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Beyond the service factory: Service innovation in manufacturing supply networks

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ABSTRACT

This paper is concerned with the nature of the connection between services and manufacturing in manufacturing-oriented supply networks. The existing literature on manufacturing shifting into service is reviewed and, although such moves are seen as a way to increased revenue and profit, there are concerns that firms do not understand how the capabilities that underpin manufacturing may be extended to enable effective service delivery. Inspired by Chase's concept of the 'service factory', which sees the factory as a repository of knowledge and a platform for services, the paper applies Edith Penrose's conception of services as emanating from firms' resources to examine an advanced component manufacturing firm in the course of a number of service-oriented projects. This leads to a model of service development in manufacturing firms, consisting of a network trigger, an opportunity to change the 'productive opportunity', the 'revelation' of resources and Penrose-services, a reconfiguration of the network, leading to an expanded productive opportunity and hence a platform for marketing new service capabilities. In this sense a network is seen as an inter-connected set of productive opportunities. It also draws attention to the importance in theory and practice of understanding both the institutional and the ontological connection between service offerings and the products, factories, firms and networks with which they are associated.

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1. Introduction

In both industrial marketing and operations management, discussions on the 'transition to service' by manufacturing firms have proliferated (see *e.g.* Cova & Salle, 2007; Jacob & Ulaga, 2008; Wilkinson, Dainty, & Neely, 2009). The argument is that manufacturers, facing increasing commoditisation of their business, should consider service offerings as a way to capture new revenue streams and increase profitability. Similarly, Ostrom et al.'s (2010) wide-ranging review of the service management field identifies 'Fostering service infusion and growth' in goods-based organisations as the first of ten research priorities. The transition from manufacturing to services is conventionally known as 'servitisation', a term first coined by Vandermerwe and Rada (1988), and the accounts of this literature are mainly concerned with a shift in the vertical scope of firms' activities from those typically classified as manufacturing by standard industry classifications to those similarly classified as services, such as maintenance, spares provision and condition monitoring. Such shifts are portrayed as changes in the division of labour in a value chain that is otherwise largely assumed to be static[1], with manufacturers taking over activities previously carried out by their customers. Such additional services might be sold separately, or under arrangements based on the 'rental/asset paradigm' of service (Lovelock & Gummesson, 2004), which emphasises the retention of ownership of the asset (typically a capital asset) by the firm that has made or assembled it, and the provision of users with access to it, rather than outright ownership of it (*e.g.* 'Performance Based Logistics' (Doerr, Lewis, & Eaton, 2005)).

However, despite the evidence that manufacturing firms in many sectors are indeed adding service activities to their offerings, there are both empirical and theoretical problems on the horizon. It seems that manufacturers who invest heavily in growing their service business often don't achieve the growth in revenues that they might expect. This has been termed the 'service paradox' (Gebauer, Fleisch, & Friedli, 2005). Furthermore, Neely (2008) identifies a so-called 'servitisation paradox', which suggests that, even if they increase revenues, servitising firms often make less profit than manufacturing firms who do not extend their activities into services. Recognising this type of problem, recent studies have examined the challenges for manufacturers in shifting into the less familiar territory of services, with the differences in customer relationships and associated operations strategy this entails (Baines et al., 2009). Others have drawn attention to the need for wholesale strategic re-alignment, considering resources, structure and incentives amongst other key issues (Neu & Brown, 2005). Resources and capabilities have been the focus of still more recent work in marketing: Matthyssens, Vandenbempt, and Weyns (2009), using a competence-based

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[1] Although see Mason & Leek, 2008. Learning to build a supply network: An exploration of dynamic business models. ***Journal of Management Studies***, 45(4): 774–799. for one example of a more dynamic interpretation.

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marketing perspective, identify a broad range of capabilities required for the transitioning to service; and Ulaga and Reinartz (2011) similarly identify categories of resources and capabilities that must underpin the transition to service.

In this paper, we complement these recent studies in two ways. First, whilst also taking a broadly capabilities-based view, we dwell less on categories and typologies of apparently novel or additional capabilities, and more on the very nature of the connection between manufacturing and service capabilities. In doing this, we are inspired by Chase's concept of the ‘service factory’ (Chase & Garvin, 1989), and Pavitt's reflection on high-value manufacturing and its relationship to services (Pavitt, 2003). The ‘service factory’ concept was proposed over twenty years ago, with Chase and Erikson (1988) and Chase and Garvin (1989) proposing that factories should be seen as repositories of specialist knowledge, providing a range of service benefits to both external customers and internal customers, especially marketing. Arguing that ‘The service tasks of the business can no longer be separated neatly and sequentially from the work of the factory’ (Chase & Garvin, 1989: 69), they propose four possible services factory roles — laboratory, consultant, showroom and dispatcher. In short, factories should be seen as service platforms rather than as sites insulated from the rest of the company. Pavitt (2003) pursues a similar theme, arguing that manufacturing in advanced economies is surrounded by intimately linked, high-skill activities, the ‘…skilled activities that manufacturing firms undertake except manufacturing itself’ (Pavitt, 2003: 88), adding perceptively that ‘…the fact that most of these activities are defined as “services” often confuses rather than clarifies’ (Pavitt, 2003: 88).

