

Entrepreneurial Courage in Emerging Technology Ventures: A Multidimensional Framework and Empirical Reflections

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Abstract: *In high-velocity sectors such as artificial intelligence, biotechnology, fintech, clean energy, and blockchain, founders routinely face uncertainty, ethical complexity, and strategic ambiguity. Entrepreneurial courage, the capacity to act decisively and ethically under pressure, has become a critical yet under-theorized competency. This paper develops a multidimensional framework of entrepreneurial courage, drawing from cross-sector literature and anchored in both Entrepreneurial Orientation and Effectuation Theory. Through thematic synthesis and empirical inquiry, the study identifies five interrelated dimensions-moral, strategic, ethical, resilience, and emotional courage-that shape founder behavior in emerging technology ventures. The EcoM model introduced herein offers a comprehensive lens to understand how courageous leadership fosters responsible innovation, stakeholder trust, and adaptive governance. By bridging fragmented constructs and offering real-world insights, this research contributes a practical roadmap for cultivating courage as a strategic asset in complex innovation ecosystems.*

Keywords: Entrepreneurial Courage, Emerging Technology Ventures, Innovation Leadership, Effectuation Theory, Strategic Risk-Taking

1. Introduction

In the rapidly evolving landscape of emerging technologies, including artificial intelligence (AI), biotechnology, fintech, clean energy, robotics, and blockchain, entrepreneurial courage has surfaced as a critical yet underexplored leadership competency. Founders operating in these domains confront extraordinary levels of uncertainty, ethical complexity, and competitive intensity, often making decisions with profound implications for society, markets, and governance. For example, Zipline launched its medical drone delivery service in Rwanda, navigating regulatory ambiguity, infrastructure gaps, and logistical complexity. The founders demonstrated courage by executing in a high-stakes environment with limited precedent [1]. Zipline's founders navigated uncharted regulatory terrain, built trust with government stakeholders, and iterated rapidly on drone technology to meet real-world demands. Their courage was not reckless; it was informed by a system-level understanding of healthcare logistics and a commitment to ethical impact. Their success led to global expansion and redefined supply chain innovation in healthcare. On a larger scope, across biotech, AI, fintech, and clean energy, founders reconfigure pipelines, pivot business models, and iterate products to transform setbacks into renewal. Other examples include Twist Bioscience's persistence through FDA rejections [2], Cursor.ai's rebound from user churn [3], and True Link Financial's navigation of fraud scrutiny [4], blockchain fintech pioneers challenging centralized power structures [5].

Entrepreneurial courage in emerging technology ventures is not a singular trait but a composite of strategic foresight, ethical conviction, emotional resilience, and adaptive tenacity. As academic interest in entrepreneurial behavior intensifies, scholars are increasingly focused on understanding not only what enables founders to persist, but how courage is conceptualized, measured, and enacted within high-stakes, innovation-driven environments. Entrepreneurial

courage is broadly defined as the willingness to pursue entrepreneurial objectives through decisive action despite facing significant uncertainty, potential loss, and adversity. Founders in high-velocity sectors routinely face ethical dilemmas, strategic ambiguity, and emotional strain, conditions that demand more than technical expertise or risk appetite. There is a pressing need for integrative models that capture how different forms of courage interact to shape venture outcomes, especially in startups.

Existing frameworks often treat these dimensions in isolation, limiting both scholarly insight and practical application. However, constructs such as risk-taking, resilience, and ethical leadership remain fragmented across disciplines, lacking a unified framework to explain founder behavior under uncertainty [6]. Addressing this gap, the present study synthesizes cross-sector literature to develop a comprehensive framework of entrepreneurial courage tailored to the realities of emerging technology ventures. This paper argues that entrepreneurial courage is a strategic posture forged at the intersection of two dominant logics, Entrepreneurial Orientation (EO) and Effectuation Theory. By examining the literature and real-world examples on how leaders in emerging technology ventures navigate uncertainty, the paper develops a multidimensional framework of entrepreneurial courage, analyzes its behavioral markers, and explores its implications for stakeholder engagement, transformation strategy, and venture scalability. We offer a perspective of entrepreneurial courage, which can be understood as multidimensional competency, encompassing moral, strategic, emotional, and resilience-based capacities, that enables founders to transform disruption into opportunity and embed integrity into innovation.

2. Background

The literature describes leadership courage as “*an active willingness to risk resources such as wealth, personal reputation, and power in the pursuit of objectives with uncertain outcomes,*” distinguishing it from mere risk tolerance by emphasizing purposeful action in the face of fear and failure [7]. This adaptive behavioral capacity becomes especially salient in emerging technology (ET) ventures, where founders must navigate ambiguous regulatory landscapes, unproven technical architectures, and volatile stakeholder expectations [8]. As innovation accelerates beyond regulatory and institutional guardrails, founders are increasingly called to lead with integrity under pressure, make bold decisions amid uncertainty, and persist through systemic setbacks. Courage manifests in diverse forms across various use cases. We can point out a few illustrations. It is evident in fintech leaders navigating fraud and compliance [9], or clean energy entrepreneurs prioritizing impact over speed [10], or transparent governance in cloud computing [11].

Entrepreneurial courage, particularly in emerging markets, may be shaped by perceived behavioral control and social norms, as evidenced by comparative studies of necessity-driven founders [12]. Across these domains, entrepreneurial courage is not reactive heroism but a sustained leadership discipline, anchored in values, shaped by adversity, and expressed through principled action. It is the invisible infrastructure behind resilient organizations, ethical innovation, and transformative impact.

