are highly social and interactive learning environments (Cohen, 2013a; Hallen et al., 2019; Levinsohn, 2015; Smith et al., 2015). Moreover, since accelerators schedule time for participants to meet regularly with both Managers and Mentors it was expected that relationships would improve with frequency of interaction. The next section presents results for Hypothesis 2.

4.3 Hypothesis 2 – Learning Resources Positively Predict Agile Learning

Hypothesis 2 states that participant interaction with *Learning Resources* positively predicts the frequency of participant engagement in *Agile Learning* strategies and behaviours (Table 4.1). This section builds on the results of Hypothesis 1 (Section 4.3). The reported results and interpretation aim to answer, in part, the second research question: 'What does learning agility theory add, if anything, to our understanding of participant learning and development in accelerators?'

The central assumption underpinning Hypothesis 2 is that accelerators promote participant learning through the provision and facilitation of interactions with three key *Learning Resources* (Managers, Mentors, and Cohort)*. Additional assumptions include (a) participants will engage different learning strategies and behaviours as result of these interactions; and (b) the value and relevance of each *Learning Resource* for participant learning will vary across time. Examining learning strategies and behaviours at different time points of an intense and developmentally challenging experience may illuminate when, and in response to what, participants demonstrate high levels of learning agility. Enhanced knowledge of the nature, strength and predictive effects present in these relationships may help narrow future accelerator learning research and help organisers create more fit-for-purpose learning contexts and just-in-time application of *Learning Resources*.

Participants responded to survey items which assessed the value of accelerator *Learning Resources* offered for their learning. Participants responded to *Agile Learning* survey items which asked how often they engaged in specific learning strategies and behaviours often associated with learning agility (DeRue et al., 2012; Smith, 2015).

Figure 4.5 illustrates the strategy and time points for testing Hypothesis 2 relationships. As per Table 4.1, Hypothesis 2 states:

> Participant interaction with *Learning Resources* (Managers, Mentors, Cohort) positively predicts the frequency of participant engagement in *Agile Learning* strategies and behaviours (Feedback Seeking, Knowledge Seeking, Experimenting, Reflection, and Flexibility).
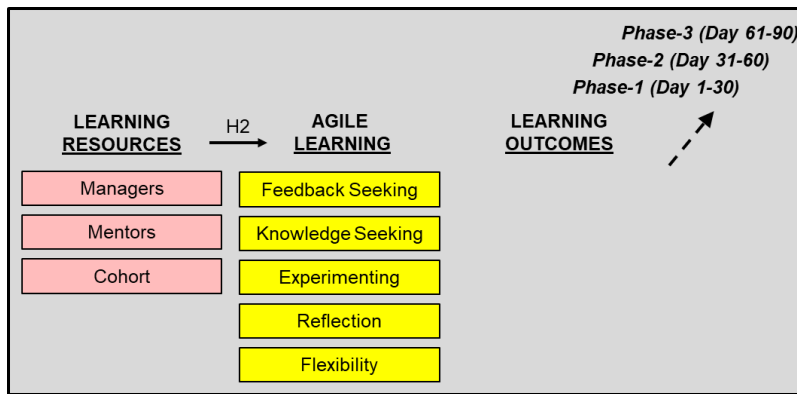
Figure 4.5. Aspects of research model tested by Hypothesis 2.

The next section presents key results for strength of association test between Hypothesis 2 variables. See Appendices H.1–H.3 = & J.1–J.5 for full results.

4.3.1: Hypothesis 2 results: Correlation

A robust two-tailed Pearson correlation technique was applied to test Hypothesis 2 (Field, 2013). In total, 19 out of 45 bivariate relationships were statistically significant at a 5 percent level of significance (Table 4.4). Squares with colour reflect statistically significant relationships orange ($p<0.01$ level) and grey ($0.01<p<0.05$ level). White squares indicate non-significant relationships ($p>0.05$). See Appendix H.1-3 for a correlation matrix of Hypothesis 2.

Table 4.4.

Summary of Bivariate Correlation Coefficients for Hypothesis 2.

	Feedback Seeking			Knowledge Seeking			Experiment.			Reflection			Flexibility		
	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
Managers	.29	.48	.44	.27	.23	.35	.21	.38	.43	.52	.57	.51	.47	.58	.32
Mentors	.13	.23	.38	.20	.04	-.08	.20	.09	.17	.50	.48	.37	.50	.36	.14
Cohort	.03	.34	.40	.20	.23	.21	.08	.15	.26	.60	.49	.34	.40	.23	.30

Note. n=29. Data summary generated from results of 2-tailed Pearson correlations. Critical values calculated using a bootstrap technique based on 1000 samples with replacement. Twenty-seven degrees of freedom.
P1=Phase 1 (day 1–30). P2=Phase 2 (day 31–60). P3=Phase 3 (day 61–90).
Experiment = Experimenting.
Agile Learning variables (X-axis); Learning Resources variables (X-axis).

$p<.01$	*.01<p<.05.*	$p>.05$=ns

Hypothesis 2 – Key findings for correlations

The results suggest that the extent to which participants valued their learning interactions with the accelerator *Learning Resources* is positively related to their frequency of engagement in the *Agile Learning* behaviours, except Knowledge Seeking, in all phases. Across the three phases, 60% of the possible relationships between Managers and the five *Agile Learning* variables were statistically significant at a five percent level, 40% for Mentors, and 26% for Cohort. The strength of association between Managers and Feedback Seeking, Experimenting, Reflection, and Flexibility was positive, moderate to strong, and ranged in magnitude from r=0.38 to r=0.58. A similar relationship was observed between Mentors and Feedback Seeking, Reflection and Flexibility (r=0.37 to r=0.50) and Cohort and Feedback Seeking, Reflection and Flexibility (r=0.40 to r=0.60).

The analysis identified several significant relationships and these relationships were not static: some increased in magnitude over time and while others decreased. For instance, some relationships, such as between Mentors and Cohort and Feedback Seeking, were not observed as significant during Phases 1 and 2 but *were* significant during Phase 3.

The analyses surfaced several unexpected relationships. Specifically, Feedback Seeking, Knowledge Seeking, and Experimenting were not associated with *Learning Resources* during Phase 1 of the accelerator. Similarly, in Phase 3, none of *Learning Resources* were associated with Flexibility. Another main finding was that, during all three phases, *Learning Resources* variables were not associated with participant engagement in Knowledge Seeking. The next section extends the analysis of Hypothesis 2 by testing the predictive effect of *Learning Resources* on *Agile Learning*.

4.3.2: Hypothesis 2 results: Multiple regression

This section presents key results from a series of robust multiple linear regression tests conducted to test Hypothesis 2. This analysis aimed to identify the extent of change in each *Agile Learning* measure which could be explained (collectively and uniquely) by interactions with the three *Learning Resources* predictors.

Accelerators are time-bound, start-up assistance programmes (Miller & Bound, 2011). Time constraints likely place pressure, whether implicit or explicit, on participants to perform quickly. Accelerators are also commonly characterised as fast-paced and dynamic experiential learning environments (Cohen, 2013a; Miles et al., 2017). Thus, participant learning and development may be influenced by how well, how quickly and flexibly individuals select and shift between learning strategies and behaviours in response to learning demands (De Meuse et al., 2010; DeRue et al., 2012; Mitchinson et al., 2012b). For instance, participants

may need to engage frequently in reflective practices during periods of concentrated and intense mentoring (Phase 1). Based on feedback, they may also need to adjust how they think about and approach building their business. A robust regression technique was applied to test if participant learning interactions with Managers, Mentors and Cohort predict their engagement in different *Agile Learning* strategies and behaviours at different points in the accelerator (Hypothesis 2). The next section presents a summary of the significant regression model and predictor level results for Hypothesis 2 (see Appendices J.1–J.5 for full results).

4.3.2.1 Hypothesis 2 results: Regression models

In general, the number of statistically significant models, based on F-test scores, was lower than expected (40%). Only six of the fifteen models tested (Table 4.5) demonstrated a statistically significant shared effect (Managers, Mentors, and Cohort) on the *Agile Learning* outcome variables.

The analyses identified significant regression models between Reflection and *Learning Resources* (P1–P3); Flexibility and Learning Resources (P1–P2); and, Feedback Seeking and Learning Resources (P3)*. The percentage of shared variance accounted for by the three *Learning Resources* ranged from approximately 20–45% (*Adj. R²* 0.196–0.436). Thus, much of the variance is left unexplained and it must be assumed that a variety of other untested factors appear to have influenced these relationships.

This set of results was unexpected because it was assumed interactions with experts (Managers and Mentors) and others learning alongside the participants (Cohort) would catalyse engagement in learning activities. The models for Knowledge Seeking and Experimenting did not appear a good fit for the data as evidenced by each demonstrating p-values greater than 5% in all phases. These findings were surprising because the a priori assumption was that participants

join accelerators to gain knowledge and that they would do so through interactions with the *Learning Resources*. Further, it was expected that interactions with *Learning Resource*s would prompt higher engagement with experimenting. The next section presents regression results for the predictors.

Table 4.5.

Summary of Multiple Regression Models for Hypothesis 2.

Phase	Agile Learning (Y)	F	$Adj.\ R^2$	p
1	(1) Feedback Seeking	.892	-.012	.459
	(2) Knowledge Seeking	.824	-.019	.493
	(3) Experimenting	.497	-.057	.687
	(4) Reflection	8.21	.436	.001**
	(5) Flexibility	4.42	.268	.013*
2	(6) Feedback Seeking	2.84	.254	.058
	(7) Knowledge Seeking	.855	.093	.477
	(8) Experimenting	1.84	.082	.166
	(9) Reflection	5.54	.327	.005**
	(10) Flexibility	4.43	.268	.013*
3	(11) Feedback Seeking	3.28	.196	.037*
	(12) Knowledge Seeking	2.22	.116	.110
	(13) Experimenting	2.04	.436	.134
	(14) Reflection	3.64	.220	.026*
	(15) Flexibility	1.41	.042	.263

Note. n=29.
F=F test statistic; *Adj. R²* = Adjusted R². *p*=p-value. Degrees of Freedom = 25. Force entry method.
Each outcome variable (Feedback Seeking, Knowledge Seeking, Experimenting, Reflection, and Flexibility) regressed separately against predictor variables (Managers, Mentors, and Cohort).
** *p* < 0.01. * .01< *p* < 0.05.

4.3.2.2 Hypothesis 2 results: Coefficient estimates

Hypothesis 2 tests if, when, and to what extent participants engaged in *Agile Learning* strategies and behaviours as result of interactions with Managers, Mentors and Cohort. In other words, do some types of *Learning Resources*

influence participants to engage more frequently in particular *Agile Learning* strategies and behaviours than others.

In general, only Managers and Cohort were predictive of *Agile Learning* (Figure 4.6)*.* Participant interactions with Mentors did not predict enhanced participant *Learning Outcomes.* See Appendices J.1–J.5 for the full model and predictor results.
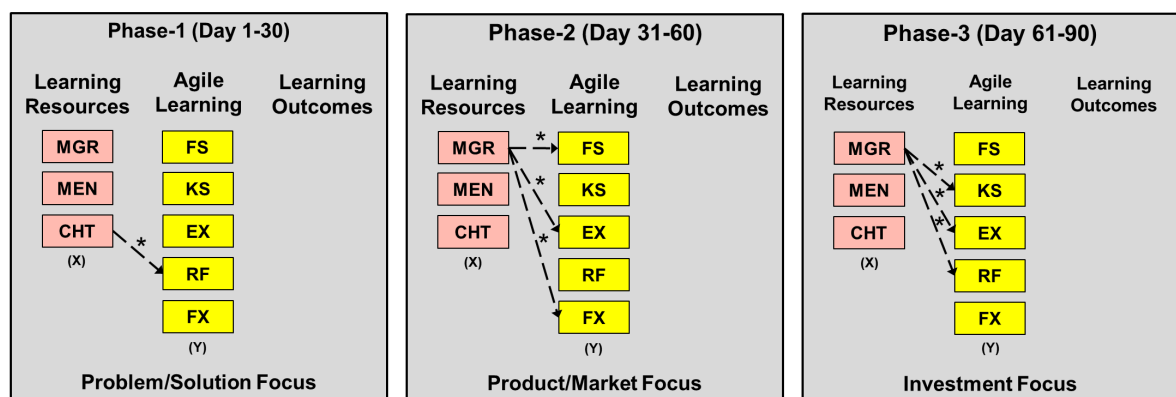
Notes. Positive .01< *p*<.05 * -------→
n=29. Critical values calculated using bootstrap technique, based on 1000 samples with replacement.
□ Outcome variables (Y): FS=Feedback Seeking; KS=Knowledge Seeking; EX=Experimenting; RF=Reflection; FX=Flexibility.
□ Predictor Variables (X): MGR=Manager; MEN=Mentor; CHT=Cohort.
Phase 1: Reflection predicted by Cohort (*b*= .349, t(25)= 2.88, *p*= .035)
Phase 2: Feedback Seeking predicted by Managers; (*b*= .406, t(25)= 2.07, *p*= .038); Experimenting predicted by Managers (*b*= .277, t(25)= 2.19, *p*= .040); Flexibility predicted by Managers (*b*= .342, t(25)= 2.81, *p*= .024).
Phase 3: Knowledge Seeking predicted by Managers (*b*= .251, t(25)= 2.08, *p*= .034); Experimenting predicted by Managers (*b*= .188, t(25)= 1.94, *p*= .041); Reflection predicted by Managers (*b*= .242, t(25)= 2.02, *p*= .042).

Figure 4.6. Hypothesis 2: Composite graphic of collective results generated from 15 separate robust multiple linear regression tests for Agile Learning by phase.

Hypothesis 2 - Agile learning regression results: Predictors for feedback seeking

An assumption at the outset of the research was that participants would take the initiative for their learning. Moreover, they would use Feedback Seeking as a learning strategy. An example survey question from the five-item Feedback Seeking scale is:

Below you will find a list of behaviours that people perform at work. Thinking back over the past 30 days, please consider how often you have engaged in each behaviour while working in the accelerator - Directly ask others for their thoughts on how I can improve my performance.

The predictors in each regression model were examined to determine the extent participant interactions with Managers, Mentors and Cohort (while holding others constant) increased the frequency of participant engagement in Feedback Seeking.

The regression model was identified as statistically significant (p=0.037) during Phase 3 (see Table 4.5). When controlling for all of the other independent variables, the sole significant predictor of Feedback Seeking was Managers (Figure 4.6). This relationship occurred during Phase 2: (b= 0.406, t(25) = 2.07, p = 0.038). This result may suggest that the close physical proximity of Managers increased their accessibility to participants. Consequently, participants perceived them as a source for regular feedback. Notably, participant interactions with Mentors and Cohort did not predict Feedback Seeking. This set of findings was unexpected, especially for Phase 1 when participants meet intensely and extensively with accelerator Mentors to gain feedback on issues they face. Unlike the intensive mentoring participants receive at the start of the programme, during the middle phase participants act with higher levels of autonomy. Thus, this result may suggest that, in the absence of regular mentoring, participants turned to Managers for feedback on their learning and performance.

Hypothesis 2 – Agile learning regression results: Predictors for knowledge seeking

It is likely that a core reason many participants apply to accelerators is to gain access to knowledge they lack. However, the fast pace of the accelerator may suggest participants can only do so if they seek knowledge in active ways. For

instance, reading books and blogs to gain new knowledge and asking others how to do things. A prior assumption was that participants would perceive Managers, Mentors and Cohort as an important source for the desired knowledge. Thus, the predictors in each regression model tested whether participant interactions with Managers, Mentors and Cohort (while controlling for others), increased their frequency of engagement in Knowledge Seeking learning strategies and behaviours. An example survey question from the four-item Knowledge Seeking scale is:

> Below you will find a list of behaviours that people perform at work. Thinking back over the past 30 days, please consider how often you have engaged in each behaviour while working in the accelerator –Collect data to increase my knowledge, evaluate my progress, and inform my next steps.

In general, the model for Knowledge Seeking indicated a poor fit for the data in all three phases (Table 4.5). However, as Figure 4.6 indicates, Managers demonstrated a unique predictive effect (while controlling for others) on Knowledge Seeking in Phase-3 (b=0.251, t(25) = 2.08, p =0.034). This finding makes both intuitive and theoretical sense because Managers work on-site with participants throughout the accelerator. Thus, these individuals would appear to be an easy source for just-in-time knowledge, especially during Phase 3 as the programme nears its end. All other variables were non-significant predictors of Knowledge Seeking.

Hypothesis 2 – Agile learning regression results: Predictors for experimenting

Experimentation is a common learning strategy for start-up entrepreneurs (Blank, 2013, Ries, 2011). This research assumes a willingness and ability to learn through experimentation would be especially valuable in fast-paced learning environments like accelerators. Experimenting may increase the speed to which

teams receive feedback for further decision-making which would reduce some of the negative impact of time-boundedness. For instance, participants may, as is common in agile software development, design a series of small-scale experiments that are quick to organise, execute and assess. Feedback from experiments may inform the development of prototypes which can be examined by users.

Managers, Mentors and Cohort were assumed to be sources of inspiration for learning experiments. Therefore, the regression model was designed to test if participant interactions with Managers, Mentors and Cohort (while holding others constant) prompted participants to engage frequently in Experimenting as a learning strategy. An example survey question from the nine-item Experimenting scale is:

> Below you will find a list of behaviours that people perform at work. Thinking back over the past 30 days, please consider how often you have engaged in each behaviour while working in the accelerator – Try different approaches to see which one generates the best results.

The regression model for Experimenting did not prove a good fit for the data (Table 4.5). However, as Figure 4.6 indicates, Managers demonstrated a strong predictive effect on Experimenting during Phase 2 (b=0.277, $t(25) = 2.19$, p=0.040) and Phase 3 (b=0.188 , $t(25) = 1.94$, p=0.041).Taken together, this may suggest that when there were no clear answers and predetermined solutions when the pace of the accelerator programme picked up (day 31–90), participants needed to try a variety of things in order to learn the best way forward. Furthermore, they perceived Managers as a helpful resource when doing so.

Hypothesis 2 – Agile learning regression results: Predictors for reflection

Research suggests one way entrepreneurs learn from experience is by engaging in reflective processes (Cope, 2001, 2005; Rae, 2004). However, engaging in reflection takes time and time is a precious commodity in accelerators. Thus, participants may place more focus on other action-oriented processes. However, some interpersonal interactions may prompt participants to engage more frequently in reflective learning practices. For instance, participants may observe how another team approaches a challenge and then reflect on how the approach may work for their team.

The regression model for Hypothesis 2 (Reflection) considers the extent participant interactions with Managers, Mentors and Cohort demonstrates the frequency of participant engagement in reflective learning practices. An example survey question from the nine-item Reflection scale is:

> Below you will find a list of behaviours that people perform at
> work. Thinking back over the past 30 days, please consider
> how often you have engaged in each behaviour while working
> in the accelerator – Consider the reasons for and
> consequences of my actions or recent events.

The regression model for Reflection (see Table 4.5) appears a good fit for the data as it demonstrated statistically significant p-values in all three phases (Phase 1, $p=0.001$; Phase 2, $p=0.005$; Phase 3, $p=0.026$). When controlling for others, both Managers and Cohort demonstrated a unique predictive effect on Reflection (Figure 4.6). During Phase 1, participant engagement in Reflection was predicted by the amount of learning participants extracted from interactions with the Cohort ($b= 0.349$, $t(25) = 2.88$, $p =0.035$). A possible interpretation of this result is that accelerator participants used interactions with their peers (interpersonal and observational) to help make sense of the events and experiences during the early portion of the accelerator programme. During Phase

3, Managers demonstrated a predictive effect on Reflection (b=0.242, t(25) = 2.02, p =0.042). This finding may suggest Managers provided options not answers such that participants needed to engage in reflection to makes sense of, understand and then act on feedback they received.

Hypothesis 2 – Agile learning regression results: Predictors of flexibility

Accelerator participants face different learning and business development tasks at different points of time throughout the programme. Prior experiences may be beneficial for participant learning. However, learning strategies which produce success, or failure, in one context or situation may not do so in others (Lombardo & Eichinger, 2000; McCall et al., 1988). In dynamic learning contexts like accelerators, participants who are willing and able to try new strategies for learning and to give up those less appropriate may respond better when faced with challenging events and experiences (Mitchinson & Morris, 2014). From a learning agility perspective, flexibility means being fast and nimble in thought and action (DeRue et. al., 2012). For instance, participants who demonstrate a high level of Flexibility will consider different perspectives and options, react well to the unexpected and work quickly to develop innovative solutions (Mitchinson et al., 2012a).

Hypothesis 2 (Flexibility) tests if, and when, participant interactions with accelerator *Learning Resources* prompted a higher frequency of engagement in flexible learning strategies. An example survey question from the ten-item Flexibility scale is:

> Below you will find a list of behaviours that can describe how people perform their work. Please evaluate how well each statement describes how you engaged in your <u>work</u> during the <u>past 30</u> days at the accelerator – Switch between different tasks or jobs as needed.

The regression model for Flexibility (Table 4.5) demonstrated a relatively good fit for the data in both Phase 1 (p=0.013) and Phase 2 (p=0.013). Figure 4.5 indicates that when considering the unique effect of each variable on Flexibility (while controlling for others), the only statistically significant predictor was Managers (Phase 2, b=0.342, t(25) = 2.81, p=0.024).

Accelerators promote experiential learning concepts, such as lean start-up (Reis, 2011). The core premise underpinning this concept is learning (good or bad) in one instance can inform in others. An a priori assumption was that participant interactions with accelerator Managers, Mentors and Cohort would help participants to engage more frequently in flexible learning strategies. Thus, it was unexpected to identify only one significant predictor.

Hypothesis 2 – Overview of regression results

Hypothesis 2 investigated the relationships between accelerator *Learning Resources* and *Agile Learning* through the application of robust correlation and regression techniques. The findings contribute, in part, to answering the two research questions: 'How do Accelerators influence participant learning and development?' and 'What does learning agility theory add, if anything, to our understanding of participant learning and development in accelerators?'

Taken together, the results provide partial support for Hypothesis 2 as evidenced by (a) 42% of the correlations tested demonstrated positive, statistically significant, bivariate associations at a 0.05 level; (b) 40% of the regression models tested demonstrated statistical significance at a 0.05 level; and (c) when testing for unique predictive effects (and controlling for others) Cohort predicted Reflection (Phase 1); Managers predicted Feedback Seeking, Experimenting and Flexibility (Phase 2); and Managers predicted Knowledge Seeking, Experimenting and Reflection (Phase 3). Notably, a unique predictive effect

between Mentors and each *Agile Learning* variable was not present in any phase.

Cohort predicted Reflection during Phase 1 (p =0.042). A plausible explanation is that participants reflected frequently on peer interactions, both formal and informal, as a strategy to help make sense of their learning experience. Managers appeared to play an influential role in participant learning as participants progressed through the accelerator. A possible explanation for this set of findings is that Managers provided an accessible and useful resource for supporting just-in-time learning.

Mentorship features heavily in the accelerator programme logic. Thus, the lack of a predictive relationship between Mentors and each *Agile Learning* variable was unexpected and suggests a need for further research with other samples and other methods. The next section provides the results for Hypothesis 3.

4.4 Hypothesis 3 – Agile Learning Positively Predicts Learning Outcomes

Hypothesis 3 states that the frequency of participant engagement in *Agile Learning* strategies and behaviours positively predicts enhanced participant *Learning Outcomes* (Table 4.1). The reported results and interpretations aim to answer, in part, the second research question which is: 'What does learning agility theory add, if anything, to our understanding of participant learning and development in accelerators?'

In general, accelerators are characterised as dynamic, fast-paced, high-stakes and novel learning environments. It is likely that learning the right things, the right way and at the right time enhances the *Learning Outcomes* for participants.

However, this may be difficult to accomplish in an accelerator because of the time-bound programme schedule.

An assumption underpinning Hypothesis 3 is that *Learning Outcomes* are influenced by when and with what frequency participants engage in *Agile Learning* strategies and behaviours. For instance, participants are likely to experience enhanced learning and performance if they can quickly and flexibly select, deploy and, when necessary, move between learning strategies and behaviours in response to learning task changes (De Meuse et al., 2010; DeRue et al., 2012; Mitchinson et al., 2012a).

The *Agile Learning* survey items asked participants to indicate their frequency of engagement in five learning agility dimensions (Smith, 2015). The variables are Feedback Seeking, Knowledge Seeking, Experimenting, Reflection and Flexibility. Section 4.4.2 (Hypothesis 2) described each *Agile Learning* variable and gave an example survey item. Participants also responded to *Learning Outcomes* items which aimed to assess, in general, perceptions of enhanced Task and Contextual Performance (Motowidlo, 2003). The four variables are Task, Relational, Adaptive, and Swiftness. Section 4.3.2.2 (Hypothesis 1) described each *Learning Outcomes* variable and gave an example survey item.

Figure 4.7 illustrates the strategy, relationships and time points associated with each test of Hypothesis 3. Both correlation and regression analysis techniques were applied to test Hypothesis 3 at each phase.

Hypothesis 3 states:

> The frequency of participant engagement in *Agile Learning*
> strategies and behaviours (Feedback Seeking, Knowledge
> Seeking, Experimenting, Reflection, and Flexibility) positively
> predicts enhanced participant *Learning Outcomes* (Adaptive,
> Swiftness, Relational, and Task).
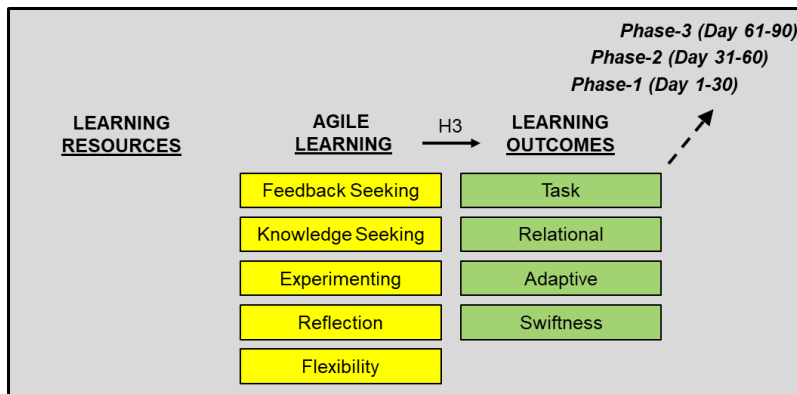
Figure 4.7. Aspects of research model tested by Hypothesis 3.

The next section presents correlation results for Hypothesis 3. Full results for the
analyses are available in the Appendices H.1-3 & K.1–K.4).

4.4.1 Hypothesis 3 results: Correlation

A robust two-tailed Pearson correlation technique was applied to test Hypothesis
3 (Field, 2013). In general, the observed bivariate correlations were positive and
moderate to strong in strength (Table 4.6). Thirteen relationships were
statistically significant at a $p<0.01$ level (Orange). Twelve were statistically
significant at a $0.01<p<0.05$ level (Grey). Moreover, thirty-five relationships were
non-significant (White).

Key Findings for correlations

At Phase 1, all *Agile Learning* behaviour, except Experimenting demonstrated a statistically significant relationship with at least one *Learning Outcomes* measure. During Phase 2, the number of the significant relationship was nearly double those observed in Phase 1. In Phase 3, the number of relationships demonstrating a statistically significant relationship decreased from Phase 2 results. These results suggest that participants engaged more frequently in *Agile Learning* strategies and behaviours during Phase 2 than in either Phase 1 or 3 and that this increased engagement was related to moderate to strong increases in participant perceptions of enhanced performance (*Learning Outcomes*).

Table 4.6.

Summary of Bivariate Correlation Coefficients for Hypothesis 3.

	Task			Relational			Adaptive			Swiftness		
	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
Feedback Seeking	.17	.44	.28	.05	.38	.37	.35	.53	.58	.05	.25	.30
Knowledge Seeking	.37	.21	.30	.20	.09	.28	.29	.28	.41	.28	.26	.47
Experimenting	.10	.27	.31	-.08	.12	.36	.14	.19	.36	-.03	.24	.32
Reflection	.31	.49	.35	.24	.38	.36	.53	.56	.58	.33	.50	.27
Flexibility	.49	.63	.44	.49	.37	.50	.37	.43	.53	.41	.60	.39

Note. n=29. Data summary generated from results of 2-tailed Pearson correlations. Critical values calculated using a bootstrap technique based on 1000 samples with replacement. Twenty-seven degrees of freedom.
Learning Outcomes variables (X-axis); Agile Learning variables (X-axis).
P1=Phase-1 (day 1-30). P2=Phase-2 (day 31-60). P3=Phase-3 (day 61-90).

p<.01	*.01<p<*	*p>*.05=

At each phase, a statistically significant, positive relationship existed between all four *Learning Outcomes* variables and Flexibility. With each additional unit of Flexibility, participant perceptions of enhanced performance increased in each of the three phases (Task, Relational, Adaptive and Swiftness). There were also

two unexpected findings. A central premise of lean start-up practice is learning through experimentation (Maurya, 2012; Reis, 2011). Thus, it was unexpected to find, in all three phases, a lack of statistically significant relationships between the *Learning Outcomes* variables and Experimenting. It had been assumed accelerator participants joined accelerators to gain access to knowledge. Therefore, it was also unexpected to find only three statistically significant, bivariate correlations between Knowledge Seeking and participant perceptions of enhanced performance (Task, Adaptive and Swiftness). The next section presents the regression results for Hypothesis 3.

4.4.2 Hypothesis 3 results: Multiple regression

This section further explores Hypothesis 3 by testing, through robust multiple linear regression analyses, the predictive effect – collectively and uniquely – the *Agile Learning* variables exerted on each *Learning Outcomes* variable.

4.4.2.1 Hypothesis 3 results: Regression models

Table 4.7 highlights statistically significant model-level results from the twelve regression models developed to test Hypothesis 3. Appendices K.1–K.4 provide full results.

As noted (Table 4.7), five of the twelve regression models demonstrated statistical significance (5% level). Several models explain a lot of the variance observed in Task, Relational, Adaptive and Swiftness (lines 5, 6, 7, 8 and 11). For instance, Feedback Seeking, Knowledge Seeking, Experimenting, Reflection and Flexibility account for approximately 25–50% of the variance observed in the *Learning Outcomes* variables in Phase 2 (Adj. R^2 0.263–0.517). As evidenced by 41% of the models tested demonstrating statistical significance (5% level), the

results suggest the theoretically informed regression models reflect a moderately good fit for the data. The next section presents coefficient estimates for the effect of each *Agile Learning* variable on the *Learning Outcomes* variables.

Table 4.7.

Summary of Multiple Regression Models for Hypothesis 3.

Phase	Learning Outcomes (Y)	F	Adj. R^2	p
1	(1) Task	2.04	.156	.111
1	(2) Relational	2.29	.187	.079
1	(3) Adaptive	2.53	.215	.058
1	(4) Swiftness	.296	.142	.128
2	(5) Task	7.00	.517	.001**
2	(6) Relational	2.99	.263	.032*
2	(7) Adaptive	6.14	.479	.001**
2	(8) Swiftness	5.49	.445	.002**
3	(9) Task	1.24	.041	.322
3	(10) Relational	1.88	.136	.137
3	(11) Adaptive	4.32	.372	.006**
3	(12) Swiftness	1.73	.116	.167

Note. n=29.
F=F test statistic; *Adj. R^2* = Adjusted R^2. *p*=p-value. Degrees of Freedom = 23. Force entry method.
Each outcome variable (Task, Relational, Adaptive, and Swiftness) regressed separately against predictor variables (Feedback Seeking, Knowledge Seeking, Experimenting, Reflection, and Flexibility).
** $p < 0.01$. * $.01 < p < 0.05$.

4.4.2.2 Hypothesis 3 results: Coefficient estimates

Hypothesis 3 tested if, when, and to what extent participants engagement in *Agile Learning* strategies (Feedback Seeking, Knowledge Seeking, Experimenting, Reflection, and Flexibility) predicted (when controlling for others) participant perceptions of enhanced *Learning Outcomes* (Task, Relational, Adaptive, and Swiftness). Figure 4.8 provides a visual overview of the results of Hypothesis 3. Notably, participants experienced an enhanced ability to adapt to changing requirements (Adaptive) by engaging in Reflection and a decreased

ability to adapt to changing requirements by using Experimenting as a learning strategy. Support and interpretation of these results follow in the next sections. See the Appendices K.1–K.4 for full results.

Notes. Positive *p*<.01 ** ⟶   .01< *p*<.05 * – – –▸   *p*<.05 * – – –▸
n=29. Critical values obtained using bootstrap multiple linear regression technique, based on 1000 experiments with replacement.
▢ Outcome variables (Y): TK=Task; RL=Relational; AD=Adaptive; SW=Swiftness.
▢ Predictor Variables (X): FS=Feedback Seeking; KS=Knowledge Seeking; EX=Experimenting; RF=Reflection; FX=Flexibility.
Phase 2: Task predicted by Flexibility (*b*= .860, t(25) = 3.67, *p*=.013); Adaptive predicted by Experimenting (*b*= -1.01, t(25)= -2.50, *p*=.032); Adaptive predicted by Reflection (*b*= 1.43, t(25)=3.34, *p*=.028). Swiftness predicted by Flexibility (*b*= .784, t(25)= 3.36, *p*=.004).

Figure 4.8. Hypothesis 3: Composite graphic of collective results generated from 15 separate robust multiple linear regression tests for Learning Outcomes by phase.

Hypothesis 3 regression results: Predictors - Task

Task, a *Learning Outcomes* variable, was included to assess the extent to which participants felt they had improved in their ability to meet business requirements in the accelerator. An assumption at the outset was that some learning strategies – for example, Knowledge Seeking – more than others, would be uniquely predictive of enhanced Task Performance.

During Phase 2, the regression model for Task (Table 4.7) was statistically significant (*p*=0.001). As indicated by Figure 4.7, during Phase 2, having a flexible learning strategy (Flexibility) was a strong positive predictor of enhanced Task performance (Phase 2, (*b*= 0.860, *t*(23) = 3.37, *p* =0.013). This finding

suggests that knowing when and how to shift between thought and action, and vice versa, is helpful for overall Task performance. See the Appendix K.1 for full results.

Hypothesis 3 regression results: Predictors – Relational

Relational, a *Learning Outcomes* variable, was included to assess the extent to which participants felt they experienced enhanced interpersonal relationships. Accelerators are highly social learning contexts. An assumption underpinning regression tests for Relational was that participants need to maintain high-quality relationships and that their selection and engagement in specific *Agile Learning* strategies may influence interpersonal outcomes.

The regression model for Relational (Table 4.7) was significant (0.05 level) during Phase 2 (p=0.032). However, the *Agile Learning* variables were not significantly unique predictors of participant perceptions of enhanced Relational performance (Figure 4.8). This set of results was not anticipated because it was assumed elements of the accelerator programme design (mentoring and co-located workspaces) would prompt participants to engage frequently with others. Furthermore, engagement in some *Agile Learning* strategies and behaviours (e.g., Feedback Seeking) would enhance interpersonal relationships. See Appendix K.2 for full results.

Hypothesis 3 regression results: Predictors – Adaptive

Contemporary business development practices for start-ups (e.g., Lean Canvas) advocate for entrepreneurs to remain nimble and responsive to changes in the business environment rather than building businesses from a preformed plan (Osterwalder & Pigneur, 2010; Reis, 2011). Accelerators commonly ascribe to and teach these concepts and practices. The *Learning Outcomes* variable. Adaptive assessed the extent participants became better at adapting to meet

changing business requirements. Adaptive was regressed against the five *Agile Learning* variables to identify if, when, and to what extent specific learning strategies influenced this *Learning Outcome*.

The regression model for Adaptive (Table 4.7*)* was statistically significant in Phase 2 (*p*=0.001) and Phase 3 (*p*=0.006). Figure 4.8 illustrates expected and unexpected findings. During Phase 2, Adaptive was negatively predicted by Experimenting ($t(23)$ = -2.50, p = 0.032) suggesting every one unit increase in Experimenting behaviour, participants' ability to adapt to changing business requirements went down at nearly the same ratio (b= - 1.01). By contrast Adaptive was positively predicted by increased frequency of participant engagement in Reflection ($t(23)$ = 3.34, p =0.028). With each one unit increase in Reflection, the Adaptive variable increased by 1.43 units (b= 1.43).

The observed positive predictive relationship between Reflection and Adaptive aligns conceptually with learning agility theory. For example, reflective practices may help participants see and consider other possibilities before acting. The observed negative predictive relationship between Experimenting and Adaptive is harder to explain. Possibly, participants perceive learning by experimentation as a time-intensive endeavour. For example, experiments take time to scope, plan, conduct and assess. Thus, a possible explanation for this unexpected finding is that participants felt 'locked in' when they committed to a set of experiments. In other words, they were less able to adapt in response to changes until they knew the results of each experiment. See the Appendix K.3 for full results.

Hypothesis 3 regression results: Predictors – Swiftness

As accelerators are time-bound learning contexts, one research assumption was that participants benefit by working quickly and efficiently towards known business development tasks (e.g., ordering supplies). Swiftness was regressed

on the five *Agile Learning* variables to test which learning strategies were most predictive of becoming faster at meeting known business requirements and at what point did this happen.

The regression model for Swiftness (Table 4.7) was statistically significant during Phase 2 (p=0.002). As indicated in Figure 4.8, Flexibility predicted Swiftness in Phase 2 (b= 0.784, t(23) = 3.36, p =0.004). Intuitively, remaining open to alternate ideas and new ways of working slows forward progress. Thus, this result is counter- intuitive as it suggests that for each one unit of increased engagement in Flexibility participants experienced a near 80% increase in their ability to deliver on known tasks (Swiftness). Compared to relying on prior experiences as a strategy for speed, participants may have found faster ways of doing things by remaining open to and exploring different ideas and ways of doing things. See Appendix K.4 for full results.

Hypothesis 3 – Overview of regression results

The findings contribute, in part, to answering the second research question by exploring how learning agility theory adds to our understanding of participant learning and development in accelerators. Firstly, Hypothesis 3 is partially supported by 25 of 60 possible bivariate relationships demonstrating significance at a 0.05 level. Secondly, five of the twelve regression models demonstrated statistical significance at a 0.05 level. Thirdly, the findings identify Reflection and Flexibility as significant predictors (0.05 level) of enhanced participant *Learning Outcomes* (Task, Adaptive, and Swiftness)*.* Lastly, they identify conflicting findings. Specifically, Adaptive was positively predicted by participant engagement in Reflection and negatively predicted by Experimenting*.*

In sum, the results suggest the *Agile Learning* measures expressed a limited predictive role in *Learning Outcomes.* This set of findings was unanticipated. A plausible explanation for the lack of alignment between assumptions and outcomes is that the learning context is highly nuanced. Thus, participants may

move between strategies and behaviours frequently making it difficult to parse the participant learning experience into discrete units of measurement. The next section offers a summary of results and limitations for Hypotheses 1–3.

4.4.3 Hypotheses 1–3: Summary

Robust correlation and multiple linear regression techniques were applied to test Hypotheses 1–3. Each relationship was tested for each phase (x3). The results indicated partial support for all three Hypotheses.

For Hypothesis 1, a total of 28 bivariate correlations, out of 36 possible pairings, were significant (77%) (Table 4.2). A separate multiple linear regression was calculated to predict each Learning Outcomes measure based on participant interactions with Managers, Mentors, and Cohort. A significant regression equation was found for 11 out of 12 multiple linear regression models tested (92%) (Table 4.8). Managers positively predicted Task in Phase 2. Cohort positively predicted Task and Relational in Phase 3, and positively predicted Adaptive in all three phases. Contrary to expectations, Mentors predicted nothing (Figure 4.4).

