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When does historical context matter? Explaining the emergence of competence-creating subsidiaries

Andrew C. Godley[1] · **Shane Hamilton**[2] · **Marrisa Joseph**[3]

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Abstract
Despite thorough attention to how context shapes subsidiary behavior, very little IB research has explored the dynamic impact of disruptive changes in historical context on organizational innovations in MNEs. Existing IB theory has robustly theorized the growth of competence-creating subsidiaries from the 1980s to the 2000s. However, our historical research demonstrates that this body of existing theory fails to explain an equally significant growth in subsidiaries with protean competence-creating characteristics from 1945 to 1970. We show that the introduction of the U.K. National Health Service in 1948 precipitated a major upgrade of research capabilities among a near majority of the population of subsidiaries in U.K. pharmaceuticals by 1970. Synthesizing from both IB and literature on historical methods, we analyze the impact of this disruptive transformation in context, identifying the specific mechanisms that produced the rapid growth in what we identify as proto-competence-creating subsidiaries. This occurred in response to a dramatically new context, in ways that differ from those predicted by current theoretical explanations, and led to an institutional innovation hitherto unknown to IB. The implications of this are significant in a contemporary moment of rapid institutional disruption, when existing conceptualizations of subsidiary behavior may increasingly fail to capture real-world dynamics.

Keywords History in international business · Innovation and R&D · Evolving role of subsidiaries and headquarters · Pharmaceuticals research · Subsidiary creativity · Historical context

Introduction

Recent contributions to the IB literature have emphasized the importance of expanding temporal horizons to enable the testing of theories across different historical contexts (Amdam & Benito, 2022; Buckley, 2021; Buckley & Casson, 2021; da Silva Lopes et al., 2019; Jones & Khanna, 2006). In particular, IB researchers should avoid the fallacy that events of the past proceeded in a linear, accumulative fashion (Decker, 2022; Lubinski, 2018; Welch & Paavilainen-Mäntymäki, 2014). Assuming a linear flow of time prevents serious consideration of how singular events can produce fundamental disruptions in institutional or technological contexts. Watershed moments produce wide-ranging transformations of political institutions, economic environments, technological capabilities, cultural values, linguistic meanings, and individual and organizational behavior (Athreye & Godley, 2009; Messina & Hewitt-Dundas, 2023).

Historians recognize such moments as dividing points between one historical period and the next and so seek to explain how a context at a given moment in time can reconfigure into a substantively new context. Historians understand context to refer to systems of meaning in which individuals and organizations are embedded (Hamilton & Godley, 2024), where actors' interactions with their environments are simultaneously both structurally deterministic and

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✉ Shane Hamilton
Shane.hamilton@york.ac.uk

Andrew C. Godley
a.godley@sussex.ac.uk

Marrisa Joseph
marrisa.joseph@henley.ac.uk

[1] University of Sussex Business School, Sussex House, Falmer, Brighton BN1 9RH, UK

[2] School for Business and Society, University of York, CL/A 145 Church Lane, Heslington, York YO10 5ZF, UK

[3] Henley Business School, University of Reading, Edith Morley 265, Whiteknights, Reading RG6 6UD, UK

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subjectively malleable (Wadhwani et al., 2020). Transitioning from one historical period to another is typically characterized by some sufficiently disruptive event that changes either or both of the structural and subjective features of the context. Such disruptions have the potential to transform MNE behavior.

Our first contribution in this paper is therefore to provide a response to the call of Meyer et al. (2020) for explorations of subsidiary transformations in moments of institutional disruption. The specific phenomenon we have selected for our study is the evolution of the internationalization of R&D and, specifically, the emergence of competence-creating subsidiaries (Cantwell & Mudambi, 2005; Papanastassiou et al., 2020). Over the past two decades a large literature has developed, characterized by a fairly widespread consensus about what the key environmental factors are that led to the growth of competence-creating subsidiaries (Schmid et al., 2014; Strutzenberger & Ambos, 2014). This consensus, however, is grounded in empirical evidence from the 1980s to the early 2000s. In order to probe whether this consensus also helps to explain subsidiary development in earlier periods, we focus on one specific population of subsidiaries in the U.K. pharmaceuticals sector from 1945 to 1970, and compare it with that from the 1980s to the 2000s. This comparison has been made possible through the creation of a new dataset drawn from a large-scale database of the historical population of subsidiaries in U.K. manufacturing (Godley & Fletcher, 2002). This evidence counters the prevailing assumption in the IB literature that competence-creating subsidiaries emerged only sometime around the 1970s (Behrman & Fischer, 1980a, 1980b; Pearce, 1989; Ronstadt, 1978) by confirming that nearly half of manufacturing subsidiaries in U.K. pharmaceuticals were conducting exploratory research before 1970.

Our second core contribution is to deploy historical methods to highlight the emergence of a novel and, at the time, distinctive organizational form. We identify an earlier form of competence-creating subsidiary, which we call a *proto-competence-creating subsidiary*. In contrast to the competence-creating subsidiaries that developed from the 1980s onward, the protean forms we identify pursued exploratory research that contributed to new product development, but they did not collaborate with parent MNE central laboratories.

Our third contribution is to draw on concepts from political science to explain the specific disruptive causal mechanisms driving this protean organizational response (Tilly & Goodin, 2006), which suggests the need for scholars to reconsider the nature of subsidiary autonomy during moments of large-scale institutional disruption. This, therefore, also contributes to the current discussion surrounding the dominant conceptualization of the subsidiary in the face of rapid changes in the global business environment (Andrews et al., 2023; Edwards et al., 2022; Lim et al., 2017).

The paper is structured as follows. The next section synthesizes a new approach to the historical context in IB from two very diverse approaches. After first noting the foundational importance of contextualization in IB, we then explore how historical methods for contextualization can address disruptive changes over time. Second, we summarize the consensus theoretical explanations within the IB literature for the emergence of competence-creating subsidiaries. We then describe the chosen empirical setting, the dataset, and the research strategies adopted. Finally, we present and discuss our findings on the emergence of proto-competence-creating subsidiaries.

Theoretical background: Historical contextualization and the emergence of competence-creating subsidiaries

The importance of historical context

There has been a rapid growth of studies with more robust contextualization in IB (Child et al., 2017; Jackson & Deeg, 2019; Nielsen et al., 2020; Welch et al., 2011, 2022). Rigorous contextualization has been developed in regards to: geographical or country characteristics (Klopf & Nell, 2018; Scott-Kennel & Saittakari, 2020; Wang & Larimo, 2020), market and network contexts (Isaac et al., 2019; Nell & Andersson, 2012), firm context (Eddleston et al., 2019; Sarabi et al., 2020), and technological context (Coviello et al., 2017; Zhang et al., 2015). IB theorists have challenged existing categories and typologies through consideration of contingency and variability across contexts, rather than assuming isomorphism (Fainshmidt et al., 2017; Kostova & Hult, 2016; Reiche et al., 2017). In the specific area of subsidiary behavior, contextualization has incorporated local market conditions, customer relationships, knowledge relevance, and subsidiary embeddedness (Crespo et al., 2022; Lim et al., 2017; Valentino et al., 2018). Yet, rarely do IB researchers explore the dynamics of historical context over a substantial period of time. Some IB scholars, noting the time-bound nature of their contextualization, have explicitly noted that lack of attention to change over long periods of time is a limiting factor in their research designs (Lyles & Salk, 1996; Manolopoulos et al., 2018). Others have recognized that without comparing phenomena across temporal boundaries, we lack clarity on the boundary conditions of theoretical models (Meyer, 2007).