Courageous leadership enables responsible innovation, fosters stakeholder trust, and sustains adaptive governance, key ingredients for building resilient, values-driven ventures [13]. Entrepreneurial courage can be a holistic strength, physical, mental, and spiritual, that enables founders to confront fear, navigate uncertainty, and act in alignment with deeply held values [14]. Sekerka and Stimel (2024) introduce the concept of professional moral courage, emphasizing the ethical dimension of decision-making in fast-paced tech ventures [15]. This form of courage involves taking principled action in response to dilemmas, often under pressure to compromise values for rapid growth. This value-driven leadership in the face of risk and complexity is an adaptive capacity, a dynamic property for navigating complexity and change [16]. Therefore, leadership courage can be conceptualized at the dynamic intersection of effectuation theory and entrepreneurial orientation (EO), embodying both adaptive resilience and bold strategic intent. In environments marked by volatility and ambiguity, courageous leaders do more than tolerate uncertainty—they harness it. Effectuation theory frames leadership courage as a capacity for iterative co-creation, leveraging available means and stakeholder trust to shape emergent opportunities [17]. Entrepreneurial Orientation, by contrast, channels courage into high-risk commitments, aggressive execution, and visionary disruption [18].

2.1 Effectuation Theory

Courageous leaders embrace ambiguity, leveraging limited means, and co-creating with stakeholders (e.g., Airbnb’s early pivots). Effectuation theory, developed by Sarasvathy (2001),

offers a decision-making logic used by expert entrepreneurs under conditions of uncertainty. Rather than starting with a predefined goal, effectuation begins with available means, who you are, what you know, and whom you know, and allows goals to emerge through iterative action and stakeholder co-creation. It emphasizes control over prediction, affordable loss over expected returns, and flexibility over planning. Effectuation theory frames entrepreneurial decision-making under uncertainty by emphasizing action over prediction [17]. Rather than starting with fixed goals and seeking optimal paths, effectual entrepreneurs begin with the resources they already possess (**bird-in-hand**), e.g. identity, knowledge, and networks, and allow outcomes to emerge through iterative experimentation testing ideas with minimal investment (**affordable loss**). Through partnerships with early users (**crazy quilt**), they scale letting their goals evolve, as they embraced surprises (**lemonade**) and shape the future through iterative action (**pilot-in-the-plane**). Courage, within this framework, is expressed through adaptive behavior: acting without complete information, embracing ambiguity as a creative force, and committing only what one can afford to lose. This reframing of risk makes uncertainty strategically useful. The “Lemonade Principle,” a hallmark of effectuation, captures the essence of entrepreneurial courage: transforming setbacks into strategic pivots. For example, a health-tech startup facing regulatory failure might repurpose its technology for fitness tracking, discovering a new market and building a viable brand. Such agility reflects a mindset where surprises are embraced as catalysts for learning, and constraints become elements for innovation.

Entrepreneurial courage is a strategic asset that integrates ethical resolve, emotional resilience, and adaptive leadership. It complements constructs like entrepreneurial orientation and authentic leadership [19], while offering a distinct lens for understanding founder behavior in volatile, uncertain, complex, and ambiguous (VUCA) environments [20]. In such contexts, where rapid change, unpredictability, systemic interdependence, and ambiguity challenge conventional decision-making, entrepreneurial courage enables founders to act decisively, uphold values, and adapt under pressure, transforming uncertainty into strategic momentum.

2.2 Entrepreneurial Orientation (EO)

Seminal Entrepreneurial Orientation (EO) literature offers a foundational construct of innovativeness, risk-taking, proactiveness, autonomy and competitive aggressiveness [18], [21]. Innovativeness requires the courage to challenge norms and experiment with novel ideas, especially when disruptive solutions face skepticism or regulatory ambiguity [22]. In high-tech startups, courage is a strategic behavior embedded in risk-taking that reflects the willingness to commit resources under uncertainty, often without guaranteed returns, as seen in ventures pursuing unproven technologies or entering volatile markets [23]. Courageous leadership behaviors, such as proactive decision-making and unwavering support, amplify EO’s impact on performance [24]. This proactiveness involves anticipating future trends and acting ahead of competitors, which demands conviction and resilience when early signals are unclear or markets are not yet formed [25]. Together, these dimensions of EO

position courage as an adaptive capability, one that enables founders to navigate ambiguity, shape emerging markets, and build ventures that thrive on strategic boldness. Transformational leaders exhibit courage by articulating bold visions, modeling risk-taking, and sustaining high expectations even amid ambiguity [26]. For illustration, Tesla exemplifies EO through its aggressive pursuit of innovation, risk-taking, and market disruption. Tesla's innovativeness is evident in its battery tech and autonomous driving systems, while autonomy is seen in its vertically integrated supply chain.

3. Methodology

In our exploratory approach, we conduct a high-level topical scoping review that maps the literature on "courage in startup leadership" within emerging-technology ventures from 2010 to 2025. We followed Arksey and O'Malley's (2005) framework to identify how courage is conceptualized in startup leadership and inspect dimensions of courage in emerging-tech startups. We investigate Database, such as Web of Science, Scopus, ABI/INFORM, and Google Scholar, using keywords: ("leadership courage" OR "entrepreneurial courage" OR "courage") AND ("emerging technology" OR "tech startup"). We include empirical and theoretical articles (2010–2025) in organizational management or entrepreneurship journals and for triangulation and we incorporate relevant articles from practice, to support a comprehensive mapping of scholarly discourse while capturing real-world applications [27]. This scoping review surfaces 200+ organizational-management studies (2010–2025) on courage in emerging-tech startup leadership. After investigation, we found articles that focus on startups in AI, biotech, fintech, clean energy, robotics, and blockchain. We isolate articles that are relevant to our aim excluding repetitive concepts, until saturation. We do not assess the quality of evidence but provide a narrative overview that informs future research design, policy development, or theoretical refinement [28]. In emerging domains such as entrepreneurial courage in technology ventures, scoping reviews help illuminate conceptual ambiguity and surface underexplored intersections across leadership, innovation, and strategic behavior [29].

