This paper was presented at the XXXVII ISPIM Innovation Conference, held in Granada, Spain on 07 June to 10 June 2026. ISBN 978-952-65771-2-8.

Embedded capabilities: a theory of connected and continuous organizational innovation

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Abstract: This study explores how innovative firms embed innovation in their organisations. Using existing literature, the study postulates on an "embedded capabilities" theory that explains how firms ingrain innovation in a cycle for: (i) linking capacities, (ii) learning orientations, and (iii) legitimatising processes. Based on the cases of three Big Tech titans, Alphabet, Apple, and Microsoft, the study finds support for the theory in embedded innovation capabilities that emerge from collaborative, democratisation, divergent thinking, empowerment, open systems, and talent management philosophies. Underlying the development of these capabilities are four orchestration mechanisms: (i) co-functional structures and collaboration, (ii) co-extended models and initiatives, (iii) co-developed ecosystems and principles and (iv) co-evolutional leadership and cultures. Principally, this study adds to current understanding on how firm connect and continue to innovate by adding to knowledge on an embeddedness basis of innovation.

Keywords: Embeddedness; innovation culture; open innovation; organisational networks; organisational learning; democratisation of innovation; collaborative innovation; co-creation; institutional innovation; Big Tech.

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1 Introduction

The question of what makes organisations innovative is a long-standing innovation management problem and tackling this problem remains timely and relevant due to constant empirical evidence linking organisational innovativeness to sustained sales, growth, financial performance and social value (Tidd & Bessant, 2021). Suggestions that innovation is a high risk endeavour, since there is a 1-in-25 success rate of innovation outcomes, are outweighed by organisational willingness to pursue innovation for rewards that are substantial, transformative and ensure viability (Durugbo, 2020). Aside from industrial, institutional, sectoral and regional level foci on creativity, implementation and appropriability for new solutions and outcomes, the purview of organisational innovation systematically spans the use of structures, strategies, techniques, and tools (e.g., mind maps, design thinking, crowdsourcing, personas, innovation labs, and storyboarding). Recent evidence in innovation management literature on the importance of capacities for digital technology and strategic leaders (e.g., Motamedimoghadam et al. (2025) and Kratochvil (2025)) continue to reinforce the notion that capabilities and networks are pivotal to connected and continuous organisational innovation.

Grounded in network and capability-based theories, this study proposes a theory of embedded capabilities that explicates how firms innovate connectedly and continuously. Employing multi-case insights from Alphabet, Apple, and Microsoft, i.e., technology companies renowned for their innovativeness, the study further explores the core mechanisms for orchestrating these capabilities. Targeting the community of researchers, practitioners and policymakers interested in organisational innovation management, and guided by these cases, the study addresses the following research question:

What are the core orchestration mechanisms that enable innovative firms embed innovation in their organisations?

Practically, the study has value for researchers, practitioners and policymakers interested in organisational innovation management. The proposed embedded capabilities constructs and identified themes of orchestration mechanisms are actionable guidance and strategic priorities for constructing and tweaking innovation management strategies. Additionally, the proposed theory is pertinent to multiple metaphoric expressions of innovation as craft, language, and diversity (Durugbo, 2020), which leads to wider practical implications for creative and strategic thinking during innovation..

2 Literature review

Embeddedness, in an organisational context, is a capability that means immersion and engulfment within relations, networks, environments, and other spheres of endeavour. Although, predominately viewed as attachment and dependence between economic actions and social networks (Granovetter, 1973), embeddedness for innovation extends to how innovative individuals are immersed in job roles, products are entrenched in innovation portfolios, organisations are ingrained in innovation ecosystems, and so on. Based on the premise that embeddedness contributes to innovation (Gertler et al., 2000), this study posits on an ‘embedded capabilities’ theory for explaining organisational innovativeness. The study postulates on this capability from an endogenous standpoint, framing continuous organisational innovation as a function of connected internal actualities and legitimacies.