Historians consider the contexts of the past from multiple epistemological perspectives, including comparative, interpretive, and poststructuralist approaches (Niittymies et al., 2022). Human behavior is deeply influenced by

dependencies and references within the local environment. When contexts are disrupted through some unprecedented event, then behavior can change. Tilly and Goodin (2006: 12) define the specific mechanisms that produce disruptive organizational and social rearrangements as events "that change relations among specified sets of elements in identical or closely similar ways over a variety of situations." Mechanisms that can be seen to produce similar rearrangements across multiple contexts can be identified as robust in explanatory terms. Three broad classes of mechanisms for social change can be identified: environmental, relational, and cognitive. The former two serve as objective, structural mechanisms, while the latter is subjective. All three offer means of explaining why broadly uniform outcomes might result from entirely incomparable initial conditions (Tilly & Goodin, 2006). Determining where one context ends and another begins, and which specific mechanism(s) produced the change, thus becomes the essential task for both explaining a significant social phenomenon and for interpreting its consequences (Gaddis, 2002; Lawson, 2008; Mahoney & Schensul, 2006). Applying these insights to IB phenomena across different historical periods should therefore enable us to differentiate between explanations that are specific to one historical context and those that transcend different historical periods.

The emergence of competence-creating subsidiaries

For IB scholars focusing on the historical development of the internationalization of MNEs' R&D functions there have been few attempts to impose historical periodization. Papanastassiou et al. (2020) divide the IB literature on the topic into different decadal groups (the 1970s, the 1980s and 1990s, and the post-2000 period), but do so using a linear temporality. Apart from associating the beginnings of the academic literature with the publication of two reports (Creamer, 1976; U.S. Tariff Commission, 1973), there has been no real attempt to understand how the growth of R&D subsidiaries may have been triggered by major events. This may be beginning to change with the recognition that subsidiary activity is becoming far more complex in response to recent transformative events (Andrews et al., 2023; Edwards et al., 2022; Lim et al., 2017). These changes in subsidiary behavior currently remain somewhat opaque to IB scholars, because very rarely has MNE subsidiary research considered the impact of political or institutional disruptions (Meyer et al., 2020). To historians, however, these large-scale transformations in politics, institutions, and technology appear to be similar to changes witnessed in the past. It follows that just as IB scholars are debating the validity of current theories about subsidiary behavior as the global economy undergoes substantial transformations, so we should also extrapolate backwards and assess whether current theoretical explanations are equally valid in earlier historical periods.

In the IB literature, the emergence of competence-creating subsidiaries is associated with the recognition that some large MNEs in the 1980s upgraded the mandates of some subsidiaries to "world product mandate" status and, subsequently, assigned them additional R&D responsibilities, coordinated by the parent research laboratories (Birkinshaw, 1996; Kuemmerle, 1997). This represented a "creative transition" for some subsidiaries, authorizing them to focus on exploratory research and to develop new products for international markets (Pearce, 1989, 1999). That competence-creating subsidiaries were increasingly observed in the 1980s must mean that they emerged earlier, however, exactly when no one knows. It was clear from case studies of large MNEs in the 1970s that overseas R&D functions were becoming increasingly specialized (Behrman & Fischer, 1980a, 1980b; Creamer, 1976; Ronstadt, 1978). Dunning (1998) noted that many U.S. MNEs were conducting some research in their U.K. manufacturing subsidiaries as early as the mid-1950s. Aggregate data confirmed that the overwhelming majority of the largest U.S. MNEs had established some overseas R&D subsidiaries in the 1960s (Creamer, 1976; U.S. Tariff Commission, 1973). However, IB researchers assumed this all to be evidence of adaptive R&D among subsidiaries because that was what the dominant model predicted. This traditional model of the MNE was premised on the assumption of the firm owning some sort of competitive advantage, where market frictions hindered attempts to exploit the advantage in international markets. Establishing manufacturing subsidiaries would help to overcome tariff barriers, or R&D subsidiaries would help to overcome heterogeneous local market requirements, thereby internalizing markets within the firm (Buckley & Casson, 2016; Vernon, 1966). In this traditional model, FDI was market-seeking, and so the purpose of establishing local R&D facilities was to exploit the MNE's home-based assets, its core technology, and to support access to overseas markets. Therefore, it was easy to assume that all early examples of research laboratories in subsidiaries must have been solely for adaptive research such as for compliance with local regulations.

However, explaining the emergence of competence-creating subsidiaries stands on a very different premise. Here, the growing diversity of R&D functions among subsidiaries is a response to growing competition in global markets. This transition in the wider environmental setting was associated with a fundamental institutional change which, beginning in 1964 with the Kennedy Round of General Agreement on Tariffs and Trade (GATT), liberalized world trade. Reducing trade barriers increased competition, prompting MNEs to shift their strategies away from market-seeking to efficiency-seeking FDI (Cantwell & Mudambi, 2005; Papanastassiou & Pearce, 2009; Pearce, 1989). By the 1980s, there was

growing recognition that improved co-ordination among specialized subsidiaries in multiple overseas locations could improve the MNE's competitive advantage. This transition from the ethnocentric model to one characterized by heterarchy (Hedlund, 1986) meant MNEs shifted from pursuing home-base exploiting, asset-seeking strategies to home-base augmenting, asset-exploiting strategies in response to the more competitive environment (Kuemmerle, 1997).

In earlier periods, when ethnocentric organizations were universal, subsidiaries operated under some considerable autonomy with "minimal parental interference" (Dunning & Lundan, 2008: 187) and any research would have been conducted in "locally independent laboratories" (Pearce, 1989: 192). By contrast, once MNEs crossed some threshold of accumulated knowledge about their wider international environment, the entire multinational organization was reconfigured away from a series of dyadic HQ-subsidiary relationships into an increasingly differentiated network and a polycentric organizational structure. Here the flows of knowledge were no longer necessarily from the center to subsidiaries, but were from increasingly specialized subsidiary laboratories ("internationally interdependent laboratories" [Pearce, 1989: 192]) to all other specialized nodes on the network (Andersson et al. 2007; Blomkvist et al., 2017).

While this process was occasionally augmented by some subsidiary managers acting entrepreneurially to attract attention and investment from parent companies and to seek an upgraded mandate for their subsidiaries (Birkinshaw, 1997; O'Brien et al., 2019; Reilly et al., 2023), overwhelmingly, the justification for privileging some R&D subsidiaries over others was because of the advantages associated with the subsidiary location. Where subsidiaries were located within regions with strong science bases producing relevant new knowledge, MNEs had a strong incentive to pursue knowledge-seeking strategies (Cantwell & Mudambi, 2005; Cantwell & Piscitello, 2005; Pearce, 1999). For those subsidiaries given "World Product Mandate" status, managers were allocated additional resources from parents to enhance research competences and to embed the subsidiary laboratory within the local knowledge-creating network, collaborating with other local R&D producers. Existing subsidiary laboratories acquired upgraded research status but they lost autonomy because their research activities were now coordinated by the MNE central research laboratories. This not only generated advantages to the MNE, but also allowed proprietary MNE knowledge to spillover into the cluster, further augmenting the innovation potential of the location (Andersson et al., 2007; Cantwell & Piscitello, 2005; Narula & Santangelo, 2009).

In consequence, there is a widespread consensus within the IB literature that the emergence and growth of competence-creating subsidiaries since the 1980s was due to three prevailing factors: an increasingly competitive global environment forcing MNEs to pursue efficiency-seeking FDI; the presence of diverse assets within the MNE's internal network which could be better coordinated to the advantage of the MNE; and the presence of networks of research and new knowledge creation within specific research-intensive overseas locations where MNEs could gain privileged access to relevant new knowledge. Competence-creating subsidiaries are therefore one aspect of what has become recognized as a key source of competitive advantage for MNEs: the ability to coordinate effective global networks, combining and recombining the knowledge and resources from within their own internal networks with the ability to develop and benefit from embeddedness in external networks in key knowledge-producing locations (Blomkvist et al., 2017; Papanastassiou et al., 2020; Zanfei, 2000).

