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Empowering frontline managers: the unsung heroes of innovation in high-tech

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Abstract

Purpose – This study explores the under-researched role of frontline managers (FMs) in corporate entrepreneurship (CE). FMs play a crucial role in driving innovation; however, they are often seen as task executors. This research examines how their position in CE is perceived and performed in the high-tech sector.
Design/methodology/approach – A qualitative design was employed, based on the thematic analysis of 19 semi-structured interviews with FMs working in the high-tech manufacturing sector. This was appropriate given the limited studies on this group's CE role, and the study's goal to explore their roles within dynamic technological and organisational contexts. Purposeful sampling targeted FMs engaged in external innovation-related activities.
Findings – The study reveals that FMs enact their roles in CE by proactively engaging with external customer demand, adapting their role performance in response to shifting organisational expectations, and asserting technical expertise to influence innovation activities, as interpreted through organisational role theory. They play an agentic role by initiating, integrating and implementing entrepreneurial initiatives. These findings illustrate how FMs' role behaviours shape entrepreneurial activity within organisations' operational core.
Originality/value – This article enriches the CE literature by focusing on FMs as embedded entrepreneurial actors and empirically clarifying their role as initiators and integrators of innovation. Their technical expertise and responsiveness to external changes reveal how CE emerges through operational practices, addressing the identified gap in FMs' roles in CE.

Keywords Corporate entrepreneurship, Frontline manager, High-tech, Innovation, Organisational role theory
Paper type Research article

1. Introduction

Organisations in the high-tech sector must innovate while maintaining operational efficiency. This tension is exacerbated by rapid innovation cycles, intense global competition and ongoing technological advancements (Valmohammadi *et al.*, 2024). Corporate entrepreneurship (CE) is widely regarded as a competitive necessity in uncertain and disrupted environments such as the high-tech sector (Glinyanova *et al.*, 2021). Entrepreneurial behaviour supports innovation-oriented activities, including new product development, process improvement and strategic transformation (Garrett *et al.*, 2021).

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The CE literature generally focuses on firm-level antecedents – such as organisational structure, culture and resources (Mustafa *et al.*, 2018) – and on external factors that influence organisations' innovation performance, competitiveness and financial outcomes (Urbano *et al.*, 2022). Although typically examined at the organisational level, CE is enacted through the everyday actions of organisational actors across hierarchical levels (Chang *et al.*, 2024; Kuratko *et al.*, 2014; Segarra-Ciprés *et al.*, 2025). Empirical studies have predominantly focused on senior and middle managers, who drive CE through top-down vision, resource allocation and the translation of entrepreneurial intent into initiatives (Girma Aragaw *et al.*, 2025). Yet micro-level enactment of CE remains limited (Plotnikova *et al.*, 2025), particularly among frontline managers (FMs). FMs occupy a structurally distinct position. Situated between senior and middle managers who hold formal entrepreneurial mandates (Zimmermann *et al.*, 2018; Segarra-Ciprés *et al.*, 2025) and non-managerial employees who lack operational authority, FMs have retained sufficient operational authority and agency to initiate and enact innovation in their daily work. This positional ambiguity is especially consequential in high-tech environments because FMs engage directly and continuously with technology, teams and customers, and technical expertise amplifies their potential as interpreters and initiators of innovation (Zimmermann *et al.*, 2018; Burcharth *et al.*, 2017; Nieuwenhuis, 2018).

Notably, how FMs perceive, enact and perform entrepreneurial roles to contribute to CE outcomes remains comparatively understudied in the CE literature (Soltanifar *et al.*, 2023; Urbano *et al.*, 2022; Starmann *et al.*, 2026). Recent reviews have called for more contextually grounded CE research (Urbano *et al.*, 2022; Girma Aragaw *et al.*, 2025) and greater attention to frontline actors' roles in the entrepreneurial process (Oluwafemi and Ogundana, 2025; Soltanifar *et al.*, 2023). The current article responds to these calls by examining FMs' perceptions and enactment of their roles as foundational to the entrepreneurial process, and clarifies how their daily practices contribute, thereby extending the CE literature on innovation outcomes to a comparatively neglected but consequential actor.

This study draws on organisational role theory (ORT) to gain insight into how FMs perceive and enact entrepreneurial roles under conditions of ambiguity, constraint and a limited formal mandate. ORT provides a fitting lens because it theorises the role itself – not just behaviour or outcomes – as a dynamic construction shaped by structural expectations, individual interpretation and local contingencies (Anglin *et al.*, 2022; Westen and Graça, 2024). This is a novel theoretical approach in CE research. The extant literature has examined role-related constructs such as autonomy, discretion and role ambiguity; however, the role enactment process itself remains under-theorised (Soto-Simeone and Biniari, 2024). This study employs ORT to examine how FMs in high-tech manufacturing perceive and enact their roles in CE. It shifts the focus from CE as a behavioural outcome to a process of role crafting in the absence of a formal entrepreneurial mandate and from a position of structural ambiguity between strategic intent and operational execution. Thus, this study addresses the research question: How do FMs perceive and enact their roles in initiating, integrating and realising CE activities?

The study makes three contributions to the CE literature. First, it establishes FM as a theoretically consequential actor in CE, demonstrating how they initiate, integrate and realise entrepreneurial activities through everyday operational practice. In doing so, it advances the field beyond its predominant focus on senior and middle managers and clarifies the distinctive nature of FM's boundary position in CE. Second, the study draws on ORT to develop a rich and nuanced perspective of FM entrepreneurial role enactment, attending to how role identity, role expectations and role negotiation are interpreted and sometimes contested as FMs respond to environmental pressures in structurally constrained contexts. ORT is extended to offer a more experiential account of how entrepreneurship unfolds at the operational level, particularly by clarifying role expectations, creating spaces for boundary negotiation and recognising the entrepreneurial contributions of FMs in high-tech contexts. Third, the findings generate actionable insights for organisations seeking to leverage FMs' entrepreneurial potential in

high-tech contexts. Specifically, it highlights the importance of legitimising FMs' entrepreneurial roles, reducing structural ambiguity by clarifying role boundary definition and designing organisational conditions that enable rather than constrain operational-level CE.

2. Literature review

2.1 Corporate entrepreneurship and managerial roles

CE formalises and sustains innovation in high-tech contexts (Pavićević *et al.*, 2026) associated with product development, process improvement and organisational transformation (Castriotta *et al.*, 2021). CE depends on structural enablers, such as autonomy and resource availability, as well as how entrepreneurial activity is distributed and enacted by individuals in senior, middle and frontline roles (Alamsjah and Asrol, 2023). Recent literature highlights that CE research has paid limited attention to how context shapes the CE process, calling for more contextually grounded explanations of how CE unfolds across organisational settings (Girma Aragaw *et al.*, 2025).