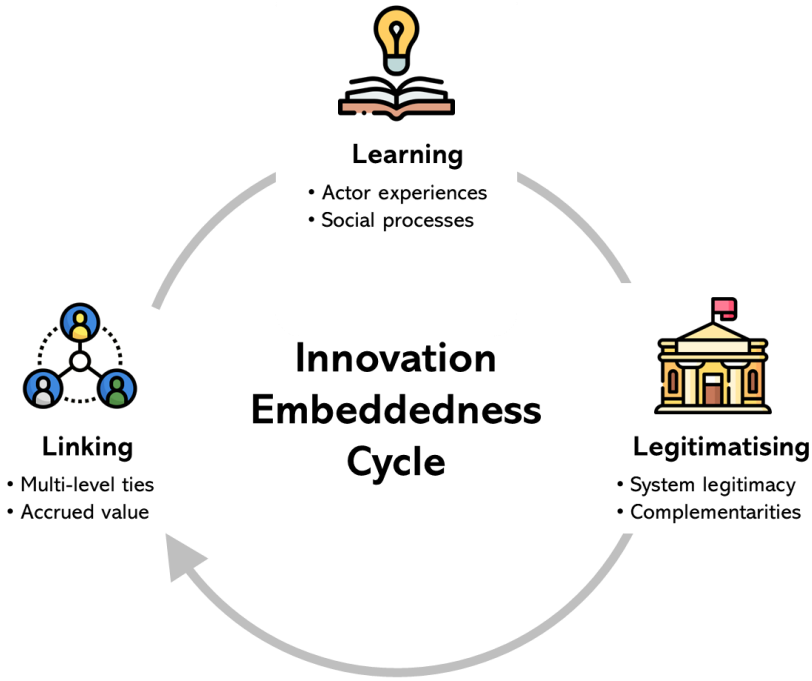

Figure 1 Processes for innovation embeddedness

With respect to current understanding of an "embedded capabilities" theory, the literature offers three key constructs (shown by Figure 1) to aid organisations ingrain innovation: (i) linking capacities, (ii) learning orientations, and (iii) legitimising processes. To begin with, *linking capacities* are an organisation's afforded latitude for individual and group-level ties, alignment within institutions, and accruements of institutional value from such ties and alignment (Granovetter, 1973; Mitchell et al., 2001). These capacities are increasingly pivotal for establishing and maintaining linkages for resource exchange and transfer among institutional entities, like universities, government agencies, trade unions, investors, creditors, and vendors (Benhayoun et al., 2020). Furthermore, *learning orientations* are an organisation's supported ethos for organisational knowledge acquisition and assimilation from socialisation and experiential mechanisms (Uzzi & Lancaster, 2003). The ability of organisations to achieve strong favourable and meaningful learning orientations usually depends on the nature of knowledge-specific resources established by linking capacities for knowledge exchange and transfer. In addition, *legitimising processes* are an organisation's institutionalised sociotechnical systems and ecosystems that grant assurances and support for innovative behaviour with furnished complementarities to aid innovativeness (Gertler et al., 2000). On the strength on available capacities and knowledge competences, the issue of legitimacy further galvanises innovative behaviour and helps connected and continuous innovative practices to proceed uncontested and championed (Nowacki & Monk, 2020).

Principally, this study adds to current understanding on how firm connect and continue to innovate by adding to knowledge on an embeddedness basis of innovation. Filling this gap in knowledge improves framing of resources exchange and transfer

within innovation systems and fosters wider dialogue and debate on innovation embeddedness in sectors and regions (Gertler et al., 2000). Complementary to recent expositions on the mechanisms that facilitate or impede innovation (Kratochvil, 2025), the insights from the case studies suggest a co-creative approach to orchestration driven by leadership and preserved in legacies. Recent literature uncovers the important role played by orchestration in enacting digital innovation activities within organisations (Motamedimoghadam et al., 2025), and in this study, a case is made for orchestration in the context of embeddedness for connected and continuous innovation.

3 Research methodology

This study adopts a qualitative multi-case logic and is guided by an interpretivist epistemology that aids in capturing and illuminating the core mechanisms for orchestrating embedded capabilities from rich-information contexts within the case firms. Thus, technology companies (i.e., Alphabet, Apple, and Microsoft), as compared by Table 1, are the unit of analysis, and the study seeks retrospective insights on the reported orchestration strategies that support connected and continuous innovative practices.

Secondary sources (Stewart & Kamins, 1993) provide case data, predominantly from the public domain, and the search engines of Google, Bing and Yahoo! aid in sourcing data. A concatenation of keywords, i.e., ‘Alphabet’, ‘Apple’, ‘Microsoft, ‘Google’, Innovation’, ‘embed*’, ‘strategy’, ‘knowledge’, and ‘culture’ informs the search process for case data. Results from the searches on the engines include web pages and audio files of company interviews, policy briefs, corporate reports, and press releases.

Content analysis, with the aid of ATLAS.ti, supports the scrutiny of gathered data for generating insights. The analysis begins with a deductive coding phase for within-case analysis, which contrasts the linking capacities, learning orientations, and legitimising processes reported on the cases. The analysis then progresses to an inductive coding phase for cross-case analysis to decipher orchestration strategies in the cases.

Table 1 Overview of cases

Case company	*Alphabet*	*Apple*	*Microsoft*
Founders	created as a holding company in **2015** following a restructuring of Google. Google was formed in **1998** by Larry Page and Sergey Brin	Steve Jobs, Steve Wozniak and Ronald Wayne in **1976**	Bill Gates and Paul Allen in **1975**
CEOs & Leadership year	**2015 - 2019:** Larry Page **2019 - Present:** Sundar Pichai **For Google** **1998 -2001:** Larry Page **2001 - 2011:** Eric Schmidt	**1977 - 1981:** Michael Scott **1981 - 1983:** Mike Markkula **1983 - 1993:** John Sculley **1993 - 1996:** Michael Spindler	**1975 - 2000:** Bill Gates **2000 - 2014:** Steve Ballmer **2014 - Present:** Satya Nadella

