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Towards understanding variety in knowledge intensive business services by distinguishing their knowledge bases

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ABSTRACT

Knowledge intensive business services (KIBS) are known to play a significant role in innovation systems. Past research has however mostly treated KIBS as a homogenous group; it is now time to understand better the variety that exists among KIBS. In this study, we apply a mix of qualitative and quantitative methods to examine a dataset of 362 UK-based KIBS firms active in three 'sectors': architecture and engineering consulting; specialist design; and software and IT consulting. By applying content analysis techniques to information drawn from firms' websites, we identify each firm's primary 'knowledge base', be that analytical, synthetic or symbolic knowledge. We then relate the firms' primary knowledge base to their engagement in R&D, design, and innovation, and examine how the 'drivers' of innovation vary between firms with different primary knowledge bases. The paper thereby contributes to the literature, first by identifying empirically 'knowledge bases', then relating these to the variety that exists among KIBS. The paper concludes by highlighting issues for further conceptual, methodological and empirical research.

1. Introduction

Over the last 20 years or so, the economic significance of business and professional service, and especially 'knowledge intensive business services' (hereafter KIBS), has been increasingly appreciated, first by economic geographers (e.g., Gillsepie and Green, 1987; Daniels and Moulaert, 1991; Wood, 2002, 2009; Doloreaux et al., 2010), then by innovation and management scholars (Bessant and Rush, 1995; Miles et al., 1995; Howells, 2006; Tether and Tajar, 2008; Muller and Doloreux, 2009; Love et al., 2011), and latterly by policymakers (e.g., European Commission, 2009; United Nations, 2011; BIS, 2012; OECD, 2012; Schricke et al., 2012).[1] These studies were often oriented to understanding how KIBS differ from product-based manufacturing firms, or from operational services, and therefore largely treated KIBS as a homogeneous group. These studies have advanced understanding of how innovation occurs in KIBS, and how KIBS contribute to systems of innovation by, inter alia, helping their clients to innovate. However, because the primarily aim has been to differentiate KIBS from other types of firm or industry, most studies have either considered KIBS as a whole, divided them by 'industry' (as defined by standard industrial classifications), or applied broad categorisations such as P-KIBS (i.e., professional KIBS) and T-KIBS (technical KIBS). Few studies have considered the specifics of the various KIBS activities from a conceptual perspective, and how these specifics – including the nature of their knowledge bases – may influence their structure and behaviours (Von Nordenflycht, 2010; Malhotra and Morris, 2009; Tether et al., 2012; Consoli and Elche-Hortelano, 2010). As KIBS constitute a large and rapidly growing component of advanced economies,[2] we consider that there is a need to move on from understanding how KIBS differ from other types of firm, to understanding better how they themselves are differentiated. By better understanding how KIBS are differentiated, policy can be better attuned to their various needs.

In this paper, we develop the idea that KIBS vary substantially in their 'knowledge bases'; that is the 'type', 'form' or 'mode' of

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[1] For example, a recent UK Government report states that: Professional and business services are a source of UK comparative advantage and the sector has in the past made a very significant contribution to UK growth. . . . [These firms also] provide a significant input to other sectors . . . and therefore offer a channel for transmitting efficiency gains and spillovers to a wider group of industries (BIS, 2012, p. 33).

[2] For example, 'Professional and Business Services' directly account for 11% of UK gross value added and provides nearly 12% of UK employment, and have grown at about twice the rate of the economy as a whole (BIS, 2013, p. 6).

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knowledge at the core of their activities (Strambach, 2008; Consoli and Elche-Hortelano, 2010; Tether et al., 2012; Consoli and Elche, 2013). We also develop an empirical methodology for identifying a firm's primary knowledge base, which relies on extracting information from company websites. We apply this to a dataset of 362 UK based KIBS active in three 'sectors': architecture and engineering consulting; specialist design; and software and IT consulting. We then relate these 'knowledge bases' to variety among the firms, in terms of their characteristics, and the activities they invest in, including their propensities to innovate, and to the activities they engage in to innovate, finding significant differences.

The paper is structured as follows. In Section 2, we contextualise the study in the literature on 'knowledge bases'. Section 3 then outlines the methods and measures used to identify 'knowledge bases', while Section 4 relates these to empirical differences in firm characteristics and behaviours. Section 5 discusses the findings, and Section 6 concludes the paper, including an outline of issues for further research.

2. Conceptual foundations

Innovation studies has long appreciated that there are different 'types', 'forms' or 'modes' of knowledge, and that these are associated with different activities, or approaches to innovation. This observation is, for example, fundamental to Pavitt's seminal taxonomy (Pavitt, 1984) and to the literature that followed (e.g., Jensen et al., 2007; Castellacci, 2008). Until recently, however, the literature on KIBS has, with a few exceptions (e.g., Strambach, 2008; Consoli and Elche-Hortelano, 2010; Tether et al., 2012; Consoli and Elche, 2013), either treated these firms/sectors as a homogeneous grouping, divided them according to the 'standard industrial classification', or applied somewhat awkward distinctions, such as between P-KIBS: 'professional service firms' (e.g., legal and accountancy services), and T-KIBS: 'technical service firms' (e.g. such as R&D services and computer services) (Miles et al., 1995).[3] We conjecture that, just as there is typically a connection between the type of product, the technologies of production, and the organisation of production in manufacturing (Woodward, 1965; Davies and Frederiksen, 2010),[4] a dimension of meaningful and significant variety among KIBS is the 'type' of knowledge central to their activities. While these businesses are unified in their characteristics of being knowledge- (rather than capital-) intensive, they may be qualitatively different on the basis of utilising different 'types', 'modes' or 'forms' of knowledge. Furthermore, we conjecture that this variation will be associated with differences in both their propensity to innovate (as conventionally measured), and with differences in their approach to innovation. R&D, for example, is more likely to be important to KIBS based on analytical knowledge, and likely to be rare among those based on symbolic knowledge.

