

# University spin-offs following acquisitions: the expanding resource-capability chasm

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## Abstract

**Purpose** – University spin-offs (USOs) play a crucial role in commercializing research findings. However, their commercialization journey often does not involve going it alone; instead, USOs commercialize through acquisitions. This paper explores the impact of acquisitions on USOs. It examines how these transactions influence their resources and capabilities, resulting from stakeholders' attitudinal expectations toward USOs.

**Design/methodology/approach** – The paper theorizes that acquisition creates a resource-capability chasm in USOs, driven by the expectations of ecosystem stakeholders. To illustrate this concept, it presents three interview-based case studies on international acquisitions of USOs specializing in artificial intelligence solutions. The pre- and post-acquisition resources and capabilities of the USOs are analyzed and compared across the cases.

**Findings** – The paper demonstrates how the resource-capability chasm spans multiple categories – managerial, invention, ecosystem and financial – highlighting the interdependencies between USOs and their ecosystems, both academic and business, in addressing and bridging these gaps.

**Originality/value** – The literature on the acquisitions of USOs is surprisingly limited. This paper offers a unique perspective on the acquisition of USOs by examining how these firms' resources and capabilities are impacted by the acquisition and how the surrounding ecosystem responds. It contributes to existing research by introducing and theorizing the concept of a resource-capability chasm in USOs, thereby deepening the understanding of the acquisition process and providing insights into strategies for effectively managing such acquisitions.

**Keywords** Acquisition, Chasm, Resource-capability, University spin-off

**Paper type** Research paper

## Introduction

In their pursuit of commercializing research findings, university spin-offs (USOs) frequently rely on acquisitions (Öberg, 2016), defined as the transfer of ownership control (Gomes *et al.*, 2020). USOs often face deficiencies in financial, managerial, and ecosystem-related resources and capabilities (Guckenbiehl *et al.*, 2021), necessitating external support. Acquisitions may not only provide these resources and capabilities but also facilitate the transition from the university ecosystem to the business ecosystem (Laage-Hellman *et al.*, 2020; La Rocca *et al.*, 2016), introducing new stakeholders. However, as theorized in this paper, these stakeholders—including the new owners—may not view acquisitions primarily as a mode of commercialization. Their expectations of the USO influence behaviors related to resource and capability provision, introducing stakeholder rationales into the discussion of USO resources and capabilities. While past research on USOs and their relationship to ecosystems has rarely addressed stakeholder expectations, this perspective helps explain USOs' post-acquisition resources and capabilities.

By focusing on USOs' resource and capability deficiencies intertwined with their transition from the university to the business ecosystem, this paper aims to *explore the impact of acquisitions on USOs. It examines how these transactions influence their resources and*



*capabilities, resulting from stakeholders' attitudinal expectations towards USOs.* The paper thereby links USOs' lack of resources and capabilities with stakeholder expectations in the university and business ecosystems (Öberg and Shih, 2014). The following research questions are addressed: How does being acquired affect USOs' resources and capabilities? How do university and business ecosystem stakeholders affect resulting resources and capabilities?

The paper reveals how acquisitions lead to a transformation of USOs' resources and capabilities. Contrary to assumptions, it demonstrates how these transactions create gaps between USOs' resources and capabilities, introducing what is posited as a *resource-capability chasm*. This chasm is linked to the attitudinal expectations of stakeholders across ecosystems.

USOs are recognized as critical drivers of societal innovation and economic growth (Mathisen and Rasmussen, 2019), yet their success is often questioned. Acquisitions have become a prevalent commercialization strategy (Öberg, 2016), enabling USOs to assumably access necessary resources and capabilities while providing acquirers with high-end solutions with return-on-investment potential. However, despite the prevalence of such acquisitions, research on this topic remains scarce. Existing acquisition literature predominantly focuses on acquirers rather than acquired firms (Öberg, 2022; Xiao and Dahlstrand, 2023), and does not specifically focus on USOs. Combined, this creates the practical motivations and research gap of this paper.

The paper contributes to prior research in the following ways: (1) It provides a novel perspective on acquisitions by focusing on USOs as a distinct type of acquired entity. Unlike past studies that predominantly adopt the acquirer's perspective and often group USOs with other invention-intensive firms (Bruegger and Capron, 2021; Cefis et al., 2020), this paper highlights the unique attributes of USOs, including their ties to universities and the differing priorities and competencies of their founders (Modina et al., 2023). (2) It extends the focus of past research on invention-intensive firms beyond technological and invention resources to include managerial, financial and ecosystem-related resources and capabilities of USOs. (3) By introducing and theorizing the resource-capability chasm, the paper underscores the critical roles of ecosystems surrounding USOs. It argues that ecosystem dependencies are not solely contingent on resources and capabilities but are shaped by past experiences, future aspirations, and the perception of USOs as resource bases. This reframes the concept of resources across stages (Vohora et al., 2004), particularly in the context of acquisitions and ecosystem integration (Angrisani et al., 2023), while emphasizing that post-acquisition resources and capabilities are linked to stakeholders' rationales.

The rest of the paper is structured as follows: Following this introduction, the theoretical background and framing are presented, departing from past research on acquisitions of invention-intensive firms and USOs to define the gap. The concept of the resource-capability chasm is introduced, with a focus on resources and capabilities in prior studies. The research design is then detailed, describing data collection and analysis across three case studies. These cases are analyzed in the context of resources, capabilities, and the resource-capability chasm, with a discussion of stakeholder expectations. The paper concludes with practical and theoretical contributions and directions for future research.

## Theoretical background

As indicated in the introduction, past research on acquisitions of invention-intensive firms has not singled out USOs, while typically approaching acquisitions from the acquirer's perspective. Meanwhile, USO research has emphasized the firms' lacking resources and capabilities. This section dips deeper into such past research to explain the research gap, before discussing resources and capabilities and introducing the notion of a chasm between these.

### *USOs' resources and capabilities*

While USOs are founded to commercialize research findings (Modina et al., 2023), researchers have repeatedly highlighted their lack of financial, managerial, and ecosystem-connecting

resources and capabilities, despite their strong foundation in invention and technological expertise (Guckenbiehl *et al.*, 2021; Evertsen and Rasmussen, 2023). Resources refer to the assets a firm possesses or has access to, forming the basis of its operations, while capabilities encompass the firm's ability to effectively utilize these resources (Pereira and Bamel, 2021).