	2011 -2015: Larry Page	**1996 - 1997:** Gilbert Frank Amelio **1997 - 2011:** Steve Jobs **2011 - Present:** Tim Cook	
Number of Employees	190,820	166,000	228,000
Revenues	$402.836 billion	$435.617 billion	$281.7 billion
Headquarters	Mountain View, California, United States	Cupertino, California, United States	Redmond, Washington, United States
Notable innovative products	**1995**: Google Search **2000:** Google Ads **2002:** Google News **2003:** Google AdSense **2004:** Gmail **2005:** Google Maps **2008:** Google Chrome **2008:** Android **2010:** Google Nest **2013:** Google Pixel **2016:** Waymo- Self-Driving Cars (spun out from Google) **2019:** Wing (Drone Delivery) **2016:** AlphaGo **2020:** AlphaFold **2021:** Google Tensor **2023:** Gemini AI	**1984:** Macintosh **2001:** iPod **2007:** iPhone **2010:** iPad **2014:** Apple Watch **2016:** AirPods **2019:** Apple TV+ **2023:** Vision Pro **2024**: Apple Intelligence System	**1975:** Microsoft BASIC **1981:** MS-DOS **1985:** Windows 1.0 **1989:** Microsoft Office **1995:** Windows 95 **2001:** Xbox **2001:** .NET Framework **2005:** Xbox 360 **2010:** Azure **2012:** Surface **2013:** Xbox One **2015:** Windows 10 **2016:** Dynamics 365 **2019:** Xbox Series **2021:** Windows 11 **2023:** Microsoft Copilot

4 Findings

In this section, the findings on the case studies are presented. The section begins with results on the initial, inductive within-case analysis that details the embedded capabilities within Alphabet, Apple, and Microsoft. The section then reports findings on a deductive analysis that unravels core orchestration mechanisms used by the case firms.

Within-case analysis

Initial analysis finds support for the main proposition of the embedded capabilities theory, namely, that innovative organisations, like Alphabet, Apple, and Microsoft, afford latitude for accrued value from institutional ties and alignment, support ethos for knowledge exchange and transfer during socialisation and individualised experiences, and institutionalise systems that galvanise innovative behaviour. The analysis finds that embedded capabilities emerge from collaborative, democratisation, divergent thinking, empowerment, open systems, and talent management philosophies.

Alphabet

Alphabet is an American technology giant created as a holding company in 2015 following Google's restructuring, and Google was founded in 1998 by Larry Page and Sergey Brin. Internationally, the company has 190,820 employees and revenue of $402.836 billion. Larry Page (1998 -2001 and 2011 -2015) and Eric Schmidt (2001 – 2011) served as Google CEOs, while Larry Page (2015 – 2019) and Sundar Pichai (2019 – Present) have been the two CEOs of Alphabet. Figure 2 shows themes related to this case.

Google's mission to 'organize the world's information and make it universally accessible and useful' is a grand one with ethical and empathetical implications. This mandate further legitimatises the innovation focus and rallies employees around a mission that:

> "has the potential to touch many lives, and we (i.e., Google) make sure that all our employees feel connected to it and empowered to help achieve it" (Susan Wojcicki, former Google Senior Vice President of Advertising and CEO of YouTube)

In furtherance of this mission, a key focus in the Google case is a fundamental rethink on how an organisation could support continuous linking, learning and legitimising. This ensures innovators are engaged, forward-looking and their efforts are amplified. According to the data from Alphabet:

> "To create a more innovative business, you must rethink how people, structures, and processes interact every day … The teams you rely on to build must have systems and processes that keep them engaged, amplify their ability to produce, and keep them consistently forward-looking" (Vinton G. Cerf, Vice President and Chief Internet Evangelist at Google)

At Alphabet, two distinctive mechanisms stimulate, set and sustain continuous innovation: empowerment to experiment and open systems for ideation. In terms of empowerment that creates link for accrued value, the Google case captures the well-known "20% time" policy and employee support for moonshot ideas that produce 10X gains as opposed to 10% improvements. Google leadership understood that 'the only way to make progress is experimenting' (Frederik Pferdt, Google's first-ever chief innovation evangelist and Innovation Lab Founder), and the following excerpts capture both practices:

> "We encourage our employees, in addition to their regular projects, to spend 20% of their time working on what they think will most benefit Google … This empowers them to be more creative and innovative. Many of our significant advances [like AdSense and Google News] have happened in this manner." (Google founders Sergey Brin and Larry Page)

> "The first thing you do when you have a moonshot idea is to find five people in the business to support your idea. Once you have their backing, you can use that as the basis of your project proposal." (Anna Baird, former Global Head of Culture and Innovation Programs)

