Chapter 1: Introduction: Services and the Green Economy

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The debate about the emergence of an environmentally sustainable global economy has become more substantial and diverse in the last decade, and at times arguably more controversial. Early concepts of the 'green economy' in the 1990s (e.g. Jacobs 1996) have been superceded by a variety of different concepts of how economic activity might become environmentally sustainable (Bina 2013), what it constitutes (Dryzek 2005), how it should be measured and a plethora of critiques levelled at competing popular and policy manifestations of the idea of a green economy (e.g. Le Blanc 2011; Caprotti & Bailey 2014). Yet equally the concept of a green economy has gained much wider currency as a policy paradigm and acceptance within state and in international policy discourses (UNEP 2011; UNDP 2012). A key aspect of this conceptual evolution is the way that the green economy has been reframed as a combined response to meet economic, climatic and environmental challenges, although acknowledging in this that enormous challenges around both the commitment of actors and practical implementation remain (Newton and Cantarello, 2014).

One of the key axes of debate within the social scientific literature in recent years has however been on the feasibility and nature of a sustainable transition in economic activity, and in particular the need for a low carbon economy in the context of the ongoing (and increasingly pressing) challenge of human-induced climate change in the twenty-first century (c.f. Schulz & Bailey 2014) as well as sustainable development that addresses resource use and management of ecosystems (Bina 2013). An enormous literature now exists across this debate about the mechanisms through which such a transition might be achieved, and the respective role of different actors including governments, firms (Porter and Kramer, 2011), NGOs and consumers to name but a few (e.g. Mulaney & Robbins 2011; Atkinson & Klausen 2011). However, within these debates the breadth of different industries considered as key agents of intransigence or change has been relatively limited. Much has been written about the energy sector of course focusing on the historical path dependant economic development of fossil fuel energy (Simmie 2012), and there is a burgeoning literature concern with the role of transport, construction, agriculture and manufacturing – at least within certain specific framings of an environmental sustainability such as reducing carbon emissions or recycling materials through product lives (e.g. Cooper 2010). However, with the exception of finance (although again in a particular and perhaps narrow way) (e.g. Labbatt & White 2011;

Carerra *et al* 2012), debate about the nature and role of service industries in the transition to a green economy has been very limited indeed.

The entry point for this book is to develop and make the case for an emerging field of work from within the sub-disciplinary area of environmental economic geography which adopts service-based perspective on the transition to a green global economy. The book is premised on the proposition that there has not been significant engagement with the nature of role of service industry involvement for the contemporary green economic transition and it develops a theoretical and conceptual approach which takes service activity as its primary focus. We argue through this book that the lack of direct engagement with the role of services represents a significant limitation on the capacity of social science theories to understand the nature of how a greener economy might come about. This introductory chapter therefore seeks to provide an overview of how the contributions in this book correspond to an emerging field of research which foregrounds the role of service inputs and service activities in green economic development, and which develops an environmental economic geographical perspective (c.f. Soyez & Schulz 2008; Schulz & Bailey 2014). The latter has to date paid little attention to service industries but in developing it from a service-based perspective, we suggest there is considerable utility for better understanding the way in which different service industries and activities are contributing to a green economic transition both as provider of 'green services' and by providing producer service inputs to other actors engaged in the transition.

We expand these arguments in the remainder of this introductory chapter around a number of component issues. In the next section we outline what is meant by a service perspective on environmental economic geography, identifying what we argue are the advantages this offers in developing both theoretical and empirical insight into the contribution of services in the contemporary green economic transition over some of the narrowly-focused frameworks for theorising service activity that have been developed in management and international business (Merchant and Gaur, 2008). Our economic geographical approach seeks to develop a theoretically pluralist approach that makes use of insight from a range of interdisciplinary bodies of work engaged with the service economy. In so doing, it enables a fuller understanding of both the breadth and complexity of green service activity, including in ways that move beyond just considering firms or industry sectors to a wider range of public and private stakeholders and actors. The third section then moves on to consider a key conceptual issue which continues to haunt social scientific debate about the service economy: how services might be defined and categorised, and where the