Managerial roles for CE can be differentiated within organisations. Senior managers act as architects of CE by setting visions, allocating resources and fostering innovative environments, and recent meta-analytic evidence continues to strongly support the explanation of CE through top management team attributes (Pavićević *et al.*, 2026; Saeed *et al.*, 2025). Although important, their strategic focus can sometimes distance them from day-to-day operations, limiting their ability to identify emerging opportunities (Radaelli and Sitton-Kent, 2016). Middle managers translate strategy into operational actions, legitimising initiatives and aligning them with organisational objectives (Ellis *et al.*, 2025). They facilitate collaboration but may also restrict frontline innovation (Alamsjah and Asrol, 2023). In contrast, FMs remain less clearly theorised as entrepreneurial actors in their own right, despite growing recognition of their relevance for innovation and CE (Soltanifar *et al.*, 2023; Starmann *et al.*, 2026). In high-tech contexts, CE is shaped by both formal managerial direction and FMs' customer-facing interactions, indicating that entrepreneurial activity within firms extends beyond upper hierarchical levels (Segarra-Ciprés *et al.*, 2025). Therefore, FMs occupy hybrid roles at the interface of technical processes, customer needs and internal coordination (Zimmermann *et al.*, 2018), with boundaries often remaining fluid (Plotnikova *et al.*, 2025). Recent research also points to the growing organisational importance of FMs in dynamic high-tech settings (Oluwafemi and Ogundana, 2025). Their entrepreneurial potential relies on autonomy (Burcharth *et al.*, 2017) and their ability to align innovation with engineering feasibility under high-tech contexts (Colombari and Neirotti, 2024).

However, entrepreneurial contribution at the front line is not explained solely by positional location. Entrepreneurial behaviour has been associated with innovativeness, proactiveness, risk-taking, opportunity recognition or exploitation, and internal and external networking (Martins and Perez, 2026). This suggests that FMs' entrepreneurial contribution also depends on actor-level orientations and behavioural dispositions enacted within their formal role (Blanka, 2019). Floyd and Lane's (2000) seminal typology demonstrates how managerial roles in CE function across levels by engaging in experimenting, adjusting and conforming behaviours. Yet how FMs in dynamic high-tech contexts interpret and enact entrepreneurial roles in everyday organisational practice remains insufficiently understood.

To situate the present study within the existing CE literature, Table 1 compares recent in-depth qualitative research (2018–2025) examining how different organisational and external actors enact CE. Focusing on recent qualitative studies provides a relevant and methodologically compatible basis for theorising and extending prior research. The studies in Table 1 reflect two broad orientations. Some scholars adopt inductive, theory-building approaches to examine phenomena such as responsible innovation through intrapreneurship (Ambos and Tatarinov 2022), strategic leadership (Putra *et al.*, 2024), digital skill mobilisation (D'Angelo *et al.*, 2024), legitimacy of radical innovation (Ellis *et al.*, 2025) and identity work in internal corporate venturing (Starmann *et al.*, 2026). Others adopt theoretical lenses such as

Table 1. Prior CE qualitative studies focusing on the roles of top managers, middle managers and entrepreneurial actors

Author and journal	Theory	Method and sample	Level of analysis, role, and focus		Outcome framework
			Firm	Individual	
Zimmermann *et al.* (2018)	Paradox theory and ambidexterity	10 innovation projects in 3 companies, $n = 51$ interviews over 3 yrs–corporate managers, initiative managers and team members		Y–frontline	Frontline managers' configurational matching and contrasting practices
Arfi and Hikkerova (2021)	SECI model and organisational learning	3 Tunisian SMEs, $n = 33$ interviews–senior decision-makers and experts	Y		Knowledge conversion processes in using digital platforms for CE
Hortovanyi *et al.* (2021)	Organisational ambidexterity	Longitudinal single case on strategic renewal, data: secondary documents and $n = 23$ (6 interviews with top managers, 18 with middle managers)	Y		Learning points (3 phases) in the ambidextrous org journey
Ambos and Tatarinov (2022)	Atheoretical	Eight case studies using multiple data sources–39 innovation lead interviews, observations, annual reports, press releases and presentations	Y		Responsible innovation capabilities developed through scaling organically and scaling strategically
Soto-Simeone and Biniari (2024)	Sociological theory of emotions	Grounded-theory design, 16 established Finnish organisations pursuing entrepreneurship–54 interviews with internal and external entrepreneurs over a year		Y–ecosystem actors	Framework of CE role engagement and enactment showing emotions within work
Perini *et al.* (2024)	Four theories to explain strategic inertia	In-depth study of 2 polar cases, using secondary documents and $n = 10$ interviews, 5 top-level managers in firm A and top and middle managers in firm B	Y		Process model of drivers of strategic renewal, reasons and outcome of strategic inertia
Putra *et al.* (2024)	Atheoretical	Single in-depth case, using field observation for 18 months, 27 interviews, $n = 14$ middle managers, $n = 7$ employees and 2 focus groups, plus documents	Y		TMT's paradoxical framing of opportunities and MM's liminal framings and actions for digital exploration and exploitation
Gomes *et al.* (2024)	Dynamic capabilities and entrepreneurial judgement	Longitudinal study of six cases, using 67 interviews (TM, MM, entrepreneurs) and participant-observer	Y		Propose a framework of entrepreneurial judgement governance adaptation for DT in 3 phases: recognising, distributing and orchestrating

(*continued*)

Table 1. Continued

Author and journal	Theory	Method and sample	Level of analysis, role, and focus		Outcome framework
			Firm	Individual	
D'Angelo *et al.* (2024)	Atheoretical	Single in-depth case, using 27 interviews with TM, MM and employees, 5 meetings observed, archival documents and external documents	Y		Digital skill mobilisation process within an incumbent firm
Ellis *et al.* (2025)	Atheoretical	In-depth, longitudinal case, using 40 interviews with directors, employees, founders and analysts, 18 months of field observations and 150 digital files		Y–MM	Process model of MM legitimation of radical innovation in nascent ecosystems
Shu and Srimuang (2025)	Dynamic capabilities	Interview with managers from 24 companies	Y	Y–digital champions	Digital transformation model: drivers, process and outcomes
Starmann *et al.* (2026)	Atheoretical	Individual entrepreneurial actors focus on identity-related conflicts and role construction over time		Y–Intrapreneurs	Process model and theory of intrapreneurs' identity work, showing tensions between employee identity and entrepreneurial role aspirations
This study	Role theory	Qualitative–19 frontline managers		Y–frontline managers	Frontline managers' CE roles in high-tech manufacturing