There indeed seems to be consensus in past research on USOs that their capabilities are foremost oriented at inventions, whereas the university and research financiers provide them with invention-related resources to boost these capabilities. While connections with universities may be vital for USOs to remain invention-intensive through the provision of these resources (Bolzani *et al.*, 2021), the link to research can sometimes be a burden (Ferreira *et al.*, 2022) from a business ecosystem standpoint (Clarysse *et al.*, 2014; Messina *et al.*, 2022). The university ecosystem can inadvertently detract attention from accumulating other necessary resources and capabilities, as research connections often take precedence over business connections (Houweling and Wolff, 2020) and as USO owners, who are typically researchers, may have priorities and competencies that differ from those needed for effective business management. A general gap in management capabilities becomes evident when these researchers do not take on leadership roles within their USOs (Lejpras, 2014), while their focus on research often keeps them tethered to the university ecosystem (cf. Angrisani *et al.*, 2023) rather than on market outreach.

Establishing strong connections within the business ecosystem is crucial for USOs to achieve success (Evertsen and Rasmussen, 2023). Walter *et al.* (2006) provided evidence that the ability to connect with business partners positively influences USO performance. Similarly, Huynh *et al.* (2017) highlighted how network capabilities—akin to business ecosystem capabilities—are beneficial for USO development. The lack of business ecosystem contacts and of capabilities to establish such connections also hinder the further financing through commercialization of the USOs. Financial resources are thereby frequently scarce due to a lack of customers and, consequently, limited income (Kulkov *et al.*, 2020). Furthermore, venture capital firms may be hesitant to enter into business ecosystems, causing USOs to focus more on securing research financing than on marketing their inventions (Yang and Zhu, 2022).

The USO research frequently describes these four types of resources and capabilities: the invention, management, financial and business ecosystem/customer-connected resources and capabilities, where the USO's lacking experience from and orientation to the business life, makes it scant on resources and capabilities related to management, finances and business ecosystem contacts, including customer connections. Meanwhile, the interplay between resources and capabilities in USOs suggests a mutual dependency: when one is present, the other tends to follow. However, significant gaps remain in areas critical to business success, particularly in the commercialization and business ecosystem domains.

#### *Acquisitions of invention-intensive firms*

In the literature on acquisitions of invention-intensive firms, while not particularly studying USOs, the emphasis is primarily on how integration can erode the invention capabilities of the invention-intensive, acquired firm and how acquirers often struggle to effectively leverage the capabilities and pre-existing inventions of these firms (Bingham *et al.*, 2024). Research has predominantly focused on cultural differences to explain these problems and adopted the acquirer's perspective (Aghasi *et al.*, 2024). Factors such as strategic fit, social proximity, and knowledge overlap are suggested to be critical (Wu *et al.*, 2023). Integration is approached with caution in such acquisitions. However, studies indicate that even when the acquired firm is allowed to operate autonomously, few new inventions are generated within it (Greven *et al.*, 2023), highlighting how cultural differences and the loss of inventors can impact outcomes irrespective of the degree of integration (Xiao and Dahlstrand, 2023; Aghasi *et al.*, 2022).

While acquisition research predominantly focuses on the benefits or losses incurred by the acquiring firm, a knowledge gap exists regarding the perspective of the acquired firm—specifically, how their resources and capabilities, including those of USOs, are impacted.

Moreover, much of the existing research emphasizes the invention capabilities and resources of firms, while other critical but often lacking resources and capabilities—financial, managerial, and ecosystem-connecting resources and capabilities—remain underexplored. These challenges, particularly relevant to USOs, are seldom problematized or even considered in the context of acquisitions. Additionally, USOs are rarely distinguished from other invention-intensive firms in the literature.

From a resource and capability perspective, acquisitions may be perceived by USOs as an attractive mode of commercialization (Öberg, 2016). Acquirers have the potential to address USOs' resource and capability gaps, including their financial constraints, limited managerial expertise, and lack of connections within the broader business ecosystem. Acquisitions thus offer USOs an opportunity to access financial resources, managerial resources and expertise, and establish business ecosystem connections, including access to customers.

Research has compared the survival rates of acquired start-ups—representing a broader category than just USOs—with their non-acquired counterparts, consistently finding higher survival rates among acquired firms. However, what such survival entails in terms of the resources and capabilities of USOs remains unexplored and warrants further investigation.

With past research focusing on invention-intensive firms without considering USOs specifically, the role of the university ecosystem related to invention resources and capabilities and owners' lack of management resources and capabilities are disregarded. Furthermore, the focus on integration and culture ignores also the broader resource and capability discussion repeatedly emphasized in USO research (Guckenbiehl *et al.*, 2021; Evertsen and Rasmussen, 2023). As Modina *et al.* (2023) conclude, USOs are less successful than invention-intensive firms, indicating that acquisitions involving USOs may face additional difficulties beyond those outlined in research on invention-intensive firms.

#### *The resource-capability chasm*

The empirics of this paper indicate what is theorized as a *resource-capability chasm* that emerges following the commercialization of USOs through acquisition. The chasm represents a misalignment where firms may possess more resources than they can effectively leverage, or where their capabilities may outpace their available resources. As proposed based on the data, this chasm arises from stakeholders' past experiences, future aspirations, and the conceptualization of USOs as a resource base. It thereby highlights the conflicting objectives of ecosystem stakeholders (Öberg and Shih, 2014) within and across the university and business ecosystems, and their links to resources and capabilities.

The notion of a chasm broadens existing perspectives on acquisitions of invention-intensive firms by specifically focusing on USOs and integrating insights from research on USO resources and capabilities. The resource-capability chasm challenges past notions of alignment between resources and capabilities in USOs (Evertsen and Rasmussen, 2023), which imply a degree of symmetry between resource access and the ability to utilize those resources (Kakati, 2003).

While the concept of a resource-capability chasm is new, McKelvie and Davidsson (2009) offer a rare portrayal of a related issue, though they do not frame it as a chasm. Their work examined the relationship between a new firm's resource base and its development of dynamic capabilities, focusing primarily on knowledge-related (i.e. invention) resources and capabilities, such as founders' and employees' human capital, technological expertise, and domain-specific knowledge. They found this relationship to be inconclusive, suggesting that financial resources and employees' human capital may, in fact, hinder the development of capabilities. Their study offers two critical insights supporting the notion of a resource-capability chasm: resources can serve as indicators of capabilities, yet the mere presence of resources does not ensure the existence or effective utilization of corresponding capabilities.