The second way in which we complement the existing research is by linking this close examination of the factory or firm's manufacturing capabilities to the network in which the firm operates. In particular, we capture and characterise how services are provided in a process of frequent network reconfiguration, rather than as a process of simply ‘moving downstream’ in a largely fixed collection and sequence of activities in a static value-chain. To achieve this we draw on key concepts from the work of Penrose (1959), especially her notion of the firm's ‘productive opportunity’, and apply them to an in-depth study of a high-tech component manufacturing firm as it explores the ‘shift to service’. Our rather fine-grained study shows some of the dynamic detail of what could be characterised ‘from afar’ (Van de Ven, 2007) as a more straightforward ‘transition’: in revealing some of this detail, we may be able to partly explain some of the difficulties experienced by manufacturing firms shifting into service. Our analysis results in a network-oriented process model of how network reconfiguration and resource use can allow the revelation of service opportunities inherent in manufacturing capabilities.

The paper is structured as follows. After a focussed account of the literature on the shift to services in the next section, we then discuss alternative theoretical perspectives related to capabilities, arguing for an approach based on Penrose. Then, we summarise the method we used to study our single, focal firm, and present data on three exemplar projects. In the analysis and discussion sections that follow, we propose a model for the development of services that are rooted in manufacturing resources, and then explore how these services relate to products, the factory, the firm, and the network. The final section concludes and suggests further work.

2. The move into services and solutions: promise, directions and doubts

Early arguments for the transition to services drew attention to the revenue streams available from after-sales service activities, especially for capital equipment (Levitt, 1983; Potts, 1988). Similarly, a decade later, Wise and Baumgartner (1999) set out a manifesto for ‘going downstream’, helpfully subtitling their article ‘the new profit imperative for manufacturing’. Mattsson (1973) had already stressed the competitive advantage provided by differentiation through selling product–service combinations. Vandermerwe and Rada (1988) coined the expression ‘the servitisation of business’ to denote the move into the provision of services and integrated solutions. Anderson and Narus (1995) identified a range of ‘supplementary service’ opportunities for manufacturing firms, not least the idea of charging for services such as applications advice that were already provided free of charge.

These early studies, then, characterised the shift into services as predominantly a matter of changing – extending – the boundaries of the firm's activities, colonising more of a largely pre-existing value-chain, taking over activities previously performed by the customer and/or third parties. ‘Moving downstream’ would generate extra revenues, and bundling products with services would create entry barriers and differentiation, improving profit margins. The next phase of this research was to delineate different forms and degrees of servitisation, and to ask serious questions about whether and how it should be brought about. For example, building explicitly on Wise and Baumgartner, Davies (2003, 2004) examines the emergence of a new type of firm in high-value capital goods sectors — the systems integrator. Not only do such firms ‘move downstream’, adding services to existing products and taking over some of their customers' activities, they also frequently outsource much or all of the (upstream) manufacturing activity: in some cases, systems integrators are firms entering the industry from bases such as consultancy, with no roots in product manufacturing. Products are regarded by systems integrators as ways to provide services on an ongoing basis, including those that minimise ownership and operational costs, often over contract periods of many years; systems integrators offer services before and during the manufacture of the product, as well as after. This also raises new issues for the client firms procuring such offerings from suppliers (Caldwell & Howard, 2011).

Mathieu (2001) provides a typology of shifts to service (‘maneuvers’) for a wide range of manufacturing firms, based on the extent of the move into service offerings (‘service specificity’), and the ‘intensity’ of the organisational change undertaken. Importantly, she identifies both the potential benefits of alternative shifts to service, and the costs, risks and difficulties they entail, a prominent theme in a number of subsequent studies in marketing, service management and elsewhere (Baveja, Gilbert, & Ledingham, 2004; Davies, Brady, & Hobday, 2007; Galbraith, 2002; Gebauer, 2008; Neu & Brown, 2005; Oliva & Kallenberg, 2003; Reinartz & Ulaga, 2008). These have mainly been concerned with aligning strategy and structure, notably the question of whether manufacturing firms should deliver services through a separate division or unit; the development of a service relationship with customers; and, particularly in Davies et al. (2007), whether to deliver the product–service largely from within one firm, or from a network coordinated by a systems integrator. These studies draw on contingency theory, organisational culture and notions of capabilities. Similar general requirements for structural change are usefully summarised by Cova and Salle (2007: 142): the need for a change in orientation, the development of new capabilities, a transformation of intra-organisational structures and processes as well as the successful implementation of those transformations.

As for the *process* of transition to services, several frameworks have been proposed. For example, Baines et al. (2009) suggest a framework for helping product-centric firms servitise their offerings, whilst Gebauer, Edvardsson, Gustafsson, and Witell (2010) identify four strategy–structure configurations for successful transitions. Others, however, cast doubts as to how far transitions can be planned or implemented, notably Kowalkowski, Kindström, Alejandro, Brege, and Biggemann (2012), who characterise transitions as emergent, reactive and gathering momentum only when services grow in volume. This more specific concern with volume of activity, scale of investment in service and the balance between product and service has been identified in a number of other recent studies (Brax & Jonsson, 2009; Skarp & Gadde, 2008; Windahl & Lakemond, 2010).

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