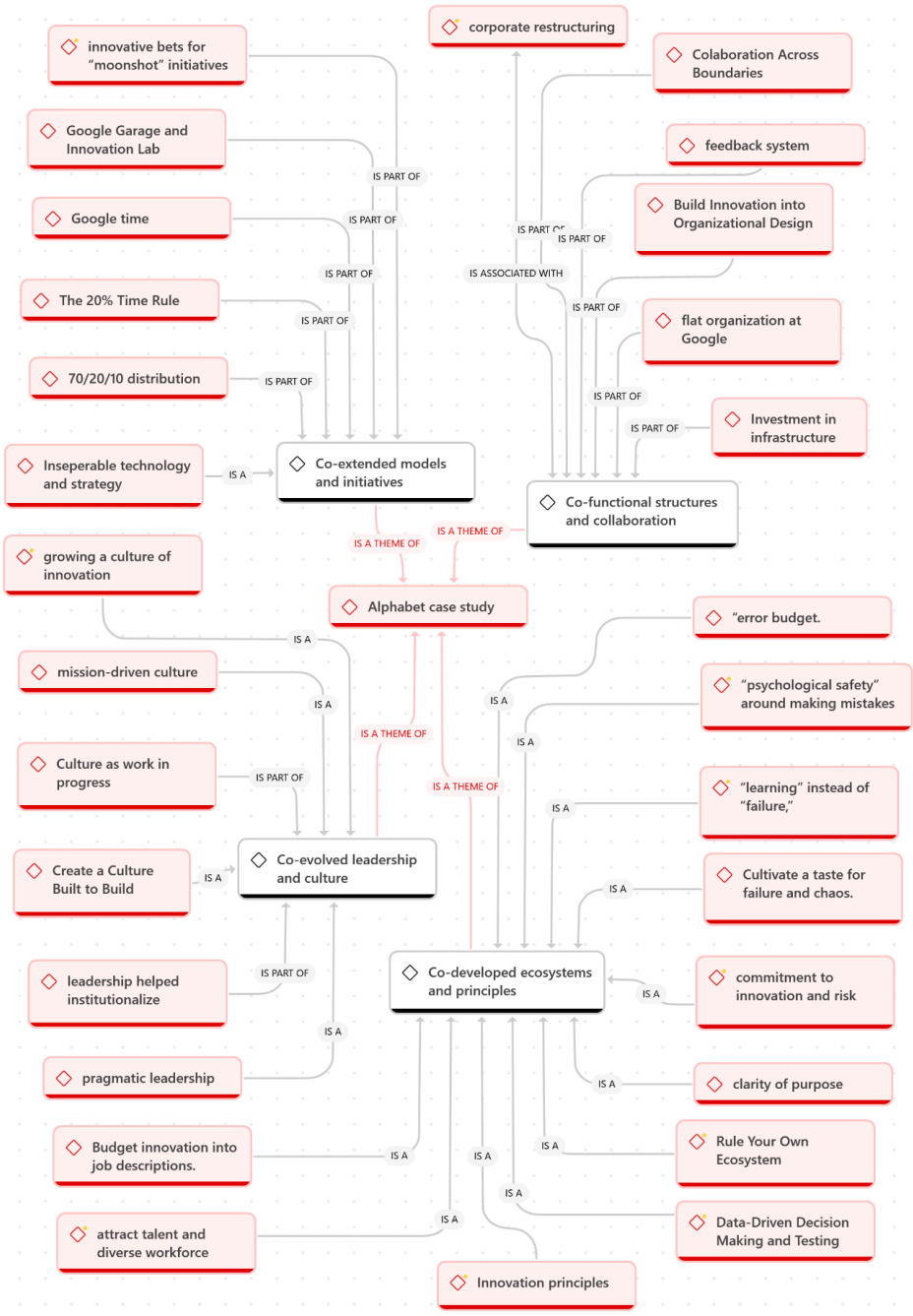

Figure 2 Network diagram from ATLAS.ti on themes and codes for the Alphabet case

The latter quote is an example of linkages for accruing value because the requirements for employees with 'moonshot ideas' to find five supporters for the idea entails making contacts or establishing links with other employees. This initial step for generating

innovation creates or reinforces linkages within the organization, adding verification and validation steps for internal ideas, as reflected in this extract:

> "The fact of the matter is that what-what really gets to the point where it's even something to contemplate or "approve" is when you have something that's fleshed out as an idea, a prototype perhaps, a design document, or, or the opportunity to bounce it off some other people and get some more input on that" (Brian Fitzpatrick, former Google Engineer)

Apple

Apple is an American multinational technology conglomerate founded in 1976 by Steve Jobs, Steve Wozniak and Ronald Wayne. Figure 3 presents the main themes related to this case. Worldwide, the company has 166,000 employees and revenue of $435.617 billion. Over the years, Apple has had seven CEOs: Michael Scott (1977 - 1981), Mike Markkula (1981 - 1983), John Sculley (1983 - 1993), Michael Spindler (1993 - 1996), Gilbert Frank Amelio (1996 - 1997), Steve Jobs (1997 - 2011) and Tim Cook (2011 - Present). However, it is widely acknowledged that the Steve Jobs years were transformational for Apple because