4. Conceptual Representation

Drawing from academic and practitioner literature, several overlapping but distinct thematic categories consistently appear. By reviewing the papers, we thematically classified the concept of leadership courage into five dimensions: Moral; Strategic; Ethical; Resilience and Emotional (Psychological).

Emerging-technology startups showcase courage as both personal and collective competency, integral to securing

funding, navigating regulation, and building user trust, etc. Our review reinforced the understanding that, in emerging technology startups, entrepreneurial courage functions as a dynamic, multidimensional capability that enables founders to navigate volatility, ambiguity, and ethical complexity. Rather than operating in isolation, the five dimensions of courage; moral, strategic, ethical, emotional, and resilience, interact synergistically to guide principled decision-making and shape venture trajectories.

The five dimensions (Table 1) elucidate how courage underpins moral integrity, strategic agility, organizational resilience, and ethical governance. We therefore represent entrepreneurial courage in emerging ventures as a multidimensional construct encompassing moral, strategic, ethical, resilience, and psychological dimensions: (1) Moral courage reflects the founder's commitment to uphold core values even under pressure, such as stakeholder dissent or resource scarcity; (2) Strategic courage drives bold decisions in vision and market pivots, including high-stakes gambits and technology bets; (3) Ethical courage ensures fairness, transparency, and equity through practices like data privacy protection and bias mitigation; (4) Resilience courage manifests in the persistence to navigate failure and ambiguity, enabling survival through funding gaps and regulatory shocks; and finally, (5) Psychological and emotional courage, rooted in the entrepreneur's internal capital, confronting fears, self-doubt, and vulnerability which sustains conviction, motivation, and adaptive leadership in the face of uncertainty. While these typologies are seen as mutually reinforcing, it is important to note that, for our context, we distinguish Moral courage from Ethical courage. The first emphasizes founders' internal values and stakeholder advocacy when facing capital pressures or regulatory scrutiny (internally focused); and the latter highlights data-privacy championing, bias mitigation, and inclusive interface governance (focused externally). Both constructs have ethical value underpinnings.

4.1 Entrepreneurial Moral Courage

Moral courage in emerging technology entrepreneurship is increasingly recognized as a sustained leadership competency rather than a momentary act of defiance. Founders across sectors and economies have demonstrated principled decision-making under pressure, anchoring innovation in ethical responsibility [30]. Moral examples include biotech leaders refusing accelerated clinical approvals to protect patient safety and prioritize ethical responsibility over expedience, even under financial or stakeholder strain [31]. Cloud-computing startups have institutionalized ethics through board-led reviews, mandating quarterly reviews that improved regulatory compliance and employee morale [32]. These mechanisms ensure ethical continuity across leadership transitions and operational growth.

Table 1: Conceptual representation of themes of entrepreneurial leadership courage (from our review)

Courage Theme - Conceptual representation	Core Components	Sample Key References
Moral Courage Willingness to uphold values under threat (e.g., stakeholder dissent, resource scarcity)	Emphasizes founders' internal values and stakeholder advocacy when facing capital pressures or regulatory scrutiny; Acting ethically under pressure; prioritizing the common good	[30], [31], [32], [33], [34], [35], [36]
Strategic Courage Risk-taking in vision and pivot decisions (e.g., market gambits, technology bets)	Centers on vision pivots, bet-big market entries, and alliance gambles in emerging technologies Bold action/decision-making in uncertain contexts	[10], [15], [37], [38], [39], [40]
Ethical Courage Championing fairness, transparency, and equity (e.g., data privacy, bias mitigation).	Highlights data-privacy championing, bias mitigation, and inclusive interface governance; Transparency/fairness; making difficult choices for integrity	[7], [11], [41], [42], [43], [44]
Resilience Courage Persistence after failure and ambiguity (e.g., surviving funding gaps, regulatory shocks)	Focuses on bouncing back from funding failures, team endurance, and crisis-driven innovation; Persistence/adaptation after setbacks or failures	[9], [23], [45], [46]
Psychological/Emotional Courage Entrepreneurial courage - deeply rooted in psychological capital	Confronting fears, self-doubt, and vulnerability	[47], [48]

For emerging-technology startups operating at the frontiers of innovation, moral courage provides the ethical backbone that aligns rapid experimentation with societal expectations, ensuring that cutting-edge solutions do not sacrifice integrity for speed. Moral courage is positioned as a foundational element in ethical decision-making models, offering critical guidance as entrepreneurs confront ambiguous dilemmas in AI bias, biotech dual-use technologies, and blockchain anonymity [34]. Founders with strong moral conation (with an internal drive to act ethically) are more likely to disclose algorithmic biases and engage in collaborative problem-solving. These decisions reinforce long-term trust and brand integrity. Beyond individual acts, moral courage is embedded into organizational systems, such as ethics review boards, governance charters, and inclusive design protocols. This proactive transparency fosters accountability in startups of emerging technology such as AI, robotics, and blockchain, where ethical ambiguity is common [35].

The literature on moral courage in entrepreneurship highlights its central role in guiding ethical decision-making under conditions of conflict, pressure, or temptation—particularly in emerging technology domains. Across domains, moral courage manifests in concrete actions: rejecting non-disclosure clauses that obscure data risks [33], elevating marginalized voices in design processes, and embedding ethical review mechanisms that endure leadership transitions. These practices reflect a proactive commitment to values over expedience [49], enabling founders to navigate tensions between profit and purpose while shaping resilient, trust-centered organizations [36].

4.2 Entrepreneurial Ethical Courage

Ethical courage is reflected in founders' willingness to prioritize fairness, transparency, and user rights—even when such choices conflict with investor demands or short-term profitability, investing in bias-mitigation tools despite added costs [40], and engaging marginalized users through inclusive co-design [37]. These decisions demonstrate a commitment to integrity in high-stakes environments where ethical shortcuts are often incentivized. Ethical courage is an enduring moral agency for the pursuit of goals beyond legal compliance. In fast-moving sectors, this form of leadership becomes a differentiator, aligning innovation with societal expectations and long-term impact [15].