This widespread consensus accurately explains the increasing diversity of R&D activities among subsidiaries in the period from the 1980s to the 2000s. However, IB scholars have not yet considered whether these consensus explanations for the emergence of competence-creating subsidiaries are also valid for any earlier period. The period before 1970 was characterized by considerable barriers to trade, when almost all FDI was market-seeking. There was no knowledge-seeking FDI then. We noted earlier that within the existing IB literature, nobody knows exactly when before the 1980s competence-creating subsidiaries first emerged. However, using a newly created dataset, we can now confirm that there was a substantial population of manufacturing subsidiaries operating in U.K. pharmaceuticals before 1970, and further, that nearly half of these conducted exploratory research. This new evidence then permits us to begin addressing our research questions, which are:

1. Are the current dominant theoretical explanations for the emergence of competence-creating subsidiaries equally valid across different historical contexts and in earlier historical periods?
2. If they are not, what are the mechanisms that led to the emergence of competence-creating subsidiaries in earlier periods and in different historical contexts?

Empirical setting, method, and data

Setting: The U.K. pharmaceuticals industry from 1945 to 1970 compared with the 1980s to the 2000s

Pearce (1999) and Davis (2000) have shown that pharmaceuticals was *the* most significant sector for subsidiary R&D specialization. For the purposes of surveying the historic evolution of competence-creating subsidiaries, it seems reasonable to assume that such specialization will

have occurred relatively early and diffused more widely than in other sectors, leaving the greatest amount of historic evidence from which to draw conclusions. Early internationalization in pharmaceuticals was associated with scientific discoveries allied to specific technological pathways. Remarkable breakthroughs in synthetic chemistry and biologicals in the 1890s allowed German firms to become the global leaders (Burhop, 2009; Kobrak, 2002). Despite important advances in the 1930s among U.S. and U.K. firms, the Germans retained their technological lead until World War II (Cantwell, 1995a; Godley et al., 2019; Quirke & Slinn, 2010). After 1945, leading U.S. firms developed significant advantages in penicillin manufacturing, plowing the profits back into R&D and producing several remarkable breakthroughs in antibiotics, steroids, psychoanalytics, and anti-hypertensives. This provided the platform for the internationalization of the U.S. industry in the 1950s and 1960s (Athreye & Godley, 2009).

The continuing importance of the U.K. market led all major pharmaceutical companies in the world to open manufacturing subsidiaries in the U.K. at some point in the 20th century. Before World War II most of the U.K.'s domestic pharmaceutical companies were fine chemicals producers (which sold ingredients to pharmacists) and manufacturers of over the counter (OTC) products. Of all British-owned firms, only Wellcome had a substantial research laboratory (Davenport-Hines & Slinn, 1992; Edgerton & Horrocks, 1994; Jones, 2001). Foreign entrants before World War II were overwhelmingly producers of toiletries and OTC products, but the onset of war encouraged Lilly and Abbott to build plants to forestall anticipated scarcities of insulin and anesthetics (Slinn, 1999).

After the war, the American producers of new broad-spectrum antibiotics – Pfizer, Lederle, and Parke Davis – decided to establish U.K. factories, supplying them with intermediates for final assembly. However, currency constraints led the U.K. government to restrict imports, forcing companies to build plants to undertake the entire manufacturing process between 1950 and 1953. American producers of other patented therapies – anti-hypertensives, corticosteroids, and sedatives – faced the same dilemma, having to invest in full-scale manufacturing facilities in order to serve the then-largest market outside the U.S. Searle, Merck, Upjohn, Mead Johnson, SKF, and Whitmoyer followed the antibiotics producers, investing in U.K. factories from 1953 to 1960. Earlier entrants and non-American producers also built new factories (for example, Roche, Aspro Nicholas, Lilly, Organon, and Abbott). These subsidiaries needed laboratory capacity for local potency testing, but, as discussed below, many subsequently upgraded their research laboratories with mandates to produce new products for international markets.

The indigenous British producers recognized the potential threat these entrants posed to their home markets and began to scale up production, to expand their international sales, and to invest in research, which transformed the U.K.-owned pharmaceuticals sector (Corley, 2003; Davenport-Hines & Slinn, 1992; Jones, 2001). Before 1970, the U.K. was not considered one of the leading centers of research in global pharmaceuticals. However, after sustained investment in research by both British and overseas MNE producers, allied to its longstanding strength in university research and clinical medicine, along with supportive government policies, Britain emerged as the world's leading location for research that led to blockbuster products in pharmaceuticals during the 1980s (Thomas, 1994), before a subsequent shift to biotechnology undermined U.K. pharmaceutical research primacy (Cockburn et al., 1999; Owen & Hopkins, 2016).

Method

The research questions focus on assessing whether the dominant theories that were empirically supported in the period of the 1980s to the 2000s are similarly robust in an earlier period, that from 1945 to 1970 when the context was different. This research seeks to understand how different historical contexts may require different explanations for phenomena, and so it is grounded in an inductive approach founded on narrative theorizing (Leblebici, 2014). However, the pairwise comparison of one historical period with another permits us to use temporal bracketing, thereby mitigating the risk from a purely narrative approach being too descriptive (Cornelissen, 2017; Langley, 1999).

The key transition between the two periods at a global level was that MNEs shifted from market-seeking, first to efficiency-seeking, and then to knowledge-seeking strategies, as a response to increasing global competition in "the last third of the 20th century" (Papanastassiou & Pearce, 2009: 21). One key event therefore which punctuated the two periods causing significant institutional change was the 1964 Kennedy Round. This was a critical juncture because it was succeeded by an ever stronger commitment to reducing barriers to trade and investment across the world. There was no single moment when the global economy switched from a less competitive into a more competitive mode. Rather the Kennedy Round ushered in a years-long process, meaning that the division between the two periods has ambiguous boundaries (Langley, 1999). Equally the end-point for this more recent period is impossible to pinpoint, but is associated with aspects of deglobalization from some point after the late 2000s onwards.

These changes in the broad, global environment that enable the identification of different periods are reinforced by what were chronologically approximately coincident changes in the U.K. pharmaceuticals sector. The end of World War II coincided (within three years) with the introduction of the U.K. National Health Service, which upended

the institutional environment for the distribution and sale of prescription medicines. Moreover, from 1964 to 1970 the U.K. created a more rigorous safety compliance regime, initially through a voluntary scheme (called the Committee on Safety of Drugs) and then from 1970 the official and mandatory Committee on Safety of Medicines (Tansey & Reynolds, 1996). This imposed far greater responsibilities for demonstrating safety and efficacy onto producers and significantly reconfigured the costs of undertaking research in the U.K. (described more fully below). With this chronological overlapping of changes in both the global and in the U.K. pharmaceuticals environments, we have therefore framed the historic period as beginning in 1945 and ending in 1970. By the 1980s, the broad global environment had become far more competitive than in the 1950s and 1960s and the U.K. pharmaceuticals sector far more research-intensive and a more attractive base for conducting research. Omitting the 1970s, when these transitions were underway but not complete, therefore helps to underline the differences in contexts between the two periods.

