BI Norwegian Business School

This file was downloaded from BI Open, the institutional repository (open access) at BI Norwegian Business School http://biopen.bi.no

It contains the accepted and peer reviewed manuscript to the article cited below. It may contain minor differences from the journal's pdf version.

Ryan, P, Buciuni, G, Giblin, M, Andersson, U. Subsidiary upgrading and global value chain governance in the multinational enterprise. *Global Strategy Journal*. 2020; 10: 496– 519. https://doi.org/10.1002/gsj.1387

Copyright policy of *Wiley*, the publisher of this journal:

Authors are permitted to self-archive the peer-reviewed (but not final) version of a contribution on the contributor's personal website, in the contributor's institutional repository or archive, subject to an embargo period of 24 months for social science and humanities (SSH) journals and 12 months for scientific, technical, and medical (STM) journals following publication of the final contribution.

https://authorservices.wiley.com/author-resources/Journal-Authors/licensing/self-archiving.html

Subsidiary Upgrading and Global Value Chain Orchestration within the MNE

Keywords: GVC; Upgrading; Governance; Orchestration; Evolution

ABSTRACT

Research Summary

Upgrading in GVCs has been understood as the evolutionary trajectory pursued by independent suppliers in emerging economies. Less is known about how subsidiaries of MNEs can move up the GVC ladder and ultimately evolve from being 'orchestrated' to becoming an 'orchestrator'. Using an in-depth longitudinal single case study in the medical devices industry we explain how a subsidiary can achieve upgrading in an intra-MNE GVC and take control of this GVC as its orchestrator. Our study shows that partaking in innovation may not be the final stage of a subsidiary's GVC upgrading trajectory but can represent the start of a new phase that culminates in its orchestration. Our findings advance the understanding of the relationship between upgrading and governance in the GVCs of high-tech MNEs.

Managerial Summary

The competitiveness of a subsidiary is determined by its capacity to move up the value chain ladder and engage in higher value-adding activities. Moving from production to innovation is generally viewed as the pinnacle for subsidiaries in the accomplishment of upgrading within a GVC, thereby ensuring long-term survival. We show however that specializing in innovation is not the highest peak a subsidiary can reach. Innovation is in fact a necessary condition for a strategic role for the orchestration of a GVC. A subsidiary's management team can deliberately strategise to ascend to such a position in the multi-business MNE as a GVC orchestrator for a product category. It can achieve this prominent position by leveraging its innovation capabilities to assume control of the business's GVC's governance.

INTRODUCTION

A key competitive advantage of the modern multinational enterprise (MNE) resides in its capacity to locate its upstream value chain activities for product design, development and manufacture in dispersed global sites (Gereffi, 1999; Pedersen, 2006; Contractor et al., 2010; Buciuni and Finotto, 2016). The manner by which MNEs organise and orchestrate their value chain activities across international frontiers determines their global strategies (Mudambi, 2008). In standard global value chain (GVC) theory, MNEs commonly from advanced economies are responsible for higher order activities such as R&D or marketing, while the more standardised activities of production are shifted to lower cost producers, often in emerging economies (Contractor et al., 2010; Pananond, 2013). This disaggregation of the GVC is generally orchestrated by MNE HQ as a quasi 'global factory' (Mudambi, 2008; Buckley, 2009; Mudambi and Venzin, 2010). However, rather than an assumption of one singular fine-sliced GVC for the MNE as purported by Mudambi (2008), the multi-divisional, multi-business MNE is essentially a collection of individual GVCs each of which is individually and independently coordinated across international borders that are manifest internally across subsidiaries or externally with subcontractors.

While significantly advancing the understanding of the globalization of production activities, GVC theory has somehow overlooked pre- and post-production functions, such as R&D, marketing, and distribution and hence falls short of explaining how value is generated and distributed globally (Gibbon et al. 2008). Tightly linked to the GVC's predominant focus on production activities is the idea of upgrading which refers to the capacity of a firm, typically a supplier, to improve its competitive advantage by moving into more profitable value chain activities. Interestingly, over the past two decades the upgrading concept has been mostly, if not exclusively, used by GVC scholars to explain the evolutionary trajectory of independent first and second-tier producers mostly located in emerging economies. As a result, the GVC

literature has substantially overlooked how upgrading occurs within the governance structure of an MNE and particularly at the subsidiary level.

In a parallel IB literature, subsidiary role evolution has been extensively explained and even merged with GVC theory. Subsidiaries can move up the value chain ladder by acquiring innovation capabilities and engaging in product and process innovation (Pananond, 2013). Some subsidiaries ultimately thrive, and arrive to prominent positions as 'competence creators' (Cantwell and Mudambi, 2005), 'global innovators' (Gupta and Govindarajan, 1991) at the strategic apex (Delany, 2000) characterised as a 'leader' rather than a 'laggard' within the MNE (Mudambi and Swift, 2012). Recognizing the potential existence of significant avenues for improving the understanding of upgrading mechanisms in intra-MNE GVC, and aiming to contribute to the further intersection of the GVC and IB fields, this study aims to provide answers to the following research question as to whether a global subsidiary can continue its upgrading process beyond the phase of innovation development and engage with governance-related activities such as the control and coordination of a product-specific value chain in its multi-business MNE.

We trace this expanded different evolutionary path that goes beyond the competence-creating subsidiary improving its external position within the GVC vis-à-vis lead firms (and sister subsidiaries). There has been a sense of 'pushing an open door' in some subsidiary's capture of a global value chain from the MNE's set of global value chains as recent theory on the dispersal of HQ activities shows a willingness and determination by some MNEs to relinquish control over, transfer and delegate some HQ activities (Nell et al., 2017). This has been shown to be particularly the case for regional sales or service activities as a regional HQ but has more recently extended to global value chain orchestration of production and product innovation activities in divisional HQs (Birkinshaw et al., 2006; Benito et al., 2011; Nell et al., 2017). The focal strategy is to disperse HQ activity to areas of distinctive and proven

competence within the MNE. The confluence of a HQ's desire to disperse HQ activities with the desire of some subsidiaries to assume responsibility and autonomy for greater roles makes for interesting new theory on subsidiary role evolution and global value chain governance and upgrading and points to a new GVC governance model for the MNE.

We conducted longitudinal single case study to explain the process by which a high-tech subsidiary grasped the opportunity afforded by a decentralising HQ of a multi-business MNE to assume control of, and capture the role for orchestration of activities for an individual GVC for a single business unit's product category. In our study, upgrading is relevant insofar as it confers the opportunity for the subsidiary to control a GVC within the MNE. Having upgraded to the global innovator for a GVC there is no further upgrading. The subsidiary role evolution extends to one of control and orchestration of the GVC with the transfer of governance as a result of earlier upgrading. So our principal contribution is to GVC governance for the MNE. The previous upgrading of the subsidiary capability to the higher echelon as a competence creator confers legitimacy to go on to control a single unit's GVC.

We contribute to theory in the two principal domains of upgrading and governance of an MNE's GVC. First, we advance the work of Pananond (2013) and introduce a new model of subsidiary upgrading in an intra-MNE GVC and, second, we shed light on new underlying governance structures of GVC governance in multi-business MNEs insofar as we explain how subsidiaries can leverage their participation in innovation functions to assume control over a single unit's GVC and move from being orchestrated to become an 'orchestrator'. This also contributes to emerging theory on the dispersal of MNE HQ activities (Nell et al., 2017).

THEORY DEVELOPMENT

Governance and upgrading of GVC have emerged as the fundaments of the GVC standard model (Gereffi et al, 2005). Governance of a GVC covers the forms and methods a firms can employ to manage value activities across organisation and space (Gibbon et al., 2008). Upgrading refers to a firm's ability to develop and advance its capabilities within the GVC (Dedrick, et al., 2010). Illustrating the evolutionary trajectory of firms partaking in GVC, and generally their attempt to move away from labour-intensive value chain activities, the construct of upgrading has been widely used by GVC scholars to explain the advancement of independent first and second-tier suppliers in emerging economies. The diffusion of this research perspective sustained the growth of a substantial literature tackling issues such as decent work, economic growth in underdeveloped regions and clusters (Ponte and Ewert, 2009) and capabilities development in low-cost suppliers (Bair and Gereffi, 2001). As the bulk of the GVC literature shifted its focus from the analysis of MNCs' global strategies (Gereffi, 1994) to the upgrading strategies of independent suppliers in developing areas, the study of MNE upgrading dynamics in GVC fell off the radar. To date, in fact, little is known about how upgrading occurs in intra-MNE GVC, what are the micro-dynamics underpinning it, and if and how subsidiaries can move up the GVC ladder and engage with governance-related decisions. Shedding light on such mechanisms will not only allow a better understanding of the always-changing and highly-complex GVC framework, but also it will contribute to explain how innovation unfolds in globally integrated production systems and how it is orchestrated by leading firms, above all MNEs.