Ethical courage is linked to empathy and service to marginalized communities, reinforcing purpose-driven behavior under pressure [50]. Together, these insights position ethical courage as both a moral imperative and a strategic asset in high-impact innovation. Examples include resisting premature monetization [38] and often requiring leaders to codify values into governance charters, institute independent ethics review boards, and allocate discretionary funds for equity-centered features [51]. Such practices reinforce stakeholder trust in AI and blockchain ecosystems, positioning ethics as a strategic asset rather than a compliance burden [39].

4.3 Entrepreneurial Strategic Courage

Strategic courage encompasses the bold decisions that enable technology startups to seize nascent market opportunities, pivot under uncertainty, and outmaneuver entrenched incumbents. Across studies, strategic courage emerges as a multidimensional construct, combining informed risk-taking, narrative framing, and coalition building. For founders in emerging-technology sectors, cultivating strategic courage requires assembling diverse advisory boards, stress testing bold scenarios, and embedding “pivot triggers” in governance charters. By doing so, startups transform uncertainty from a paralyzing threat into a strategic asset—delivering pioneering solutions that redefine markets and outlast competitors who favor incrementalism over audacious bets. Strategic courage is exemplified by founders who commit to bold, high-stakes decisions in uncharted domains—such as deploying untested blockchain consensus mechanisms, investing in deep-learning research despite stagnant revenues [42], or building clean-energy infrastructure before pricing validation [41]. These acts reflect a willingness to embrace uncertainty in pursuit of transformative innovation, often requiring technical daring and investor persuasion. Rather than reacting to market trends, courageous founders shape them, entering nascent sectors, influencing regulatory discourse, and redefining competitive boundaries. Examples show how clean-energy and robotics startups leveraged strategic alliances and early deployment to embed themselves in global supply chains and policy conversations, securing long-term positioning despite short-term constraint. Strategic courage adheres to entrepreneurial orientation theory, linking it to innovativeness, proactiveness, and risk-taking [7]. Strategic courage is not impulsive, it's structured through rigorous

planning, scenario stress-testing, and governance mechanisms that enable bold pivots. Such mechanisms include anticipatory resource allocation and embedding “pivot triggers” in governance charters [44]. Strategic courage in entrepreneurship reflects a leader’s ability to make bold, future-shaping decisions—such as pursuing disruptive innovation, pivoting business models, or entering uncharted markets—particularly under conditions of uncertainty and environmental turbulence. This form of courage is closely linked to proactiveness, risk-taking, and leadership foresight, serving as a behavioral cornerstone in high-velocity technology sectors.

Across domains, strategic courage emerges as an adaptive capability essential for navigating volatility and shaping innovation trajectories. Founders must often persuade stakeholders to support visionary bets that defy conventional logic. Strategic courage involves crafting compelling narratives around asymmetric upside, assembling diverse advisory boards, and forming coalitions that legitimize bold moves. This framing transforms uncertainty from a liability into a strategic asset, enabling ventures to outmaneuver incumbents and deliver pioneering solutions. For example, [43] described robotics spinouts that formed partnerships with manufacturing conglomerates despite steep revenue-sharing terms, effectively embedding their innovation roadmaps within global supply chains.

4.4 Entrepreneurial Resilience Courage

Resilience courage is increasingly recognized as a strategic capability in emerging technology entrepreneurship, defined by a founder’s ability to persist, adapt, and reconfigure in the face of existential adversity. Rather than passive endurance, resilience courage reflects active engagement with disruption, transforming setbacks into renewal through transparency, learning, and collective action. Resilience courage is defined by a founder’s ability to actively engage with disruption—rebounding from adversity through strategic adaptation rather than passive endurance. Startups rebounded from seed-round collapses by reconfiguring pipelines and conducting open post-mortems, fostering rapid knowledge transfer and continuous improvement [46]. Resilience courage is cultivated through shared narratives of adversity, reflective rituals, and distributed recovery ownership. Leaders who normalize setbacks and publicly acknowledge uncertainty foster psychological safety and institutional memory, enabling teams to adapt and persist [45] and recover faster. These practices embed courage into organizational culture, positioning failure as a feedback mechanism for innovation. Behind these practices is a culture that normalizes setbacks as hallmarks of exploratory innovation—encouraging introspection, collective problem solving, and resource re-optimization. Resilience courage also manifests in how startups respond to external shocks—mobilizing stakeholder networks and reallocating resources to sustain momentum. For instance, Gayam Motor Works’ pandemic-era pivot to rental battery models exemplifies how resilience is anchored in responsiveness to environmental constraints and a commitment to long-term impact [52]. The company set up battery swapping and charging at their large customer warehouse. A move that generated a steep increase in e-commerce penetration globally.

4.5 Entrepreneurial Emotional Courage

Emotional courage—acting despite fear or self-doubt—is increasingly recognized as essential to founder persistence and team cohesion and a critical enabler of entrepreneurial persistence and well-being [47]. From a psychological perspective, courage is frequently tied to resilience, risk propensity, autonomy orientation, and proactive motivation, which collectively helps founders convert entrepreneurial intention into entrepreneurial behavior [53]. Courage is a mechanism for navigating ambiguity and fostering team trust. This enables the exercise of agency under conditions where most would hesitate, a theme echoed in foundational theories of entrepreneurial orientation and effectuation. Beyond rational risk-taking, courageous decisions often stem from emotional returns such as fulfillment and purpose, as Su et al. demonstrate through longitudinal analysis of entrepreneurial behavior [54]. Entrepreneurial courage is deeply rooted in psychological capital—hope, efficacy, resilience, and optimism—which enables founders to act purposefully despite uncertainty or failure. Bockorny & Youssef-Morgan (2019) offer compelling empirical evidence that psychological capital (PsyCap)—comprising hope, efficacy, resilience, and optimism—fully mediates the relationship between entrepreneurial courage and life satisfaction, suggesting that courage fuels both recovery and fulfillment in venture creation. In line with Bockorny and Youssef-Morgan’s findings, entrepreneurial courage may serve as a psychological anchor that mediates uncertainty and sustains founder well-being, especially in ethically ambiguous contexts. This type of courage enables founders to translate intention into consistent behavior by fostering autonomy, risk propensity, and proactive motivation [48]. It empowers agency where hesitation is common, aligning with theories of entrepreneurial orientation and effectuation [55].

