



The dual knowledge role of open innovation intermediaries: Internal weaving and external filtering for MNE subsidiaries

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ARTICLE INFO

Keywords:

Open innovation (OI) intermediaries
Multinational enterprise (MNE)
Subsidiary
Knowledge sourcing
Knowledge transfer
Dual embeddedness

ABSTRACT

Developing dual embeddedness for subsidiaries with competence-creating mandates in multinational enterprises (MNE) presents contradictory knowledge demands in internal and external networks that hamper their innovative capacity. Sourcing knowledge externally and transferring this across the MNE is a delicate yet demanding balancing act, and scholars suggest that competence-creating subsidiaries achieve this by building firm-specific innovative capabilities. Although open innovation (OI) studies contend that intermediaries may be important in connecting subsidiaries locally, we have yet to fully understand if, and how, these intermediaries influence subsidiary dual embeddedness. Through an exploratory qualitative case study design, we find that an OI intermediary performs a critical *dual knowledge role* through internal weaving and external filtering in helping subsidiaries navigate the conflicting knowledge challenges of dual embeddedness. Specifically, we disentangle how performing this role requires the OI intermediary to habitually engage in a range of complementary activities that enhance intra-firm knowledge transfer both vertically and laterally, to and from the subsidiary, as well as expanding the capacity of the subsidiary to source knowledge externally in their local network. In spotlighting the intermediary-subsubsidiary interface, our findings generate greater integration between the literature in international business (IB) and open innovation, specifically subsidiary dual embeddedness, and OI intermediaries.

1. Introduction

There is a growing body of literature in the international business (IB) domain that highlights the role of subsidiaries in multinational enterprises (MNEs) in building innovation capacity through their unique position between global (internal) networks and local (external) networks (Achcaoucaou et al., 2014; Andersson et al., 2002; Ryan et al., 2018). This work assumes that subsidiaries with competence-creating mandates in particular have the potential to enhance their innovative capacity by simultaneously sourcing knowledge from external networks and transferring knowledge within internal networks (Andrews et al., 2022; Nell et al., 2011). Yet, in seeking to develop their innovative capacity, these subsidiaries are confronted with an *innovation-integration dilemma* – it is difficult to engage simultaneously in the knowledge work of external sourcing and internal transfer (Ferraris et al., 2020; Mudambi, 2011). To resolve this puzzle and enhance their innovative capacity, competence-creating subsidiaries need to evolve toward a

position of dual embeddedness within their internal and external networks, balancing conflicting integration and innovation demands (Monteiro and Birkinshaw, 2017). External embeddedness enables subsidiaries to access valuable knowledge in a locally complex environment, while internal embeddedness enhances subsidiaries' knowledge transfer with other MNE units (Hansen, 1999). However, this is a difficult endeavour and prior studies have identified the intensive knowledge-based challenges that exist in developing subsidiary dual embeddedness (Achcaoucaou et al., 2014; Ryan et al., 2018). For example, internal and external embeddedness can pose conflicting requirements that hinder the ability of the subsidiary to access and utilise complementary and heterogeneous knowledge sets across both contexts (Song, 2014). Cultural, institutional, and hierarchical boundaries that emanate from dual embeddedness create frictions and tensions that impact the subsidiary's ability to source and share valuable knowledge that is central to innovation (Schotter et al., 2017). As such, addressing the knowledge-intensive challenges for dual embeddedness, as well as

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<https://doi.org/10.1016/j.technovation.2023.102721>

Received 3 May 2020; Received in revised form 9 February 2023; Accepted 12 February 2023

Available online 15 February 2023

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the impact they have on a subsidiary's innovative capacity, poses a significant problem for many MNE subsidiaries (Cenamor et al., 2019; Conroy et al., 2019).

External auxiliary actors can help MNE subsidiaries to access specialist knowledge and penetrate valuable networks locally, thus contributing to the growth and development of a subsidiary's competence-creation (Lopez-Vega and Tell, 2021; Schnyder and Sallai, 2020). Considering this, we turn to the field of open innovation (OI), specifically literature on OI intermediaries, as a potential way for MNE subsidiaries to address the knowledge-intensive challenges of dual embeddedness. To establish, build, and maintain external embeddedness, OI intermediaries may exhibit specialised knowledge sourcing capacities, acting as knowledge bridges between the MNE subsidiary and what may be a highly heterogeneous and complex local context (Howells and Thomas, 2022; Lopez-Vega et al., 2016; Tran et al., 2011). In addition to managing external embeddedness for identifying and extracting local knowledge, subsidiaries also face the challenge of internal embeddedness when subsequently mobilising and transferring this knowledge within and across the MNE (Asakawa et al., 2018; Yamin and Andersson, 2011). These challenges may range from communication difficulties with a distant headquarters (HQ) to navigating a complex internal structure in determining who to subsequently share valuable knowledge with (Reilly and Scott, 2014; Schotter et al., 2017). Subsidiaries may also lack the capacity to translate contextually specific knowledge to and from other sister subsidiaries that could benefit from its recombination (Andrews et al., 2022; Gutierrez-Huertel O et al., 2020). Research suggests that innovation intermediaries may improve intra-firm knowledge activities through, for example, providing consulting or training services to knowledge senders and receivers (Bessant and Rush, 1995; Howells, 2006). Despite this progress, the above studies have less to say about the specific roles, functions, and activities that OI intermediaries perform when engaging with competence-creating subsidiaries.

Dual embeddedness is a particularly important challenge for competence-creating subsidiaries that are knowledge creators, senders, and receivers and have the decision-making autonomy to engage with intermediaries in the local market (Achcaoucaou et al., 2014). Yet, competence-creating subsidiaries are unique in that they need to continually balance contradictory knowledge creation demands as they seek to expand their innovative capacity in co-evolving internal and external networks (Ryan et al., 2018). A commonly held assumption in this literature is that these subsidiaries can develop technological or innovative capabilities to enhance their product innovativeness and grow their competence-creating mandates (Andrews et al., 2022; Collinson and Wang, 2012; Figueiredo et al., 2020; Phene and Almeida, 2008; Song, 2014). In contrast, for competence-exploiting subsidiaries, though they may demonstrate dual embeddedness, they do it for different purposes, such as adapting the products from the HQ for local markets with limited innovative capacity or autonomy (Cantwell and Mudambi, 2005). Equally, extant work in OI has tended to focus on the role and function of intermediaries for domestic firms in national contexts (De Silva et al., 2018; Mina et al., 2014; Sieg et al., 2010), while acknowledging that there is a need to further decipher the role of OI intermediaries when engaging with MNE subsidiaries in a cross-border context. Specifically, there is a need to unpack the various activities that OI intermediaries engage in to assist MNE subsidiaries (as their clients) in overcoming the knowledge-intensive challenges of dual embeddedness. Yet, prior research has generated limited insights into this issue. Against this background, our paper seeks to explore how OI intermediaries may enhance the innovative capacity of MNE subsidiaries by facilitating the knowledge work necessary for dual embeddedness.

Our study employs a qualitative research design, with an exploratory case study of an OI intermediary (INTERM) and its subsidiary clients. The intermediary in our study is French and has global operations based across Europe, China, and the USA. They are a private and independent

agency that specialises in providing OI research services to corporate clients. Their value proposition for MNE subsidiaries lies in augmenting innovation initiatives and strategies through timely and comprehensive knowledge and analytics of technological trends as well as access to complementary technologies in fast-moving ecosystems of innovative start-ups. They mainly engage in the exploratory stages of the innovation and knowledge creation process, such as forecasting, technology road-mapping, gatekeeping and brokering, information scanning, and knowledge processing. These characteristics are like innovation intermediaries cited in extant work such as *proactive* intermediaries (Lichtenthaler, 2013) that act as knowledge brokers or mediators in ambiguous and fast-paced environments (Agoqué et al., 2017; Aquilani et al., 2017; Klerkx and Leeuwis, 2009).

Our study makes two primary contributions to existing literature. First, our findings enrich the IB literature on competence-creating subsidiaries and dual embeddedness (Achcaoucaou et al., 2014; Albis et al., 2021; Ciabuschi et al., 2014; Figueiredo, 2011; Lô and Geiger, 2022) by illuminating the underappreciated yet valuable role of an OI intermediary as a knowledge conduit between a subsidiary's internal and external network. Specifically, we explicate how an intermediary performs a *dual knowledge role* that consists of internal weaving and external filtering functions in helping subsidiaries navigate the contradictory knowledge-intensive challenges of dual embeddedness. Contrasting with extant research on competence-creating subsidiaries that portrays them as autonomous and largely capable independent actors in managing innovation (Andrews et al., 2022; De Beule and Van Beveren, 2019; Ferraris et al., 2020; Reilly and Scott, 2014), we find that these subsidiaries face unique challenges to be even more connected locally and globally which increases the need for them to leverage the dual knowledge role of an OI intermediary. Our findings, therefore, challenge the assumption that subsidiaries lead knowledge creation in their dual network (Ryan et al., 2018), arguing that OI intermediaries are crucial in facilitating subsidiary knowledge sourcing in complex local ecosystems with heterogeneous networks and in turn transferring this knowledge internally within the MNE. These insights suggest that subsidiaries with advanced and innovative mandates should avoid becoming complacent, inward-looking, or overconfident by leveraging the expertise, knowledge and networks that OI intermediaries garner. Moreover, we find that OI intermediaries assist competence-creating subsidiaries with transnational mediation (Mahnke et al., 2008) where their role extends beyond mere local knowledge search by opening-up cross-border connections and knowledge-sharing pathways with HQ and other subsidiaries across a globally dispersed MNE structure. As such, our study argues that OI intermediaries are crucial actors in enabling competence-creating subsidiaries to manage the innovation-integration dilemma of engaging simultaneously in external knowledge sourcing and internal knowledge transfer (Mudambi, 2011).