Such shortcomings point to gaps in the current GVC literature and suggest avenues for further research at the intersection with the well-developed IB's global subsidiary theory. Subsidiaries have long been considered to be predominantly passive recipients of mandates from HQ for activities within an orchestrated system across MNE subunits, at least at the

early post-investment stages of the subsidiary's existence. However, we now know that subsidiaries can proactively strategise to gain advantage over sister subsidiaries for more significant roles for innovation within a disaggregated GVC system (Birkinshaw, 1998; Birkinshaw and Ridderstrale, 1999; Delany, 2000; Asakawa, 2001; Luo, 2005; Becker-Ritterspach and Dörrenbacher, 2009; Dörrenbacher and Gammelgaard, 2010; Ambos et al., 2010). Over time, some subsidiaries can evolve from competence exploiters to competence creators within the internal MNE GVC that absorb and generate important knowledge locally, often in combination with attractive partners (Cantwell and Mudambi, 2005; Cantwell and Mudambi, 2011; Santangelo, 2012; Ciabuschi et al., 2014). Whilst the R&D activity of a competence exploiting subsidiary is mainly in the realm of incremental adaptation of products, strong evidence shows that competence creating subsidiaries proactively attract mandates from corporate HQ that elevates their role to higher order product innovation activities in the MNE's GVC and strategically positions them above sister subsidiaries in this GVC for higher-order innovation activities. Subsidiaries that over time have proven their worth in contributing to product and process development informally within the corporate network can sometimes become responsible for the further development of the product and/or process by being formally mandated this activity and becoming Centres of Excellence (Holm and Pedersen, 2000; Frost el al., 2002). Delegation of autonomy to serve as a centre of excellence for R&D can signal a HQ's willingness to relinquish control over an important GVC activity for the MNE. Delany (2000) reports that subsidiaries can progresses to a final evolutionary destination at the 'strategic apex'. The strategic apex position may confer dominion over sister, formerly peer, subsidiaries in the GVC.

Each GVC in an MNE may contain a mix of competence-exploiters and competence-creators. Rugman et al., (2011) contend that the competence creating role of a subsidiary refers to its specific role in undertaking innovation activity in the value chain, with production, sales and

administration support being the other value chain activities that the subsidiary may execute. Therefore, the competence creating subsidiary conducts, and even controls innovation within the MNE's GVC at the co-evolving nexus of internal corporate and external host knowledge networks (Figuereido, 2011; Achcaoucaou et al., 2014; Ryan et al., 2018). There is evidence that subsidiaries that control R&D knowledge exercise strategic power in the MNE (Mudambi and Navarra, 2004; Mudambi et al., 2014). Mudambi et al. (2014) importantly explain how a subsidiary can 'take' the orchestrator role, i.e. having technological capabilities and power to influence strategic decisions thereby paving way for themselves as orchestrators. While ultimate power and control rests with HQ which monitors and may even constrain subsidiaries' activities (Mudambi and Navarra, 2004; Dörrenbacher and Gammelgaard, 2010), some subsidiaries are adept at balancing attention from HQ that signals its strategic importance and achievements in delivering on its charter and specific mandates with HQ monitoring that controls and determines its degrees of latitude for initiative taking and independent action (Birkinshaw, 1998; Bouquet and Birkinshaw, 2008; Ambos et al., 2010; Ambos et al., 2011; Conroy and Collings, 2016; Cavanagh et al., 2017; O'Brien et al., 2018). Mandates are assigned at the adjudication of HQ and can be won and lost by subsidiaries (Birkinshaw, 1996; Gilmore, 2017). Power rests steadfastly with HQ. However, HQ can be influenced by the performance of the subsidiary particularly in developing important knowledge that is transferred and assimilated into the MNE (Luo, 2005).

Taking this control dimension further, recent research on the role of HQ within the MNE has indicated an increased propensity by HQ in some MNEs to disperse HQ activities (Nell et al., 2017). This entails relinquishing control over these activities and associated decision-making. The MNE HQ is conceptualised as a system within which activities can be distributed across organisation and place (Birkinshaw et al., 2006; 2017; Benito et al., 2011; Baaij and Slangen, 2013; Decreton et al., 2017). Whereas the decision as to where to locate Regional HQ Sales

and Marketing activities is strongly influenced by where markets are or where customers can be best served, decisions about the relocation of Divisional HQ(s) are conditioned by the innovation capabilities and track record of the subsidiary and the quality of infrastructure and knowledge resources in the host location (Forsgren et al., 1995, Andersson et al., 2002; 2005; Cantwell and Mudambi, 2011; Castellani et al., 2013). The multi-divisional MNE can be further sub-divided into product categories and then product lines (Stopford and Wells, 1972; Collis et al., 2007). The multi-divisional MNE is commonly comprised of a set of GVCs each of which can be disaggregated externally via HQ dispersal and coordinated internally by a designated orchestrator within the MNE In such an organisational configuration, a divisional HQ historically served as an intermediary as both agent for HQ and principal for the subsidiary within the GVC (Benito et al., 2011).

The underlying conditions for such dispersal of HQ activities are akin to those that underpin the determination of an MNE to unbundle value chain activities (Mudambi, 2008; Schmeisser, 2013). HQ disperses responsibility to those business units that have distinctive and proven capabilities in a technological regime and product category (Boschma, 2015). These are likely to be the identified competence-creators within the MNE commonly formally designated as centres of excellence for R&D. These subsidiaries often have experience of orchestrating R&D activities with HQ, sister subsidiaries, external research centres and subcontractors.

In an in-depth single case study, Pananond (2013) shows how a local subsidiary in an emerging economy having accumulated sufficient capabilities expanded internationally through acquisition and ascended the value chain ladder for higher-order activity and elevated subsidiary role and prominence within the MNE as a global innovator. This reflects an implicit consensus in the subsidiary role evolution literature that the strategic apex for the ambitious subsidiary is a position as a competence-creating subsidiary designated as a centre

of excellence for R&D within an internal corporate system coordinated and controlled by parental HQ. Pananond (2013) and others such as Cantwell and Mudambi (2005), Asakawa, (2001) and Delany (2000) suggest this to be the ultimate ambition and status for the self-interested subsidiary's evolutionary process. We, however, show how a subsidiary in an advanced economy that remains integrated within the MNE can gain internal prominence through capturing an even higher role for orchestration of the global value chain for a specific business unit and product category within the multi-business MNE. The ambition for the subsidiary becomes one not simply of winning mandates for activities but of gaining control of one of the MNE's GVCs for a specific product category.

There remains a gap in theory on how those subsidiaries that can assume autonomy for activities in a particular product category for the multi-business MNE can leverage their upgraded GVC position and activities (Buciuni et al., 2013) to capture and assume control of a singular GVC for the multi-GVC MNE. In this paper, we extend the theory of the subsidiary as seeking different degrees of assigned or assumed autonomy for initiatives (Birkinshaw, 1997; Dörrenbächer and Gammelgard, 2016; Cavanagh et al., 2017) to one of seeking control over GVC activities. We first show how a subsidiary can evolve and have its mandate upgraded and arrive at the strategic apex, where HQ vests responsibility for higher-order innovation activities within a GVC to a competence creating subsidiary. We then illustrate how the role for orchestration of GVC activities in an individual GVC can shift from HQ to the subsidiary through a mix of subsidiary autonomy strategy and HQ decentralisation strategy. I doing so, we shed light on the new underlying structure of GVC governance in the MNE.

METHODOLOGY

Methodologically, the subsidiary evolution literature has tended to take a static and cross-sectional exploration of MNE activity, which can be limiting. In IB theory development generally, there are routinely calls for studies of evolutionary change processes over time using longitudinal approaches in the future studies sections of cross-sectional research papers. But there is a conspicuous absence of such studies in the IB literature. The exploration of evolutionary developments is particularly suited to longitudinal study (Madhok and Liu, 2006; Cantwell et al., 2010; Lewin and Volberda, 2011). We thus conducted a process case study (Piekkari et al., 2009; Welch et al., 2011) that employs longitudinal data to examine evolving subsidiary mandates and roles within an MNE's GVC. We believe that this process study better captures the complexities of GVC upgrading and governance in the evolving roles across time (Welch and Paavilainen-Mantymaki, 2014). The outcome is an enriched description of the evolutionary process of GVC upgrading within the MNE subsidiary and transition of governance. We also complement this firm-level qualitative data with ancillary primary data from interviews with the subsidiary's local partners in its earliest quasi value chain activity.

In the IB literature, there has been a historic bias towards quantitative research in investigating evolutionary processes and innovation in subsidiaries (Michailova and Mustaffa, 2012) and in particular the singular use of patents to evaluate knowledge flows (Almeida and Phene, 2004). The deployment of qualitative methods can potentially produce rich interpretations of the evolutionary processes involved in GVC upgrading and governance (Piekkari et al., 2009; Michailova and Mustaffa, 2012; Welch and Piekkari, 2017). Our qualitative study adopts a single case study approach given the especially deep and revelatory

insights into evolutionary processes across time that we wished to chronologise (Eisenhardt 1989, Yin, 2009; Welch et al. 2011).