Source(s): Authors' own work

dynamic capabilities (Gomes *et al.*, 2024; Shu and Srimuang, 2025), paradox theory (Zimmermann *et al.*, 2018), organisational ambidexterity (Hortovanyi *et al.*, 2021), organisational learning (Arfi and Hikkerova, 2021) and sociological theory of emotions (Soto-Simeone and Biniari, 2024) or draw on multiple theories to examine strategic inertia (Perini *et al.*, 2024), product innovation and strategic renewal as CE phenomena. Across both approaches, the majority of studies concentrate on top and middle manager perspectives (Arfi and Hikkerova, 2021; Shu and Srimuang, 2025; Hortovanyi *et al.*, 2021; Perini *et al.*, 2024), and most propose firm-level process models as their primary contribution (Hortovanyi *et al.*, 2021; D'Angelo *et al.*, 2024; Gómez-Haro *et al.*, 2011). While there is growing recognition of frontline actors in CE (Zimmermann *et al.*, 2018; Soto-Simeone and Biniari, 2024; Ambos and Tatarinov 2022), studies that examine FMs' role enactment at the individual level remain scarce. Of the studies reviewed, only Zimmermann *et al.* (2018) focus specifically on FMs' configurational practices. Soto-Simeone and Biniari (2024) examine the roles of internal and external entrepreneurial actors, and Ellis *et al.* (2025) review middle managers' legitimation processes. Addressing this gap, the current study extends limited research by drawing on ORT to examine how FMs' entrepreneurial roles are constituted and enacted in practice, attending to how social expectations, structural constraints and individual agency shape role performance in high-tech contexts.

2.2 Organisational role theory

ORT defines roles as socially influenced expectations informed by formal structures and individual interpretations (Anglin *et al.*, 2022). Recent role-based research further emphasises that organisational roles are enacted through ongoing identity work and interpretative processes, particularly under conditions of ambiguity and constrained authority (Westen and Graça, 2024). It differentiates between expected roles in job descriptions and enacted roles, which reflect actual behaviours influenced by context (Wickham and Parker, 2007). The current study explores four ORT dimensions: formal role responsibilities (Burcharth *et al.*, 2017); role enactment – initiating improvements (Zimmermann *et al.*, 2018); role identity – self-perception as problem-solvers (Stevenson *et al.*, 2024) and role negotiation – redefining boundaries (Gibson *et al.*, 2019). These dimensions provide a foundation for interpreting CE at the front line through proactive behaviours and extend insights by examining FMs' entrepreneurial behaviours in dynamic, high-tech contexts. ORT reframes these frontline qualities not as fixed personal traits, but as role-based orientations expressed through identity, enactment and negotiation in context (Westen and Graça, 2024). ORT has not been used in prior CE studies to examine FMs' entrepreneurial role enactment, offering an opportunity to enrich the literature and provide insight into practice. In high-tech contexts, this role enactment is often tension-laden, as FMs are expected to follow top management directives while simultaneously innovating in response to evolving customer demands.

2.3 High-tech industry

The high-tech industry is characterised by volatility, accelerated technological change, shorter innovation cycles and global competition (Kuratko *et al.*, 2023), making it an ideal context for exploring FMs' role in CE. High-tech manufacturing faces ongoing disruption from technological breakthroughs, evolving regulations and shifting customer expectations (Bierwerth *et al.*, 2015). Unlike stable sectors that rely on strategic continuity, these firms must continuously adapt and reconfigure their capabilities to remain competitive (Mousavi *et al.*, 2019). Rapid knowledge obsolescence demands continuous innovation (Chen *et al.*, 2023), prompting CE to adapt and seize emerging opportunities (Girma Aragaw *et al.*, 2025). Complex business-to-business relationships require customised engineering solutions and tight cross-functional integration, often under an engineer-to-order model that co-develops products with clients. This couples product architecture with process adaptability (Thorben, 2009), which is of particular interest to CE (Glinyanova *et al.*, 2021). Engineering-to-order

creates a rigid yet dynamically evolving organisational context in which CE is shaped by external uncertainty and internal technical constraints. FMs must make context-sensitive decisions navigating centralised technical boundaries, requiring entrepreneurial actions that are responsive, integrative and structurally negotiated.

Considering the high-tech context and FMs' role identity, expectations, enactment and negotiation in working towards innovation outcomes such as product innovation and problem-solving, Figure 1 outlines the conceptual model examined in this study.

3. Method

This study adopted an exploratory qualitative approach to investigate how FMs perceive and enact their roles in contributing to CE. It focused on role interpretations and enactment processes that are not directly observable through formal organisational artefacts or quantitative measures. Grounded in a critical realist paradigm, it acknowledges that reality is interpreted through individual perceptions, thereby allowing an exploration of both organisational conditions and the personal meanings attached to roles. The research design is appropriate, given the lack of in-depth understanding of FMs' roles and the aim of this research to elaborate on the theory (Creswell and Poth, 2016; Gioia *et al.*, 2013).

3.1 Data collection

Following ethics approval (S242002), participants were recruited through purposive snowball sampling, combining theoretically informed selection criteria with participant-facilitated referrals using industry networks. This approach was suitable for accessing FMs in high-tech manufacturing, a group that is difficult to reach through conventional recruitment channels, given the sensitive nature of knowledge-sharing and innovation strategies (Marshall and Rossman, 2014). To ensure participants could speak directly to the phenomena of interest, selection criteria required substantial experience in entrepreneurial or innovation initiatives, a technical-functional background (e.g. sales, research and development [R&D], project management), and operational involvement in external business-to-business collaboration. These criteria reflected the study's focus on FMs who occupy boundary-spanning positions

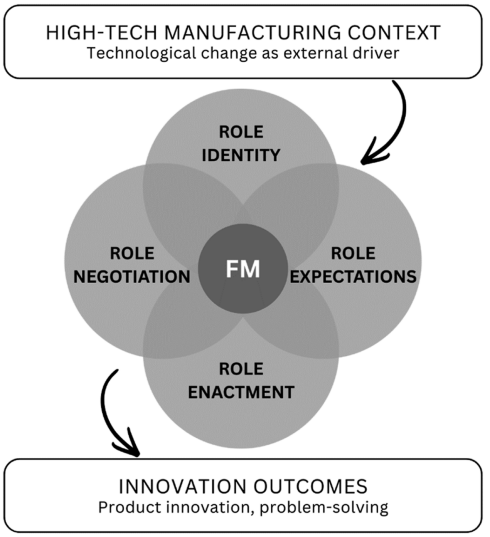

Figure 1. Conceptual model-FM role in CE. Source: Adapted from Anglin *et al.* (2022)

between customers, technical systems and internal decision structures, making them well-placed to illuminate how CE is perceived and enacted operationally (Palinkas *et al.*, 2015). The sample size of 19 interviews was considered sufficient, as thematic patterns became more consistent from Interview 16 onwards, indicating theoretical saturation. The remaining interviews confirmed the stability and coherence of the emerging themes, rather than producing substantively new insights (Braun and Clarke, 2022; Creswell and Poth, 2016).