For Hypothesis 2, a total of 19 bivariate correlations, out of 45 possible pairings, were significant (42%) (Table 4.4). A series of multiple linear regression analyses were performed to investigate, separately, the relationships between each Agile Learning measure based on participant interactions with Managers, Mentors, and Cohort. A significant regression equation was found for 6 out of 15 multiple linear regression models tested (42%) (Table 4.8). Managers positively predicted Task in Phase 2. Cohort positively predicted Task and Relational in Phase 3, and positively predicted Adaptive in all three phases. Contrary to expectations, Mentors predicted nothing (Figure 4.6). Participant interactions with Cohort positively predicted Reflection in Phase 1. Again, Mentors predicted nothing.

Table 4.8.

Summary of Support for Hypotheses 1–3 as Derived from Multiple Linear Regression Model Results at a 0.05 Level of Statistical Significance.

Predictor Variables	Outcome Variable	P1	P2	P3
Hypothesis 1 [a]				
Managers (x^1)	Task (y^1)	Supported	Supported	Supported
Mentors (x^2)	Relational (y^2)	Supported	Supported	Supported
Cohort (x^3)	Adaptive (y^3)	Supported	Supported	Supported
	Swiftness (y^4)	Supported	Not supported	Supported
Hypothesis 2 [b]				
Managers (x^1)	Feedback Seeking (y^5)	Not supported	Not supported	Not supported
Mentors (x^2)	Knowledge Seeking (y^6)	Not supported	Not supported	Supported
Cohort (x^3)	Experimenting (y^7)	Not supported	Not supported	Supported
	Reflection (y^8)	Supported	Supported	Not supported
	Flexibility (y^9)	Supported	Supported	Supported
Hypothesis 3 [cd]				
Feedback Seeking (x^5)	Task (y^1)	Not supported	Supported	Not supported
Knowledge Seeking (x^6)	Relational (y^2)	Not supported	Supported	Not supported
Experimenting (x^7)	Adaptive (y^3)	Not supported	Supported	Not supported
Reflection (x^8)	Swiftness (y^4)	Not supported	Supported	Supported
Flexibility (x^9)				

Supported = ☐ (green)   Not supported = ☐ (orange)

Note. Source = author's calculations. *n*=29 for all tests.
[a] Hypothesis 1: Participant interactions with Learning Resources positively predicts Learning Outcomes.
[b] Hypothesis 2: Participant interactions with Learning Resources positively predicts Agile Learning.
[c] Hypothesis 3: Participant engagement in Agile Learning positively predicts Learning Outcomes
[d] X^4 omitted purposefully from this presentation to numerically align predictor and outcome variables for Agile Learning variables

For Hypothesis 3, a total of 25 bivariate correlations, out of 60 possible pairings, were significant (42%) (Table 4.6). A separate multiple linear regression was calculated to predict each Learning Outcomes measure based on the frequency of participant engagement in Feedback Seeking, Knowledge Seeking, Experimenting, Reflection and Flexibility. Out of the 12 multiple linear regression models tested, five were significant (42%) (Table 4.8). Both expected and unexpected findings were identified for the coefficients. Experimenting negatively predicted Adaptive in Phase 2, and Reflection positively predicted Adaptive in

Phase 2. Flexibility positively predicted both Task and Swiftness in Phase 2. (Figure 4.8).

The next section begins to consider how participants may have experienced the accelerator learning experience differently.

4.5 Hypothesis 4 – Difference Between Funded and Non-funded Teams

Regression results for Hypotheses 1–3 contribute to the understanding of the accelerator learning phenomenon by identifying which accelerator provided *Learning Resources* and personal learning strategies and behaviours influenced participant *Agile Learning* and *Learning Outcomes* the most. Moreover, when these relationships occurred. However, the statistical results do not indicate why participants responded as they did. For instance, why did participants perceive some *Learning Resources* to be more useful than others? Further, did participants from different groups vary in their responses to the survey items?

As teams form an important level of the accelerator learning environment, participants were grouped into either a Funded or Non-funded team category. A team of participants was deemed 'Funded' if, at the end of the programme, the team received investment from sources (e.g., angel investment, venture capital investment, and/or government grant) beyond the initial seed-investment the accelerator provided teams for participating in the programme. Conversely, a team of participants that failed to secure investment at the end of the programme was deemed Non-funded. Grouping teams into one of these two groups made it possible to look for variance in how participants from Funded and Non-funded teams responded to each survey variable which, in part, helped answer Research Questions 1 and 2 (Table 4.1).

Hypothesis 4 states:

> Participants from Funded and Non-funded teams will demonstrate a difference in measures of *Learning Resources* (Managers, Mentors, and Cohort), *Agile Learning* (Feedback Seeking, Knowledge Seeking, Experimenting, Reflection, and Flexibility) and *Learning Outcomes* (Task, Relational, Adaptive, and Swiftness) over the three phases.

Statistical tests were not conducted for Hypothesis 4 because of the small sample of participants (n=29) and the limited number of teams (10). As noted previously, the process for comparing teams entailed grouping participants into teams and then grouping teams by their end-of-programme funding status (Funded and Non-Funded). Comparisons were made by calculating mean participant scores for each *Learning Resource, Agile Learning*, and *Learning Outcomes* measure. The scores for each team were graphed by phase to support the interpretation.

Each survey item contributed toward either a seven-point (low-to-high level of agreement) or a seven-point (low to high frequency of engagement) scale. Scores below a scale's midpoint reflected a lower level of agreement and engagement. Conversely, scores above a scale's midpoint indicated higher levels of each.

The next section provides the key results from this simple comparative analysis. Appendices L.1-L.7 and M.1-M.3 include any results not presented in this section.

Hypothesis 4 results: Comparison of learning resources scores for teams

The three *Learning Resources* measures assessed the extent to which participants perceived their interactions with Managers, Mentors and Cohort as 'hugely' valuable for their learning. Appendix M.1-M.3 provides mean participant scores by team and phase. Appendices L.1–L.7 provide full results for analyses not presented in the next section.

In general, Non-funded and Funded teams indicated Managers exerted a positive influence on their learning. Scores for nearly all teams were all above the mid-point for the Managers measure in all phases. The exception was AROVALLEY (Non-funded). Between Phases 1 and 3, this team demonstrated a nearly three- point decrease in learning from interactions with Managers (Figure 4.9).

Participants from both Non-funded and Funded teams perceived Mentors as useful for learning as indicated by nine teams responding with scores above the midpoint. However, over time, a general downward trend was observed in the mean responses scores from seven of the ten teams (Figure 4.10).

Both groups indicated they valued interactions with their peers (Cohort) as a source for learning (see Appendix L.1).
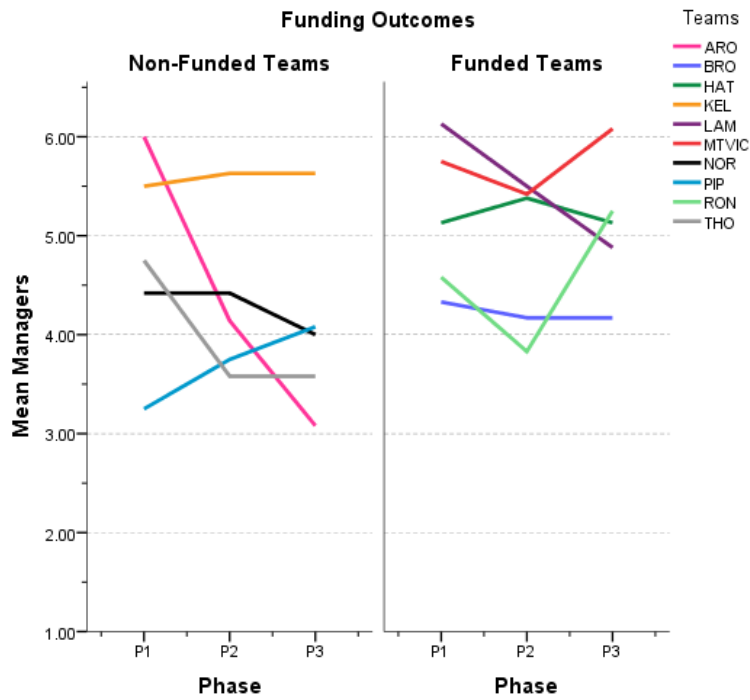
Figure 4.9. Mean participant scores for Managers by phase and end-of-programme funding outcomes for teams.
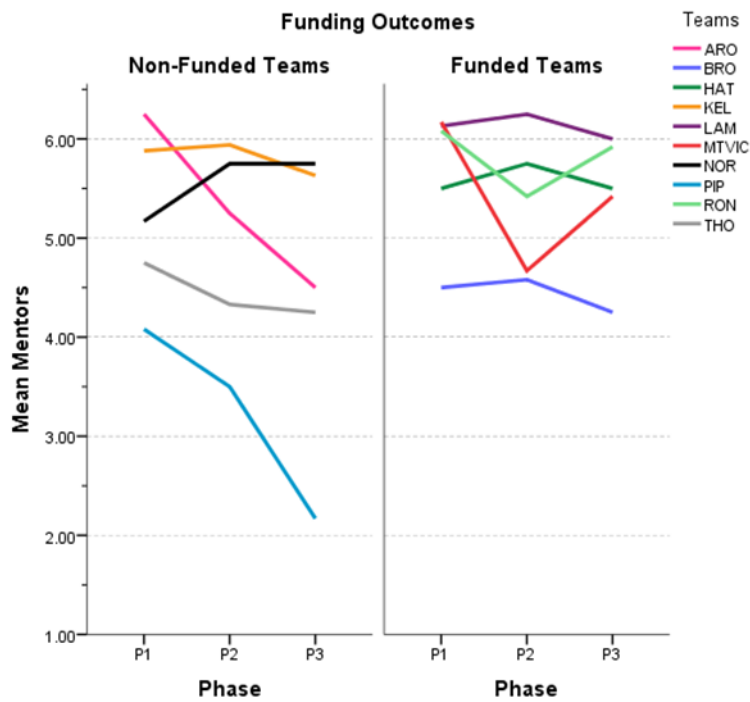
Figure 4.10. Mean participant scores for Mentors by phase and end-of-programme funding outcomes for teams.

Hypothesis 4 results: Comparison of agile learning scores for teams

The five *Agile Learning* variables measured the frequency of participant engagement in strategies and behaviours associated with learning agility. These are Feedback Seeking, Knowledge Seeking, Experimenting, Reflection and Flexibility. A research assumption was that participants would differ in the strategies and behaviours they selected to learn in the accelerator. Moreover, participant survey responses would reflect these differences. For instance, Funded teams may experience more interactions with Mentors during the accelerator than Non-funded teams and engaging more frequently in reflective practices may be necessary to make sense of the higher volumes of feedback received.

Although similar in many ways, Non-funded teams demonstrated a higher frequency of engagement in Feedback Seeking (Figure 4.11). Thus, participants from Non-funded teams may have been less clear about what they were trying to achieve. Thus, they were more apt to ask for assistance than Funded teams. When looking at just Funded teams, the Feedback Seeking patterns demonstrated by the two highest Funded teams were different. Over the three phases, HATAITAI's pattern of Feedback Seeking moved from low to mid to lower. In contrast, LAMBTON engaged more in Feedback Seeking than HATAITAI at the outset and increased their frequency of doing so over time. Although both teams received investment, it remains unknown what factors contributed to the observed differences.
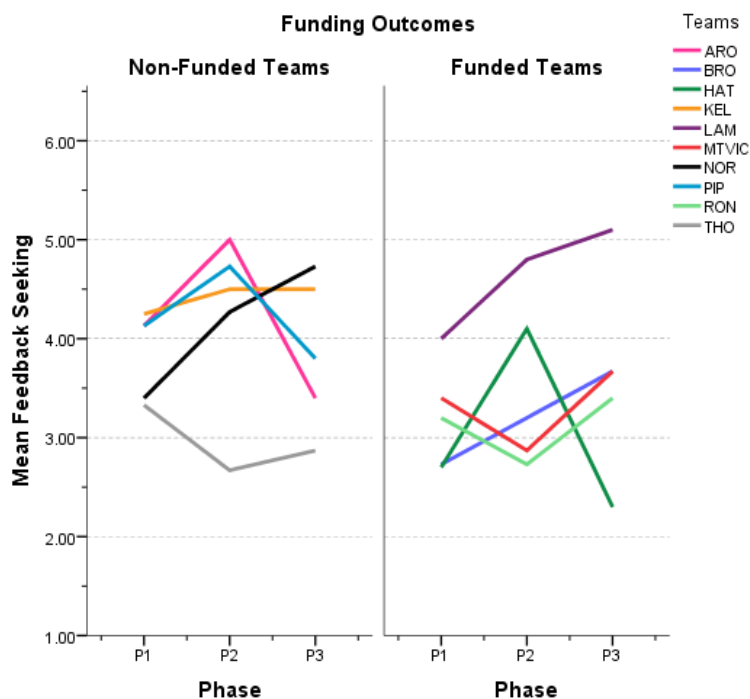
Figure 4.11. Mean participant scores for Feedback Seeking by phase and end-of-programme funding outcomes for teams

All scores were above a mean score of five in all three phases suggesting that both Non-funded and Funded teams demonstrated high engagement in Experimenting (see Appendix L.2). For Knowledge Seeking, both groups remained above the mid-point for all three phases; specifically, eight of the ten teams stayed above a score of five for all three phases (Figure 4.12). The results suggest both groups engaged strategically in Knowledge Seeking behaviour, possibly to fill critical voids in understanding. The two groups of teams exhibited fairly uniform frequencies of engagement in the learning strategies of Reflection and Flexibility.
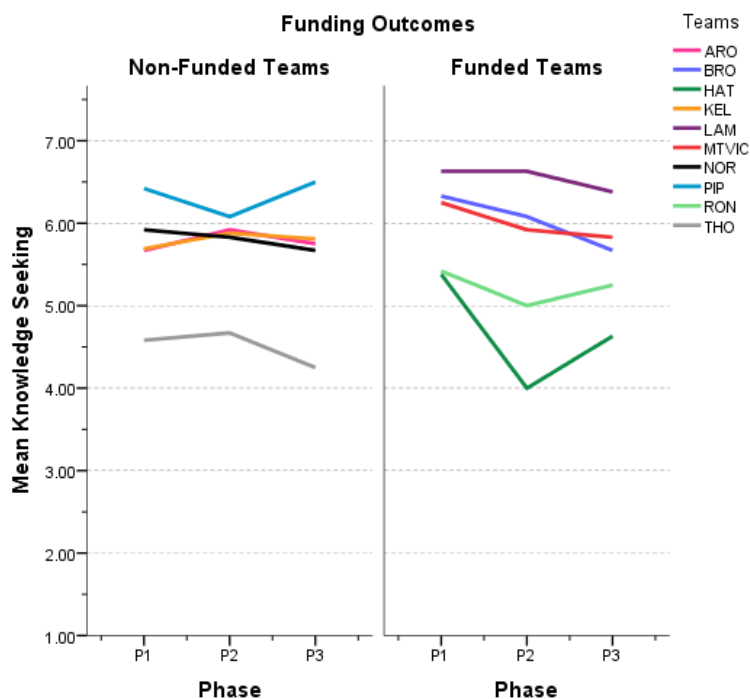
Figure 4.12. Mean participant scores for Knowledge Seeking by phase and end-of-programme funding outcomes for teams.

Hypothesis 4 results: Comparison of learning outcomes scores for teams

The four *Learning Outcomes* variables (Task, Relational, Adaptive, and Swiftness) measured the participants' perceptions of enhanced performance. The comparative analyses of Task, Relational and Swiftness, suggest Non-funded and Funded teams were reasonably consistent in their responses to these measures (See Appendix L.5–L.7). Although scores varied subtly between phases, participants from most Non-funded and Funded teams indicated mid-to-moderate levels of enhanced performance for each dimension.

A few general observations include participants reporting decreased adaptability and a notable lack of uniformity in responses from Non-funded teams (Figure 4.13). Between Phases 2 and 3, 80% of the mean reported scores for Adaptive (both groups) decreased. Only KELBURN and BROOKLYN reported an increase

and each increase was subtle in magnitude. Overall, participants from the Non-Funded teams PIPITEA and THORNDON indicated the lowest perceptions of enhanced performance. The scores for these teams fell primarily below the midpoint of each measure.
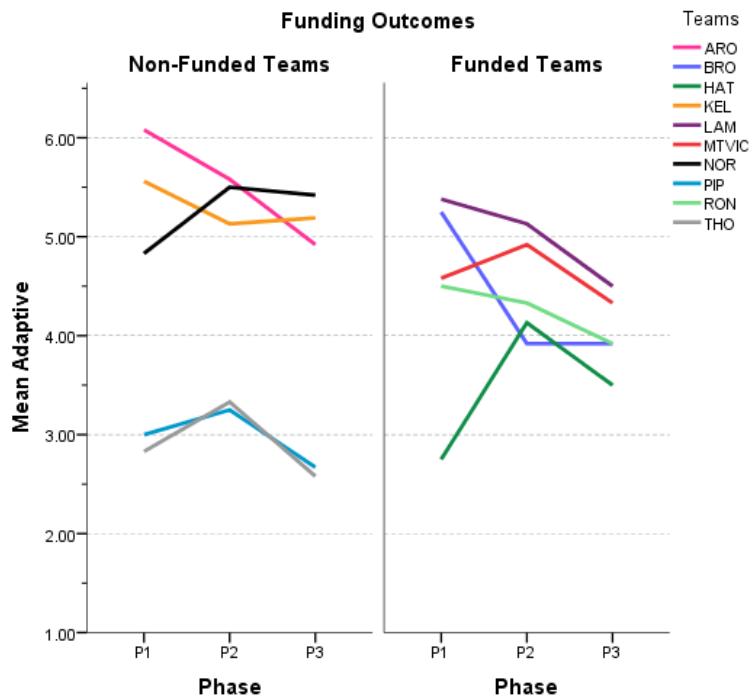
Figure 4.13. Mean participant scores for Adaptive by phase and end-of-programme funding outcomes for teams.

Hypothesis 4 - Overview of results

Taken together, Hypothesis 4 was partially supported. Mean participant scores for Funded and Non-funded teams were plotted and visually assessed for each of the 12 scales. Each plot depicts five Funded and five Non-funded teams across all three phases for a single scale. Of ten teams, two of the negative rankings came from Funded teams and eight from just two of the five Non-funded teams, PIPITEA (5) and THORNDON (3). Interestingly, higher levels of Feedback Seeking were noted for Non-funded teams (Figure 4.11). Although some differences, based on end of programme funding outcomes, were

observed between teams the survey data does not offer insight into why these relationships occurred. Qualitative methods were applied to explore further the survey results. Chapter Five presents findings from two qualitative studies.

4.6 Chapter Summary

Chapter Four presented the findings from Strand 1 of the three-strand quantitative and qualitative mixed methods study (survey, observation, and interview). Strand 1, a multiphase quantitative survey method, occurred during the accelerator. The research incorporated a multilevel research approach to examine participant learning and performance at different levels of the accelerator learning environment (Cohort, Team, and Participant). Strand 1 investigated participant learning and performance though a Cohort lens. Strand 2, an observation method, examined participant learning and performance though a Team lens and Strand 3, an interview method, did the same but through a participant lens. Collectively, findings generated from each strand, and corresponding level, contribute understanding of the sample.

The research prioritized the survey method (Strand 1) because it supported a hypo deductive testing approach. Four hypotheses were examined through tests of association, effect and difference. Each relationship of interest was tested for each phase. The multiphase analysis strategy helped highlight how relationships between variables evolved over time. Both expected and unexpected relationships were identified.

For instance, both Managers and Cohort were positively predictive of participant learning and participant performance. Managers exerted the greatest effects on participant learning, and the observed effects were most prominent during the mid to latter phases of the accelerator programme. Notably, Manager interactions influenced participant engagement in different agile learning strategies and behaviours at different points in the accelerator programme. In

contrast, the Cohort was most predictive of participant performance, and the positive effects of peers on participant performance were observed as consistent throughout the accelerator. Particularly, participant adaptive performance behaviour in participants were positively influenced by their interactions with the Cohort.

Unexpectedly, Mentors failed to demonstrate a predictive effect on both participant learning and participant performance, and this non-effect was observed during all three phases of the accelerator programme. This set of findings is important because it runs counter to accelerator literature which suggests Mentors play a significant and influential role for participant learning in accelerators (Cohen, 2013a; Miller & Bound, 2011).

To help connect and bridge the Cohort and Team level strands of this research, a comparative analysis of mean scores for participants from Funded and Non-funded teams was conducted. Specifically, the team analysis examined the extent to which participants responded similarly to the research measures. The only notable difference between how participants from Funded and Non-funded teams responded was observed for the variable Feedback Seeking. Non-Funded participants sought feedback more than their peers during the middle and later portions of the accelerator programme.

Taken together, the survey findings help answer, in part, the two research questions. The survey research illuminated when the relationships between variables were, or were not, significant. However, the findings do not explain why some relationships occurred and others did not. This is particularly troublesome when considering counter intuitive findings such as the non-effect findings for Mentors. Thus, participant learning and development may be more nuanced than can be explained by a sole survey method. Accordingly, this set of findings is explored further qualitatively. First by examining how participant interactions with

Managers, Mentors and their Cohort of peers influenced participant learning and performance in teams (Strand 2) and individually (Strand 3).

The concepts and measures examined in the survey research and the patterns of relation identified were supplemented and extended by the inclusion of two qualitative methods (Strand 2, Observation and Strand 3, Interview). The next chapter examines participant learning and performance in teams.

Chapter 5 | Qualitative Observation Findings

Chapter Five offers findings from Strand 2 of this three-strand quantitative and qualitative mixed methods study (survey, observation, and interview). The research context for this multilevel study is accelerators and accelerators as learning environments.

Strand 2, a qualitative observation method, occurred during the accelerator and examined participant learning and performance for each team, and for each phase. The research questions investigated are: *How do accelerators influence participant learning and development? - and - What does learning agility theory add, if anything to our understanding of participant learning and development in accelerators?* Figure 5.1 highlights the methodology, method, priority, timing and focus of Strand 2, and its relationships to the other two strands.

Research Design		QUAN Method		Qual Method		Qual Method
Mixed Methods		*Strand 1: Survey Focus: Cohort*		*Strand 2: Observation Focus: Teams*		*Strand 3: Interview Focus: Participants*
		During Accelerator				**Post Accelerator**
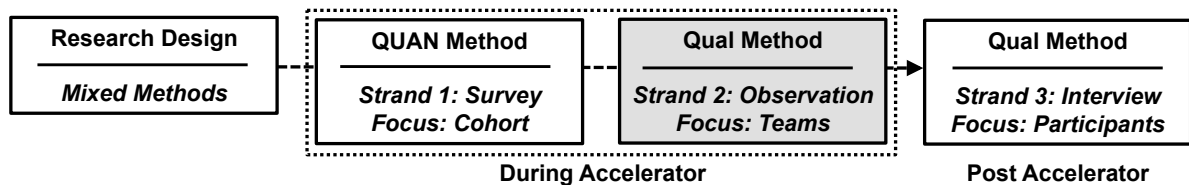
Figure 5.1. Research design, methodology, method, priority, timing and focus of Strand 2.

All three strands of this research employ a theory informed rather than a theory testing approach. The concepts examined during the survey research were pulled forward into the team study to examine how participant learning and performance behaviours, in aggregate, affected the extent teams achieved expected outcomes.

The primary, and secondary, analytic lenses for the observation method draw upon individual performance and learning agility literature. An individual performance lens was applied to examine how participant behaviours influence the team task environment (Task Performance) and the human context where team work is done (Contextual Performance) (Borman & Motowidlo, 1993; Motowidlo et al., 1997). A learning agility lens was also applied to consider how participant learning strategy and behaviour contributes to each in teams, and vice versa (Mitchinson et al, 2012a; Smith, 2015).

The observation method steps the research focus down a level of organisation. Strand 2 moves the study from examining participants as members of the Cohort to participants as members of teams. The choice to focus on participant learning and performance in teams was influenced by several factors. First, teams play a prominent role in accelerator programme logic. For instance, accelerators accept teams of participants not solo participants. Second, research suggests accelerators, and accelerator teams specifically, are social learning environments (Cohen et al., 2019; Levinsohn, 2015). This choice was further supported by Strand 1 survey findings which highlighted the positive effects of Cohort interactions on participant performance behaviors. Third, early observations made by the researcher suggest comparative team functioning was of intense interest to participants, and the unit in which much learning took place. Fourth, publicly available data indicated which team did, or did not, secure investment funding at the end of the accelerator beyond the accelerator provided seed-funding tied to programme participation. The existence of naturally occurring groups facilitated comparison. Lastly, examining learning and performance in teams provided an opportunity for data reduction and enabled comparisons, within teams and between teams, and across time. Taken together, the team observation method was incorporated to supplement enhance understanding of participant learning and performance beyond that which was accessible through the survey method.

Chapter Five begins with a brief review of the quantitative findings and implications for the observation method, site and participants, and methods, data, and analysis strategy associated with the observation method. Then it proceeds to present the observation findings in two parts. First, key findings from an assessment of participant performance by team association and phase are visually and narratively presented. Second, two detailed team narratives are provided to illustrate how personal characteristics and situational factors influenced changes in team learning and performance. Collectively, the qualitative observation findings add explanatory power to the previously presented survey results (Strand 1). The chapter closes with a short summary and interpretation of team learning and performance findings, suggests possible implications, and provides a transition to the participant focused qualitative retrospective interview method.

5.1 Summary of Quantitative Findings and Implications for Observation Method

Chapter 4 presented quantitative survey findings from participant data collected during each accelerator phase. Findings were reported at the Cohort (H1-3) and Team (H4) levels. Respectively, the first three hypotheses examined the relationships between *Learning Resources* and *Learning Outcomes*; *Learning Resources* and *Agile Learning*; and, *Agile Learning* and *Learning Outcomes*. Hypotheses 1-3 were examined through inferential techniques. Hypothesis 4 posited participants from *Funded* and *Non-funded* teams would differ in how they responded to the survey items. Specifically, Hypothesis 4 was investigated descriptively. The findings provide a conceptual bridge between the quantitative cohort focused survey research and the qualitative team focused observation research.

Taken together, results indicated Managers and Cohort were a positive influence for both learning and performance, but Mentors were not; participants engaged in

different *Agile Learning* strategies, at different times and with different levels of effect; and, few differences existed in how participants from Funded and Non-funded teams responded to the survey items. Due to their prominence in accelerator programme logic, the findings for Mentors were unexpected. Similarly, it was unexpected to identify experimenting behaviour exerted a negative effect on participant performance. Further, it was unexpected to not observe more differences in the data relative to how participants from Funded and Non-funded teams responded to the survey measures. This was particularly true because early observations made during the accelerator indicated participants acted differently relative to how they interacted with the accelerator environment and approached learning in the accelerator.

In sum, the survey findings for Hypotheses 1-4 are helpful for answering, in part, 'what' and 'when' dimensions of the research questions because they illustrate patterns of relationship and effect present within the data. However, they do not inform the 'why' or 'how' for these observations. Thus, it remained unknown what personal characteristics and situational factors may have affected the findings. The varied levels of effect between constructs and between phases suggested the need to understand better how the accelerator learning environment, personal characteristics and situational factors affected participant learning and performance. Strand 2 seeks to add qualitatively understanding of participant learning and performance by examining participant learning and performance in teams.

5.2 Review of Observation Site, Participants, Methods, Data and Analysis Strategy

5.2.1 Observation site and participants

The observation method occurred at the same research site associated with Strand 1 survey research (see Section 3.3). All observation data was collected during a single accelerator programme and all data pertains to the cohort of twenty-nine participants associated with that programme. The same twenty-nine

individuals participated in all phases of the survey research, and all strands of the study. Participants were, on average, within an age range of 20-26 years old, male, and university educated.

5.2.2 Methods

In total, the field observation method included five different types of data, and all data was collected during the accelerator. The twenty-nine participants, in conjunction with the three quantitative surveys collected during Strand 1, completed several open-ended qualitative survey questions focused on their learning experience. On two occasions, Managers answered the same questions but from a team level perspective. Thus, they provided responses for each of the teams. Mentors contributed to an electronic feedback log after each team 1:1 meeting they hosted. Consequently, each team has a running record of interactions and insights from Mentors. At the end of each week, the CEO from each team was expected to summarise their team's learning from the week, goals for the next and to identify needed resources (Team Learning Log).

Additionally, throughout the accelerator, the research collected field notes during the same five weekly events (see Figure 3.5). They were (a) the CEO start of the week report; (b) Managers start of the week briefing; (c) weekly all team pitch practice session; (d) 1:1 team meeting with Mentors; and (d) end of the week CEO progress report to the Cohort. Table 3.10 presents an example for each data source (see CH3).

5.2.3 Data and analysis strategy – Observation method

Multiple forms of data were collected, from different respondents and about different teams. Therefore, each dataset was initially processed and prepared independently. Data directly associated with a team (e.g., Mentor Log) and individual participant responses were combined to form a team dataset.

Subsequently, the researcher experimented with different coding (e.g., concept-driven coding and open coding) and analysis techniques (e.g., frequency counts). Ultimately, an efficient and conceptually anchored scheme, inspired by template analysis approaches (Brooks et al., 2015; King, 2014), was employed as it enabled usage of a priori codes. The scheme created conceptually built upon the Task and Contextual Performance dimensions assessed in Strand 1 (Motowildo, 2003).

Task Performance conceptually captures the essence of two implicit and parallel goals for accelerator teams: maintain core technical functions and advance the viability of the venture. To accomplish these goals, participants need to behave in ways that promote a productive and supportive work environment for themselves and others (Contextual Performance). The two sets of behaviors provide an intuitive two axis scheme whereby teams of participants could be identified as demonstrating either high or low levels of each. Moreover, this could be done so by phase. Thus, enabling identification of patterns over time.

Once the scheme was devised, the researcher returned to the data and set aside passages clearly non-related to the identified performance dimensions. After which, 337 segments of qualitative data (26,000+ words) remained. A coding taxonomy from which data was hand coded against, primarily through usage of tables, highlighters, and processes of sorting and re-sorting. Table 5.1 provides an example of the field coding scheme and representative statements for high and low examples of Task and Contextual Performance.

Table 5.1.

Participant Statements Reflective of Task and Contextual Performance.

		High	**Low**
Task Performance	Team possesses needed knowledge, skill, aptitude, resources	There's lots of basic mistakes we've made which in hindsight are so obvious. When I think about it, finding these problems and the answers is actually super exciting. - Team Learning Log (BRO7)	We are struggling to get aligned around goals & products to close the performance gap. - Research Field Note (R1)
	Team meets its own business development benchmarks	This team began working on a completely new idea with only 35 days left of the programme. They were able put together prototypes & learn very quickly - Other-rater Qualitative Survey (MGR7)	They should have listened more closely to their customer development data, instead of trying to look for data points that supported their own hypothesis. Other-rater Qualitative Survey (MGR9)
	Team meets expectations & benchmarks of accelerator	Very good team. Seem the most advanced of all the teams. Have good structures in place. Market is well thought out & seem to have identified a definite problem/pain. - Other-rater Feedback Log (MEN47)	This team appears to have made very little progress while in the lab. I would argue they have made the least of all. I struggle to identify any significant learnings - Other-rater Feedback Log (MGR8)

		High	**Low**
Contextual Performance — Relational	Team interacts with others in ways that support task achievement	We learnt how to communicate more clearly; reconcile our different threads into a (relatively) cohesive story; stay out of abstract land and get into concrete requirements. - Participant Qualitative Survey (RON7)	CFO was really hard going: defensive, arrogant, not willing to listen. I think the dynamics will make this group fall apart quite quickly - Other-rater Feedback Log (MEN16)
Swiftness	Team works quickly to meet known requirements	Wow, these guys are on a roll, growing by 10% per week. They are highly focused on customer acquisition & growth. - Other-rater Feedback Log (MEN32)	A dysfunctional team only gets worse without a concerted effort to improve things. Legal documents never cover all eventualities - Participant Qualitative Survey (THO7)
Adaptive	Team adapts to address changing requirements	Over the past 30 days the team learnt how to be flexible in their roles & recognise when they needed to gain new skills or upskill in a different area to keep the team as whole moving forward. - Other-rater Qualitative Survey (MGR11)	The lead founder was inclined to act like an elastic band & spring back to earlier ideas. - Other-rater Feedback Log (MEN25)

Each week, teams discussed their business development targets with Managers. Accelerator Managers updated a public display board after each meeting. These public proclamations of each team's weekly goals provided a cornerstone for the Task Performance assessment. The assessment of Task Performance was based on stated business objectives, whether longstanding or recently changed. How well participants used their knowledge, skills and abilities to achieve business development benchmarks and expectations associated with the accelerator program influenced the Task Performance assessment. In contrast, Contextual Performance (high/low) was associated with participant behavioural contributions to the social fabric of the team learning and performance environment. For instance, individual differences like values, vision, learning behaviours, communication styles and conflict resolution approaches could influence how well team members work together, or not.

Once the data was coded against the created scheme, patterns of stability and change across time were assessed. For instance, levels of Task and Contextual Performance could vary between phases. The placement (high or low) on the matrices was made possible by examining the frequency of researcher-coded scores, triangulating coded narratives with researcher-generated field notes, and by cross-checking results with two accelerator Managers to corroborate or challenge the preliminary assessment made for each team's Task and Contextual Performance. To do this, each Manager was presented with the coding scheme, example comments, and the draft 2x2 matrices. Subsequent discussion identified a 90% alignment between researcher assessment and Managers assessment. Points of agreement and divergence aided the researcher to make further refinements to the matrices. Findings are presented next.

5.3 Observation Findings

The observation findings include a comparative assessment of participant levels of Task and Contextual Performance by team and phase (2x2 matrices), three short team narratives are offered to support and extend the comparative assessment, and two detailed long form narratives which discuss learning and performance behaviours for both a Funded and a Non-funded team. These findings are presented next.

5.3.1 Participant Task and Contextual Performance by team association

As indicated in Figure 5.2, most teams experienced some degree of change in either their level of Task or Contextual Performance during the accelerator. For instance, six teams experienced changes in their levels of performance. Two ventures demonstrated shifts in their level of Task Performance (PIPITEA, and THORNDON), two experienced shifts in their level of Contextual Performance

(KELBURN and MTVIC), and two teams demonstrated a change in both (AROVALLEY and BROOKLYN).

In contrast, four teams (HATAITAI, LAMBTON, NORTHLAND and RONGOTAI), behaved much the same way on day one as they did at the end. HATAITI and LAMBTON demonstrated consistently high levels of Task and Contextual Performance. NORTHLAND displayed low levels of both Task and Contextual Performance in all phases. RONGOTAI displayed consistently low Task and high Contextual Performance in all phases.
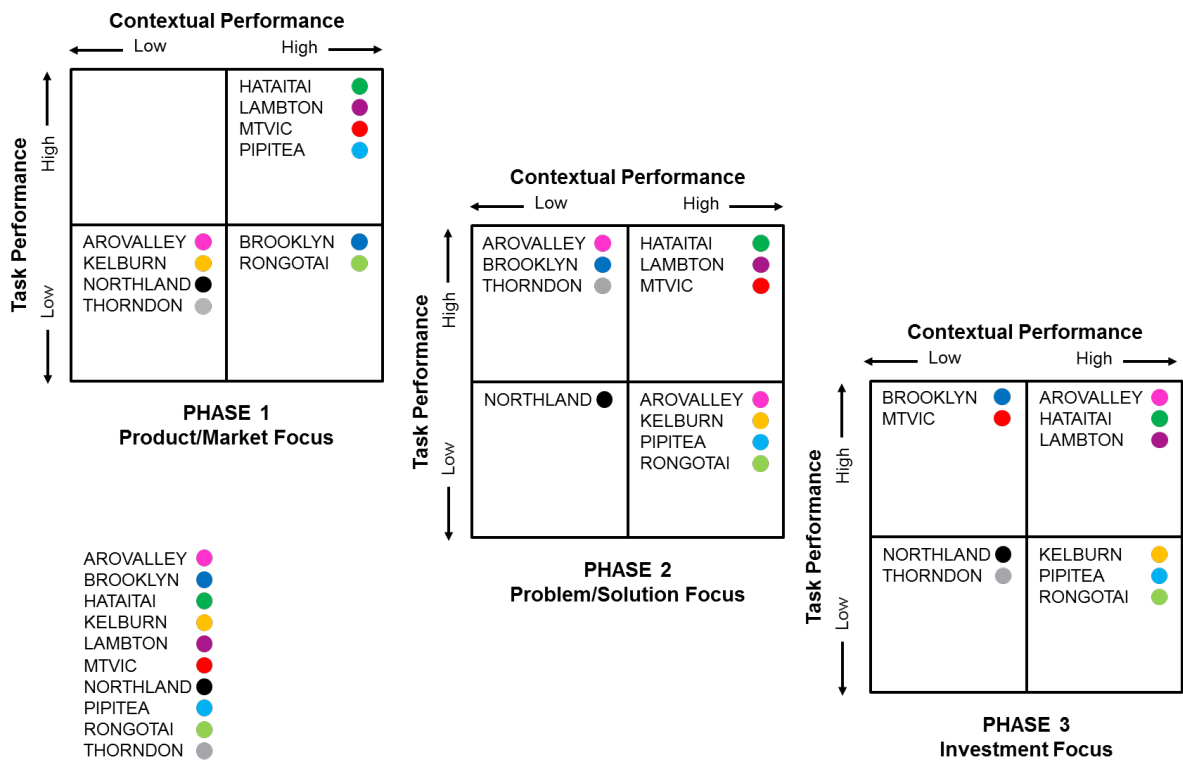
Figure 5.2. Participant levels of task and contextual performance by team and phase.

In contrast, four teams (HATAITAI, LAMBTON, NORTHLAND and RONGOTAI), behaved much the same way on day one as they did at the end. HATAITI and

LAMBTON demonstrated consistently high levels of Task and Contextual Performance. NORTHLAND displayed low levels of both Task and Contextual Performance in all phases. RONGOTAI displayed consistently low Task and high Contextual Performance in all phases.

Although not evident in Figure 5.2 all teams except one (NORTHLAND), changed their business idea at some point during the accelerator. Pivots entailed changes such as retooling aspects of the product to fit better the validated needs of the market which would consume it. In extreme instances, an original business model failed, and teams needed to develop an entirely new business model (e.g., AROVALLEY, KELBURN, RONGATAI). A Mentor feedback log entry points out the need for KELBURN to restart from scratch:

> By the time I spoke with them, their original idea was in tatters. We examined the remnants and didn't find much to work with (MEN19).

Notably, several teams experienced a pivot or restart. Consequently, these changes impacted (positively/negatively) how teams approached achieving objectives. The circumstances and individual responses leading up to a pivot, the pivot, and what occurs after that appeared to influence future actions of team members (Contextual Performance). For instance, a decision made unilaterally by one team member on behalf of a team may result in decreased engagement and action by other team members if they disagree with the decision.

When considering end of the Accelerator outcomes, five of the ten teams received investment funding. As indicated in Figure 5.2, HATAITAI and LAMBTON (Funded) demonstrated high levels of Task and Contextual Performance in all phases. MTVIC (Funded) was high in Task and Contextual Performance during Phase 1 and 2 but experienced a decrease in Contextual Performance in Phase 3.

RONGATAI (Funded) demonstrated high levels of low Task Performance and high Contextual Performance in all phases. The levels of Contextual Performance demonstrated by RONGATAI appeared to influence investor funding decisions; however, the venture failed approximately six months after the accelerator.

Although, BROOKLYN (Funded) demonstrated low Task Performance and high Contextual Performance initially (Phase 1) the magnitude of each flip-flopped during the program. BROOKLYN, a newly formed team, appeared slow to warm up to speed on the Task Performance dimension. As BROOKLYN's founder became more task focused they experienced decreases in their levels of Contextual Performance, in part due to one founder working in a distrusted manner during Phases 2 and 3. Possibly, negative learning and performance behaviours were amplified by not having all team members working from the same place.

Collectively, these findings suggest, regardless of idea quality, positive interpersonal influence end of programme outcomes. High Contextual Performance during Phase-1 appears to matter for end of programme outcomes. Likely, when individuals demonstrate behaviours which inspire trust, support, and commitment in others, a reciprocal effect also at a team level. High levels of Contextual Performance in teams possibly supports participants to feel safe enough to take risks such as experimenting with new ideas and ways of doing things.