4.6 Reframing Courage in ET Venture Leadership

In summary, entrepreneurial courage is increasingly recognized as a multidimensional construct that enables founders to navigate volatility, ethical ambiguity, and systemic scrutiny—particularly in emerging technology ventures. These five dimensions form the invisible infrastructure of courageous leadership in ventures that seek not only to disrupt but to endure. Scholars such as Sekerka & Stimel (2024) and Mertz & Bloomquist (2024) frame moral courage as proactive competency embedded across the startup lifecycle [36], while psychological capital was found to mediate the relationship between courage and entrepreneurial well-being [56]. Recently, theoretical frameworks such as Namal et al. (2023) demonstrate that courage moderates the positive impact of market turbulence on innovation, though excessive technological disruption may require adaptive mechanisms [57]. Courage functions as a moderating capability that enhances innovation under market turbulence, though excessive technological disruption may require additional adaptive mechanisms. There is a need for integrative frameworks that illuminate how distinct forms of courage converge to influence ET venture trajectories, particularly within startup ecosystems. Drawing from established literature, we propose an adaptive model of entrepreneurial courage (ECoM) tailored to emerging tech ventures (Figure 1). This model conceptualizes courage as a

dynamic capability that equips founders to navigate uncertainty, ethical complexity, and systemic volatility. It comprises five interrelated dimensions (see Figure 1), each

shaping venture behavior amid scrutiny, ambiguity, and high-stakes decision-making.

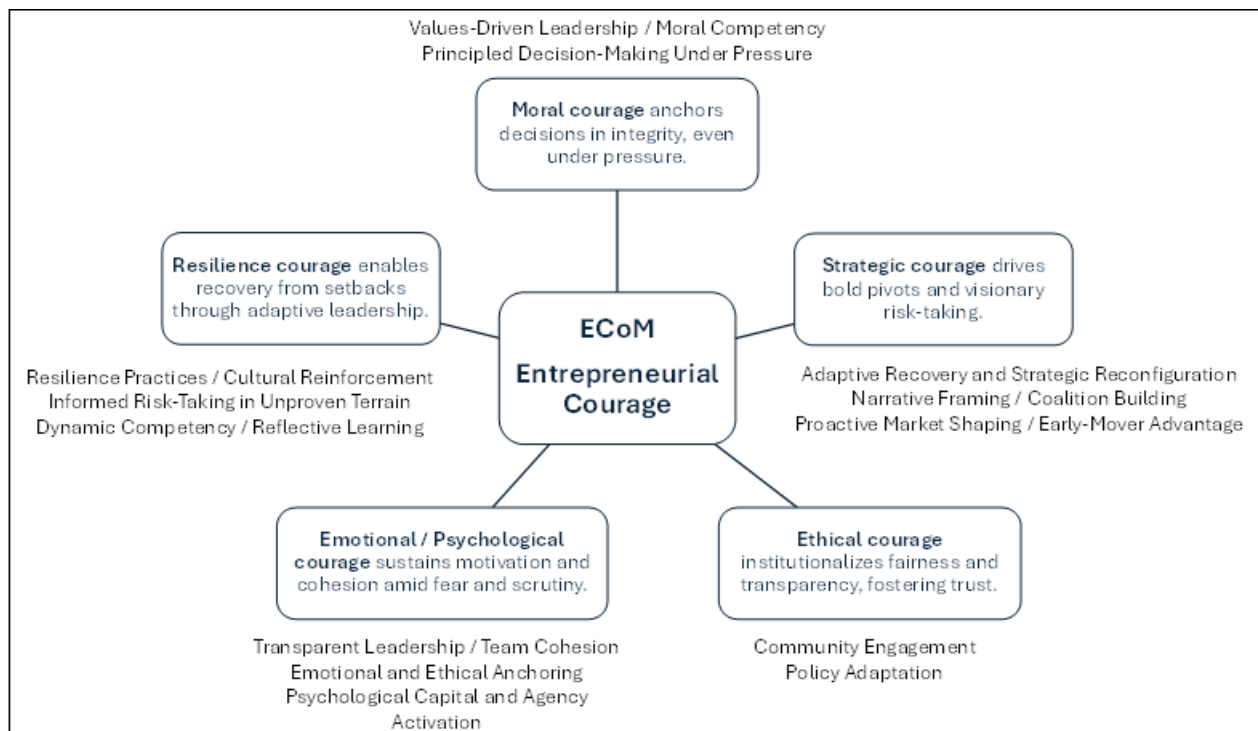


Figure 1: ECoM- Model for Entrepreneurial Courage in Emerging Technology Startups