Research Setting

Medtronic is the world's largest medical device company with annual sales of almost $29 billion in 2016. Medtronic focuses on designing and developing full implantable medical devices. It has a multi-business divisional corporate structure with multiple GVCs across each product category. We profile Medtronic Corp. in Table 1 and provide an organisational structure chart and the position of Medtronic (Ireland) Galway subsidiary within the MNE's configuration.

INSERT TABLE 1 ABOUT HERE

INSERT FIGURE 1 ABOUT HERE

Selection of the Critical Case

To select the case subsidiary for our study, we employed non-probability purposive sampling that is justified relative to the study's intent. We ultimately used our accumulated sectoral and theoretical knowledge, insight, experience and judgement to identify a critical case subsidiary

(Patton, 2002). To allow us to investigate the evolution of a subsidiary over time we identified baseline criteria for selecting the critical case. First, Medtronic is a multi-product divisional structured MNE in a high-tech business domain. We purposely selected one of its subsidiaries, Medtronic (Ireland) based in Galway as the critical case for our study. Second, Medtronic (Ireland) is a global integrator within this MNE for the GVC for coronary heart stents. This case subsidiary is a lead subunit within its internal corporate network. Third, it represents an extremely appropriate case to investigate as it engages in R&D as a centre of excellence within the MNE (see Table 2) and produces patents and therefore the subsidiary has a clear track record of advancement through innovation. Summary detail on the subsidiary is presented in Table 2.

_____

INSERT TABLE 2 ABOUT HERE

_____

Data collection

As part of a wider study on the evolution of a high-tech industry cluster, we tracked Medtronic (Ireland's) evolution from competence exploiter to competence-creator and latterly, a corporate role as GVC coordinator for the coronary heart stent product category over a twelve year period within this multi-business MNE. We aim to show in this paper how it evolved to conduct R&D for the MNE GVC and later coordinate innovation for a single GVC. Therefore, our research question necessitated investigating the subsidiary and collecting data over such a significant period of time. We conducted a longitudinal study on its role evolution. We used qualitative interviews conducted in three separate years over the

12 year period to understand how the subsidiaries' roles have changed (see Table 3). Semi-structured interviews were conducted with subsidiary managers - targeting top level management and R&D managers who possess first-hand knowledge of the processes under investigation (Davis and Meyer, 2004). We also conducted additional interviews with former senior managers of this subsidiary who were part of the management team in the initial investment and the early years of the subsidiary's presence in Galway. These interviews were necessary to help us gain a more in-depth understanding of how these subsidiaries achieved the level of innovation within their respective corporations. Interviews with representatives from the R&D unit of the subsidiary across different years of data collection covered the nature of the R&D activities engaged in and have engaged in previously, how they manage R&D in the dual context of HQ network and local embeddedness, their mandate and autonomy for R&D and changing position in the Medtronic GVC. We also complemented and triangulated this primary data with ancillary data from the subsidiary's partners for knowledge creation in the host domain (Table 4) and secondary material in the form of corporate websites, press articles and company documents to provide richer context where necessary. This is important as triangulation provides a more comprehensive understanding of complex phenomena such as evolutionary processes (Sobh and Perry, 2005). We finally collected patent data for the subsidiary to show and corroborate innovation evolution over time.

INSERT TABLE 3 ABOUT HERE

INSERT TABLE 4 ABOUT HERE

_____

Data analysis

The ethos of our analysis of our comprehensive, longitudinal data was interpretivist (Welch et al., 2011). In our analytical strategy we endeavoured to be systematic in our sense-making and remained highly context-sensitive (Michailova and Mustaffa, 2012). Initially, the interviews were transcribed and data organised for within case analysis (Eisenhardt and Graebner, 2007). For the case subsidiary we constructed a history of its role evolution, project mandates and innovation activities over time. Research team members read the individual case narratives and agreed on the accuracy of descriptions of the key projects undertaken by the subsidiaries and the evolutionary timeline for the case. Drawing on our longitudinal data, we ordered key events and milestones chronologically (Welch and Paavilainen-Mantymaki, 2014) and built a chain of evidence and thick description for the GVC upgrading for the case subsidiaries (see Figure 2). (Also, in our analysis of the copious primary data, we selected rich illustrative quotes). Such longitudinal analyses led to accounts that depict GVC transformation and evolutionary change over time. Our robust, coherent chronological analysis of a longitudinal chain of events overcame issues of short termism that might have missed longer term causes and permitted us to develop a process-based explanation of the subsidiaries' evolution and upgrading in the GVC.

We further employed triangulation of our primary qualitative data with secondary data in our analysis to deepen our interpretation of our interview data and enhance the reliability and trustworthiness of our findings (Sobh and Perry, 2005). Specifically, we tracked and collated

secondary sources on key events, critical happenings and notable milestones in the case firm over the course of the study. This took two forms. We traced and kept contemporary notes in an extensive file on key events such as the announcement of a new production line or establishment of a Centre of Excellence for Manufacturing or R&D in the case subsidiary. To this end we continuously monitored and amassed press releases, press articles and website announcements. Secondly, we trawled back over press and websites for events we had heard of in our interviews but might have missed in our on-going secondary data collation.

In a prolonged reflexive engagement with our data, both primary and secondary, we refined our analysis through successive iterations between theory and data (Ryan and Bernard, 2000; Silverman, 2000). Data analysis and theory development were iteratively performed leading to the development of new theory on subsidiary role evolution and upgrading in the GVC.

INSERT FIGURE 2 ABOUT HERE

The following section presents the findings from the research.

FINDINGS

We present our longitudinal data, primary and secondary, chronologically to reflect the evolution of capabilities, roles, mandates and upgraded positioning of the case subsidiary within the MNE and GVC. The subsidiary's evolutionary transitions to the strategic apex and beyond to the coordination of a GVC for a business within the multi-divisional, multiple GVC HQ is described. The simultaneous inclination of the HQ to decentralise activities to the

areas of distinctive capability is shown to come to the fore towards the end of the chronological narrative. This upgrading and assumption of a GVC governance role, in a climate of HQ dispersal is shown to have required a plan to earn a strong role by a subsidiary management team who needs confidence and competencies to engage in political efforts with corporate and seek out opportunities internally and externally.

Medtronic (Ireland) Galway-based Subsidiary

The now Medtronic facility in Galway was initially established as a greenfield investment by the corporation, CR Bard in 1982. (As CR Bard was later acquired by Medtronic, we shall use Medtronic as our appellation to eliminate any unnecessary confusion). Starting as a knowledge recipient, the facility – since then – has evolved to a knowledge generator and donor within the corporation. At the time of establishment, the Galway facility was mandated to manufacture cardiovascular devices only – PTCA. The Galway facility was established to manufacture particular product lines and process engineers were employed to migrate manufacturing lines from the US to Galway. Initially, the products that were migrated were quite low technology; building simple catheters. Knowledge about the manufacture of these was transferred from USCI divisional HQ to Galway and the team successfully migrated a number of product lines, thereby becoming proficient in manufacturing processes for building catheters. In 1985 there were less than 100 employees in the Galway subsidiary.

Expertise began to develop among the Galway team in the product, as opposed to just the manufacturing process, when they began to develop ‘specials’, that is, non-standard products where physicians requested catheters to be made to particular specifications. As a former executive of Medtronic in Galway stated “so specials were our first introduction into making products that were not made by the corporation before. The corporation used to service that

business out of the US previously and rather than service it out of the US, they serviced it out of Galway". As the Corporation started to develop PTCA products the (at that time) divisional HQ decided to migrate a guidewire manufacturing line to Galway. A guidewire is one component used in an angioplasty procedure and was a substantial project for the Galway team at the time because it was a component of angioplasty-related products that were just emerging at the time and were relatively sophisticated. Senior management in Galway at the time sold the expanding operational capabilities in the facility to the divisional HQ in Billerica at the time to get a mandate to manufacture this product line. Significantly, the Galway subsidiary took the opportunity to not just replicate what was done in the Divisional HQ with respect to this product line but used engineering skills and capabilities locally to add value to projects, as described in the following quotation:

"During the migration we took products and if you take some of the manufacturing processes that are used in the manufacture of a guidewire, like the abrasing process, so when I took the abrasing equipment from the US I wouldn't replicate it, I would upgrade it, and get it sourced in Ireland so that it would be built in an Irish manufacturing site with upgrades…We also used control systems that they [the Division] didn't do. We used PLC (Programmable Logic Controllers) technologies - that were just coming into the market at the time - and we built PLCs into the equipment as we transferred it. So, we scored an awful lot of brownie points for doing things like that with the Divisional HQ. We were all building this kudos with senior corporate management teams" (ex R&D Director, Medtronic in Galway).