Two types of team analysis follow. The first set of team narratives are included to summarise the framework through qualitative examples of a mix of high, medium, and low performance teams. HATAITAI is a successful team that demonstrated consistently high levels of both Task and Contextual Performance. PIPITEA is a team that failed its business model early in the programme (low Task Performance) but successfully transitioned to a new one by demonstrating

consistently high levels of Contextual Performance. NORTHLAND is a team that demonstrated consistently low levels of Task and Contextual Performance.

The second type of team narrative is purposefully more detailed. The team narratives explore what enabled changes in participant levels of Task and Contextual performance and learning agility. The team narratives explore the reciprocal relationship of what participants brought to the experience and what it brought to them, and how the relationships between each influence the selection of strategies for learning and performance. In particular, the essential role teams serve in the learning environment is highlighted in each narrative.

5.3.1.1 HATAITAI: High Task Performance and High Contextual Performance

HATAITAI entered the accelerator as a two-person team. They had a year's worth of experience working on their venture, a developed product, and over 1,400 web designers using their proprietary software to deploy, host and maintain client websites on their servers. Moreover, they demonstrated an attitude of willingness and readiness for maximising the benefits made available to them.

From a Task Performance perspective HATAITAI went from strength to strength as evidenced by a Mentor and Manager comment, each suggesting HATAITAI were both:

> Further along than any of the other companies. Lots of plausible
> next round options. Most investment-ready (MEN20).

Moreover, they were highly effective in how they engaged and used the resources:

> This team was a likeable team working on an interesting problem. This allowed them to engage quality mentors. They then used them efficiently and effectively. They got access to international mentors of quality, and that has given them confidence going forward (MGR9).

Their overall high level of Task Performance appears related to how well team members worked together (Contextual Performance). HATAITAI demonstrated a consistent ability to adapt appropriately to changes, effectively manage relationships and work quickly toward known business development targets (high Contextual Performance). These characteristics influenced their overall ability to deliver consistent outputs and achieve objectives (high Task Performance). The general learning mindset, behaviours, and strategies this team brought to the experience are well reflected in several team learning log entries (weeks one and four respectively).

> There's lots of basic mistakes we've made, which in hindsight are so obvious. When I think about it, finding these problems and answers is actually super exciting. It's like we've been running a marathon with only one leg and still achieved moderate success (paying customers). It's like how fast can we run now when we've got two legs? (HAT7)

And,

> We are now in the second phase of the Lab. This is where we take everything we've learnt from the first month and put it into action. We've been itching to get to this part so we can go full throttle (HAT7).

Conclusion: HATAITAI

Across the three phases of the accelerators, HATAITAI moved from strength to strength. At the end of the accelerator, they secured the greatest amount of follow-on investment of all teams (Funded).

Taken together, HATAITAI's team members demonstrated a commitment to both each other and the experience. Beyond being highly talented and committed to their start-up and the Accelerator experience they individually, and collectively, demonstrated high levels of learning agility. They possessed a strong learning orientation and displayed an overall openness and willingness to try things, even at the risk of failure. They actively pursued feedback, demonstrated low levels of defensiveness, and made time to reflect on feedback received.

5.3.1.2 PIPITEA: Variable Task and High Contextual Performance

PIPITEA entered the accelerator with a well-developed and highly featured database product for the online auction industry. Their software offering relied on access to an online auction company's proprietary database. During the first few weeks, the venture was perceived by many as either almost funding-ready or ripe for early acquisition by another company. Moreover, the team's members demonstrated a high level of commitment to each other, their common values and their vision for the company.

PIPITEA's founders demonstrated a deep emotional investment and high commitment to their product idea. They displayed a general resistance to perspectives contrary to their own and appeared to underutilise the range of expert perspectives available to them. For instance, they did not actively engage with Mentors and Managers nor did they actively apply the taught start-up practices and frameworks. Rather, they produced small, non-customer validated,

improvements to their product based on assumptions they had about their customer's wants and needs.

As time progressed, Mentors and Managers expressed concern about PIPITEA's low level of business expertise, general lack of willingness and ability to evolve past their product-focused mindset and make significant progress towards validating an investable business model. These sentiments are reflected in comments by Mentors and Managers like:

> Commercially naive and almost certainly will end in tears at some point (MEN21).

Moreover,
> Even after all of this time they are still very focused on a third-party client offering – Mentor's haven't been able to shift their thinking much (MGR8).

By week six of the accelerator, PIPITEA's business model became unattractive to investors because they failed to effectively negotiate long-term access to the online auction company's proprietary database. Although the team experienced a hard setback, they took some time to take stock of their situation, inventoried their collective knowledge, skill, experience, and interest, committed to each other and the start-up process and began experimenting with ideas in hopes of identifying another business model. In a progress presentation to the Cohort, the CTO shared a frank and honest assessment of their current state of affairs:

> We are starting again at week six and [it's] a long shot to get an investible product by the end. Will need to get warm validation then build like crazy to maybe arrive at the finish line. If I had to put a bet on us today, I don't know if I would take the odds (PIP8).

Although, PIPITEA's first business failed, the team members consciously committed to using the second half of the accelerator as a sandbox for their learning. In contrast to the first half of the accelerator where they had avoided using the taught start-up practices, they embraced them during the second half. They used processes of reflection, experimentation, and feedback to learn both formally and informally, and to quickly test and validate a new business model. How they approached learning differently during the latter half of the accelerator is reflected in a team member's Phase 3 survey response:

> I learned more in the past [30 days] than in the first two months. The speakers became more useful, and I respected how much they could provide (in comparison to the earlier months). A big part of why we are in the programme is to learn – the first month of getting bombarded with mentors followed by the second month of getting traction made 'learning' seem a low priority task. Getting near the end, I started to value what I had learnt more than the development of the business (PIP8).

Conclusion: PIPITEA

PIPITEA failed to develop an investable business model before the end of the accelerator (Non-funded).

PIPITEA's founders initially demonstrated low levels of learning agility as demonstrated by a deep attachment to their original business idea, resistance to feedback, unwillingness to consider other perspectives and general defensiveness. For instance, one founder points to how they disregarded a high volume of feedback which challenged their thinking:

> We were told by everyone that the original business was
> something that would never work. Everyone whom we asked
> said that there was almost no way that you are coming out of
> that as a separate business … And we were like whatever, we
> can get this to work. We can steer our way through (PIP8).

The high level of attachment to their product appeared to impede their ability to notice and respond to feedback from experts (Managers and Mentors) suggesting they make changes to their business model. However, when PIPITEA restarted with a new business midway through the accelerator, they began to demonstrate an 'all in' attitude for learning. For instance, the uncertainty of starting a new business under the constraints of the programme forced one founder to think and engage with the experience in new ways:

> So, I never had to experience that uncertainty. I never
> understood that 'fast fail' thing … and it was when we restarted
> that I felt like I was actually being an entrepreneur and that was
> when it was uncertain, and I had to apply what I had already
> learned (PIP9).

Team members were equally in charge of the ideation and development of the second business. This mindset shift was displayed by an increased willingness and ability to be curious, take risks, ask for help and adapt behaviour and strategy in response to changes in the accelerator environment. For instance, one founder describes how he viewed his team's 'restart' as an additional learning opportunity:

> In that three months we kind of packed in everything we could,
> even starting from scratch again and, that I actually found, was
> quite beneficial for reinforcing everything we had learnt in the
> previous one and a half months (PIP8).

Taken together, PIPITEA's founders displayed variable levels of Task Performance, high levels of Contextual Performance, and moderate to high levels of learning agility during the second half of the accelerator.

5.3.1.3 NORTHLAND: Low Task and Low Contextual Performance

NORTHLAND offered a social media app designed to help people connect for spontaneous in-person activities. The CEO worked independently on the product during the 18 months before the accelerator. Several months before the accelerator the CEO recruited a second founder (CTO). A third founder was recruited a few weeks before to oversee marketing (CMO). Effectively, NORTHLAND was a newly formed team when it entered the accelerator.

Once in the accelerator, team members demonstrated low levels of learning agility as indicated by being fixated on their product, closed to new ideas and defensive of their thinking and actions. Specifically, they received a high volume of targeted feedback from Mentors which encouraged them to do either a pivot or restart. For instance, one mentor said:

> I can't see how there is a business here the way they have described it. It requires lazy people to download another app to join another social network for times when they got no mates … needs a serious pivot (MEN8).

Rather than being open to others' perspectives and taking appropriate suggestions on board NORTHLAND continued to build the product they set out to create. Thus, they failed to advance an investable business model. Consequently, they did not meet both their stated business objectives and the expectations of the accelerator. Their consistently low level of Task Performance is captured by a Manager log note, which states:

> The team needs to put in some serious work into visionary solutions and stop building a product – they have spent four-week[s] head down making small, useless, tiny incremental tweaks to their mobile app rather than figuring out what the real product is here, getting people excited about that, and then building it (MGR8).

Not only did NORTHLAND fail to make significant progress in their business model they demonstrated consistently poor-quality relationships within the team. This also affected their interpersonal interactions and with others in the accelerator.

The CEO did not have a 'good pulse on group dynamics' (MGR8), was often withdrawn, and did not work with the other founders well. Consequently, team members struggled to behave as a unified front, consistently failed to deliver on business development goals and, as a team member pointed out:

> In every way possible the relationship has failed. You can pluck down three good people, yet they just don't make a good team (NOR8).

Conclusion: NORTHLAND

NORTHLAND failed to develop a viable business model and did not receive investment at the end of the Accelerator (Non-funded).

Taken together, a poor relational dynamic within the team affected how team members behaved and performed during the accelerator. NORTHLAND demonstrated low levels of Contextual Performance during all three phases and failed to achieve business development objectives and meet accelerator

expectations (low Task Performance). Team members displayed low levels of learning agility. For instance, they either avoided feedback situations or were defensive when they did receive feedback. Moreover, they failed to adapt their behaviours and strategies even when situations called for them to do so.

Discussion of participant task and contextual performance by team association

This research sought to add understanding of how accelerators influence participant learning and development and how learning agility theory may add to this understanding. The qualitative field study findings draw from an analysis of participant Task and Contextual Performance behaviours. The analysis considered how, in aggregate, individual level behavioural contributions influenced progress toward expected business development outcomes and how individual behaviours affected the social, psychological and emotional work environment within each team. The analysis also examined the strategies and behaviours associated with participant levels of learning agility. In general, participants varied in their levels of Task and Contextual Performance *and* their engagement in *Agile Learning* strategies and behaviours. This indicates that the accelerator participants were not homogenous in how they responded to and learned from changing events and experiences.

Teams composed of participants who actively developed, monitored and maintained strong interpersonal relationships appeared to weather the stress and strain associated with their accelerator experience better than peers. Even in times of high stress (e.g., nearing Demo Day) participants who demonstrated high levels of Contextual Performance at the outset continued to deliver strongly on expected team outcomes at the end. For instance, of the six teams who demonstrated high Contextual Performance during Phase 1, five teams received investment at the end of the accelerator programme.

In general, how well participants interacted with their team members also related to the quality of their interactions with others such as peers, Managers and Mentors, and vice versa. The quality of relationships within teams appeared to affect how well they learned from others outside their team and how well they responded to situational and environmental changes. The findings suggest participants demonstrating high levels of Task and Contextual Performance were also quick and responsive to changes in their business development process, the accelerator context and their team's needs. These individuals actively sought out and received feedback well, demonstrated an openness to trying new things even at the risk of failure, made time to reflect and transferred learning derived from both successes and challenges into new experiences. Notably, they demonstrated a high level of commitment to themselves, their team, and the process. For instance, PIPITEA failed their first business because they lost access to the third-party data they needed for the software to work. However, they possessed high levels of relational strength and commitment. Consequently, they were able to support each other well and in ways that enabled restarting afresh with a new business model.

In contrast, teams like THORNDON and NORTHLAND demonstrated poor interpersonal relations throughout the accelerator. Constant relational strain in THORNDON inhibited their ability to achieve business development objectives effectively, and by the eleventh week relationships degraded to the point that lawyers served as the communication conduit between members. Collectively, the findings suggest the time-bound, accelerator-programme environment was mentally, physically and emotionally stressful for participants. Many teams, like AROVALLEY and KELBURN, were unable to validate the business model with which they entered the accelerator. Consequently, they needed to envision, validate and build a new business model in less time than they expected. Furthermore, other teams experienced significant relationship challenges. For example, the observed lack of relational harmony in NORTHLAND and THORNDON appeared to spill over into all aspects of their accelerator experience. Mentors and Managers were less likely to engage with participants from teams experiencing dysfunctional relationships. Moreover,

participants who spent time managing relationships appeared to engage less frequently and less effectively with available *Learning Resources*.

Participants who demonstrated clarity about their values and expectations for their involvement with the accelerator appeared less affected by unexpected events and experiences. Further, they appeared better able to flexibly, quickly and appropriately adapt learning strategy and behaviour to fit situational demands than peers who lacked this level of clarity. For instance, participants from HATAITAI and LAMBTON identified and managed the tension between meeting their expectations and those of the accelerator Managers better than their peers. Being clear on what they wanted enabled them to be pragmatic in how and when they chose to interact with elements of the experience such as mentoring, educational workshops and interactions with their peers.

The accelerator environment provided numerous opportunities for formal and informal learning. For instance, many participants indicated that the co-location of teams in a centralised workspace helped them to cut their learning short by observing other teams experience successes and challenges. Thus, the learning obtained by one could be shared with many. However, several teams of participants did not engage well with other teams. Consequently, it appears they both learned less from peers and contributed less to others' learning.

Taken together, participants, individually and collectively, demonstrated variable levels of Task and Contextual Performance and learning agility. How participants behaved within their teams affected interactions with other participants and also generally impacted how they related to the experience, and the outcomes they achieved. Specifically, how they maintained base-level business operations, created new opportunities and exploited existing resources appeared related to how they well they approached learning tasks.

The next section provides two representative team narratives. One is representative of a consistently high-performing team and the other demonstrated variable levels of Task and Contextual Performance.

5.3.2 Team narratives for Funded and Non-funded teams

This section presents two in-depth team narratives. The narratives were developed to illustrate how personal characteristics and situational factors influenced changes in team learning and performance. A narrative for both a Funded and a Non-funded is presented.

Events and experiences portrayed are presented chronologically and relate to the levels of participant learning and performance demonstrated by each team. The analysis examined person-level and situational factors assumed to affect how participants behaved in ways that enabled, positively or negatively, individual learning and performance within teams.

The presentation format is consistent to support comparison. Each narrative begins with a short business brief that features the venture's name, information on the founders, their business idea, business model and end-of-programme funding status (Funded or Non-funded). The introduction to each narrative also includes a figure indicating observed levels of Task and Contextual Performance. LAMBTON was a team that demonstrated consistently high levels of learning and performance. AROVALLEY was a team that demonstrated variable levels of learning and performance.

5.3.2.1: LAMBTON: High Task and Contextual Performance (Funded)

LAMBTON overview

LAMBTON pioneered a novel middleware software solution that automated the integration of multiple streams of client financial data into a single accounting platform. LAMBTON demonstrated consistently high levels of Task and Contextual performance (Figure 5.3).
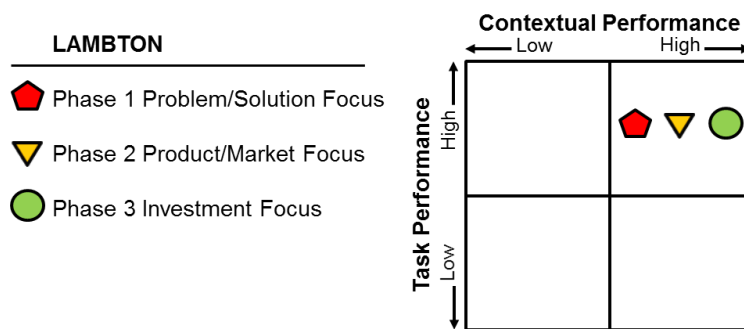
Figure 5.3. Levels of task and contextual performance by phase for LAMBTON.

LAMBTON entered the accelerator as a two-founder team, with an existing problem/solution fit, an early-stage working product prototype, positive validation and ongoing engagement with future customers. Consequently, expectations for success were high for LAMBTON as foreshadowed by statements made by Mentors in their feedback log. For instance, one said:

> This team and product will be the strongest in the lab this year (MEN12).

And, another pointed out that:

> They are racing ahead of the class. If they continue to push hard, they'll crush it (MEN32).

These early projections aligned well with the end-of-programme investment outcome. LAMBTON was the most successful start-up in the accelerator. At the end of the Accelerator, they secured the greatest amount of follow-on funding from Angel Investors and Venture Capitalists (*Funded*). At present, LAMBTON is an active business.

LAMBTON learning and performance narrative

LAMBTON's two founders were highly motivated, technically skilled and well-seasoned business professionals. They possessed deep expertise in digital marketing, and each had over fifteen years of experience working in a start-up and corporate contexts. Notably, each founder had prior experiences with starting, growing and exiting start-ups.

LAMBTON's founders demonstrated a strong relational 'fit' with each other. They held a common vision for the venture, a complementary set of personal values, skill sets, prior experiences and a willingness to make similar contributions and sacrifices to ensure they reached their ambitious goals. A founder's retrospective interview comment illustrates LAMBTON's people-centric values:

> We've always said even from the start, it's all about the team, all about the concept, and then all about the product. The company can fall over tomorrow but there's still that team that will stay together for the next thing, that's what I believe. I'm 99% sure we would stay together through to the next venture, the next venture, and the next venture, which is awesome (LAM7).

LAMBTON applied to the Accelerator as a two-person team (CEO and CTO) however they added another founder (CFO) and two part-time developers just before the accelerator started. These individuals provided business and product

development support but did not regularly participate in the accelerator experience. Although LAMBTON's founders had worked part-time for a year on their business and were well ahead of many of the other teams, they were consciously aware there were many gaps in what they knew. These founders used the accelerator to strategically fill their resource voids. For instance:

> Like we only know what we know. So we treated it as our MBA, like 'what are our gaps that we don't know business-wise that we need to fill?' And then to fill them in, either learn as fast as possible or bring on other team members to help fill those gaps (LAM8).

From the start of the accelerator, LAMBTON's founders made clear to all why they chose to participate in the accelerator:

> We went in with the key things that we wanted to get out of it, which was, connections to the networks and, obviously, a big capital raise (LAM8).

This sense of clarity was demonstrated by their pragmatic, yet also strategic, approach for meeting both their business development objectives and accelerator expectations. For instance, before interacting with Mentors and presenters, LAMBTON's founders actively ensured they achieved a high return on their invested time. They only attended educational sessions offering immediately relevant content, sent only one team member to Mentors they viewed as a low value and selectively applied taught concepts and frameworks (e.g., lean start-up).

Although the founders were skilled, experienced and pragmatic in their approach they also demonstrated a keen desire to learn from the experience. They appeared to hold their expertise lightly and drew readily upon the expertise of

others. This was noted by several Mentors and captured in a comment by one who described the founders as being:

> Smart, pragmatic, great attitude. No egos – Love it! (MEN15).

Moreover, another commented in the feedback log about the learning mindset the CEO displayed:

> Even though this team has already had a lot of exposure, and is in general on good track, the CEO was the most enthusiastic when speaking to me. He was truly asking for mentoring, and open for any and all critiques or suggestions (MEN35).

Overall, *Learning Resources* like Mentors were incredibly helpful for this team. The founders' robust business backgrounds allowed them to interact candidly with Mentors and draw on available expertise to learn rapidly. However, LAMBTON found learning from Mentors was not without its own set of challenges. Even with a clearly defined problem and solution, LAMBTON appeared to get flooded with a mosaic of conflicting feedback. One founder described how at times:

> One of the first lessons that we learned was that the term mentor means a very different thing to different people. There were different quality of mentors and different levels of experience and different worldviews. Like we would literally go from a meeting with a guy going 'you're thinking too big' and then the next guy going 'you're thinking too small, this is a global problem.' And we were like whoa … they talk about mentor whiplash. It was just stunning to see the different opinions of these mentors (LAM7).

Sorting through the volume of Mentors and feedback was initially hard for the team. In hindsight, a founder described how their approach to mentoring changed over time:

> Coming in, like we had the goal of, yeah, let's get lots of connections. And the reality was, it wasn't just grab as many as you could, like Pokémon. Like, don't try to catch them all. It was very much just take a few, do your due diligence of them, and make sure they are the right people for you. Because again, a wrong mentor, a wrong idea, a wrong employee, a wrong investment, I believe, can all be detrimental to a particularly early stage company (LAM8).

Over time, the founders adapted their strategy for learning interactions with Mentors. Their approach evolved from trying to collect and use all information to a strategy whereby they consciously assessed the advice they received against their internal vision and values they set for their company. For instance:

> Be very upfront with people but remember it is your company. That is a very important one that a lot of people and teams lost focus on. And they would get battered to-and-fro. And we did for a point as well. But then we were like 'wait hold on there, this is our company. I am sorry but we are the ones passionate about it, and we are the ones going to make it work. You just sit back there. We will take that on board, but we don't accept that, thank you.' So remembering that it is your company is really important (LAM7).

The processes of measuring up advice against their own internal values and bouncing advice off their core trusted advisors helped LAMBTON stay on 'their' course rather than one imposed on them by external parties.

Midway through the accelerator, LAMBTON began to feel the pressure of their success. Early and robust market interest from major global financial service institutions placed unanticipated demands on the founders' time. Initially, the team embraced the fast pace and additional demands by developing strategies that supported quick learning and enabled LAMBTON to deliver continuously on their goals. For instance, in a learning log entry, a LAMBTON founder described the positive impact time pressures had on the team:

> The hectic schedule, as weird as it sounds, is helping us to stay focused. The more restricted the time we have, the tighter the deadlines and focus have to be. The result is that distractions are minimised (LAM7).

However, LAMBTON began to struggle to meet external personal commitments until they re-prioritized their shared core value—family. This process of reconciling competing demands is captured in a team learning log entry:

> It is quite hard to balance being in the accelerator with being a husband and father. We are both making sure we schedule a non-negotiable block of family time to balance this out (LAM8).

By week 10, the pace of business development continued to speed up for LAMBTON. By that point, they had their first investor on board and some offers on the table to consider. Tidings of early success also created challenges for the founders. They needed to strike a balance between allocating time to achieve team-level objectives and meeting accelerator-related expectations. A founder pragmatically described the tension in a survey response:

> Play the game. It's important to do even if you can't spend time on the programme otherwise you will upset the key people involved. This is really disappointing as our business has outgrown the accelerator in many ways, but we get

handicapped back by needing to do things other[s] require more (LAM7).

Managing expectations of the accelerator was not LAMBTON's only challenge. Success also affected how the team interacted with others. As Demo Day neared, LAMBTON increasingly isolated themselves from others in the Cohort and interacted less with the accelerator management team. One of the founders posited other teams were intimidated by their success and suggested that:

Being the top team in the other's eyes has shown a complete split of people willing to work with us or push us away (LAM7).

Consequently, LAMBTON invested less energy in relationships with their peers. A Manager described this insular behaviour in the feedback log:

[The] team went a bit rogue and seemed quite arrogant about sharing and learning from others; especially during the run-up towards the end (MGR7).

During Phase 3, LAMBTON demonstrated a minor dip in the quality of relationships with the accelerator organisers and demonstrated a reduction in capacity to meet accelerator related-expectations. However, the founders continued to function well interpersonally as a team. Consequently, they continued to behave in ways that helped contribute towards reaching their lofty business objectives. By the end of the programme (Demo Day), LAMBTON had secured the highest business valuation of the ten teams and received more offers for investment than it needed to finance its next round of business development.

LAMBTON – Learning and performance summary

Taken together, LAMBTON demonstrated a high-level of Task and Contextual Performance throughout the accelerator programme. This may be attributable to how they developed and maintained relationships, worked quickly toward goals and, when necessary, adapted strategies and behaviours to meet emergent challenges.

In contrast to many of the other teams, LAMBTON's founders strategically and consistently integrated their vision and values into their processes for decision-making. The founders demonstrated a willingness to take risks, be vulnerable, seek feedback, and use reflection as a source of inspiration and learning. Moreover, the founders demonstrated low levels of defensiveness when receiving feedback. Observations showed that, when things did not go as predicted, LAMBTON's founders demonstrated an ability to frankly discuss issues, make decisions and adapt approaches as indicated. Notably, they consciously utilised learning in one experience to inform learning in others. Taken together, LAMBTON displayed a high level of learning agility throughout.

5.3.2.2: AROVALLEY: Variable Task and Contextual Performance (Non-funded)

AROVALLEY overview

AROVALLEY pursued two distinctly different business models during the accelerator. The team's first business model targeted the multibillion-dollar global equestrian industry. AROVALLEY's second business targeted brand marketing agencies trying to capitalise on multimedia messaging campaigns. AROVALLEY's founders demonstrated varying levels of learning and Task and Contextual Performance during the accelerator (Figure 5.4).
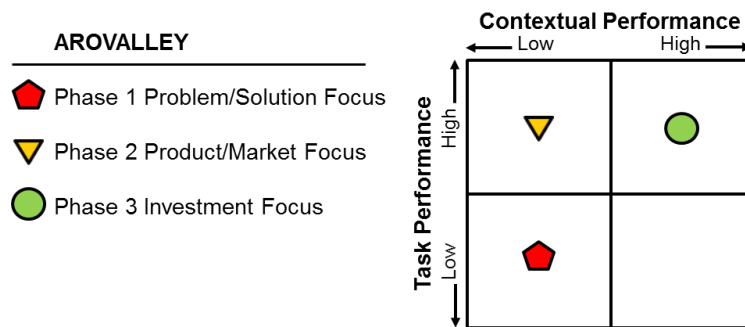
Figure 5.4. Levels of task and contextual performance by phase for AROVALLEY.

The team's first business model targeted the multibillion-dollar global equestrian industry. Initially, AROVALLEY sought to validate and develop a mobile software application designed to help farriers digitally image, assess and custom print 3-D horseshoes. However, the team failed to effectively validate the value proposition underpinning their business model. At week seven, the team discontinued their equestrian business and started working on a software analytics solution for brands and brand management agencies wanting to run Snapchat advertising campaigns. At the end of the accelerator, AROVALLEY did not receive Angel investment (Non-funded). However, its software analytics business model did secure Angel investment approximately six months after the accelerator. At present, AROVALLEY is an active business.

AROVALLEY learning and performance narrative

The CEO's passion and deep working knowledge of the equestrian industry was the foundation for AROVALLEY's initial business model. The CEO worked part-time for two years on it while at university. He applied to the accelerator as a three-person team. However, the marketing (CMO) and technical (CTO) founders were replaced shortly before the accelerator. Practically, functionally and relationally AROVALLEY was a newly formed team.

AROVALLEY's founders were recent engineering school graduates from the same university. They each appeared bright, skilled and technically able to develop and deliver on their equestrian industry business model. However, only the CEO possessed the industry-specific knowledge and a deep passion for the problem they were solving.

The team members were demonstrably excited to be involved with the accelerator, fun to be around and were well-liked by Managers, Mentors and Cohort. However, the team struggled to develop effective processes, even with help from expert others, for validating and scaling their business model. The challenge of moving from plan to actual was described by one founder as:

> Essentially, the manager had a plan for how the progression through the lab was supposed to look. And we sat down with him in the first week and plotted out how that would look for us. Like week one was validate your idea, week two was like … like get a million customers … And, yeah, we were like 'sweet' just follow this plan and it will be easy. And then we got stuck on step one for the first few weeks. Yeah, it wasn't good being in the accelerator environment because you know there is all this pressure on to be five steps ahead of where you are (ARO7).

Although the founders actively sought feedback from others, they failed to operationalise effectively what they learned along the way. Sometimes they ruminated so much on feedback that forward progress on their first business stalled. Other times they adopted the opinions of others without thoughtfully considering the implications of such actions. For instance, one founder described how easily he allowed his views to be swayed by his interactions with Mentors:

> Like … you are going to all of these mentors and being attacked from every angle. And some of them get it, and some of them don't. And you're kind of listening, like listening to everyone,

they tell you to take it all in, which I did. But, one of the problems I had after every mentor meeting is, I would be sort of changed by their views. Like it was way too easy to change rather than stick to my guns ... I think I had gone too far and was trying to listen to every single mentor ended up making my thoughts way too cluttered (ARO8).

The team's learning activities lacked coherence and depth during the first six weeks of the accelerator. They appeared to lack a sense of purpose and direction for what they were trying to accomplish. Consequently, the outcomes of their efforts remained subpar in comparison to expectations. AROVALLEY's founders struggle to commit to a particular course of action was noted by many. For instance, a Mentor comment during week three suggested:

Their pitch was very weak and didn't inspire much enthusiasm for the product. …The team seems very capable, but for some reason, they are not very focused (MEN35).

Moreover, a Manager posited the lack of direction might have been because:

The leadership of the current CEO is not very effective, he is inexperienced, and struggling to coordinate all aspects of the business plan (MGR8).

Specifically, AROVALLEY's founders appeared to just go through the motions of using the accelerator-taught practices, such as lean start-up, rather than earnestly applying them to test business assumptions. For instance, a Mentor with equestrian industry connections personally introduced the founders to a contact who was already using a competitor's 3-D horseshoe product. The Mentor later noted how the team failed to use the introduction as a learning opportunity:

Arranged for the team to meet with an expert to discuss the
product. He brought some competing products, but the team did
not show with the appropriate curiosity about them even though
their prototype was crude in comparison. It isn't apparent that
basic questions about the best materials to use, the best way to
manipulate the material, and the best way to secure the product
are being approached with any scientific rigor (MEN19).

In many ways, AROVALLEY'S founders appeared to be more excited about the
social processes associated with the accelerator experience than engaging in the
technical practices for rigorously validating a viable and investable business
model. As noted by one founder, the team felt the overall experience was more
important than business outcomes:

As a team, we were probably one of the tightest outside the
accelerator. Like we would hang out together and stuff. And so
we just kind of did not care, we just wanted to do what was fun
for us, and we were not trying to be number one. Our main goal
was just to enjoy it the whole time, and I think we did a pretty
good job of that (ARO9).

By the midpoint of the accelerator, the pressure on the team was building.
AROVALLEY had not yet moved past the validation stage for the equestrian
business. As each week passed, AROVALLEY continued to fall behind the other
teams. Ultimately, they came to realise that they were trying to sell solutions to
people who did not have a problem.

I think a lot of it in my mind came down to the fact that it wasn't
providing the value that it needed to be like it was just an idea
and it sounded like it would make people's lives easier (ARO7).

During the same period, a survey response from an accelerator management team member suggested AROVALLEY might have chosen to move on from the equestrian business if they had:

> Listened more closely to their customer development data, instead of trying to look for data points that supported their own hypothesis … They could have come to this realisation faster if they had gone into this with less preconceived bias and a willingness to really delve deep into listening and understanding what their customers were saying (MGR9).

At week seven, the learning dynamic in the team shifted radically. Acting on a Manager's suggestion, AROVALLEY's founders did a start-up-weekend styled push to vision, develop and validate a new business idea within 54 hours. While doing so, the team filmed their ideation process and published several short video clips documenting their experience. What initially started as a fun way to chronicle their creative journey morphed into a video capture solution and value proposition for marketers seeking to run advertising campaigns on the multimedia messaging application – Snapchat.

Whereas AROVALLEY's founders struggled to apply accelerator-taught practices, such as lean start-up, to their hardware-based equestrian business they were immediately applicable to their digitally based business model. Usage of these practices, a new suite of Mentors and support from the other participants helped AROVALLEY's founders quickly validate and evolve their business model. A founder describes the shift in the support they got from the other teams:

> It was like a noticeable flip of the switch. Like everyone at that point was pretty keen to see us succeed at something. So, everyone was right behind it. They were like screw it! You guys are having a crack at something else. Go for it! (ARO7).

Notably, and unlike with their equestrian business, the founders began to take a strong stand for their ideas and an increased willingness to take responsibility for their actions. Rather than looking externally to Mentors and Managers for answers, reflecting as a team became an effective strategy for deriving insights from the things they attempted. They demonstrated a strong willingness to advocate and act on their behalf. Their newfound strength of voice and direction is illustrated by a founder survey response:

> Stand up for your opinion – listen to everyone else's advice but just do what you think is right and learn from that (ARO8).

This statement is complemented by the experience of another founder. They add:

> If you don't ask you don't get. There is no reason why you shouldn't go straight for the top if you're confident that what you have is the right solution. You're going to cop shit from people who don't understand what it is you're doing. You just need to back yourself (ARO9).

The change in the team's mindset and approach for learning in the accelerator was noticed by many. The founder's shifts in learning behaviours and strategies are recounted clearly in a survey response submitted by a Manager:

> This team began working on a completely new idea with 35 days left of the programme. They were able to put together prototypes and learn very quickly – much quicker than they did in the first two-thirds of the programme. I believe a significant amount of progress and learning was made when they transitioned to the new idea and a person with a stronger leadership style became the team leader and took ownership of progress. They then took risks (sending a team member to Los

Angeles) and heavily leveragerd the mentors and the network. They have also been highly coachable when engaging frequently with the accelerator management (MGR8).

AROVALLEY's software analytics solution was not mature enough to raise funding at the end of the accelerator (Non-funded). At Demo Day they pitched for continued support rather than investment. The work the team did in the final month of the accelerator spurred further advisor and investor interest. Subsequently, AROVALLEY received Angel investment six months after the accelerator programme ended.

AROVALLEY learning and performance summary

AROVALLEY demonstrated variable levels of learning and performance in the accelerator. How team members behaved was different between the first and second half of the accelerator.

During the first half of the accelerator AROVALLEY demonstrated low levels of Task and Contextual Performance and learning agility. In many ways, AROVALLEY appeared to be:

Trying to 'force fit' the [first] business – to themselves, the accelerator, and the investors (MEN37).

Knowledge of the industry and passion for the problem was held solely by the CEO for the first business. Each stage of direction setting, planning, decision-making and assessment routed through him. Consequently, levels of initiative and opportunities for learning through experience within the team became stifled. During the first half of the accelerator, AROVALLEY's founders displayed low levels of learning agility. For instance, they demonstrated low levels of self-

awareness, struggled to deal with the complexity of the learning tasks, overlooked learning opportunities, sought easy wins rather than taking risks to find the best options and displayed resistance to feedback and evidence which proved contrary what they wanted to do.

The learning and performance dynamic changed radically within the team once the founders committed to shifting to the digital marketing business idea. The founders behaved and learned in new ways and demonstrated higher levels of resolve and responsibility for achieving success. For instance, they displayed greater initiative as demonstrated by proactively networking with experts, peers and advisors to source needed knowledge. Moreover, they made time to reflect, took risks and challenged the status quo.

Notably, the founders made time to pause, reflect, connect and understand each other at a deeper and more personal level. Through these processes, the CEO of the equestrian business came to realise he lacked a passion for the new business and was unable to find a role for himself in the new enterprise. He eventually made the hard decision to step off the team. The other founders supported his decision to vacate his role on the team.

Taken together, AROVALLEY's founders displayed lower levels of learning agility in the first half of the accelerator and higher levels in the second half. Furthermore, the founders varied in their levels of Task and Contextual Performance across the three phases of the accelerator.

Discussion of team narratives for Funded and Non-funded teams

The two team narratives illuminate how the fast pace and time-bound programme design both helped and hindered participant learning and development. Moreover, the roles and influences accelerator *Learning Resources* played on participant learning and performance behaviour.

The qualitative findings suggest both sets of founders were individually and collectively affected by interactions and interdependencies between themselves, their team, other teams and the programme environment. Furthermore, these relationships were not static. Instead, they evolved as the individuals themselves evolved in response to events and experiences they encountered.

Although Task Performance behaviour varied between these teams and by phase, both exhibited high levels of Contextual Performance behaviours early in the accelerator. The findings suggest these participants possessed similar levels of skills, knowledge, and experience, a strong commitment to themselves, the team, and the process, and a readiness for the learning challenges associated with the experience. They appeared to weather the physical, emotional, and cognitive demands of the programme well because they possessed high self/other awareness. Maintaining productive lines of communication, creating systems of support and pushing each other to take risks appeared to fuel learning and progress even when times were tough. A key distinction between these teams, and the other teams in this accelerator was 'time in the saddle' together. LAMBTON was not in a team forming stage so they hit the ground running. Whereas, AROVALLEY was working through both formation processes and accelerator processes in concert, and this slowed progress until they restarted with a new idea. Shifts in roles at the restart cleared the pipeline for new, more agile, approaches to learning and performance.

Taken together, processes of reflection, knowledge seeking and flexibly letting go of ideas and ways of doing things and on-boarding new perspectives characterised appropriate learning strategies for Phase 1. Seeking new

knowledge, experimenting, asking for feedback, and re-calibrating thinking and actions early and often characterised appropriate learning strategies for Phase 2. All of the *Agile Learning* strategies appeared appropriate in Phase 3; however, being able to select and move between strategies quickly and flexibly appeared to matter a lot for performance outcomes.

The field study examined, from a near-term perspective, how participants learned and developed in the accelerator. However, research suggests learning is often separated in time from the entrepreneurial events and experiences that inspire it (Cope, 2003; Cope & Watts, 2000). Therefore, an interview method was added to explore learning in retrospect, that is, the participants' lessons from experience.

The next section explores participant learning interactions with the *Learning Resources* tested in the quantitative study (Managers, Mentors and Cohort).

5.4 Chapter Summary

Chapter Five presented findings from Strand 2 (observation) of the three-strand quantitative and qualitative mixed methods study (survey, observation, and interview). The observation method examined learning and performance through a team lens. Data was collected during the accelerator and included: researcher field notes (ongoing), participant responses to open-ended survey questions (monthly), electronic team learning reflections (weekly), Manager responses to open-ended survey questions (x2) and Mentor feedback entered electronically after 1:1 team meeting (ongoing).

Observation data for each team was plotted onto a series of 2x2 matrices. The coding scheme for the 2x2 framework incorporated individual performance concepts assessed in the survey research. Levels of Task and Contextual

performance (high/low) were plotted for each team, and phase. Additionally, levels of learning agility (high/low) were considered and reflected in team narratives. The patterns depicted in the matrices were contextualised through development of representational narratives.

The observation research generated several key findings. First, end of programme funding outcomes for the teams appear related to the Contextual Performance behaviours demonstrated by participants during Phase-1. Teams that lacked a positive internal working culture at the outset struggled to establish a positive team task environment, and as consequence, many failed to achieve expected performance outcomes. Second, positive and productive interpersonal relationships were more important than a strong business proposition. Teams that demonstrated high contextual performance were able to effectively manage the complexity, uncertainty, and ambiguity necessary associated with pivoting away from failed business models toward new ones. In contrast, strong business models were unravelled by teams with psychologically unsafe work environments. Last, the learning strategies and behaviours participants select and deploy most be stage appropriate to maximise the benefits of the accelerator learning environment.

The patterns and themes identified in qualitative observation data (Strand 2) and those identified and reported in the quantitative survey data (Strand 1) are explored further through a retrospective interview method which was conducted some six months after the accelerator ended (Strand 3). The next chapter explores learning and performance at the core unit of participation – the participant.

Chapter 6 | Qualitative Interview Findings

This chapter presents findings from Strand 3. Qualitative interview data was collected after the accelerator to answer the two research questions: *How do accelerators influence participant learning and development? -* and - *What does learning agility theory add, if anything to our understanding of participant learning and development in accelerators?* Figure 5.1 highlights the methodology, method, priority, timing and focus of Strand 3, and its relationships to the other two strands.