Data

Data for the most recent period, the 1980s–2000s, are drawn from surveys of subsidiaries' R&D activities (which included U.K. pharmaceuticals) along with a series of detailed interviews with subsidiary managers conducted in the mid-1990s by Marina Papanastassiou and Robert Pearce, which they augmented with statistics on subsidiary patenting (Papanastassiou & Pearce, 2009; Pearce, 1999). For the earlier period, 1945–1970, outside a few industry-wide data points, there are very few official (or semi-official) sources of data on the U.K. pharmaceuticals sector. The data used here are therefore drawn from a series of research projects by John Dunning, Geoffrey Jones, and Andrew Godley on the historic population of subsidiaries of foreign multinationals in the U.K. (as described more fully in the Appendix). These data have been supplemented by other relevant sources, ranging from patent statistics, to transcripts of near-contemporaneous interviews with key industry stakeholders, as well as more conventional sources such as industry data and occasional official government records.

Finally, our definition of a competence-creating subsidiary needs clarification. Perhaps the first definition in the IB literature was from Ronstadt (1978), who emphasized the importance of "exploratory" research among what he called "Corporate Technical Units." This was refined by Pearce (1989), building on Behrman and Fischer (1980a and 1980b), who focused on the implications for subsidiary research agendas following some subsidiaries attaining a "World Product Mandate." These subsidiaries focused on new product development for markets beyond their domestic market. This represented a transition from being "locally integrated laboratories," where research was largely adaptive, solely for the requirements of the local market and largely autonomous from the parent company research laboratories, to becoming "international interdependent laboratories," where the upgraded research mandate was to develop new products for international markets, coordinated by parent central research laboratories (Papanastassiou et al., 2020; Pearce, 1989).

Many subsidiaries continued exploratory, pre-competitive research, even when their formal status within the MNE had not changed, and so IB researchers have used surveys, interviews, and longitudinal data to identify whether subsidiaries have crossed the threshold from competence-exploiting to competence-creating status. A consistent method that enables researchers to differentiate between competence-creating and competence-exploiting subsidiaries has been whether the subsidiary has registered a patent in an overseas jurisdiction, typically the U.S. (Blomkvist et al., 2017; Cantwell & Mudambi, 2005; Papanastassiou & Pearce, 2009). For subsidiaries outside the U.S., the registration of a U.S. patent has been assumed by successive IB scholars as evidence of research sufficiently innovative and exploratory to meet the U.S. Patent Office requirements for novelty. The costs of registration furthermore indicate a minimal threshold of value both to the subsidiary and parent and so indicates a minimal level of research co-operation between a parent and subsidiary (Cantwell, 1995b). For the earlier period, it is not possible to survey and interview key actors, but we have otherwise exactly replicated the method of identifying competence-creating subsidiaries for the earlier period, adding to evidence of subsidiary research capabilities gathered from corporate histories and contemporaneous specialist publications a search for evidence of U.S. patent registration by U.K. subsidiaries.[1] This establishes a consistent dependent variable across both periods, which is the within-period change in the percentage of the population of subsidiaries in U.K. pharmaceuticals that can be identified as competence-creating. We accept that patents are far from being a perfect proxy for research output (Silberston, 1975), but nevertheless, they continue to be a widely used metric. Furthermore, operationalizing research into competence-creating subsidiaries this way does give greater weight to their identification on the basis of their research capabilities

[1] We note that new product development is typically more complex in pharmaceuticals, having to pass much higher regulatory thresholds before product launch than in other industries. In order to apply a threshold of research quality consistent across competence-creating subsidiaries among pharmaceuticals and non-pharmaceuticals sectors, we have focused more on new product development rather than market reception (Grabowski & Vernon, 2000; Morgan et al., 2008; Munos, 2009).

rather than their integration into parent company research, something to which we return in the Discussion.

Findings

By the mid-1990s, 80% of pharmaceuticals subsidiaries in the U.K. had acquired competence-creating status (Pearce, 1999, Table 1), as parents pursued knowledge-seeking strategies (Papanastassiou & Pearce, 2009: 2–20; Pearce, 1999: Table 4).[2] But what of the earlier period, 1945 to 1970? Our summary of the principal characteristics of the historical population of subsidiaries in U.K. pharmaceuticals is reported in the Appendix, Tables A1 and A2. These data confirm that FDI in U.K. pharmaceuticals manufacturing was extensive before 1970. Between 1880 and 1940, we have identified 45 manufacturing subsidiaries opened, overwhelmingly from U.S. parents, 35 of which were still operating in 1945 (Table A1). From 1945 to 1970, a further 42 production subsidiaries opened, similarly dominated by U.S. parents. After passage of the Therapeutics Substances Act (1925), pharmaceuticals producers in the U.K. needed small laboratories able to comply with potency testing regulations, representing a minimal level of adaptive research. Among those entrants opening before World War II, evidence of exploratory R&D or new product development is minimal. Only one subsidiary, May & Baker (acquired by Rhône Poulenc in 1927), engaged in research that led to a new product for international markets, which was the novel sulphonamide M&B 693 in 1937 (Slinn, 1984). May & Baker was one out of the total population of 35 pharmaceuticals subsidiaries operating by World War II. Therefore, only 3% of that population was competence-creating subsidiaries, and, conversely, fully 97% of subsidiaries (or 34 out of 35) were competence-exploiting.

After World War II, this pattern of subsidiary behavior was transformed. Of the 42 new entrants, 23 – the majority – were identifiable as competence-creating subsidiaries by the end of the period. Moreover, of the 34 subsidiaries pursuing only adaptive research that had opened before 1940, 11 upgraded their research laboratories by 1970 and began to conduct exploratory research, including the subsidiaries of Parke Davis, Hoffman La Roche, Aspro Nicholas, Johnson & Johnson, AHP, Ciba, Abbott Laboratories, Bristol Myers, Eli Lilly, and Organon. Adding May & Baker to these 11 older established subsidiaries and adding them to the 23 more recent subsidiaries, leads to a total of 35 subsidiaries identified as competence-creating out of a total population of 75 manufacturing subsidiaries operating by 1970, or 47%, an increase of 44% from the pre-war share. The data therefore suggest that although competence-creating subsidiaries were very rare before World War II (only 3% of the population of pharmaceutical subsidiaries), they increased to nearly half (47%) of a larger population by 1970, from when they further increased to 80% by the mid-1990s. We now move to explaining these broadly similar increases in the population of competence-creating subsidiaries in the two periods under consideration.

Levels of competition. The first explanation of the emergence of competence-creating subsidiaries emphasizes the importance of how increasing levels of competition forced MNEs to move from market-seeking first to efficiency-seeking, which in turn prompted knowledge-seeking strategies. Before 1970, however, levels of global competition were low. MNEs were not pursuing efficiency-seeking strategies and so there was no competitive push toward knowledge-seeking FDI. Given that barriers to international trade and investment precluded such strategies, overseas research laboratories generally were not competence-creating. Even specifically within the U.K. pharmaceuticals sector levels of openness (a proxy for competition) were relatively low in the 1950s and 1960s, far lower than in the 1980s and 1990s (see Appendix, Table A3). There is therefore no evidence to suggest that FDI in U.K. pharmaceuticals between 1945 and 1970 was efficiency-seeking.

Alternative explanations drawn from current theory might be that these parent MNEs recognized potential for improving innovation within their internal networks, or that parent MNEs sought location advantages in the U.K. innovation system specific to pharmaceuticals technologies. In this scenario, the rapid increase in competence-creating subsidiaries from 1945 to 1970 could be explained by many parents recognizing the benefits to becoming double-network organizations regardless of the levels of competition they faced. If this were the case, then we would expect to see, on the one hand, evidence of competence-creating subsidiaries in the U.K. showing significantly increased levels of research collaboration within MNEs' polycentric internal networks, and, on the other, evidence of significant embeddedness within the local U.K. pharmaceuticals research innovation system.