In doing so, the subsidiary engaged with the local university around laser machining particularly with the National Centre for Laser Application to develop innovative manufacturing processes. This phase highlights the first upgrading achieved by the Irish subsidiary, a process which culminated with the development of new production and technical competences.

Using the internal engineering skills of its labour force, as well as linking with local external research centres, National University of Ireland, Galway's (NUIG) Biomedical Engineering School and Galway-Mayo Institute of Technology (GMIT), the subsidiary moved from transferring knowledge from the US to translating new knowledge acquired into process efficiencies; crossing syntactic and semantic boundaries.

The Galway subsidiary constantly chased the opportunity with HQ to move the facility closer to engaging in new product development and thereby partaking in innovation within the cardiovascular GVC. The Galway team was skilled at positioning the capabilities of the locality; they were active at building capabilities and demonstrating these to Divisional and Corporate HQ so as to position the subsidiary more significantly within the corporation's cardiology division. The subsidiary built relations with HQ to enhance their reputation, as evidenced in the following quotation;

"We had a very good, committed management team that were intent on building on all opportunities; it wasn't something that we were asked to do, we actually went after – 'we can do that in Galway, we can bring this piece over here, we can improve your yields, we can increase your profitability'. And by getting a couple of projects under our belts that showed our ability to do things, they just kept giving us more….We would bring over the US management team to Ireland and do a tour and show them all the best stuff we had done, show them our plans and look for more budgets…We were always assuring the corporation that if they gave us the (project) budget we would give them the return" (ex R&D Director, Medtronic in Galway).

The opportunity for the subsidiary to undertake new product development projects came about a decade after establishing in the region. After the guide-wire project, Medtronic HQ started to migrate the entire new-to-market balloon catheter product to Ireland that was a

rapidly growing market and was a particularly lucrative product in the marketplace. ACS, the other main competitor in the international marketplace at the time for balloon catheters started to become more dominant and Medtronic, through the USCI Division, had to respond and change the design parameters of their balloon catheter device in the late 1980s. The modified balloon catheter was designed in the USCI divisional HQ and the manufacturing of the product started to be migrated to the Galway subsidiary. There were two techniques in coronary angioplasty intervention at the time; 'over-the wire' and 'rapid exchange' the latter of which was more efficient in angioplasty procedures and was more prevalent in Europe. Medtronic HQ wanted to get into that area. The Galway subsidiary took the opportunity at that time of the Divisional HQ being prevented from developing angioplasty products by the FDA as well as the advent of 'rapid exchange' technology to put a proposal to the Divisional HQ to design and develop a new next generation device for the Japanese market, which was a particularly profitable market at the time. The device was to make Medtronic competitive against the next generation of devices being produced by ACS, who was the market leader at this stage. The Galway subsidiary, having demonstrated capabilities on previous projects, won a formal charter for new product development in 1992/1993 and received budget. The Divisional HQ did not give the Galway facility the title of 'Product Development' immediately even though their charter was to design and develop next generation devices, because, as the ex-R&D Director of the Galway subsidiary stated "they [HQ] didn't want it to be seen that it [new product development] was outside the US".

By 1993 the Galway facility had in excess of 500 people working in the subsidiary and in making their transition beyond a focus on process engineering, the subsidiary recruited product development engineers to work in the New Product Development team. In 1995 the subsidiary received the title of 'Global Technology Centre for Angioplasty' and in August 1996 the corporation officially opened a IRL£3.5milllion R&D centre in the Galway facility.

Between 1991 (when the first patent from the Galway facility was filed) and 1998, 23 patents were filed in the US where a listed inventor was from the Galway subsidiary or the Galway subsidiary was listed as the assignee. All of these patents are related to balloon catheters or stents, and one patent is entitled 'Reinforced Rapid Exchange Balloon Catheter' demonstrating the subsidiary's design of rapid exchange devices as planned. For 15 of these patents, there were no inventors listed from other corporate sites other than the Galway subsidiary. In the case of the remaining patents, inventors from the US (mainly Massachusetts and New Hampshire) as well as London and Israel are listed along with Galway-based inventors on the patents, evidencing a collaboration with internal sites in projects for the generation of new knowledge around new product design.

By the late 1990s, the R&D Director based in the Galway facility was given responsibility for Global R&D in angioplasty therapeutic products and other sites in this division, including those in the US, reported into him. As a result, the R&D Director from the Galway subsidiary would be, at this stage, interacting more at a corporate level and attending corporate meetings with R&D directors across the various divisions of Medtronic. A second stage of upgrading within Medtronic cardiovascular GVC was accomplished. Such promotions of Galway-based personnel within the corporate hierarchy were significant for politically championing new projects for the subsidiary. During the 1990s, stents, which are a metal mesh that is used as a permanent scaffold to keep the artery wall open during a PTCA (angioplasty) procedure, were emerging as another advancement to balloon catheters. The development of stents became a core specialisation in the Galway facility in the years that followed. Late in 1999, Medtronic HQ announced the creation of a further 400 jobs in the Galway subsidiary to bring the total to 1,000 employees, with 250 specialists planned to work in research and development.

The decade from 2000 to 2010 was marked by significant growth in the subsidiary. By 2001 the subsidiary employed 1200 people and in 2002 another investment was made by the corporation with a further 400 jobs in the Galway site. At this stage, the site in Galway was primarily focused on the design and development of drug-eluting stents that allow for the controlled release of drugs from the stent to the artery wall to prevent future blockages. Through this phase, the Irish subsidiaries further specialized its production and product development activities and started coordinating labs and research centres partaking in innovation in the cardiovascular GVC. During this decade the subsidiary received the status of being a designated Centre for Excellence in the development and manufacture of treatments for cardiovascular and cardiac rhythm diseases (as part of the corporate Cardiac and Vascular Group). The Galway subsidiary, which by 2008 employed almost 2000 people, was a core site in the development and manufacture of the Endeavour stent. A total of 62 patents were filed in the US between 2000 and 2010 that had inventors listed solely from the Galway Medtronic subsidiary or the inventors listed were from Galway as well as other various locations in the US, including California, Minnesota and Colorado.

At this stage the subsidiary had become politically adept at seeking approval and thus obtaining budget from HQ for engaging in R&D projects with attractive external partners (Cantwell and Mudambi, 2011). It partnered with NUIG to establish the Regenerative Medicine Institute (REMEDI) for stem cell research. In particular, REMEDI sought to develop a new generation of devices that could deliver stem cells to rebuild damaged organs inside the body (Brown, 2017). This was a move into unrelated branch technology (Boschma, 2015) for the entire corporation but initiated by the Galway site

Similarly in 2014/15 the subsidiary also became an official research partner in another research centre established at the local university named CURAM (Centre for Research in Medical Devices). This Centre designs and develops ‘smart’ implantable medical devices.

The subsidiary also engages in research projects nationally, for example with a research institute in Trinity College Dublin, and internationally with multiple universities both in Europe and the US.

The subsidiary has also chased the opportunity to engage in diverse technological areas within the corporate chain. Based primarily on its track record with developing drug-eluting stents, the subsidiary recently has been given the remit of designing and developing TAVI (Trans-catheter Aortic Valve Implementation) devices, which have emerged in the marketplace as part of a system to replace a diseased aortic valve in the heart through minimally-invasive surgery. While the research for the design of TAVI devices is conducted at HQ sites, the Galway subsidiary is involved in co-designing the delivery system and the development of the devices.

In 2013, the corporation invested in €7.7 million in the establishment of a new Customer Innovation Centre in the Galway subsidiary, the purpose of which is to provide a facility to bring together Medtronic engineers and physicians to develop new therapies. With currently 130 personnel dedicated to R&D activity in the subsidiary, product innovation is now considered a core part of the subsidiary's activities. In the four years since the establishment of the Customer Innovation Centre over 1,000 customers have visited the Galway site. Thus the subsidiary now engages in both upstream and downstream GVC activities.

Medtronic Galway was successful in 2015 in securing the mandate to manufacture the company's new drug coated balloon. The company's press announcement at the time stated that a new manufacturing facility would be built in Galway to "manufacture the market-leading IN.PACT® Admiral® drug-coated balloon (DCB) for the treatment of peripheral artery disease. The decision to locate the new manufacturing facility in Galway is based on the existing high-tech capability and expertise at the site in drug-device combination products

for Medtronic's coronary business. Highly skilled professionals from other parts of the Medtronic organization who specialize in the areas of quality and manufacturing engineering, supply chain and production management, will be stationed in the new facility".

Tony Semedo, president of the Aortic & Peripheral Vascular business at Medtronic HQ, reinforced this view of Medtronic's Galway site as a 'centre of excellence' when he stated that the investment showed its importance to Medtronic's overall growth strategy: "Our global market leadership in DCB is driving the need to open the new facility here in Galway to provide more patients access to this highly efficacious and safe treatment option for peripheral arterial disease. Our Galway operations and staff have very specific expertise in this area, which is the platform for this announcement. Once fully operational, this facility will be the only DCB manufacturing area of its kind in Medtronic worldwide. Our organisation is on an expansionary path, with a notable amount of this growth to be fuelled by products coming out of Medtronic Ireland" (IDA Ireland, 2017).