> "He (Steve Jobs) didn't expect innovation out of just one group in the company or creativity out of one group, he expected it everywhere in the company" and "Steve's DNA will always be the core of Apple, Steve is deeply embedded in the company." (Tim Cook, Apple CEO)

Embedded capabilities at Apple were developed by Steve Jobs based on two key philosophies. The first philosophy is for a collaborative structure that supports collaborative debates and cross-functional collaboration. For instance, the portrait mode of dual-lens cameras by Apple involved more than 40 collaborators in areas of design, software and engineering. The data suggests collaboration, which entails strong and durable problem and goal-oriented relationships, was embedded at Apple, as suggested by the following excerpts:

> "One of the keys to Apple is Apple's an incredibly collaborative company. And so, you know how many committees we have at Apple? No? Zero. We have no committees, no committees. We are organized like a startup. One person is in charge of iPhone OS software, one person is in charge of mac hardware, one person is in charge of iPhone hardware engineering, another person is in charge of worldwide marketing another person is in charge of operations. We are organized like a startup, we are the biggest startup on the planet, and we all meet for three hours once a week and we talk about everything. We are doing the whole business and there's tremendous teamwork at the top of the company which filters down to tremendous teamwork throughout the company. And teamwork is dependent on trusting the other folks to come through with their part without watching them all the time" (Steve Jobs, former Apple CEO)

The latter part of this quote entails themes on trust, teamwork and 'organising like a startup'. In other words, a focus on agility and trustworthiness for quicker decision-making due less layers of bureaucracy and improved communication. Digital collaboration using platforms like App Store Connect, epitomise this philosophy and focus on open innovation and collaboration with developers.