Adding to this, while also moving beyond invention resources and capabilities, it is essential to distinguish between ownership control, resource accessibility, and capabilities. Firms employ various business transactions, relational arrangements, and ownership transfers to align their resources with their capabilities, effectively bridging chasms. Such bridging strategies include divesting, sharing resources, or leveraging the capabilities of external partners, including acquisitions. While accessibility may provide short-term use of a resource, firms can risk losing control over that resource or its future development. Additionally, accessibility connects to another type of capability: beyond simply utilizing resources, firms may possess the ability to attract external partners and ecosystems, integrating external resources and capabilities into their operations.

Therefore, capabilities encompass not only the aptitude to perform tasks and utilize resources but also the ability to connect with others, adapt to changing conditions, and reinvigorate the organization. In the context of USOs, it is particularly important to emphasize not only adaptability but also the ability to rejuvenate. [Ambrosini et al. \(2009\)](#) distinguished between incremental dynamic capabilities and transformative dynamic capabilities. The latter refers to a firm's ability to revitalize its existing capabilities, offering a pathway for profound organizational change and the ability to shape markets.

When additionally considering various types of resources and capabilities—financial, inventive, managerial, and business ecosystem-connected—as often discussed in relation to USOs and their present and lacking elements ([Angrisani et al., 2023](#); [Evertsen and Rasmussen, 2023](#)), the picture becomes increasingly intricate. Firms often possess resources or capabilities of one type while lacking others. As USOs develop, they progress through stages that would require new resources and corresponding capabilities ([Gruber et al., 2010](#)). However, they may possess resources without the capabilities needed to utilize them effectively, or vice versa.

This complexity highlights that USOs may encounter chasms specific to each type of resource and capability. Moreover, the absence of capabilities related to attracting external partners can hinder the bridging of these resource gaps—whether financial, invention, ecosystem-connected, or managerial.

#### *Acquisitions, the resource-capability chasm and expectations – towards an analytical framework*

While research has extensively explored questions related to resources and capabilities, less attention has been paid to the chasm between them and as is the focus in this paper: how bridging for new resources and capabilities may controversially create chasms between resources and capabilities. This paper seeks to address this gap by introducing the reciprocal nature of resources and capabilities, while emphasizing that firms depend on their ecosystems for resources and capabilities they lack internally. The paper focuses on the specific scenario of USOs as acquisition targets, underscoring the pivotal role of university and business ecosystems encompassing USOs, while highlighting that dependencies are not solely rooted in resources or capabilities. Rather, as revealed through the empirics of the paper, they are intricately intertwined with past experiences and future aspirations, underscoring the significance of attitudinal expectations (cf. [Vohora et al., 2004](#)).

Expectations encompass assumptions made by others and introduce an element of uncertainty, influencing others' decisions regarding resource and capability bridging. They dictate not only assumptions about the functionality of various resources and capabilities but also guide activities such as business exchanges, alliances, and acquisitions. They are intertwined with priorities and goals ([Öberg and Shih, 2014](#)), expressed as rationales, while connecting them to the role of others. The expectations held by ecosystem stakeholders may influence their willingness to contribute, giving rise to a multifaceted discussion involving resources, capabilities, and expectations in the acquisition of USOs—and how these elements intersect and impact one another.

Relatedly, past research has described decisions related to resources along the development of USOs (cf. [Vohora et al., 2004](#)). Focusing specifically on researchers, [Donatiello and](#)

Gherardini (2019) described how their motivations for establishing USOs may extend beyond commercialization, including the facilitation or researcher recruitment and the reduced need for public transparency. Hesse and Sternberg (2017) linked researchers' willingness to USO growth. Beyond researchers as founders, Magomedova *et al.* (2023) explored the rationales of university venture capitalists, while François and Philippart (2019) discussed legitimacy, indirectly acknowledging the roles of other stakeholders' attitudes toward USOs. Moreover, Öberg and Shih (2014) illustrated how USOs, policymakers, users, and manufacturers operate with different priorities and goals that affect resources allocation and time constraints.

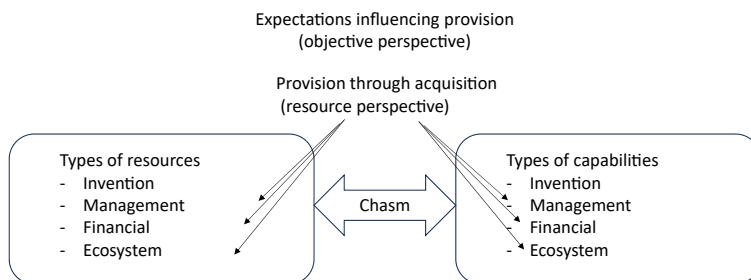
While such research importantly introduces how parties' rationales—not just the resources and capabilities they possess—affect USOs, it has not yet connected these questions to acquisitions or described chasms between resources and capabilities as outcomes of attitudinal expectations and decisions. The integrated perspective put forth in this present paper thereby expands the comprehension of the consequences of acquisitions for USOs, extending beyond the mere potential reduction of invention capabilities as seen in past research on acquisitions of invention-intensive firms. Figure 1 provides a summary of this paper's key components based on past research.

### Research design

The empirical portion of this paper employs a case study methodology. While case studies may lack generalizability, they excel as research designs for establishing explanations of connections between elements and providing a foundation for further testing of findings (Yin, 1994). This methodology is particularly well-suited to an explorative research purpose, as it enables the development of knowledge where gaps have been identified and allows for the contextualization of phenomena.

Three acquisitions of USOs were examined based on the following criteria: originating from research findings, focusing on cutting-edge technology (with artificial intelligence, AI, chosen as the empirical selection criterion to capture such technology), and having undergone acquisition. All three USOs specialized in pioneering AI solutions related to sensor technology and were acquired by international corporations. The use of multiple cases allows for a comparison of findings and facilitates the exploration of differences among them (Eisenhardt, 1991).