The first signs of HQ's dispersal of activities affecting the Galway site was evident when members of the senior Global Management Team were seen to reside in, and operate out of the Galway site, for example the Vice-President for Global Supply for Medtronic Corp. Now five members of the senior team do likewise. The manner in which HQ dispersal has even further evolved within Medtronic was reported by Geoff Martha, Executive Vice President of RTG Group (Salemi, 2016) on the decentralisation of power to subsidiaries who become designated leaders in their therapy group. Martha acknowledges that the leader, the subsidiary, is the expert in their field and that they alone have the accumulated knowledge to know what is best in their space, for example, their customers and their competitors. They will also be empowered enough to make the trade-offs in their area of business, for example allocate resources to R&D and access to capital for acquisitions. This is what Martha calls the '*big and little*' Medtronic model, decentralisation of power to subsidiaries who have the

knowledge to take advantage in their sector, while utilising the large power of the Medtronic group where necessary. The Galway site robustly pushed this open door for their core specialisation in the production and development of coronary angioplasty devices. The subsidiary in Galway increased its R&D activity locally in this technology area but now chose to shift certain lower value added activities, for example, manufacturing, to a site in Mexico, thereby orchestrating a concentrated GVC (Porter, 1986). As one senior manager at the Galway site commented:

"Galway has inverted; we look to get lower technology products that we make in Galway manufactured in other lower cost locations as we drive ourselves up the value-stream. We are behaving almost like a HQ looking to maximise return from the locality and to maximise profit for the corporation. Back in the early days we would have wanted to keep a project even if it wasn't hugely profitable; we would want to keep and build. But now we have gotten to a point where we are such a key element of the (global) organisation that we actually can operate almost as we want".

This highly concentrated GVC continues to expand to Japan, Israel and even back to the mothership home country of USA. The capability for GVC coordination develops and grows at the Galway site. One respondent stated that "we have the social skills to have things running smoothly (in the GVC)".

Medtronic's Galway site now has three broad approaches open that are complimentary: (1) design and manufacture on-site; (2) design on-site and manufacture elsewhere, and (3) design elsewhere and manufacture here. The last option is only for cutting-edge new products as a senior executive interviewed in 2017 reported that "Galway is not interested in mature technologies". Rather "we are always looking at the evolution of new products". The capacity exists to "provide solutions by capability matching". This means taking technology solutions

into related and unrelated branches by utilising the subsidiary's developed innovation capabilities. This, along with the coordination of a concentrated but expanding GVC for a business unit's product category in the MNE, represents the new strategic apex (Delany, 2000) for this subsidiary.

We now proceed in the paper to discuss how our empirical findings generate new theory of GVC governance in the high-tech MNE.

DISCUSSION

In this paper we develop theory on how, in a multi-business MNE, product-specific GVC is orchestrated by a competence creating subsidiary and a high-order governance role is appropriated from HQ. Building on the earlier work of Pananond (2013) on subsidiary upgrading, we contend that performing innovation development is not the end of the upgrading process for a global subsidiary in a GVC. Rather, it is the starting point of an additional phase of upgrading, which culminates with the subsidiary taking over the governance of the GVC it specializes in. Therefore, this study aimed to resolve the question of whether and how a global subsidiary can continue its upgrading process beyond the phase of innovation development and engage with governance-related activities such as the control and coordination of a product-specific value chain. In this critical case, the subsidiary's innovation capabilities are an enabling factor in gaining responsibility for coordination of this singular GVC within the multi-business MNE corporate structure. This paper illustrates how an MNE's subsidiary can leverage its upgraded role within the MNE's GVC to crack through the MNE glass ceiling and take control of one GVC for this multi-business MNE. This multi-divisional, multi-business MNE is comprised of a set of GVCs. The studied case, Medtronic, represents a prime example of a 'producer-driven' GVC (Gereffi, 1994). We traced the

evolution of this subsidiary's role up to and beyond the recognised summit as a competence-creator to a new peak of GVC control for a product category within the multi-business MNE. We showed how this critical case subsidiary assumed the role for orchestration of an individual GVC within the MNE by virtue of its cardinal credibility within the MNE established by a proven track record over time for successfully delivering on mandates and producing innovation for the MNE as a competence creator. The early signs of a capability for governance in a subsidiary may be discerned through its semi-autonomous capacity for careful selection and coordination of external partners for innovation development in the host domain (Cantwell and Mudambi, 2011). GVC control is the ultimate mandate as it involves HQ relinquishing control of a division or business unit for a product category within the multi-business MNE. Rather than simply improving the subsidiary's position within the MNE (Pananond, 2013), GVC control places that subsidiary in a controlling position hierarchically above sister subsidiaries in the corporate network. This represents a new strategic apex for the evolution of the subsidiary beyond 'competence-creator' (Cantwell and Mudambi, 2005), 'global innovator' (Gupta and Govindarajan, 1991), or 'centre of excellence for R&D' (Holm and Pedersen, 2000; Frost et al., 2002) and marks the zenith of strategic prominence within the MNE. While highly independent, the subsidiary remains highly integrated in the MNE corporate structure rather than becoming an independent spinout in its own right outside of the original MNE.

Whilst dispersing some activities, HQ still reigns over corporate structure and strategy. However, the progression to control of a product category's GVC is shown to be a deliberate subsidiary strategy with early managerial vision and strategic intent. The subsidiary reigns over a particular GVC in the multi-business MNE. It monitors product market conditions and dynamics, and assesses external firm (rather than internal peer subsidiary) competition. This was previously the sole remit of corporate HQ which, importantly, still retains ultimate

authority over this GVC-orchestrating competence-creating subsidiary. It's a case of devolution, rather than disconnection, for orchestration of a singular GVC by HQ.

Ultimately, we provide a nuanced explanation of the conditions for GVC orchestration and governance within a multi-business MNE (Cano-Kollmann et al., 2016). Since much of the value for an MNE rests in its capacity to manage GVCs across dispersed global sites, the orchestration of a GVC activities for a single product line by the subsidiary in our study may be seen as to some extent appropriating value from HQ. However, the dispersal of activities by MNE HQ to areas of specialist and distinctive technological capabilities frees up the HQ for greater strategic focus on corporate success. Furthermore, HQ maintains control over downstream activities in this idiosyncratic MNE through sales-force management and multi product distribution on a global scale and corporate brand identity management.

Our single case study contributes to theory in a number of domains: subsidiary role evolution; GVC governance and upgrading within the multi-business high-tech MNE; and new forms of organisational configuration and decentralisation for the MNE. Our process study provides an enriched description of processes of innovation activities and subsidiary role evolution for a GVC for a single business line within the multi-business MNE. Our chronological sequencing of events, many critical, provides explanations of these evolutionary processes, GVC upgraded activities and their drivers as they intersect and change over time. Our robust longitudinal approach, we believe, overcomes issues of short termism that may miss longer term causes of change in evolutionary processes. We also identify critical inflection points in the evolutionary process such as mandate upgrades from HQ and how partner attraction in the local knowledge network may be discerned as early signs of subsidiary capability for orchestration of activities. We show how the subsidiary purposely determined to upgrade its mandate, over time, for innovation activities in the GVC and rise to an elevated hierarchical position within the MNE's GVC for one category and thus position itself above former peer

subsidiaries. The subsidiary was originally a part of a disaggregated value chain orchestrated by HQ. It ultimately became the orchestrator of product innovation within the MNE and later the orchestrator of a concentrated GVC for a single business within the multi-business MNE.

In order to upgrade, the subsidiary needs to master a function. This can of course be any function, and in accordance with Mudambi et al. (2014), this will, if successful, yield functional power. Certain functional activities are more important, or at least more difficult to substitute the performing actor, and can therefore result not only in functional power but also strategic power. Mudambi et al., (2014) show that marketing and technical functional power where technical, but not marketing, leads also to strategic power. Very much in the same vein the principal managerial implication for global strategy of our study is that progression to control of a product category's GVC in a multi-business MNE is shown to be a deliberate subsidiary strategy which requires managerial vision and strategic intent from an early stage (cf. strategic power, Mudambi et al. 2014). Subsidiary management must adeptly manage the evolution of subsidiary role and GVC upgrading whilst seeing the strategic apex as a governance role for a business's GVC within the multi-business MNE. This most prominent of positions will be ever more achievable as the momentum of governance within the MNE shifts to the dispersal of HQ activities to areas of the MNE with developed specialist technological capabilities and some positive track record for organisation and coordination both of across-subsidiaries innovation activities within the MNE and of attractive knowledge-bearing partners outwith the MNE. In our study we focus on the upgrade of the innovation activity within the case company which, to some extent, resembles the 'technology' activity identified by Mudambi et al. (2014). It is clearly so that the innovation contribution from Medtronic has had a paramount influence on its ability to conquer the 'strategic' activity of governing the GVC.