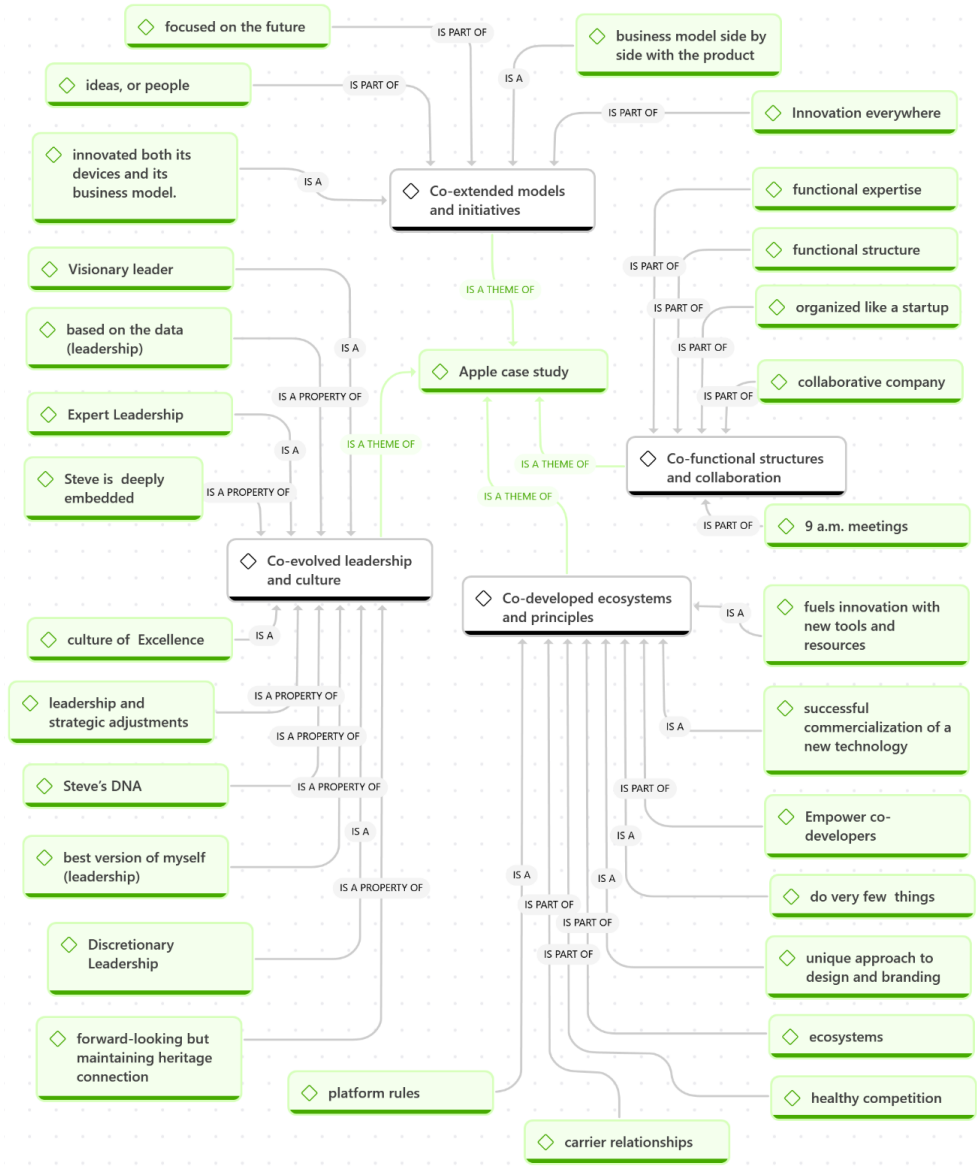

Figure 3 Network diagram from ATLAS.ti on themes and codes for the Apple case

Similar to Alphabet, linkages for accruing value at Apple are encouraged based on collaborative structures that accentuate the technical expertise of innovators. This focus legitimatises and empowers these innovators to apply their deep knowledge on technologies to engage in disruptive innovations that produced camera technologies like panorama photos (2012), optical image stabilization (2015), the dual-lens camera (2016), portrait mode (2016), and night mode (2019). According to the data:

> "To create such innovations, Apple relies on a structure that centers on functional expertise. Its fundamental belief is that those with the most expertise and experience in a domain should have decision rights for that domain … Relying on technical experts

rather than general managers increases the odds that those bets will pay off" (Joel M. Podolny and Morten T. Hansen, Apple University)

The second philosophy is for talent development that adopts a longer-term view of employees. This approach supports team building, learning from failure, continuous improvement and mentoring, as illustrated by the following extract:

"I'm not sure I learned this when I was at Apple, but I learned it based on the data when I was at Apple and that is I now take a longer-term view on people. In other words, when I see something not being done right, my first reaction isn't to go fix it, it's to say we're building a team here and we're gonna do great stuff for the next decade not just the next year. And so, what do I need to do to help so that the person that's screwing up learns versus how do I fix the problem" (Steve Jobs, former Apple CEO)

Both principles expressed by Steve Jobs underlie the ring-shaped Apple Park and Apple Campus (containing the Apple University), two key Apple infrastructure that support embedded capabilities. Located in at the company's corporate headquarters in Cupertino, California , these institutions offer place-based affordance for establishing connections and sharing ideas. For instance, Tim Cook, Apple CEO, remarked that Apple Park promotes

"collaboration even more than I thought and that was a key component of the design … there's so many places in here that you unexpectedly run into people. You do it at the cafeteria, you do it at the coffee bar ,you do it outside when you're going across the pathway and I think that promotes this unplanned"

collaboration and I think it's fantastic also there's a connection here to Steve … we had the theatre named after him and think about him all the time, but I can feel him in other spaces in here" (Tim Cook, Apple CEO)

Although the 20% rule has since been abandoned, the principle's legacy as a stimulant for open innovation further adds to the rich innovative heritage of Google.

In terms of open systems for ideation, Googlers (i.e., Google employees) are encouraged to share, rate and comment on ideas on a companywide suggestion box. Using volunteers, peer exchanges, hallway conversations, meetings and email exchanges, Alphabet creates multiple exploratory paths for innovator linkages with a view to encouraging creativity. The risk of a 'dead end' is legitimised, ensuring innovators feel 'psychological safety' and are unafraid to experiment with their ideas. According to the data:

"At Google, we'll go down a number of different paths as we explore new capabilities in the system, and we often encourage people to go down these paths, even if they might end up at a dead end. And we share, blamelessly, with others the fact that there was a dead end, so everyone learns. That's how we advance everybody's ability to carry out their work" (Vinton G. Cerf, former Vice President and Chief Internet Evangelist at Google).

"(Alphabet management wants) to hear ideas from everyone – and that includes our partners, advertisers and all of the people on my team. I also want to be a part of the conversations Googlers are having in the hallways" (Susan Wojcicki, Google Senior Vice President of Advertising)

Microsoft

Microsoft is an American multinational big tech company founded in 1975 by Bill Gates and Paul Allen. Globally, the company has 228,000 employees and revenue of $281.7 billion. Microsoft has had only three different CEOs: Bill Gates (1975 - 2000), Steve Ballmer (2000 - 2014) and Satya Nadella (2014 - Present). Figure 4 depict the key themes related to this case.

Figure 4 Network diagram from ATLAS.ti on themes and codes for the Microsoft case

Embedded capabilities at Microsoft are developed primarily via divergent thinking and democratised innovation. Company structure and operations for supporting innovation, mainly around the R&D division and product-centric teams, legitimises these principles. Similarly, company-initiated grassroot innovation initiatives like the Microsoft Garage and annual hackathon, are pivotal in creating the company-wide links for innovation and affordances for shared experiences as part of continuous learning. According to Dean Carignan, the Chief of Staff, Office of the Chief Scientist at Microsoft,

> "at Microsoft, Divergent thinking isn't left to chance, it's baked into the company's structure and operations. At Microsoft research, our Advanced R&D division is pushing the boundaries of what's possible is the very Mission, and across the broader company events like the annual hackathon give every employee the opportunity to step away from their day job collaborate across organizations and learn by doing. Even in the product-centric teams, like the developer division, leadership dedicates full-time support to pursue promising hypotheses they recognize that Discovery doesn't fit between meetings and it can't be prioritized part-time"