The first case involves a Swedish USO specializing in digital-image analysis. This USO was dedicated to developing advanced software solutions based on sensor technology, with a particular focus on an electronic eye application for image interpretation. The acquiring company was an international corporation, primarily operating in the defense sector. Its product portfolio encompassed a diverse range of offerings at the time, including vehicle



**Figure 1.** Chasms among capabilities and resources. Note(s): Chasms may exist between different types of resources and capabilities, including invention, management, financial, and ecosystem. These various types influence one another, with ecosystem capabilities potentially addressing other resource deficiencies. Additionally, the figure illustrates how expectations, shaped by past experiences and future objectives, impact the provision of lacking resources and capabilities. Source: Author's own work

production, civil aircraft, and various IT solutions, into which the USO's AI solutions were thought to fit as means to read surveillance pictures and foreign-country territory images. The acquiring company viewed the USO's technology, particularly its image interpretation application, as intriguing for integration into defense solutions.

The second case revolves around the acquisition of a German USO by a Swedish firm. Both companies had emerged from research findings in sensor technology, with a specific focus on technology for scent differentiation and the development of an electronic nose, where the anticipated application of the sensor technology differed between the firms. The acquisition led to a refocus of the acquirer's operations to align with the acquired firm, while not extensively providing any resources or capabilities. Notably, this case stands out from the other two as it involves a USO also as acquirer. However, as will be shown later, it leads to similarly broadened chasms.

The third case revolves around a German car manufacturer's acquisition of a Swedish USO specializing in anti-spin control software. The USO had initially developed this software and had prior connections with the domestic automotive industry, which guided its research toward this sector. The acquisition was driven by the acquirer's interest in obtaining the USO's invention and its capabilities for future inventions, as well as generating revenue from other car manufacturers, while it, from the USO point of view, would secure the firm's long-term development.

The cases thereby demonstrate variations in the following aspects: (1) *Relatedness* between the acquirer and the USO's sectoral affiliation. In the third case, there is an overlap, whereas the other two cases involve USOs with uncertain industrial affiliations. (2) *Technological preunderstanding*, with the second case displaying the most comprehensive pre-understanding of the USO's technology. (3) *Maturity of the USO*, exemplified in the third case by a USO with prior business ecosystem connections. (4) *Size*, with the second case featuring a small acquirer, while the other cases involve large multinational firms. Additionally, there were differences in terms of the very *transaction* and past owners' potential *shared post-acquisition ownership*. Case I demonstrates a complete takeover; Case II the exchange of shares and thereby the acquired firm's continuous ownership of the combined organization; and Case III a retained minority ownership by the founders. The various differences help ensuring that identified similarities are not solely a result of shared contexts or other case resemblances (Eisenhardt and Graebner, 2007), however within the realm of transferability of findings rather than generalizability (Guba and Lincoln, 1989).

#### *Data collection*

Semi-structured, open-ended interviews constituted the primary data source and were supplemented with secondary data, including newspaper articles, press releases, annual reports, and internal documents from the USOs and other organizations involved in the cases. Interviewees represented USOs, the acquiring companies, and stakeholder entities collaborating with the USOs in research and commercialization efforts. Interviewees held roles such as founders, CEOs, investment managers, sales, marketing and procurement managers or directors, and consultants from support organizations and universities. Selection of interviewees was based on their representation of the USOs or their direct interaction with USO representatives. Given the relatively small size of the USOs, constraints in the number of interviews affected data collection. A total of 20 interviews were conducted. The interview questions covered a broad range of topics, including but not limited to: the USO's founding, the research idea that led to its formation and its developmental process, contributions from stakeholders, details of the acquisition (timing, method, and rationale), the USO's motivations for the acquisition, how they were approached, the roles, resources, and capabilities of both the USO and the acquirer, and how the USO was perceived by its representatives and external parties.

Secondary data sources served to provide supplementary information, construct timelines of events related to issues discussed during interviews, and capture contemporaneous

perspectives as reported at the time of occurrence (Huber and Power, 1985). Official documents and press releases were sourced from various databases to ensure comprehensive coverage, resulting in a systematic overview comprising approximately 300 items. Table 1 summarizes the data sources.

### Data analysis

In the data analysis procedure, notes from interviews or interview transcripts in, conjunction with secondary data, underwent several cycles of coding. The coding process facilitated the transition from empirical codes to theoretical conceptualization and theorization as first-order concepts, second-order themes and aggregate dimensions (see Figure 2, cf. Gioia et al., 2013). Throughout the analysis, data sources were separated based on the interviewees' perspectives, distinguishing whether they represented the USO or a stakeholder organization.

A case outline was developed for each case to facilitate the construction of timelines and the sequencing of events (Huber and Power, 1985). These timelines were divided into episodes based on pivotal changes within the USO, potentially affecting its resources and capabilities (Gremler, 2004). This approach aimed to capture the developmental process, with episodes defined by changes to accommodate the non-linear nature of processes (Pettigrew, 1997). The adoption of an episode analysis technique allowed for systematic examination of multiple instances within each case, facilitating both intra-case and inter-case comparisons to systematize patterns among various episodes and provide explanatory insights (Jessop, 2005). Episodes were thereafter aggregated into pre- and post-acquisition stages, while still considering, for instance, delayed integration efforts at the post-acquisition stage and perspectives of interviewees. To develop first-order constructs (see Figure 2), the pre- and post-acquisition stages were analyzed in terms of resources and capabilities available to the USO.

Next, the resources and capabilities were categorized into invention, financial, managerial, and ecosystem-related resources and capabilities (Guckenbiehl et al., 2021) while integrating data across cases to develop second-order themes as axial codes. These themes captured accessible and lacking resources, as well as potential chasms for each type. To explain these chasms, attitudinal expectations were identified through statements made by stakeholder representatives about the USOs and their role in providing resources and capabilities as a backward tracing technique (Jessop, 2005). The empirical findings thereby link these expectations to explanations for the observed chasms based on statements made by interviewees.