As with all research, this study inevitably has limitations. Although the time span of more than a decade for the case subsidiary provides a very deep and rich understanding of the evolutionary processes and phenomena at hand, it still has limitations regarding the generalisability of the model developed. A larger quantitative study would elicit wider, if less deep, data that could complement this study. Qualitative study is highly apt to investigate amorphous themes such as innovation competences and the single case study can be especially revelatory for complex evolutionary processes and happenings, nevertheless, the usual limitations over the large case-study method apply insofar as we traded off issues of external validity against the rich insights derived from the qualitative investigation of underexplored phenomena (Eisenhardt, 1989; Yin, 2009). However, since the aim was theory building rather than generalisability, this study responds to the exhortation of Michailova and Mustaffa (2012) for IB theory to evolve from idiosyncratic qualitative studies in context sensitive settings.

BIBLIOGRAPHY

Achcaoucaou, F., Miravitlles, P. and Leon-Darder, F. (2014). 'Knowledge sharing and subsidiary R&D mandate development: a matter of dual embeddedness', *International Business Review*, **23**, 76-90.

Almeida, P. and Phene, A. (2004), 'Subsidiaries and knowledge creation: the influence of the MNC and host country on innovation', *Strategic Management Journal*, 25, 847-864.

Ambos, B., Asakawa, K. and Ambos, T. (2011), 'A dynamic perspective on subsidiary autonomy', *Global Strategy Journal*, 1, 3-4, 301–316.

Ambos, T., Andersson, U. and Birkinshaw, J. (2010). 'What are the consequences of initiative taking in multinational subsidiaries?', *Journal of International Business Studies*, 41, 1099 – 1118.

Andersson, U., Björkman, I. and Forsgren, M. (2005). 'Managing subsidiary knowledge creation: The effect of control mechanisms on subsidiary local embeddedness', *International Business Review*, 14, 521 – 538.

Andersson, U., Forsgren, M. and Holm, U. (2002). 'The strategic impact of external networks - subsidiary performance and competence development in the multinational corporation', *Strategic Management Journal*, **23**, 979 – 996.

Asakawa, K. (2001). 'Organizational tension in international R&D management: the case of Japanese firms', *Research Policy*, 30, 735-757.

Baaij, M. and Slangen, A. (2013), 'The role of headquarters-subsidiary geographic distance in strategic decisions by spatially disaggregated headquarters', *Journal of International Business Studies*, 44, 941-952.

Bair, J. and G. Gereffi (2001), 'Local clusters in global chains: The causes and consequences of export dynamism in Torreon's blue jeans industry,' World Development, 29(11), 1885–1903.

Becker-Ritterspach, F. and Dorrenbacher, C. (2009), 'Intrafirm competition in multinational corporations: Towards a political framework'. *Competition and change*, 13(3), pp.199–213.

Benito, G., Lunnan, R. and Tomassen, T. (2011), 'Distant encounters of the third kind: multinational companies locating divisional headquarters abroad', *Journal of Management Studies*, 48, 373-394.

Birkinshaw, J. (1997), 'Entrepreneurship in multinational corporations: the characteristics of subsidiary initiatives'. *Strategic Management Journal*, 18, 207–29.

Birkinshaw, J. (1998), 'Foreign-owned subsidiaries and regional development: The case of Sweden'. In J.Birkinshaw, and Hood, N. (Eds.), *Multinational corporate evolution and subsidiary development* Houndmills: Macmillan, 268-298.

Birkinshaw, J. and Ridderstråle, J. (1999), 'Fighting the corporate immune system: a process study of subsidiary initiatives in multinational corporations', *International Business Review*, 8, 149–180

Birkinshaw, J., Ambos, T. and Bouquet, C. (2017), 'Boundary spanning activities of corporate HQ executives; insights from a longitudinal study', *Journal of Management Studies*, 54, 422-454.

Birkinshaw, J., Braunerhjelm, P., Holm, U. and Terjesen, S. (2006), 'Why so some multinational corporations relocate their headquarters overseas?', *Strategic Management Journal*, 27, 681-700.

Boschma, R. (2015) 'Towards an evolutionary perspective on regional resilience', *Regional Studies*, 49(5), 733–751.

Bouquet, C. & Birkinshaw, J. (2008). 'Weight versus voice: How foreign subsidiaries gain attention from corporate headquarters'. *Academy of management journal*, 51(3), pp.577-601.

Brown, J. (2017). Galway gets to the heart of the matter [Online]. Available: https://www.ft.com/content/2f0e878e-7b8d-11d9-9af4-00000e2511c8 [Accessed 06/06/2017].

Buciuni G., Corò G. and Micelli S. (2013) Rethinking the role of manufacturing in global value chains. An international comparative study in the furniture industry, *Industrial and Corporate Change* 23(4), 967-996.

Buciuni, G., Finotto, V. (2016), Innovation in Global Value Chains: Co-location of Production and Development in Italian Low-Tech Industries, *Regional Studies, 50*(12): 2010-2023.

Buckley, P. (2009), 'Internalisation thinking: From the multinational enterprise to the global factory', *International Business Review*, **18**, 3, 224-235.

Cano-Kollmann, M., Cantwell, J., Hannigan, T. Mudambi, R. and Song, J. (2016), 'Knowledge connectivity: an agenda for innovation research in international business', *Journal of International Business Studies*, **47**, 255-262.

Cantwell, J. Dunning, J. and Lundan, S. (2010), 'An evolutionary approach to understanding international business activity: the co-evolution of MNEs and the institutional environment', *Journal of International Business Studies,* 41, 567-586.

Cantwell, J., and Mudambi, R. (2005), 'MNE competence-creating subsidiary mandates', *Strategic Management Journal*, **26**, 1109-28.

Cantwell, J.A. and Mudambi. R. (2011), 'Physical attraction and the geography of knowledge sourcing in multinational enterprises', *Global Strategy Journal,* **1**, 206-232.

Castellani. D., Jimenez, A. and Zanfei, A., 2013, 'How remote are R&D labs? Distance factors and international innovative activities', *Journal of International Business Studies,* 44(7), pp.649–675.

Cavanagh, A., Freeman, S. Kalfadellis, P. and Cavusgil, S. (2017), 'How do subsidiaries assume autonomy? A refined application of agency theory within the subsidiary-headquarters context', *Global Strategy Journal,* **7**, 172-192.

Ciabuschi, F., Holm, U. and Martin Martin, O. (2014). 'Dual embeddedness, influence and performance of innovating subsidiaries in the multinational corporation', *International Business Review*, 23, 897-909.

Collis, D., Young, D. and Goold, M. (2007), 'The size, structure and performance of corporate headquarters', *Strategic Management Journal*, 28, 383-

Conroy, K. and Collings, D. (2016). 'The legitimacy of subsidiary issue selling: Balancing positive & negative attention from corporate headquarters', *Journal of World Business*, **51**, 612-627.

Contractor, F. J., Kumar, V., Kundu, S. K. and Pedersen, T. (2010). 'Reconceptualizing the firm in a world of outsourcing and offshoring: The organizational and geographical relocation of high-value company functions'. *Journal of Management Studies*, 47, 1417–33.

Davis, L., & Meyer, K. 2004. 'Subsidiary Research and Development, and the Local Environment', *International Business Review,* 13(3): 359–382.

Decreton, B., Dellestrand, H.,Kappen, P. and Nell, P. (2017), 'Beyond simple configurations – the dual involvement of corporate and divisional headquarters in subsidiary innovation activities in multi-business firms', *Management International Review,* 57, 855-878.

Dedrick, J., K. L. Kraemer and G. Linden (2010), 'Who profits from innovation in global value chains?: A study of the iPod and Notebook PCs,' *Industrial and Corporate Change,* 19(1), 81–116.

Delany, E. (2000), 'Strategic development of the multinational subsidiary through subsidiary initiative-taking'. *Long Range Planning,* **33**(2), 220-244.

Dörrenbächer, C. & Gammelgaard, J. (2016). 'Subsidiary initiative taking in multinational corporations: the relationship between power and issue selling'. *Organization studies*, 37, pp.1249-1270.

Dörrenbächer, C. and Gammelgaard, J. (2010), 'Multinational corporations, inter-organizational networks and subsidiary charter removals', *Journal of World Business,* 45, 206-216.

Eisenhardt, K. (1989), 'Building theories from case study research', *Academy of Management Review,* 14, 532-51.

Eisenhardt, K. and Graebner (2007). 'Theory building from cases: opportunities and challenges', *Academy of Management Journal*, 50, 25-32.

Figuereido, P. (2011), 'The role of dual embeddedness in the innovative performance of MNE subsidiaries: evidence from Brazil'. *Journal of Management Studies,* 48(2): 417-440.