Research Design	QUAN Method	Qual Method	Qual Method
Mixed Methods	*Strand 1: Survey Focus: Cohort*	*Strand 2: Observation Focus: Teams*	*Strand 3: Interview Focus: Participants*
	During Accelerator		**Post Accelerator**
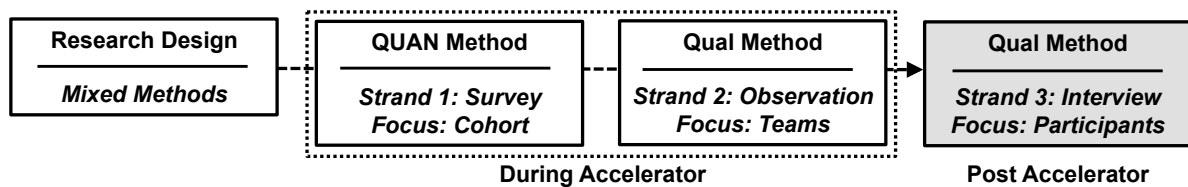
Figure 6.1. Research design, methodology, method, priority, timing and focus of Strand 3.

The interview method was included to capture participant perceptions of the accelerator learning environment. Several factors influenced the choice to focus on participant learning and development at the participant level. First, individuals are the base ingredient for both accelerator teams and accelerator cohorts. Second, survey findings suggest participants responded to changes in the accelerator learning environment by shifting between learning strategies and behaviors. However, what events and experiences prompted these changes remained unknown. Third, observation findings highlight how groups of participants worked together, well or not, to pursue team level outcomes. Further, that individual participants experienced and responded to the accelerator learning environment differently. Fourth, much research suggests entrepreneurs learn through experience (Corbett, 2005; Gartner, 1985; Minniti & Bygrave, 2001; Politis, 2005). Yet not all experiences generate learning, some experiences teach

the wrong lessons, and some learning is only accessible through processes of reflection (Cope, 2003, 2011; Cope & Watts, 2000; Daudelin, 1997; McCall, 2010). In sum, the retrospective participant interview investigation was incorporated to capture the *pull forward* lessons from experience for learning in an accelerator. Specifically, to identify things that helped and hindered participant learning.

This chapter begins by reviewing key findings from the survey and observation methods and suggests their implications for the interview method. This is followed by a review of the interview site, participants, method, data and analytic approach. Last, three sets of findings are presented. The first set of findings examines peer effects that helped and hindered participant learning and performance. A similar format is used to present findings for both Manager and Mentor.

6.1 Summary of Findings from Strand 1 and Strand 2 and Associated Implications for Interview Method

Strand 1 was a multiphase quantitative survey method. It occurred during the accelerator and examined participant learning and performance at the cohort level. Four hypotheses were tested to highlight patterns of relationship between the research constructs. Key findings include: Managers and Cohort were positively predictive of participant learning and performance, but Mentors were not; participants engaged in different learning strategies at different times and to different levels of effect for performance; and, participants from Funded and Non-funded teams responded quite similarly to the survey items.

Strand 2 was a qualitative interview method. Data collection occurred during the accelerator and examined participant learning and performance at the team level. Key findings include: high quality interpersonal relationships were as

important for learning and performance, if not more, than strong skills and a good business case; the quality of interpersonal relationships during Phase-1 appeared to influence end of programme funding outcomes; and, stage appropriate learning strategies and behaviours enabled participants to, or not, maximise the benefits of the available accelerator learning resources.

6.2 Review of Interview Participants, Method, Data and Analysis Strategy

A brief review of the research site, participants, method, data, and analysis strategy follows. Each of the following sections was described previously, and in detail, in Chapter Three.

6.2.1 Interview participants

The interview method occurred separate in time from the accelerator programme, but it included the same twenty-nine participants associated with the survey and observation strands of this multilevel study (see Section 3.3). In short, the research participants were associated with a prototypical GAN accelerator based in New Zealand. All interview data was collected from twenty-nine participants associated with a single accelerator programme cohort. Participants were, on average, within an age range of 20-26 years old, male, and university educated. They were distributed unequally across ten accelerator teams.

6.2.2 Method, data and analysis strategy – participant interviews

The findings are drawn from analysis of interview transcripts generated through twenty-nine interviews with accelerator participants. The aim for including the interview method was not to generate a set of stand-alone findings. Rather, the

objective was to further explore relational patterns and situational factors identified in the analyses of Strand 1 and Strand 2 data.

The interviews were conducted some six months after the accelerator ended, thus offering a retrospective understanding of the participant learning experience. Participants were interviewed to understand better– if, what and how – they learned from participating in the accelerator. Participants were contacted through email to set up interview times. Twenty-five interviews were conducted both in-person and four via video conference. Each interview ranged in length from 45 to 120 minutes and produced transcripts between 6,000 and 14,000 word in length. As a verification strategy, transcripts were returned electronically to participants for review and comment (Gibbs, 2007; Richards, 2009). Only one participant returned their transcript with an amendment. In this instance, the amendment was limited to a single section of text and done to clarify a point.

A hybrid environmental approach (Saldaña, 2016) was selected to analyse the interview data. The approach was well suited for exploring the 'culturally codified' dimensions the research context and for identifying 'time-based forces' within the accelerator learning environment that affected learning and performance (p. Saldaña & Mallette, 2017, 161). Specifically, the researcher sought to identify and examine dimensions of the accelerator learning environment that helped and hindered participants. Coding and data display methods included both hand and electronic approaches. The analysis process for the interview data, entailed the identification and application of different coding strategies with the intent that each recursively informed both prior and later strategies. Coding included processes to categorise, evaluate, and identify causal relations. Categorising processes offered an initial holistic understanding of the data (Gibbs, 2007; Richards, 2009). Evaluative coding helped to identify general factors that helped and hindered participant learning, and causal coding processes helped explore relational influences on learning and performance (Saldaña, 2016).

In practice, some strategies were more useful and informative than others. Multiple passes through the data enabled the identification of positive and negative elements of the learning environment, interactive effects and perceptions of individual and collective efficacy (Saldaña, 2016). Coded passages were clumped into themes, examined for patterns within and between themes, and moved, combined, or re-configured as needed. Attention was paid to passages pertaining to values, attitudes, and beliefs (Saldaña, 2016) as they appeared to underpin behavioural action/inaction. Ultimately, codes, derived from across the methods were woven into a narrative that was then triangulated against Strand 1 and Strand 2 findings. Points of resonance and contrast were examined. Table 6.1 provides details the analytic process used for Strand 3.

The next section presents findings from an analysis of the participant learning experience. Specifically, how participants learned, or not, from interactions with the accelerator *Learning Resources* examined by the quantitative survey. The dimensions influencing the participant learning experience covered next include participant interactions with (a) other teams (Cohort); (b) individuals associated with the accelerator management team (Managers); and (c) individual experts organised by the accelerator to provide mentoring (Mentors).

Table 6.1.

Summary of Analytic Process for Interviews.

Analytic Process	Elements of Analysis	Description of Analytic Process
1. Preparing familiarising and sense-making	Listening, transcribing, reading, note taking	A holistic and embodied familiarity with the participant narratives was generated through a multi-step familiarization process which included listening to each participant interview once then again for transcription and then reading each transcript twice. Handwritten notes made throughout these processes provided means for reflection and next steps. (Gibbs, 2007; Richards, 2009).
2. Capturing concepts	Coding and data display	The coding approach aimed to supplement, extend and explain Strand 1 and Strand 2 findings. A hybrid environmental approach (Saldaña & Mallette, 2017) was employed and included multiple coding approaches (structural, evaluative, causation). Multiple recursive cycles through the data supported identification of positive and negative elements of the learning environment, interactive effects between elements, and general participant perceptions of individual and collective learning and performance efficacy.
3. Categorising	Identification and clumping by themes	Coded passages were clumped into categories by themes, examined for patterns within and between themes, and moved, combined, or re-configured as needed. Categorising stopped when alternate explanations no longer appeared.
4. Scanning	Pattern identification within and between themes	Patterns were sought across, within and between the different coding strategies. Attention was paid to passages pertaining to values, attitudes, and beliefs as they appeared to underpin observed periods of behavioural action and inaction.
5. Collating and interpreting	Code combining	Ultimately, codes, derived from across the methods, were weaved into a narrative that reflected plausible accountings of participant learning and performance experiences, and that conceptually aligned with literature and Strand 1 and Strand 2 findings. Points of resonance and contrast between the narrative and other findings were explored and refined through cyclic processes of triangulation.
6. Explaining reporting, and extending	Composing and sharing	The thesis writing process entailed working between findings and prior literature to produce a situated understanding of the participant learning experience. Preliminary reporting to audiences of accelerator organisers and participants occurred as well as conference presentations.

Source. Gibbs, 2007; Richards, 2009; Saldaña, 2016; Saldaña & Mallette, 2017.

6.3 Findings – Participant Learning Experience

This section presents the interview findings. The aim of including the interview method was two-fold. First, to qualitatively consider how the three accelerator *Learning Resources* examined in the survey research (Cohort, Managers and Mentors) influenced participant learning and development. Analysis of survey results indicated participants engaged at different times and at different levels of intensity with Managers, Mentors and Cohort. However, it was unclear how, why, or for what outcomes participants engaged with these individuals. Second, to explore the types of learning strategies and behaviours participants employed in response to the dynamic accelerator learning environment, and when. The order for presenting the interview findings is - Cohort, Managers and Mentors.

6.3.1 Participant learning experience: Cohort

Accelerators are a unique form of start-up assistance in that, unlike incubators, they competitively select participants to enter, complete and graduate from the time-bound programme together (Clarysse, et al., 2015; Isabelle, 2013). Further, teams of participants are commonly situated in shared work environment (Cohen, 2013a). Accordingly, Strand 3 explored how the cohort environment influenced participant learning and performance.

Participant interviews were punctuated with anecdotal stories of the accelerator learning experience. Twists-and-turns and ups-and-downs were often explicit in participant descriptions. However, a theme central to near all interviews was the essential and powerful role the Cohort played during their accelerator learning experience and afterward.

Specifically, participants described the processes for learning from others and contributing to others' learning. Several founders made comments which

succinctly reference the learning role the Cohort played in their accelerator experience. One states:

> Instead of being three people discovering new things and sharing them, there were 30 people generating new ideas. Like not everyone need[ed] to reinvent the wheel (PIP7).

Another participant suggested how being alongside their peers provided a real-time soundboard for their experience:

> It was a good sanity check having the other teams there. You had someone in the exact same position who you could just talk to, and they would immediately understand what was happening (MTVIC7).

At the core, participants just found it good to help and be helped by others:

> It was nice to meet other people, have a good time, learn about other businesses and help each other at the same time (KEL6).

These types of comments were common and pointed toward the sense of place, community, and support participants received being a member of the Cohort. Participants described feeling alongside and with peers when they experienced challenges and setbacks. For instance, one founder describes how they felt hearing about other team's setbacks:

> I think there was a lot of emotional support which flows over into the learning aspect. Every Friday we would do the 'good, bad and ugly' meeting and sum up the week. I still remember the Black Friday, where two of the teams got up there and basically said 'our entire market has fallen apart, and we don't have a

business anymore. Now we are going to have to pivot, and we don't have any ideas for anything.' And every single company in there felt that pain with them. And felt like you were on that journey with them as well. The amount of support there was incredible (LAM8).

Another founder offered a specific example of the support his team received from the CEO of another team after learning their team failed their first business and was struggling:

The CEO from HATAITAI was like yeah here is all of my … He actually pulled out a file of all the business ideas that he had had since Uni, and he was like 'here you go guys. This is my list of 50 crazy ideas and some of them not so crazy.' And he was like 'boom' this is my thinking, this is all the market research I have done. And, I was like 'holy shit' we have just known this guy for a week, and he is already helping us. This is awesome (KEL6).

Other comments referenced how the opportunity to learn alongside peers helped spark their motivation, confidence, and sense of camaraderie. For example, one founder describes how they did not feel isolated when experiencing adversity because they could see how others experienced setbacks yet rebounded from them:

Like something terrible happens to you and then something pretty bad happens to another team. So, you are like … 'it happens'. And, then you remember something bad happened to that team a few weeks ago but look at where they are now. And, it just gives you motivation, a big motivation boost (PIP8).

The co-working environment meant events and experiences some people had were observable to many. For instance, several founders shared how the public learning environment provided ongoing opportunities to learn what to do by watching how others tackled learning challenges. For example, one describes how watching others helped chart their next steps:

> It was awesome having those guys on the other steps because you could have someone a couple steps ahead of you and you would be like 'ah sweet, that is how you approach it.' So for us, it almost felt selfish because we were learning how to do the next bit from the guys in front of us. It worked nicely for us (ARO9).

And another participant offers that watching others reduced some of their need for learning through experimentation:

> It was awesome having nine other teams with you. It meant you could learn their stuff as they were doing it. You know without having to go down those tracks yourself. So, you could just straight up learn from what they were doing. And you would be like 'hey they did that really well … let's just yank that' (ARO8).

Not only did participants learn what to do, observing others helped them to both learn what not to do and to become self-aware of limitations. One founder frankly pointed to how, at times, they were blind to their flawed ways:

> I think you learned a lot about the process by seeing the other teams. Because it is easier to see how someone else is (…) up than it is to see how your team is (…) up. And, it is easy to see how another team does well relative to yours (MTVIC9).

Another founder also spoke of how observing processes of high-performing teams provided a mirror for viewing their shortcomings:

> At the lab, you have the top talent in New Zealand. So it can be kind of frustrating when you see how your team could be working. Like how you should be functioning more like the other teams around you. But you can't see it in yourself. Like that definitely made us see that we were having as many problems as we actually were because we were not as well-oiled as some of the other teams (NOR7).

The process of learning from others did not occur immediately for most participants. They expressed a need to settle into the community by learning group norms, processes and expectations. Being amongst other like-minded people was perceived as beneficial for by many founders. For example, one founder states:

> Like it was fantastic! It was amazing having all of these other people who have the same dream and goal as you sitting in the same room. And, it was great to be able to commiserate and celebrate with all these guys who just understood (PIP9).

And, another offered:

> Your life become the lab because the people you work with are the same people who you go out and hit the piss with. And so. In that sense it is quite a closed-off ecosystem. But, it is also a very cool one because your sole focus, for that three-month period, your sole focus is that you are all going to get funding on demo day (MTVIC7).

Participants indicated that the processes of giving and receiving feedback were important for their learning. However, as one founder stated, it took time for participants to build up the trust to do so:

> Yeah, so I think it took a while for the relationships to form between the teams to a point where you could have a good banter. And, I think that was a crucial step because once you felt comfortable ripping out another team you could feel comfortable getting ripped out by them (MTVIC7).

The interview process made clear that many participants invested in building relationships that were not viewed as time-limited. Rather, they expressed the long-term value the relationships with their peers offered for their learning for both the near- and long-term. The value of the fast-faced, frequent interactions was described by one founder:

> Constantly bouncing stuff off each other is the way to go. Like it helps with the learning and like building a network of people that you can continue bouncing ideas off afterward. Basically, just a set of mates who are all trying to do the same shit. And, cry on each other's shoulders from time to time (ARO7).

Moreover, several ranked the value their peers offered during and after the accelerator as more valuable than interactions with the management team. For instance:

> To be honest, the peers added much more value than the management team to us. And even post Accelerator, have that peer network is really valuable. It is just really cool knowing that these people went through something like that with you. It is kind of cool when you catch up with them that you know that

they have gone through the same battles. You can talk battle stories with them. It is really quite valuable (LAM8).

Conclusion – Cohort

Participants identified the Cohort as a powerful resource for their learning. They expressed that being part of the Cohort offered them both near-term and long-term benefits. In the near-term, they could have a chat to swap ideas, observe how others approached challenges and adapt it to suit their needs. From a long-term perspective, they felt the sense of community, network and support they gained persisted beyond the accelerator. The informal learning opportunities were many as described by a founder from NORTHLAND:

> You saw, which kind of people work collaboratively versus ones that were kind of in it for themselves. You saw what kinds of ideas were going to work and which ones wouldn't. You saw which types of pitches worked, which personalities worked in that kind of situations and which ones didn't work, and I think what strategic failures that some teams made and which strategic successes other teams made … I think all those memories and experiences will just come back and influence my way forward. That is the learning right! (NOR8).

For most participants there were many benefits of being alongside other start-ups. Peer interactions helped participants speed up learning processes and be more flexible in how they thought about and acted on feedback. Importantly, most described a sense of solidarity arising from being 'in the trenches' with other start-up founders operating at the same stage of business development. However, the co-working environment was challenging for some. These individuals shared that the constant social distractions, different personalities and lifestyles, and interpersonal conflicts within and between teams prompted them to work offsite.

6.3.2 Participant learning experience: Managers

The accelerator management team was a key learning resource for participants. These individuals typically possess both deep personal experience with the start-up process and strong personal and professional connections to other start-up entrepreneurs. Accelerator managers provide the professional oversight of the programme design and supporting participant learning and business development. Generally, they work at the same location as participants for the duration of the programme thereby affording participants with easy and regular access to coaching and advice.

In general, interview study participants described their interactions with Managers an important component of their learning experience. Participants felt Managers aided their learning by being accessible and supportive, pushing them to try new things, providing both affirmation and correction and, importantly, helping teams from getting lost in detail by offering a higher-level perspective of process and progress.

Working from the accelerator site enabled Managers to cultivate a deep understanding of each team's successes, challenges and needs. For instance, Managers hosted a weekly one-on-one meeting with each team. These meetings aimed to provide direction, guidance and accountability. A comment by a PIPITEA founder captures the value of these meetings for participants:

> Without those meetings, I think you would lose structure. It would be like, 'what are we supposed to be doing this week?', rather than it being this 'this is week X and this is your goal for the week' … And, after meeting with the Managers, we would put in new systems. It allowed you to track progress and not forget what you had done (PIP8).

During Phase 1, Managers helped by aggregating Mentor perspectives. They helped participants by distilling key 'need-to-know' messages from the multiple, and often disparate, sources of feedback. As the programme progressed, they also served as an important source of advice and coaching. For instance, a founder from MTVIC points to the role the Managers played in their personal development:

> I went to the Manager with mostly non-technical specific questions. They were more like, 'I am not quite sure what to do here' or 'I am not sure if this feels right.' He was much more like a guidance counsellor. Almost, he almost took a more paternal role with our team (MTVIC7).

Although interactions with Managers were perceived as helpful for learning, several participants likened Managers to Mentors but with more power over teams. Furthermore, a lack of clarity concerning the role Managers played in their businesses made it difficult to know how to use them to best advantage. For instance, Managers were responsible for developing successful teams, ensuring the accelerator was successful, and protecting their interests—like their job and shares of equity in each venture. A participant from LAMBTON pointed to the tension participants faced:

> Because they were shareholders, there was a perception they can tell you what to do … because they are the ones running the accelerator. But in reality, they probably don't understand your business as well as you do. Therefore, they should be able to step down faster than the company when saying what they do (LAM8).

At one level Managers functioned as a member of each team's board of directors and at another like the director of an investment fund. For instance, they have the power to approve and take away accelerator-related tranche

payments and they function as a conduit for team progress to investors. Consequently, several participants spoke of a general reluctance to share what was going on warts-and-all, even if it meant limiting access to important advice.

Conclusion – Managers

The interview findings demonstrate that participants found interactions with Managers an essential component of their learning experience. These findings supplement and extend the survey findings which demonstrated, over several phases, that participant interactions with Managers influenced their frequency of engagement in *Agile Learning* strategies and behaviours and their perceptions of enhanced *Learning Outcomes*.

To work most effectively and pull the greatest learning from interactions with Managers, participants suggest it is important for future participants to (a) come to each Manager interaction with a plan for what they want to get out of each exchange to ensure feedback is specific to their needs; (b) recognise Managers have a limited understanding of their team's business and therefore, consider all advice in light of what the teams already know since *they* are the experts; and (c) perform to the metrics for your team rather than succumbing to pressure to perform against generic accelerator metrics supplied by the management team. The next section presents the role and utility of Mentors for participant learning.

6.3.3 Participant learning experience: Mentors

Accelerators utilise an intensive mentoring model to aid participant learning and business development. This network of volunteer experts (Mentors) is recruited, selected, and administered by the accelerator. In general, the aim of connecting participants with these experts – former founders and technical experts – is to cut short their learning and business development processes through the provision of expert advice and coaching. During the first 30 days (Phase 1), each team of

participants met with four to six Mentors per day. After which they elected to continue meeting with Mentors they deemed high value for the duration of the programme.

For the current study, participants varied widely in their reactions to the mentoring process. For most, the intense 'mentor dating' process was overwhelming. However, a few found the experience personally and professionally enlightening. A founder from PIPITEA shared how the intensity of the mentoring process left them feeling a bit in denial and 'caught out' by learning what they did not know:

> There was a kind of denial for some of the questions in the beginning just because we had this idea that we were, I guess, further ahead than they thought we were. And it was quite hard, especially in those first weeks, because it came on so hard and heavy when you are each seeing four Mentors a day for half an hour. And you are iterating so hard each time trying to get just a little better answering those questions, and they are still coming up with new ones. And it started to become this huge list of things we did not know (PIP9).

In contrast, a founder from MTVIC felt the intensity of the mentoring process was an opportunity to 'step up' and prove themselves:

> Being forced to talk to so many Mentors was a good thing because you had to keep your reputation in there and prove yourself, so that kept you on top of your game (MTVIC8).

Overall, perceptions of the mentoring experience varied. However, all participants spoke of a need to learn how to process and reconcile conflicted feedback from multiple sources from multiple perspectives and, due to the accelerator's time-

compressed mentoring strategy, to do so quickly. A founder from PIPITEA describes the learning challenge participants faced when dealing with conflicting Mentor feedback:

> You learned stuff from Mentors, but the meta-learning from all that was just like … how do you process 20 different opinions, from a bunch of smart people, who are experienced in what they are talking about, and yet they are all conflicting? Half are conflicting the other half. Like that was the first time that I had dealt with it and it was tricky. They talk about mentor backlash and it is not good (PIP8).

Many participants felt the feedback they received from Mentors was generic. Consequently, participants needed to draw on their knowledge and experience rather than merely adopting and actioning Mentor suggestions. A founder from RONGATAI suggested assigning an 'expert halo' to Mentors is flawed thinking because participants are the ones who know their business best:

> They are going to throw a ton of Mentors at you in the first week and first month, and these guys, you may think that they know their shit, but really they don't know much about your business. They don't know much about your team and about your situation. Their advice is coming from their point of view (RON7).

Some participants also described how their learning was disrupted by Mentors who pushed for unrealistic performance metrics and 'taunted people into action' (PIP7). Moreover, the mentors were viewed as being prone to stating opinions as facts rather than qualifying their advice as merely informed opinions. The power dynamics inherent in these interactions was summed up by a founder from LAMBTON:

> We actually found a lot of them [Mentors] were shut down. Like
> they had a one-track mind and you couldn't get them out of it.
> Ironically, the whole point of connecting with Mentors is they are
> meant to open you up to many different ways of thinking. But
> we found you couldn't challenge them back (LAM7).

In addition to the sheer volume of feedback, participants indicated the source of the feedback mattered. In general, good Mentors were characterized as individuals who asked questions instead of telling you what to do, who helped participants identify blind spots in their thinking and formulate next steps for learning. Moreover, those who demonstrated a commitment to developing entrepreneurs and the NZ start-up ecosystem rather than those just vetting their next investment were highly prized. A founder from KELBURN shares how they struggled to generate business interest from Mentors after invalidating their first business model. However, they did later find Mentors interested in helping grow entrepreneurs and people:

> Because we really didn't have a clear direction at the start, the
> Mentors all kind of dropped off. I think they were not interested
> because they were looking for the ones that would make them
> money in the long term. So we really struggled to get a group
> of Mentors that would really be able to help us. In the end, we
> did get three Mentors who were in there to sort of help, to help
> us grow as individuals and to help us learn. So that was cool. It
> was really cool (KEL6).

Participants noted that the compressed mentoring window was in many ways at odds with developing functional, supportive and trusting relationships with Mentors because those relationships take time to build. For instance, a founder from MTVIC states:

> I do think there was a lot of time wasted in Mentor meetings because it is hard to go to someone and be like I want to discuss this specific thing with you if you do not know who they are and what they offer … you need to meet them and build a relationship first. But then you are meeting so many people that you just can't do it (MTVIC7).

Many participants indicated a knowledge, skill and experience mismatch between Mentors and the unique start-up-centric needs of each team. Alternatively, some Mentors were well suited for mentoring in the start-up space. The unique learning and business development needs of the accelerator teams quickly outpaced available knowledge. Notably, participants felt many Mentors operated in business contexts far removed from the learning needs, risks faced and decision-making processes facing start-ups. A founder from THORNDON pointed to this skill and experience mismatch:

> You should have to be successful at building a small business before you come in and try to mentor a small business. There were people who've been successful at large businesses, you know, successful in corporate environments that were giving start-ups corporate advice and that doesn't really work (THO9).

Consequently, participants found these individuals offered little value in terms of aiding their learning and business development needs.

Conclusion – Mentors

Collectively the presented findings suggest participants found the mentoring process both helpful and disruptive. The intensity of the meeting schedule and the variability of start-up-specific expertise held in the pool of Mentors limited participant learning. The pace and intensity of the meetings did not allow

participants enough time to adequately reflect upon and make sense of the feedback they received, sort for relevance and value, and act. In addition, participant learning needs quickly outpaced available expertise.

During the interviews, participants offered a range of strategies to help future participants learn quickly and flexibly within the intensive mentoring environment. These suggestions can be categorised broadly into three categories: invest in relationships, have a plan, and document learning along the way.

Rather than seeking Mentors based primarily on the technical knowledge or networking opportunities they offer participant comments suggest it is super important to identify Mentors that you can connect with at a personal level. Strong interpersonal relationships help participants to be flexible in their thinking which in turn can lead to more effective and efficient processes of doing. Further, having strong relationships can help participants become more willing and open to receive Mentor feedback and provide participants with means of gaining more perspective on their thinking rather than just adopting the perspectives of others. Participants also suggested it is critical to have a plan for what you want to accomplish in the accelerator.

Lacking a clear sense of purpose and values makes participants vulnerable to being swayed by Mentors' ideas and advice. The findings suggest that when teams knew what they wanted to accomplish they were able to better select who they wanted to meet with and for what reasons. Moreover, clarity can be shared. Consequently, by being in the loop Mentors can better target their assistance and support to fit the needs of the team. Also, participants become better positioned to compare Mentor feedback because each interaction can be based on a common foundation of understanding. Although having strong relationships and a plan is helpful for learning, participants also indicated it is necessary to have a strategy for managing learning inputs.

Participants spoke of different strategies for managing the volumes of information they accessed in the accelerator. They suggested it is necessary to develop systems to document all meetings, advice, thinking and decisions. Documentation provides the means to identify, individually and collectively make sense of and understand conflicting feedback. Documentation also helps participants expose the reasoning behind their thinking and actions and assess and integrate feedback from others.

6.3.4 Discussion of participant learning experience

In sum, the field study provides core qualitative evidence. The interview method provides both a validity check and a way to expand understanding further. Key takeaways from the interview analysis are (a) Cohort interactions provided emotional support and the means to cut short learning by observing what worked and what didn't work for others; (b) Managers, who hold a lot of implicit and explicit power that participants must make sense of and navigate, are helpful as aggregators of feedback; providers of coaching, advice and support; and for setting expectations; and (c) some Mentors offered valuable technical expertise and assistance, personal guidance and support but others tended to offer generic feedback and, at times, asserted opinions as facts.

Some participant suggestions for how best to strategically learn in an accelerator include

- ask for feedback, help, and support early and often;
- set aside time to make connections with others in the accelerator;
- watch what others are doing and exploit their learning;
- be generous and share what you know, it will encourage others to do so as well;
- make plans explicit so you have something tangible to measure your efforts against;
- make time to reflect on your goals and objectives, and to ensure they still align with personal values; and,

- document your learning to reinforce what has individually and collectively been accomplished.

6.4 Chapter Summary

The aim of the interview research was to capture retrospective perceptions of the accelerator learning experience at the level of the participant. Specifically, the interview method sought to identify elements of the accelerator learning environment that helped and hindered participant learning and performance. Although the interviews explored a range of issues, the analytic focus was placed on the *Learning Resources* (Cohort, Managers, and Mentors) associated with the survey research. The reasoning behind this choice was to provide a validity check to survey data.

There are several key takeaways from the interview research that shed light on how accelerators influence participant learning and performance. Participants felt the: Cohort provided emotional support and the means to short-cut learning by observing what worked and what didn't work for their peers; Managers were helpful for aggregating feedback, providing coaching, advice and support, and setting both expectations and the pace for business development; and, Mentors offered mixed value as some offered valuable technical advice and personal support and other Mentors offered generic feedback, asserted opinions as facts, and low-value advice. Taken together, the findings suggest participants experienced the greatest positive benefits for learning and performance from, most to least, the Cohort of peers, then Managers, and then Mentors. These results align closely with Strand 1 and Strand 2 findings.

Chapter Seven provides an integrated discussion of the three-strands of findings. The three-strands of data add layers of understanding about how accelerators influence participant learning and performance, and collectively they generate a better, and more complete, understanding of the research sample.

Chapter 7 | Discussion

Chapter Seven provides an integrated discussion of the findings generated through this three-strand mixed methods study. The investigative context for this multilevel study is accelerators and accelerators as learning environments. The research questions investigated are: *How do accelerators influence participant learning and development?* - and - *What does learning agility theory add, if anything, to our understanding of participant learning and development in accelerators?*

Each strand of the study examined participant learning and development at a different level of participation associated with accelerator programme design logic (i.e., survey-cohort; observation-team; interview-participant). The analytic focus for each strand was the same – participant learning and development. Each lens adds partial understanding for how accelerators influence participant learning and development. However, a better, and more complete, understanding is achieved by integrating the three strands of findings in relation to the four research hypotheses.

Chapter Seven starts with a brief review of the research aim, approach and summary of key findings for each strand of data collection. Then an integrated discussion of the collective findings for each hypothesis is offered. Theoretical and practical are offered, methodological implications addressed, limitations noted and opportunities for future research suggested.

7.1 Summary of Research Aim, Site and Participants, Design and Methods

The three-strands of this mixed methods study examined the same phenomenon but did so from the different levels of participation embedded in accelerator programme design (cohort, team and participant). Collectively, the multisource

data helped generate, in breadth and depth, a longitudinal and multilevel understanding of how accelerators influence participant learning and development. Four hypotheses were developed and investigated to help answer the two research questions (see CH 2). Table 7.1 provides a summary of the hypotheses and the research questions to which each relates.

Table 7.1.

Summary of Hypotheses and Research Questions.

RQ1	How do accelerators influence participant learning and development?	
RQ2	What does learning agility theory add, if anything to our understanding of participant learning and development in accelerators?	
H	RQ	Description
1	1	Participant interaction with *Learning Resources* positively predicts enhanced participant *Learning Outcomes*.
2	2	Participant interaction with *Learning Resources* positively predicts the frequency of participant engagement in *Agile Learning* strategies and behaviours.
3	2	The frequency of participant engagement in *Agile Learning* strategies and behaviours positively predicts enhanced participant *Learning Outcomes*.
4	1&2	Participants from Funded and Non-funded teams will demonstrate a difference in measures of *Learning Resources*, *Agile Learning*, and *Learning Outcomes* over the three phases.

Note. Author is source. Adapted from Table 2.9, order changed for emphasis.

The research site was a GAN affiliate accelerator programme based in New Zealand. The twenty-nine study participants were associated with the ten teams admitted to a single accelerator cohort. In general participants were in their mid-twenties, male, and university educated (see CH 3).

Strand 1 employed a quantitative repeated measures survey approach (see CH4). Both quantitative and qualitative survey data were collected during the accelerator. The survey research entailed a pilot at outset and three surveys during the accelerator, each collected 30 days apart. The twenty-nine participants associated with the accelerator cohort responded to each survey. Analyses included tests for association, effect, and difference. Each hypothesis was tested for each phase. This was done to consider how relational patterns

between the research constructs evolved over time. The primary lens for analysis and reporting was the cohort (Hypotheses 1-3). However, a team lens was applied for analysis and reporting of Hypothesis 4. This was done to build a conceptual bridge between the cohort and team lenses.

Strand 2 applied a qualitative observation method (see CH5). Observation data was collected during the accelerator. The observation research collected primary and archival data. Data sources included: researcher field notes, participant qualitative survey responses, manager qualitative survey responses, manager and mentor feedback, and learning journals for each team. The same twenty-nine participants associated with the survey research participated in the observation research. The accelerator, learning agility, and individual performance concepts underpinning the survey research were explored qualitatively. However, the analytic focus stepped down one level of accelerator participation to teams. The team lens was included to acknowledge the central role teams play in the accelerator programme logic. The analysis examined the influence of both personal characteristics and situational factors on learning and development in teams.

Strand 3 employed a qualitative interview method (see CH6). Interview data was collected some six months after accelerator. The aim of including this retrospective assessment of the participant learning experience was to capture reflections not explicit to, nor immediately accessible from, participants during the accelerator experience. The same twenty-nine participants associated with the survey and observation research participated in the interview research. Again, the analytic focus stepped down one level of accelerator participation. The participant lens was included because participants are the requisite unit for accelerator teams and cohorts. The interviews explored how participants learned in general, and the aspects of the accelerator experience that enabled or hindered learning and development. Specific attention was paid to the types, quality and outcomes of learning interactions with the accelerator *Learning Resources* and the learning strategies participants selected and deployed.

In sum, Strand 1 (survey) and Strand 2 (observation) occurred during the accelerator. Respectively, these methods were included to generate insight on participant learning and performance through both a cohort and a team lens. The qualitative interview method (Strand 3) captured the participant learning experience in retrospect and did so through a participant lens. The research assigned priority to the survey strand, and the two qualitative methods were incorporated to supplement and extend the survey findings. The next section provides a summary of the key research findings.

7.2 Summary of Key Findings for Strands 1-3

The following pages provide a summary of key findings in table format. Table 7.2 provides a summary of quantitative survey findings for Hypotheses 1-3 (Strand 1). Results for Hypothesis 4 are narrated separately. Table 7.3 present a summary of qualitative findings for Strand 2 (observation) and Strand 3 (interview). These tables are included as advance organisers for the discussion section. The discussion section integrates the three sets of finding and levels of participation against the backdrop of each hypothesis.

Table 7.2.

Strand 1: Summary of Key Findings for Hypotheses 1 – 3, Bivariate Correlations, Multiple Linear Regression Models and Coefficients.

Analyses	Hypothesis 1	Hypothesis 2	Hypothesis 3
Bivariate Correlations	78% are sig.	42% are sig.	42% are sig.
Regression Models	92% are sig.	42% are sig.	42% are sig.
Regression Coefficients	6 are sig.	7 are sig.	4 are sig.
Phase 1	—	Cohort positively predicted Reflection.	—
Phase 2	Managers positively predicted Task.	Managers positively predicted Feedback Seeking, Experimenting & Flexibility.	Experimenting negatively predicted Adaptive. Reflection positively predicted Adaptive. Flexibility positively predicted Task & Swiftness.
Phase 3	Cohort positively predicted Task & Relational.	Managers positively predicted Knowledge Seeking, Experimenting & Reflection.	—
All Phases	Cohort positively predicted Adaptive.	—	—

Note. n=29 for each Phase. 0.01 <p< 0.05* for all reported results.

Hypothesis 1 – Participant interaction with Learning Resources positively predicts enhanced participant Learning Outcomes.

Hypothesis 2 – Participant interaction with Learning Resources positively predicts the frequency of participant engagement in Agile Learning strategies and behaviours.

Hypothesis 3 – The frequency of participant engagement in Agile Learning strategies and behaviours positively predicts enhancement of participant Learning Outcomes.

Table 7.3.

Summary of Key Findings for Strand 1 and Strand 2.

#	Strand 2, Observation Method	Strand 3, Interview Method
1.	General – the quality of interpersonal relationships within teams is more influential for success than quality of business ideas.	General – value of Learning Resources for enhancing participant learning & performance: Cohort – high, Managers - moderate & Mentors – low.
2.	General – situational factors such as business re-starts (3 teams) & minor pivots (6 teams) affected how participants approached learning & performance individually & in teams.	Cohort – participants valued peer interactions, both informal & vicarious, for learning social norms, processes, & expectations, & for letting off steam & having fun.
3.	Performance – high Contextual Performance in Phase 1 was associated with positive performance & end of programme funding outcomes (5 of 6 teams).	Cohort – participants used peers' experiences as a lens for self-appraisal of individual knowledge, skills, and values, & their team's progress & functionality in relative terms.
4.	Performance – high Contextual Performance included the following team level agile strategies: similar knowledge, skills, values & levels of risk tolerance; low ego, & high commitment to learning.	Cohort – participants valued peer interactions for the sense of solidarity & support they experienced, which also enabled them to feel safe exploring personal & professional issues.
5.	Performance – high team Contextual Performance supported individual agile learning strategies through processes of support, transparency, self/other care, social exchange & psychological safety.	Managers – participants perceived Managers as a useful & accessible source for expert advice & coaching, and for their ability to aggregate Mentor feedback.
6.	Agile Learning – learning strategies & behaviours need to be stage appropriate to benefit from learning interactions. Effective strategies are: Phase 1, Reflection & Knowledge Seeking; Phase 2, Feedback Seeking, Experimenting & Flexibility; & Phase 3, Knowledge Seeking & Flexibility.	Managers – participants appreciated the direction, expectation and pace-setting role managers played in their business development process.
7.	Agile Learning – some learning strategies & behaviours are harmful at some stages, or signal harm. For instance, being defensive, protecting, withholding, avoiding feedback, new ideas, & ways of doing things & thinking & acting the same even when evidence suggests otherwise.	Mentors – participants indicated they played a limited role for their learning & performance. Initially they illuminated blind spots associated with participant business models & industry knowledge. However, they quickly identified much feedback & advice as generic, & conflicted.
8.	Agile Learning – participants with high learning agility adapted well to changes in the business development environments & continued to demonstrate appropriate & effective interpersonal interactions (high contextual performance).	Mentors – participants perceived a general mismatch between the knowledge, skills, & expertise offered by many Mentors & their unique needs. Moreover, motives behind involvement for some Mentors were unclear, thus affecting perceived value of their contribution.

Note. Strand 2 data collected during the accelerator, and from multiple sources. Strand 3 data collected six months after the accelerator.

7.2.1 Discussion of findings for Hypothesis 1

Hypothesis 1 – participant interaction with *Learning Resources* positively predicts enhanced participant *Learning Outcomes* – concerned the primary research question: How do accelerators influence participant learning and development? (Table 7.1). Findings from each study suggest partial support for Hypothesis 1. Table 7.2 provides a summary of support for Hypotheses 1 – 3, and Table 7.3 offers key qualitative findings. A discussion of findings for Hypothesis 1 follows.

Strand 1 (repeated measures survey) illuminated the important interactive effect Cohort and Managers exert on participant *Learning Outcomes* as indicated by the performance behaviours they engaged in (Chapter 4). In all phases, Cohort interactions positively predicted how well participants approached, assessed, and adapted to changing business requirements (Contextual - Adaptive). Cohort interactions also positively predicted participant ability to achieve business development objectives and accelerator expectations (Task, Phase-2), and the extent they experienced enhanced interpersonal relationship (Contextual - Relational, Phase-3). Manager interactions also positively predicted enhanced task performance behaviors (Task, Phase-3). These results were expected and support prior research that suggests participant learning benefits from interactions with both Cohort and Managers (Cohen, 2013a; Hallen et al., 2016; Wise & Valliere, 2014), and that access to feedback, coaching and advice enhances overall learning and performance (Ashford, 1983; London & Sessa 2006; McCall et al., 1988; McKenna et al., 2007).

Unexpectedly, Mentors did not enhance participant performance in any of the dimensions assessed, nor in any phase. This finding is contrary to both industry assertions and programme logic which imply a positive association between Mentors and accelerator outcomes, of which learning is one (Colombo et al., 2018; Hoffman & Radojevich-Kelly, 2012; Miles et al., 2017). This finding is

especially counterintuitive for Phase 1, because participants meet daily with numerous Mentors scheduled by the accelerator during the first month and the explicit objective of these meetings is to provide expert advice and coaching. Strand 2 (qualitative field study) identified that participant levels of Task and Contextual Performance varied between participants and between phases, and these person-level differences influenced team performance outcomes (Chapter 5). Although the accelerator programme design features (e.g., advice, coaching, educational workshops and mentoring) appear helpful for aiding participants to maintain and advance their businesses, this study's findings suggest participants must demonstrate high Contextual Performance in order for these resources to be effective in influencing enhanced Task Performance in teams.