Polycentrism. Evidence for the more recent period suggests that after the 1980s there was a strongly positive correlation between pharmaceutical MNEs adopting the polycentric form and investing in competence-creating subsidiaries in the U.K. (Papanastassiou & Pearce, 2009). For the earlier periods, there are significant data problems to measuring polycentrism. There is no single definition of what constitutes a polycentric structure, and there is no source of

[2] Unfortunately, neither Pearce (1999) nor Papanastassiou and Pearce (2009) report the actual number of survey respondents by sector. They identified 812 production subsidiaries and 180 R&D subsidiaries across all sectors. Pharmaceuticals was one of ten industries. Inferring from Pearce (1999, Table 4, p. 169), it was likely one of the three largest industries in terms of total numbers of R&D subsidiaries in the U.K.

historic evidence on exactly when the world's pharmaceuticals MNEs moved from ethnocentric to polycentric structures (Ghoshal & Bartlett, 1990; Hedlund, 1986).

In the absence of data on types of organizational structures among pharmaceutical MNEs between 1945 and 1970, Table 1 lists the 26 parent MNEs of the 35 competence-creating subsidiaries in U.K. pharmaceuticals along with each parent's total number of worldwide manufacturing subsidiaries in the years immediately preceding 1970. The mean number of these MNEs' worldwide manufacturing subsidiaries was 6.8 (with a mode of just one). In the empirical underpinning of the early literature on network organization among MNEs the typical number of production subsidiaries is many dozens (e.g., Ghoshal & Bartlett, 1990: 605). There is a threshold number of subsidiaries below which the organizational costs of moving to a polycentric structure make it uneconomic to do so. There is no definitive answer in the literature as to what that threshold number of subsidiaries might be, but it surely must be more than 6.8. The strong inference is that although there was very significant growth in the number and share of competence-creating subsidiaries in the period 1945 to 1970, it was highly unlikely that any of these pharmaceuticals MNEs had polycentric structures at the time. They were simply too small for the costs of structural change and increased central coordination to be worthwhile.

Table 1 Global subsidiary count of overseas parents with a competence-creating subsidiary in U.K. pharmaceuticals in 1963 (in order of year of parent's initial entry into U.K.)

Parent	Subsidiaries in U.K. in 1965	Total overseas production subsidiaries in 1965 (inc. U.K.)
Parke Davis	1	12
Roche	1	2
Rhone Poulenc	1	1
Sterling Winthrop	2	28
Johnson & Johnson	3	25
Aspro Nicholas	4	8
AHP	8	14
Ciba	2	n.d.
Abbott	1	5
Lilly	3	8
Bristol Myers	3	3
Organon	1	3
Roussel UCLAF	2	5
Squibb	1	1
Pfizer	3	22
Merck	2	13
Armour	1	2
SKF	1	2
Upjohn	1	3
Miles Laboratories	1	1
SB Penick	1	1
GD Searle	1	1
Vicks	2	2
Whitmoyer	1	1
Mead Johnson	1	1
Crookes Laboratories	2	n.d.
Mean number of subsidiaries in c. 1965	2.0	6.8

Notes and Sources There is no source that lists numbers of global subsidiaries for the world's MNEs, so the count was based on a number of different sources, notably annual reports, and including the database. This meant that information was inevitably partial and drawn from 1970 and the years immediately preceding it. The count is therefore approximate and covers a range of years before 1970 (and so presented as 'c.1965'). List of sources in Database, Appendix Table A1, A2. We note that Cohen et al. (1975) reports slightly higher numbers of manufacturing subsidiaries for U.S. pharmaceuticals MNEs, but at a slightly later end-date, with a mean of 10.7.

Indeed, a closer examination of Table 1 reveals that the parents with the greatest number of worldwide production subsidiaries were Sterling Winthrop, Johnson and Johnson, Pfizer, AHP and Merck, with nearly two-thirds of the total (102 out of 164) between them. Sterling Winthrop, Johnson and Johnson and AHP were heavily diversified, with ethical pharmaceuticals representing only around 10% of their total sales, a small fraction of their subsidiaries, and so unlikely candidates as the vanguard of polycentrism in global pharmaceuticals. However, if the strategic shift to polycentric structures took place among the leading MNEs before 1970, it seems reasonable to assume that such a move would have taken place among the largest pharmaceuticals-focused firms first, which were Pfizer and Merck. Yet, the corporate histories for Pfizer and Merck are consistent in suggesting that their U.K. subsidiaries were "generally unfocussed" or "autonomous" at this time and thus unlikely vehicles for enhanced organizational learning (Mahoney, 1959: 39; Mantle, 1994: 26). Among the rest of the MNEs with competence-creating subsidiaries in U.K. pharmaceuticals, the mean number of world-wide manufacturing subsidiaries was only 3.4. There is no evidence from the business history literature that any of these MNEs had developed structures that facilitated knowledge sharing anytime before 1970. Overwhelmingly, they were simply too small for the costs of transitioning to polycentric structures to have been worthwhile. Given that this was a time when ethnocentrism was universal, perhaps this is not surprising. Both Ford and Unilever, much bigger MNEs each with many more subsidiaries, were far from coordinating knowledge flows or research efforts between subsidiaries until the 1980s (Jones & Khanna, 2006).

Structural change is important in this explanation for subsidiaries developing research capabilities because it is seen as the immediate result of the gains to organizational learning crossing some sort of critical threshold. However,

Table 2 U.S. patents in pharmaceuticals assigned to U.K. subsidiaries, 1945 to 1970 and: A. with count for U.K. resident co-authors outside subsidiary, B. with count for all co-authors at parent MNC, or other subsidiaries, or other (non-U.K.) laboratories. *Source* Hall et al. (2001). Out of total population of 249 co-authors on 103 patents

Co-authors at U.K. university or public laboratory	Co-authors at U.K. private sector laboratory	
0	0	
Co-authors at parent company	Co-authors at sister subsidiary	Co-authors at other (non-UK) laboratory
1	0	3

We have adopted the conventional view in the industry, that it requires up to ten years of R&D creative effort before a patent is granted, to determine a cut-off of 31 December 1979 as the latest date of filing for a patent for inclusion in the set (e.g., ABPI, 2009). This gave a total of 103 patents with a gross total of 249 co-authors. Details of individual patents were checked using Google Patents.

organizational learning and knowledge recombination could, in principle, have been significant in these MNEs without structural change taking place. While organizational learning and recombination activities were a particularly important driver of subsidiaries acquiring research capabilities in the very recent past (Pearce, 1999: Tables 4 and 5), it might have been the case that knowledge-sharing and recombination were in reality also on the increase before 1970, but that they took place within the traditional ethnocentric structures.

If this were the case, then there would be evidence of complementary research paths taken by parents and U.K. subsidiaries before 1970 that are suggestive of recombination strategies. There are occasional references of subsidiary and parent pursuing complementary research paths in the corporate histories. However, where there is enough detail to form judgments, the far stronger impression is that the U.K. subsidiaries were left to pursue their own research agendas. The only evidence from corporate records of any parent central laboratory coordinating the subsidiary research laboratory is for Ciba, which integrated what it called fundamental research in its U.K subsidiary with its central laboratory at its Basel headquarters.