The interview protocol was guided by Figure 1, exploring how FMs perceive and enact their roles in CE to achieve innovation outcomes – such as product improvement and problem-solving – within organisational boundaries. Interviews followed a semi-structured format, opening with participants' professional backgrounds before moving to their involvement in CE and innovation activities, and subsequently exploring how they perceive and navigate their roles, autonomy and organisational constraints in practice. This sequencing allowed participants to first establish their own contextual grounding before engaging with more conceptually demanding aspects of their role experience (Creswell and Poth, 2016). Interviews ranged from 30 to 100 min and took place between September and November 2024. As data collection progressed, issues and tensions emerging from earlier interviews were probed in subsequent interviews, enabling iterative comparison across participants and progressively refining the analytical depth of the dataset.

Table 2 provides a profile of the FM participants, who are predominantly male and highly experienced in their roles.

3.2 Thematic analysis

The interview transcripts were analysed thematically using a six-phase approach that integrated the Braun and Clarke (2022) method with Gioia *et al.*'s (2013) inductive logic to develop themes and deductively define aggregated theoretical dimensions based on ORT (Fereday and Muir-Cochrane, 2006). This hybrid approach ensured both empirical openness and theoretical anchoring (see Table 3). This systematic approach, detailed in Table 3, provides a transparent and replicable pathway from transcripts to aggregated theoretical dimensions,

Table 2. Demographic data of participants

Participant code	Function	Gender	Tenure
FM 01	R&D Manager	Male	32 Years
FM 02	Sales Manager	Male	23 Years
FM 03	Sales Manager	Male	7 Years
FM 04	Regional Sales Manager	Male	39 Years
FM 05	Regional Sales Manager	Male	36 Years
FM 06	Sales Manager	Male	34 Years
FM 07	Sales Manager	Male	27 Years
FM 08	Project Manager	Male	38 Years
FM 09	Regional Sales Manager	Male	10 Years
FM 10	Sales Manager	Male	35 Years
FM 11	Sales Manager	Male	25 Years
FM 12	Sales Manager	Male	6 Years
FM 13	R&D Manager	Male	25 Years
FM 14	Sales Manager	Male	29 Years
FM 15	R&D Manager	Male	15 Years
FM 16	R&D Manager	Male	26 Years
FM 17	Inside Sales Manager	Female	15 Years
FM 18	Sales Manager	Male	34 Years
FM 19	R&D Manager	Male	11 Years

Source(s): Authors' own work

Table 3. Data analysis in six phases

Coding stage	Description
Phase 1: Familiarisation with the data	All 19 interviews were transcribed and read multiple times, with detailed notes taken in NVivo following thematic immersion and reflexive engagement (Nowell *et al.*, 2017). The focus was on how FMs described their daily work, decision-making boundaries and responses to organisational conditions, providing insights into role enactment in complex environments (Gioia *et al.*, 2013). Emotional tone, language and implicit meanings were noted, underscoring the importance of interpretive sensitivity in thematic analysis. Reflexive notes and early analytical memos were recorded to document initial interpretations and emerging assumptions
Phase 2: Generating initial codes	Using NVivo, transcripts were inductively coded line-by-line, following thematic analysis recommendations (Braun and Clarke, 2022). Codes were assigned to in vivo quotes representing behaviours, beliefs, and organisational dynamics, forming first-order codes in participants' own words (Gioia *et al.*, 2013). During the inductive coding, care was taken to reflect participants' lived experiences (Wimpenny and Gass, 2000)
Phase 3: Searching for themes	Coded data were reviewed to be grouped into clusters of meaning (Braun and Clarke, 2022). First-order codes were grouped into second-order themes, e.g. "boundary spanner", "opportunity identification" and "translating knowledge", reflecting conceptual patterns across interviews (Gioia *et al.*, 2013). Merging constructs began to reflect or resonate with key CE concepts, including environmental triggers, organisational structures and individual agency (Urbano *et al.*, 2022)
Phase 4: Reviewing themes	A constant comparison process refined emergent patterns through iterative analysis (Fereday and Muir-Cochrane, 2006). Overlapping categories were refined or collapsed into broader themes (Gioia *et al.*, 2013). For example, "organisational constraints" and "barriers" were merged into the "organisational inhibitors" theme. Transcripts were reread to ensure data segments captured meaning and were appropriately coded (Braun and Clarke, 2006). Themes were iteratively compared across interviews to assess consistency, variation and analytical fit
Phase 5: Defining and naming themes	Themes were named to reflect how FMs engage in entrepreneurial activities in their organisations. Themes were iteratively refined to ensure coherence with participants' experiences (Fereday and Muir-Cochrane, 2006, Nowell *et al.*, 2017). Second-order themes such as "management support", "autonomy" and "role negotiation" were mapped onto CE constructs, linking antecedents (environmental, organisational, individual) with CE activities (e.g. opportunity recognition and role adaptation) and innovation outcomes (Ireland *et al.*, 2009)
Phase 6: Final data structure with aggregate themes	Themes were synthesised into a coherent narrative about FMs' engagement in CE within high-tech manufacturing. The final data structure depicts first-order codes, second-order themes and aggregate dimensions (Gioia *et al.*, 2013). ORT is used as an interpretive lens to gain insight into FMs' expected and enacted roles in CE (Anglin *et al.*, 2022). An audit trail was maintained throughout the analysis to document coding decisions, theme development, and refinements to the emerging data structure. Rigour was further strengthened through peer debriefing with two senior qualitative scholars (Miles *et al.*, 2020) and member checking to confirm transcript accuracy (Saunders *et al.*, 2019), and data triangulation (Miles *et al.*, 2020)

Source(s): Adapted from Braun and Clarke (2006)

enabling other researchers to apply the same thematic analysis in comparable organisational contexts.

An audit trail was maintained throughout the analysis to document coding decisions, theme refinement and the development of the emerging data structure. Reflexive notes were written after each interview and revisited during coding to record early interpretations, emerging assumptions and the researcher's positioning in relation to the data (Finlay, 2021). These practices supported reflexive engagement, analytical transparency and confirmability by making visible how interpretations were developed and revised across the analytical process.

The developing coding structure and thematic interpretation were reviewed iteratively with two senior qualitative scholars. They critically assessed the coherence of codes, the development and boundaries of themes, and the fit between data extracts and emerging interpretations. This process strengthened dependability by challenging premature conclusions and increasing consistency in data interpretation. Member checking was used to assess transcript accuracy, allowing participants to confirm that the interview record accurately reflected their accounts (Saunders *et al.*, 2019). A rich description of the high-tech manufacturing context and participants' roles was used to enhance transferability, enabling readers to assess the relevance of the findings to comparable settings.

These procedures strengthened the credibility, dependability, confirmability and transparency of the study by embedding quality assurance across data collection, coding, thematic refinement and interpretation. This methodological design makes the analytical logic traceable and supports the robustness of the findings in the high-tech context.

4. Findings

Table 4 outlines the five key themes that show how FMs in high-tech manufacturing firms implement CE. The analysis highlights role enactments influenced by external triggers, internal constraints and changing organisational expectations.