In comparing resources and capabilities across episodes of development, the pre-acquisition stage constructed the baseline towards which the post-acquisition resources

**Table 1.** Data collection

	Case I	Case II	Case III
Interviewees	USO: Co-founder I, II, CEO Acquirer: investment manager; marketing manager University ecosystem: consultant Business ecosystem: early customer contact	USO: Co-founder Acquirer: CEO, Founder University ecosystem: incubator representative	USO: CEO, Co-founder, R&D manager, marketing manager Acquirer: investment manager, marketing manager University ecosystem: researcher Business ecosystem: customer, supplier
Secondary data	Annual reports (10 years) Press releases (18) Newspaper items (85)	Annual reports (5 years) Press releases (23) Newspaper items (26)	Annual reports (10 years) Press releases (23) Newspaper items (78)
<b>Source(s):</b>	Author's own work		

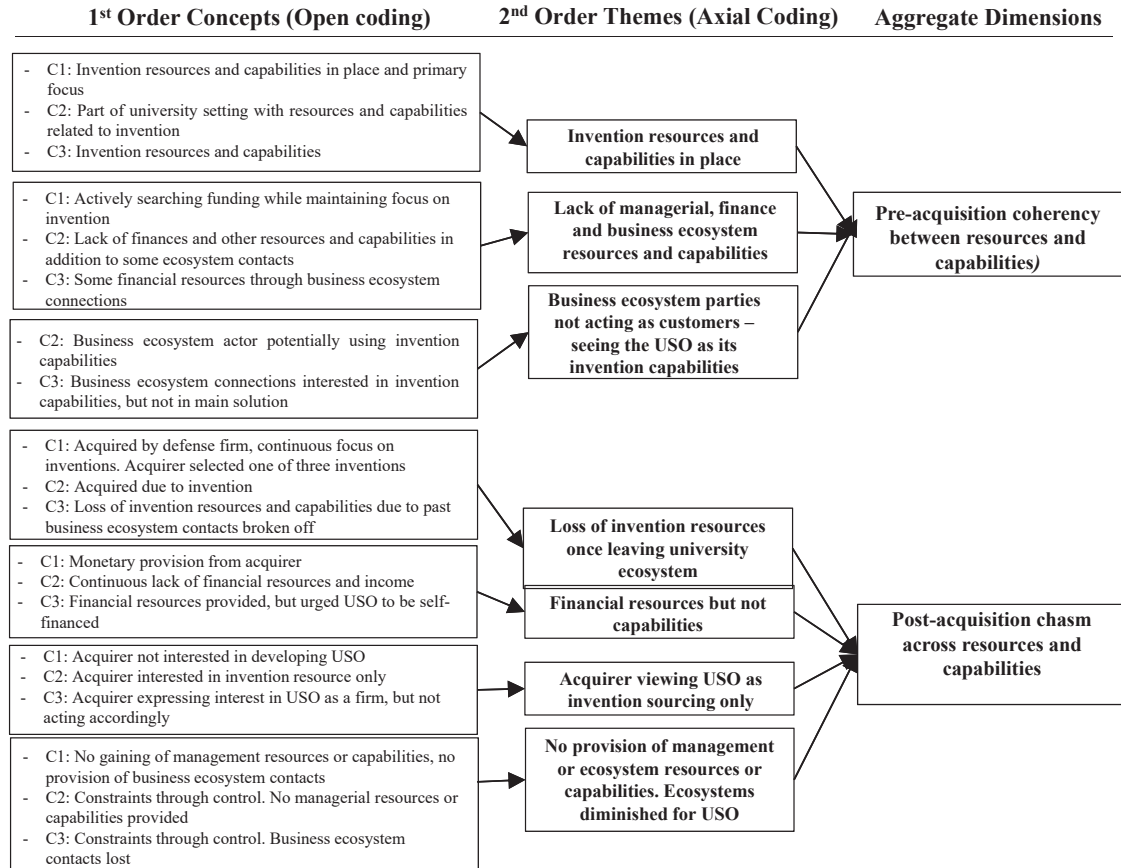


Figure 2. Coding scheme, following Gioia et al. (2013). Source: Author's own work

and capabilities were compared. In this comparison, diagrams illustrating the changes in resources and capabilities, including their reduction and expansion, overlaps, and divergences, were employed (see Table 3 below) to depict the shifts from the pre- to post-acquisition stage. By employing an analytical distancing approach, it was possible to address statements derived from interviews (close analysis), while simultaneously establishing chasms between resources and capabilities and among various types of resources and capabilities in a more “objective” manner. The division between pre- and post-acquisition resources, capabilities and their chasms allowed for their comparison and the subsequent theorizing about the acquisition’s effects on USOs as aggregate dimensions. These aggregate dimensions thereby portray the emergence of chasms while linking them to attitudinal expectations to provide an explanation. In the final stage of the analysis, the findings were compared with existing research to validate the identified research gap and more precisely position the paper and its contributions.

### Findings

This section presents the individual cases, structured around their pre- and post-acquisition resources and capabilities, highlighting the differences for the USO before and after the acquisition.

#### Case I

*Pre-acquisition.* In the first case, the USO’s practical applications of its digital-image invention was initially unclear, and the researchers who became the company’s owners were heavily involved in the technological development of the invention. They explored various application areas based on current trends in digitalization, including AI for material quality control, workflow decision making, and image interpretation. Early connections with customers in the construction sector were established, although they did not generate significant business income, they facilitated some development of the application’s functionality. The USO was managed by the researchers on the side of their research, but lacked the financial resources needed for further development. “*We were part of a top-research environment and played with the technology. Starting a company was only a bonus on the side*” (Co-founder I). While a venture capital firm provided some temporary support, it did not offer substantial financial backing, and its involvement was limited in duration. The USO actively sought solutions to reach customers and attain financial stability, while maintaining its primary focus on the invention’s technological functionality and the research associated with it.

*Post-acquisition.* The acquisition by the defense firm infused the USO with the financial resources necessary to further develop its image interpretation concept but also resulted in disconnection from stakeholders it had previously engaged with. Consequently, the two other application areas (workflow planning and material controls) were not pursued. No efforts were made to generate new ideas. “*This was detrimental to us. An external CEO was put onboard the USO but drown in the large corporation*” (Co-founder II). While the acquisition made the USO a part of an international corporate group, there were no intentions for the USO to function independently; instead, the focus remained predominantly on the technological aspect. Consequently, few actual customer connections related to the USO’s concept were established. “*The focus was on [the acquirer’s] operations. These being in defense, there were no functioning market—they only had one customer, the national defense office—and this disbanded [the USO] from all external input*” (CEO, USO). Prior collaborations with USO customers were terminated because the USO was no longer perceived by these as an attractive source for generating innovative ideas. The customers now viewed the USO as part of the acquiring entity, with which they did not identify. The cessation of previous collaborations subsequently hindered the USO’s success in developing solutions, as this development had previously partly taken place within these collaborative efforts. Eventually, the acquirer’s financial difficulties led to a decision to streamline its operations and divest the USO.