boundaries of a service / non-service activity or product might be best understood. Here we seek to clarify the utility of conceptualising different types of services and argue that the concept has considerable value in epistemological terms, even if its broadness does present challenges. The following section then continues by addressing the other important definitional aspect to the topics of this book: the nature of what might be meant by the green economy. Again we argue that a broad definition has considerable utility but also argue that a service perspective poses a series of potential ways in which the green economy might be reconceptualised and implemented The final section then outlines the structure of the rest of the book, and provides some guidance to the reader as to how the different contributions from a wide variety of authors working on service industries or activities each contribute in different ways to our overall argument.

1.1 Environmental economic geography from a service perspective

The book is grounded in an approach that can be termed environmental economic geography that focuses on a service perspective. This means it explores on the one hand how services themselves can be sustainable whilst equally being concerned with how service industries provide a crucial contribution to other industries shift towards a more sustainable economic activity. The premise shared by both the editors and chapter contributors to this book is that service sector activity represents an unexplored and under-researched dimension to the development of the green economy, that not only warrants attention but which needs to be foregrounded in theoretical and policy discussions of a green economic transition. Much of the existing research undertaken on the green economy has operated within a conventional epistemological framing of the economy as a range of different industries that are faced with a challenge of shifting towards environmental sustainability. Firms within these industries are seen as agents of change or transition and the processes by which production, distribution and consumption systems are transformed as being contained within firms in terms of knowledge, innovation and decision-making. What the authors in this book share is a view that whilst there is obviously a need and merit in considering specific industry cases, the contribution of a whole variety of service activities to this process has been largely ignored and consigned to the background of these change processes. Our argument is that to more effectively understanding the nature of change and whether or not it will be successful, then the nature and role of these service contributions to the green economy need to be understood in much more depth. We suggest to a considerable extent that the success or otherwise of greener economic development is bound into the nature of the service sector contribution to firms and

industries operating at a range of scales which are not easily captured by analyses that treat industry sectors as black boxes containing aspects of the green economy.

In this respect, a service-oriented approach to sustainable economic transition argues for more integrated perspective based on the assumption that services are integrated into all types of industries, regardless of the industrial sector. Such arguments have been made using the theory of service-dominated logic (Vargo and Lusch, 2008) and in discussions about the "servitization" of economic activities (Toivonen and Tuominen, 2009; Neely *et al* 2011) as well as the value creation logic (Ørberg Jensen and Petersen 2014). This is not to seek to subsume all industry categories into 'services' in some broad generalisation but rather in line with this servitization argument services may be conceived to be a perspective and not referring to particular activities (Enquist et al 2011). A service perspective means that the experiences from the side of both clients and customers come in focus and the function of the economic activity in relation to outcomes becomes the important issue. This interconnectedness among sectors has also attracted an increasing interest in policy development in relation to economic integration and international competitiveness for firms (EU, 2014).

The second important issue we want to raise is how service activities may contribute to the transition of the society more generally towards sustainable processes. This leads the discussion towards service activities as mediators, developers and agents for knowledge dissemination, knowledge development, learning and innovations and that may lead to more sustainable processes and systems. Economic activities of advanced producer services are important for future growth and sustainable development but the impact of services is still in need of further research (Beyers, 2012, Daniels 2012; Bryson et al., 2014). These include both technical firms (in engineering, ICT and architecture) and those in management, eco-service infrastructure (e.g. legal services, certification and auditing services, management consulting and environmental/engineering services) education and other relevant fields. The importance of advanced services for the innovation system, but also as creators of regional economic development in both mature and emerging markets is evident (Park and Shin, 2012; Jensen, 2013). This connects to the growth of sustainable or green economies in the most rapidly growing emerging markets in Asia and Latin America. The combination of integrated service systems can enhance the sustainability. The interconnectedness of the global economy through product trends, production networks or value-chains also shows the difficulty of only work with greening of the economy in partial geographical areas, when, in the end, it has global repercussions. This calls for joint solutions and cooperation among players in the

mature and emerging economies. Increased co-operation and up-grading of the value-chains in emerging markets is seen to be of great value for future economic development (Hsu *et al* Stark et al., 2014).