Forsgren, M., Holm, U. and Johanson, J. (1995) Division Headquarters go abroad – A step in the internationalization of the Multinational Corporation, *Journal of Management Studies*, 32(4): pp. 475-491

Frost, T., Birkinshaw, J., and Ensign, P. (2002), 'Centers of excellence in multinational corporations', *Strategic Management Journal*, 23, 997–1018

Gereffi, G. (1994), 'The organization of buyer-driven global commodity chains. How US retailers shape overseas production network,' in G. Gereffi and M. Korzeniewicz (eds), Commodity Chains and Global Capitalism. Praeger: Westport, CT, 95–122.

Gereffi, G. (1999). 'International trade and industrial upgrading in the apparel commodity chain', *Journal of International Economics*, 48, 37–70.

Gereffi, G., Humphrey, J. and Sturgeon, T. (2005). 'The governance of global value chains'. *Review of International Political Economy*, 12, 78–104.

Gibbon, P., J. Bair and S. Ponte (2008), 'Governing global value chains: an introduction,' Economy and Society, 37, 315–338.

Gillmore, E. (2017), *Four Essays on Subsidiary Evolution: Exploring the Antecedents, Contexts and Outcomes of Mandate Loss*. Published Doctoral Dissertation, Mälardalen

University.

Gupta, A.K. and Govindarajan, V. (1991). 'Knowledge flows and the structure of control within multinational corporations', *Academy of Management Review,* 16, 768–792.

Holm, U. and Pedersen, T. (2000), 'The Centers of Excellence Project—Methods and Some Empirical Findings', 23–41, in Holm, U. and Pedersen, T. (Eds.), *The Emergence and Impact of MNC Centres of Excellence*, London: McMillan.

IDA IRELAND. (2017). Medtronic announces new high-tech facility in Galway [Online]. @IDAIRELAND. Available: http://www.idaireland.com/en/newsroom/medtronic-announces-new-h/ [Accessed 06/06/2017].

IDA IRELAND. (2017). Medtronic, a global leader [Online]. @IDAIRELAND. Available: http://www.idaireland.com/en/how-we-help/case-studies/medtronic/ [Accessed 06/06/2017].

Lewin, A. and Volberda, H. (2011), 'Co-evolution of global sourcing: the need to understand the underlying mechanisms of firm-decisions to offshore', *International Business Review,* 20, 241-251.

Lewin, A. Y., Massini, S. and Peeters, C. (2009). 'Why are companies offshoring innovation? The emerging global race for talent'. *Journal of International Business Studies*, 40, 901–25.

Luo, Y. (2005). 'Toward coopetition within a multinational enterprise: a perspective from foreign subsidiaries'. *Journal of World Business,* 40 (1), 71-90.

Madhok, A. and Liu, C. (2006). 'A co-evolutionary theory of the multinational firm', *Journal of International Management*, 12, 1-21.

MEDTRONIC Annual Reports. (2017). Corporate Reports [Online]. Available: http:///us-en/about/corporate-reports.html [Accessed 06/06/2017].

Michailova, S. and Mustaffa, Z. (2012). 'Subsidiary knowledge flows in multinational corporations: research accomplishments, gaps and opportunities', *Journal of World Business*, 47, 383-396.

Mudambi, R. (2008). 'Location, control and innovation in knowledge-intensive industries'. *Journal of Economic Geography*, 8, 699–725.

Mudambi, R. and Navarra, P. (2004). 'Is knowledge power? Knowledge flows, subsidiary power and rent-seeking within MNCs'. *Journal of International Business Studies*, **35**, 385–406.

Mudambi, R. and Venzin, M. (2010). 'The strategic nexus of offshoring and outsourcing decisions'. *Journal of Management Studies*, 47, 1510–33.

Mudambi, R., Pedersen, T. and Andersson, U. (2014). 'How subsidiaries gain power in multinational corporations'. *Journal of World Business,* 49, 101–13.

Mulligan, J. (2017). Interview: Cheerleader for the medical devices sector knows innovation is key - Independent.ie [Online]. @Independent_ie. Available:

http://www.independent.ie/business/irish/interview-cheerleader-for-the-medical-devices-sector-knows-innovation-is-key-29920365.html [Accessed 06/06/2017].

Nell, P, Kappen, P. and Laamanen, T. (2017), 'Reconceptualising Hierarchies: The Disaggregation and Dispersion of Headquarters in Multinational Corporations' *Journal of Management Studies,* 54, 1121–1143

O'Brien, D., Sharkey Scott, P., Andersson, U., Ambos, T. and Fu, N. (2018), 'The Micro-Foundations of Subsidiary Initiatives: How Subsidiary-Manager Activities Unlock Entrepreneurship', *Global Strategy Journal*, DOI: 10.1002/gsj.1200.

Pananond, P. (2013), 'Where do we go from here?: Globalizing subsidiaries moving up the value chain', *Journal of International Management*, 19 (3), 207-219

Patton, M. (2002), *Qualitative research and evaluation methods*, 3rd edition, Thousand Oaks, CA: Sage.

Pedersen, T. (2006), *Managing Global Offshoring Strategies: A Case Approach*. Copenhagen: Copenhagen Business School Press.

Piekkari, R, Welch, C. and Paavilainen, E. (2009), 'The Case Study as Disciplinary Convention: Evidence from International Business Journals', *Organizational Research Methods*, 12: 567-89.

Ponte, S. and Ewert, J. (2009), 'Which Way is "Up" in Upgrading? Trajectories of Change in the Value Chain for South African Win', *World Development*, 37, 1637-1650

Rugman, A., Verbeke, A. and Yuan, W. (2011), 'Re-conceptualixing Bartlett and Ghoshal's Classification of National Subsidiary Roles in the Multinational Enterprise' *Journal of Management Studies*, 48, 253-277.

Ryan, G. and Bernard, H. (2000). 'Data management and analysis methods'. In Denzin, K. and Lincoln, S. (Eds.), *Handbook of Qualitative Research*, 2nd ed., Thousand Oaks, CA: Sage, 769–802.

Ryan, P., Giblin, M., Andersson, U. and Clancy, J. (2018), 'Subsidiary knowledge creation in co-evolving contexts', *International Business Review*, DOI.org/10.1016/j.ibusrev.2018.02.003

Salemi, T., (2016), Medtronic's Geoff Martha on how the medtech giant will transform health care [Online] @healthegy.com. Available: http://healthegy.com/medtronics-geoff-martha-on-how-the-medtech-giant-will-transform-health-care/ [Accessed 07/06/2017].

Santangelo, G. (2012). 'The tension of information sharing: Effects on subsidiary embeddedness'. *International Business Review*, **21**, 180-195.

Schmeisser, B. (2013). 'A systematic review of literature on offshoring of value chain activities'. *Journal of International Management*, 19, 390–406.

Silverman, D. (2000), *Doing Qualitative Research: A practice handbook*, London, UK: Sage.

Sobh, R. and Perry, C. (2005). 'Research design and data analysis in realism research', *European Journal of Marketing*, 40, 11

Stopford, J. and Wells, L. (1972), *Managing the multinational enterprise: organisation of the firm and ownership of the subsidiaries*, New York: Basic Books

Welch, C. and Paavilainen-Mantymaki, E., (2014). 'Putting Process (Back) In: Research on the Internationalization Process of the Firm', *International Journal of Management Reviews*, 16, 1, 2-23.

Welch, C., and Piekkari, R., (2017), 'How should we (not) judge the 'quality' of qualitative research? A reassessment of current evaluative criteria in International Business', *Journal of World Business*, 52, 5, 714-725.

Welch, C., Pekkari, R., Plakoyiannaki, E. and Paavilainen-Mantymaki, E. (2011). 'Theorising from case studies: towards a pluralist future for international business research'. *Journal of International Business Studies*, **42**, 740-62.

Yin, R. (2009), *Case Study Research: Design and Methods*, 4th ed, London Sage.