Rigorous selection practices suggest accelerator participants are primed for success (Miller & Bound, 2011; Roberts et al., 2016); however, the results of this study suggest participants operate under conditions of constant change. For instance, part way into the programme three teams restarted with a new business model and another six teams made minor business pivots. Although some changes – such as failed supplier relationships – originate externally to the participants, how each person made sense of these changes was an intrapersonal process (Bridges, 2004).

Thus, participants varied in their responses to change and this variance affected how participants behaved when working on core business processes and how they interacted with others. The variance also affected levels of both Task and Contextual Performance behaviours and how one participant responded often impacted how others would react, and vice versa. Participants with poor interpersonal behaviours negatively affected emotional and psychological safety within teams (low Contextual Performance). This may be because they failed to make the critical intrapersonal transitions associated with the changes they, and their team, experienced.

The multiple source of field study data pointed to interpersonal dysfunction within some teams. For instance, statements referencing disrespectful interactions and posturing for power (THORNDON). Dysfunction within teams often spilled beyond team boundaries to interactions with others. Managers, Mentors and Cohort often purposefully avoided these individuals and teams. Thus, artificially limiting access to much-needed learning and business development supports. Moreover, low levels of Contextual Performance seemed to be aligned with how individuals within teams generated ideas, explored opportunities, and made necessary routine and novel business decisions (low Task Performance).

The findings highlight the importance of social relationships for learning in entrepreneurial environments (Gibb, 1997; Rae, 2004), and that participant Task and Contextual Performance behaviours (Motowidlo, 2003) can both help and hinder team business development and interpersonal functioning, and this relationship appears reciprocal. Moreover, how participants deal with changes at both intrapersonal and interpersonal levels influences performance outcomes (Bridges, 2004; Cope, 2011; Hogan et al., 2010). In other words, how collectives of participants behave can also influence individual learning and performance behaviours. Poor team formation processes (e.g., NORTHLAND) affected the strength of relational ties in some teams, and this reinforced dysfunctional social processes.

The findings from Strand 3, (retrospective semi-structured interviews) illuminate further the value of the Cohort for enhancing participant performance in all phases. Learning interactions with peers were highly valued; Managers moderately; and Mentors little (Chapter 5). Participants, in particular, used social interactions and peer observations to learn group norms, processes and expectations, and others' successes and challenges helped inform what to do and what not to do. They also self-assessed their levels of knowledge, skill and progress by using their peers' progress as a mirror for themselves. Moreover, participants felt emotionally supported and safe to explore non-accelerated issues such as what to do if their venture failed. These findings are consistent

with other research that suggests peer interactions provide participants with opportunities to learn informally and vicariously (Levinsohn, 2015; Hallen et al., 2017; Marsick & Watkins, 2015). In other words, participants can use their peers' experiences to learn more quickly thereby conserving critical resources such as time and cognition for other tasks.

Managers enhanced participant performance by being an accessible source for expertise in start-up processes (Chrisman & McMullan, 2004; Rotger et al., 2012; Wise & Valliere, 2014; Yusuf, 2014), thus helping to offset some of the risks of being new (Stinchcombe, 1965). Managers also served as master navigators for the accelerator process. By being the custodians of the 'ideal plan' for validating and building a business within the short time frame of the programme, they played a critical direction- and expectation-setting role. Moreover, they aggregated Mentor feedback (Cohen, 2013a), tracked participant progress and provided an external source of accountability. All in all, Managers provided a form of external scaffold which helped boost participant performance along at a rate unlikely to have been attained independently (Vygotsky, 1973).

Although, Managers played an important role for boosting performance, some teams experienced business development slowdowns due to not knowing how to reconcile the procedural and business development expectations of the accelerator (reporting, attending events etc.) with their own. Moreover, some felt pressured to make decisions that appeared to primarily benefit the accelerator and occurred at the expense of their team (KELBURN, LAMBTON), and others self-censored reporting for fear of losing the Managers' support (AROVALLEY, PIPITEA). This novel set of findings may offer practical implications for accelerator organisers and will be addressed in Chapter Eight.

The non-effect of Mentors on participant performance found in studies one and two suggests participants found little value in these interactions. This is supported by some comments that mentor advice was glib and at times self-

interested (Eby et al., 2000; Yitshaki & Drori, 2018). Alternatively, even after receiving good, expert advice, participants with rigid mindsets may have failed to shift their beliefs, behaviours and actions (Grimes, 2018; Parker, 2006). This may have been due the problem identification and solution focus of the mentoring process. In other words, limited to a single- loop learning focus rather than a developmental double-loop learning approach (Argyris, 1976). Moreover, participants may have simply reached a point of saturation due to the frequency and intensity of the mentoring interaction, thus the value of these exchanges diminished over time (DeRue & Wellman, 2009).

The implicit role of Mentors is to guide participant learning and development through prompting reflection and action through the provision of expert coaching and advice (Bernthal, 2017; Grimes, 2018; Memon et al. 2014; Memon et al. 2015; Miller & Bound, 2011). When reflecting after the accelerator, some interview participants indicated Mentors offered limited value for enhancing their performance. Specifically, they played a role in illuminating blind spots associated with their business models and provided them with limited technical support, advice and coaching. However, many participants encountered advice that was generic and often contrary to other feedback; and, in general, there was a mismatch between the knowledge, skill and expertise offered and the challenges they face (Eby et al., 2000; Noe et al., 2002). Moreover, the value of these interactions decreased quickly over time, and may have been because Mentors did not have a similar level of 'skin in the game.' Alternatively, participants de-prioritised Mentor interactions and shifted their energy toward relationships that offered more immediate value, namely their peers.

In sum, the collective findings for Hypothesis 1 suggested participants experienced enhanced learning outcomes through social learning interactions (Bandura, 1993, Cope, 2005; Lave & Wenger, 1991; Vygotsky, 1978) primarily with peers. Moreover, the findings illuminated the important role of informal and incidental learning in dynamic, experiential learning environments like accelerators (Cohen, 2013a; Hallen et al., 2016; Mansoori, 2017; Marsick &

Watkins, 2001, 2015). High Contextual Performance appeared to contribute more value toward end of end-of-programme funding outcomes than having a good business plan. In other words, good ideas could only be taken so far by participants demonstrating poor interpersonal behaviours. Lastly, the sources of interaction which offered the greatest levels of influence on participant performance were the Cohort and Managers. Mentors played a limited role in enhancing participant learning and performance.

The next section considers findings related to the role Managers, Mentors and Cohort played on participant learning strategies and behaviours.

7.2.2 Discussion of findings for Hypothesis 2

The objective for investigating Hypothesis 2 – participant interaction with *Learning Resources* positively predicts the frequency of participant engagement in *Agile Learning* strategies and behaviours – was to answer, in part, the second research question: What does learning agility theory add, if anything, to our understanding of participant learning and development in accelerators? (Table 7.1). Taken together, the findings from each study suggested partial support for Hypothesis 2. Table 7.2 provides a summary of support for Hypotheses 1 – 3, and Table 7.3 offers key qualitative findings. A discussion of findings for Hypothesis 2 follows.

Strand 1 (repeated measures survey) findings indicated participants engaged more frequently in *Agile Learning* strategies and behaviours as result of interactions with both Managers and Cohort. These results were expected. However, interactions with Mentors did not predict engagement in any *Agile Learning* strategies during any phase, and none of the *Learning Resources* influenced participant engagement in *Agile Learning* during Phase 1 (Chapter 4). These results were unexpected.

During Phase 2, participant interactions with Managers positively predicted the frequency to which they asked for feedback on their performance (Feedback Seeking), experimented with new ideas and approaches (Experimenting), and to demonstrate flexibility in their thinking and actions (Flexibility). Moreover, during Phase 3, participant interactions with Managers positively predicted the frequency to which participants sought new ideas and perspectives (Knowledge Seeking), continued to experiment to learn (Experimenting), and used reflection as a strategy evaluate their learning and performance and be more effective (Reflection). Each of the learning strategies prompted by interactions with Managers appear appropriate for the programme demands associated with both Phase 2 (for example, identifying a final business model) and Phase 3 (preparing to court investors).

Participant interactions with their peers (Cohort) positively predicted frequency of participant engagement in reflective practices for learning (Reflection, Phase 1). Thus, suggesting participants acculturated to the accelerator experience by reflecting not only on their own experience but also other's experiences, and what they meant for them (Cohen, 2013a; Marsick & Watkins, 2015). In other words, they used the good, bad and ugly experiences of others as a source for speeding their learning, and they did so by reflecting frequently.

The survey results affirm other findings which suggest interactions with accelerator Managers (Wise & Valliere, 2014) and Cohort (Cohen, 2013b) play an important role in participant learning and performance. However, the real value of Study 1 findings relate to the relationship between Managers and participant *Agile Learning* strategies and behaviours. The findings suggest participants used Managers differently for learning during each phase, and that these interactions prompted participants to engage in and shift between all five *Agile Learning* strategies. Moreover, the *Agile Learning* strategies selected match well with the demands of each phase. These findings align conceptually well with learning agility theory which places emphasis on the appropriate selection and deployment of learning strategies instead of merely having an

ability to learn (De Meuse et al., 2010; DeRue et al., 2012). Further, the findings suggest being learning agile appears helpful within an accelerator learning environment.

Notably, the positive predictive role of Managers contrasts the role of Mentors, who were found to not predict engagement in *Agile Learning* strategies and behaviours in any phase. These findings are similar to those identified for Mentors during Hypothesis 1 testing.

Strand 2 (the qualitative field study), found that participant levels of learning agility varied within teams, between teams and between accelerator phases (Chapter 5). Moreover, participant levels of learning agility affected team agility, and vice versa. This reciprocal relationship led to high levels of agile team behaviours for some teams.

The findings suggest individual levels of learning agility are not fixed, and that they can be influenced by situational factors (DeRue et al., 2012; McKenna et al., 2007). In many instances, accelerator participants from the same team demonstrated different levels of learning agility. Moreover, some high agile learners became confined by their situation, and in time they too demonstrated low levels of agility (e.g., NORTHLAND). As a reciprocal upward and downward cycle, learning agility appeared to affect the well-being of participants. High agile learners appeared to be more self-aware of their individual needs and those of their teammates. They practiced good self-care and encouraged others to do so as well. In contrast, high levels of stress and uncertainty overwhelmed participants demonstrating low levels of learning agilty and this sense of being overwhelmed impacted the learning and performance of their teammates.

In sum, participants high in learning agility appeared purposeful in their learning strategies for interacting with the Managers, Mentors and Cohort. Moreover, the

type of learning strategies occurring within teams was reciprocal in that individual behaviour shaped collective behaviour, and vice versa. Also, participant learning agility, individually and collectively, was both helped and hindered by the programme design. For instance, meeting with Mentors could enhance learning; however, the frequency of these meetings appeared to allow little available time to process the learning.

The findings from Strand 3 (retrospective interviews) echo those previously reported for the value of the Cohort as a powerful and constant influence on participant learning. Managers were a medium-level influencer of learning, and Mentors were a low-level influencer of learning.

Peers provided an accessible source for social learning and emotional support. Similarity with the peer group helped participants build connections that were both personal and professional. Social exchanges occurred freely. The interpersonal connections built helped many engage more fully in the public learning aspects of the accelerator. Participants described feeling supported by their peers, and publicly sharing (knowingly or nor) successes, challenges and failures helped make learning generated by one team accessible to all.
The presented findings point to a number of strategies for learning from Cohort interactions: for example, investing early and often in developing strong interpersonal relationships; sharing expertise and learning along the way and encouraging others to do so as well; asking for and giving feedback liberally; and using the learning and performance of others as a guage for your own.

Participants found Managers a useful and reliable source for expert advice and coaching. The findings illuminated a few takeaway strategies to help maximise the possible benefits of Manager interactions: be clear about personal values and desired outcomes in order to work with internally generated metrics rather than those set externally by accelerator management; for each meeting, have a

plan with needs and desired outcomes identified; and be sure to document learning insights so they are accessible in the future.

Although Mentors were given little value in Strands 1 and 2, some Strand 3 participants reported finding some value from specific mentors. However, this was primarily on a personal rather than professional level. Most participants likened the mentoring process to drinking from a firehose. Thus, suggesting the 'prototypical' intense mentoring model applied by the accelerator was overwhelming at the time. Specifically, participants identified it being difficult to reconcile the pressure to act with the need to process and reflect upon feedback received. Some participants described managing the tension but most struggled to do so well.

The interviews signalled a few strategies that may be useful for pulling learning from Mentor meetings. Those strategies included (a) investing time in developing relationships with Mentors who are aligned around personal and team values; (b) setting aside time to reflect on the perspectives enountered and evaluate them against those personally held; (c) exploring and challenging ideas to gain more perspective; and (d) when uncertain, exploring ideas held within the team rather than relying on external parties to guide decisions.

In looking across the suggested strategies participants offered for pulling value from interactions with Managers, Mentors and Cohort, some correspond with the theoretical dimensions of learning agility measured by the LAAI, but there are a few new ones. For instance, asking for feedback and making time to reflect are included in the LAAI whereas being clear on personal and team values may be novel additions.

7.2.3 Discussion of findings for Hypothesis 3

The aim for investigating Hypothesis 3 – the frequency of participant engagement in *Agile Learning* strategies and behaviours positively predicts enhanced participant *Learning Outcomes* – was to answer, in part, the second research question: What does learning agility theory add, if anything, to our understanding of participant learning and development in accelerators? (Table 7.1). When examined collectively, the findings from Strands 1–3 suggest partial support for Hypothesis 3. Table 7.2 provides a summary of support for Hypotheses 1 – 3, and Table 7.3 offers key qualitative findings. A discussion of findings for Hypothesis 2 follows.

Strand 1 (repeated measures survey) identified some participant *Learning Outcomes* were enhanced by some *Agile Learning* strategies, but only during Phase 2 (Chapter 4). Interestingly, *experimenting*, an important learning strategy for learning from experience, specifically in entrepreneurial environments (Cope, 2005; Kolb, 1984; Pittaway & Cope, 2007; Politis, 2005) returned an unexpected result.

Trying out new approaches and ideas to determine what is most effective (Experimenting) negatively predicted how well participants adapted to changing business requirements (Contextual - Adaptive). Conceptually, this finding was initially difficult to reconcile because learning experiments, a core practice of the Lean Startup movement (Blank, 2013; Ries, 2011), and commonly associated with learning in accelerators (Cohen et al., 2018; Grimes, 2018; Mansoori, 2017) are a strategy for testing hypotheses about a business model. Moreover, experimenting early and often is touted as a strategy for helping to know when to stay on course, pivot to a new course, or abandon the quest to chase other opportunities (Maurya, 2012).

Possibly, external performance pressures inherent in the learning environment (e.g., financial reward, accelerator expectations) elevated the perceived levels of psychologic risk for participants. Thus, enticing them to work toward know targets rather than taking risking failure for the sake of learning (Dweck & Leggett, 1988; VandeWalle, 1997). Alternatively, the vicarious learning environment may have prompted participants to try experiments for the sake of doing so, and these experiments may have produced the 'wrong' learning.

The analyses also identified Reflection had a positive predictive effect on Task Performance and Flexibility was positively predictive of two Contextual Performance variables, Task and Swiftness (both Phase 2). These findings suggest that, with no one right way to build a business, reflecting frequently about personal performance and being flexible in how thinking and doing are approached are beneficial learning strategies in accelerators. Moreover, the results are intuitive and point to the benefits of slowing down, taking stock of how an experience is *being* experienced both individually and collectively, and through which lenses (Argyris, 1976; Flavell, 1979; Veenman et al., 2004). Also, when necessary, to adjust learning strategies and behaviours to match better the demands of current and future situations (Eichinger & Lombardo, 2004; Mitchinson & Morris, 2014).

Strand 2 (qualitative field study) findings suggest individual levels of learning agility affect individual levels of Task and Contextual Performance, and that the relationship is reciprocal. Moreover, individual levels of each appear to affect team levels of each and these relationships are also reciprocal. Although learning agility (De Meuse et al., 2010; Lombardo & Eichinger, 2000) and Task and Contextual Performance (LePine et al., 2000; Motowidlo et al., 1997) are commonly portrayed as an individual-level constructs the findings from this research suggest they may also be considered a team-level construct. Consequently, the boundaries between the concepts are not crisp nor simple because individual levels of each appear to affect others, and vice versa.

Conscious, appropriate, and pragmatic responses to changes in both the social and business environment were possible at the team level when participants were well aligned in their levels of learning agility and Task and Contextual performance. However, high levels of psychological and emotional safety in teams was necessary for learning agility to manifest individually (De Meuse et al., 2010; DeRue et al., 2012; McKenna et al., 2007), and collectively. Mismatches were immediately evident in some teams like BROOKLYN; with other teams, like MTVIC, mismatches became apparent only when they began to experience the complexities of the accelerator experience.

Participants who demonstrated high levels of Contextual Performance engaged less agile teammates to try learning agility strategies and behaviours, thus it appeared that learning agility could be developed in teams (KELBURN). However, low levels of learning agility also appeared to erode trust. As trust came under threat in some teams (THORNDON) interpersonal conflicts became common and business development suffered. Moreover, individuals who once demonstrated high levels of learning agility often became less agile over time if they consistently encountered poor interpersonal relations in their team (NORTHLAND). For instance, participants who demonstrated poor Contextual Performance appeared less able to acknowledge, process and make sense of complex issues, and work with teammates to choose appropriate courses of action thereby shuttering opportunities for learning agility to occur in the team.

Taken together, participants who demonstrated high learning agility and high contextual performance contributed well to achieving expected team outcomes. Moreover, high levels of each exert positive knock-on effects within teams and on stakeholders. However, teams caught up in interpersonal conflict suffered decreases in learning agility and in all areas of the business including those that they knew how to do well. They became less effective in delivering on known tasks and less willing to think quickly and flexibly and to act in new ways. Consequently, this research argues high individual and collective Contextual Performance is a key ingredient for success in an accelerator. Without strong

interpersonal relationships, based on support and trust, in a team a good idea will go to waste. This is because any time spent managing dysfunction will be at the expense of allocating resources toward progressing the business idea

Strand 3 (retrospective interviews) explored how, what, and from who participants learned. The reporting of Strand 3 findings emphasised learning interactions with Managers, Mentors, and Cohort as well as individual strategies for learning the most from these interactions. A theme present across these interactions was individual levels of learning agility are heavily influenced by situational factors in the learning environment. Specifically, interpersonal relationships played a large role in supporting, and hindering, the conditions for individuals to be learning agile.

Although team dynamics were not a focus of this research, they were found to play an important role for Agile Learning in accelerators. The findings suggest how well and to what extent participants engaged with the experience agilely was shaped not only by individual strategies but others as well. These findings align with other research which suggests learning agility is dynamically influenced by combinations of more stable personality characteristics and situational factors (De Meuse et al., 2010; DeRue et al., 2012; McCall et al., 1988; McKenna et al., 2007; Mitchinson & Morris, 2014). Furthermore, participant accounts echoed Strand 2 findings that participant Task and Contextual Performance behaviours (Motowidlo et al., 1997) were influenced by participant levels of learning agility, and that the relationships between each informed the others.

The relative weighting of learning and performance goals appears to suggest that participants who were comfortable with and skilled at shifting between old ways of thinking and doing also demonstrated high levels of Task and Contextual Performance (Lombardo & Eichinger, 2000; McCall et al., 1988). In most instances, nimbleness of thought and action boosted the effectiveness of participants for getting routine things – such as doing a blog update – and more

complex, uncertain and ambiguous tasks (like courting investors) done quickly and efficiently. A sense of safety in the team (high Contextual Performance) appeared to increase personal efficacy and supported the risk taking necessary for learning fast. Moreover, others, such as peers and Managers, appeared to engage more openly with participants who demonstrated a curiosity and desire to learn.

General openness to the novelty of the accelerator learning experience (Costa & McCrae, 1992; LePine et al., 2000) showed up in how participants wrestled with and reconciled ideas and experiences, how they related with people who were new, and how they adapted learning strategies to better fit changing learning and business development demands (Ployhart & Bliese, 2006; Pulakos et al., 2000). Some participants demonstrated a higher level of developmental readiness (Hannah & Avolio, 2010) for the learning challenges, such as encountering novel learning demands, and they appeared ready and willing to draw more effectively upon available resources for needed guidance and support.

Most teams were composed of a mix of high-agile and low-agile learners. In other words, some participants demonstrated higher frequency of engagement Agile Learning strategies and behaviours like seeking feedback and reflecting on events and experiences. Moreover, learning orientations varied amongst participants. High-agile learners perceived challenges as chances to learn, grow and develop (Button et al., 1996; Dweck, 1986); by contrast, low-agile learners appeared to approach situations from a risk and reward perspective (VandeWalle, 1997). Learning orientation mismatches affected how participants perceived and communicated experiences consequently affecting levels of learning agility and Contextual and Task Performance in teams.

Some teams were able to work through mismatched levels of learning agility and if they also demonstrated high levels of Contextual Performance (e.g., PIPITEA). In these instances, these teams gravitated towards being more learning agile. In

instances of low levels of Contextual Performance teams gravitated toward being less agile (e.g., THORNDON). Moreover, high learning agility was attractive to Managers, Mentors and peers and helped to prompt more learning interactions.

In sum, strong interpersonal relationships matter for fast and flexible learning and business development to occur in accelerators and learning and performance behaviours in teams are reciprocal. Moreover, the quality of interpersonal relationships in team affects how others (i.e., Managers, Mentors, and Cohort) interact with teams. In other words, individual behaviours shape collective behaviors, and vice versa.

7.2.4 Discussion of findings for Hypothesis 4

The quantitative findings for Hypotheses 1–3 indicate participants varied in who, and when, they interacted with to learn, the learning strategies they engaged in, and the types of performance they experienced.

Thus, Hypothesis 4 sought to explore if 'participants from Funded and Non-funded teams will demonstrate a difference in measures of *Learning Resources*, *Agile Learning* and *Learning Outcomes* over the three phases' (Table 7.1). The outcome would answer, in part, Research Questions 1 and 2: 'How do accelerators influence participant learning and development?' and 'What does learning agility theory add, if anything, to our understanding of participant learning and development in accelerators?' Collectively, the results supported Hypothesis 4. A summary of the key results follows.

The findings from Strand 1 (repeated measures survey) for Hypothesis 4 suggest participants from both Funded and Non-funded teams were mostly homogenous in how they responded to each *Learning Resources*, *Agile Learning*, and

Learning Outcomes scale. Thus, it appears team outcomes were not related to how participants answered thesurvey questions.

A singular difference was noted. Participants from Non-funded teams used Feedback Seeking as a learning strategy more than participants from Funded teams. In both Phase 2 and Phase 3, participants from Non-Funded teams sought feedback on their performance more often than their peers. A possible explanation is that these individuals did not possess the same level of clarity for their business idea and the processes needed to advance it. Alternatively, they lacked lower levels of self-efficacy than their peers (Bandura, 1977,1993). Thus, they may have engaged with others to gain a better sense of the quality of their ideas, efforts and outcomes. In other words, they may have sought feedback to have someone tell them how well they were performing and, if they lacked confidence, they may have been wanting someone else to point the way forward by telling them the next steps.

In the case of Funded teams, these participants may have possessed greater levels of individual and collective efficacy for their ideas and efforts, and were better able to self-assess their own competency gaps, thus they did not feel a need to check in with others for external validation (Miles et al., 2017). Moreover, the programme design (e.g., public performance leader boards) may have served as a proxy source of positive scaffolding and directive reinforcement for Funded teams (e.g., possibly reinforcing a high performer status).

Strand 1 findings suggest participants from Funded and Non-funded teams differed little in how they responded to the survey measures. However, research suggests processes of experiential learning underpin entrepreneurship (Minniti & Bygrave, 2001; Politis, 2005), and that people differ in how and what they learn from experience (Cope, 2005; Lombardo & Eichinger, 2000; McCall et al., 1988). Thus, based on the publicly known end-of-programme outcomes – five teams Funded and five teams Non-funded – a reasonable inference is that learning in

an accelerator occurs at a more nuanced level than can be explained by survey data alone. The two qualitative studies shed additional light on how and why the learning experience differed for participants.

Neither Strand 2 (qualitative field study) nor Strand 3 (retrospective interviews) aimed to test Hypothesis 4. Each was included to add depth of understanding to the survey findings (Strand 1). Of note, is that many of the qualitative findings for Hypothesis 4 overlap with those previously reported for Hypotheses 1–3. Consequently, this section will limit the summary and discussion to one finding not introduced in the preceding sections. It pairs the timing of team formation (Section 3.4.2) with observations of differences in learning and performance behaviours between Funded and Non-Funded teams.

From a demographic perspective, participants were relatively homogeneous in that they were nearly all participants were male, had a university degree, and over half were in their early to mid-twenties. A key area of distinction at the team level related to when teams were formed and when additional participants (i.e., founders) joined teams. A simple external measure of success for accelerators is whether teams received funding at the end of the accelerator.

In this study, five teams received funding and five teams did not. Six teams experienced membership changes shortly before the accelerator began. Five of these teams remained Non-funded at the end of the programme. Thus, nearly all the Non-funded teams were still in the early stage of team formation during the accelerator. A possible inference from this simple finding is that participants spent critical resources such as time and energy on forming the team, and this came at the expense of advancing their businesses. For instance, teams which were still in the process of identifying strategies for effective communication and role definition (KELBURN, NORTHLAND and THORNDON) appeared less effective at utilising the available *Learning Resources*, such as Mentors.

Moreover, participants from these teams demonstrated lower levels of learning agility, Task and Contextual Performance.

Taken together, the quantitative and qualitative findings differ in the extent they offer support for Hypothesis 4. Although the survey research identified few differences in participant responses to the survey measures, the qualitative findings illuminated a more nuanced story. Participants from both Funded and Non-funded teams varied in the types of learning behaviors they exhibited, and this variance was observed within and between teams. Teams which experienced interpersonal conflicts appeared fragmented in their efforts and demonstrated a lack of coherence in their beliefs and actions.

Individual difference, both actual and perceived, was a source of task and relational conflict within teams (De Dreu & Weingart, 2003). Low levels of psychological safety, as indicated by poor trust, commitment, and support, appeared to amplify perceived differences and lower participant willingness to tolerate short-term discomfort for long-term growth and gain (Bradley et al., 2012; Edmondson, Kramer, & Cook, 2004). The magnitude of conflicts and their effect on team performance appeared greater in Non-funded teams. Task Performance behaviours were impacted by interpersonal conflicts in the form of disagreements around technical decisions and functions, such as internal procedures and resource allocation (de Jong, Song, and Song, 2013). Individual Contextual Performance behaviours were impacted primarily by interpersonal conflicts rooted in values, beliefs, aspirations, and individual styles and preferences (De Dreu & Weingart, 2003; Tuckman, 1965). In other words, conflicts within teams demonstrating low levels of psychological safety appeared to amplify unhelpful and unproductive behaviour (e.g., NORTHLAND, THORNDON). Moreover, conflict, rooted in individual difference between accelerator participants, extended outward from participants to teams to stakeholders, and back again. Some of teams used accelerator resources less effectively because they spent on team formation processes rather than business development processes

(Tuckman, 1965), and these forming teams remained more vulnerable to forces inside and outside the team.

In general, these findings suggest strong interpersonal relationships are important for effective team performance, and performance suffers when time is not allocated to team building (Salas, Cooke, & Rosen, 2008).

7.3 Chapter Summary

This chapter provided a synthesis of the three sets of findings (survey, observation, and interview) generated to answer - *How do accelerators influence participant learning and development?* and *What does learning agility theory add, if anything, to our understanding of participant learning and development in accelerators?* Tables 7.2 & 7.3 provide a summary of key themes present in the findings.

In brief, the key findings are: a) participant learning interactions with managers and the cohort (but not mentors) were predictive of increased engagement in agile learning strategies and enhanced performance, and levels of influence varied by phase; b) participant-level variation influenced individual and team agile learning and task and contextual performance outcomes; c) participants possessing clarity around personal values and expectations for themselves and their team at the outset of the accelerator experienced lower levels of interpersonal conflict, and for some, the experience itself helped provide this clarity; and, d) participants learned more from watching peers' successes and challenges than from accelerator learning resources.

Chapter 8 | Conclusion

This research set out to answer a core research question: *How do accelerators influence participant learning and development? -* and a supplemental question - *What does learning agility theory add, if anything, to our understanding of participant learning and development in accelerators?* The research setting is a Global Accelerator Network affiliate accelerator programme based in New Zealand. Data was collected on twenty-nine participants associated with ten venture teams participating in a single accelerator programme cohort. A multilevel quantitative and qualitative mixed methods approach was adopted, and concepts and measures from academic work on accelerators, learning agility processes, and individual performance were incorporated as investigative tools and lenses.

This study makes multiple empirical and theoretical contributions to a diverse range of areas of research and practice. The areas of research to which this study contributes are accelerators, learning environments, and learning agility. The following sections will first review the contributions and their implications for research, followed by the implications for practice, including for policy makers, followed by methodological implications, limitations and identification of opportunities for future research.

8.1 Contributions to Research on Accelerators and Accelerators as Learning Environments

This study contributes to entrepreneurship research focused on supporting the development and success of early-stage enterprises by examining and reporting on a new form of startup assistance – accelerators. The reported findings add to the emerging body of accelerator research seeking to understand accelerators and how they 'accelerate' the emergence of high-growth ventures.

Consistent with prior research, this study finds that accelerators do more than shelter emerging organisations; they actively support the development of the new venture, provide active learning environments for the entrepreneurs, and they foster the development of entrepreneurship capacity (Cohen et al., 2019; Hallen, et al., 2019; Miles et al., 2017; Seet et al., 2018; Smith et al., 2015).

However, extant accelerator research is limited in its analysis of participant learning processes, behaviours and strategies. While prior research identifies different sources of learning, it does not reveal the relative differences in their impact. Nor does prior research consider multiple levels of participation embedded in accelerator programme design (cohort, team, and participant). This study's multi-level analysis brings to light just how important the cohort model of accelerators is, and what impact it has on participants. The cohort model is one of the key differentiating features of accelerators, versus incubators, and is an enabling factor for gaining economies of scale regarding mentoring, peer-learning, programme design and seeking following funding (Bliemel et al., 2018; Cohen, 2013a). As a consequence of this contribution to accelerator research, this study also contributes to the broader research on business incubation (Bruneel et al., 2012; Grimaldi & Grandi, 2005; Hackett & Dilts 2004b; Rothaermel & Thursby, 2005) by adding understanding of accelerators as a new and distinct form of incubation.

To elucidate how this study advances accelerator research, Table 8.1 summarises the key contributions against each of the defining features of accelerators, with an emphasis on learning.

Table 8.1.

Summary of Contributions to Accelerator Literature.

#	Accelerator Feature: key empirical contribution	Implication
1.	Mentors (Low effectiveness)	Accelerators near exclusive focus on the positive value-add effects of intense mentoring may establish unrealistic participant expectations for the efficacy of mentoring relationships. Further, like in all interpersonal relationships, dissimilar motivations, values, beliefs and expectations, as well as issues of power, knowledge and experience, can negatively affect the quality of interpersonal connection and overall effectiveness of mentoring interactions. Thus, accelerators need to identify the right mentors for the job.
2.	Heterogeneity of learners (Participant and teams)	Participants enter with different sets of capabilities and develop at different rates during the programme. This challenges standardization of accelerator features and reflects the fundamental uncertainty of entrepreneurship.
3.	Teams (Extending #2, team composition matters more than the business idea)	The axiom that early stage investors invest in the team, not the business, takes on new meaning in accelerators. Do accelerators adequately resource teams to resolve interpersonal dysfunctions and to maintain team functionality, health and wellbeing? Or does the single-minded focus on revenues and funding come at the expense of team functionality and wellbeing?
4.	Cohort (Peer-to-peer interactions generate positive, consistent, and reciprocal effects on participant learning)	The cohort learning environment exerted positive individual and collective effects on participant learning performance. Peer-to-peer interactions helped participants catch and remedy errors quickly, learn social norms and processes, and experience a sense of solidarity and support. The observed positive effect was present in all three phases, and peer-to-peer learning effects occurred through reciprocal processes.
5.	Managers (Managers help shape the trajectory of teams by drawing upon their own experiences to guide learning and by helping participants make sense of conflicting Mentor feedback)	Managers influence both what participants learn (e.g., technical knowledge) and how they go about learning it (e.g., learning strategy). With respect to managing Mentors, Managers serve a dual role. On the one-hand, they match participants to Mentors. On the other-hand, they serve as a 'meta-mentor' by helping participants make sense of the Mentors potentially conflicting feedback.
6.	Programme design (Most accelerators over-emphasize task-oriented performance metrics, yet participants need unstructured time for reflection to enable deep rather than surface learning to occur)	An over-emphasis on task-oriented metrics and programming limits the amount of 'free' time for creative interactions, experimentation, and reflection all of which are fundamental to lean start-ups and authentic learning. Although, task-oriented designs give Managers a greater illusion of control they fail to acknowledge the uncertainties and nuances of entrepreneurship. These uncertainties are particularly conducive to learning by reflection, which itself is a practice that accelerators would be wise to provide structured guidance for how, when, and why to use it.

Note. Author.

8.1.1 Mentors

There is a lot of industry hype for the value and credibility Mentors bring to accelerators, and for what they offer participants for learning and how they support team performance. For instance, most descriptions of accelerators include mentorship as a key value-add component of the standardised offering of support (Bliemel et al., 2016; Cohen et al., 2018; Hoffman & Radojevich-Kelly, 2012; Miller & Bound, 2011; Seet, et al., 2018). Moreover, many accelerators, explicitly claim to offer 'mentor-driven' programmes (www.gan.co; www.techstars.com), and the basic logic for doing so is 'mentoring is as indispensable as startup capital' (Sanchez-Burk, Brophy, Jensen, Milovac, & Kagan, 2017, p.2). Yet, as Bernthall (2016) points out, accelerators rely on volunteer experts to develop the next generation of start-ups. Thus, the inherent design and corresponding success of an accelerator programme is tied to the quality and consistency of the expertise accelerators broker for participants.

Although research points strongly to the importance of mentorship for entrepreneurial learning, career (e.g., technical, political, social skills) and psychosocial (e.g., enhanced efficacy) development (Eby, McManus, Simon & Russell, 2000; McKevitt, & Marshall, 2015; Memon, et al., 2015; Sullivan, 2000), this study's survey and interview findings suggest Mentors exerted a low-level of influence on participant learning and performance processes. As demonstrated in other accelerator research (Cohen, 2013a), Mentors did illuminate blind spots associated with participants' business models and provided some technical and industry knowledge (Yitshaki & Drori, 2018). However, participants perceived a general mismatch between the knowledge, skills and expertise the Mentors offered and the unique business and personal development needs (Eby et al., 2000; Heslin et al., 2006). Specifically, the findings suggest participant engagement in mentor-related learning and performance outcomes was somewhat limited by the Mentors' motivation, time, and technical expertise, as well as their experience coaching and developing other entrepreneurs (Heslin & VandeWalle, 2008). For instance, participants questioned the motives and reasoning behind some Mentors involvement because it appeared some Mentors

were involved primarily to scope and vet future investments and to strengthen their personal business network. Accordingly, participants found the feedback and advice both generic and conflicted, and, at times, questioned and disregarded feedback from these Mentors.

The observed low-effect of Mentors on participant learning and development could be attributable to a range of factors. For instance, participants may have experienced a negative mismatch between Mentors' personalities, expectations, motivations, goal orientations, and learning styles and their own (London & Sessa, 2006; Sullivan, 2000). Another possibility is that Mentors were too proud to admit they were not experts in the entrepreneur's situation and hid this disparity by showering advice onto participants despite the fact their experience and expertise was generated when operating in a different context. Further, Mentors may not have possessed the level of experience in mentoring and developing others needed by participants (Eby et al., 2000; Noe et al., 2002). Alternately, and from a participant perspective, it is possible the feedback received from Mentors was valuable, but participants chose to disregard it because it required them to unlearn or give up something that brought prior success, posed a threat to their identity, or called their competency into question (Grimes, 2018; McCall, 2010; Parker, 2006).

Taken together, if accelerators aim to scaffold and support participant learning and performance through mentorship (Yitshaki & Drori, 2018) then accelerators need to identify the right Mentors for the job. This may entail assessing Mentors motivations for involvement, verifying the amount of time they have available to commit, and ensuring Mentors are not only experts in their specialty business area but that they also possess training and experience as a coach, facilitator, educator or mentor. Further, mentors who acknowledge their role is not to *tell* entrepreneurs what to do (coach) but to help them to learn how to assess and approach challenges they face (mentor).

8.1.2 Heterogeneity of learning and performance in participants and teams

Accelerators apply an open and competitive application process to identify entrepreneurs and ventures with high potential for success (Christensen, 2009; Hathaway, 2006) which suggests some degree of homogeneity (e.g., knowledge, skills, and experience), will exist amongst each cohort of participants. However, this study's observation and interview findings suggest participants interacted with the available accelerator learning resources differently and it is posited this variance may, in part, be tied to each participant's general goal orientation and expectations for the accelerator experience.

For instance, some participants perceived the accelerator experience as an opportunity to learn how to become an entrepreneur, and for them, building a business was the way to achieve their goal (e.g., HATAITAI, MTVIC, PIPITEA, and RONGOTAI). In contrast, becoming successful by solving an important problem was the goal for some participants on teams like NORTHLAND and THORNDON. Prior research would describe the first entrepreneur as someone operating from a learning mindset or orientation and the latter someone holding a performance mindset or orientation (Colquitt & Simmering, 1998; Dweck & Leggett, 1988; Vandewalle, 1997). Arguably, neither type of goal orientation is better.

However, the findings suggest a participant's mindset may influence how they perceived and responded to the changes in the accelerator learning environment and their business. The findings also suggest some contexts, such as time-pressured and high-stakes environments like accelerators, may create conditions for individuals to temporarily operate from either a learning or performance oriented (Button et al., 1996). For instance, accelerator participants operating from a learning orientation embraced challenges and setbacks as a chance to improve, they appeared less defensive, and a willingness to take chances on relationships and ideas. Participants from AROVALLEY AND PIPITEA

demonstrated a learning mindset. Both teams of participants experienced business failures mid-way through the programme, and instead of quitting they found a new business problem to apply, practice, and deepen the knowledge gained. In general, participants from Funded teams demonstrated behaviours and mindset associated with a learning orientation. In contrast, participants from several Non-funded teams appears to operate from a performance orientation. Broadly, these individuals were less transparent about the challenges they faced, resistant to feedback from others, prone to defensive behaviour, and often worked in isolation from others in the cohort.

Collectively, the differences between participants backgrounds, their orientation, and their perceived purpose for joining an accelerator creates a suite of challenges for accelerator Managers. In particular, the cohort model of accelerators is based on the premise of low variation within a cohort. In other words, accelerators offer the same standardised terms of investment to teams within a cohort based on the assumption each venture is at a similar stage of business development activity. Thus, it is assumed they will benefit equally from the same structured programme of learning and business development supports. This research indicates otherwise, that despite their best efforts, accelerator managers recruit a very heterogeneous cohort, and that there are quickly diminishing returns to cohort-based standardisation.

8.1.3 Teams

The findings suggest team 'fit' is crucial for both individual and collective learning and performance outcomes. Although accelerators select teams with good ideas and the human capital (e.g., knowledge, skills, and experiences) to execute them (Cohen & Hochberg, 2014; Hoffman & Radojevich-Kelley, 2012), the findings indicate team outcomes can be upended by poor social capital (e.g., lack of shared values, goals expectations, and trust) (Bradley et al., 2012; Edmondson, 1999; Motowidlo, et al., 1997). The findings highlight heterogeneity in participant

learning and performance behavior and strategy influenced learning and performance in both teams and the whole cohort.