Various taxonomies of knowledge have been proposed (Kakabadse et al., 2003), but in this paper we build on the distinction made by Asheim and colleagues (Asheim and Coenen, 2005; Asheim et al., 2007) between 'analytical', 'synthetic' and 'symbolic' knowledge (Strambach, 2008; Strambach and Dieterich, 2011; Tether et al., 2012). With its roots in the literature of regional innovation systems, this typology has been used to classify the 'knowledge bases' that predominate in different industries and regions; the typology has also occasionally been applied to firms (e.g., Liu et al., 2013). It provides an alternative to other categorisations, such as that between tacit and codified knowledge (Polanyi, 1967); or that between 'know-what', 'know-why', 'know-how' and 'know-who' discussed by Lundvall and Johnson (1994).

We favour Asheim and colleagues' conceptualisation because it includes a 'type of knowledge' or 'knowledge base' which is different from those included in previous categorisations and which we consider likely to be particularly important to some KIBS – namely 'symbolic knowledge'. By including 'symbolic knowledge', Asheim and colleagues not only extend beyond the widely used but perhaps increasingly stale discussion of tacit and codified knowledge, but also allude to the social construction of at least some types of knowledge – especially expressive or symbolic knowledge, which is less rational or functional (Cappettta et al., 2006; Jahnke, 2013; Verganti and Öberg, 2013). We briefly review the conceptualisation of 'knowledge bases' as a whole, before outlining 'analytical', 'synthetic' and 'symbolic knowledge' specifically.

2.1. Knowledge bases – synthetic, analytical and symbolic (the SAS model)

The understanding that innovation is organised differently in different sectors or activities is foundational in innovation studies. Pavitt (1984), for example, distinguished between science-based, scale-intensive, supplier-dominated and specialist supplier sectors, where the former rely heavily on R&D, often conducted in dedicated laboratories, while the latter are engaged in problem solving, developing solutions for and with their clients. The nature of these activities is also influenced by both the nature of their knowledge bases, and the organisation of knowledge production. Science-based activities utilise science to develop largely cumulative knowledge, whereas specialist suppliers search for solutions which may be ad hoc, and highly context specific. Science-based knowledge production tends to be centralised, whereas specialist suppliers are dispersed. Other studies have made related distinctions. Jensen et al. (2007), for example, differentiate a 'science and technology' mode of innovation based on the production and use of codified scientific and technical knowledge, from a 'doing, using and interacting mode', which relies on informal processes of learning and experience-based know-how. Malerba (2002), meanwhile, emphasises the interplay between the knowledge base of a sector, its pattern of innovation, and wider organisation. To date, most of this work has been undertaken in the context of manufacturing, or product-based industries, but some contributions, including Evangelista (2000), Hollenstein (2003), Castellacci (2008) and Tether and Tajar (2008), have sought to extend and apply these ideas to services. Within this tradition, Asheim and colleagues' first distinguished between two 'knowledge bases': 'analytical' and 'synthetic', before later adding a third: 'symbolic knowledge'.

According to Asheim and colleagues, 'analytical knowledge' is strongly associated with specialised skills (and associated qualifications and activities) related to rational abstraction, objective reasoning and empirical testing. Due to its cognitive and formally based procedural foundations, analytical knowledge is developed using (widely) recognised and 'legitimate', formalised models and predefined methods, that are framed by systematic and organised structures and codes of conduct (Asheim et al., 2007). This 'type', 'form' or 'mode' of knowledge has close parallels with Gibbons and colleagues' (Gibbons et al., 1994) Mode 1 of knowledge production, which is driven by the application of 'scientific methods' (c.f., the

[3] This categorisation is awkward because it is not always clear where to classify KIBS. For example, in the UK, architecture is a 'profession' in that an architect needs to qualify and be registered to practice, but architects can also be considered both creative and technical service providers. Design consultancy, meanwhile, is not a 'profession' as neither qualifications nor registration is required to practice as a design consultant, but while some of these are highly technical, others are not. Perhaps both architects and designers could be accommodated in a new classification of C-, or 'creative', KIBS, but this misses the point. These taxonomic difficulties imply the need for a stronger conceptual grounding of the characteristics of, and variety amongst, KIBS and 'professional service firms' (Malhotra and Morris, 2009; Von Nordenflycht, 2010).

[4] This does not mean there is always a one to one mapping between these. For example, in the car industry, assembly lines predominate, but some manufacturers, such as Morgan, still use craft methods.