Second, by focusing on the intermediary-subsidary interface, we contribute to OI studies, specifically literature on OI intermediaries (Aquilani et al., 2017; Howells and Thomas, 2022; Mahnke et al., 2008; Mina et al., 2014). We find that the function and activities of OI intermediaries in facilitating an MNE subsidiary's innovative capacity are much more expansive and complex than existing studies in OI portray. Our findings identify a range of specialised and complementary activities that OI intermediaries repeatedly enact when engaging with MNE subsidiaries. Specifically, the dual knowledge role of OI intermediaries utilises a range of activities to enhance intra-firm knowledge transfer while simultaneously facilitating inter-firm knowledge sourcing to the MNE subsidiary. In contrast to other work on OI intermediaries that focuses on search patterns (Jeppesen and Lakhani, 2010; Lopez-Vega et al., 2016; Mina et al., 2014), we concentrate on MNE subsidiaries as knowledge seekers when engaging with an OI intermediary and highlight how the intermediary facilitates subsidiary embeddedness with a specific network of key knowledge providers (HQ, sister subsidiaries and local partners). In this sense, we find that OI intermediaries help the subsidiary develop meaningful access to heterogeneous knowledge

providers within and outside the MNE network in both familiar and unfamiliar geographical areas. As such, a novel insight from our study is that we identify the OI intermediary as an *embedding agent*, that performs a boundary-spanning mechanism (Lopez-Vega et al., 2016) to enhance a subsidiary's embeddedness internally in the MNE and externally in the local ecosystem. In doing so, we answer recent calls for more work on the activities of OI intermediaries (Howells and Thomas, 2022), particularly in the context of the intermediary-subsidiary interface. Our study, therefore, combines disparate insights from the literature on IB and OI, specifically subsidiary dual embeddedness, and OI intermediaries.

2. Theoretical background

2.1. Subsidiary dual embeddedness and knowledge creation

Traditionally, the process through which MNEs innovated was linear and 'closed', with knowledge created and developed in the home market of the HQ and transferred to its global network of subsidiaries (Almeida et al., 2002; Roth and Morrison, 1990). More recently, this process is increasingly iterative and 'open', requiring MNEs to frequently access and utilise external sources of knowledge embedded in local markets (Nell et al., 2011; Phene and Almeida, 2008). Subsidiaries are generally expected to lead this complex search process locally, but often struggle to effectively tap into and acquire valuable knowledge due to entry barriers to local networks (Cantwell and Mudambi, 2011; Phene and Almeida, 2008; Song et al., 2011). Although local complexity in terms of varied cultures (Aoyama, 2009), heterogeneous knowledge (Sammarra and Biggiero, 2008), or intertwined networks (Owen-Smith and Powell, 2004) offer valuable opportunities to expand subsidiary innovativeness, they may also increase search costs for subsidiaries and stunt the growth of their mandates. As a result, subsidiaries may struggle to transfer acquired knowledge to the HQ or other subsidiaries, due to a lack of attention from these units (Monteiro, 2015) or a lack of integrative mechanisms for transferring location-specific knowledge across the MNE (Persson, 2006; Zeng et al., 2018). Increased communication and greater awareness of shared expertise between globally dispersed subsidiaries increase lateral collaboration and knowledge sharing between subsidiaries, enhancing the innovative capacity of the MNE (Santistevan, 2022).

The substantial challenges that subsidiaries face in developing their innovative capacity are often considered through the lens of (relational) embeddedness (Ferraris et al., 2020). Embeddedness is conceptualised as a way to develop and grow a subsidiary through social coexistence, close and ongoing communication, and knowledge exchange with network actors (Figueiredo, 2011). It denotes "trust, fine-grained information transfer, and joint problem-solving arrangements" (Uzzi, 1997: 42) and can diminish uncertainty in transactions or cooperation (Nielsen, 2005). The embedded ties can be developed through personal relationships or third-party referral networks facilitating trust (Uzzi, 1996). Such (strong) ties can function as the social control mechanism that promotes more commitment focusing on long-term interests and mitigating opportunistic behaviours (Rowley et al., 2000). They can also facilitate a shared communication protocol and feedback mechanisms for knowledge transfer (Dhanaraj et al., 2004) with a higher mutual openness (Gilsing and Duysters, 2008). As a result, embedded relations enable enriched resource access, flexibility, and transfer of tacit knowledge (Moran, 2005; Uzzi, 1997). Embeddedness research stresses complex social processes where market exchange happens (Dacin et al., 1999; Granovetter, 1985).

For subsidiaries, local knowledge sourcing by developing high network frequency with quality connections creates external embeddedness, and is crucial to enhancing their innovative capacity (Almeida and Phene, 2004). In turn, external embeddedness enables subsidiaries to tap into and access a diverse and unique breadth of knowledge with heterogeneous relationships locally (Achcaoucaou et al., 2014;

Andersson et al., 2002; Ghoshal and Bartlett, 1990). Local interactions may increase the subsidiary's 'neighbouring' capabilities (Ciabuschi et al., 2014) allowing them to build trust, and in turn leverage knowledge from innovative start-ups in knowledge-rich ecosystems, enhancing their product innovativeness. However, becoming over-embedded externally may lead to isolation, or worse mandate removal, for the subsidiary due to a lack of integration and reverse knowledge sharing inside the MNE (Yamin and Andersson, 2011). As such, a subsidiary's innovative capacity is also dependent on maintaining internal embeddedness with HQ and sister subsidiaries, which involves continually deepening and developing network ties and transferring locally valuable knowledge across the MNE (Achcaoucaou et al., 2014; Asakawa et al., 2018; Garcia-Pont et al., 2009; Lô and Geiger, 2022). Equally, subsidiaries that become too embedded internally risk becoming clones who merely receive knowledge from other units and offer limited distinctive or innovative value (Ferraris et al., 2020). Developing a subsidiary's innovative capacity is therefore a demanding process which is determined by how effectively they handle the contradictory knowledge challenges of dual embeddedness. These insights suggest that subsidiaries confront an innovation-integration dilemma (Mudambi, 2011) where dual embeddedness in both internal and external networks is a delicate balancing act that is maintained by engaging in knowledge transfer internally and knowledge sourcing externally.

Subsidiaries with competence-creating mandates, that are knowledge creators, senders, and receivers, are particularly exposed to these dual embeddedness demands (Achcaoucaou et al., 2014; Cantwell and Mudambi, 2005). Given they will generally possess advanced product development or R&D responsibilities, these subsidiaries are under pressure from the rest of the MNE to act as valuable sources of knowledge by establishing technology leadership in specialised fields and continually improving product innovativeness (Figueiredo, 2011). These subsidiaries are continually seeking to upgrade their functional capacity through 'technology leader' strategies that require a balance between product exploitation and exploration in internal and external networks (Ciabuschi et al., 2014; Lopez-Vega and Tell, 2021). Competence-creating subsidiaries are unique from others in that they need to continually balance contradictory knowledge creation demands as they seek to expand their innovative capacity across these networks (Ryan et al., 2018). However, conventional thinking suggests that these subsidiaries develop technological or innovative capabilities through their own efforts to enhance product innovativeness and grow their competence-creating mandates (Andrews et al., 2022; Collinson and Wang, 2012; Figueiredo et al., 2020; Phene and Almeida, 2008; Song, 2014). Extant studies have concentrated on the inner workings and capacity of these competence-creating subsidiaries in developing their innovative capacity through dual embeddedness (De Beule and Van Beveren, 2019), largely overlooking the complementary role of innovation specialists such as OI intermediaries. We suggest that these unique challenges increase the need for MNE subsidiaries to leverage the dedicated expertise of OI intermediaries. Although studies have shown that auxiliary actors can help MNE subsidiaries to solve local adaptation problems in terms of market requirements (Lopez-Vega and Tell, 2021) or manage political risk (Schnyder and Sallai, 2020), we still have an insufficient understanding of how OI intermediaries help MNE subsidiaries address these conflicting knowledge-intensive demands.

2.2. Innovation intermediaries

Innovation studies have long argued that innovation intermediaries are complex entities and may denote a range of entities - brokers, third parties, incubators, technology transfer offices, and agencies - involved in supporting the OI process (De Silva et al., 2018; Howells, 2006; Klerkx and Leeuwis, 2009). An innovation intermediary can be broadly defined as an "organization or body that acts as an agent or broker in any aspect of the innovation process between two or more parties" (Howells, 2006:

720). Collectively, studies highlight the multidimensional nature of innovation intermediaries and introduce commonly used terms such as innovation consultants, brokerage organisations, change agents, and boundary organisations (Aquilani et al., 2017; Gassmann et al., 2011; Howells, 2006; Klerkx and Leeuwis, 2009; Lichtenthaler, 2013).

Studies have looked specifically at OI intermediaries defining them as organisations that bridge the gap between seekers that desire new concepts, ideas, or technologies and innovators that can provide access to valuable knowledge (Howells and Thomas, 2022; Kokshagina et al., 2017). A common finding is that OI intermediaries are vital ‘middlemen’ (Tran et al., 2011) that perform a variety of different roles and scholars have reported on the multitude and disparity of innovation intermediation types. Lichtenthaler (2013) found that innovation intermediaries in general may have either passive, proactive, or reactive roles. While passive intermediation relates to typically media-based services such as online platforms, proactive types act as agents to determine sources of innovative knowledge or technologies for firms. Reactive types refer to the scenarios where recipients have already used the technologies, and intermediaries help their clients to receive licenses from patent holders or identify patent infringers. Colombo et al. (2015) provided an in-depth analysis of previous studies on innovation intermediaries showing four distinct types based on two dimensions, knowledge access and delivery. While *brokers* link knowledge providers and seekers, and hence build bridges between start-ups and internal innovation departments of firms (Becker and Gassmann, 2006), *mediators* provide the contacts of appropriate solvers to the client. *Collectors* include their innovation network to solve problems within large organisations while *connectors* require their innovation network to recommend themselves for a collaborative project. Chesbrough (2006) further differentiated *agents* from *brokers* – agents owe allegiance to clients while brokers simply connect different parties. Howells (2006) seminal work identified a variety of functions for innovation intermediaries arguing that each type of intermediary tends to perform multiple functions. These functions vary from exploratory to commercialisation stages of the innovation process, such as forecasting, technology road mapping, gatekeeping and brokering, information scanning, and knowledge processing between partners (Howells, 2006). Open innovation intermediaries ultimately act as complements rather than substitutes in improving the knowledge seeking activities or capabilities of firms (Agogu e et al., 2017; Lin et al., 2016).

There is a shared consensus in this literature that OI intermediaries in particular are important auxiliary actors for knowledge creation in the innovation process (Howells and Thomas, 2022). Some studies refer to these as knowledge-intensive business services or KIBS (Klerkx and Leeuwis, 2009), knowledge brokers (Boari and Riboldazzi, 2014), and idea or technology scouts (Noack and Jacobsen, 2021). For instance, scholars suggest that innovation intermediaries may develop a range of knowledge practices to make external knowledge, technologies, or experts more accessible, and enhance the innovative capacity of their clients (De Silva et al., 2018). However, these intermediaries may also engage in a range of other services beyond knowledge search such as mobilising technologies across firms and industries, stimulating learning processes and innovation initiatives, facilitating network exchanges between innovation actors, and building ecosystem infrastructures (Agogu e et al., 2017; Tran et al., 2011). These intermediaries are often distinct from incubators, accelerators, IP brokers, virtual platforms, consultancies or university technology transfer offices that focus on public-private collaborations in bringing technologies to market (Mian et al., 2016; Miller et al., 2018). These innovation intermediaries are also distinct from internally decoupled corporate entrepreneurial outposts that MNEs often establish in an attempt to stimulate firm-wide innovation (Decreton et al., 2021). Despite this progress, much of the seminal work in this space is confined to exploring intermediation within domestic firms and their external environments.