In practice, these dimensions of courage are evident in contemporary use cases showing the invisible infrastructure of courageous leadership in ventures, they seek to endure as they disrupt. At its core, *moral courage* anchors decision-making in ethical conviction, ensuring that integrity is upheld even under pressure, e.g. **Signal's** refusal to monetize user data despite market incentives, prioritizing privacy over profit and reinforcing stakeholder trust [58]. Another example is **OpenAI's** transition from nonprofit research to commercial deployment through its partnership with Microsoft, a move that redefined its trajectory while sparking debate around mission drift and institutional identity [59], this is a good example of *Strategic courage*. *Strategic courage* empowers bold pivots and visionary risk-taking, allowing entrepreneurs to pursue transformative goals amid uncertainty. Furthermore, as a salient example of *Ethical courage* is the case of **Hugging Face** [51], institutionalizing fairness and transparency, to foster legitimacy across stakeholder networks. Hugging Face champions open-source collaboration and openly publishes model limitations, thereby advancing trust and accountability in AI development. We can also find evidence of how emotional and psychological courage sustains motivation and team cohesion in high-stakes environments marked by fear and scrutiny, in the example of Bumble that was launched following a traumatic departure from Tinder, transforming personal adversity into a platform for empowerment and cultural change [60]. Finally, *resilience courage* equips leaders to recover from setbacks through adaptive leadership, turning adversity into strategic momentum. one of the great examples is the case of Airbnb's rebound after a COVID-19 era collapse downturn. The leaders demonstrated exemplary crisis leadership by responding with radical transparency, stakeholder empathy,

and strategic recalibration. Openly communicating with employees and the public (*emotional and psychological courage*), and pivoted Airbnb's business model toward longer stays and remote work to align with emerging travel behaviors. These adaptive decisions stabilized the company and led to a renewed mission centered on flexible living.

5. Empirical Inquiry

To complement the conceptual framework developed in this paper, we conducted a qualitative inquiry to gather field-based evidence on leadership courage in emerging technology startups. We interviewed leaders and founders of 3 companies, using a semi-structured interview instrument (Appendix), allowing for both consistency across participants and flexibility to explore context-specific insights [61]. We then coded the interviews in the context of our 5 dimensions, allowing for emerging themes. This approach enables the deepened understanding of how our conceptual constructs manifest in real-world settings.

5.1 Use Case Profiles

Use Case A- AI CX – (Company A) AI-Powered Call Center Automation: Company A operates in a competitive B2B SaaS landscape, positioning itself as a trust-first alternative to hype-driven automation. The company is a Series A startup, founded in 2022, specializing in AI-powered automation for call center agents. With a team of around 35 employees, it serves enterprise clients in telecom, insurance, and retail. The company has raised \$8 million and is focused on ethical deployment of voice-based AI, emphasizing hybrid human-AI workflows and transparent sentiment analytics.

Use Case B- HealthTech Cash-Pay Direct-to-Patient Medication Platform: Company B is a seed-stage health tech startup launched in 2023, with a lean team of 20 professionals spanning health policy, pharmacy, and logistics. It enables direct-to-patient medication access through a transparent cash-pay platform, targeting underserved and uninsured populations. Backed by \$3.5 million in seed funding and grant-supported pilots, Company B is preparing for regional expansion. Its mission centers on affordability, ethical data use, and last-mile delivery innovation in a fragmented healthcare ecosystem.

Use Case C- AI-Driven Manufacturing Robots: Company C is a Series B industrial automation company founded in 2021, employing about 50 engineers, designers, and field operators. It builds AI-driven manufacturing robots designed for precision, safety, and human collaboration. With \$15 million in funding and strategic partnerships with OEMs and labor unions, Company C is scaling deployments in automotive and aerospace sectors. The company champions ethical automation, resisting job-replacement narratives and focusing on measurable impact and labor dignity.

6. Discussion

In a landscape saturated with buzzwords and inflated claims, all three companies demonstrated the courage to resist the hype cycle and focus on real outcomes. Courageous entrepreneurs are trying to avoid the “ChatGPT for X” branding trend, choosing instead to emphasize operational value and outcome-driven design, despite the great hype. Company B rejected the “disruptive health tech” label, positioning itself as a reliable and ethical alternative that prioritized patient needs over flashy innovation. Company C steered clear of flashy demos and exaggerated claims, focusing instead on measurable improvements in safety and precision.

6.1 Leadership Courage in Emerging Tech Startups

Across all three companies, courage was defined by principled restraint and human-centered design. They

prioritized trust over speed in its call center AI, resisting the temptation to overpromise and instead focusing on transparent, ethical interactions between humans and machines (Company A). Company B challenged entrenched pharmaceutical systems, building a platform that centered patient dignity and affordability, even when it meant disrupting legacy intermediaries. Company C reimaged industrial automation to honor human labor, designing systems that resisted the narrative that efficiency must come at the cost of dignity. In each case, leadership courage meant making decisions that favored long-term trust and ethical integrity over short-term gains or technical bravado.

Table 2 presents summaries of empirical notes re: leadership courage reported by our participants. More relevantly, they all counted events where they made difficult decisions. These decisions reflect a consistent willingness to uphold ethical commitments, even at the expense of funding, partnerships, or market positioning, demonstrating that strategic courage is rooted not in disruption for its own sake but in calculated risk-taking that fosters trust and legitimacy within complex ecosystems. Moreover, these responses reveal that resilience courage transcends mere persistence—it entails acknowledging missteps and converting setbacks into opportunities for deepened trust and renewed credibility.

Leaders consistently demonstrated a willingness to uphold moral commitments, even when doing so risked funding, partnerships, or market positioning.

Moral courage was visible through principled resistance to stakeholder pressures that threatened core values. Company A’s founder, for instance, refused investor demands to fully automate quality assurance, insisting on a hybrid model that preserved human judgment: *“It was a tough conversation, but it preserved our values.”* Company B similarly declined a partnership with a major pharmacy chain whose opaque pricing engine would have compromised transparency, affirming, *“We built our own transparent pricing layer, even though it meant losing a big-name partner.”* Company C redefined its product narrative under investor dissent, rejecting branding as *“job eliminators”* and instead emphasizing collaboration and worker dignity.