4.1 High-tech industry context: real-time market triggers

In high-tech manufacturing, entrepreneurial effort is sparked by customers and continual market sensing rather than formal plans. FMs portrayed innovation as a required, real-time response rather than a discretionary choice. FM02 explained, "ultimately, we're driven by customer needs". These external requests often arrive suddenly and leave little room for forward planning, as FM08 noted: "They don't come with problems in six months. They come with them now, and we have to act quickly". Such compressed timeframes fold experimentation into everyday routines, making CE an embedded aspect of operational practice rather than a separate strategic exercise.

Market awareness plays a key role in FMs identifying entrepreneurial opportunities, and is developed through daily interactions, service activities and informal communication. FM04 recounted, "You need to know what's happening in the field, what customers need, or what they might be waiting or hoping for", indicating frontline sensing is cumulative, experiential and embedded in technical routines.

Many customer requests guiding FMs' decisions are implicit. Participants described interpreting indirect cues and detecting latent needs. FM09 remarked, "Sometimes, the customer doesn't say it directly, but you can hear between the lines what's changing", illustrating how tacit understanding and sensemaking contribute to opportunity recognition. Aligned to ORT, those cues are informal, relational indicators of change.

Over time, such customer cues coalesce into a working picture of emerging demand. FM06 noted, "If I visit other customers and get similar feedback, then I know there's a market demand". These patterns serve as informal learning mechanisms supporting decentralised entrepreneurial sensing.

Table 4. Data structure of FM role in CE

Aggregated dimension	Second-order themes	First-order codes
High-tech industry	Customer-driven innovation	Ultimately, we're driven by customer needs. (FM02) Their problems are now, not in 3–4 months. (FM10) They don't come with problems in six months. They come with them now. And we have to act quickly. (FM08)
	Market awareness	You need to know what's happening in the field, what customers need or what they might be waiting for or hoping for. (FM04) Sometimes, the customer doesn't say it directly, but you can hear between the lines what's changing. (FM09) If I visit other customers and get similar feedback, then I know there's a market demand. (FM06)
Role expectations	Management support	Management tells us, "If it's good, do it, but take care of your main job". (FM01) They said, "The idea isn't bad, let's try it out." So, the vacuum robot was bought, and it worked fine. (FM15) If higher management doesn't approve the funding for a project, a frontline manager will find it very difficult to push forward with anything (FM12)
	Autonomy	Nobody checks what I do in detail. It's up to me to decide what makes sense. (FM09) We're trusted to find our own way to reach objectives. (FM10) If I see a need, I don't have to ask. I just do it. (FM06)
	Time scarcity	But if you're not in such a large company where you can just do that, you always have daily tasks, and they always take priority because they bring in the money.(FM15) I would love to innovate more, but the day is full of tasks that are not innovative. (FM05) It's hard to find time for ideas. We're constantly under delivery pressure. (FM13)
Role identity	Technical expertise	I know the product inside out. That's why people listen when I say something needs to change. (FM04) I don't need a PowerPoint to explain my ideas. I show them the problem and the solution. (FM07) If I talk to R&D or production, they know I understand what I'm talking about. That makes it easier to move things forward. (FM10)
	Cumulative experience	Over the years, you learn how to get things done. Not everything is in the manual. (FM12) You can't innovate if you don't know the system. (FM06) Sometimes it's not the best idea that works; it's the one that fits with how things move around here. (FM08)

(*continued*)

Table 4. Continued

Aggregated dimension	Second-order themes	First-order codes
Role enactment	Opportunity identification	Problem-solving is a big part of what I do. I see it as an opportunity. (FM01) They're the ones who notice when things aren't progressing or when new technologies need to be explored. (FM15) You have to ask what's going on, what's new, and what's happening in the market. You often get enough prompts from these conversations. (FM10)
	Boundary spanning	Ultimately, the frontline manager connects the customer with the rest of the organisation. (FM12) A frontline manager . . . we are directly at the front, the link between customer and production. (FM09) I'm the bridge between the frontline outside and the colleagues in development within the company. (FM13)
	Knowledge broker	A salesperson is essentially a kind of translator. Production speaks its own language, and the customer speaks theirs. It's your job to bridge that gap. (FM11) Sometimes, technical concepts need to be simplified for internal teams to understand. (FM09) I act as a bridge between departments by transferring knowledge that is otherwise stuck in silos. (FM12)
	Implementation navigation (exploitation)	I'm fully responsible for ensuring the product works. (FM15) I must try to implement everything in the innovation area . . . (FM19) Especially as frontline managers . . . we're also heavily involved in the implementation . . . from the early phase all the way to the completion. (FM16)
Role negotiation	Decision boundaries	We're brought in to provide our input, but the final decision rests with middle management. (FM01) Depending on the scale of the investment, higher-level management decisions are required for larger investments. (FM13) Without certain information, I believe some decisions would be different than if I hadn't provided customer insights. (FM03)
	Operational constraints	Even if I want to change a part, it needs to go through three stages before it's allowed. (FM13) If that budget isn't available, there may not be any time during work hours to push these solutions forward. (FM15) There are always quality checks and documentation steps that slow everything down. (FM07)

Source(s): Authors' own work

FMs often act independently on insights, initiating action based on technical confidence and familiarity without waiting for formal validation. This highlights that CE in high-tech contexts arises organically from FMs' experience and situational judgment, externally triggered, time-sensitive and embedded in everyday practices as they navigate role expectations.

4.2 Role expectations

FMs described role expectations as shaping their space for CE. These were not written into job descriptions but emerged in daily interactions and organisational norms, setting operational boundaries through management support, autonomy and time scarcity.

Management support from middle and senior managers was verbal, creating a conditional licence to innovate, welcomed but circumscribed. When innovation aligned with efficiency or addressed immediate customer needs, managers expressed support, although tethered to delivery priorities. FM01 stated, "Management tells us, 'If it's good, do it, but take care of your main job'", suggesting that innovation is conditionally encouraged but remains secondary to operational outcomes.

FM12 observed, "If higher management doesn't approve the funding for a project . . . FMs will find it very difficult to push forward with anything". This reinforces that while managerial rhetoric may endorse innovation, resource constraints often inhibit proactive engagement. Thus, CE exists in a zone of tacit endorsement, contingent on budgetary discretion and alignment with operational goals.

Given this conditional permission, FMs reported a high degree of embedded autonomy. This autonomy was not formalised but arose from the practical demands of technically complex, time-sensitive demands. FM10 explained, "We're trusted to find our way to reach objectives". FM06 added, "If I see a need, I don't have to ask. I just do it". This indicates that entrepreneurial agency at the front line is often an extension of operational discretion rather than a discrete managerial initiative.

However, autonomy was tempered by pervasive time scarcity. Participants described how tight delivery schedules and continuous customer obligations constrained their ability to pursue exploratory initiatives. FM15 articulated this tension: "Daily tasks . . . always take priority because they bring in the money". Similarly, FM13 noted, "We're constantly under delivery pressure", and FM05 explained, "I would love to innovate more, but the day is full of tasks that are not innovative". These reflections demonstrate that CE engagement is temporally constrained, requiring FMs to capitalise on marginal spaces for innovation.