The above studies have less to say about the specific role, function, and activities that OI intermediaries perform when engaging with

competence-creating subsidiaries that are embedded within and across globally dispersed MNE structures (Lin et al., 2016). As outsiders exposed to liabilities of foreignness, subsidiaries may experience benefits locally from utilising the specialised practices of intermediaries to penetrate external networks, establish ties with unfamiliar actors, and leverage complementary knowledge bundles (Figueiredo, 2011). Several studies propose that OI intermediaries may help MNEs to overcome cultural gaps and distance, reduce search costs locally, and enhance the scope of external innovation (Lin et al., 2020; Lopez-Vega et al., 2016; Mahnke et al., 2008; Tran et al., 2011). This may be important for competence-creating subsidiaries that are mandated to develop technological leadership or expertise that is location-specific and difficult to extract from complex and rapidly evolving ecosystems (Decreton et al., 2021). However, the local innovation activities of competence-creating subsidiaries need to be valuable for the rest of their MNE, but demonstrating the relevance of local knowledge to other units is a relentless and complicated undertaking (Conroy and Collings, 2016). Yet, the literature in IB and OI tells us little about the role, function, and activities of OI intermediaries, if any, beyond local knowledge search. For instance, competence-creating subsidiaries will likely be expected to share innovative products or technologies with sister subsidiaries (Achcaoucaou et al., 2014) and intermediaries that have global operations outside the local context may be able to open up cross-border connections and knowledge sharing pathways with other subsidiaries. Competence-creating subsidiaries are also likely to possess decision-making autonomy from an HQ that is either disconnected or has a limited understanding of the subsidiary’s local network (Ciabuschi et al., 2014). In this sense, it could be reasoned that OI intermediaries can assist subsidiaries with the transnational mediation (Mahnke et al., 2008) of location-specific knowledge or in convincing an absent HQ that the subsidiary’s local connections, products, and technologies are valuable for the rest of the MNE.

When engaging with MNEs, intermediaries may therefore have to perform different types of roles, functions, and activities such as widening a firm’s geographical reach as they endeavour to support overseas clients. Lopez-Vega et al. (2016) claimed that OI intermediaries wield processes particularly suited to local and distant search through exploitation (refinement searches) and exploration (innovative searches). Open innovation intermediaries may need to become embedded in the MNE’s global innovation process, otherwise the entire firm may not understand the value added across contexts (Klerkx and Leeuwis, 2009). A trustworthy relationship minimises the prefacing learning period, allocates deep insights into the firm’s activities, and convinces HQ to engage in further collaboration (De Beule and Van Beveren, 2019; De Silva et al., 2018; Lichtenthaler, 2013). As such, the role, function, and activities of OI intermediaries in facilitating a subsidiary’s innovative capacity may be much more extensive and complex than existing studies in IB and OI portray.

3. Research design and method

We employed a qualitative research design to generate original insights and address shortcomings in the extant literature on subsidiary embeddedness and OI intermediation. As the phenomenon of intermediary-subsidary engagement lacks a clear theoretical foundation, an inductive exploratory case study approach was utilised (Eisenhardt and Graebner, 2007). This approach allows for a *thick description* and a richer understanding (Gibbert et al., 2008) of relations at the intermediary-subsidary interface, an issue that requires further investigation in both IB and OI (De Silva et al., 2018). We employ a single exploratory case study as it allows for the exploration of deeper theoretical insights on *how* a specific OI intermediary enhances a subsidiary’s innovative capacity (Siggelkow, 2007), particularly in a dual embeddedness context (Piekkari et al., 2009).

The chosen case for our study is a French OI intermediary. In choosing this case, we adhered to the principles of theoretical sampling

in that it was suitable for extending insights on intermediary-subsidary relations, particularly on key themes related to knowledge, embeddedness, and innovation. Given that INTERM had a diverse base of MNE subsidiaries as their clients, it provided us with a rich case to explore the specific role, function, and activities of OI intermediaries when engaging with MNE subsidiaries. France is a country that is known for its rich innovation ecosystem and continued investment in promoting local innovation-related activities and is therefore an appropriate context to explore OI intermediaries (Boyer et al., 2021). The intermediary, which we refer to as INTERM for anonymity purposes, is characterised by industry agnosticism and global operations. INTERM's HQ is based in France and has major innovation hubs in London, Berlin, Madrid, Tel-Aviv, and China. INTERM was founded in 2014 and has 50–100 employees providing services to firms mainly operating in informational and financial service industries with a focus on Europe, China, and USA. They classify themselves as an OI intermediary that is a private and independent agency specialising in *providing open innovation research products to corporate clients*. Their aim is to “provide the right open innovation tools for decision-makers from corporates to discover, qualify, and engage in innovation initiatives” and their co-founders specialise in corporate-start up collaboration having worked across a broad range of blue-chip firms, large consultancies, and high-tech start-ups. They utilise market expertise, advanced analytics, and scientific methodologies to create precise evaluations based on qualitative and quantitative metrics. Their value proposition for MNE subsidiaries lies in augmenting innovation initiatives and strategies through timely and comprehensive knowledge and analytics of technological trends as well as access to complementary technologies in fast-moving ecosystems.

When considering the literature on OI intermediaries' roles, it could be argued that INTERM is a *proactive* intermediary (Lichtenthaler, 2013) that determines sources of innovative knowledge or technologies for firms. Studies have tended to focus on OI intermediaries as virtual platforms or consulting companies such as McKinsey (Sieg et al., 2010) but INTERM is neither of these. Instead, they are more akin to knowledge brokers or technology scouts (Boari and Riboldazzi, 2014; Klerkx and Leeuwis, 2009) that utilise knowledge practices and specialised capabilities to enhance the innovative capacity of clients (De Silva et al., 2018). In line with Howells and Thomas (2022), INTERM offers services related to the exploratory stages of the innovation and knowledge creation process, such as forecasting, technology road-mapping, gate-keeping and brokering, information scanning, and knowledge processing between partners. As such, they do not engage in commercialisation related activities like prototyping, accreditation, regulation, arbitration, or intellectual property rights (Agogué et al., 2017). In this sense, they offer a specialist service as a valuable and complementary knowledge repository that creates new combinations of knowledge from heterogeneous fast-paced environments with high uncertainty and complexity (Aquilani et al., 2017; Klerkx and Leeuwis, 2009; Lichtenthaler, 2013). In contrast to much of the literature on innovation intermediation, INTERM offers a rich example of a global OI intermediary that engages in cross-border activities to connect local and global actors and knowledge sets. With more than 250 international clients, INTERM exhibits a *very powerful example* of an exploratory single case (Siggelkow, 2007: 20) that provides rich and intricate insights on intermediation with subsidiaries.

In triangulating data collected from INTERM, we also collected data from subsidiary clients of INTERM, based in MNEs with global operations i.e., they had a subsidiary network beyond their home region. We focused on subsidiaries that held competence-creating mandates and were therefore authorised to access knowledge locally and beyond to augment their innovative capacity (Achcaoucaou et al., 2014; Cantwell and Mudambi, 2005). We applied the classification of competence-creating as moving toward the simultaneous embeddedness in internal and external networks, acting as knowledge receivers, seekers, and creators leveraging R&D or advanced technological

capabilities (Achcaoucaou et al., 2014). Studies on competence-creating mandates argue that responsibilities may be local, regional, or global in nature (Cantwell and Mudambi, 2005), and INTERM sought to connect their subsidiary clients both locally and beyond where appropriate. For instance, although Spanish and Danish subsidiaries we spoke to had competence-creating mandates, this also extended to early-stage exploration of opportunities in neighbouring markets e.g., engaging with INTERM to identify new technologies in the French market. Although all subsidiaries we spoke to had product development or R&D departments, they still needed support from INTERM to enhance their knowledge work internally and externally.

3.1. Data collection

We gathered primary data through 19 in-depth semi-structured interviews. To explore the interaction between INTERM and subsidiaries, the data were collected in two phases. First, interviews (11) were conducted within INTERM as the main unit of analysis. Second, these were triangulated by interviews (8) with managers in various MNE subsidiary clients (8) of INTERM. The criteria for sampling interviewees in both INTERM and subsidiaries involved an expert purposive sampling approach appropriate to choose participants based on pre-selected characteristics related to our central research question. This sampling strategy was utilised to access *elite informants* capable of providing rich insights on the intermediary-subsidary relationship, by virtue of their role, power, networks, expertise and experience (Aguinis and Solarino, 2019).

First, 11 interviews with INTERM managers were targeted toward those in senior leadership positions across functions, carrying extensive experience interacting with MNE subsidiaries. To appreciate the full range of perspectives on INTERM's activities and engagement with subsidiaries, interviews were conducted with managers that were based across various offices of INTERM i.e., France (3), UK (4), Germany (2) and Israel (1).

Second, 8 interviews were conducted with 8 separate MNE subsidiaries who were all clients of INTERM and referred to us by INTERM interviewees through snowball sampling. The subsidiaries were drawn from a variety of industries such as Railway, Insurance, Electronics, Pharma and Automotive, and were based in various locations such as UK/Ireland (3), Germany, Spain, Israel, Denmark, and France. The country of origin of these subsidiary clients' HQs varied from Germany, Japan, France, China, USA, and South Korea. Subsidiary managers were interviewed with respect to their experience in utilising INTERM's services as well as their perspective on innovation intermediaries in general and if/how they may enhance innovative capacity.

All interviews lasted on average 60 min and were conducted primarily via video call (Skype) considering the variety of country contexts represented. Four interviews (two in INTERM's HQ in Paris, and two in the German office) were conducted face-to-face. These interviews were carried out in French and German but subsequently translated. All other interviews were conducted in English. All interviews were complemented by in-depth note taking while individual follow-up conversations with some respondents enhanced the validity of the data. We assured anonymity by reporting the interviewee's job title only. Data cleaning was realised by transcribing all interviews verbatim and individually to mitigate data overload and to emphasise significant findings.