A more systematic analysis of subsidiary patenting behavior suggests that whatever research collaborations took place, they were insufficiently novel or worthwhile to have led to any patents co-authored by parent and subsidiary scientists. *Only one U.S. patent* out of 103 registered by U.K. pharmaceuticals subsidiaries in the period was co-authored by scientists at both the U.K. subsidiary and at the parent company (see Table 2). No co-authors were employed at any other sister subsidiaries. Indeed, only four co-authors from the entire population of 249 co-authors were employed *outside the subsidiary* to which the patent was assigned. Nearly 99% of all authors were employees of the subsidiary sponsoring the research. There is no evidence to support the view that these competence-creating subsidiaries emerged as the result of parent MNEs wanting to enhance the innovation potential of their internal networks. Internal networks were insufficiently developed for that to have been worthwhile.

Host economy location advantages. While research laboratories at U.K. subsidiaries recruited local scientists, there is otherwise little to suggest that they were trying to embed themselves into a location that was generating new knowledge. The U.K.'s location advantages in pharmaceuticals research did increase between 1945 and 1970, but not when compared with other leading research locations in the world during those years. The period when the U.K. became a global center for pharmaceuticals R&D was in the 1980s and 1990s. The amount of R&D conducted in U.K. pharmaceuticals rose from only £30 million in 1970 to £2,000 million in 1995, a significantly greater increase in R&D expenditures than in any other leading economy (ABPI, 1992–2009; Pearce, 1999). This was an increase from 6.6% of industry output in 1970 to 10.3% by 1980, and further to 16.1% by 1990, underlining how the U.K. became a research hub for pharmaceuticals after 1970 (ABPI, 1992: 1 and Table 22).[3]

By contrast, in the period leading up to World War II, the level of expenditure on R&D in the U.K. was "miniscule, even by the standards of the time" (Slinn, 1999: 20). U.K. R&D expenditure increased over the period 1945 to 1970 from £3 million in 1953 (the first year for which we have data) to £12 million by 1965, before accelerating to £30 million by 1970. This was an increase of 8% per annum in real terms between 1953 and 1965, which is significant, but it is still significantly less than the rate of growth over the period in the U.S. and in West Germany (Thomas, 1994; Walker, 1971). Moreover, a growing share of this research expenditure was coming from the overseas subsidiaries themselves. In 1953, the R&D expenditures of overseas subsidiaries in the U.K. were negligible, but by 1965 they contributed nearly one third (Cooper, 1966). The growth rate in research expenditures by indigenous U.K. pharmaceuticals interests

[3] R&D expenditure is an imperfect measure of inputs into the research process, in particular, given that it aggregates expenditure on basic research with typically much larger developmental work, when what is of key value to increasing location advantages is mostly the local capabilities in basic research (Scannell et al. 2012).

was only half the rate of growth in the U.S. industry over the same period (Walker, 1971). Unsurprisingly research output among U.K. pharmaceuticals producers lagged behind, British firms registering only a small fraction of the patents registered by the leading U.S. and West German firms before the 1970s (Davenport-Hines & Slinn, 1992; Godley et al. 2019; Quirke & Slinn, 2010). The U.K. was not a leading center of pharmaceuticals research before the 1970s and so possessed relatively few location advantages to attract knowledge-seeking FDI.

That the U.K.'s location advantages were relatively slight is reinforced when evidence of collaboration between the subsidiaries and U.K. research centers is examined. The earliest cases of competence-creating subsidiaries in the U.K. did have access to local research competences, like May & Baker in the 1930s. However, for the period from 1945 to 1970, U.K. university or public laboratory and subsidiary collaborations were only rarely mentioned in the corporate histories. Furthermore, analysis of the patenting behavior of competence-creating subsidiaries in U.K. pharmaceuticals in Table 2 shows that out of the 103 U.S. patents that were assigned to U.K. pharmaceuticals subsidiaries during 1945–1970, representing a total population of 249 patent authors, *not one co-author* was employed at a British university or public or private sector laboratory. In stark contrast to the 1980s and 1990s, competence-creating subsidiary patent authors were almost entirely employees of the firms to which the rights were assigned. There is little evidence that these competence-creating subsidiaries were embedded into the U.K. pharmaceuticals research community or with its leading university scientists.

This systematic temporal bracketing of two periods with different historical contexts has produced an unequivocal if surprising outcome. None of the three prevailing factors responsible for the emergence and growth of competence-creating subsidiaries in the 1980s to 2000s had any significant role during the emergence and growth of competence-creating subsidiaries between 1945 and 1970. The answer to the first research question - whether the dominant theoretical explanations for the emergence of competence-creating subsidiaries are equally valid over different historical contexts - is clear. The theoretical explanations that enjoy currency within the IB literature today are far from able to explain the emergence of competence-creating subsidiaries between 1945 and 1970.

We therefore can address the second research question: what were the mechanisms that led to the emergence of these subsidiaries in the period 1945 to 1970? Without the benefit of initial theoretical guidance, we now turn to inductive theorizing based on a close reading of the available business history literature of the U.K pharmaceuticals subsidiaries. As indicated earlier, apart from the widespread upgrading of research capabilities, the dominant theme in this literature is one of subsidiary autonomy. Indeed, for a large minority of these subsidiaries for which data are available (12 out of the 35 extant in 1970) there is clear evidence of considerable levels of local managerial agency, even entrepreneurial activity. Merck, for example, was the most aggressive in promoting its international sales in the 1950s and 1960s. Its global sales director described its international division (which was largely focused on the U.K.) as being like "a bunch of drunken tightrope walkers" (Cohen, 2001: 12). Its approach was to encourage substantial subsidiary autonomy to achieve sales targets in each region: "Each subsidiary developed its own style, patterned on the personality of its local chief executive" (Galambos, 1991: 141).

Other competence-creating subsidiaries in the U.K. were also characterized by high levels of entrepreneurial activity, operating under conditions of near total autonomy. Pfizer's U.K. subsidiary was led by two dominant figures who operated with minimal interference from and minimal concern for the parent company (Mantle, 1994). It wasn't until their retirement in the mid-1960s that the U.K. subsidiary was folded back into the larger organization. Aspro Nicholas in the U.K. was almost at war with its Australian parent during the period. SKF's U.K. research laboratory developed and launched the blockbuster Tagamet without any parental interference.

The emerging theme from this structured narrative is that subsidiary autonomy and managerial agency were more influential than any parent-led move toward either asset exploitation or knowledge-seeking strategies. These subsidiary managers exhibited their entrepreneurial behavior in a somewhat different way to that emphasized in the recent literature, however. Recent scholarship has focused mostly on how entrepreneurial managers are able to attract attention from MNE headquarters or from other subsidiaries, and how they then acquire additional investment in their subsidiaries and go on to acquire a favored status (Birkinshaw, 1997; Reilly et al., 2023). Their entrepreneurial behavior is largely directed to the internal network of the MNE organization, with less focus on external opportunities (although O'Brien et al., 2019, is a recent corrective).

The evidence from the business history literature for the period 1945 to 1970 strongly suggests that entrepreneurial subsidiary managers were pursuing external, market-facing opportunities. In particular, during this period, subsidiary managers were highly active in developing innovative marketing strategies that were successful in gaining sales within the U.K.'s newly formed National Health Service and in conjunction with the U.K. Government's Ministry of Health (Slinn, 2005). This novelty in the institutional structure facing the pharmaceutical subsidiaries needs further elaboration, because it represents a profound institutional disruption that changed the context of sales in the U.K. pharmaceuticals sector.