FMs' accounts showed that role expectations offered no stable foundation for CE, but a shifting landscape shaped by conditional support, autonomy and time limits. Their actions were opportunistic, relying on temporary alignments of managerial tolerance, operational freedom and time. This challenges the idea that autonomy alone enables CE (Burcharth *et al.*, 2017), showing instead that opportunity rests on a fragile balance of permission, discretion and time.

4.3 Role identity

Role identity reflects how FMs engage in entrepreneurship through self-perceptions shaped by technical expertise and operational experience. Innovation is viewed as a natural extension of their problem-solving skills rather than an added responsibility. Participants highlighted a professional identity rooted in technical legitimacy, which fosters confidence and influence in their entrepreneurial efforts. FM04 stated, "I know the product inside out. That's why people listen when I say something needs to change". Embedded technical expertise provided informal authority, enabling FMs to champion innovation without formal power.

This credibility was enacted through practice rather than performance. FM07 noted, "I do not need a PowerPoint to explain my ideas. I show them the problem and the solution". Thus, entrepreneurial action is demonstrated practically through competence, reflecting pragmatically driven innovation.

Role identity was moulded by cumulative experience, with participants describing innovation capacity as practical judgment developed through years of exposure. FM12 explained, "Over the years, you learn how to get things done. Not everything is in the manual". This suggests that FMs draw on their tacit knowledge, institutional memory and experiential intuition for CE rather than on formal innovation processes emphasised at higher organisational levels.

This experience-based orientation also influenced how FMs valued ideas. Rather than prioritising novelty, they emphasised feasibility and contextual fit. FM08 observed, "Sometimes it's not the best idea that works; it's the one that fits with how things move around". This pragmatism highlights that frontline entrepreneurship values feasibility over abstract creativity.

Innovation arose from adaptive optimisation informed by deep familiarity with products and processes. FM06 noted, "You can't innovate if you don't know the system". This positions entrepreneurial behaviour as an extension of operational knowledge for FMs.

The collaborative dimension of role identity also mattered. FM10 stated, "If I talk to R&D or production, they know I understand what I'm talking about. That makes it easier to move things forward". Mutual technical fluency enables informal, trust-based collaborations for CE at the front line.

Collectively, the analysis reveals role identity as a temporal, relational construct, developed through long-term operational embeddedness, enacted through practical expertise, and sustained through trust-based influence. FMs did not perceive themselves as "entrepreneurs" but rather as competent professionals whose credibility enabled situated entrepreneurial action within their work contexts.

4.4 Role enactment

Role enactment reflects how FMs in high-tech manufacturing live CE through continuous, context-responsive activities embedded in everyday work. Rather than being a discrete initiative, CE unfolds recursively through repeated practices that adapt to emergent challenges within their operational environments.

Opportunity identification at the front line was rooted in a problem-solving orientation, in which daily inefficiencies, bottlenecks or sudden client demands served as entrepreneurial triggers. FM01 explained: "Problem-solving is a big part of what I do. I see it as an opportunity", highlighting how operational frictions functioned as cues for opportunity recognition.

This recognition was not a one-off event; it accumulated through repeated exposure across projects, reflecting a cumulative experiential process. As FM15 noted, "They're the ones who notice when things aren't progressing or when new technologies need to be explored". Similarly, FM10 stressed the role of ongoing interactions: "You have to ask what's going on, what's new, and what's happening in the market. You often get enough prompts from these conversations". These accounts show that opportunity identification was dynamic, relational and embedded in everyday interaction, rather than an isolated act of ideation.

Importantly, recognition and enactment were tightly coupled. FM09 stated, "The whole process wouldn't even start without me", while FM02 reinforced, "Innovation starts at the front". Together, these reflections illustrate frontline agency, in which proximity to customers and operations enabled the immediate translation of recognition into action, consistent with situated and relational views of entrepreneurial work.

Upon identifying opportunities, FMs engaged in *boundary-spanning*, moving ideas across departmental, functional or hierarchical lines. These efforts were largely informal and relational, leveraging the FM's embedded position between the frontline and internal technical teams. FM12 stated, "Ultimately, the frontline manager connects the customer with the rest of the organisation". FM13 echoed: "I'm the bridge between the frontline

outside and the colleagues in development within the company". This boundary work highlights that CE is not confined to functional silos but facilitated by lateral relational networks.

As knowledge brokers, the FMs are closely linked to boundary-spanning activities. FMs routinely translated across knowledge domains by interpreting customer needs for technical teams, simplifying specifications for internal stakeholders and informing production discussions with market insight. FM11 noted, "A salesperson is essentially a kind of translator. Production speaks its own language, and the customer . . . theirs. It is your job to bridge that gap". FM09 added, "Sometimes, technical concepts need to be simplified so internal teams can understand them". This highlights entrepreneurial work as a continuous process of knowledge translation rather than just opportunity recognition.

Finally, *implementation navigation* marked the culmination of CE at the front line. Participants stressed that entrepreneurial engagement extended beyond idea generation to operational realisation. FM15 explained, "I'm completely responsible for making sure the product works". FM16 noted, "We are also heavily involved in the implementation . . . from the early phase to the completion". These statements demonstrate how FMs integrate CE into their daily operational activities.

Across all four practices, opportunity identification, spanning, brokering and implementation role enactment emerged as a recursive, situated practice. Entrepreneurial work developed incrementally, adapting to triggers, constraints and feedback. This fluidity allowed FMs to sustain momentum even without formal support structures, positioning them as dynamic agents navigating a complex organisational context.

4.5 Role negotiation

Role negotiation highlights how FMs pursue CE within the tension between limited authority and spaces of discretion. Their entrepreneurial autonomy is continually renegotiated, shaped by decision boundaries and operational constraints.

Decision boundaries shape the extent of entrepreneurial engagement. A key feature of role negotiation is the division of authority. FMs surface opportunities and contribute operational insights; however, final decisions on resource allocation and strategy remain with upper management. FM01 stated, "We are brought in to provide our input, but the final decision rests with middle management". This reflects top-down decisions: frontline CE depends on higher-level endorsement.

Yet, FMs are not passive actors. Several participants noted that frontline proposals often catalyse formal deliberation. FM13 remarked, "Depending on the scale of the investment, higher-level management decisions are required for larger investments". This suggests that FMs' embedded knowledge and operational insights position them as key informants capable of triggering organisational action.

The extent of this influence hinges on the quality and specificity of information FMs provide. FM03 stated, "Without certain information, I believe some decisions would be different than if I had not provided customer insights". This illustrates that FMs influence decisions through indispensable contextual intelligence, rather than positional authority.