Open-ended questions were asked for both sets of interviews, but interview schedules were different. Questions for INTERM managers concentrated how they seek to enhance subsidiary innovation and embeddedness, the challenges in doing so, and the knowledge-related activities they use in this process. Questions for subsidiaries revolved around the value they get from engaging with INTERM and OI intermediaries in general, as well as how this improves their knowledge activities, embeddedness, and innovation capacity. Although we did capture some dyadic relationships between respondents in INTERM and subsidiary clients (e.g., in France, UK/Ireland, Germany, and Israel) this

was not necessarily our focus in analysing the data. In collecting the data, our focus was predominantly on understanding intermediary-subsidary relationships in general. For instance, some respondents from INTERM spoke specifically about their relationship with client subsidiaries, but also spoke about the influence of intermediaries in general, while respondents from client subsidiaries spoke about INTERM but were also encouraged to speak about their experiences with innovation intermediaries in general. Table 1 shows the interviewee profiles and roles for INTERM respondents. Table 2 outlines the interviewees for the client MNE subsidiaries as well as the mandates and products/technologies of each subsidiary, and evidence from interviewees.

3.2. Data analysis

The data analysis proceeded along three coding steps in line with work on constructing qualitative analysis (Gioia et al., 2013; Sætre and Van de Ven, 2021; Saldaña, 2021). These coding steps represented a systematic process of disassembling and reassembling the data for determining frequencies and patterns (Grodal et al., 2021). Firstly, each interview was summarised into key attributes following its transcription. This *open coding* process involved the creation of first-order codes, maintaining the original terms used by the interviewees, as it was considered important to keep the authenticity of the data. Second, in attempting to generate patterns within these first-order constructs and make them more palatable, we grouped them together into second-order constructs. This involved merging, collapsing, and dropping certain categories as we refined the patterns amongst our initial codes into more stabilised categories (Grodal et al., 2021). In attempting to move toward generic themes i.e., the structure of second-order constructs replicated across all interviews, each of these categories was triangulated across interviews in INTERM with each construct evident in client subsidiaries (Eisenhardt and Graebner, 2007). Our interpretation was informed by and grounded in insights on subsidiary innovation (Ferraris et al., 2020; Phene and Almeida, 2008; Reilly and Scott, 2014), and dual embeddedness (Achcaoucaou et al., 2014; Ciabuschi et al., 2014; Meyer et al., 2011; Ryan et al., 2018), and the roles and functions of innovation intermediaries (Aquilani et al., 2017; Colombo et al., 2015; De Silva et al., 2018; Howells, 2006; Lin et al., 2016, 2020; Mahnke et al., 2008). Some second-order constructs we generated are evident within existing literature on OI intermediation, such as those related to *establishing trust* and *bridging cultural differences*, while others emerged from the data analysis, such as the INTERM's role in *coordinating the HQ-subsidiary relationship*.

Third, in seeking to establish a structure within the data and enrich the theoretical link between the relevant literature, we developed aggregate dimensions. In this sense, the collated data were unitised by amalgamating the first- and second-order constructs into overarching dimensions of internal weaving and external filtering. We did not anticipate our final aggregate dimensions *a priori* but instead; we were alerted to them as they emerged within the analysis process. Literature on subsidiary embeddedness, specifically knowledge *transfer* and *sourcing* (Monteiro and Birkinshaw, 2017) acted as guiding logics in making the *conceptual leap* to our theoretically novel dimensions (Klag and Langley, 2013). To ensure the reliability of the coding, all

Table 1
INTERM interviewees.

Interviewee Role	Function	Location
CEO(X2)	Operations	France
President	Operations	United Kingdom
Partner INT(X2)	Strategy	United Kingdom
Manager INT	Strategy	United Kingdom
Manager UK	Business Development	United Kingdom
Manager CD	Corporate Development	France
Manager BD GER	Business Development	Germany
Manager BD DACH	Business Development	Germany
Advisor ISR	Country Manager	Israel

co-authors tested the logic of the codes through debate and *authentic criticisms* until agreement on operationalisations was reached (Saldaña, 2021). As such our second-order constructs relate to the specific activities that INTERM engaged in which in turn make up the functions of internal weaving and external filtering that encompass INTERM's dual knowledge role as an embedding agent for MNE subsidiaries.

Trustworthiness of qualitative research is dependent on internal validity and we adopted a number of practices to enhance this in our findings (Lincoln and Guba, 1985). Internal validity decisions are usually made in the design phase but applied to the data analysis phase and this was established by clearly outlining the data collection and analysis approaches. Our study had a clear theoretical justification for the sampling of firms, interviewees, and data collection. During interviews, we asked focused questions to obtain details on why or how certain things were happening (Bansal and Roth, 2000), comparing responses between INTERM respondents and subsidiaries. This approach helped us to rule out rival explanations (Yin, 2009). In analysing the data, we drew on constant comparison techniques across interviewees along with pattern matching between relationships in data and previous literature as well as in the coding process between researchers (Silverman, 2020). This involved prolonged engagement and persistent observation of the data, data collection triangulation, clearly documenting all codes/themes and how the coding process unfolded, as well as keeping all records of notes, transcripts, or reflections. We compared our findings with the literature, paying attention to similarities and differences to refine our constructs and the relationships between these.

4. Findings

Our findings detail the *dual knowledge role* of INTERM in terms of enhancing the innovative capacity and dual embeddedness of MNE subsidiaries. In the below sections, we outline how this role involves a dual function of internal weaving and external filtering which in turn include a variety of activities focused on augmenting intra-firm knowledge transfer for the subsidiary while also facilitating inter-firm knowledge sourcing to the subsidiary in the local ecosystem. We do not aim to present these activities sequentially or suggest that any one is more important than the other, but instead, we argue that they should be habitually maintained by the intermediary as they engage with the subsidiary. The next section introduces INTERM and the client subsidiaries from our findings.

4.1. INTERM and MNE subsidiaries

INTERM interviewees identify their firm as an OI intermediary, with respondents stating, *we are first and foremost an open innovation intermediary* (CEO INTERM) and *our focus when engaging with subsidiaries is to provide them with the right tools and insights to stay ahead of the innovation curve by discovering tech trends and assessing start-ups across a wide range of sectors* (President INTERM). Equally, the subsidiary clients of INTERM all carried competence-creating mandates engaging in product development or R&D activities with autonomy to explore opportunities related to new ideas, concepts, and technologies. These mandates provided the foundations to interact with INTERM. For instance, subsidiary respondents stated, *we have R&D here in Germany ... we work on finding new start-ups and technologies ... we are quite autonomous, of course, there is a corporate R&D strategy, and we try to align with that* (CAO GER, ELEC/JPN) ... *when it comes to product development, we are ultimately the owners of the execution* (CMO ESP, PHARMA/GER). Table 3 presents the final coding structure and depicts the central themes outlined in our findings.

4.2. Internal weaving

We define the internal weaving function as the way in which the OI intermediary enhances a subsidiary's innovative capacity by facilitating embedded relations for intra-firm knowledge transfer. We find that

Table 2
INTERM'S client subsidiaries and interviewees.

Interviewee Role	Function	Subsidiary location	HQ location	Industry	Subsidiary mandate and product/technology focus	Evidence
CAO Nordics	Analyst	Denmark	Germany	Railway	R&D and advanced product development mandate of switch systems	<i>We have autonomy for the development, manufacture and distribution of products and technology related to switch systems.</i>
HOO UK	Operations	United Kingdom	France	Pharma	Innovation centre for dermo-cosmetics	<i>We focus on developing innovative solutions in dermo-cosmetic products through collaboration with key partners</i>
CAO GER	Analyst	Germany	Japan	Electronics	R&D mandate focused on products and technologies in semiconductor devices, audio & video consumer products, automotive as well as medical.	<i>We have R&D here in Germany ... we work on finding new start-ups and technologies in order to have a joint collaboration with our corporate R&D department ... we are quite autonomous, of course there is a corporate R&D strategy, and we try to align with that. But we have a certain degree of freedom to evaluate our own strategy and make proposals to fulfil that strategy in our research facilities.</i>
CMO ESP	Marketing	Spain	Germany	Pharma	New product development related to human and animal products distribution	<i>We are developing our mandate and beginning to engage in early-stage R&D ... we see ourselves as an innovation scout due to the prevalent life science cluster here in Barcelona. When it comes to product development we are ultimately the owners of the execution, so how we do it. However, it can take a long time to have approved due to regulations and we also need to engage with the global research department.</i>
HOO ISR	Operations	Israel	South Korea	Automotive	R&D and advanced technologies in mobility services, artificial intelligence (AI), advanced materials, robotics, and new platforms.	<i>We are viewed by [HQ] as a hub of crucial technology such as artificial intelligencea lot of R&D is taking place here which creates strong collaborative efforts.</i>
STRAT IRE	Strategy	Ireland	US	Pharma	New product development and R&D in biological drugs.	<i>Our mandate is advanced product development and R&D it's where we want to be in terms of adding value within the firm</i>
INN UK	Innovation	United Kingdom	Japan	Insurance	Product development mandate for medical, financial insurance and pension insurances.	<i>I have a big budget for research and development ... I'm interested in new business models, new technologies, new ideas, concepts ... we focus on researching and trying to export new technology from here to Japan</i>
OPS FRN	Operations	France	China	Electronics	R&D centre in wireless communication, artificial intelligence, design, image processing and sensors.	<i>Our mandate is to increase collaboration with the local ecosystem, particularly driving knowledge development in microelectronics and software and enhancing processor technologies.</i>

internal weaving involves two main activities: coordinating the HQ-subsubsidiary relationship and transferring knowledge between internal subsidiaries. Below we outline how INTERM engages in these activities to facilitate subsidiary knowledge transfer and in turn internal embeddedness.

4.2.1. Coordinating the HQ-subsubsidiary relationship

The subsidiary's innovative capacity is dependent on how effectively it can transfer knowledge with the HQ (vertically), but many subsidiary interviewees noted that this was often challenging. Engaging directly with HQ was crucial for INTERM's subsidiary clients with competence-creating mandates that were seeking to deepen their influence over HQ and its involvement in their innovation activities. One subsidiary respondent in the Israelian subsidiary of a South Korean MNE stated that although *we are viewed by [HQ] as a hub of crucial technology ... our decision-making process is very much strategically influenced from the mothership. The ability for us to move forward in an investment is based upon a sponsor from HQ* (HOO ISR, AUTO/ROK). Our findings suggest that INTERM was actively involved in the process of *managing the HQ* on behalf of the subsidiary and its innovation activities, which enhanced communication and increased knowledge exchange between the HQ and the subsidiary.