A key aspect of this is the role of consultancy services in a variety of forms. Consulting capability is often needed at different stages of infrastructure and construction process, product and process development in manufacturing through management and technical knowledge, industrial design, legal advice, etc. Various chapters in this book also address issues about how innovation and knowledge development for more eco-friendly technologies and systems are related to the societal and institutional context. The effects of environmental solutions also requiere and understanding of geographical scale. This means that what we find to be a sustainable technological solution on a local level can have a less positive impact on a larger scale. The use of smart ICT-solutions which reduces the pollution levels in our cities causing less emissions, might lead to a more harmfull extraction of minerals used in these devices somehwere else. This also suggests there is a need to pay attention to how services can be used to reduse the overall consumption by for example contribute to the production or service systems leading to longer lasting products (the Matsimuto chapter explores this issue in some depth).

Finally, a third key element to our argument about the need for a service perspective in considering the greening of the economy is concerned with the nature of policy and policy development. A range of commentators have argued that there is a need for an holistic approach to policy development if green economic development is to be successful, and that a reliance on industry, research and development institutions or government in isolation will not lead to coherent approach (Ely *et al* 2013; Atkinsen & Klausen 2011). The EU 2020 Smart Growth initiative is a good example of an attempt to develop such an holistic approach to integrate the goals of ecological sustainable goals with goals about economic growth involving a wide range of stakeholders (EU 2012). This program involves the development of many activities and initiatives from politics and with implications for economic activities. This is in the form of programs for research and development, arenas and platforms for meetings and information dissemination, networks, etc. and at different geographical scales. This means regulations, incentives and resources of different kinds with implication on how economic activities transform the production or infrastructure to become more green and ecological sustainable. In that respect, we extend our service perspective on green development to a whole range of ‘service-like’ activities that are not conventionally classified as either services or pure economic activity. We suggest there is a need to include public

bodies, third sector activity and hybrid public-private entities in our service-based perspective on green development since non-commercial knowledge production, policy bodies, public sector funding and the constitutions of public-private partnerships are important frameworks for the development and implementations of "green" solutions that covers the need of society of as a whole (Ely et al. 2013).

1.2 Defining the service economy: an old debate in 'green' clothing?

Having set out the case for a service based perspective on green economic development thus far, before going any further it is important in terms of the goals of this book to consider in more depth some of the longstanding (and not unproblematic) debates about the nature of the service economy itself. Social scientific interest in the nature of the 'service' sector is longstanding, with work spanning a range of disciplines emerging during the 1970s as it was recognised that a growing proportion of advanced industrial economies GDP was accounted for by service industries rather than agriculture, mineral extractive or manufacturing industries (Hermelin & Rusten 2015). This service transition is well rehearsed in a literature spanning decades, but in the context of the second decade of the twenty-first century and the focus on this book, a number of key features of the contemporary debate about what the service economy 'is', how it relates to the rest of the economy, and the geographical and scalar dimensions to service industry activity are important.

First, it is clear that any definition of a service sector to national, regional or global economies needs to operate with a very great degree of generality. Whilst national statistical agencies point to the fact that service industries for seventy to eighty percent of GDP in economies such as the UK, US or Sweden, and indeed increasingly account for over 60 percent of many emerging economies such as Brazil or China, the nature of the service industries within this classification varies enormously (Illeris 1996). The literature generally distinguishes service industries by market and by 'order'. The former enables an important distinction between producer and consumer services, with industries such as management consultancy or investment banking falling into the producer service category and hospitality, retail banking and leisure in the consumer service. To complicate matters further, many service industries unevenly occupy both categories with, for example, financial and legal service industries comprising firms that provide services to both groups of customers. With regards to the concept of order, there is also a debate about the relative importance to different types of services for economic development and sustainability, wealth creation and the innovativeness of economies. Much of the literature places significance on the role of