This case highlights the acquirer's primary emphasis being on the technological invention for its own business. The acquisition provided the USO with financial resources while causing the loss of invention capabilities due to its incorporation into a bureaucratic company structure, and not providing any business ecosystem and management resources or capabilities. In this case, neither the USO nor its invention was marketed. The case indicates similarities with past research on acquisitions of invention-intensive firms and highlights cultural differences (cf. [Bingham et al., 2024](#)). It also points out that the USO's lacking resources and capabilities (cf. [Guckenbiehl et al., 2021](#); [Evertsen and Rasmussen, 2023](#)) were not resolved through the acquisition. The acquirer viewed the USO more as a resource base rather than a firm with its own merits.

### Case II

*Pre-acquisition.* The USO in the second case started as a side project and sustained its technological development through consultancy work undertaken by its six founding researchers. These founders continued to work at the university while concurrently developing their idea, maintaining constant ties to research, and supplementing their income with research funding. They had some connections within the local automotive sector, which led them to explore potential applications in the automotive industry, particularly in adjusting the intake of fresh air into car cabins. However, these connections did not result in any customer contracts, and the focus remained predominantly on technological, invention development. The perpetual challenge was the scarcity of financial resources, and the USO struggled to expand its business ecosystem beyond local contacts. "We researched daytime, conducted consultancy work in the evenings and weekends and run the company in between" (Co-founder, USO).

*Post-acquisition.* The subsequent acquisition was a strategic move for the Swedish acquirer, providing access to the technology developed by the acquired party and enabling a shift from its costly solutions to mass-produced products. "We had tried to reach the food sector, but the sensor technology showed greater differences between olive oil based on season than whether it was good or overdue" (CEO, acquirer). The acquisition involved the exchange of shares between the two companies, with the expectation that the German researchers would continue with the combined entity. However, the outcome of the acquisition was that most of the German researchers departed from the company. "We felt controlled, and that did not fit us" (Co-founder, acquired USO). The acquirer did manage to redirect its business toward mass-produced products but continued to face financial challenges and encountered a lengthy journey in establishing customer connections and generating sales. These connections were formed between the acquirer and customers and did not align with the previous ties between the German USO and car manufacturers.

In this case, the USO gained very few new resources (financial limitations persisted, and no new customer or business connections were established) and lost many of its capabilities, particularly in inventions. The primary target of this acquisition was the invention of the German USO, which was largely replaced by the acquirer's solution. Like Case I, the acquirer appeared to view the USO primarily as a resource base for its own benefit. Additionally, the lack of resource and capability provision was exacerbated by the acquirer's own limited resources and capabilities ([Evertsen and Rasmussen, 2023](#)).

### Case III

*Pre-acquisition.* The USO in the third case was early funded by a venture capital firm associated with a domestic car manufacturer, which became a temporary and partial owner of the USO. Given the invention's focus on a digital anti-spin system based on sensor technology, there was an imperative to align it with hardware produced by automotive sector suppliers. While some connections were established with these suppliers, they primarily pertained to the development of other inventions. Also, in the interactions with the car manufacturer, the USO concentrated on different development projects rather than the specific system. However,

these projects, alongside contributions from the venture capital firm and an additional venture firm, provided the USO with some financial resources. “So, collaborations were about earning income to be able to develop our idea” (Co-founder). The USO was partly managed by a representative from the car manufacturer, while researchers held most other positions within the small USO. With the venture capital firms expressing a desire for an exit, the USO began exploring alternative ways to secure financing and managerial expertise, coinciding with the car manufacturer’s shift in business focus away from car manufacturing.

*Post-acquisition.* Post-acquisition integration involved implementing the acquirer’s routines within the USO, with managerial decisions falling under the purview of the German owner. Previous connections with car manufacturers and suppliers were largely severed following the acquisition. Despite intentions to leverage the USO’s invention capabilities, the USO’s freedom to develop new ideas was constrained, partly due to its inability to maintain its previous business ecosystem connections. “We lost our past collaboration partners. Suppliers to the car manufacturers saw us as taking a stand against them. Other customers played a waiting game. They now wanted our owner to develop the solution with us” (Co-founder, USO). Consequently, while still capable of inventing, the frequency of inventions declined. The USO’s anti-spin system struggled to secure customers initially. However, as an epilogue, changes in U.S. legislation mandated similar solutions in cars, ultimately opening doors to customers.

This case illustrates how although the USO received some financial resources, its existing business ecosystem resources were largely replaced by the acquirer’s, negatively impacting its invention capabilities. The acquisition had primarily focused on the USO’s invention capabilities and resources, offering limited support beyond financial contributions to facilitate inventions. The focus was thus on resources (financial) rather than capabilities. Compared to past research on invention-intensive firms (Aghasi et al., 2024; Wu et al., 2023), the acquirer’s business ecosystem affected the USO’s resources and capabilities. Table 2 provides a summary of the cases.

**Table 2.** Case summaries

	Case I	Case II	Case III
Resources held prior to acquisition	Invention resources (Ecosystem resources)	Invention resources (Ecosystem resources)	Invention resources (Managerial resources; ecosystem resources)
Capabilities held prior to acquisition	Invention capabilities	Invention capabilities	Invention capabilities
Needed capabilities	Financial resources Managerial capabilities Abilities to establish customer contracts (selling capabilities)	Financial resources Managerial capabilities Abilities to establish customer contracts (selling capabilities)	Financial resources (Managerial capabilities) Abilities to establish customer contracts (selling capabilities)
Expectations by acquirer	Reach invention (resource)	Reach invention (resource)	Reach invention and capability to invent (resource and capability)
Resources held following the acquisition	Financial resources (Managerial resources)	–	Financial resources Managerial resources
Capabilities held following the acquisition	–	–	(Invention capabilities)
Needed capabilities following the acquisition	Ecosystem resources Selling capabilities Invention capabilities	Financial resources Ecosystem capabilities Selling capabilities (Invention capabilities)	Ecosystem resources Invention resources

**Source(s):** Author’s own work

Despite variations in relatedness between the acquirer and the USO, technological pre-understanding, USO maturity, size, transaction specifics, and post-acquisition minority ownership (cf. Eisenhardt and Graebner, 2007), the three cases reveal a consistent pattern of changes in resources and capabilities following the acquisitions. In an aggregated cross-case analysis, Table 3 depicts the USOs' invention, ecosystem-connected, managerial, and financial resources (R) and capabilities (C), and the relative chasms between resources and capabilities before and after the acquisitions. The sizes of the circles represent the main resources and capabilities, while the expectations of stakeholders are illustrated as dotted circles. The absence of dotted circles indicates that no university or business ecosystem stakeholders showed interest in the resource or capability.