Interviewees in INTERM outlined the importance of increasing their communication for knowledge flow with HQ; *we are always trying to communicate with the HQ and connect them back with the subsidiary. Any chance I get I will travel to the HQ and set up meetings or dial in virtually. This builds relations and opens the flow of information between us, the HQ and the local subsidiary, which is a win-win situation* (CEO INTERM). Respondents noted that this was one way they add value for the subsidiary by coordinating with HQ, especially when *there is a lack of information exchange.*

One example, [an MNE subsidiary] that operates here in Berlin and revealed to us how their information flows. Information exchange is not appreciated [by the HQ] (Manager BD GER, INTERM). Communicating with HQ on innovation-related activities was more complex for those subsidiaries with an HQ outside their region, for instance, the German subsidiary of a Japanese HQ or a French subsidiary of a Chinese HQ. However, subsidiary interviewees commented on the value of INTERM in enhancing knowledge flows and embeddedness with HQ with one individual noting, [INTERM] has really helped us in communicating with the corporate function and this has improved relations and enabled greater information flow (OPS FRN, ELEC/CHNA).

Increasing communication with HQ on behalf of the subsidiary was complex for INTERM given that HQ regularly intervened in local innovation at the subsidiary. INTERM respondents noted that when they identified an innovation opportunity for subsidiaries, this was often delayed as subsidiaries had to first convince the HQ of the value of this innovation. As such, an important part of the coordinating activity for INTERM was involving HQ earlier in the decision-making process or more specifically trying to engage HQ in the intermediary-subsubsidiary relationship *at the right time*. One INTERM respondent provided a vivid example of how HQ reacted when they were not brought into the innovation process earlier;

I get the ball rolling internally with the intent to launch the process the following day. However, the next morning we receive an email with the information that the headquarters has thrown everything into disarray again, determining new strategic goals (Manager BD GER, INTERM).

A respondent in a German subsidiary reiterated the need for INTERM to continually include the Japanese HQ despite their autonomy in R&D, *we have R&D here in Germany, but this is all coordinated by Japan.*

Table 3
Coding structure.

First-order constructs	Second-order constructs (activities)	Aggregate dimensions (function)
<ul style="list-style-type: none"> - Increasing the subsidiary's communication and relations with HQ - Ensuring that key decision makers at HQ are involved earlier in the subsidiary innovation process - Managing political dynamics with the HQ on behalf of the subsidiary - Championing the local subsidiary at HQ by increasing its credibility - Proactively communicating on behalf of the subsidiary with sister subsidiaries - Identifying duplications or best practices with other sister subsidiaries - Structuring information between individual senders and receivers in subsidiaries - Proactively targeting key decision makers across the MNE subsidiary network - Creating a mutual understanding between the subsidiary and the local context - Translating local language for the subsidiary - Identifying how the subsidiary may take advantage of institutional uncertainty opportunities - Providing the subsidiary with access to local ecosystems - Bridging ecosystem heterogeneity for the subsidiary - Mapping ecosystems within the local context for the subsidiary - Reducing information asymmetry for the subsidiary - Having a clear direction and search criteria to improve subsidiary knowledge sourcing - Providing effective decision-making tools for the subsidiary when navigating local complexity - Providing more accurate information - Grasping the level of risk in the local market for the subsidiary - Involving subsidiary early in discussions with local partners - Leveraging existing relationships for the subsidiary in volatile or culturally sensitive contexts - Building new connections locally for the subsidiary - Connecting the subsidiary to an international network 	<ul style="list-style-type: none"> Coordinating the HQ-subsidary relationship Transferring knowledge between subsidiaries Bridging cultural and institutional differences for the subsidiary Navigating subsidiary access to a complex ecosystem Increasing decision speed and decreasing risk locally for the subsidiary Becoming a trusted scout for the subsidiary 	<ul style="list-style-type: none"> Internal weaving (Intermediary enhances a subsidiary's innovative capacity by facilitating intra-firm knowledge transfer) External filtering (Intermediary enriches a subsidiary's innovative capacity by augmenting local knowledge sourcing)

Whenever we get in contact or we would like to work together ... this automatically means that at some point, [INTERM] have to work with Japan (CAO GER, ELEC/JPN).

INTERM respondents added that involving HQ earlier in the innovation process also included targeting key decision makers at HQ, *if you speak to the headquarter right away, the decision-making process is much quicker than if you speak to the local innovation teams* (Manager UK, INTERM). For instance, INTERM respondents detailed that a subsidiary will often not have the key decision-makers based locally and these individuals will usually sit at the HQ, so it is important for INTERM to target them early;

It's always easier to negotiate contracts with people who are the budget owners and have responsibility. And usually, you come upon them the closer you get to the HQ. This means I'm more likely to meet the CDO at the HQ. It's possible [in the subsidiary] but the process is longer and thus rather resource-inefficient, as you encounter some roundabout routes (Manager BD GER, INTERM).

Involving the HQ or not may depend on the structure of a given MNE as to whether it is centralised or decentralised, or even based on the country of origin, as one interviewee noted, *we have a lot of international [clients] such as Japanese, American, Chinese and in that case, we discuss and negotiate with the head of the subsidiary. But France and Germany are most of the time headquarter-based* (CEO, INTERM). However, it became clear that INTERM's intermediation activities were very much global in nature, and interviewees added that their end goal is to always try to target *company-wide innovation* when trying to connect with the HQ and the broader MNE on behalf of the subsidiary.

Another crucial part of INTERM's coordinating activity involved improving the credibility of the subsidiary at HQ. In some cases, where the subsidiary *lacked credibility* internally or had a politically charged relationship with the HQ, INTERM established a direct relationship with the HQ to shield the subsidiary and ensure more effective knowledge transfer. This contributed to increased knowledge flows and internal embeddedness between the HQ and the subsidiary. One INTERM respondent outlined how they navigated this political context, and targeted key decision-makers at HQ, *we had to share the information to only the right people because the HQ didn't want the local team to have all the information. The job was very political between the subsidiary and headquarter* (Manager CD, INTERM). These political dynamics also unfolded in terms of divergent *mentalities and objectives* as, when it comes to innovation, the HQ is only interested in *how my group is being disrupted* while the subsidiary is *going to be interested in a very specific piece of technology or tool they lack* (CEO INTERM). It was evident that INTERM is continuously trying to balance these contradictory political objectives at the HQ-subsidary interface.

Despite trying to remain an impartial actor in the HQ-subsidary relationship, INTERM respondents were conscious of these political obstacles to innovation and they, therefore, engaged in *championing* the local subsidiary as *local subsidiaries are never seen as equal and thus will face more challenges in voicing their needs compared to the headquarter* (Manager UK, INTERM). For instance, some respondents noted how they have seen local subsidiaries lose their innovative capacity and develop a risk-averse mentality because they were frustrated by HQ *always putting them down for trying something new, you may just resign and give up* (Partner INT, INTERM). As one subsidiary individual suggested, *credibility at HQ is such an important resource for us ... [INTERM] have helped enhance our credibility at HQ given their knowledge of the local context* (STRAT IRE, PHARMA/US).

Moreover, given its global orientation, INTERM also engaged directly with the HQ without involving the subsidiary, to explore opportunities in a local market. In this sense, INTERM engages with the HQ only, as the following quote suggests;

The headquarter [in Paris] pays [us] to go to China to scout start-ups. We present [it] back in Paris, after this they send the information back to China to their local operations (Manager CD, INTERM).

Ultimately, INTERM respondents outlined how coordinating HQ-subsubsidiary relations is a delicate balancing activity, in that if the subsidiary is too closely connected with the HQ, then their innovation will become cannibalised, and if they are too far away then they are not benefiting from any experience back-loop (CEO INTERM). If this activity is not maintained over time it may lead to diminishing knowledge flows and less internal embeddedness between the HQ and subsidiary.

4.2.2. Transferring knowledge between subsidiaries

In performing their internal weaving function, we find that INTERM engages in the activity of facilitating intra-firm knowledge transfer for the subsidiary with other sister subsidiaries (laterally). Subsidiary respondents outlined the importance of increasing intra-firm knowledge transfer, stating, *it can happen that you make a proposal and then you get the information 'oh, we did this already five years ago' or 'we know that start-up' or 'we have already been in contact' or another scouting team has already contacted them etc. So, the internal information flow is crucial to be efficient (CAO GER, ELEC/JPN)*. This was particularly relevant for INTERM's subsidiary clients seeking to evolve their competence-creating mandates further through lateral knowledge flows and embeddedness.

This lateral knowledge sharing often took place both with sister subsidiaries within the subsidiary's region and across regions. Yet, this transfer often does not take place, and INTERM respondents noted that subsidiaries in the same MNE do not know how to talk to each other. For instance, *it's a big problem with these large companies. Not only have they limited innovation activities ... it is almost like different companies with these subsidiaries (Advisor ISR, INTERM)*. Subsidiaries in the one MNE often do not communicate or understand each other and INTERM respondents commented that *we know even better than them what their colleagues are doing and that is not unusual*. The following quotes are representative of this issue;

We worked for two or three subsidiaries of the same group, and they don't know each other ... we know subsidiary A and subsidiary B of the same group better, each of them working with [us], than they know themselves as they are very demarcated (CEO, INTERM).

[Subsidiaries] don't share it [knowledge] at all. I'm currently talking to three different departments where the people are based in two different locations, they have no clue from each other [or] that we're talking to them. There is no interaction between them at all. If I talk to [a] different department, they never knew that I talked to the other one (Manager BD GER, INTERM).

As such, INTERM engaged in improving knowledge flows between subsidiaries within their client MNEs. Respondents detailed how they may work for different subsidiaries in the same MNE, and it was important to identify any duplication and inefficiencies. In most cases, respondents actively facilitated knowledge transfer between two disconnected subsidiaries stating *we are giving them the information, the contact details of the other person, of which they may have never heard about it (Manager BD DACH, INTERM)*. In one instance, INTERM was interacting with both French and German subsidiaries, and they arranged a meeting with the French subsidiary, inviting people from the German subsidiary. However, *nobody there knew how they got into the meeting. Once we explained that we're already working with the subsidiary in France, they started to ask, what were they doing there, how they're structured or how the department is built up (Manager BD GER, INTERM)*. Subsidiary respondents outlined the importance of this activity for addressing blind spots in their internal knowledge sharing stating, *[INTERM] changed the relationship we had with our European counterparts ... they knew more than we did about our European plants, and we leveraged their expertise (HOO UK, INSUR/JPN)*.

Another important part of this activity involved bridging relations

between subsidiaries by providing a structure to the information between sender and receiver internally within the MNE. This structure involved setting up meetings between subsidiaries to act as a knowledge-sharing context while also assessing the *information gaps that each subsidiary had and communicating with each how they could learn from each other (Advisor ISR, INTERM)*. This was important given most MNEs were complex global structures that subsidiaries found difficult to navigate as one interviewee suggested, *we would ideally love to do more collaboration internally, but our structure is just so vast it's impossible to know who is doing what and how we can share and learn from each other (HOO UK, PHARMA/FRN)*. In an example of a German subsidiary, INTERM was educating one subsidiary on how other subsidiaries in their MNE source external knowledge. For instance, *they have so many subunits around the world ... they ask me, how do they [the other subsidiaries] work with start-ups? So, I tell them what they do, explain, inter alia, how they work together (Manager BD GER, INTERM)*.