Table 1: Medtronic Corporation Profile

Incorporation year	1923 (CR Bard), 1949 (Medtronic)
Operational Headquarters	New Jersey, US (CR Bard) Minnesota, US (Medtronic)
Net Sales (2017)	$2.970 billion
R&D / Innovation (% of Sales, 2014)	8.7%
Number of principal locations internationally (2017)	25 principal locations
Employees (2017) approx.	49,000
Main Business Groupings	Cardiac and Vascular (Cardiac Rhythm and Disease Management; Coronary; Structural Heart; Endovascular) Restorative Therapies (Spine; Neuromodulation; Surgical Technologies), Diabetes, Minimally invasive Group (acquisition of Covidien in 2015)

Table 2: Summary descriptions of subsidiary case – Medtronic (Ireland)

Year of establishment in Galway, Ireland	1982
Primary Business areas of activity	1998: Coronary diagnostic catheters, micro-surgical equipment 2008: Drug-eluting stents, metal stents, balloon catheters 2015: Drug-eluting stents, endovascular devices, structural heart devices
Centre of Excellence	Drug-eluting stents
Employees	1982: 300 1998: 900 2008: 2500 2015: 3000
Cumulated Number of Patent applications filed in US linked to subsidiary	2005: 53 2014: 133

Table 3: Primary Data Collection for Subsidiary Case

Data	Year	CR Bard/Medtronic
Qualitative Interviews	2005	1 (R&D Director)
	2008	2 (CEO/MD, VP) 4 (R&D – Director, Senior Manager, Senior Engineer, NPD manager)
	2010/2015	1 (former R&D Director at the time of site establishment) *(interview conducted in 2015)*
	2017	1 (General Manager)
	Total	9

Table 4: Ancillary Data Collection for Subsidiary's Local Partners for Innovation Development

Data	Year	Higher Education Institutes, Research Centres
Qualitative Interviews	2005	3 (Two research centres – NCBES and REMEDI - , Technology Transfer Office)
	2010	2 (Two research centres – NCBES and REMDI)
	2016/2017	4 (Two Professors of Biomedical Engineering, CURAM research centre, training programme - Bioinnovate Programme)
	Total	9

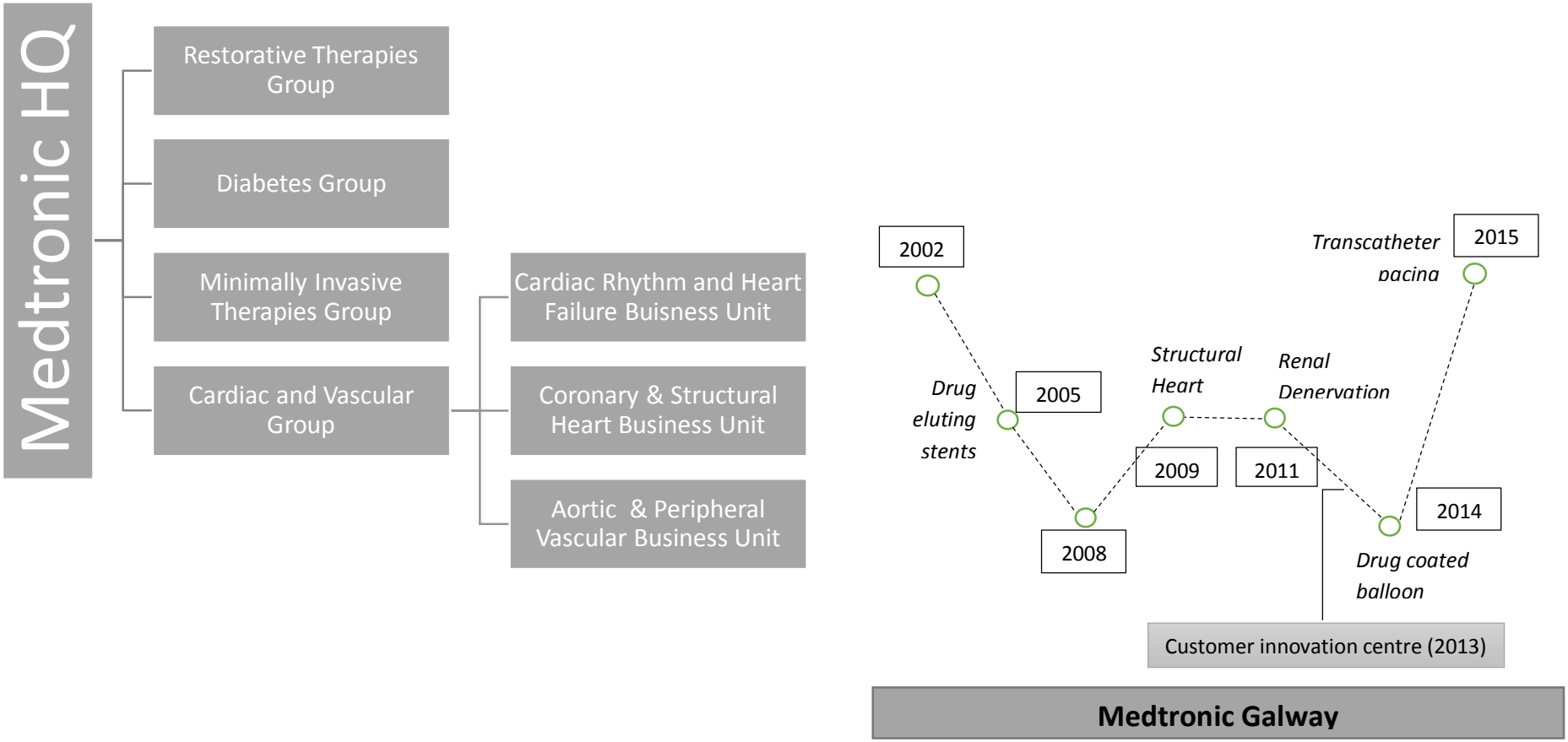

Figure 1: Medtronic Divisional Chart and the Galway Subsidiary

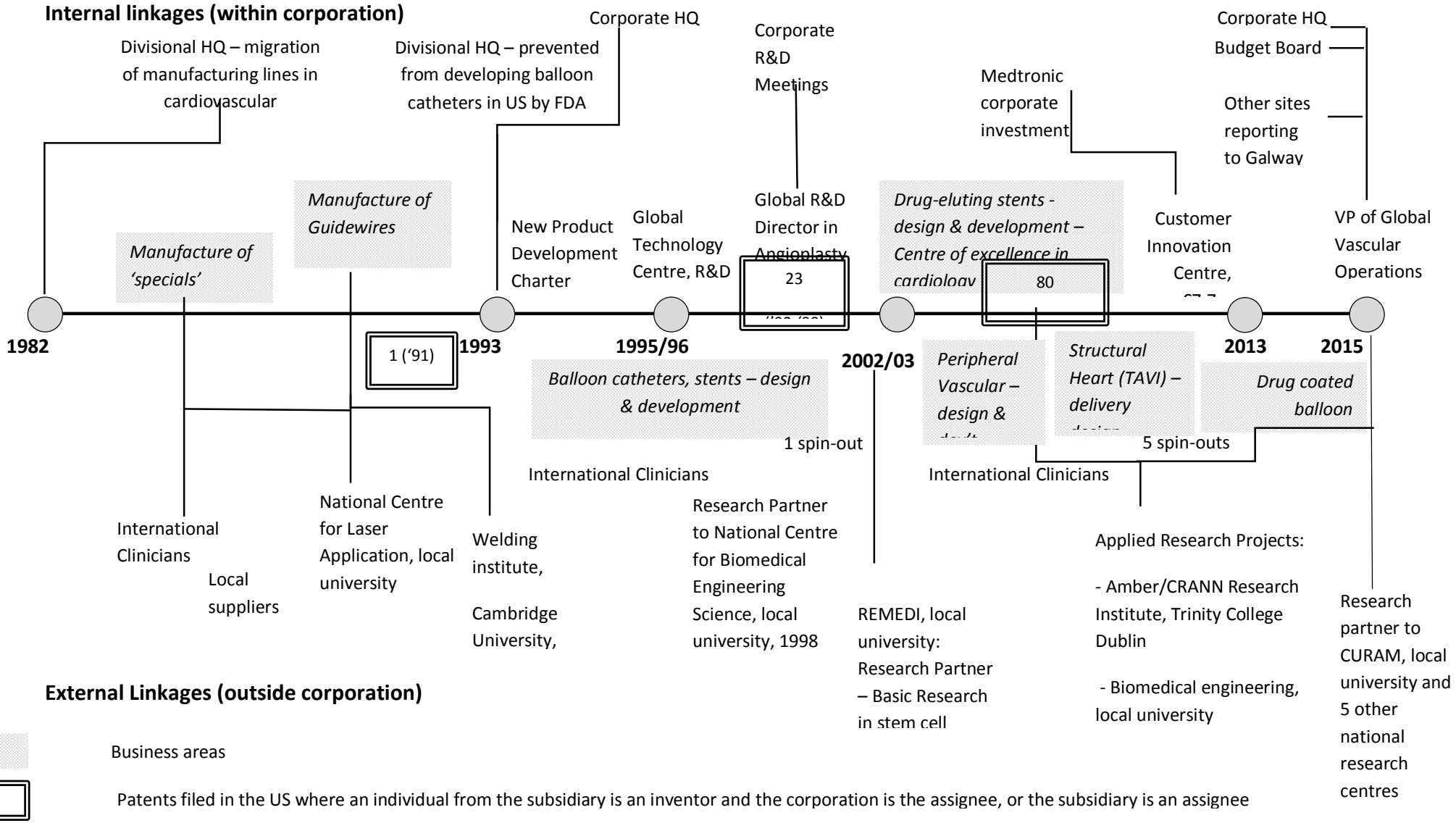

Figure 2: Key Incidents, Activities and Events - CR Bard/Medtronic Subsidiary, Galway