Table 2: Leadership Courage (Empirical Summary Mapped to 5 Conceptual Dimensions of Conceptual Model)

Courage Theme	A (Call Center AI)	B (Cash-Pay Meds)	C (AI Manufacturing)
Moral Courage	Refused investor pressure to fully automate QA; upheld hybrid model to preserve human judgment	Declined opaque pricing engine from pharmacy chain; prioritized transparent cost architecture	Rejected branding as “job eliminators”; redefined robots as collaborative agents despite investor dissent
Strategic Courage	Piloted voice agents in live environments without precedent; resisted hype cycle to focus on operational value	Launched without clear regulatory guidance; built platform with patient advocacy input	Deployed robots in unionized settings; resisted flashy demos in favor of measurable safety and precision
Ethical Courage	Declined sentiment data scraping; published training data and invited audits	Refused data monetization offers; published cost breakdowns and invited watchdogs	Rejected training on competitor datasets; published labor impact assessments and co-designed retraining modules
Resilience Courage	Owned client churn publicly; recovered through transparency and team learning	Recovered from failed rural pilot by co-designing logistics with community	Took responsibility for weld error; launched cross-functional review and improved deployment protocols
Psychological/Emotional Courage	Created “Courage Labs” for team risk-sharing; showed vulnerability in postmortem reflections	Hosted “Ethics in Action” sessions; personally visited failed pilot sites to rebuild trust	Created “Courage Board” for anonymous team decisions; modeled emotional transparency in leadership communications

Strategic courage emerged across all three companies through bold action in the face of uncertainty, where credibility was built not by avoiding risk but by embracing it with integrity. Company A piloted its voice agent prototype without industry benchmarks, opting for a limited rollout with full transparency, a move the founder described as one that “built credibility.” Company B launched its platform despite the absence of a clear regulatory pathway, choosing to co-design with legal counsel and patient advocacy groups in what was called “a leap into ambiguity.” Company C deployed its adaptive welding robot in unionized environments, a high-risk decision that “earned trust” through direct engagement with legacy systems and labor oversight.

Ethical courage was most evident in decisions that prioritized fairness, transparency, and user dignity over technical expediency. Company A declined to scrape sentiment data from recorded calls, opting instead for opt-in architecture: “Technically legal, but ethically gray. I vetoed it.” “We have also sunset a feature that mimicked human empathy too convincingly, choosing clarity and consent over manipulation”. Company B rejected data monetization offers and replaced automatic refill nudges with pharmacist-reviewed prompts, describing the pivot as “a values-first move.” Company C refused to train its AI on competitor datasets, building its own simulation lab and publishing labor impact assessments. These actions reflect a shared commitment to ethical boundaries, even when shortcuts were legally permissible or technically advantageous.

Resilience courage was demonstrated through transparent recovery from failure and proactive engagement with critique. Company A responded to client churn with a public postmortem and direct outreach: “That vulnerability strengthened our culture.” It also invited external audits after bias concerns, turning a potential public relations crisis into a credibility win. Company B recovered from a failed rural pilot by personally visiting the community and co-designing improved logistics, stating, “That vulnerability built trust.” Company C took responsibility for a weld error that halted production, launching a cross-functional review and inviting labor groups to co-design retraining modules.

Finally, psychological and emotional courage surfaced in how leaders cultivated vulnerability and normalized principled

risk-taking within their teams. Company A created what they referred to as monthly “*Courage Labs*” where team members shared bold decisions made under uncertainty, reinforcing that “*courage isn’t just for the C-suite*.” Company B hosted “*Ethics in Action*” sessions to surface real dilemmas in design, data, and partnerships, embedding courage into its operational DNA. Company C established a “Suggestion Board” for anonymous team decisions, modeling emotional transparency in leadership communications. These rituals and cultural practices reflect a sustained, value-driven form of courage, one rooted in psychological safety, empathy, and shared accountability.

Each company articulated a legacy vision rooted in ethical systems that “*elevate the human experience*”. Company A aspired to be remembered for modeling ethical AI deployment that respects invisible labor in customer service, those whose contributions often go unseen. Company B envisioned a future where medication access is radically transparent and deeply human, with platforms that honor the patient rather than the technology. Company C sought to leave a mark as the company that made industrial AI collaborative and human-aware, designing tools that respect the hands they work beside. Together, these visions reflect a shared belief: that “*courage is not just about what you build, but how, and for whom, you build it*”, as well expressed by one of the leaders.

6.2 Entrepreneurial Courage Across Venture Stages of ET Startups

During the inquiry we were able to identify a few contextual manifestations of courage that may become more relevant during different stages of the lifecycle of the ET startup. Therefore, informed by our empirical study, we present a typology that illustrates how entrepreneurial courage may evolve across the lifecycle of ET ventures, offering a dynamic lens through which founder behavior can be understood. Table 3 maps five interrelated dimensions: moral, strategic, resilience, ethical, and emotional, against three critical venture stages: ideation, incubation, scaling [62]. This typology underscores that entrepreneurial courage is not episodic, it is a continuous, adaptive capability that shapes venture outcomes across time.

Table 3: Entrepreneurial courage, adaptive capability shaping ET startup stages

Stages	Ideation	Incubation	Scaling
Moral Courage	Upholding values in early design decisions; resisting unethical shortcuts for speed	Reaffirming purpose and values amid existential threats	Navigating investor pressure while maintaining mission integrity
Strategic Courage	Pursuing bold, unproven ideas; entering nascent markets	Reconfiguring business models; reallocating resources under duress	Making high-stakes pivots; expanding into uncertain geographies
Resilience Courage	Persisting through early rejection or funding gaps	Bouncing back from failure; rebuilding team trust and operational continuity	Sustaining momentum during scale challenges; managing burnout
Ethical Courage	Embedding fairness and transparency in product architecture	Protecting user rights and equity during retrenchment or restructuring	Institutionalizing governance; resisting exploitative monetization strategies
Emotional Courage	Acting despite fear of failure or imposter syndrome	Confronting loss, uncertainty, and public scrutiny with transparency and empathy	Leading through visibility and scrutiny; managing founder vulnerability