Given its focus on cross-border intermediation, as INTERM begins to work with a local subsidiary they automatically engage in proactively seeking to connect with other subsidiaries globally within that MNE, as their President notes;

It's in our interest to make sure that when we start working with one entity that the whole group knows, but it is very difficult to manage this and spread the word when the group has hundreds of thousands of employees. It's the account managers job to make sure that during the contract we push forward to have our name shared.

However, similar to sharing knowledge with HQ, subsidiary-subsubsidiary knowledge transfer can be a delicate process, and INTERM respondents often had to share the information to only the right people in the right department (CEO, INTERM).

In sum, INTERM performs an important internal weaving function made up of crucial activities to increase intra-firm knowledge transfer and internal embeddedness, with both the HQ and sister subsidiaries, for its client subsidiaries.

4.3. External filtering

We define the external filtering function as the way in which the intermediary enriches a subsidiary's innovative capacity by facilitating external embeddedness for augmenting local knowledge sourcing. Specifically, this function involved four main activities: bridging cultural and institutional differences for the subsidiary, facilitating subsidiary access to a complex local ecosystem, increasing subsidiary decision-making speed while decreasing risk locally, and becoming a trusted scout for the subsidiary. Below we outline how INTERM engages in each of these activities.

4.3.1. Bridging cultural and institutional differences

Cultural differences between the subsidiary and its external environment are a significant challenge for INTERM in sourcing external knowledge. As an Israeli subsidiary respondent from a South Korean MNE stated, *each country has a different kind of culture, a way of collaboration and communication. Israel exhibits very informal and direct communication whereas communication in South-Korea is very much more formal, hierarchical (HOO ISR, AUTO/ROK)*. Another respondent in a German subsidiary noted how lacking a cultural bridge creates difficulties in sourcing knowledge stating *it's a matter of communication ... we need someone who can handle the complexity of cultures ... we need a medium (CAO Nordics, RAIL/GER)*.

INTERM serves as a cultural bridge between the subsidiary and the local cultural context and in order to create a mutual understanding and increase embedded relations locally. As one respondent noted, *if [subsidiaries] were able to bridge it easily without me, they would not need me. That is what I do every day, try to bridge the gaps, create a mutual understanding ... I understand that when one person says X, in different countries, different cultures, X does not mean X. I am explaining every day what X*

means to different people (Advisor ISR, INTERM). Specifically, INTERM respondents were important translators in terms of speaking the local language, which subsidiaries believed was an important avenue to filtering external knowledge. A manager in INTERM's UK office added that this bridging role is particularly important when the cultural distance between the MNE's country of origin and the local subsidiary market is larger;

Even though it's one global market there still is localisation, meaning we have got a bunch of different cultures, local specificities and touches you cannot see if you do not live there or if you are not present in the local environment. To take advantage of these local touches, you should be working with someone who is present locally [...] and has a very good understanding of the respective culture (Manager UK, INTERM).

More broadly, INTERM respondents cited how institutional disruptions that create uncertainty or high risks provide them with an opportunity to enact their translation expertise and source knowledge for subsidiaries. For instance, recent geopolitical events such as Brexit or the trade war between US and China meant that the market is more complex which makes it more challenging to establish embedded relations. One respondent noted, *the need for [innovation intermediaries] increases when there is high uncertainty. Or in the areas where there is a huge structural and infrastructural difference, where the need of a translator is higher (CEO, INTERM)*. There is however a double-edged nature to this uncertainty for INTERM in that it may create difficulties in *accessing information, particularly in institutionally unstable markets but in developing countries such as Africa or South America, where you don't find trustworthy information easily, [intermediaries] make sense (Manager CD, INTERM)*.

4.3.2. Navigating access to a complex ecosystem

As part of its external filtering function, one of INTERM's important activities involved helping subsidiaries access and navigate local ecosystems that are complex and heterogeneous. Although subsidiaries we spoke to had competence-creating mandates, with greater autonomy to innovate locally, they noted that they still needed help from INTERM to understand these idiosyncratic systems. Subsidiary respondents detailed how important intermediaries were for *connecting them to local ecosystems* because *if you don't have any local resources, you will miss most of the exciting things happening there ... innovation intermediaries help to find the right solutions and partners (HOO ISR, AUTO/ROK)*. Although the subsidiaries we interviewed often have R&D departments that perform some type of product development or customisation, INTERM remained an important complement to this as subsidiaries often *don't have time and resources to look for other business opportunities. This is typically the main bottleneck of multinationals why they don't innovate enough (HOO ISR, AUTO/ROK)*.

INTERM respondents detailed that they serve to bridge the distance between their subsidiary clients and the local ecosystem in that they provide the subsidiaries with a *local presence* so that they *connect the source of innovation with my clients, I am their foothold in the industry. If you are based in France, you understand what is happening every day in the ecosystem ... You are connected to that ecosystem ... the main value that I cut open is the full presence (Advisor ISR, INTERM)*. INTERM's President added that it is more than just connecting the subsidiary to a local ecosystem, but also about giving them *access to the most qualified part of the ecosystem ... we build a local ecosystem around [us] in the place where we are, with analysts and other external partners on the ground*.

Respondents noted that there are certain things within an ecosystem that *cannot be bridged* effectively by subsidiaries, particularly the complexity of *how an ecosystem is interwoven ... how actors and institutions are interconnected (Manager BD GER, INTERM)*. As such, INTERM actively engaged in *bringing clients in geographies where they don't have strong innovation. In Israel, if you don't have the right person, it's a very obscure country and complicated to navigate and easier to just pay someone who shows strong R&D networking activities in the country (Manager CD, INTERM)*. Further, ecosystems in some countries are subject to radical

and intricate shifts as industry boundaries blur, creating more opportunities for firms to interact, with INTERM acting as external scouts for identifying these opportunities.

Subsidiary respondents noted that they will often direct intermediaries in terms of the types of knowledge or innovation that exists in these ecosystems, stating *we share what we're looking for and then they could constantly screen and monitor certain markets or certain areas and then provide us with information in a continuous flow (CAO GER, ELEC/JPN)*. In this sense, INTERM acts to *reduce the information asymmetry that exists between start-up ecosystem and large MNEs as decisions in the former are often made according to the rule of thumb ... or rather gut instinct (Manager BD DACH, INTERM)*. Information asymmetry also results from *a lot for noise in the local ecosystem* so there is a need for the intermediary to more effectively *connect the dots and improve the quality of the local networks by introducing efficient processes (Partner INT INTERM)*. In connecting the dots of complex and interwoven ecosystems, INTERM respondents added that they provide a platform for subsidiaries to be *part of the inner circle that takes place at meetings and events ... otherwise you waste an incredible number of resources (Manager BD GER, INTERM)*. Therefore, *we are gradually building a mini hub for each ecosystem, with experts for this particular ecosystem, presenting only the amount of information that is genuinely relevant (Manager BD GER, INTERM)*. INTERM respondents also carried out what they refer to as *ecosystem mapping* and in doing so they advance the *quality of information* that subsidiaries can source locally increasing the external embeddedness of the subsidiary.

4.3.3. Increasing decision-making speed and decreasing risk locally

INTERM respondents commented that they often recognise how slow the subsidiary is at making decisions on innovation and much of this due to a risk averse orientation. Subsidiary respondents commented that *slow decision-making hampers relations locally and deters local partners like start-ups that value speed and agility* when engaging in innovation and sharing information (HOO ISR, AUTO/ROK). As a result, INTERM sought to accelerate the decision-making process of the subsidiary by establishing a *clear search direction* on deciding which technologies, partners, or industries that subsidiaries should be operating in or diversifying into locally. This was crucial for competence-creating subsidiaries that are looking to progress their mandate and drive R&D through further embedding locally. A clear direction is imperative when searching for local knowledge and increasing external embeddedness as *we help them define in which areas, they want to go ... define the criteria and the needs (Manager BD DACH, INTERM)*. As one respondent noted, *we can bring in fresh pair of eyes and knowledge from a very vast background. Most of our clients are still focused on their specific industry whereas we as a company have a very industry-agnostic approach (Partner INT, INTERM)*. INTERM seeks to accelerate the innovative capacity of subsidiaries, which involves *saving time and money* so that subsidiaries can move *quicker* and release products to markets at greater speed by utilising the local connections that INTERM has already established.

The Spanish subsidiary of a German Pharma MNE client added that *[INTERM] can speed things up when I want to have an overview about what's going on in the field (CMO ESP, PHARMA/GER)* and this may be particularly important for subsidiaries in the early stages of their competence-creating mandate that are beginning to develop innovation decision-making processes. As one respondent suggests, *because it is still kind of a new subject for most corporates, they already save time ... because they can implement us and then build it up from there. Especially, some corporates are almost too late to build it up, so they can make it way faster (Manager BD DACH, INTERM)*.

Given the high level of heterogeneity in the local market, INTERM speeds up subsidiary decision-making and knowledge flows locally by providing a more secure assessment of the *level of risk* in collaborating. As one respondent noted, *we decrease the risk of [subsidiaries] doing collaboration by grasping the level of risk locally*, which often involves *protecting [the subsidiary] from mistakes (Manager BD DACH, INTERM)*. In this sense, the level of risk is lower given that INTERM provide

information that is more accurate than internal analysis departments;

Corporates are not afraid to take risks, they are afraid to take risks that they don't know or risks that they cannot measure ... they do innovation, and they will take that risk with a better proactivity than if they would still be questioning whether it is very risky (CEO, INTERM).

Others commented that although some subsidiaries can assess risks, INTERM *are external to the decision-making process which provides an extra slice of value to the risk assessment* (CEO, INTERM).

4.3.4. Becoming a trusted scout

Another central activity in INTERM's external filtering function involves furnishing trust with and between the subsidiary and the local environment. Trust enhances embeddedness locally and facilitates knowledge sharing but was very rarely established up front and had to be continually maintained over time. Trust is important when engaging with the subsidiary as they may be sceptical in the initial stages, leading to a lack of direction for INTERM in terms of what type of local knowledge may be relevant for the subsidiary. Our findings also suggest that trusting the intermediary is important for increasing embeddedness with local partners, as referrals from the intermediary will in turn be trusted by the subsidiary. As one subsidiary respondent noted, [INTERM] *have provided us with some valuable suggestions of local start-ups that we engage with ... Trusting [INTERM] and their expertise was an important part of that process for us* (CMO ESP, PHARMA/GER).