**Table 3.** Resources, capabilities, and expectations

Type of resource/capability	Prior to acquisition	After acquisition
Invention		
Ecosystem	 Actual (left) and wished for (right) resources and capabilities related to different spheres: interactions with universities, etc. (actual), and with customers (wished for), respectively	
Management	 Actual and wished for related to different areas of interest: technology and growing a business respectively	
Financial	Basically non-existent and dependent on external parties	

**Note(s):** R refers to resources; C to capabilities. Sizes of circles demonstrate the 'size' of the resource/capability. The dotted circle describes external parties' expectations, which if lacking points to how external parties did not have any expectations on the particular USO resource/capability. The sizes of the circles represent the relative proportion of the resource/capability, allowing for comparison across different types as well as before and after acquisition-related expansions and declines. They are hand-drawn and should not be interpreted as absolute measurements, as, for example, a managerial capability cannot be directly scaled against a financial resource

**Source(s):** Author's own work

## Discussion

In a cross-case analysis, this section discusses the developments from pre-acquisition to post-acquisition, highlighting how resources and capabilities are shaped by past experiences, future aspirations, and the conceptualization of USOs as a resource base. These factors contribute to changes in resources and capabilities, ultimately leading to the emergence of chasms.

*Before the acquisitions*, the cases indicated either complete or partial alignment between resources and capabilities. In other words, if a specific type of resource was present, so was the associated capability. The alignment between resources and capabilities reflects how most research views the relationship between firms' resources and their utilization (Evertsen and Rasmussen, 2023; Kakati, 2003). Perhaps particularly interesting in the cases of USOs is how this was so despite the USOs' weak or non-existent business ecosystem connections, and thereby their limitations in sourcing resources externally (cf. Criaco *et al.*, 2014). If capabilities in terms of connecting with others are limited, more resources need to be held internally.

Taking a closer look at the specific resources and capabilities pre-acquisition (see Tables 2 and 3), invention resources and capabilities dominated the USOs (Guckenbiehl *et al.*, 2021), where capabilities generally exceeded (albeit overlapping with) the available invention resources. Universities and other supporting organizations in the university ecosystem played a role in bolstering invention resources, signifying the USOs' reliance on the university ecosystem (Houweling and Wolff, 2020). These entities' focus on inventions suppressed the engagement in the USOs' transformation into fully-fledged companies, despite some university ecosystem stakeholders being incubators or early-stage venture firms (cf. Hillemane *et al.*, 2019). In terms of management resources, the presence of external managers varied across the USOs. These managers, often selected from incubators or personal networks, lacked proficiency in establishing customer connections or negotiating business deals, and tended to focus on inventions rather than business opportunities.

Regarding business ecosystem resources and capabilities, there seemed to be a distinction between the USOs' capacity to establish contacts with business entities and their ability to sell solutions. Such stakeholders namely played roles other than business partners, offering support and aiding in development but not becoming customers or suppliers of the USOs' inventions. They were primarily drawn by the invention capabilities of the USOs, such as suppliers and car manufacturers in Case III, who sought the invention capabilities of the USOs while offering mainly financial resources. They expected capabilities in return but did not extend their focus beyond the USOs' invention capabilities. These entities, in their capacity as firms, inadvertently established what this paper theorizes as an *in-between ecosystem* form, which, in turn did not facilitate the integration of the USO into the broader business ecosystem. This in-between ecosystem was characterized by businesses treating the USO as part of the university ecosystem in terms of their expectations.

The resources and capabilities in place prior to the acquisitions, along with the constraints associated with particular resource types, collectively reveal a pattern consistent with findings from previous USO research (e.g. Guckenbiehl *et al.*, 2021; Evertsen and Rasmussen, 2023). They resulted from the origin of the USOs, but also how the university setting did not help through linking capabilities (such as capabilities to establish business connections). Among those possible business ecosystem parties present, and adding to past research, the USOs were repeatedly seen as an invention hub rather than a business partner, indicating how expectations, uncertainties about the future and past experiences played a part in explaining external stakeholders' treatment of the USOs. This means that while the USOs had limited capabilities in connecting with business ecosystem stakeholders, it attracted such parties based on its invention capabilities. Furthermore, the cases indicate how various resources and capabilities influenced other types of resources and capabilities while revolving around the inventions, such as choices of managers being made with invention capabilities and resources in mind.

**Table 3** illustrates the disparity between the existing and desired resources and capabilities concerning management and business ecosystems at the pre-acquisition stage. This highlights the contrast in orientations between current focus on inventions (actual) and the desired focus on achieving business success. Additionally, as thus indicated by the dotted circles, ecosystem stakeholders directed their attention towards the inventions.

*Post-acquisition*, Cases I and III saw the introduction of resources related to the financing of USOs' inventions, indirectly affecting invention resources. However, in all three cases, invention capabilities diminished. This resulted from researchers leaving (Case I and II) and the constriction of capabilities following the acquisitions, leading to routinized invention. This is all in line with past research on acquisitions of invention-intensive firms and the description of culture and inventors leaving affecting inventions and related capabilities (Bingham *et al.*, 2024).

As imperative additions to past research on acquisitions of invention-intensive firms, business ecosystem stakeholders that had supported the USOs' invention development severed their ties with the USOs, creating a chasm between invention capabilities and resources that these parties had previously partly bridged and leading to less input in invention processes. Additionally, resources and capabilities related to the USOs' ability to operate independently as companies (ecosystem-connected resources and some managerial resources) were either underutilized or potentially lost post-acquisition. As a result, a chasm was created between held or obtained resources and capabilities after the acquisitions across the four types: invention, managerial, ecosystem-connected and financial resources and capabilities (see **Table 3**).

This outcome was not arbitrary or a result of inherent acquisition mechanisms but, as explained by the interviewees, rather stemmed from the expectations placed on USOs by ecosystem stakeholders. Opposite to Vohora *et al.* (2004), the USOs thereby did not follow a path linked to various resources. Rather, the process of commercialization through being acquired was influenced by dependencies stemming from the new owners' expectations grounded in the USOs' past, and past business ecosystem stakeholders' expectations related to the USOs' future. Resources and capabilities reached through others namely followed from reciprocal understandings of needs and willingness to share, where stakeholders either linked their engagement with the USO to the university *or* business ecosystem.