The organisation's own structures continually slowed entrepreneurial efforts at the front line. FM13 described how even a minor modification "needed to go through three stages before its allowed", showing how formal procedures and approvals served as everyday barriers. Resource scarcity reinforced these limits. FM15 explained that when budgets were absent, there was "no time during work hours to push solutions forward", meaning innovation was displaced by immediate delivery. Quality regimes added further weight, with FM07 recalling how "checks and documentation steps" regularly stalled momentum. Together, these accounts illustrate that CE was not blocked outright but constrained by layered organisational routines, making entrepreneurial action a matter of navigating processes and timing initiatives rather than freely pursuing ideas.

Thus, timing and procedural navigation emerge as critical dimensions of role negotiation, showing that frontline CE is less about formal empowerment than about tactically working the system. Across interviews, these role-related patterns covering role expectations, role identity, role enactment and role negotiation were described consistently by FMs from different firms and functional backgrounds, indicating stable empirical findings rather than isolated accounts.

5. Discussion

This study examined how FMs in high-tech manufacturing perceive and enact their roles in CE, and how their daily practices contribute to innovation outcomes. It was found that real-time customer and market demand are triggers of CE, with responses reflected through shifting role expectations, identity, enactment and negotiation. This suggests that CE is not only shaped by organisational structures and higher-level managerial direction (Urbano *et al.*, 2022), but is also enacted through the everyday practices of FMs who lack a formal entrepreneurial mandate. Interpreted through ORT, these findings position FMs as situated, discretionary actors whose entrepreneurial agency is affected by local sensemaking, structural constraint and relational context rather than by top-down strategic direction alone. For management practice, this means that firms need to recognise CE at the front line as both the responsibility of senior and middle managers, and as a role-based process that requires organisational support within everyday operational work.

5.1 High-tech industry environment: external activation of CE

In high-tech contexts, FMs engage in CE by responding to real-time customer demands rather than top-down directives. This responsiveness is integral to their role, with innovation driven by client needs and external triggers. FMs identify opportunities through direct interactions and practical judgment, highlighting opportunity recognition as an operationally embedded process, supported by continuous informal sensing. Accounting for context addresses the call of Girma Aragaw *et al.* (2025), the findings extend prior research that emphasises the importance of decentralisation (Colombari and Neirotti, 2024). More specifically, the role enactment of FMs corresponds to Soto-Simeone and Biniari's (2024) work on how external factors trigger CE actions. The current study underscores that real-time opportunity identification is a key entrepreneurial trigger in high-tech contexts, influenced by customer immediacy and tacit cue recognition, with FMs' activities driven by market demands and executed through embedded practices.

5.2 Role expectations

The expectations for the CE role among FMs are shaped by factors such as managerial support, autonomy and time constraints. The existing literature on CE considers autonomy a formal requirement (Urbano *et al.*, 2022); however, the findings suggest that FMs tend to view and utilise autonomy as a situational necessity. This means they respond to immediate technical and customer demands rather than relying solely on formally designated authority. This finding aligns with ORT's conception of role expectations shaped by environmental factors or a fixed organisational position (Clement *et al.*, 2022), and resonates with Zimmermann *et al.*'s (2018) findings regarding goal and supervision autonomy as FMs configure their practices in context. Managerial support emerged as conditional, provided only when it did not jeopardise core operations. This is consistent with Burcharth *et al.* (2017), who observed that frontline support is often bounded by operational priorities. FMs exercised entrepreneurial judgment with limited discretion, orienting role expectations around immediate customer and operational demands rather than formal empowerment. These patterns suggest that FM role expectations are shaped by internal organisational arrangements and also actively negotiated at the boundary between internal structures and external market dynamism – a process ORT conceptualises as role-making rather than role-taking (Anglin *et al.*, 2022). For CE, ORT's

explanatory reach illuminates contexts in which formal structures may lag behind the pace of operational demands. In practice, this suggests that firms should not rely solely on formal autonomy, but should actively clarify role expectations, create dedicated time for innovation-related activities and ensure managerial support extends beyond rhetorical encouragement to operational enablement.

5.3 Role identity: technical expertise as the basis for entrepreneurial agency

Role identity among FMs is shaped by internal self-construction based on technical expertise, cumulative experience and situated problem-solving. Rather than drawing on formal authority, FMs gained entrepreneurial credibility through their technical know-how by using product knowledge and engineering expertise to propose and implement innovations that others lacked the standing to advance. Their identities evolved iteratively through personal competence and situated learning, and repeated responsiveness practices, consistent with ORT's perspective of role identity theory as continuously verified through role performance (Anglin *et al.*, 2022). Participants viewed innovation as a natural extension of their skills, emphasising the importance of expertise in entrepreneurship. In high-tech contexts, where technical credibility carries particular weight in the industry, entrepreneurial agency emerges from accumulated expertise, rather than positional authority. These findings extend Soto-Simeone and Biniari (2024) work on the identity-related aspects of CE role enactment, demonstrating that for FMs, identity and agency are mutually constituted through technical practice. Thus, firms should recognise the value of expertise-based credibility as a legitimate foundation for frontline entrepreneurial contribution and create conditions that enable it to be developed and mobilised.

5.4 Role enactment

The initiator–integrator–realiser pattern forms the core of role enactment within the broader dimensions of ORT. This integrative model demonstrates that FMs enact CE not through formal roles but through dynamic practices that cross boundaries and translate ideas into action. FMs exhibit three recurring role patterns: as initiators, they identify inefficiencies and customer needs to drive innovation without formal directives; as integrators, they bridge functional areas, assess feasibility and recombine knowledge; and as realisers, they embed innovation into workflows. Real-time demands and technical expertise influence these roles. They extend Floyd and Lane's (2000) behavioural framework by repositioning entrepreneurial action at the front line, and by reinterpreting role behaviour as overlapping enactments shaped by structure, agency and real-time technical demands, consistent with Ellis *et al.*'s (2025) findings on middle managers' legitimisation. FM entrepreneurial role enactment evolves iteratively through personal resources and operational pressures rather than being specified by formal organisational design. This challenges prevailing assumptions of FMs functioning primarily as implementers of higher-level entrepreneurial intent (Kuratko *et al.*, 2014) by demonstrating that innovation develops bottom-up through customer-near, technically embedded frontline practice. The CE literature risks underestimating this dynamic if FMs remain conceptualised as executors rather than entrepreneurial contributors. In practice, firms should create structured channels that enable FMs to identify opportunities, translate customer knowledge across functions and contribute to implementation beyond their formal operational tasks.

5.5 Role negotiation: sustaining entrepreneurial action within constraints

FMs' role negotiation depended on ongoing discussions and alignment positioning, rather than formal empowerment. Operating within bounded discretion, FMs navigated hierarchically by coordinating proposals with organisational priorities, leveraging trust, negotiating and timing initiatives. Their influence stemmed from informational advantage, established relationships

and tactical communication. This reflects ORT's conceptualisation of negotiation as a continuous, situational process (Anglin *et al.*, 2022) shaped by organisational constraints and relational context (Clement *et al.*, 2022). Procedural frictions – such as multistage approvals, budget limits and operational overload – were seen as normal organisational conditions rather than exceptional barriers, with FMs developing tactical awareness to integrate innovation within existing operational flows without compromising delivery responsibilities. Critically, this negotiation occurred in the absence of a formally sanctioned process, with FMs advancing CE through a discretionary action rather than an explicit mandate – a pattern ORT regards as role-making under constraint rather than role-taking within prescribed boundaries (Anglin *et al.*, 2022). For the CE literature, this extends understanding of how entrepreneurial action is sustained at the front line through relational and tactical agency rather than structural authorisation. For practice, supporting frontline CE requires enabling discretionary space and negotiation capacity, reducing unnecessary procedural barriers and creating workable conditions for FMs to advance ideas without undermining their core responsibilities.