Although teams are a prominent feature in the accelerator literature, they were not the initial focus of this study. However, the observation research highlighted the critical role teams play in shaping the learning and performance culture of the accelerator learning environment. For instance, not all teams of participants demonstrated the requisite readiness for being accelerated, and this impacted participants potential for contributing to and benefiting from vicarious and informal learning processes (e.g., NORTHLAND) (Hallen et al., 2016; Marsick and Watkins, 2001). Some teams were immature in their state of business development, others were immature in their state of formation, and some suffered from a bit of each. The accelerator system of learning and business development supports was designed to boost the state of business development for each team. However, the findings suggest the task-oriented accelerator environment was not designed to support necessary processes for nascent team development (e.g., climate and culture). Thus, immaturity at the team level added an extra layer of challenge because effective teams take time to build (Tuckman, 1965). Teams like KELBURN and NORTHLAND spent much of their time trying to create productive relationships and processes (contextual performance), and this impacted their overall team task performance activity (De Dreu & Weingart, 2003; Griffin et al., 2000; Motowidlo 2003; Salas, Cooke, & Rosen, 2008).

The findings suggest a clear, and not surprising, association between the quality of interpersonal relationships within teams and how participants individually and collectively learned and performed in teams. Keeping pace and meeting accelerator expectations was closely tied to how well a team built new knowledge, skills, and abilities. However, the cognitive and emotional demands were high for participants throughout the programme, and these pressures affected how participants interacted interpersonally within teams and between teams. For teams, high-quality relationships and high psychological safety were evidenced by shared goals, values, skills, and knowledge, and a culture of

mutual respect. In contrast, teams that demonstrated low levels of psychological safety were more affected by the long hours, high stress, and rapid change occurring within the accelerator and team environments. In sum, a strong interpersonal fit within teams was crucial for both individual and collective learning and performance outcomes.

8.1.4 Cohort

As evidenced by the construction of cohort classes (Miller & Bound, 2011), accelerators are implicitly designed as social learning environments (Bandura, 1977, 1993). This study's findings complement prior work which has identified the largely positive peer-effects of cohort classes (Smith et al., 2015) and that peer-to-peer interactions generate informal and vicarious learning opportunities (Hallen et al., 2017; Levinsohn, 2015). However, this study adds new understanding by identifying time points when peer interactions are most influential for learning.

For instance, during the first month of the accelerator, participants drew upon their peers' experiences as a strategy for helping make sense of the intensive mentoring experience. First-hand participant accounts of how they learned by watching and mirroring the learning and performance strategies used by their peers was supported elsewhere in the data through the reports of others (i.e. Managers and Mentors). Study participants reported the peer learning environment helped them, individually and collectively, catch and remedy errors quicker than if they were operating independent of the accelerator learning environment, learn social norms, and processes, and have fun learning to be an entrepreneur. In other words, participants learned what to do from other participants, and they learned from their peers how to go about learning what to do. Further, participants experienced a sense of solidarity and support from being amongst peers which in-turn helped to foster a sense of safety that enabled the exploration of difficult personal and professional issues.

Broadly, the findings fall in line with Gibb's (1997) suggestion that entrepreneurs learn from interacting with peers, dynamic processes of doing, accessing feedback, copying peers' ideas and actions, problem solving, opportunity taking, and making mistakes (p. 19). However, negative effects of social modelling were also present in the cohort. Some participants described comparing their skills, knowledge, team dynamics, and business development progress to their peers, and this generated a sense of overload, anxiety, distress, and demoralization for them which manifested in defensive behaviours and closed them off to others in the accelerator environment.

In sum, the cohort learning environment exerted positive effects on participant learning performance, the effect was present in all three phases, and learning occurred through reciprocal processes. In general participants learned faster, worked more effectively on their business, were more adaptable to changes and swifter when working toward known targets. These findings contribute important evidence for the reciprocal learning and development effects which occur between participants and peers in accelerator learning environments (Grimes, 2018; Hallen et al., 2019; Levinsohn, 2015; Smith et al., 2015).

8.1.5 Managers

This study identified time periods when Managers were most influential for participant learning and performance, and the ways they helped and hindered the occurrence of each. Prior research suggests Managers provide participants with administrative support, technical advice and networking assistance (Scillitoe & Chakrabarti, 2010) and consolidate and deliver multisource feedback to participants (Cohen, 2013a). Further, the efficacy of managers for enhancing venture performance is associated with the amount of prior startup experience they possess (Wise & Valliere, 2014). In other words, Managers help shape the trajectory of selected teams by drawing upon their own experience. This study's findings complement prior research *and* extends it by suggesting the role Managers play for participant learning and performance includes influencing both

what participants learn (e.g., technical knowledge) *and* how they go about learning it (learning strategy and behaviour).

For instance, this study found that during Phase 2 Managers influenced participants to engage in phase appropriate learning strategies such as seeking feedback, experimenting to test assumptions, and trying out different strategies for thinking and doing. Toward the end of the programme managers influenced engagement knowledge seeking and reflective practices, both learning processes well aligned with preparing to pitch for and secure follow-on investment.

Further, the findings suggest participants perceived Managers as an accessible source for expert advice and coaching, appreciated their ability to help shape a direction for the teams, set performance expectations and business development milestones, and establish a cadence and pace for learning and performance activities. Managers established professional and personal relationships with most participants; however, participants were at times unclear which of the multiplicity of roles Managers were operating from within. For instance, Managers regularly moved from being a peer to an accelerator employee to mentor and to investor. Thus, the perceived credibility of feedback was, at times, compromised, and this appeared to have a negative knock-on-effect for performance for some teams (Eby et al., 2000; London & Sessa, 2006). In sum, Managers scaffolded participant learning and performance activities and had the most influence during the mid-to-latter phases of the accelerator.

8.1.6 Programme design

The key empirical contributions regarding program design indicate that accelerator managers are pushing a programme design with too little consideration of the heterogeneity of the cohort (see 8.1.2), with too much emphasis on business outcomes and not enough slack or guidance for

participants to reflect on their recent attempts at attaining various business outcomes. The latter two issues are interrelated but discussed separately here.

First, this study finds that there is a high emphasis on attaining business outcomes, instilled by a busy structured programme, an abundance of mentors, and inter-team peer pressure to meet or exceed milestones. Prototypical accelerator programme design is distinguishable by three phases of activity (e.g., explore business, build business, and pitch business). Accordingly, accelerators provide phase-specific resources to help participants reach business development milestones (Miles et al., 2017). The combination of explicit business development milestones and a time-bound programme design suggests participants need to maintain a task-orientation because time spent off-task comes with the risk of falling behind.

This study's findings suggest situational factors occurring both within the programme and team influenced how, what, when, and why participants engaged with available learning resources like mentoring. For instance, some participants chose to rely on specific types of feedback (e.g., directive) and from specific sources (e.g., preferred mentor). Although seeking feedback from lots of sources takes time, these participants may have discovered other valuable opportunities to exploit by encountering a greater diversity of perspectives. In sum, the findings suggest an overemphasis on task-oriented performance metrics may privilege speed over flexibility which may in-turn limit exposure to both learning and business development opportunities.

This brings us to the second point, that the haste and pressure to demonstrate business outcomes inhibits the ability to make sense of longer-term progress. Arguably, the fast-paced accelerator time schedule implicitly promotes surface rather than deep learning. Surface or single-loop learning occurs at a tacit level and can occur quickly because decisions are based on understanding generated through past experiences (Argyris, 1976). Thus, this learning strategy is good in

situations where outcomes can be predicted and limiting when present conditions do not mirror the past. In contrast, deep or double-loop learning occurs when individual pause to reflect upon and question the reasoning or governing system behind their thinking (Argyris, 1991), or as Schon (1987) offers 'a dialogue of thinking and doing through which I become or skilful' (p.37).

Although, double-loop learning is more helpful for generating greater understanding of complex and uncertain situations such as those accelerator programme participants face, the findings from this study suggest participants need 'slack' time to process, sort, make sense, and as appropriate integrate and move between processes of thinking and doing. However, many participants reported not having enough time to deeply reflect on what they were learning and experiencing, and this lack of reflective time manifested in predictable but perverse learning behaviours such as defensiveness and avoidance. Thus, the structure and pace of the accelerator design may buffer or moderate engagement in reflective practices.

Research indicates feedback is important for both individual (Ashford & Cummings, 1993) and group learning (London, 2003); however, this study's findings suggest learning and performance in accelerators is positively and negatively influenced by the type, form, and frequency of feedback. For instance, participants met frequently with a diverse range of Mentors during the first 30 days of the accelerator. These Mentors provided participants with a broad range of perspectives and advice. However, the observation and interview findings suggest the time compressed programme schedule limited the amount of time participants had for processing, understanding and acting on the feedback they encountered. Consequently, participants described experiencing periods of high stress and overwhelm, and this impacted both their learning and performance (e.g., KELBURN). Interestingly, Managers mitigated, in part, some of the processing and sensemaking overload, or mentor-whiplash, participants experienced. They did so by serving in a 'meta-mentor' role by collecting, sorting, and aggregating mentor feedback before sharing it with participants.

Metaphorically, the Managers aided participant learning by 'culling the wheat from the chaff'.

These findings align with general learning and performance research which suggests feedback, coaching and advice are important for supporting learning and development when operating under developmentally challenging conditions (Ashford, 1983; Ashford & Cummings, 1983; DeRue & Wellman, 2009; London, 2003; McCall et al., 1988). Taken together, the findings suggest operating well as a learner and teammate requires demonstrations of high contextual performance behaviour and engagement in deep learning processes. However, the findings also suggest the accelerator programme design privileges task-oriented behaviour and surface learning. Thus, the learning and performance requirements appear out of synch with learner needs.

8.2 Contributions to Research on Learning Agility

This research hypothesized participants with a willingness and ability to both learn flexibly and fast through experience and to transfer learning to future situations (DeRue et al., 2012; Mitchinson et al., 2012; Smith, 2015), would positively influence performance outcomes for accelerator teams. However, this research did not aim to explicitly 'test' or add 'proof' for learning agility theory or the measure of it. Rather it sought to explore the use of learning agility as an explanatory lens for understanding how accelerator learning environments influence participant learning and performance at the levels of cohort, team, and participant. Contributions to learning agility literature are summarized in Table 8.2. The findings from this investigation indirectly contribute to learning agility literature in five ways: a) offering a novel learning lens for entrepreneurship, b) pointing to mediating and moderating effects of learning agility; c) highlighting the need for psychological safety for learning; d) dynamism of learning agility in accelerators; and, e) utilization of a new measure of learning agility for accelerators.

Table 8.2.

Summary of Contributions to Learning Agility Literature.

#	Contribution	Explanation
1.	Empirical investigation of learning agility in a start-up accelerator context introduces learning agility to entrepreneurship research.	Learning agility theory and measures are applicable for understanding learner processes and behaviours in contexts beyond traditional research contexts (e.g., leadership, talent management and human resource).
2.	Learning agility plays a mediating and moderating role for participant learning and performance in accelerators.	Highly agile learners engaged more frequently and effectively with accelerator learning resources. The opposite was true for low agility learners.
3.	The relationship between psychological safety and learning agility may be under examined.	Psychologically safe learning environments, as characterized by mutual respect, values alignment and support, enable learning agility. In contrast, low respect, poor values alignment, low support and conflict, inhibited learning agility.
4.	Learning agility may be both an individual and team level state as the construct is dynamic, changes over time, and is affected by situational factors.	For accelerators, and possibly other contexts, learning agility appears a multilevel construct because individual levels of learning agility influence team levels, and vice versa.
5.	Usage of the LAAI as an investigative tool for learning about a sample rather than to inform its development and validation.	A repeated measures format was applied to identify to examine how a sample of participants responded to a learning intervention (accelerators). Dynamic patterns of change in levels of learning agility and in the frequency of participant engagement in each learning process and behavior by phase were observed.

Note. Author.

8.2.1 Learning agility research for accelerators

This study contributes to learning agility research by examining its associated concepts and measures in a new research context – accelerators. Little research has examined the utility of learning agility theory for understanding how individuals, like startup entrepreneurs, approach learning in complex and emergent environments such as accelerators. Although, exceptions exist, such as McKenna et al., (2007) who examined learning agility within clergy and Reed's (2012) research on leaders at the USA Army War College, much learning agility research draws samples from individuals working in traditional corporate roles, such as accountancy, health care, and investment banking, and graduate

and executive education participants (Burke et al., 2016; Dai et al., 2013; Drinka, 2018; Lombardo & Eichinger, 2000; McCall et al., 1998; Mitchinson et al., 2012; Smith, 2015; Spreitzer et al., 1997; Smith, 2015). This study's findings suggest learning agility theory appears to work as a lens for understanding individual learning processes in other organizational environments (accelerator versus human resource contexts). Thus, the historically narrow investigative focus of learning agility research has somewhat limited the potential for broad impact of this intuitively appealing and conceptually useful learning concept.

8.2.2 Learning agility mediates and moderates learning activities in accelerator

Observation and interview findings suggest participant learning agility effects how and when participants engaged with the accelerator learning environment (i.e., managers, mentors, cohort, and teams) to aid their learning and performance. Moreover, the findings also suggest how participants experienced interactions with the accelerator learning environment influenced the extent they demonstrated agile learning strategies and behaviors.

Consistent with the conceptual model offered by DeRue et al. (2012), this study positioned learning agility between the input and outcome variables. This is because learning agility was hypothesised to play, in part, both a moderating and mediating role for participant learning and performance (Baron & Kenny, 1986; Drinka, 2018). In other words, learning agility, could be affected by a combination of individual characteristics (e.g., goal orientation, openness to experience, and metacognition) and situational factors (e.g., relationships, complexity, developmental challenge, and safety). Further, being learning agile could also affect how learners approach learning situations and what they get from them. Although the quantitative survey data was useful for identifying patterns of relationship between the variables, mediating and moderating effects were not examined statistically due to the small sample size (Fritz & MacKinnon, 2007).

However, qualitative findings point to the moderating and mediating role learning agility played in participant learning and performance.

In the present study, individuals who demonstrated frequent engagement in agile learning strategies and behaviors also engaged more frequently and more effectively with available accelerator learning resources (managers, mentors, and cohort). The opposite was true for individuals demonstrating low levels of learning agility. For instance, interpersonal dysfunction dampened the presence of learning agility in both individuals and teams. Lower levels of behavioral flexibility and speed were observed in teams experiencing interpersonal conflict. Further some participants stuck to either a behavior or strategy well beyond its useful life and at other times participants selected inappropriate behaviours and strategies for the situations they faced. Thus, these findings align with and extend literature that suggests learning agility is affected by both personal characteristics and situational factors (Catenacci-Francis, 2018; DeRue et al., 2012; McKenna et al., 2007; McCall, 2010; Michinson et al., 2012a).

8.2.3 Relationship between learning agility and psychological safety may be underexamined

The findings suggest a psychologically 'safe' work environment (Carmeli & Gittell, 2009; Edmonson, 1999; Edmondson, et al. 2004) is necessary for learning agility to be demonstrated by accelerator participants, teams of participants, and the broader cohort. Perceptions of safety varied amongst participants and teams and over time. For instance, features of the accelerator learning environment (e.g., time constraints, and regular reporting of performance milestones in public) and interpersonal interactions with people operating within the accelerator (i.e., managers, mentors, cohort, and teams) all played a role in creating, or not, of a psychological safe learning space for participants. Moreover, participant perceptions of the learning environment changed over time, and the felt sense of safety varied amongst participants and amongst teams of participants.

For instance, situational factors related to both the accelerator programme design and interpersonal interactions in the accelerator environment worked to support and inhibit learning agility in individuals (De Meuse et al., 2010; DeRue et al., 2012; McKenna et al., 2007). For instance, from a design perspective, accelerators promote lean startup methodology and associated practices as a strategy for fast learning (Christensen, 2009; Mansoori et al., 2019). Yet, the findings suggest many participants failed to engage frequently in two key agile learning behaviours, soliciting feedback from stakeholders and experimenting to test assumptions. This was unexpected as both feedback seeking and experimenting are key learning practices associated with the lean startup methodology (Blank, 2013; Maurya, 2012). For instance, some participants felt the public learning environment (e.g., pitching the venture's business case) placed them at risk for negative criticisms and judgments from managers and mentors. Thus, interactions with these groups were perceived risky. However, and in contrast, participants perceived interactions with peers as a safe space to bounce around ideas because these individuals were engaged in a similar journey.

When conditions were perceived as unsafe, lower agile learners appeared to perform less effectively. For instance, participants from Non-funded teams like NORTHLAND and THORNDON appeared to stick to old, less productive, approaches rather than trying new business development practices taught by the accelerator. Moreover, they demonstrated higher levels of defensiveness. Conversely, individuals who initially demonstrated lower levels of agility appeared to become more agile, and more receptive to the accelerator intervention if they experienced a psychologically safe work environment (AROVALLEY). This study's findings align with recent findings by Drinka (2018) who found individuals initially low in learning agility became more agile when they experienced a psychologically safe work environment and when facing unsafe conditions high agile learners became less agile. Thus, the role of psychological safety may be under examined for accelerators learning environments and as an antecedent for learning agility to manifest in individuals.

8.2.4 Learning agility may be an individual and team property

This research offers a minor contribution to learning agility theory by analysing quantitative and qualitative learning agility data longitudinally. This study's research design contrasts 'one-off' learning agility assessments offered by consultancies seeking to identify and develop individual high potential leaders (e.g., Korn Ferry) because it strategically created an extended window from which to view participant learning behavior. Although, learning agility researchers suggest agile learners learn flexibly and quickly from experience and they can transfer learning to perform successfully when they face future conditions that are novel, complex, and uncertain (De Meuse, 2019; Dai et al., 2013; De Meuse et al., 2010; DeRue et al., 2012; Eichinger & Lombardo, 2004; Lombardo & Eichinger, 2000; Spreitzer et al.,1997), scant empirical evidence exists to support propositions learning agility varies over time for individuals (DeRue et al., 2012), and in the case of this research for teams.

The multi-phase research strategy enabled identification of patterns of change in levels of learning agility in both participants and teams. The multi-level findings may suggest learning agility, for accelerator environments, is both an individual and team level construct. In other words, individual levels of learning agility influence and are influenced by others within teams and the cohort. Further, the findings show participants and teams of participants demonstrated variable levels of engagement in agile learning processes and behaviours over the course of the accelerator. For instance, participants engaged more frequently in Feedback Seeking during Phase-2 and Reflection during Phase-3. In many instances, variance observed at the individual level was also presented at the team level. Last, the findings suggest selecting and deploying phase appropriate learning strategies are important for accelerator participants, and teams of participants, to fully benefit from accelerator learning resources like Managers, Mentors, and their Cohort of peers.

8.2.5 Application of LAAI as an investigative tool for accelerator contexts

This study also contributes to learning agility research through its usage of a recently developed, valid, and reliable measure called the Learning Agility Assessment Inventory (LAAI) (Burke, 2016, Catenacci-Francois, 20018; Drinka, 2018; Mitchinson et al., 2012a; Smith, 2015). This was the first study to utilize the five-factor version of the LAAI as an investigative tool for learning about a sample of participants rather than to inform further development and validation of the measure. Moreover, a repeated measures format was employed to collect learning agility data at multiple points during the accelerator programme. This approach helped to identify patterns of change in participant levels of learning agility and the frequency of participant engagement in each type of learning behavior during each phase.

In this sample, the LAAI demonstrated acceptable levels of reliability for the overall measure and for each LAAI subscale, and for each of the three phases. Moreover, the five subscales appeared to possess content validity for the accelerator environment. However, the findings suggested the removal of one item from the Knowledge Seeking subscale that related to - *updating knowledge and expertise through formal training or education*. Possibly, participants interpreted formal training or education to be training offered by a university rather than the accelerator. Upon reflection, the language of two other items will be modified slightly for future accelerator cohort because participants are founders of their ventures, thus they are accountable to each other rather than a formal supervisor as indicated by each item (i.e., *my manager*). Moreover, modifying these two items may make the instrument more appropriate for assessing levels of learning agility in wider populations. For instance, individuals working in roles like independent contractors, sole business owners, and even non-traditional work roles such as stay-at-home caregivers.

8.3 Implications for Policy and Practice

This study offers several implications for accelerator policy and practice. Table 8.3 highlights suggestions pertaining to the selection of participants, the design, and management of accelerator programmes.

Table 8.3.

Summary of Implications for Accelerator Policy and Practice.

#	Theme	Suggestion
1.	Selection (Teams and participants)	Prioritise social capacity over human capacity by examining the interpersonal fit within teams in addition to technical knowledge, skills, experiences and business ideas.
2.	Selection (Mentors)	Train mentors how to be mentors and participants how to be mentees. Assess the Mentors' motivations and intentions during the selection process to ensure Mentors will act in the participants best interest and not in their own.
3.	Programme design	Adjust the ratio of structured (task and programe oriented requirements) to unstructured (participant directed) time within the accelerator so that participants have more time to reflect upon the learning experiences they encounter. Further, offer participant segment specific programmes to align accelerator resources with the specific learning and business development needs of unique participant segments (e.g., Female Founders; Immigrant Startups; Government Tech).

Note. Author.

8.3.1 Implications for cohort, teams, and participants

The findings highlight that to perform well in the task-oriented accelerator environment, participants need to demonstrate behaviours which both maintain and advance their business case and foster a productive culture, climate, and work environment within the team and cohort. In this study, teams with strong and positive interpersonal dynamics fared better when they experienced business development setbacks and pressures from the accelerator programme (e.g., time-limited, intense, complex, risky, and hyper-social). In contrast, teams with a strong business case but poor interpersonal dynamics struggled to

advance their enterprise as expected. Time spent managing conflict and dysfunction came at the expense of advancing their venture.

Accordingly, expanding traditional accelerator selection criteria beyond past experiences, past performance, knowledge, skills, and business ideas to consider the interpersonal 'fit' within teams of participants may result in the identification of teams better *fit-for-purpose* to learn and perform well in an accelerator learning environment. For instance, identifying behaviours present within teams that can positively and negatively affect team fit and function may help to ensure the provided learning resources are optimised rather than wasted. A possible way to do so is to engage teams of participants in a series of pre-accelerator business development exercises. Engagement in exercises which resemble expected accelerator learning conditions and demands (e.g., complex, stressful, and time-based) may help surface the nature and quality of interpersonal relationships within teams.

8.3.2 Implications for mentoring

Although accelerators are often described as mentor-driven programmes, the findings from this research suggest participants derived limited value from mentor exchanges. Accelerators may better optimise the potential value of mentor exchanges by reducing the volume and intensity of meetings and standardise Mentor selection and training processes.

Firstly, participants expressed they did not know how to manage the volume of feedback, much competing, that they received from Mentors. Participants expressed feeling mentally and physically exhausted after meeting with six mentors in the same day, and after 30 days of that pace they described being wiped out. They expressed needing periods of 'slack' in the schedule that allowed time for reflection, sensemaking, and decision making. Consequently, organisers may better optimise the potential value of mentor exchanges by reducing the volume and intensity of meetings, thus creating points of calm

amidst the storm for participants. Moreover, they may integrate educational sessions for participants that expressly teach strategies for seeking feedback, working with multiple sources of feedback, processing and acting upon feedback.

Secondly, participants indicated much feedback was either general in nature or tied to thought frameworks like lean startup. Consequently, in the case of lean startup, participants experienced six mentors providing the same non-differentiated feedback, and for some they felt socially impelled to follow the feedback even though it was not well suited to their immediate business needs. Several participants questioned the motivation behind the involvement of some mentors as some mentors appeared more invested in scoping out future investments and maintaining their place within the ecosystem than in developing the ecosystem. Thus, accelerator organisers may extract more benefit out of volunteer mentors if they assessed Mentors' motivations and intentions during the screening and selection process. Moreover, identification of a mismatch between the accelerator aims and mentors aims before a programme begins may reduce levels of pro-forma and self-interested advice on behalf of mentors.

Both participants and mentors may benefit more from the mentoring process if each was oriented to their respective role and provided with training for how to give, receive and process feedback. For example, to train each party how to communicate in ways that explicitly separates actual data from feeling and from impact (Garvey-Berger & Johnson, 2015). This may help Mentors be explicit Doing so may help participants process less feedback based on inferences, judgments, and assumptions.

Further, the findings suggest individual demonstrations of both learning agility and individual performance behaviour can affect others' levels of each, and vice versa. Thus, it may be useful to consider the extent learning agility and individual performance concepts and behaviours relate to Mentors. For instance, the low level of effectiveness of Mentors, may have affected the motivations, learning

strategies, and levels of engagement for some participants. Collectively, these suggestions might help address participant complaints of experiencing mentor over-load and pro-forma and self-interested advice.

8.3.3 Implications for programme design

Examining the accelerator learning environment through learning agility and individual performance perspectives revealed several contributions to accelerator knowledge. Specifically, this study's findings highlight the magnitude of influence managers, mentors, cohort, and teams exerted on participant learning and performance varied across time. The observed heterogeneity of individuals, teams, learning trajectories, and end-of-programme venture outcomes (i.e., Funded, Non-funded) may imply the structured and time-bound suite of entrepreneurial support (e.g., mentoring and educational workshops) produced both positive and negative aspects for participant learning and performance. For instance, the findings suggest participants perceived the learning and performance benefits they received from: a) mentors as low across all phases; b) managers strongest during the middle and last phase of the programme; and, c) cohort as super helpful during all three phases. Taken together, the findings suggest the influence of the accelerator learning environment is dynamic for participants at all three levels of participation (cohort, teams, and individuals). Moreover, the findings suggest accelerator participants benefit from instructional sequences based on relevance, quality, and timing rather than high volumes of information received from diverse sources.

Therefore, it may be beneficial for organisers to question the merits of accelerator programme designs which privilege knowledge acquired from a range of diverse pool of volunteer mentors and experts (Bernthal, 2016; Cohen, et al., 2018), and diverse educational content (Mansoori, 2017; Miller & Bound, 2011) rather than teaching participants a focused suite of skills and assessing participants for comprehension, integration, cohesion, and application. Further,

moderating the time balance between structured (e.g., entrepreneurship education, meetings, and mentorship) and unstructured time away from programme activities may enhance participants ability to effectively reflect, refine, consolidate and cohere their conceptual and applied understanding of taught concepts and practices. In sum, a narrower educational offering combined with greater amounts of non-structured time may enhance participants' ability process the experience which in-turn may boost participant's readiness and capacity for learning within and between situations.

8.3.1 Methodological implications

Given the increasing popularity of accelerators as a vehicle for promoting entrepreneurial education and capacity and the scarcity of research into accelerators as learning environments this research was timely. The application of novel learning and performance theory and measures and a behavioural lens for examining how accelerators influence participant learning and performance is believed to be a timely contribution to the literature. Moreover, the selected research design responded to suggestions to explore accelerator phenomena at multiple levels and through both quantitative and qualitative methods (Colombo et al., 2018).

It is expected that the findings from this study will contribute directly to the growing body of accelerator literature focusing on learning and add to existing learning agility and individual performance theory by examining each in a startup context. Moreover, it is hoped this multilevel mixed methods research effort will act as a stepping stone to similar in-depth investigations in this emerging field.

8.4 Limitations and Future Research

The complex nature of participant learning and performance in accelerators was captured through simultaneous and longitudinal assessment, and at multiple levels. This approach supported an examination of the operationalised relationships, independently and collectively, through both traditional quantitative and qualitative analytic processes and triangulation. In sum, the multilevel mixed methods approach strengthened the overall methodological rigor of the empirical study.

However, all research designs possess strengths and weaknesses, and each influences the value of the contributions claimed. Limitations associated with this research have been noted alongside discussions of methodology, methods and findings. However, this multilevel mixed methods study has several limitations and corresponding future research opportunities worth noting before discussing opportunities for future research which can build upon this study's empirical contributions (Tables 8.1 and 8.2).

First, the findings from this multilevel mixed methods research were derived from participants associated with a single accelerator programme cohort hosted by a GAN affiliate accelerator. The size of the cohort (i.e. ten teams and twenty-nine participants) is consistent with the size of cohorts hosted by other GAN accelerators. Although the sample size (n=29) is arguably small for the quantitative method it is ample for the qualitative methods. Collectively, the three strands of this study examined the same sample of participants and phenomenon (participant learning and performance) from different levels of accelerator participation (cohort, team, and participant). The research argued the application of different methods for examining a single sample at breadth and depth was robust and the findings are generalizable to other GAN accelerators. However, the nature and representativeness of the sample warrants caution

when interpreting and generalising findings within and beyond the sampling frame (all GAN accelerators).

For instance, findings and interpretations are suggested to be generalisable to the extent the boundary conditions of this New Zealand research site match conditions found at other GAN affiliate accelerators, and accelerators at large. Although this study's research site utilised the prototypical GAN programme design, other GAN members may emphasis different aspects of the programme design, may have access to a different type and calibre of entrepreneurs, managers, mentors, and investors and operate in a more, or less, economically free region. For instance, regional economics, regulatory practices, human capital resources and philosophical approaches for start-up assistance likely vary between European, North American, and Australasian entrepreneurial and investment ecosystems. For example, in 2019 New Zealand, the site of this research, ranked third out of 186 economies throughout the world for being very economically free (https://www.heritage.org/index/country/newzealand). Thus, economic barriers to entry are low for New Zealand startups. Consequently, the findings from this research may generalize to some but not all GAN accelerators, and only apply to non-GAN accelerators that operate under similar boundary conditions. Future research should attempt to identify samples from accelerators which operate from similar philosophical approaches and under similar economics, regulatory, human capital conditions.

Second, this research prioritised the quantitative method (Strand 1) because the hypothesised relationships and survey findings provided a conceptual and structural backbone for the study. A hypothesis testing approach coupled with well-structured conceptual frameworks helped keep the high volume of quantitative and qualitative data reasonably manageable for the skills and experience of the researcher. Moreover, it helped promote conceptual consistency when considering data generated and analysed at different levels of participation.

In hindsight, this set of choices self-limited some of the potential richness available to be harvested in the qualitative data. For instance, inductive analytic strategies coupled with an interpretive epistemology may have generated a more nuanced understanding of the types of individual and programme-related factors that helped and hindered participant learning and performance. Alternately, other empirical lenses such as critical theory may provide opportunities to explore the role of power and effects of cultural norms indirectly identified in this study. Future research may choose to pursue alternative epistemology lenses and analytic approaches. Doing so may add new understanding of the complex learning phenomenon.

Third, the predominant source for study data was the participant. Multiple types of quantitative and qualitative data were secured from participants, and this data was collected to examine a similar phenomenon – participant learning and development. Although common language and learning terminology was utilised for describing learning constructs (e.g., reflection and feedback), it is possible participants made sense of these terms differently. Moreover, the nature of the research design created conditions for method and respondent bias to exist (Podsakoff and Organ, 1986). Risks of bias were reduced, in part, by triangulating data provided by participants against researcher generated data, archival data and data provided by Accelerator Managers and Mentors (Gibbs, 2007; Richards, 2009). Future research may capture a fuller view of the participant learning experience and reduce threats of bias by incorporating both a larger sample and larger pool of non-participant respondents.

Fourth, the direction of influence established in this study's research model was singular in nature. Said differently, this study did not set out to quantitatively test the reciprocal nature the relationships between constructs. However, the qualitative findings suggest participant learning and performance at the individual level to be closely tied to both team level learning and cohort level learning. Therefore, findings about the reciprocal nature of learning are suggested rather

than empirically demonstrated. Consequently, future researchers may find it fruitful to empirically examine the directionality of these relationships.

Given accelerators are viewed as an important strategy for startup assistance, and as this research suggests, more research on accelerators as learning environments is warranted. Beyond the suggestions for future research associated with the limitations of this study, the findings from this study illuminate a range of opportunities for future research. This next section will first describe the first study to build on thesis research. Then opportunities for other researchers are described.

Next steps

The findings from this study point to both near-term and mid-term participant learning and performance outcomes. Accordingly, examining long-term effects of accelerator interventions on entrepreneurial learning and entrepreneurial capacity development may be fruitful for adding greater understanding of accelerator outcomes. Further, it would be interesting to know if and how accelerators influence entrepreneurial learning and entrepreneurial capacity development when individuals participate in several accelerators.

Although the longitudinal quantitative research strategy applied in this study allowed for the testing of accelerator, learning, and performance concepts, and much understanding was gained by the identification of relational patterns over time, further studies, and with larger samples, may better instantiate the conceptual linkages put forth beyond this single research study. For instance, did participants continue to be entrepreneurs, and if so how did the accelerator learning experience influence for choices to pursue other entrepreneurial opportunities. Longitudinal research may also illuminate better the influence of short and mid-term learning and performance experiences on eventual business

outcomes such as second-round funding, maintaining, or exiting, either through failure or sale occur.

Beyond the inherent opportunities for future research tied to this study design, several opportunities exist for conducting empirical research based on new questions generated from this research (see contributions summarized in Tables 8.1 and 8.2). Possible questions for future accelerator learning (Table 8.4) and learning agility research (Table 8.5) are presented next.

Table 8.4.

Examples of future accelerator learning research questions generated from this study.

#	Focal Area:	Question(s)
1.	Mentors	How might participant learning and development outcomes differ if accelerators trained mentors to be 'proper' mentors rather than 'ad hoc' expert advisors?
2.	Heterogeneity of learners	How might participant learning and development outcomes differ if participants also participated in a pre-accelerator training programme designed to lift capability and readiness within participants and teams?
3.	Cohort	How do participant interactions with peers influence how they make sense of the accelerator learning experience? – and – What personal characteristics and situational factors influence the quality and effectiveness of participant learning interactions in accelerators?
4.	Teams	How might the learning and development in teams be different if accelerators assessed relational strength of teams and the ideas they are championing rather than just business ideas? – *and* – What effects on participant learning and development may eventuate if accelerators trained participants on characteristics of dysfunctional teams and provided resources and counseling assistance to overcome them?
5.	Managers	In what ways do Managers moderate their engagement and support with participants and teams over the course of an accelerator, and how does variation effect participant learning and development within and between each phase?
6.	Programme design	What impacts might a reduced programme structure (e.g., less mentoring and more unstructured time) have on participant learning and performance? – *and* – Do 3rd generation incubators (e.g., ilab accelerator) which provide bespoke on-demand support generate better learning and performance outcomes than accelerators which provide a standardised programme of mentoring, education and business development supports?

Note. Author.

Table 8.5.

Examples of future learning agility research questions generated from this study.

#	Focal Area:	Question(s)
1.	Startup context	How, and to what extent, does learning agility help explain participant learning processes occur in other entrepreneurship education environments such as incubators?
2.	Mediate and moderate	How, and to what extent, might learning agility mediate and moderate participant engagement with accelerator learning resources?
3.	Psychological safety	What is the relationship between learning agility and psychological safety for startup entrepreneurs in accelerators?
4.	Multilevel construct	How, and to what extent, is learning agility both a property and capacity of individuals and teams?

Note. Author.

8.6 Concluding Comments

Accelerators are increasingly becoming a go-to-strategy for rapidly boosting learning and entrepreneurial capacity and business development within startup teams. However, much is still unknown about this new form of startup assistance. This mixed methods research identified specific *how*, *when*, and *why* factors associated with the accelerator learning environment, and the participants operating within them, that effect participant learning and performance. The research operationalised concepts and measures from accelerator, learning agility, and individual performance literature as strategic tools and lenses to examine participant learning and performance at the three levels of participation embedded within accelerator programme design – participant, team, and cohort. This study's findings and interpretations provide scholars, organisers and stakeholders with a greater appreciation of the importance of learning, and learning well, in accelerators. Moreover, it offers ideas for how accelerator stakeholders can enhance accelerator programme design to better foster participant learning and development within Cohorts of high-potential startup entrepreneurs.

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Appendices

Appendix A. Participant Information Sheet.

Research project title: Participant Learning in Business Accelerators

Overview:

Geoff Harrison, a Ph.D. Candidate from the School of Management at Victoria University of Wellington, is conducting research that will explore how agile learning influences the performance of new venture teams (NVTs) participating in a business acceleration program. Specifically, the research will examine how accelerator provided resources (e.g., human, physical, financial) and business development practices influence entrepreneurial learning and development. This research will contribute to both academic and practitioner knowledge about how to best support new start-up business ventures.

This research will contribute to an emerging body of academic and practitioner knowledge about how to best foster entrepreneurial learning via acceleration. The information gathered is intended to serve as a primary source of data for the generation of scholarly and practitioner works including but not limited to Ph.D. thesis, conference presentations, conference reports, and journal articles.

Victoria University of Wellington (VUW) reviews and approves all research conducted on its behalf before commencing. Human ethics approval was granted for this study.

Protecting your privacy:

All data collected during the research period will remain strictly **confidential.** Electronic and written data will be securely stored until the end of the research period. The researcher will destroy all data at the conclusion of the study (1/1/2020). Only the researcher and his supervisors will have access to the data.

Your identity will remain confidential during data collection and reporting of study results. The researcher will remove all individual identifiers before reporting the findings in aggregate form. Qualitative findings will use pseudonyms when being reported.

Data Collection:

Observation – will be done to examine how accelerator-provided learning resources and practices influence individual and team learning. Research methods may, by way of example, include observing: Accelerator events, individual team meetings, meetings with mentors or managers, and informal conversations. Accelerator-provided documents will also be reviewed.

Survey – you will be requested to complete three surveys during the Accelerator program. Each survey will take 15–20 minutes to complete. An electronic invitation and survey link will be sent to you at approximately the 30-, 60-, and 90-day marks of the accelerator. Surveys coincide with the end of each phase of business validation (market, product and investor).

Interviews – you will be invited to participate in a 60–minute interview after the accelerator programme. The focus of the interviews will be your accelerator experience and how this experience informed your learning. With your consent, the interview will be digitally recorded.

Consent process:

Participation is voluntary: The researcher will be available to answer questions about the study throughout the accelerator programme. *Participants may elect to be involved fully, partially or not at all*. Consent to be included in the study can be given either electronically or via written consent.

Withdrawal:

During the course of data collection, participants may elect to withdraw at any time and are not obligated to provide a reason. Individual identifiers will be removed from data collected before withdrawal.

Contact information:

If you have any questions or would like further information, please contact either me or my supervisors.

Researcher:	Primary Supervisor:	Secondary Supervisor:
Geoff Harrison	Jim Sheffield	Geoff Plimmer
Ph.D. Candidate	Senior Lecturer	Senior Lecturer
Victoria Business School	Victoria Business School	Victoria Business School
School of Management	School of Management	School of Management
geoff.harrison@vuw.ac.nz	jim.sheffield@vuw.ac.nz	geoff.plimmer@vuw.ac.nz
Phone: 022-341-5436	phone: 04 463 5085	Phone: 04 463 5700

Appendix B. Participant Consent Form.

Agreement to participate:
My signature on this consent form will serve as an agreement between myself, the researchers, and Victoria University of Wellington. My signature indicates that I understand and agree to the terms outlined below.

- I have been provided with adequate information about the research project and have had the opportunity to seek clarification and more information.
- I understand that the data collected about me and my involvement in the accelerator will be utilised to produce published works.
- I understand that all electronic and written data will be stored securely until destroyed at the end of the study period (1/1/2020).
- I understand that participation is voluntary, that I can withdraw at any time, and that I am not obligated to provide a reason.
- I understand that should I withdraw individual identifiers will be removed from data collected prior to reporting.
- I understand that, for confidentiality purposes, each participant will utilise a code in lieu of their name when completing a survey.

By signing this consent form, I am indicating that: I fully acknowledge and understand the terms and provisions outline above; I have been afforded the opportunity to ask questions and am satisfied with the answers; and that I agree to participate in the portions of the research that I have indicated below.
I am willing to participate in data collection via these methods:

☐ Observation   ☐ Survey   ☐ Interview

☐ I would like to receive an executive summary of the research.