The creation of the NHS: an institutional disruption

The share of competence-creating subsidiaries in U.K. pharmaceuticals increased from 3% to 47% of a moderately large population in the period 1945 to 1970. If the share of 47% is seen as the baseline for the beginning of the later period, then we know that by the mid-1990s this had increased to 80% (Pearce, 1999: Table 1). This result suggests that the increase in the share of competence-creating subsidiaries out of all research subsidiaries was at least as great in the earlier as in the later period. However, 1945 to 1970 was a period of low and diminishing competition, when the U.K. science base supporting pharmaceutical research remained relatively less attractive than in the U.S. or in West Germany, when subsidiaries were not well embedded within the U.K. science base, and when MNE networks were too small for parents to invest in organizational structures to promote recombination. In the pursuit of an alternative explanation, we turn now to consider the implications of understanding historical time as dynamic. We focus on a transformative institutional disruption while specifically identifying the environmental, relational, and cognitive mechanisms that generated contextual transformation. In assessing how organizational actors responded to the changed context, we identify the emergence of a novel organizational form; which we conceptualize as a *proto-competence-creating subsidiary* as explained below.

The key disruptive transformation in the U.K. pharmaceuticals sector during this period was the creation of the NHS in 1948. The NHS introduced a dramatic change in the structure of the market for pharmaceuticals after the war. This structural change occurred in two overlapping stages, the first involving an environmental mechanism of *restriction*, the second a relational mechanism of *negotiated gatekeeping*, which also triggered the cognitive mechanism of *legitimacy seeking*.

Restriction. First, in the immediate aftermath of World War II, all pharmaceutical subsidiaries had to negotiate with and gain approval from the Ministry of Health for any sales of prescription medicines in the U.K. The advent of the NHS led to a trebling of prescriptions paid for by the government between 1948 and 1951, arousing government fears of runaway costs. Health ministers sought to restrict prescriptions to an approved list of drugs of scientifically demonstrable therapeutic value. This process was enshrined in the Voluntary Price Regulation Scheme (VPRS) in 1957. After the intervention of the U.K. Treasury, however, U.K. domiciled producers of new and efficacious therapies with export potential were favored with high prices from the monopsonist purchaser. In consequence, the VPRS navigated a trade-off between restricting access to the market for scientifically proven therapies with providing incentives to innovate, leading U.K.-domiciled pharmaceutical firms to invest heavily in research capabilities (Abraham, 2009; Cooper, 1966; Thomas, 1994; Webster, 1988).

Negotiated gatekeeping Before 1939, pharmaceutical producers' sales efforts were directed at "detailing" individual physicians (Church & Tansey, 2007). During the war, the army of detail men were disbanded and salesforce recruitment resumed only slowly after the war (Slinn, 1999). The NHS's advent led to centralization of healthcare in hospitals and new investments in clinical research. Pharmaceutical firms replaced their sales divisions with full-blown marketing divisions, aiming to link their chemical and biological research with the needs articulated by clinical researchers (Tansey & Reynolds, 1996). Negotiated gatekeeping became further entrenched after the thalidomide disaster of 1961, which led to the introduction of more rigorous demands for drugs to demonstrate both safety and superior efficacy, first with the voluntary Committee on Safety of Drugs, and then with the Committee on Safety of Medicines after 1970. These reforms significantly increased the costs of conducting pharmaceuticals research in the U.K. and of being able to gain VPRS approval. This increase in the costs of research produced a shakeout in the industry, with the less innovative firms withdrawing from research (Thomas, 1994).

Legitimacy seeking These two environmental mechanisms were reinforced by the cognitive mechanism, where subsidiary managers understood that success in sales was related to reputation, thus leading to efforts to acquire greater legitimacy with the critically valuable medical elite (Thomas, 1994). Potential blockbuster drugs required clinical trials, creating a symbiotic relationship between NHS-based clinicians and pharmaceutical R&D and marketing departments. For example, May & Baker drew on its NHS connections in the 1950s to develop an extensive research project on anti-hypertensive agents to be used during surgery, leading to the approval of Ansolysen in 1954 and subsequent worldwide patenting and marketing (Slinn, 1984). A handful of leading clinical gatekeepers, along with official negotiations with NHS approval committees, ensured that from the 1950s onward the U.K. pharmaceutical market was structured by evidence-based discussions of therapeutic efficacy (Gaudillière, 2013; Slinn, 1999; Tansey & Reynolds, 1996).

Merck had become the most successful of all pharmaceutical producers in the U.K. (Galambos, 1991). Merck's European Regional Director at the time described the U.K. subsidiary as having the "best marketing we had anywhere in the world" (Cohen, 2001: 45). Merck's marketing strategy in the U.K. was squarely based on expanding production and sales operations and then expanding into research, what then-CEO Jack Connor described as "developmental units," "because it was important in [the U.K.] to have some scientific work going on in these laboratories. It was a real opportunity" (Connor, 1991: 18). Merck's marketing and brand strategy in the U.K. focused on legitimacy seeking, and they successfully identified

the role of local scientific and research capabilities in supporting reputational gain. Merck was far from the only one. By 1966, 73% of the total value of prescription sales in the U.K. were attributable to the subsidiaries of the foreign MNEs, and only 27% to the U.K. producers (Slinn, 1999: 76).

The result was, as the Sainsbury Committee's 1967 report confirmed, that "prices and profits, research and sales promotion … are closely intertwined, and each has a profound influence on the other" (cited in Slinn, 1999: 76). The subsidiary managers in the U.K. had correctly identified that in the different context of postwar Britain, their sales strategy needed to change. They moved away from the prewar focus on large salesforces, and instead prioritized marketing efforts to promote scientific veracity in negotiations with key gatekeepers, which required major investments in upgrading subsidiary research capabilities.

Effective approaches to historical context provide a deeper understanding and help expose social phenomena that might be ignored by existing theory. However, they also provide a means of interpreting and evaluating the significance of outcomes of social processes over time (Lawson, 2008; Tilly & Goodin, 2006). In the example of Merck's U.K. subsidiary managers, they understood the context to be different to earlier periods. Their intersubjective interpretation of what was fundamentally novel about the new context led to an appreciation of the opportunity that presented itself, and upon which they acted (Lubinski, 2018). The cognitive mechanism of *legitimacy-seeking* enabled managers to reinterpret how to create and capture value within their structurally rearranged context.

The increase in exploratory research among subsidiaries during the 1950s and 1960s can be understood therefore as a combination of attempts by subsidiaries to respond to these three mechanisms that emerged as influential because of critically important changes to the context. The introduction of the NHS had led to the VPRS, which, under political pressure, devised a pricing mechanism which disproportionately rewarded research leading to the development of new products which could compete in overseas markets. Furthermore, the requirements for demonstrating efficacy over existing therapies before new products received approval led to further investments in research. Finally, subsidiary managers recognized that gaining scientific legitimacy was important for their brands (Suchman, 1995). The result was that highly autonomous U.K. subsidiaries increasingly developed laboratories focusing on exploratory research to develop new products for international markets.

Explaining the emergence of competence-creating subsidiaries

Accounting for major changes in historical context in this long-term analysis of these two periods of rapid growth in the shares of competence-creating subsidiaries now permits some of the apparent theoretical inconsistencies to disappear. The period from 1945 to 1970 entailed a wholesale change in context – the emergence of a structural change in purchasing pharmaceuticals imposed by the new NHS. This was a disruptive event (Meyer et al. 2020), which opened up the possibility for an entrepreneurial response by subsidiary managers. After World War II, quality control laboratories were increasingly upgraded and research scientists employed to pursue exploratory research. However, this occurred at a time of low competitive pressures, when there was little drive towards recombination strategies, and when there were relatively few location advantages in the U.K. pharmaceutical sector compared with the U.S. and with West Germany. Rather, the emergence of competence-creating subsidiaries was a combination of responding to the environmental mechanism of restriction, direct incentives offered through the VPRS to invest in research for those that could, to the relational mechanism of negotiated gatekeeping, by upgrading research capabilities, and to the cognitive mechanism of legitimacy-seeking, in order to increase reputation and sales.