These findings address a gap in CE research by explaining how entrepreneurial activity is enacted at the operational front line through role expectations, identity, enactment and negotiation under conditions of technological complexity and time pressure. Extant CE research has predominantly examined entrepreneurship at the firm level or through senior and middle managers; this study demonstrates how entrepreneurial action emerges from situated role work by FM in high-tech manufacturing contexts.

6. Contribution

This study addressed the research question of how FMs perceive and enact their roles in initiating, integrating and realising CE activities. In doing so, the study contributes to the CE literature in three ways: (1) by establishing FM as theoretically consequential at the operational level, clarifying their distinctive boundary position and extending the field's focus beyond senior and middle managers; (2) by extending ORT to offer a more experiential account of FMs' multidimensional role enactment, attending to how role identity, expectations and negotiation are interpreted and sometimes contested within structurally constrained contexts and (3) by offering practical insights for organisations and managers seeking to leverage FMs' entrepreneurial potential, specifically through legitimising FM roles, reducing structural ambiguity and designing conditions that enable rather than constrain operational-level CE. Thus, the integrative framework outlined in Figure 2 depicts how FMs enact entrepreneurship and deepens understanding of CE as a situated phenomenon in a high-tech context.

The integrative framework shown in Figure 2 reinterprets Kuratko *et al.*'s (2014) pragmatic framework through the lens of ORT to address the gap in understanding how FMs perceive and enact their entrepreneurial role in dynamic high-tech contexts. The first contribution demonstrates that FMs are theoretically consequential actors, not merely task executors of higher-level entrepreneurial intent (Soltanifar *et al.*, 2023), actively contributing to innovation within the operational core as technical specialists. The findings revealed that organisational structures alone are insufficient to explain CE activities in a dynamic high-tech context. They identify opportunities under immediate customer and market pressure, integrate and translate knowledge across organisational boundaries, and support where external market dynamism directly shapes FMs' role execution. The framework extends CE research by showing that entrepreneurial action in high-tech firms emerges from the operational core through customer-near, technically grounded frontline practice.

The study's second contribution is extending ORT. As shown in Figure 2, it provides a nuanced understanding of FMs' role enactment as multidimensional, through role identity, role expectations, role enactment and role negotiation, characterised by structural ambiguity in the absence of a formal mandate. This reconceptualises CE enactment as a process of role crafting. The findings show that FMs' role is grounded technical expertise and experiential

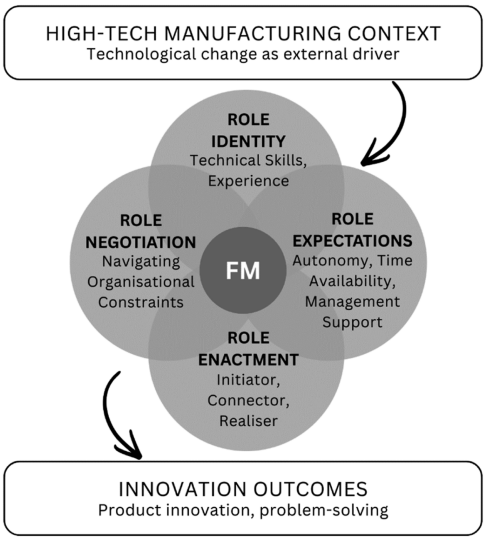

Figure 2. Integrated framework of FMs' role in CE in high-tech. Source: Authors' own work

credibility, rather than positional authority, enabling FMs to legitimise solutions and earn customer trust through demonstrated competence. Role expectations are shaped by organisational norms such as autonomy, relative time availability and management support, as well as by external market and technological pressures from client urgency and product instability, extending ORT beyond conventional studies to internally structured role contexts (Anglin *et al.*, 2022). This study's novel contribution lies in FMs' role enactment as initiator–connector–realiser to translate entrepreneurial opportunities into action across organisational boundaries. Role negotiation captures how FMs create a liminal workspace for entrepreneurial action by navigating organisational constraints and external demands, anchored in their technical credibility, expertise and relational capital, rather than formal authority, regarded as role-making under constraint within prescribed boundaries.

Third, the study offers practical implications for organisations seeking to foster innovation-driven CE at the operational level. The findings show that FMs are often the first to identify market-relevant problems, translate customer knowledge internally and advance innovation under operational constraints, yet remain structurally under-supported. Organisations should recognise FMs as operational innovators by establishing systematic channels through which their insights from customer interactions and operational bottlenecks are systematically captured and incorporated into R&D and strategic decision-making. Senior and middle managers should reduce bureaucratic barriers by decentralising decision-making, creating discretionary space for FMs to pursue bottom-up initiatives without compromising operational responsibilities. Finally, organisations should strengthen FMs' entrepreneurial capacity through targeted professional development in boundary-spanning and negotiation skills, enabling FMs to navigate internal hierarchies and translate customer needs into technically grounded innovation. By providing discretionary space and practical negotiation tools, organisations can better enable FMs to advance ideas and strengthen CE capabilities through everyday CE practices.

7. Limitations and future research

This study enhances understanding of how FMs enact CE in high-tech manufacturing, but has limitations that suggest areas for future research. First, it relies solely on FM perspectives,

neglecting insights from middle and senior managers, whose support influences entrepreneurial agency. Multi-level studies could incorporate these viewpoints, providing a more relational understanding of CE as a distributed and negotiated process.

The cross-sectional design in this study captures a static view of entrepreneurial role enactment, despite the dynamic nature of entrepreneurial behaviour. Longitudinal and process-based research designs could reveal how frontline employee agency evolves in response to organisational changes, customer demands and technological shifts, providing insights into role development that are currently lacking in the literature.

Additionally, while the interviews conducted in German high-tech manufacturing allow for deep contextual analysis, they limit generalisability. Comparative research across various sectors (e.g. aerospace, healthcare technology, digital services) and cultural contexts could identify the influences shaping perceptions and enactment of entrepreneurial roles.

Finally, the analytical process employed in this study is replicable and transparently documented, while the empirical insights are context dependent. Future research may apply the same process in other settings to enable systematic, theoretically informed comparisons across organisational, industrial and national contexts. Addressing these limitations would enhance CE theory and refine ORT, offering a more comprehensive, context-sensitive view of entrepreneurial behaviour in practice.

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