Participant Name:_____

Signature:_____**Date:**_____

Researcher Name: Geoff Harrison

Signature:_____**Date:**_____
**Contact
Information:**

Researcher:	Supervisor:	Secondary Supervisor:
Geoff Harrison	Jim Sheffield	Geoff Plimmer
PhD Candidate	Senior Lecturer	Senior Lecturer
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Appendix C. Survey (Phase 3)

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI

VICTORIA
UNIVERSITY OF WELLINGTON

Research project title: *Learning and development in business accelerators*
Overview: Geoff Harrison, a PhD Candidate from the School of Management at Victoria University of Wellington is conducting research that will explore how learning influences the performance of new venture teams (NVTs) participating in business acceleration programmes. Specifically, the research will examine how accelerator-provided resources (e.g. human, physical, financial) and the associated business practices (e.g. co-location, programme schedule, lean start-up) influence learning within and between individuals in the cohort of NVTs.

This research will contribute to an emerging body of academic and practitioner knowledge about how to effectively foster entrepreneurial learning via acceleration. The information gathered is intended to serve as a primary source of data for the generation of scholarly works including but not limited to: PhD thesis, conference presentations, conference reports, and journal articles.
Victoria University of Wellington (VUW) reviews and approves all research conducted on its behalf prior to it commencing. Human ethics approval has been granted for this study.

Protecting your privacy: All data collected during the research period will remain strictly **confidential**. Electronic and written data will be securely stored until the end of the research period. Data will be destroyed at the conclusion of the study. Only the researcher and his supervisors will have access to the data.

To maintain confidentiality, all individual identifiers will be removed before reporting the findings.

To ensure that all survey data collected is valid and usable for the research project, it is *critical* that you *only* use the *Participant Code* that is *assigned* to you by the accelerator Manager. Usage of anything other than an assigned code will make the data you provide invalid and unusable for the study.

If during the accelerator, you become unsure of your Participant Code, please check with the accelerator Management team so that it can be reissued.

Please enter your Participant Code here: _____

Q1-3: Please reflect on your experiences over the past 30–days in the accelerator and answer the following questions

(1) Strongly Disagree	(2) Disagree	(3) Somewhat Disagree	(4) Neither Agree nor Disagree	(5) Somewhat Agree	(6) Agree	(7) Strongly Agree

Q1: I learnt a huge amount by…

1. requesting feedback from the accelerator managers
2. reflecting on my interactions with the accelerator managers
3. experimenting with concepts provided by the accelerator managers
4. seeking knowledge from accelerator managers

Q2: I learnt a huge amount by…

1. requesting feedback from the accelerator mentor
2. reflecting on my interactions with the accelerator mentor
3. experimenting with concepts provided by the accelerator mentors
4. seeking knowledge from accelerator mentors

Q3: I learnt a huge amount by…

1. requesting feedback from participants on the other teams
2. reflecting on my interactions with participants on the other teams
3. experimenting with concepts provided by participants on the other teams
4. seeking knowledge from participants on the other teams

Q4: Below you will find a list of behaviours that people perform at work. Thinking back over the past 30 days, please consider how often you have engaged in each behaviour while working in the accelerator

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Not at All			Occasionally			Very Frequently

1. Ask my peers to provide me with feedback on my performance
2. Seek feedback from my manager about my performance
3. Discuss my potential for advancement within the organization with my manager
4. Directly ask others for their thoughts on how I can improve my performance
5. Seek new information on topics related to my job or field
6. Update my knowledge and expertise through formal training or education
7. Read trade journals, newspapers articles, books, or other sources to stay informed
8. Collect data to increase my knowledge, evaluate my progress, and inform my next steps
9. Take on new roles or assignments that are challenging
10. Engage in tasks that are ambiguous in terms of how to succeed
11. Embrace work that is risky, even if the outcomes are uncertain
12. Volunteer for assignments or projects that involve the possibility of failure
13. Bring up problems and tough issues with others
14. Ask others for help when needed
15. Discuss my mistakes with others
16. Challenge others' ideas and opinions even when they are shared by many people
17. Look for ways to leverage the unique skills, knowledge and talent of others
18. Work with colleagues from different backgrounds or job functions to share perspectives
19. Collaborate with people in other parts of the organisation
20. Ask a variety of stakeholders for their point of view
21. Evaluate new techniques or different ways of solving problems
22. Experiment with unproven ideas by testing them out
23. Try different approaches to see which one generates the best results
24. Jump into action and learn by trial and error
25. Stop to reflect on work processes and projects
26. Take time to reflect on how to be more effective
27. Consider the reasons for and consequences of my actions or recent events
28. Critically evaluate work-related events with others in order to understand what happened

Q5: Below you will find a list of behaviours that can describe how people perform their work.
Please evaluate how well each statement describes how you engaged your <u>work</u> during the <u>past 30</u> days at the accelerator...

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Not at All		Occasionally			Very Frequently	

1. Consider many different options before taking action
2. Switch between different tasks or jobs as needed
3. Find common themes among opposing points of view
4. Articulate seemingly competing ideas or perspectives
5. Propose solutions that others see as innovative
6. Quickly develop solutions to problems
7. Get up to speed quickly on new tasks or projects
8. Acquire new skills and knowledge rapidly and easily
9. React well to unexpected problems
10. Readily grasp new ideas or concepts

Q6-8: Please reflect on your experiences over the past 30–days in the accelerator and answer the following questions

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree

Q6: I became more flexible in <u>meeting changing</u> business requirements by…
1. seeking feedback from others
2. reflecting on my experiences
3. experimenting to validate my ideas
4. acquiring knowledge from others

Q7: I became faster at <u>meeting known</u> business requirements by…
1. seeking feedback from others
2. reflecting on my experiences
3. experimenting to validate my ideas
4. acquiring knowledge from others

Q8: My relationships improved by…
1. seeking feedback from others
2. reflecting on my experiences
3. experimenting to validate my ideas
4. acquiring knowledge from others

Q9: <u>Overall</u>, I became <u>better at meeting</u> business requirements by…
1. seeking feedback from others
2. reflecting on my experiences
3. experimenting to validate my ideas
4. acquiring knowledge from others

Q10a: Please share the <u>most significant things</u> you have learned over the <u>past 30 days</u> in the accelerator.

Q10b: How did you learn these things?

Please reflect on your experiences over the past 90 days in the accelerator and indicate your level of agreement with the following statements

(1) Strongly Disagree	(2) Disagree	(3) Somewhat Disagree	(4) Neither Agree nor Disagree	(5) Somewhat Agree	(6) Agree	(7) Strongly Agree

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Q12: My overall learning and development in the accelerator is due hugely to interactions with....

1. Managers
2. Mentors
3. Peers (other teams)
4. Own team
5. Lab Techs
6. Educational programmes

Q13a-c: Please rank the following resources in order of greatest benefit to your learning and development during the accelerator programme?
1 = being least influential; 6 = being most influential

1. _____ Learning derived from interactions with managers
2. _____ Learning derived from interactions with mentors
3. _____ Learning derived from interactions with peers (other teams)
4. _____ Learning derived from interactions with own team members
5. _____ Learning derived from interactions with lab techs
6. _____ Learning derived from educational programs (e.g. speakers, pitching, weekly updates)

Q13b: Please explain why you feel the top ranked resource was the most influential on your learning and development.

Q13c: Please explain why you feel the least ranked resource was the least influential on your learning and development.

Q14: _____ On a scale from 1–10 (low to high), I would rank my overall experience being a participant in the accelerator as …

Appendix D. Pilot survey[a] – Means and Standard Deviations at the Item Level for Agile Learning (*n*=29).

Agile Learning[b]	Phase 1	
	M	SD
Feedback Seeking		
1. Ask my peers to provide me with feedback on my performance	4.14	1.36
2. Seek feedback from my manager about my performance	3.03	2.11
3. Discuss my potential for advancement within the organisation with my manager	2.41	1.97
4. Directly ask others for their thoughts on how I can improve my performance	3.69	1.76
5. Discuss my mistakes with others	4.93	1.51
Knowledge Seeking[c]		
1. Seek new information on topics related to my job or field	6.52	.738
2. Update my knowledge and expertise through formal training or education	4.14	2.15
3. Read trade journals, newspaper articles, books, or other sources to stay informed	6.10	.976
4. Collect data to increase my knowledge, evaluate my progress and inform my next steps	4.66	1.91
5. Bring up problems and tough issues with others	5.24	1.60
Experimenting		
1. Take on new roles or assignments that are challenging	5.79	1.01
2. Engage in tasks that are ambiguous in terms of how to succeed	5.66	1.34
3. Embrace work that is risky, even if the outcomes are uncertain	5.72	1.33
4. Volunteer for assignments or projects that involve the possibility of failure	5.52	1.53
5. Challenge others' ideas and opinions even when they are shared by many people	5.52	1.36
6. Evaluate new techniques or different ways of solving problems	5.52	1.24
7. Experiment with unproven ideas by testing them out	5.07	1.39
8. Try different approaches to see which one generates the best results	4.80	1.32
9. Jump into action and learn by trial and error	5.62	1.50

Appendix D. (Continued).

Agile Learning[a]	Phase 1	
	M	SD
Reflection		
1. Ask others for help when needed	5.00	1.63
2. Look for ways to leverage the unique skills, knowledge and talent of others	5.10	1.65
3. Work with colleagues from different backgrounds or job functions to share perspectives	5.00	1.73
4. Collaborate with peers in other parts of the organization	4.86	2.28
5. Ask a variety of stakeholders their point of view	4.52	1.99
6. Stop to reflect on work processes and projects	4.59	1.27
7. Take time to reflect on how to be more effective	4.59	1.35
8. Consider the reasons for and consequences of my actions or recent events	4.93	1.58
9. Critically evaluate work-related events with others in order to understand what happened	4.83	1.71
Flexibility		
1. Consider many different options before taking action	5.55	1.15
2. Switch between different task or jobs as needed	6.03	.981
3. Find common themes amongst opposing points of view	5.07	1.36
4. Articulate seemingly competing ideas or perspectives	5.24	1.35
5. Propose solutions that others see as innovative	5.52	1.06
6. Quickly develop solutions to problems	5.48	1.12
7. Get up to speed quickly on new tasks or projects	5.59	.946
8. Acquire new skills and knowledge rapidly and easily	5.76	.951
9. React well to unexpected problems	5.21	1.21
10. Readily grasp new ideas or concepts	5.79	.819

Note. Reported calculations are for the entire sample (*n*=29). Pilot data collected at the end of week one. Participants indicated their frequency of engagement in *Agile Learning* behaviours during the six months prior to the start of the accelerator programme.
[a] Pilot survey conducted during week 1 of the accelerator.
[b] Agile Learning measured by LAAI (Smith, 2015).
[c] To increase the overall reliability of *Knowledge Seeking*, in each phase of the accelerator programme, item 2 was deleted from the scale.

Appendix E. Means and Standard Deviations at the Item Level for Agile Learning for Phases 1–3 (*N*=29).

Agile Learning[a]	Phase 1 M	Phase 1 SD	Phase 2 M	Phase 2 SD	Phase 3 M	Phase 3 SD
Feedback Seeking						
1. Ask my peers to provide me with feedback on my performance	3.76	1.43	4.21	1.74	4.10	1.68
2. Seek feedback from my manager about my performance	3.34	1.52	3.59	1.74	3.03	1.92
3. Discuss my potential for advancement within the organisation with my manager	1.76	1.30	2.21	1.59	2.17	1.71
4. Directly ask others for their thoughts on how I can improve my performance	4.00	1.67	3.97	1.59	4.10	1.54
5. Discuss my mistakes with others	4.97	1.09	5.38	1.27	5.45	1.38
Knowledge Seeking[b]						
1. Seek new information on topics related to my job or field	6.07	1.31	5.93	1.25	5.79	1.24
2. Read trade journals, newspaper articles, books, or other sources to stay informed	5.59	1.55	5.48	1.62	5.48	1.35
3. Collect data to increase my knowledge, evaluate my progress and inform my next steps	5.59	1.24	5.21	1.57	5.17	1.31
4. Bring up problems and tough issues with others	6.00	.886	5.90	1.01	5.90	.939
Experimenting						
1. Take on new roles or assignments that are challenging	5.97	1.21	5.83	1.14	5.86	1.25
2. Engage in tasks that are ambiguous in terms of how to succeed	6.14	.953	6.17	.966	6.31	.712
3. Embrace work that is risky, even if the outcomes are uncertain	6.38	.902	6.24	.739	6.24	.912
4. Volunteer for assignments or projects that involve the possibility of failure	6.28	.996	5.69	1.17	5.93	.923
5. Challenge others' ideas and opinions even when they are shared by many people	5.45	1.09	5.45	1.02	5.55	1.21
6. Evaluate new techniques or different ways of solving problems	5.69	1.07	5.45	1.38	5.34	1.11
7. Experiment with unproven ideas by testing them out	5.79	1.05	5.79	1.08	5.45	1.15
8. Try different approaches to see which one generates the best results	5.69	1.11	5.59	1.15	5.38	1.18
9. Jump into action and learn by trial and error	5.72	1.13	5.79	1.26	5.72	1.36

Appendix E. (Continued).

Agile Learning[a]	Phase 1		Phase 2		Phase 3	
	M	SD	M	SD	M	SD
Reflection						
1. Ask others for help when needed	5.66	1.17	5.69	1.14	5.69	1.11
2. Look for ways to leverage the unique skills, knowledge and talent of others	5.52	1.12	5.52	1.15	5.52	1.21
3. Work with colleagues from different backgrounds or job functions to share perspectives	5.41	1.48	5.34	1.40	5.41	1.55
4. Collaborate with peers in other parts of the organisation	5.76	1.64	5.24	1.70	5.45	1.59
5. Ask a variety of stakeholders their point of view with others	5.10	1.90	5.38	1.40	5.03	1.35
6. Stop to reflect on work processes and projects	5.17	1.44	5.31	1.26	5.52	1.38
7. Take time to reflect on how to be more effective	5.17	1.69	4.97	1.15	5.24	1.64
8. Consider the reasons for and consequences of my actions or recent events	5.45	1.50	5.72	.797	5.59	1.24
9. Critically evaluate work-related events with others in order to understand what happened	5.45	1.27	5.38	1.15	5.62	1.27
Flexibility						
1. Consider many different options before taking action	5.38	1.29	5.21	1.29	5.41	1.38
2. Switch between different tasks and jobs as needed.	6.10	1.17	6.03	1.18	6.03	1.18
3. Find common themes amongst opposing points of view	5.45	1.12	5.59	1.05	5.76	.872
4. Articulate seemingly competing ideas or perspectives	5.62	1.08	5.45	1.15	5.79	.978
5. Propose solutions that others see as innovative	5.34	1.14	5.14	1.27	5.45	1.06
6. Quickly develop solutions to problems	5.41	1.21	5.62	.941	5.52	1.02
7. Get up to speed quickly on new tasks or projects	5.86	.953	5.66	1.01	5.69	.967
8. Acquire new skills and knowledge rapidly and easily	5.66	.897	5.76	1.02	5.45	1.24
9. React well to unexpected problems	5.31	1.11	4.97	1.38	5.14	1.36
10. Readily grasp new ideas or concepts	5.97	.778	5.83	.848	5.55	.909

Note. Reported calculations are for the entire sample (*n*=29). Data collected at the end of each accelerator programme phase (approximately day 30/60/90). Participants answered questions from a perspective that considered their frequency of engagement in particular learning behaviours during the prior 30 days in the accelerator.
[a]Agile Learning assessed by LAAI (Smith, 2015).
[b] Based on analysis of LAAI V^2; item 2 from *Knowledge Seeking* was deleted from the scale to increase reliability.

Appendix F. Means and Standard Deviations at the Item Level for Learning Resources for Phases 1–3 (*N*=29).

Learning Resources [a]	Phase 1		Phase 2		Phase 3	
	M	SD	M	SD	M	SD
Managers						
1. I learnt a huge amount by requesting feedback from accelerator managers	4.90	1.54	4.41	1.43	4.76	1.58
2. I learnt a huge amount by reflecting on my interactions with accelerator managers	5.41	1.32	4.97	1.35	4.83	1.65
3. I learnt a huge amount by experimenting w/ concepts provided by accelerator managers	5.41	1.02	5.00	1.56	4.76	1.60
4. I learnt a huge amount by seeking knowledge from accelerator managers	4.86	1.43	4.55	1.68	4.69	1.63
Mentors						
1. I learnt a huge amount by requesting feedback from accelerator mentors	5.48	1.30	5.31	1.56	5.03	1.82
2. I learnt a huge amount by reflecting on my interactions with accelerator mentors	5.90	1.18	5.17	1.63	4.90	1.65
3. I learnt a huge amount by experimenting w/ concepts provided by accelerator mentors	5.34	1.29	5.14	1.64	4.76	1.68
4. I learnt a huge amount by seeking knowledge from accelerator mentors	5.86	1.27	5.28	1.67	5.28	1.89
Cohort						
1. I learnt a huge amount by requesting feedback from the other teams	5.10	1.63	4.97	1.43	4.86	1.48
2. I learnt a huge amount by reflecting on my interactions from the other teams	5.31	1.49	5.00	1.36	4.90	1.23
3. I learnt a huge amount by experimenting w/ concepts provided by the other teams	4.83	1.42	4.55	1.45	4.41	1.48
4. I learnt a huge amount by seeking knowledge from the other teams	5.31	1.49	4.97	1.38	4.69	1.42

Note. Reported calculations are for the entire sample (*n*=29). Data collected at the end of each accelerator programme phase (approximately day 30/60/90). Participants answered questions from a perspective that considered their level of agreement with each statement. Each survey considered the interactions participants had with the provided Learning Resources during the prior 30 days in the accelerator.

[a]Learning Resources measures developed by author for this study.

Appendix G. Means and Standard Deviations at the Item Level for Learning Outcomes for Phases 1–3 (*N*=29).

Learning Outcomes[a]	Phase 1		Phase 2		Phase 3	
	M	SD	M	SD	M	SD
Adaptive						
1. I became more flexible in meeting changing requirements by seeking feedback from others	4.45	1.53	4.45	1.57	4.07	1.67
2. I became more flexible in meeting changing requirements by reflecting on my experiences	4.45	1.62	4.49	1.57	4.14	1.71
3. I became more flexible in meeting changing requirements by experimenting to validate my ideas	4.83	1.51	4.52	1.43	4.24	1.46
4. I became more flexible in meeting changing requirements by acquiring knowledge from others	5.03	1.38	5.31	1.26	4.69	1.42
Swiftness						
1. I became faster at meeting known requirements by seeking feedback from others	5.24	1.02	5.00	1.00	4.97	1.38
2. I became faster at meeting known requirements by reflecting on my experiences	5.14	1.33	5.14	1.06	5.14	1.33
3. I became faster at meeting known requirements by experimenting to validate my ideas	5.52	.738	5.38	.979	5.10	1.29
4. I became faster at meeting known requirements by acquiring knowledge from others	5.79	.774	5.31	1.11	5.07	1.22
Relational						
1. My relationships improved by seeking feedback from others	5.48	.949	5.52	1.21	5.21	1.24
2. My relationships improved by reflecting on my experiences	5.38	.903	5.24	1.24	5.45	1.30
3. My relationships improved by experimenting to validate my ideas	4.93	1.25	4.48	1.30	4.31	1.34
4. Relationships improved by acquiring knowledge from others	5.62	1.12	5.24	1.21	5.07	1.39
Task						
1. Overall, I became better at meeting requirements by seeking feedback from others	5.31	1.39	5.55	.985	5.00	1.28
2. Overall, I became better at meeting requirements by reflecting on my experiences	5.34	1.32	5.55	1.12	5.31	1.14
3. Overall, I became better at meeting requirements by experimenting to validate my ideas	5.41	1.27	5.62	1.27	5.07	1.03
4. Overall, I became better at meeting requirements by acquiring knowledge from others	5.31	1.17	5.48	1.12	5.07	1.39

Note. Reported calculations are for the entire sample (*n*=29). Data collected at the end of each accelerator programme phase (approximately day 30/60/90). Participants answered questions from a perspective that considered their level of agreement with each statement. Each survey considered participant perceptions of enhanced performance during the prior 30 days in the accelerator.
[a] Learning Outcomes measures developed by author.

Appendix H.1. Pearson Correlations, Means and Standard Deviations for Phase 1 (Days 1-30).

Measure	1	2	3	4	5	6	7	8	9	10	11	12	*M*	*SD*
1 Managers	-												5.15	1.09
2 Mentors	.624**	-											5.65	1.10
3 Cohort	.377*	.320	-										5.14	1.32
4 Feedback Seeking	.294	.130	.037	-									3.57	.878
5 Knowledge Seeking	.277	.207	.208	.142	-								5.81	.817
6 Experimenting	.219	.208	.086	-.026	.647**	-							5.90	.599
7 Reflection	.529**	.504**	.600**	.313	.414*	.467*	-						5.41	1.03
8 Flexibility	.479**	.507**	.407*	.111	.602**	.429*	.578**	-					5.61	.620
9 Task	.424*	.572**	.492**	.178	.374*	.107	.317	.497**	-				4.69	1.35
10 Relational	.382*	.504**	.591**	.059	.207	-.008	.347	.491**	.847**	-			5.42	.678
11 Adaptive	.319	.112	.748**	.353	.299	.145	.532**	.373*	.449*	.498**	-		5.35	.857
12 Swiftness	.363	.476**	.365	.055	.286	-.003	.334	.411*	.588**	.590**	.245	-	5.34	1.09

Note.n=29. Critical values obtained using bootstrap technique based on 1,000 samples with replacement. Two-tailed.
Items 1–3, Learning Resources variables. Items 4–8, Agile Learning variables. Items 9–12, Learning Outcomes variables.
Hypothesis 1 _____   Hypothesis 2 _ _ _ _ _ _ _ _ _ _   Hypothesis 3 ═══════
 ** *p* < 0.01. * 0.01<*p* < 0.05.

Appendix H.2. Pearson Correlations, Means and Standard Deviations for Phase 2 (Days 31-60).

Measure	1	2	3	4	5	6	7	8	9	10	11	12	M	SD
1 Managers	-												4.73	1.41
2 Mentors	.599**	-											5.22	1.52
3 Cohort	.541**	.450*	-										4.87	1.29
4 Feedback Seeking	.487**	.237	.344	-									3.87	1.18
5 Knowledge Seeking	.234	.048	.239	.528**	-								5.63	1.03
6 Experimenting	.386*	.090	.153	.476**	.705**	-							5.78	.728
7 Reflection	.577**	.483**	.498**	.594**	.767**	.766**	-						5.39	.787
8 Flexibility	.580**	.368*	.235	.514**	.634**	.675**	.701**	-					5.52	.787
9 Task	.597**	.489**	.329	.443*	.210	.272	.494**	.633**	-				4.72	1.28
10 Relational	.398*	.437*	.455*	.388*	.094	.126	.382*	.378*	.829**	-			5.21	.869
11 Adaptive	.654**	.464*	.855**	.537**	.289	.199	.566**	.434*	.616**	.660**	-		5.12	.960
12 Swiftness	.348	.454*	.290	.256	.260	.240	.502**	.604**	.774**	.689**	.532**	-	5.35	.936

Note. n=29. Critical values obtained using bootstrap technique based on 1,000 samples with replacement. Two-tailed.
Items 1–3, Learning Resource variables. Items 4–8, Agile Learning variables. Items 9–12, Learning Outcomes variables.
Hypothesis 1 _____   Hypothesis 2 ....   Hypothesis 3 _____
** $p < 0.01$. * $0.01 < p < 0.05$.

Appendix H.3. Pearson Correlations, Means and Standard Deviations for Phase 1 (Days 61-90).

Measure	1	2	3	4	5	6	7	8	9	10	11	12	*M*	*SD*
1 Managers	-												4.76	1.54
2 Mentors	.428*	-											5.09	1.70
3 Cohort	.418*	.346	-										4.71	1.27
4 Feedback Seeking	.444*	.382*	.403*	-									3.77	1.19
5 Knowledge Seeking	.353	-.088	.212	.567**	-								5.29	.894
6 Experimenting	.433*	.174	.261	.299	.459**	-							5.75	.714
7 Reflection	.513**	.372*	.344	.601**	.533**	.795**	-						5.45	.949
8 Flexibility	.327	.140	.309	.380*	.593**	.669**	.702**	-					5.78	.744
9 Task	.389*	.416*	.703**	.281	.305	.316	.355	.444*	-				4.28	1.39
10 Relational	.511**	.398*	.616**	.308	.282	.362	.364	.502**	.753**	-			5.07	1.15
11 Adaptive	.475**	.412*	.745**	.582**	.412*	.365	.586**	.538**	.715**	.715**	-		5.09	1.04
12 Swiftness	.435*	.156	.514**	.308	.470*	.321	.279	.398*	.738**	.738**	.671**	-	5.11	1.01

Note. *n*=29. Critical values obtained using bootstrap technique based on 1,000 samples with replacement. Two-tailed.
Items 1–3, Learning Resource variables. Items 4–8, Agile Learning variables. Items 9–12, Learning Outcomes variables.
Hypothesis 1 ——————   Hypothesis 2 ----------------   Hypothesis 3 ══════
** *p* < 0.01. * 0.01<*p* < 0.05.

Appendix I.1. Hypothesis 1 Regression Results – Learning Outcomes (Task) Regressed on Learning Resources (Manager, Mentor and Cohort) During Phases 1–3.

Task (y)	Hypothesis 1 Phase 1 (Days 1–30)						
	B	$SE\ B$	β	t	p	$BCa\ 95\%\ CI$ [a]	
Intercept (x^0)	1.26	1.77		1.29	.547	-1.56	4.25
Manager (x^1)	.011	.181	.011	.053	.966	-.338	.418
Mentor (x^2)	.455	.270	.456	2.35	.129	.022	.859
Cohort (x^3)	.284	.274	.342	2.09	.348	-.050	.910

Model: ($F_{(3,25)}$=6.38, R^2=.434, Adj. R^2=.366, p=.002**). Durbin-Watson=1.73.

Task (y)	Hypothesis 1 Phase 2 (Days 31–60)						
	B	$SE\ B$	β	t	p	$BCa\ 95\%\ CI$ [a]	
Intercept (x^0)	.344	1.23		5.31	.006**	1.06	.573
Manager (x^1)	.325	.162	.487	2.30	.047*	.041	.497
Mentor (x^2)	.129	.174	.210	1.06	.406	-.094	.584
Cohort (x^3)	-.021	.135	-.029	-.155	.868	-.273	.268

Model: ($F_{(3,25)}$=5.20, R^2=.384, Adj. R^2=.311, p=.006**). Durbin-Watson=2.12.

Task (y)	Hypothesis 1 Phase–3 (Days 61–90)						
	B	$SE\ B$	β	t	p	$BCa\ 95\%\ CI$ [a]	
Intercept (x^0)	2.08	1.01		3.43	.080	.184	4.19
Manager (x^1)	.035	.135	.054	.336	.796	-.275	.385
Mentor (x^2)	.106	.124	.179	1.16	.382	-.166	.337
Cohort (x^3)	.494	.177	.619	4.02	.005**	.208	.710

Model: ($F_{(3,25)}$=9.42, R^2=.531, Adj. R^2=.474, p=.001**). Durbin-Watson=1.92.

Note. n=29. Critical values obtained using bootstrap techniques, based on 1000 experiments with replacement. Forced entry method applied.
Coefficient Information: *B*=unstandardised coefficient; *SE B*=standard error of the coefficient; β=standardised beta; *t*=*t* test statistic; *p*= p-value. [a] *BCa 95% CI*=bias corrected and accelerated confidence intervals for *B*.
Model information: F=F test statistic; R²=Coefficient of determination; Adj. R²=Adjusted R².
** p < 0.01. * 0.01<p < 0.05.

Appendix I.2. Hypothesis 1 Regression Results – Learning Outcomes (Relational) Regressed on Learning Resources (Manager, Mentor and Cohort) During Phases 1–3.

Relational (y)	Hypothesis 1 Phase 1 (Days 1–30)						
	B	$SE\ B$	β	t	p	*BCa 95% CI* [a]	
Intercept (x^0)	2.23	1.44		2.99	.159	-.230	4.49
Manager (x^1)	-024	.146	-.031	-.159	.883	-348	.454
Mentor (x^2)	.288	.220	.368	1.95	.253	-.084	.629
Cohort (x^3)	.316	.177	.485	3.03	.082	.121	.667

Model: ($F_{(3,25)}$=7.11, R^2=.460, Adj. R^2=.395, p=.001**). Durbin-Watson=1.56.

Relational (y)	Hypothesis 1 Phase 2 (Days 31–60)						
	B	$SE\ B$	β	t	p	*BCa 95% CI* [a]	
Intercept (x^0)	2.94	1.60		4.08	.082	.174	6.48
Manager (x^1)	.061	.169	.089	.388	.727	-.201	.255
Mentor (x^2)	.159	.189	.252	1.17	.423	-.153	.586
Cohort (x^3)	.218	.160	.293	1.43	.162	-.058	.575

Model: ($F_{(3,25)}$=3.22, R^2=.279, Adj. R^2=.192, p=.040*). Durbin-Watson=1.78.

Relational (y)	Hypothesis 1 Phase 3 (Days 61–90)						
	B	$SE\ B$	β	t	p	*BCa 95% CI* [a]	
Intercept (x^0)	1.99	1.07		2.98	.078	-.079	3.68
Manager (x^1)	.179	.136	.264	1.55	.167	-.118	.505
Mentor (x^2)	.076	.128	.124	.755	.564	-.161	.413
Cohort (x^3)	.380	.170	.462	2.82	.022*	.060	.639

Model: ($F_{(3,25)}$=7.36, R^2=.469, Adj. R^2=.405, p=.001**). Durbin-Watson=1.97.

Note. n=29. Critical values obtained using bootstrap techniques based on 1000 experiments with replacement. Forced entry method applied.
Coefficient Information: B=unstandardised coefficient; *SE B*=standard error of the coefficient; β=standardised beta; t=t test statistic; p= p-value. [a] *BCa 95% CI*=bias corrected and accelerated confidence intervals for B.
Model information: F=F test statistic; R²=Coefficient of determination; Adj. R²=Adjusted R².
** $p < 0.01$. * $0.01<p < 0.05$.

Appendix I.3. Hypothesis 1 Regression Results – Learning Outcomes (Adaptive) Regressed on Learning Resources (Manager, Mentor and Cohort) During Phases 1–3.

Adaptive (y)	Hypothesis 1 Phase 1 (Days 1–30)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	1.22	1.30		1.20	.228	-1.09	6.22
Manager (x^1)	.234	.255	.189	1.13	.315	-.220	.980
Mentor (x^2)	-.307	.235	-.248	-1.52	.144	-.730	-.090
Cohort (x^3)	.779	.140	.756	5.49	.001**	.437	1.03

Model: ($F_{(3,25)}$=12.41, R^2=.598, Adj. R^2=.550, p=.001**). Durbin-Watson=2.05.

Adaptive (y)	Hypothesis 1 Phase 2 (Days 31–60)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	.160	.749		.302	.684	-.479	2.97
Manager (x^1)	.259	.162	.284	2.26	.135	-.080	.457
Mentor (x^2)	-.023	.134	-.028	-.233	.809	-.192	.253
Cohort (x^3)	.709	.120	.714	6.33	.001**	.516	.926

Model: ($F_{(3,25)}$=30.06, R^2=.783, Adj. R^2=.757, p=.001**). Durbin-Watson=1.87.

Adaptive (y)	Hypothesis 1 Phase 3 (Days 61–90)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	-1.97	.724		-.254	.563	-1.78	.412
Manager (x^1)	.140	.124	.155	1.05	.172	-.146	.476
Mentor (x^2)	.103	.127	.126	.879	.333	-.122	.606
Cohort (x^3)	.700	.163	.637	4.47	.001**	.375	.930

Model: ($F_{(3,25)}$=12.47, R^2=.599, Adj. R^2=.551, p=.001**). Durbin-Watson=2.29.

Note. n=29. Critical values obtained using bootstrap techniques based on 1000 experiments with replacement. Forced entry method applied.
Coefficient Information: B=unstandardised coefficient; $SE\ B$=standard error of the coefficient; β=standardised beta; t=t test statistic; p=p-value.
[a] *BCa 95% CI*=bias corrected and accelerated confidence intervals for B.
Model information: F=F test statistic; R^2=Coefficient of determination; Adj. R^2=Adjusted R^2.
** $p < 0.01$. * $0.01 < p < 0.05$.

Appendix I.4. Hypothesis 1 Regression Results – Learning Outcomes (Swiftness) Regressed on Learning Resources (Manager, Mentor and Cohort) During Phases 1–3.

Swiftness (y)	Hypothesis 1 Phase 1 (Days 1–30)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	.337	.961		4.92	.003**	1.60	4.85
Manager (x^1)	.026	.154	.041	.184	.872	-.256	.418
Mentor (x^2)	.233	.156	.377	1.72	.131	-.046	.515
Cohort (x^3)	.118	.142	.229	1.24	.436	-.065	.391

Model: ($F_{(3,25)}$=3.20, R^2=.278, Adj. R^2=.191, p=.040*). Durbin-Watson=2.36.

Swiftness (y)	Hypothesis 1 Phase 2 (Days 31–60)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	3.61	1.02		5.32	.002**	1.63	5.85
Manager (x^1)	.053	.159	.086	.362	.741	-.232	.247
Mentor (x^2)	.210	.148	.368	1.64	.093	-.146	.593
Cohort (x^3)	.052	.178	.077	.362	.771	-.223	.447

Model: ($F_{(3,25)}$=2.34, R^2=.220, Adj. R^2=.126, p=.097). Durbin-Watson=1.51.

Swiftness (y)	Hypothesis 1 Phase 3 (Days 61–90)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	2.56	1.49		3.11	.131	-.310	4.64
Manager (x^1)	.231	.161	.310	1.63	.144	-.067	.740
Mentor (x^2)	-.084	.148	-.125	-.676	.575	-.427	.297
Cohort (x^3)	.388	.210	.427	2.33	.096	.025	.748

Model: ($F_{(3,25)}$=4.19, R^2=.335 Adj. R^2=.255, p=.016*). Durbin-Watson=1.84.

Note. n=29. Critical values obtained using bootstrap techniques based on 1000 experiments with replacement. Forced entry method applied.

Coefficient Information: *B*=unstandardised coefficient; *SE B*=standard error of the coefficient; β=standardised beta; *t*=*t* test statistic; *p*= p-value.

[a] *BCa 95% CI*=bias corrected and accelerated confidence intervals for *B*.

Model information: F=F test statistic; R²=Coefficient of determination; Adj. R²=Adjusted R².

** $p < 0.01$. * $0.01 < p < 0.05$.

Appendix J.1. Hypothesis 2 Regression Results – Agile Learning (Feedback Seeking) Regressed on Learning Resources (Manager, Mentor Cohort) During Phases 1–3.

Hypothesis 2 Phase 1 (Days 1–30)							
Feedback Seeking (y)	*B*	*SE B*	β	*t*	*p*	*BCa 95% CI* [a]	
Intercept (x^0)	2.64	1.31		2.67	.029*	-.174	7.59
Manager (x^1)	.300	.240	.373	1.49	.160	-.101	1.11
Mentor (x^2)	-.062	.239	-.077	-.316	.776	-.495	.148
Cohort (x^3)	-.053	.158	-.079	-.383	.698	-.481	.231

Model: ($F_{(3,25)}$=.892, *R²*=.097, Adj. *R²*=-.012, *p*=.459). Durbin-Watson=2.29.

Hypothesis 2 Phase 2 (Days 31–60)							
Feedback Seeking (y)	*B*	*SE B*	β	*t*	*p*	*BCa 95% CI* [a]	
Intercept (x^0)	1.80	.886		2.00	.008**	-.443	.528
Manager (x^1)	.406	.194	.482	2.07	.038*	.013	.906
Mentor (x^2)	-.086	.186	-.111	-.505	.529	-.511	.109
Cohort (x^3)	.122	.201	.133	.635	.539	-.241	.570

Model: ($F_{(3,25)}$=2.84, *R²*=.254, Adj. *R²*=.165, *p*=.058). Durbin-Watson=2.06.

Hypothesis 2 Phase 3 (Days 61–90)							
Feedback Seeking (y)	*B*	*SE B*	β	*t*	*p*	*BCa 95% CI* [a]	
Intercept (x^0)	1.13	1.37		1.28	.184	-1.75	2.14
Manager (x^1)	.208	.135	.269	1.36	.094	-.025	.488
Mentor (x^2)	.132	.151	.189	.985	.304	-.159	.488
Cohort (x^3)	.212	.215	.225	1.18	.268	-.139	.937

Model: ($F_{(3,25)}$=3.28, *R²*=.283, Adj. *R²*=.196, *p*=.037*). Durbin-Watson=1.86.

Note. n=29. Critical values obtained using bootstrap techniques based on 1000 experiments with replacement. Forced entry method applied.
Coefficient Information: *B*=unstandardised coefficient; *SE B*=standard error of the coefficient; β=standardised beta; *t*=t test statistic; *p*= p-value.
[a] *BCa 95% CI*=bias corrected and accelerated confidence intervals for *B*.
Model information: F=F test statistic; R²=Coefficient of determination; Adj. R²=Adjusted R².
** *p* < 0.01. * 0.01<*p* < 0.05.

Appendix J.2. Hypothesis 2 Regression Results – Agile Learning (Knowledge Seeking) Regressed on Learning Resources (Manager, Mentor Cohort) During Phases 1–3.

Knowledge Seeking (y)	Hypothesis 2 Phase 1 (Days 1–30)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	4.26	1.64		3.98	.012*	1.16	6.02
Manager (x^1)	.180	.275	.208	.826	.429	-.404	.971
Mentor (x^2)	.034	.247	.039	.160	.894	-.476	.755
Cohort (x^3)	.084	.160	.117	.565	.568	-.164	.298

Model: ($F_{(3,25)}$=.824, R^2=.090, Adj. R^2=-.019, p=.493). Durbin-Watson=2.35.

Knowledge Seeking (y)	Hypothesis 2 Phase 2 (Days 31–60)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	4.66	1.22		5.41	.001**	1.68	5.76
Manager (x^1)	.175	.210	.239	.928	.370	-.282	.681
Mentor (x^2)	-.123	.180	-.182	-.750	.356	-.546	.266
Cohort (x^3)	.154	.207	.192	.832	.438	-.242	.705

Model: $F_{(3,25)}$=.855, R^2=.093, Adj. R^2=-.016, p=.477). Durbin-Watson=2.19.

Knowledge Seeking (y)	Hypothesis 2 Phase 3 (Days 61–90)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	4.76	.728		6.81	.001**	3.56	5.61
Manager (x^1)	.251	.126	.431	2.08	.034*	.023	.527
Mentor (x^2)	-.169	.094	-.322	-1.60	.055	-.351	.018
Cohort (x^3)	.101	.162	.143	.716	.516	-.222	.406

Model: ($F_{(3,25)}$=2.22, R^2=.211, Adj. R^2=.116, p=.110). Durbin-Watson=2.20.

Note. n=29. Critical values obtained using bootstrap techniques based on 1000 experiments with replacement. Forced entry method applied.
Coefficient Information: *B*=unstandardised coefficient; *SE B*=standard error of the coefficient; β=standardised beta; *t*=t test statistic; *p*= p-value.
[a] *BCa 95% CI*=bias corrected and accelerated confidence intervals for *B*.
Model information: F=F test statistic; R²=Coefficient of determination; Adj. R²=Adjusted R².
** $p < 0.01$. * $0.01 < p < 0.05$.

Appendix J.3. Hypothesis 2 Regression Results – Agile Learning (Experimenting) Regressed on Learning Resources (Manager, Mentor, Cohort) During Phases 1–3.

Experimenting (y)	Hypothesis 2 Phase 1 (Days 1–30)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	5.14	.967		7.45	.001**	3.06	5.95
Manager (x^1)	.082	.138	.149	.581	.521	-.175	.336
Mentor (x^2)	.064	.165	.117	.468	.670	-.216	.825
Cohort (x^3)	-.003	.086	-.008	-.036	.964	-.155	.108

Model: ($F(3,25)$=.497, R^2=.056, Adj. R^2=-.057, p=.687). Durbin-Watson=1.90.