This prompts a number of questions. How can a unit of analysis defined as an outcome of knowledge-seeking investments – the competence-creating subsidiary – have been brought into existence through market-seeking activities? If the significant mechanism for contextual change was the centralization of authority for purchasing prescription medicines, which would have triggered strategic discussions at HQ on marketing strategies, why did this seemingly lead to subsidiary managers responding rather than the senior parent company managers? Exploring the implications of changes in the historical context for competence-creating subsidiaries in the U.K. after 1945 in response to these questions leads to new contributions to IB theory.

The creation of the NHS undoubtedly represented a fundamental institutional change in the market for pharmaceuticals in the U.K. Of course, in principle, senior parent company managers could have invested in networking strategies to influence NHS purchasing decisions, but the policy change in purchasing structures represented a sudden increase in the costs associated with adapting to the new "rules of the game" (North, 1990) and with acquiring necessary new knowledge to facilitate that adaptation. In other areas of IB, it is recognized that new learning within organizations about culturally distant markets is complicated, and typically best done by those within the organization closest to that market. Local subsidiary managers act entrepreneurially in designing innovative organizational responses, and as boundary spanners in translating this new knowledge to the rest of the organization (da Silva Lopes et al., 2019; Reilly et al., 2023). Furthermore, MNEs find that the transfer of knowledge about the idiosyncrasies of local markets and market structures is relatively inefficient compared with the

transfer of other types of knowledge (Crespo et al., 2022). Both from the perspective of the need to respond to changes in the external environment (the new rules of the game), and from the perspective of the relative efficiency of sharing different types of knowledge internally within the MNE, the conclusion is that local subsidiary managers are better placed to respond to disruptive events that change the institutional context than are senior managers from the parent company. Finally, given the specific need to design new marketing and sales strategies in response to the more complex setting arising from such a significant institutional change in buying, theories of the benefits of incorporating information from lead-users in complex settings derived from innovation studies (Lim et al., 2017) would also reinforce the perspective that greater proximity would mean that local subsidiary managers would be better placed to respond to the relevant lead-users, in this case select senior physicians, to generate innovation.

It follows that the theory of the emergence of competence-creating subsidiaries should be extended to take account of how the subsidiaries studied here emerged from market-seeking and not efficiency-seeking or knowledge-seeking strategies, and how they built on existing sales and marketing logics. Subsidiary managers caused their "locally independent laboratories" to become transformed not into "internationally *interdependent* laboratories" (Pearce, 1989: 192), but into "internationally *independent* laboratories." These early competence-creating subsidiaries, therefore represent an institutional innovation in IB. This explains why they were initiated by local, sales-oriented, entrepreneurial subsidiary managers, and not as responses to improving innovative capabilities within internal MNE networks or as attempts to seek new knowledge in local systems of innovation. It explains why their research agendas remained autonomous, not coordinated by central laboratories, yet still innovative. Ultimately, however, they were vulnerable both to increases in the costs of research and to the reassertion of parental control. In the 1970s, several parents withdrew from conducting research in the U.K. (Thomas, 1994). For the majority of these proto-competence-creating subsidiaries, parents took control and they became "internationally interdependent laboratories." What emerged as a group of proto-competence-creating subsidiaries in the 1950s and 1960s, evolved into real competence-creating subsidiaries by the 1980s.

Conclusion

This article has made four principal contributions to IB research on MNE subsidiaries. First, we have heeded the call of Meyer and et al. (2020) to advance research into the dynamic rather than static contexts of MNE subsidiaries, including detailed attention to the behavior of subsidiary managers in response to disruptions in the institutional environment. In doing so, we build on recent methodological and empirical contributions that demonstrate the value of integrating historical methods into IB research and theorization (Buckley, 2021; da Silva Lopes et al., 2019; Decker, 2022; Jones & Khanna, 2006). An important implication of our study for IB is the need to consider the flow of time not as a linear chronology of events but as dynamic, occasionally characterized by profound disruptions in context. Organizational actors are historically embedded, and thus the cognitive mechanisms they develop in response to changes in organizational and market structures are shaped not only by the linear passage of time but also by the subjective meaning those actors derive from changing contexts (Lubinski, 2018; Welch & Paavilainen-Mäntymäki, 2014).

Second, we have identified a previously unrecognized organizational innovation in the internationalization process, the emergence of proto-competence-creating subsidiaries. We find that these emerged from the 1940s through the 1960s in response to historically significant changes in the institutional context of U.K. pharmaceuticals. The identification of this organizational innovation is more than a simple historical curiosity, as it may have potentially important policy implications. The IB literature on the internationalization of R&D has developed very significant policy prescriptions for nations and regions wanting to upgrade research capabilities. The research in this paper has concentrated on the example of the U.K., which developed into one of the world's leading centers for pharmaceuticals research in the 1980s. Identifying that an institutional innovation that emerged as a result of a different set of drivers to those predicted by IB theory therefore implies that governments may have greater degrees of freedom for enhancing their regional research upgrading policies than current theories on internationalizing research would suggest.

Third, we demonstrate the value of extending historical methods to include political science approaches to contextualization, as a means of developing a more robust theoretical relationship between causal mechanisms and behavioral change (Lawson, 2008; Tilly & Goodin, 2006). One of the key contributions made by historians of internationalization processes has been to identify novel organizational forms in the past that presage or prefigure similar organizational innovations in the more recent past. What might seem "new" to researchers in the 2020s, is often not actually new (da Silva Lopes et al. 2019; Jones & Khanna, 2006). We build on this important work, however, by demonstrating the value of theorizing across historical and contemporary time periods to identify specific causal mechanisms that produce similar rearrangements in organizational structures across multiple contexts. Drawing on Tilly and Goodin's (2006) typology of three classes of mechanisms for contextual

change, we propose that objective structural mechanisms (environmental and relational) as well as subjective (cognitive) mechanisms can help explain the underlying aspects of institutional disruption that led to the emergence of proto-competence-creating subsidiaries. Further research could build upon these insights, exploring how the mechanisms we identify – *restriction*, *negotiated gatekeeping*, and *legitimacy seeking* – might help in explaining other partially understood phenomena in MNE subsidiary research.

Finally, we contribute to existing IB theory on subsidiary behavior by suggesting that local subsidiary managers may have stronger capabilities than HQ managers for responding to disruptive institutional changes. The research here suggests that the acquisition of subsidiary research capabilities in the period 1945–1970 emerged from a disruptive transformation in the institutional structure that governed sales of prescription medicines. We can trace how this transformational event required organizations to learn the new rules of the game for selling, and so to better understand the priorities that drove centralized purchasing. This prompted the investment in upgraded research laboratories by subsidiary managers for the purposes of negotiating higher prices, persuading official committees of the value of their new products, and for legitimacy-seeking for marketing. Our analysis of autonomous local subsidiary managers in the past can therefore inform research on the increasing complexity of present and future subsidiary managers confronting "grand challenges" (Andrews et al., 2023; Edwards et al., 2022; Lim et al., 2017; Meyer et al., 2020).

This research clearly has important limitations. It has focused only on a series of events of subsidiary behavior in just one empirical setting, U.K. pharmaceuticals. It is dependent on imperfect methods of triangulation and source criticism to understand and overcome biases inherent in fragmentary and incomplete historical data. Future research could replicate the research design here by selecting other examples of long-running IB phenomena, in other locations, and test prevailing theoretical explanations over multiple historical periods. Moreover, future researchers may want to integrate this approach to better understand historical context with the existing IB studies on other types of contexts.

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