Acquirers primarily regarded the USOs as sources of inventions (or, in Case III, as possessing invention capabilities). Business ecosystem participants transitioned from a focus on the USOs' invention capabilities (with the USO as part of the university ecosystem) to perceiving their inventions solely as resources or even disengaging from involvement and contributions to shared invention activities as the USO was competitively seen as part of the business ecosystem where they themselves were actors. In Case III, for instance, business ecosystem stakeholders began to view the USO as a competitor or anticipated more from the new owner, accentuating ecosystem dependencies among those directly connected to the USOs and those linked to their broader ecosystem. Universities distanced themselves, viewing the USOs as commercialized entities no longer within their purview. Consequently, chasms between resources and capabilities transcended various categories (managerial, invention, ecosystem-connected, and financial), emphasizing the interdependencies between USOs and the academic and business ecosystems.

Expectations inherently contain elements of uncertainty, influencing associated managerial decisions by the external stakeholders. The dotted circles in **Table 3** thus represent external stakeholders' attitudinal expectations regarding the USOs' resources and capabilities, signifying a post-acquisition emphasis on resources over capabilities. Resources represent the present, while capabilities relate more to future outputs and performance, reflecting a changed timeframe and increased uncertainty. Consequently, expectations contributed to a self-fulfilling prophecy related to USOs' resources and capabilities—their types and the gaps between them—ultimately reinforcing their role as resource bases. Based on these findings, the following propositions are suggested:

P1: Without external ownership, expectations regarding an USO are focused on its invention capabilities within the university ecosystem.

P2: As part of the university ecosystem, an USO's connections with the business ecosystem create an in-between ecosystem in which business ecosystem stakeholders assume other roles than those of customers and suppliers.

P3: An acquisition induces a resource-capability chasm for an USO, arising from the owner placing expectations on it as an invention resource base, while it is viewed as a competing business entity by in-between ecosystem stakeholders.

P4: With business ecosystem ownership, stakeholders from the university and business ecosystems withdraw from supportive roles based on their expectations of an USO's integration with its owner.

### *Contributions to theory*

In recent years, research has highlighted how resources have become more fluid (Bauman, 2000) and are influenced by various boundary-expanding activities of firms, such as collaborating with others or utilizing external resources. This is particularly relevant for USOs seeking business ecosystem connections and the notion of capabilities as the utilization of resources. This paper pinpoints how stakeholders' expectations shape resources and capabilities, with the paper illustrating how they can lead to chasms between resources and capabilities, favoring resources over capabilities. It furthermore shows how these expectations are linked to the university *or* business ecosystem, while the stakeholders may be present in the other type of ecosystem, creating an in-between ecosystem with stakeholders engaging at a distance related to a type of ecosystem they are not part of. It also highlights how acquirers continue to treat the USO as it was still part of the university ecosystem, while they are in fact the parties transferring them into the business ecosystem (cf. Laage-Hellman *et al.*, 2020).

The paper shows how various—invention, ecosystem-connected, managerial and financial—resources and capabilities link to one another (McKelvie and Davidsson, 2009), and create patterns among them, while they may also work opposite to one another and challenge each other. This implies that disparities can arise not only between resources, capabilities, and expectations but among different categories of resources and capabilities. This introduces a different perspective from the one focusing on resources associated with various USO stages (Vohora *et al.*, 2004), as it specifically explores the interplay between capabilities and resources, as well as the connection between attitudinal expectations and ecosystem types.

By focusing on resources and capabilities, and exploring acquisitions from the perspective of the target USO, this paper highlights how the resources and capabilities of USOs are transformed during acquisition. It theorizes the resource-capability chasm and its connection to attitudinal expectations and ecosystems, thereby challenging traditional linear or stage-gate models of USOs' commercialization.

### *Managerial implications*

For managers in the position of acquiring USOs, it is crucial to analyze ecosystem resource and capability dependencies, as well as competition, as part of the due diligence process. In particular, contributions of the in-between ecosystem stakeholders should be examined, along with how sensegiving and provisional structures can help to maintain these connections. At the post-acquisition stage, managers should enhance their facilitation of the resources needed by the USO, rather than merely transferring inventions for their own benefit, as augmenting managerial, ecosystem, and financial resources and capabilities may help the USO remain inventive. Nesting the acquirer within the USO ecosystems may prove valuable

beyond the acquisition, including sponsoring research, and creating collaborative spaces with in-between ecosystem stakeholders.

More specifically, managers should: (1) strategically assess stakeholder expectations, including ecosystem dynamics and engagement; (2) map resources and capabilities and address post-acquisition chasms; (3) introduce training and development programs; (4) implement partnership and collaboration strategies; (5) continuously monitor and adjust to developments through feedback; and (6) effectively communicate value to stakeholders.

### Conclusion

This paper explores the impact of acquisitions on USOs. It examines how these transactions influence their resources and capabilities, resulting from stakeholders' attitudinal expectations towards USOs. Based on three case studies, the paper demonstrates that capabilities are gradually suppressed and disconnected from resources following acquisitions due to stakeholders' expectations enmeshed with past experiences, future aspirations, and the concept of USOs as a resource base, and including their willingness to provide resources as well as committing long-term to the USO. Prior to the acquisitions, the cases illustrated that USOs had overlaps between resources and capabilities, with invention capabilities sometimes exceeding available resources, and the three studied USOs' main resources and capabilities being related to inventions. Conversely, connections with external stakeholders often showed the reverse pattern. By focusing on acquisitions as a means of commercialization, the paper demonstrates how the resource-capability chasm emerges during the transition from the university to the business ecosystem, even though the USO remains a distinct entity in both contexts.

### *Limitations and further research*

The empirical part of this paper is based on three case studies. While these case studies are valuable for, through interviewees, gaining insights into how items are linked, the limited number of interviews and cases highlights the need for further research. Both quantitative and qualitative studies are required to develop additional explanations, test and verify the propositions in this paper. Moreover, the cases in this paper focused on a specific technology within the same geographical context. Through including various types of inventions and make cross-case analyses, similarities across such cases would indicate generalizability beyond the specificity of AI (cf. Eisenhardt, 1991). Quantitative studies would provide valuable validation of those factors explaining the emerging resource-capability chasm and its link to expectations.

The study of USO acquisitions deserves further exploration, particularly in terms of understanding differences between held and needed resources at different phases of a firm's development and the establishment of resource-capability fit. Future research could investigate how local, cross-sectorial, or emerging-market acquisitions impact the autonomy of acquired USOs compared to those presented in this paper.

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