In the ideation stage, moral and strategic courage are especially pronounced. Founders must commit to bold, unproven ideas while resisting shortcuts that compromise

values. Emotional courage also plays a foundational role, as early-stage entrepreneurs confront fear, uncertainty, and the risk of failure with limited external validation. As a startup

enters the stage of incubation, all five dimensions converge in objective. Moral courage anchors the venture's purpose, strategic courage enables adaptive reconfiguration, and resilience courage drives recovery from setbacks. Ethical courage ensures fairness and transparency during restructuring, while emotional courage supports founders in leading with empathy and clarity through uncertainty. During scaling, the complexity intensifies. Strategic courage is required to make high-stakes decisions about market expansion and resource allocation, while ethical courage becomes central to institutionalizing governance and resisting exploitative monetization. Emotional and resilience courage help sustain momentum amid operational strain, team dynamics, and increased scrutiny.

Entrepreneurial courage is a strategic asset that shapes the trajectory of emerging technology ventures. This paper reframes courage as a multidimensional force encompassing moral clarity, epistemic integrity, and relational resilience. In volatile, ethically ambiguous environments, courageous leadership enables founders to navigate uncertainty, resist short-term pressures, and uphold values that transcend market logic.

7. Conclusion

Entrepreneurial courage has emerged as a defining trait in the volatile landscape of emerging technology ventures, where founders routinely confront ethical dilemmas, strategic uncertainty, emotional strain, and systemic setbacks. As innovation outpaces regulation, leaders must act boldly—risking reputation, resources, and stability—to pursue transformative goals under ambiguous conditions. Scholars have begun to map this multidimensional courage across domains: strategic courage enables bold pivots and market entry; moral courage anchors decisions in values despite pressure; resilience courage transforms failure into renewal; and emotional courage sustains well-being amid fear and doubt. Together, these forms of courage constitute a critical capability for navigating the high-stakes terrain of biotech, AI, fintech, clean energy, and blockchain—where the frontier of possibility is inseparable from the demand for principled, adaptive leadership.

The academic literature on entrepreneurial courage in emerging technology domains is rapidly coalescing into a robust, multi-dimensional field. Courage, once overlooked, is now recognized as both a dispositional trait and a contextual capability, critical to innovation, resilience, and ethical leadership. Measurement approaches range from psychometrics and behavioral indices to in-depth thematic and network analysis. Across AI, biotech, fintech, clean energy, robotics, and blockchain, entrepreneurial courage is manifested in the boldness to innovate, the resilience to endure, the integrity to lead ethically, and the foresight to anticipate and shape future challenges. This in-depth analysis provides a comprehensive overview of the state of research on entrepreneurial courage in the context of emerging technology ventures. By attending to the conceptual, operational, and thematic nuances highlighted across the reviewed academic papers, future research and entrepreneurial practice can better understand and cultivate

the kinds of courage needed not only to survive but to thrive at the vanguard of technological and societal transformation.

Drawing from interdisciplinary insights in organizational psychology, behavioral economics, and innovation studies, the paper argues that courage is both a compass and a catalyst. It guides decision-making under duress and fuels the capacity to act when data is incomplete, stakes are high, and stakeholder tensions are acute.

By integrating conceptual depth with empirical anchors, including real and hypothetical cases, the paper invites founders, investors, and policymakers to recognize courage not as heroism, but as disciplined risk-taking in service of long-term integrity. In doing so, it lays the groundwork for a new venture ethic, one that privileges resilience, transparency, and purpose over mere disruption. More specifically, this paper makes three key contributions to the literature on entrepreneurship and innovation leadership in emerging technology contexts.

First, it introduces a multidimensional framework of entrepreneurial courage—comprising moral, strategic, resilience, ethical, and emotional dimensions—tailored to the realities of high-velocity, high-uncertainty innovation environments. By synthesizing insights from entrepreneurship theory, psychological capital, and effectuation, the paper moves beyond trait-based definitions to position courage as a dynamic capability embedded in founder decision-making. Second, drawing cross-sector relevance and thematic integration from AI, biotech, fintech, clean energy, robotics, and blockchain, the study demonstrates the wide applicability of entrepreneurial courage across sectors. The thematic typology mapping courage dimensions against venture stages (ideation, scaling, crisis recovery) offers a novel lens for understanding how courage evolves and interacts with strategic inflection points. Finally, the paper highlights how accelerators, investors, and ecosystem builders can cultivate entrepreneurial courage through governance design, ethical mentorship, and resilience coaching.

8. Future Research

To advance both scholarly theorization and practical application, future research must move beyond conceptual mapping toward empirical validation and ecosystem integration. Courage is not a static property, but rather an adaptive capability. It evolves across the venture lifecycle. Longitudinal research could track how founders' courage profiles shift from ideation to scaling, crisis recovery, and exit. Such studies illuminate the temporal dynamics of courage, revealing when and how different dimensions become salient, and how they correlate with venture performance, team cohesion, and ethical outcomes. To further operationalize entrepreneurial courage, future studies ought to explore validated psychometric scales and behavioral indicators that assess each dimension independently and in interaction. Instruments such as the Psychological Capital Questionnaire (PCQ) [63] and Moral Courage Scale [64] offer promising foundations. Additionally, decision-making simulations, founder interviews, and venture case coding could be used to capture real-time expressions of courage in

high-stakes contexts. Accelerators, incubators, and investors play a pivotal role in shaping founder behavior. Policy frameworks and funding mechanisms should be designed to cultivate courage—not just reward traction. This includes embedding ethical review protocols, offering resilience coaching, and incentivizing values-driven innovation. Courage should be treated as a strategic asset, with ecosystem actors actively supporting its development through mentorship, governance design, and inclusive stakeholder engagement.

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