With imperatives for embedded capabilities, each Microsoft leader continued the company's vision to 'empower every person and every organization on the planet to achieve more' with the current CEO emphasizing empathy and purpose as personal paths for achieving this vision, i.e.,

> "My personal philosophy and my passion … is to connect new ideas with a growing sense of empathy for other people … My approach is to lead with a sense of purpose and pride in what we do, not envy or combativeness" (Microsoft CEO Satya Nadella)

This approach reflects a culture change, which is needed to refresh embedded capabilities and renew employee drive and passion. The following excerpts reflect the importance of initiatives like the hackathon, which creates multi-level ties and social processes for learning and renewing employee drive, as well as the threat to business survival if change is not embraced:

> "I went to my first hackathon three years ago and fell back in love with Microsoft … I realized that I now have permission to talk to anyone I want to. I'm no longer limited by my job function or level" (Chris Kauffman, Director, Business Planning and Change Management at Microsoft)

> "When the rate of change outside the company is greater than the rate of change inside the company, the end is near," (Jonathan Oliver, former Global Head of Innovation at Microsoft Advertising)

However, establishing these changes can be challenging and, according to Jeffrey Snover, the architect of Windows PowerShell and former Microsoft technical fellow, requires management reiteration, employee buy-in and translation of plans into visible actions. Overall, in analysing the Microsoft case, this study finds that a key focus for embedded capabilities is the use of corporate divisions and systematic programs that afford employees with outlets to contribute and integrate ideas.

Cross-case analysis

Cross-case analysis finds evidence of four themes that capture the range of orchestration mechanisms with the three cases: (i) co-functional structures and collaboration, (ii) co-extended models and initiatives, (iii) co-developed ecosystems and principles and (iv) co-evolutional leadership and cultures.

Co-developed ecosystems and principles

Co-developed ecosystems and principles is derived from 30 codes and entail processes for 'learning from failure', 'psychological safety' around mistakes, democratising innovation, and empowering co-developers. This theme in the Microsoft case emphasises long-term approaches to device management, direct aim at competitors security, and looking and learning from failure. Cultural shifts aid Microsoft (re)establish these structures as noted by the following:

"To kickstart the cultural shift, you need to move the responsibility to innovate from functional silos to be part of your overall business strategies and goals. At Microsoft, while we still have labs and departments geared towards research and development, innovation is core to our entire business. This results in innovation being seen at every level and department, driving our business in its entirety," (Jonathan Oliver, former Global Head of Innovation at Microsoft Advertising)

At Apple, this theme depends on carrier relationships, co-developer empowerment, and healthy competition. Distinctively, Apple embedded innovation by developing collaborative relationships that caused industry disruption, i.e.,

"going out and forming all of these carrier relationships was very important to introducing Apple more broadly and sort of turning the industry on its side and owning the design because at that time if you remember the carrier was owning the design of the phone" (Tim Cook, Apple CEO)

For Google, the thematic focus is on commitment to innovation and risk and attraction for talent and diverse workforce. The data particularly noted the risk of failures and errors, as underscored by excerpts related to an 'error budget' and shifts in focus towards 'learning' instead of failure', i.e.,

"One tool Google uses is an "error budget." When a predefined error or failure threshold is exceeded, the activities pause until the budget is available again. This creates a failure rate limit to minimize risks." (Denis Krupennikov, former Google Software Engineering Manager)

"Sometimes science learns more from failure than it does from success. If you ask why something didn't work, you often learn more than you would have if it actually did work. And so, even at Google, we try a lot of things out that don't work—and we learn from them and refine our practices" (Vinton G. Cerf, Vice President and Chief Internet Evangelist at Google)

These themes are: (i) co-functional structures and collaboration that support camaraderie, collaboration across boundaries, and tone-setting practices (e.g., 9am meetings), (ii) co-extended models and initiatives strive for user-centric mindsets and models (e.g., the 20% time rule and 70/20/10 distribution) and collaborative engineering events (e.g.,

hackathons and 'moonshot initiatives'), (iii) co-developed ecosystems and principles such as 'learning from failure', 'psychological safety' around mistakes, democratising innovation, and empowering co-developers, and (iv) co-evolutional leadership and cultures based on visionaries and high-calibre researchers as leaders, excellence, 'learn-it-all' and 'built-to-build' cultures', talented and diverse workforce, and discretionary leadership.