One respondent detailed their experiences in this context stating, *at the beginning they gave us mere search criteria, you can work with it but after some time, they involved us soundly and explained which problems they face. This allows our analysts to include the information and integrate it into the search, all generated by trust* (Manager BD GER, INTERM). Trust was also important between INTERM and local partners as *having good partners who corporates trust is a very important credential to us and also just like an easy way to do events together which just [further] increases our credentials* (Manager BD DACH, INTERM).

Interestingly, INTERM respondents noted that trust between the subsidiary and local environment is often about *telling the hard truths* because *the independent support is enhancing trust by transparent communication and being able to say no, creates trust* (President, INTERM). Yet, full transparency is a delicate balancing act between local actors and the subsidiary in that INTERM does not want to *give away its IP*. Trust is even more important in some Asian cultures such as Japan, Korea, and China, as the interviewee of a Japanese MNE based in a German subsidiary noted, *if you don't have personal relationships, you probably will not be successful and especially for a Japanese corporation knowing each other, trusting each other is the main key success factor* (CAO GER, ELEC/JPN). Moreover, in local environments that have higher volatility, or if *your trust in the political system is limited you feel nervous about ongoing conflict, innovation intermediaries are definitely something that helps you* (Manager BD GER, INTERM).

INTERM garnered trust locally through established networks. Respondents added how they often must *scout* for partners in new networks, engaging with experts that were familiar with broader industry changes. For instance, *I go with them for lunch or meet them at events and they talk a lot about everything, and you can ask them a lot of things, get a lot of insights* (Manager BD DACH, INTERM). INTERM respondents also recognised that network-based trust was particularly important for subsidiaries to source knowledge in certain cultures, as *China and Israel are network-based economies, if you find the right person you get a lot of open doors and it's easy to navigate* (Manager CD, INTERM).

In many cases, this trust building was more than just local, and INTERM established an *international network* that enabled some subsidiaries to source cross-border knowledge beyond their local market. As one respondent noted, *if you've got a big network, they tend to search for an outside door to the rest of the world ... Partnering with us even though we're small in China for instance, we're opening the door for Western multinationals on the ground* (Manager CD, INTERM). One interviewee added he

has a *request from [a French company] to point out what's happening in Asia* (Manager BD GER, INTERM). These insights further evidence INTERM's role as a global innovation intermediary when engaging with MNE subsidiaries.

Fig. 1 is a summary framework of our findings. It highlights how INTERM performs a dual knowledge role consisting of internal weaving and external filtering functions. These functions involve the innovation intermediary engaging in a range of activities to facilitate intra-firm knowledge transfer from the subsidiary and to augment local knowledge sourcing for the subsidiary.

5. Discussion & contributions

The primary aim of this study was to explore how OI intermediaries may enhance the innovative capacity of MNE subsidiaries by facilitating the knowledge work necessary for dual embeddedness. By bringing together insights on subsidiary dual embeddedness and OI intermediaries we make two primary contributions. First, we enrich IB literature on competence-creating subsidiaries and dual embeddedness (Achcaoucaou et al., 2014; Albis et al., 2021; Ciabuschi et al., 2014; De Beule and Van Beveren, 2019; Ferraris et al., 2020; Figueiredo, 2011; Lô and Geiger, 2022; Ryan et al., 2018) by identifying and unpacking the critical *dual knowledge role* of OI intermediaries as *embedding agents* for MNE subsidiaries. Specifically, we explicate how their role consists of both internal weaving and external filtering functions in helping subsidiaries navigate the knowledge-intensive challenges of dual embeddedness. Identifying OI intermediaries as embedding agents for subsidiary dual embeddedness enriches the literature on competence-creating subsidiaries and the significance of auxiliary actors in this process. Specifically, we challenge conventional thinking in IB literature that competence-creating subsidiaries lead in complex knowledge sourcing locally and instead suggest that they may be somewhat dependent on OI intermediaries. Second, we contribute to OI studies, specifically literature on OI intermediaries (Aquilani et al., 2017; Howells and Thomas, 2022; Lopez-Vega et al., 2016; Mahnke et al., 2008; Mina et al., 2014), by illuminating the range of complementary activities that OI intermediaries perform when engaging with MNE subsidiaries. Specifically, the dual knowledge role of OI intermediaries utilises a range of activities to enhance intra-firm knowledge transfer while simultaneously facilitating inter-firm knowledge sourcing to the MNE subsidiary. As such, blending IB and OI research, our study answers calls for more work on the activities of OI intermediaries (Howells and Thomas, 2022) by showing how they help competence-creating subsidiaries manage the innovation-integration dilemma. Below we expand on these contributions.

5.1. Subsidiary dual embeddedness

Our study contributes to research on developing subsidiary dual embeddedness (Achcaoucaou et al., 2014) as we reveal that even subsidiaries with competence-creating mandates will confront intensive and often conflicting knowledge-intensive challenges that cannot be addressed in isolation. Extant work in the field of IB examining subsidiary innovative capacity has mainly focused on the capabilities of the subsidiary in managing dual embeddedness (De Beule and Van Beveren, 2019; Ferraris et al., 2020; Figueiredo, 2011; Phene and Almeida, 2008), overlooking the 'how' of auxiliary actors, like OI intermediaries, in bolstering the knowledge creation capacity of the subsidiary both internally and externally. Our study shifts the attention to the critical dual knowledge role of OI intermediaries in assisting MNE subsidiaries to deepen and maintain internal and external embeddedness, specifically through internal weaving and external filtering. We illuminate how, in certain scenarios, competence-creating subsidiaries may face significant obstacles in establishing or progressing their dual embeddedness (Albis et al., 2021; Forsgren et al., 2005; Reilly and Scott, 2014), triggering assistance from OI intermediaries for effective intra-firm

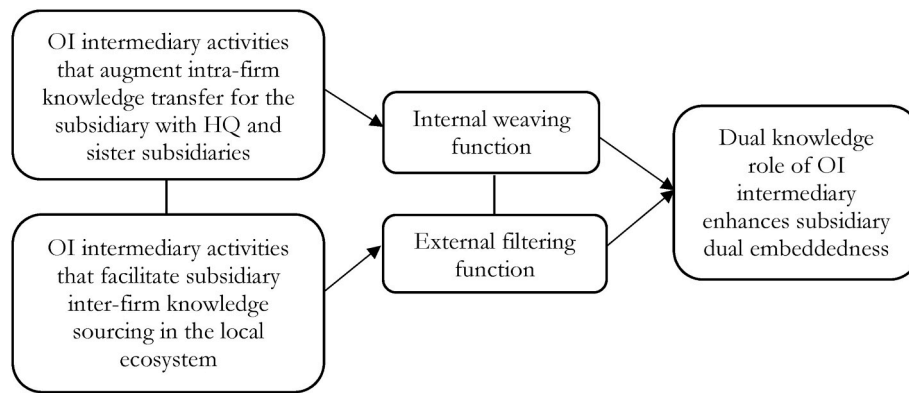


Fig. 1. The dual knowledge role of OI intermediaries for MNE subsidiaries.

knowledge transfer with HQ and sister subsidiaries as well as sourcing locally embedded knowledge. Research identifies how the challenges of achieving subsidiary dual embeddedness include local complexity, such as varied cultures, heterogeneous knowledge, or intertwined networks (Aoyama, 2009; Owen-Smith and Powell, 2004; Sammarra and Biggiero, 2008), and a lack of attention from other units or lack of integrative mechanisms within MNEs (Monteiro, 2015; Persson, 2006; Zeng et al., 2018). Expanding the reach of these studies, we suggest that such embeddedness challenges expose the true value of leveraging and exploiting OI intermediaries that possess specialised expertise for MNE subsidiaries to navigate these conflicting demands. While some subsidiaries may be capable of developing and maintaining either internal or external embeddedness (Meyer et al., 2011; Ryan et al., 2018), our study disentangles the critical role of OI intermediaries as embedding agents in both fostering subsidiary intra-firm embeddedness with HQ and sister subsidiaries, while also augmenting inter-firm embeddedness in the local environment. As such, our findings reveal how OI intermediaries perform a crucial yet overlooked role in helping subsidiaries defuse tensions in the innovation-integration dilemma (Mudambi, 2011).

The dual knowledge role that INTERM performed in our study was concentrated on a variety of activities that are important for enhancing knowledge sourcing externally and knowledge transfer internally for the subsidiary. Regarding external knowledge sourcing, studies have concentrated on the role of subsidiaries as local scouting units for enhancing the innovative capacity of the MNEs (Andrews et al., 2022; Monteiro and Birkinshaw, 2017; Monteiro, 2015). In contrast, focusing on the intermediary-subsidary interface, we identify OI intermediaries as dedicated external scouting units that subsidiaries should utilise to source locally embedded knowledge within complex ecosystems. Open innovation intermediaries act as highly specialised scouts and possess location-specific social and human capital that subsidiaries will have difficulties accessing or exploiting. As such, when MNE subsidiaries are not able to carry out value-added knowledge sourcing processes such as translating, matchmaking, or transforming (Monteiro and Birkinshaw, 2017), intermediaries can perform these activities on their behalf. However, as OI intermediaries are in effect external actors, our findings suggest that an important function involves building the trust of their subsidiary clients and external actors in the local market. Such trust is crucial as subsidiaries' externally embedded ties are developed by third-party referral (Uzzi, 1996) – subsidiaries are more likely to trust the referred external units if they trust the intermediary. Therefore, the trusted intermediary can help subsidiaries to establish embedded ties with more external units, maximising their external embeddedness. In addition, while dual embeddedness studies have indicated the importance of bridging cultural and institutional differences (though without enough attention to the role of innovation intermediaries) (Cenamor et al., 2019; Ferraris, 2014; Meyer et al., 2011), we reveal decision-making speed and risk assessment as important activities for

external knowledge sourcing that have not been sufficiently analysed previously. A higher decision-making speed enables embedded ties with more external units possessing useful knowledge. It is particularly important in high-velocity or complex environments where technologies can become obsolete quickly (Bourgeois and Eisenhardt, 1988). Our findings therefore suggest that leveraging the knowledge expertise function of intermediaries may be even as important for competence-creating subsidiaries with greater autonomy to enrich their local innovation capacity.