Experimenting (y)	Hypothesis 2 Phase 2 (Days 31–60)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	5.11	.715		8.77	.001**	3.55	5.99
Manager (x^1)	.277	.130	.534	2.19	.040*	.028	.727
Mentor (x^2)	-.101	.140	-2.11	-.917	.406	-.414	.057
Cohort (x^3)	-.023	.115	-.041	-.188	.816	-.277	.272

Model: ($F(3,25)$=1.84, R^2=.181, Adj. R^2=.082, p=.166). Durbin-Watson=2.55.

Experimenting (y)	Hypothesis 2 Phase 3 (Days 61–90)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	4.66	.645		8.27	.001**	3.70	6.57
Manager (x^1)	.188	.106	.405	1.94	.041*	.013	.330
Mentor (x^2)	-.015	.096	-.035	-.174	.870	-.150	.204
Cohort (x^3)	.058	.093	.103	.513	.482	-.155	.229

Model: ($F(3,25)$ = 2.04, R^2=.496, Adj. R^2=.436, p=.134). Durbin-Watson=2.12.

Note. n=29. Critical values obtained using bootstrap techniques based on 1000 experiments with replacement. Forced entry method applied.
Coefficient Information: *B*=unstandardised coefficient; *SE B*=standard error of the coefficient; β=standardised beta; *t*=*t* test statistic; *p*= p-value.
[a] *BCa 95% CI*=bias corrected and accelerated confidence intervals for *B*.
Model information: F=F test statistic; R²=Coefficient of determination; Adj. R²=Adjusted R².
** $p < 0.01$. * $0.01 < p < 0.05$.

Appendix J.4. Hypothesis 2 Regression Results – Agile Learning (Reflection) Regressed on Learning Resources (Manager, Mentor, Cohort) During Phases 1–3.

Reflection (y)	Hypothesis 2 Phase 1 (Days 1–30)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	1.36	1.32		1.56	.299	-1.82	3.63
Manager (x^1)	.209	.169	.222	1.18	.218	-.042	.559
Mentor (x^2)	.210	.205	.223	1.22	.314	-.239	.673
Cohort (x^3)	.349	.173	.445	2.88	.035*	-.054	.571

Model: ($F_{(3,25)}$=8.21, R^2=.496, Adj. R^2=.436, p=.001**). Durbin-Watson=1.88.

Reflection (y)	Hypothesis 2 Phase 2 (Days 31–60)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	3.32	-.005		6.16	.001**	2.15	4.39
Manager (x^1)	.196	.017	.350	1.68	.097	-.001	.507
Mentor (x^2)	.087	-.018	.169	.860	.318	-.202	.258
Cohort (x^3)	.141	.003	.232	1.23	.189	-.086	.370

Model: ($F_{(3,25)}$=5.54, R^2=.400, Adj. R^2=.327, p=.005**). Durbin-Watson=2.27.

Reflection (y)	Hypothesis 2 Phase 3 (Days 61–90)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	3.41	.822		.392	.001**	2.16	6.25
Manager (x^1)	.242	.120	.392	2.02	.042*	.049	.448
Mentor (x^2)	.090	.110	.161	.854	.393	-.090	.388
Cohort (x^3)	.093	.129	.124	.661	.436	-.155	.246

Model: ($F_{(3,25)}$=3.64, R^2=.304, Adj. R^2=.220, p=.026*). Durbin-Watson=2.25.

Note. n=29. Critical values obtained using bootstrap techniques based on 1000 experiments with replacement. Forced entry method applied.
Coefficient Information: *B*=unstandardised coefficient; *SE B*=standard error of the coefficient; β=standardised beta; *t*=t test statistic; *p*= p-value.
[a] *BCa 95% CI*=bias corrected and accelerated confidence intervals for *B*.
Model information: F=F test statistic; R²=Coefficient of determination; Adj. R²=Adjusted R².
** *p* < 0.01. * 0.01<*p* < 0.05.

Appendix J.5. Hypothesis 2 Regression Results – Agile Learning (Flexibility) Regressed on Learning Resources (Manager, Mentor, Cohort) During Phases 1–3.

	Hypothesis 2 Phase 1 (Days 1–30)						
Flexibility (y)	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	3.48	.756		5.84	.001**	2.19	5.15
Manager (x^1)	.113	.118	.198	.928	.257	-.115	.591
Mentor (x^2)	.175	.123	.309	1.48	.124	-.116	.359
Cohort (x^3)	.110	.092	.233	1.33	.131	-.026	.182

Model: ($F(3,25)=4.42$, $R^2=.347$, Adj. $R^2=.268$, $p=.013*$). Durbin-Watson=2.24.

	Hypothesis 2 Phase-2 (Day 31-60)						
Flexibility (y)	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	4.11	.924		7.32	.001**	2.07	5.36
Manager (x^1)	.342	.143	.612	2.81	.024*	.061	.566
Mentor (x^2)	.029	.132	.056	.271	.784	-.187	.294
Cohort (x^3)	-.074	.173	-.121	-.618	.684	-.473	.337

Model: ($F(3,25)=4.43$, $R^2=.347$, Adj. $R^2=.268$, $p=.013*$). Durbin-Watson=2.24.

	Hypothesis 2 Phase-3 (Day 61-90)						
Flexibility (y)	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	4.84	.819		7.42	.001**	3.35	7.59
Manager (x^1)	.123	.120	.255	1.18	.301	-.084	.323
Mentor (x^2)	-.019	.116	-.044	-.212	.867	-.238	.311
Cohort (x^3)	.128	.175	.218	.105	.499	-.190	.353

Model: ($F(3,25)=1.41$, $R^2=.145$, Adj. $R^2=.042$, $p=.263$). Durbin-Watson=1.74.

Note. n=29. Critical values obtained using bootstrap techniques based on 1000 experiments with replacement. Forced entry method applied.

Coefficient Information: B=unstandardised coefficient; $SE\ B$=standard error of the coefficient; β=standardised beta; t=t test statistic; p= p-value.

[a] *BCa 95% CI*=bias corrected and accelerated confidence intervals for B.

Model information: F=F test statistic; R²=Coefficient of determination; Adj. R²=Adjusted R².

** $p < 0.01$. * $0.01 < p < 0.05$.

Appendix K.1. Hypothesis 3 Regression Results – Learning Outcomes (Task) Regressed on Agile Learning (Feedback Seeking, Knowledge Seeking, Experimenting, Reflection and Flexibility) During Phases 1–3.

Task (y)	Hypothesis 3 Phase 1 (Days 1–30)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	1.81	2.67		.730	.518	-10.52	9.98
Feedback Seeking (x^1)	.077	.234	.062	.326	.759	-.451	.653
Knowledge Seeking (x^2)	.310	.351	.268	1.02	.442	-.321	.799
Experimenting (x^3)	-.502	.764	-.275	-1.11	.563	-2.11	.851
Reflection (x^4)	.091	.368	.086	.356	.796	-.818	1.70
Flexibility (x^5)	.700	.658	.398	1.61	.385	-.568	1.45

Model: ($F(3,23)$=2.04 R^2=.307, Adj. R^2=.156, p=.111). Durbin-Watson=1.54.

Task (y)	Hypothesis 3 Phase 2 (Days 31–60)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	2.03	1.42		1.94	.193	-.339	4.58
Feedback Seeking (x^1)	.151	.131	.191	1.15	.252	-.124	.389
Knowledge Seeking (x^2)	-.460	.328	-.508	-2.34	.186	-1.08	.355
Experimenting (x^3)	-.465	.357	-.361	-1.64	.253	-1.07	-.036
Reflection (x^4)	.641	.479	.539	2.12	.211	.080	1.60
Flexibility (x^5)	.860	.289	.722	3.67	.013*	.394	1.42

Model: ($F(3,23)$=7.00, R^2=.603, Adj. R^2=.517, p=.001**). Durbin-Watson=2.14.

Task (y)	Hypothesis 3 Phase 3 (Days 61–90)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	1.59	3.04		.921	.636	-3.76	6.87
Feedback Seeking (x^1)	.127	.241	.149	.537	.599	-.347	.709
Knowledge Seeking (x^2)	-.013	.304	-.012	-.044	.969	-.574	.511
Experimenting (x^3)	.067	.590	.048	.139	.934	-1.21	1.45
Reflection (x^4)	-.043	.544	-.040	-.098	.930	-1.10	.723
Flexibility (x^5)	.531	.575	.391	1.34	.339	-.592	1.84

Model: ($F(3,23)$=1.24 R^2=.213, Adj. R^2=.041, p=.322). Durbin-Watson=1.74.

Note. n=29. Critical values obtained using bootstrap techniques, based on 1000 experiments with replacement. Forced entry method applied.

Coefficient Information: B=unstandardised coefficient; *SE B*=standard error of the coefficient; β=standardised beta; t=t test statistic; p= p-value.

[a] *BCa 95% CI*=bias corrected and accelerated confidence intervals for *B*.

Model information: F=F test statistic; R²=Coefficient of determination; Adj. R²=Adjusted R².

** $p < 0.01$. * $0.01 < p < 0.05$.

Appendix K.2. Hypothesis 3 Regression Results – Learning Outcomes (Relational) Regressed on Agile Learning (Feedback Seeking, Knowledge Seeking, Experimenting, Reflection and Flexibility) During Phases 1–3.

Relational (y)	Hypothesis 3 Phase 1 (Days 1–30)					BCa 95% CI [a]	
	B	*SE B*	β	*t*	*p*		
Intercept (x^0)	3.68	2.06		1.92	.101	-1.53	7.39
Feedback Seeking (x^1)	-.089	.191	-.091	-.485	.691	-.480	.353
Knowledge Seeking (x^2)	.069	.238	.076	.293	.772	-.349	.388
Experimenting (x^3)	-.542	.534	-.379	-1.56	.400	-1.66	.718
Reflection (x^4)	.204	.220	.245	1.04	.305	-.271	.981
Flexibility (x^5)	.658	.495	.476	1.97	.296	-.352	1.26

Model: ($F_{(3,23)}$=2.29 R^2=.333, Adj. R^2=.187, *p*=.079). Durbin-Watson=1.35.

Relational (y)	Hypothesis 3 Phase 2 (Days 31–60)					BCa 95% CI [a]	
	B	*SE B*	β	*t*	*p*		
Intercept (x^0)	3.14	2.17		2.37	.228	-.650	7.96
Feedback Seeking (x^1)	.213	.152	.263	1.28	.191	-.120	.711
Knowledge Seeking (x^2)	-.467	.363	-.502	-1.87	.289	-1.18	.235
Experimenting (x^3)	-.521	.375	-.395	-1.45	.207	-1.21	-.074
Reflection (x^4)	.800	.683	.656	2.09	.280	-.075	2.23
Flexibility (x^5)	.448	.417	.367	1.50	.294	-.253	1.15

Model: ($F_{(3,23)}$=2.99, R^2=.394, Adj. R^2=.263, *p*=.032*). Durbin-Watson=2.05.

Relational (y)	Hypothesis 3 Phase 3 (Days 61–90)					BCa 95% CI [a]	
	B	*SE B*	β	*t*	*p*		
Intercept (x^0)	.789	2.60		.466	.780	-3.93	5.21
Feedback Seeking (x^1)	.249	.263	.284	1.08	.356	-.235	.877
Knowledge Seeking (x^2)	-.171	.347	-.147	-.590	.630	-.852	.318
Experimenting (x^3)	.278	.565	.191	.587	.646	-.720	1.41
Reflection (x^4)	-.278	.595	-.254	-.648	.659	-1.37	.577
Flexibility (x^5)	.743	.581	.531	1.92	.242	-.180	2.12

Model: ($F_{(3,23)}$=1.88 R^2=.290, Adj. R^2=.136, *p*=.137). Durbin-Watson=1.77.

Note. n=29. Critical values obtained using bootstrap techniques based on 1000 experiments with replacement. Forced entry method applied.
Coefficient Information: *B*=unstandardised coefficient; *SE B*=standard error of the coefficient; β=standardised beta; *t*=*t* test statistic; *p*= p-value.
[a] *BCa 95% CI*=bias corrected and accelerated confidence intervals for *B*.
Model information: F=F test statistic; R^2=Coefficient of determination; Adj. R^2=Adjusted R^2.
** *p* < 0.01. * 0.01<*p* < 0.05.

Appendix K.3. Hypothesis 3 Regression Results – Learning Outcomes (Adaptive) regressed on Agile Learning (Feedback Seeking, Knowledge Seeking, Experimenting, Reflection and Flexibility) During Phases 1-3.

Adaptive (y)	Hypothesis 3 Phase 1 (Days 1–30)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	.971	3.24		.327	.747	-6.60	7.46
Feedback Seeking (x^1)	.259	.309	.168	.912	.371	-3.60	.991
Knowledge Seeking (x^2)	.255	.380	.179	.700	.491	-.493	.815
Experimenting (x^3)	-.481	.742	-.213	-.891	.382	-2.05	1.45
Reflection (x^4)	.611	.397	.465	2.01	.057	-.314	1.30
Flexibility (x^5)	.150	.612	.069	.289	.775	-1.12	1.03

Model: (F(3,23)=2.53, R^2=.355, Adj. R^2=.215, p=.058). Durbin-Watson=2.27.

Adaptive (y)	Hypothesis 3 Phase 2 (Days 31–60)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	1.50	1.76		1.10	.370	-1.54	5.10
Feedback Seeking (x^1)	.356	.220	.329	1.90	.135	-.092	.660
Knowledge Seeking (x^2)	-.370	.398	-.298	-1.32	.296	-1.10	1.11
Experimenting (x^3)	-1.01	.416	-.572	-2.50	.032*	-2.10	.469
Reflection (x^4)	1.43	.676	.881	3.34	.028*	-.194	1.98
Flexibility (x^5)	.361	.357	.222	1.08	.263	-.367	1.05

Model: (F(3,23)=6.14, R^2=.572, Adj. R^2=.479, p=.001**). Durbin-Watson=1.75.

Adaptive (y)	Hypothesis 3 Phase 3 (Days 61–90)						
	B	$SE\ B$	β	t	p	BCa 95% CI [a]	
Intercept (x^0)	-.639	.230		-.331	.785	-4.83	5.09
Feedback Seeking (x^1)	.421	.068	.359	1.60	.267	-.202	1.23
Knowledge Seeking (x^2)	-.133	-.077	-.086	-.405	.779	-.990	.530
Experimenting (x^3)	-.395	.003	-.203	-.731	.592	-1.59	.889
Reflection (x^4)	.476	-.112	.325	.973	.534	-.838	1.46
Flexibility (x^5)	.674	.705	.360	1.53	.381	-.464	2.36

Model: (F(3,23)=4.32, R^2=.484 Adj. R^2=.372, p=.006**). Durbin-Watson=1.75.

Note. n=29. Critical values obtained using bootstrap techniques based on 1000 experiments with replacement. Forced entry method applied.
Coefficient Information: B=unstandardised coefficient; $SE\ B$=standard error of the coefficient; β=standardised beta; t=t test statistic; p= p-value.
[a] *BCa 95% CI*=bias corrected and accelerated confidence intervals for B.
Model information: F=F test statistic; R^2=Coefficient of determination; Adj. R^2=Adjusted R^2.
** p < 0.01. * 0.01<p < 0.05.

Appendix K.4. Hypothesis 3 Regression Results – Learning Outcomes (Swiftness) Regressed on Agile Learning (Feedback Seeking, Knowledge Seeking, Experimenting, Reflection and Flexibility) During Phases 1–3.

	Hypothesis 3 Phase 1 (Days 1–30)						
Swiftness (y)	B	$SE\ B$	β	t	p	_BCa 95% CI_ [a]	
Intercept (x^0)	4.93	1.40		3.17	.007**	1.97	8.19
Feedback Seeking (x^1)	-.101	.128	-.131	-.679	.433	-.374	.187
Knowledge Seeking (x^2)	.237	.189	.331	1.24	.202	-.033	.452
Experimenting (x^3)	-.537	.389	-.474	-1.90	.121	-1.25	.720
Reflection (x^4)	.208	.213	.316	1.31	.328	-.113	.722
Flexibility (x^5)	.270	.312	.247	.991	.385	-.329	.633

Model: ($F_{(3,23)}$=1.93, R^2=.296, Adj. R^2=.142, p=.128). Durbin-Watson=2.42.

	Hypothesis 3 Phase 2 (Days 31–60)						
Swiftness (y)	B	$SE\ B$	β	t	p	_BCa 95% CI_ [a]	
Intercept (x^0)	1.97	1.18		1.89	.105	-.093	4.49
Feedback Seeking (x^1)	-.088	.148	-.120	-.674	.529	-.379	.298
Knowledge Seeking (x^2)	-.256	.260	-.305	-1.31	.329	-.683	.250
Experimenting (x^3)	-.587	.372	-.492	-2.08	.148	-1.16	-.007
Reflection (x^4)	.756	.427	.685	2.51	.081	.134	1.73
Flexibility (x^5)	.784	.244	.710	3.36	.004**	.302	1.12

Model: ($F_{(3,23)}$=5.49, R^2=.544, Adj. R^2=.445, p=.002**). Durbin-Watson=1.84.

	Hypothesis 3 Phase 3 (Days 61–90)						
Swiftness (y)	B	$SE\ B$	β	t	p	_BCa 95% CI_ [a]	
Intercept (x^0)	.226	2.75		.120	.941	-4.52	5.45
Feedback Seeking (x^1)	.186	.236	.192	.772	.467	-.354	.756
Knowledge Seeking (x^2)	.385	.410	.300	1.20	.428	-.361	.993
Experimenting (x^3)	.426	.692	.265	.806	.540	-.994	1.73
Reflection (x^4)	-.443	.556	-.366	-.925	.426	-1.58	.832
Flexibility (x^5)	.350	.580	.227	.810	.559	-.879	1.71

Model:($F_{(3,23)}$=1.73, R^2=.274, Adj. R^2=.116, p=.167). Durbin-Watson=1.54.

Note. n=29. Critical values obtained using bootstrap techniques based on 1000 experiments with replacement. Forced entry method applied.
Coefficient Information: B=unstandardised coefficient; $SE\ B$=standard error of the coefficient; β=standardised beta; t=t test statistic; p= p-value.
[a] _BCa 95% CI_=bias corrected and accelerated confidence intervals for B.
Model information: F=F test statistic; R²=Coefficient of determination; Adj. R²=Adjusted R².
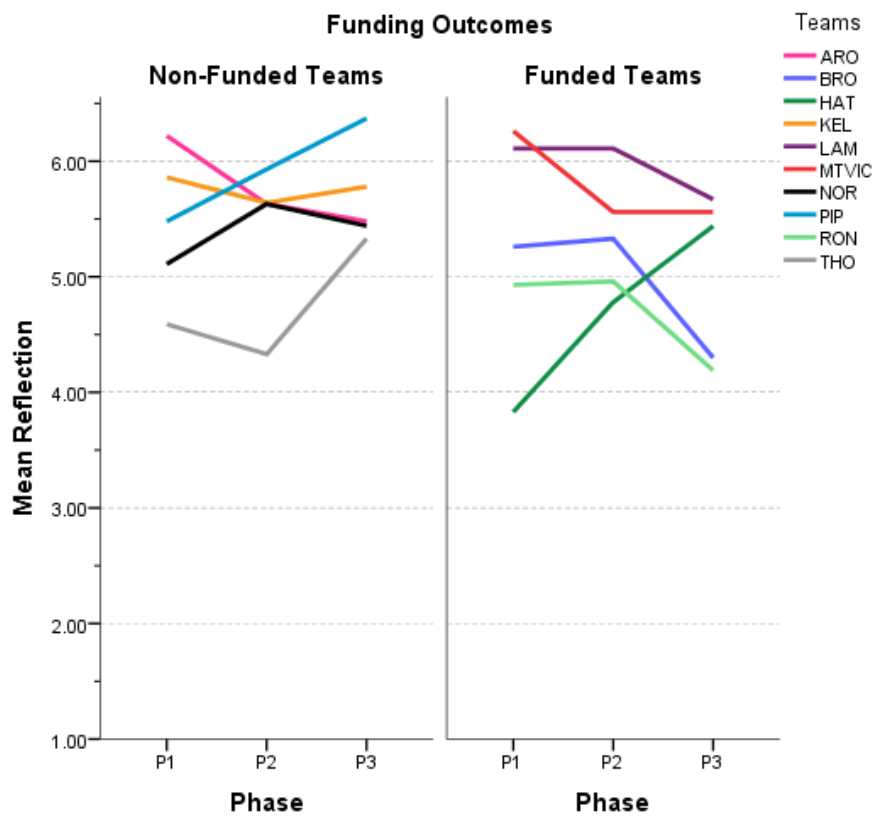** $p < 0.01$. * $0.01<p < 0.05$.

Appendix L.1. Hypothesis 4 – Mean Participant Scores for Cohort by Phase and End-of-Programme Funding Outcomes for Teams.
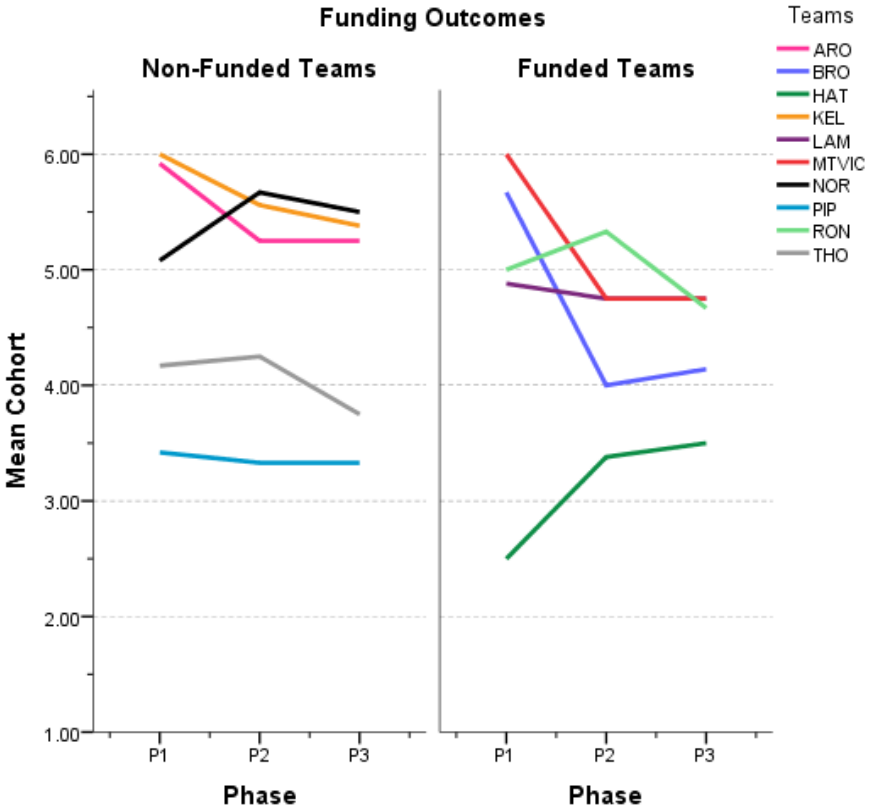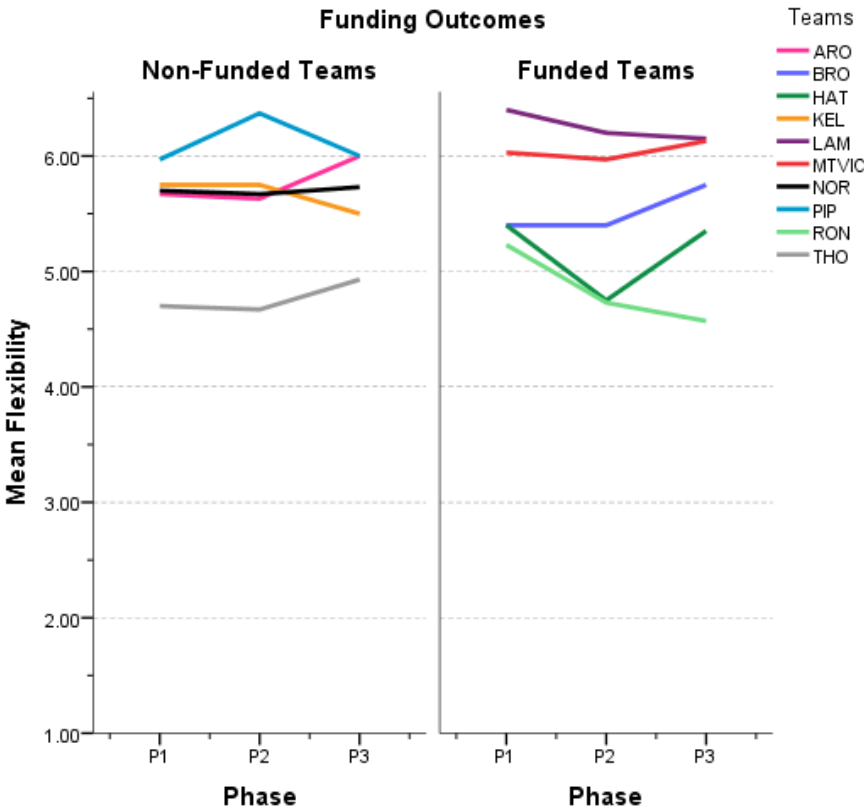
Appendix L.2. Hypothesis 4 – Mean Participant Scores for Experimenting by Phase and End-of-Programme Funding Outcomes for Teams.
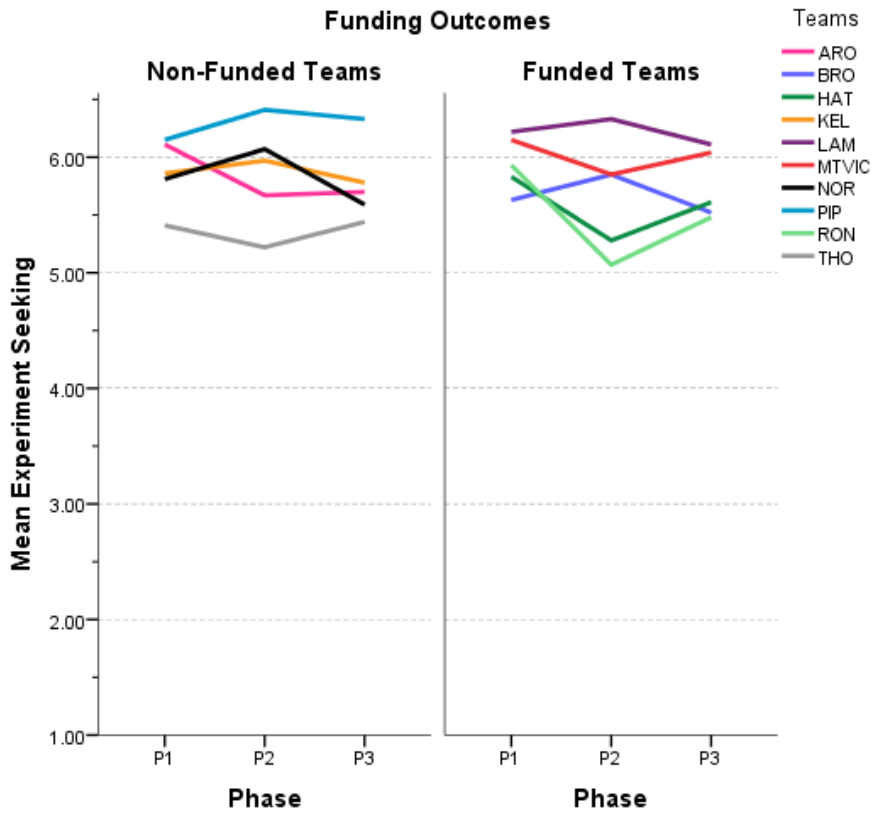
Appendix L.3. Hypothesis 4 – Mean Participant Scores for Reflection by Phase and End-of-Programme Funding Outcomes for Teams.

Appendix L.4. Hypothesis 4 – Mean Participant Scores for Flexibility by Phase and End-of-Programme Funding Outcomes for Teams.

Appendix L.5. Hypothesis 4 – Mean Participant Scores for Task by Phase and End-of-Programme Funding Outcomes for Teams.
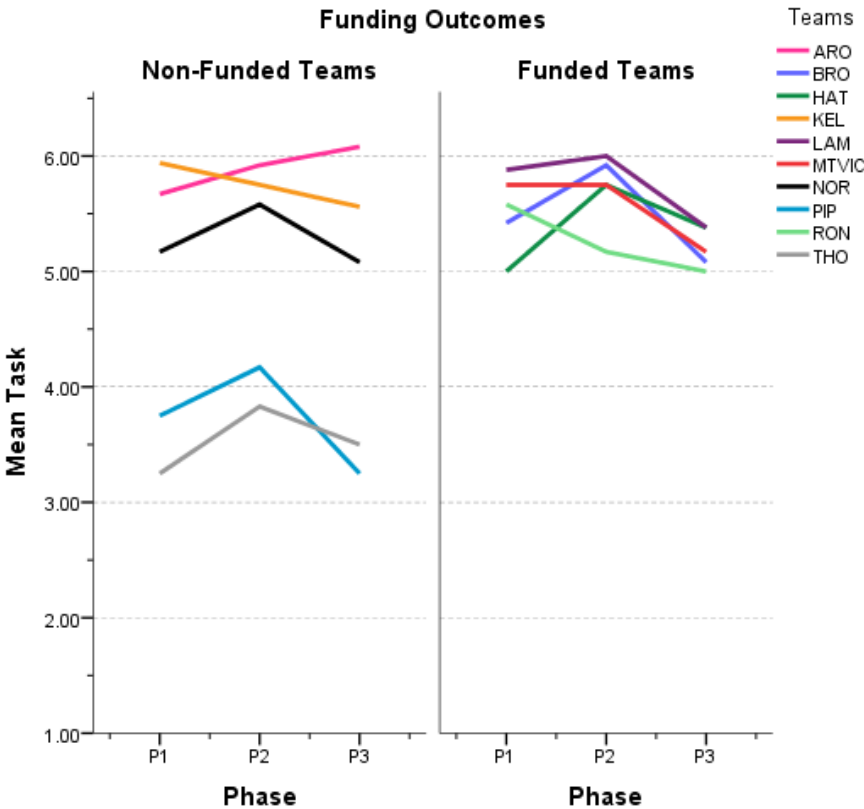
Appendix L.6. Hypothesis 4 – Mean Participant Scores for Relational by Phase and End-of-Programme Funding Outcomes for Teams.
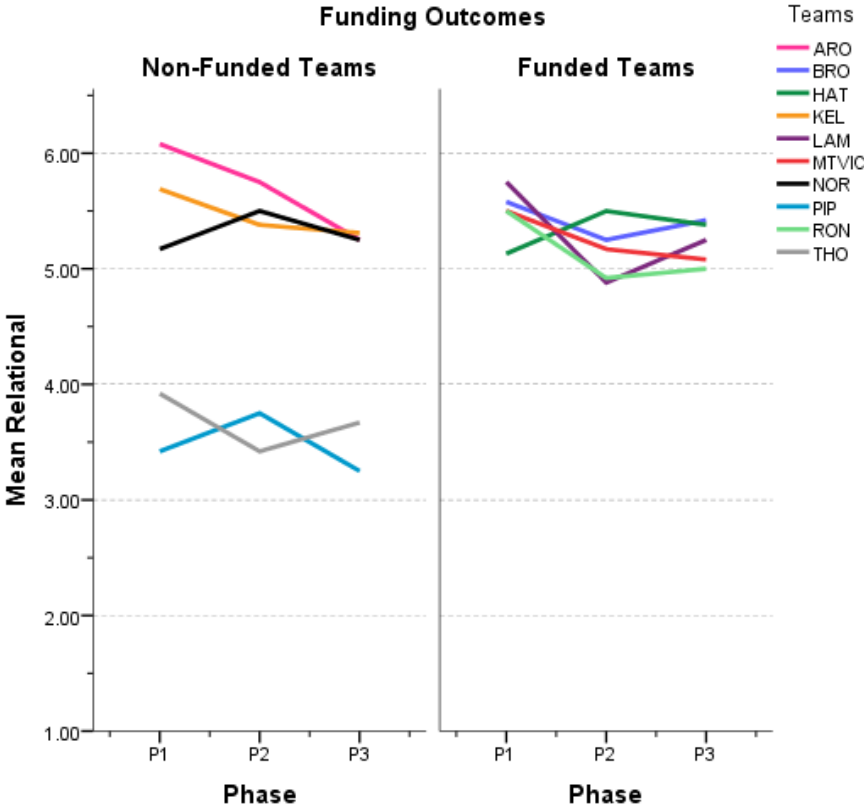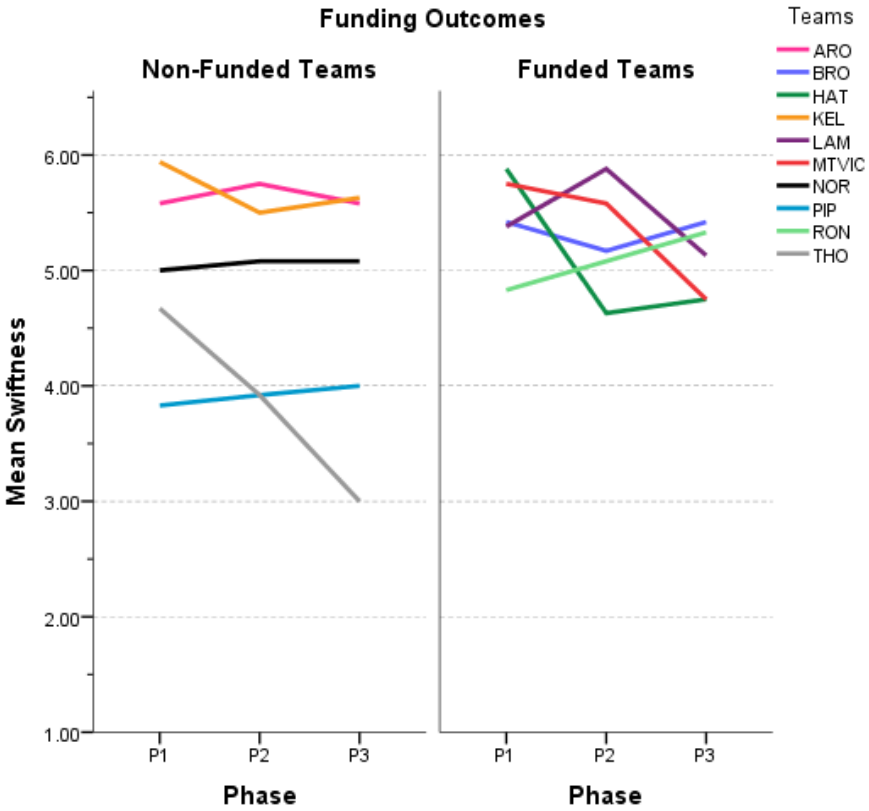
Appendix L.7. Hypothesis 4 – Mean Participant Scores for Swiftness by Phase and End-of-Programme Funding Outcomes for Teams.

Appendix M.1. Hypothesis 4 – Mean Scores for Funded and Non-funded Teams by Phase for Agile Learning.

Mean by Phase	Feedback Seeking			Knowledge Seeking			Experimentation			Reflection Seeking			Flexibility		
	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
Funded Teams															
BROOKLYN	2.73	3.20	3.67	6.33	6.08	5.67	5.63	5.85	5.52	5.26	5.33	4.30	5.40	5.40	5.57
HATATAI	2.70	4.10	2.30	5.38	4.00	4.63	5.83	5.28	5.61	3.83	4.78	5.44	5.40	4.75	5.35
LAMBTON	4.00	4.80	5.10	6.63	6.63	6.38	6.22	6.33	6.11	6.11	6.11	5.67	6.40	6.20	6.15
MTVIC	3.40	2.87	3.67	6.25	5.92	5.83	6.15	5.85	6.04	6.26	5.56	5.56	6.03	5.97	6.13
RONGATAI	3.20	2.73	3.40	5.42	5.00	5.25	5.93	5.07	5.48	4.93	4.96	4.19	5.23	4.73	4.57
Non-funded Teams															
AROVALLEY	4.13	5.10	3.40	5.67	5.92	5.75	6.11	5.67	5.70	6.22	5.63	5.48	5.67	5.63	6.00
KELBURN	4.25	4.50	4.50	5.69	5.88	5.81	5.86	5.97	5.78	5.86	5.64	5.78	5.75	5.75	5.50
NORTHLAND	3.40	4.27	4.73	5.92	5.83	5.67	5.81	6.07	5.59	5.11	5.63	5.44	5.70	5.67	5.73
PIPITEA	4.13	4.73	3.80	6.42	6.08	6.50	6.15	6.41	6.33	5.48	5.93	6.37	5.97	6.37	6.00
THORNDON	3.33	2.67	2.87	4.58	4.67	4.25	5.41	5.22	5.44	4.59	4.33	5.33	4.70	4.67	4.93

Note. n=29. P1=Phase 1; P2=Phase 2; P3=Phase 3.

Appendix M.2. Hypothesis 4 – Mean Scores for Funded and Non-funded Teams by Phase for Learning Resources.

Mean by Phase	Managers			Mentors			Cohort		
	P1	P2	P3	P1	P2	P3	P1	P2	P3
Funded Teams									
BROOKLYN	6.00	4.14	3.08	6.25	5.25	4.50	5.92	5.25	5.25
HATATAI	5.50	5.63	5.63	5.88	5.94	5.63	6.00	5.56	5.38
LAMBTON	4.42	4.42	4.00	5.17	5.75	5.75	5.08	5.67	5.50
MTVIC	3.25	3.75	4.08	4.08	3.50	2.17	3.42	3.33	3.33
RONGATAI	4.75	3.58	3.58	4.75	4.33	4.25	4.17	4.25	3.75
Non-funded Teams									
AROVALLEY	4.33	4.17	4.17	4.50	4.58	4.25	5.67	4.00	4.14
KELBURN	5.13	5.38	5.13	5.50	5.75	5.50	2.50	3.38	3.50
NORTHLAND	6.13	5.50	4.88	6.13	6.25	6.00	4.88	4.75	4.75
PIPITEA	5.75	5.42	6.08	6.17	4.67	5.42	6.00	4.75	4.75
THORNDON	4.58	3.83	5.25	6.08	5.42	5.92	5.00	5.33	4.67

Note. n=29. P1=Phase 1; P2=Phase 2; P3=Phase 3.

Appendix M.3. Hypothesis 4 – Mean Scores for Funded and Non-funded Teams by Phase for Learning Outcomes.

Mean by Phase	Task			Relational			Adaptive			Swiftness		
	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
Funded Teams												
BROOKLYN	5.67	5.92	6.08	6.08	5.75	5.25	6.08	5.58	4.92	5.58	5.75	5.58
HATATAI	5.94	5.75	5.56	5.69	5.38	5.31	5.56	5.13	5.19	5.94	5.50	5.63
LAMBTON	5.17	5.58	5.08	5.17	5.50	5.25	4.83	5.50	5.42	5.00	5.08	5.08
MTVIC	3.75	4.17	3.25	3.42	3.75	3.25	3.00	3.25	2.67	3.83	3.92	4.00
RONGATAI	3.25	3.83	3.50	3.92	3.42	3.67	2.83	3.33	2.58	4.67	3.92	3.00
Non-funded Teams												
AROVALLEY	5.42	5.92	5.08	5.58	5.25	5.42	5.25	3.92	3.92	5.42	5.17	5.42
KELBURN	5.00	5.75	5.38	5.13	5.50	5.38	2.75	4.13	3.50	5.88	4.63	4.75
NORTHLAND	5.88	6.00	5.38	5.75	4.88	5.25	5.38	5.13	4.50	5.38	5.88	5.13
PIPITEA	5.75	5.75	5.17	5.50	5.17	5.08	4.58	4.92	4.33	5.75	5.58	4.75
THORNDON	5.58	5.17	5.00	5.50	4.92	5.00	4.50	4.33	3.92	4.83	5.08	5.33

Note. n=29. P1=Phase 1; P2=Phase 2; P3=Phase 3.