Co-evolutional leadership and cultures

Co-evolutional leadership and cultures emerge from 29 codes and are based on visionaries and high-calibre researchers as leaders, excellence, 'learn-it-all' and 'built-to-build' cultures', talented and diverse workforce, and discretionary leadership. In the Microsoft case, this theme is reflected in concepts on how transformation starts with culture, adopting a learn-it-all rather than a know-it-all culture, the perpetual nature of business change, having high-calibre researchers as leaders, leaders as the torchbearers of culture, and cultivating a multi-cultural environment. The data analysis particularly suggests that for Microsoft leadership,

> "Everything we do links back to our culture. What that means is we focus on the people side of change, and we take a human-centered approach that focuses on the user's experience of the process." (David Laves, director of Business Programs at Microsoft)

For Apple, this theme resonates in discretionary, expert , visionary and data-driven leadership, strategic adjustments, and excellence cultures. However, an encapsulating concept for this them from the Apple case is the idea of a forward-looking culture that maintain heritage connection with past visionary leadership, i.e.,,

> "what we do is forward-looking, but I like my connection back to Steve and I like the company's connection back to Steve because from him emanates our values and our DNA, so I think that connection is important" (Tim Cook, Apple CEO)

In the Alphabet case, the theme is reflected in mission-driven cultures, pragmatic leadership and leadership that helped institutionalize innovation. The case captures the idea that culture is a work in progress that needs to be nurtured and supportive of learning from failure, as reflected in the following excerpt:

> "Nurturing a culture that allows for innovation is the key … Our growing Google workforce comes to us from all over the world, bringing with them vastly different experiences and backgrounds. A set of strong common principles for a company makes it possible for all its employees to work as one and move forward together. We just need to continue to say 'yes' and resist a culture of 'no', accept the inevitability of failures, and continue iterating until we get things right" (Susan Wojcicki, Google Senior Vice President of Advertising)

Co-extended models and initiatives

Co-extended models and initiatives is a theme developed from 21 codes and represents schemes for user-centric mindsets and models (e.g., the 20% time rule and 70/20/10 distribution) and collaborative engineering events (e.g., hackathons and moonshot initiatives). While the Microsoft case presents ideas on a holistic aspect of change

management and orchestrated journey, the Apple case offers a futuristic perspective of change and innovation. These considerations require:

> "Understanding how an organization behaves and why, then aligning employees' ambitions with organizational goals is the core discovery," (Prerna Ajmera, General Manager of HR Digital Strategy and Innovation at Microsoft)

> "(Being) always focused on the future and trying to feel like we're very much sort of at that starting line where you can really dream and have big ideas that are not constrained by the past in some kind of way." (Tim Cook, Apple CEO)

For the Alphabet case, the concepts underpinning this theme relate to 'innovative bets' or 'other bets' such as Waymo, Wing, Calico, Verily, GFiber and Google DeepMind.

Co-functional structures and collaboration

Co-functional structures and collaboration is derived from 19 codes and are measures taken for camaraderie, collaboration across boundaries, and tone-setting practices for embedding capabilities. Concepts from the Microsoft case contributing to this theme are cross functional projects, divergent thinking and a sense of community and camaraderie. For instance, the idea a "Spirit Week," before Hackathons enable employees acquaint themselves and bond with teammates. Notably, the Microsoft case highlights the importance of structures that foster collective innovation potential, i.e.,

> "The company wanted to move away from the belief that only leaders or innovation departments are the ones who come up with great ideas and push them down into the organization" (Kumar Mehta, former Microsoft Research and Analytics team)

In both Apple case, functional expertise and structure, and organisation like a startup are concepts that embody this theme. However, a noteworthy concept that fosters collaboration in the Apple case is the idea of 9 am Monday meetings with the top management team to discuss top business priorities, a practice introduced by Steve Jobs and preserved by Tim Cook.

Perspectives from the Alphabet case related to this theme include building innovation into organizational design, and investment in infrastructure

collaboration across boundaries to break down organisational silos. The notion of a functional and flat organisations for collaborative creativity also resonates in the Alphabet case, as captured by the following vivid metaphor

> "someone described it a lot of mad scientists running around trying crazy new things and sort of ideas bubbling up from the bottom" (Ben Collins-Sussman, former Engineering Director at Google)

For this reason, Alphabet implements a feedback system to enable Googlers make suggestions for continuous improvement of collaborations. However, these systems must be credible and instil confidence in employees that feedback will result in changes, i.e.,

> "It's important to recognize that a feedback system only works when people believe changes will be made as a result of their feedback" (Vinton G. Cerf, Vice President and Chief Internet Evangelist at Google)

5 Conclusions

In summary, the Alphabet, Apple, and Microsoft case studies identifies four orchestration mechanisms for embedding connected and continuous innovation in organisations: (i) co-functional structures and collaboration, (ii) co-extended models and initiatives, (iii) co-developed ecosystems and principles and (iv) co-evolutional leadership and cultures. Underpinning these mechanisms are embedded innovation capabilities that emerge from collaborative, democratisation, divergent thinking, empowerment, open systems, and talent management philosophies. Insights from the cases also suggest the importance of ethical and empathetical visions for innovation convergence, empowerment and open systems for generating moonshot ideas, collaborative debates and long-term view for developing innovation talent, and culture refresh to renew employee drive.

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