Regarding internal knowledge transfer, studies on HQ-subsidary relationships suggest that HQ may positively (Bjorkman et al., 2004; Ciabuschi et al., 2010) or negatively (Ciabuschi et al., 2010; Zeng et al., 2018) affect internal knowledge transfer of subsidiaries. Reconciling prior findings, this study shows that internal weaving, which involves the activity of coordinating the HQ-subsidary relationship, is an important but delicate balancing act for intermediaries to perform. To bolster internal knowledge transfer for the subsidiary, intermediaries need to increase communication with HQ and key decision-makers at the right time. On the one hand, HQ can prevent subsidiary knowledge from being transferred to other units if they do not recognise the value of this knowledge. On the other hand, as important decision-makers, HQ can provide valuable support for subsidiary knowledge transfer. In this sense, a key function of an OI intermediary's role may be to convince key corporate decision-makers to change their mind on the subsidiary's behalf, using its credibility and non-political relationship. In this way, the intermediary can facilitate on-going communication (Figueiredo, 2011), mitigate uncertainty for cooperation (Nielsen, 2005), and promote trust (Uzzi, 1997) internally, all of which are features of embedded ties beneficial for the subsidiary's internal knowledge transfer. Studies on dual embeddedness point to certain issues such as cognitive limits, identity, and routines (Meyer et al., 2011; Schotter et al., 2017; Song, 2014), but largely overlook the credibility and political issues that can hinder knowledge transfer (Conroy et al., 2019). For transferring knowledge laterally between subsidiaries, it is important to establish a connection with the right people and utilise the right structure of information as the communication protocol (Dhanaraj et al., 2004), which we find is a crucial activity of an OI intermediary's internal weaving function. Such a protocol can facilitate mutual openness (Gilsing and Duysters, 2008) within the MNE. Increased communication and greater awareness of shared expertise between globally dispersed subsidiaries facilitates lateral collaboration, enhancing the innovative capacity of each subsidiary (Santistevan, 2022). As such, we argue that the OI intermediary performs a crucial activity in facilitating both vertical and lateral flows of knowledge to and from the subsidiary, by increasing its internal embeddedness across the MNE.

5.2. Open innovation intermediaries

Another major contribution of our paper lies in advancing our

understanding of the specific function and activities that OI intermediaries engage in as part of their dual knowledge role with the subsidiary. In contrast to extant work on innovation intermediation in general (Colombo et al., 2015; De Silva et al., 2018; Howells, 2006; Lichtenthaler, 2013; Lin et al., 2020; Tran et al., 2011), we show that, when serving as embedding agents for MNE subsidiaries, innovation intermediaries may not confine their role to external knowledge sourcing. Open innovation intermediaries may act as internal brokers to link disconnected units across the MNE to facilitate intra-firm knowledge transfer on the subsidiary's behalf. In this sense, we find that internal weaving and external filtering functions are complementary parts of their dual knowledge role which are performed in tandem to combat contradictory embeddedness demands for the subsidiary. For instance, through internal weaving, we find that OI intermediaries can help MNE subsidiaries to transfer knowledge internally that can maximise the use of externally sourced knowledge in MNEs. Similar to Lopez-Vega et al. (2016), we argue that, through external filtering, OI intermediaries can help MNE subsidiaries to source more external knowledge that can be recombined by other units within the MNE.

In detailing how intermediaries weave internal ties for MNE subsidiaries, we build on work in the area of internal embeddedness (Garcia-Pont et al., 2009; Yamin and Andersson, 2011) and intra-firm knowledge transfer in MNEs (Asakawa et al., 2018). Much of the work on innovation intermediaries in general (Agogué et al., 2017; Klerkx and Leeuwis, 2009; Lin et al., 2016) and OI intermediaries in particular (Lopez-Vega et al., 2016; Mina et al., 2014) considers their role in connecting firms to external knowledge search without fully unpacking their boundary spanning capacity in connecting the local subsidiary to other internal units. An interesting finding from our study is that OI intermediaries may often have a better understanding and awareness of an MNE's internalised structure and innovation initiatives than the local subsidiary that they serve. INTERM in our study acted as an internal broker by connecting local subsidiaries to other internal units for project collaboration and knowledge transfer. This may mean that OI intermediaries are more effective than local subsidiaries at communicating the value of local knowledge that may appear unrelated or technically complex for the HQ to decipher. In this sense, OI intermediaries carry out scouting activities internally within the MNE, providing an objective eye for navigating and connecting the local subsidiary with actors across a globally complex architecture. This was an important part of the internal weaving function that INTERM performed. In contrast to extant work that considers OI intermediaries in a local context (Aquilani et al., 2017; Howells and Thomas, 2022; Lin et al., 2016), INTERM is an interesting case of what we refer to as a globally connected OI intermediary whose activities may transcend the local context when engaging with MNE subsidiaries through transnational mediation (Mahnke et al., 2008). By illuminating the global dimension of their role in helping subsidiaries influence across the internal MNE structure, these insights expand the reach of extant work on the various functions and activities that OI intermediaries perform (Aquilani et al., 2017; Lopez-Vega et al., 2016; Mahnke et al., 2008).

Building on studies on the external embeddedness of the MNE (Figueiredo, 2011; Nell et al., 2011) we find that OI intermediaries also perform a crucial function in the external filtering of knowledge for MNE subsidiaries. We therefore enrich research on the significant role of innovation intermediaries in domestic contexts (Howells, 2006; Lichtenthaler, 2013; Lin et al., 2016; Tran et al., 2011) and apply these insights to the context of subsidiary knowledge sourcing. In general, we argue that intermediaries may act as MNE knowledge agents, characterised by *proactive engagement* (Lichtenthaler, 2013) in exploring innovative technologies and partners, accessing, acquiring, and comprehending unknown sources of innovation. Studies show that knowledge ambiguity may impair external embeddedness and the innovativeness of the subsidiary due to cultural differences and language barriers between the subsidiary and its local ecosystem (Simonin, 1999; Zeng et al., 2013). In contrast, we find that OI intermediaries act

as bridges or gateways to external actors in local ecosystems that are rich in heterogeneous and diverse knowledge (Monteiro and Birkinshaw, 2017). Our findings reveal that OI intermediaries have often built the necessary embedded relational networks with key industry or innovation experts in local start-ups that are critical for enhancing the subsidiary's innovative capacity. As trusted scouts, they are able to extend these embedded relations to the subsidiary through referral. In our study, INTERM became a source of accurate and reliable knowledge in what were often difficult external networks for subsidiary clients to navigate, consisting of various actors across multiple industries. In diverse cultural contexts, OI intermediaries may need to perform a translation activity in deciphering the intricacies of local cultures as well as interpreting the architecture of complex local ecosystems for subsidiaries. Moreover, our findings reveal that the more geographically and cognitively distant the HQ and subsidiaries are, the more likely that intermediation generates complementary value, driving concurrent knowledge sourcing and transfer. Therefore, OI intermediaries are critical embedding agents, augmenting a subsidiary's innovative capacity by decoding network complexities and enhancing local responsiveness. In this sense, subsidiary innovation initiatives (Ambos et al., 2010; Dörrenbächer and Gammelgaard, 2016) may occur more regularly if the OI intermediary enables the subsidiary to understand, access, and acquire already filtered knowledge more rapidly and with less risk.

5.3. Limitations and future research

The findings of this study are subject to limitations. First, with a small sample size, focusing on a specific type of OI intermediary and competence-creating subsidiaries, the results may not be transferrable to all types of intermediaries or subsidiaries. However, we aimed to generate rich examples and first-hand insights rather than establishing generalisability. Therefore, while it has included several countries and industry contexts, to illustrate the multidimensional and global nature of innovation intermediation, future research should pursue a single host country design to control for deviations in institutional settings while focusing on a particular industry. Second, the scope of this study was limited in terms of not having representation from HQ. Although subsidiary managers could answer questions regarding HQ involvement, the HQ perspective may be necessary to get the full picture of intermediation on the MNE. Third, we concentrated on the relationships between the intermediary and subsidiaries and covered multiple countries but did not focus specifically on dyadic relationships (one location of the intermediary and one MNE subsidiary in the same country), although some dyads were captured (e.g., in France, UK/Ireland, Germany, and Israel). Focusing on dyadic relationships may reveal more detailed dynamics of interactions. Finally, quantitative, and longitudinal studies are necessary to determine the actual efficacy of innovation intermediaries on the MNE's innovation progress over time.

There are also potential avenues for future work that can build on our findings. For instance, the role of innovation intermediaries within contexts of high uncertainty or volatility, such as emerging market multinationals, is intriguing and should be explored further. Studies could also investigate the political manoeuvring actions of subsidiaries to build influence internally, by leveraging innovation intermediaries. Hence, scholars could explore if the intermediary can assist in triggering the process of subsidiary initiative-taking and strengthen entrepreneurial power at the subsidiary level. Further work is also required to establish whether subsidiaries exploit the intermediary's knowledge proactively or are perhaps being *pushed into* it by their HQs. Although we focused on INTERM's engagement with competence-creating subsidiaries others could compare whether our findings are similar to competence-exploiting subsidiaries. Our results were not collected or analysed sequentially and no one function was considered more important than any other, but we encourage others to look at the evolution of these functions over time. Some research questions that we encourage others to pursue in building on our findings include: How do

OI intermediaries engage with competence-exploiting subsidiaries? What activities and functions do they enact to enhance their knowledge base locally and globally? How do subsidiaries leverage other types of innovation intermediaries such as incubators, accelerators, IP brokers, or university technology transfer offices? What role if any do these intermediaries perform in enhancing subsidiary internal embeddedness?

6. Conclusion

MNE subsidiaries can enhance their innovative capacity by simultaneously sourcing knowledge from their external networks and transferring knowledge across the MNE network. However, competence-creating subsidiaries are confronted with an innovation-integration dilemma which presents contradictory challenges in achieving dual embeddedness. In this paper, we found that OI intermediaries perform a crucial dual knowledge role when helping subsidiaries navigate the knowledge-intensive challenges of dual embeddedness. The OI intermediary in our study proactively engaged in simultaneously weaving knowledge ties internally across the MNE while filtering and translating knowledge externally for subsidiary clients. Our findings suggest that although this is a complex and demanding role to perform the OI intermediary was extremely proactive in seeking out and leveraging knowledge-creation opportunities for subsidiaries. It also facilitated embedded relations (internally and externally) for subsidiaries which is beneficial for knowledge sourcing and transfer. However, we reveal how performing this role requires the OI intermediary to habitually engage in a range of complementary activities that enhance intra-firm knowledge transfer both vertically and laterally, to and from the subsidiary, as well as expanding the capacity of the subsidiary to source knowledge externally in their local network. Interestingly, in contrast to extant work on OI intermediaries that largely concentrates on their local facing role in knowledge search, our findings illustrate a global dimension to the innovation intermediary's role and function in facilitating subsidiary dual embeddedness. Our work in this respect serves to move the conversation forward between IB and OI scholars on the significance of intermediary actors in enhancing subsidiary innovation.

Declaration of competing interest

None.

Data availability

The data that has been used is confidential.

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