knowledge intensive business services (KIBS) as 'higher order services industries' which are argued to be the key to wealth generation and innovation in the contemporary global knowledge economy (Bryson & Daniels 2015). High order services have thus been the focus of much research in relation to their capacity to transform the nature of economies (ibid.) and clearly such an argument resonates through many of the chapters in this book engaged with considering how green economic development occurs and whether it is successful or not. However, what we would highlight at the outset is that an over-emphasis on high-order service industries may present a narrow and unhelpful account of the role in which services are leading to the greening of economies. Taking the concept of an environmentally sustainable economy in its broadest sense, lower order consumer services are important albeit in different ways from high order producer services. Sectors such as waste management, construction and local public services are considered in various chapters in this book and represent a significant aspect to the way in which services are contributing to a green economic transition.

A second aspect to this debate however is the validity of distinguishing a service at the level of industries or firms at all. A growing body of research has demonstrated that the purity of service provision by service firms in service industries is questionable. This even goes as far as the provision of a given service itself. In contemporary economies, a research emphasis on production as a process or practice has shown that many producer services are in effect co-produced across and between service firms and their clients (Ørberg Jensen and Petersen 2014; Bramklev and Ström, 2011), and potentially with an array of multiple service providers collaborating and work together in delivering services via projects (Rusten and Bryson 2010). Obvious examples would be the delivery of foreign direct investments in different countries where are firm buying a foreign subsidiary would require a whole range of services (financial, legal, consultancy) from different external firms and enabled by internal employees in order to undertake the acquisition as a project. The pureness of any given service itself is therefore problematic to identify, and service-based research has been argued to maybe be better focused around these service-rich projects in these contexts (Jones & Ström 2012). Such an insight is highly pertinent to many of the industries and topics considered in this book in the process of economic 'greening', and the fact that a purely green service sector firm or service activity is hard to purify from non-green activity or agents is widely evident in many of the cases considered. A key point therefore that runs through the book is that we are not arguing that the green service economy is easy to disentangle from the 'non-green' economy, and the binary division here is almost certainly an unhelpful one.

Rather, the book is premised on a conception of the key contribution of service industries, firms and practices to spatially uneven 'greening' processes in the economy, in all the diverse and messy forms that are currently occurring.

This leads to a third and final aspect to the debate about the service economy which is important to understand in the context of this collection, and which this book seeks to contribute to: the uneven nature of the globalization of service firms and industries, and the increasingly complex spatial form of service sector activity. This is leading to changing delivery of services and the development of services in different economies and regions across the planet. Debates about the nature of service sector in the global economy have, as with other sectors, been increasingly concerned with the rising significance of transnational firms (TNCs) in service industries, and the globalization of the market for services. TNCs have become increasingly dominating in many service industries such as banking, retail and hospitality, although the challenges faced by service firms to internationalize are in many cases greater than in manufacturing or extractive industries. Many services are embodied activities, delivered by skilled individuals, and are thus highly sensitive to different national and cultural contexts (EU, 2014)). Other service industries such as legal services are also shaped by national regulatory jurisdictions which makes the development of standardised global service products more difficult for firms (c.f. Jones 2005; Faulconbridge 2010). However, social science research has increasingly been concerned to examine the role of KIBS in transmitting industry and business practice norms across the planet, and in fostering innovation in different national economies. This trend of course has considerable significant for the theme of this book in seeking to understand how service TNCs are often central in delivering green services to firms in different national economic contexts which are propagating the greening of these economies. The particular complexities of how service firms TNCs including smaller firms piggybacking global manufacturing companies are entangled in green economic development at a variety of scales in the global economy, and their relationship to the transmission of knowledge, technological innovation and business practices is at the heart of our argument for the value of a geographical approach to green service development (c.f. Faulconbidge 2013). Many of the contributions to this book explore this spatial dimension to the nature of services in green economic development through the lenses of local or regional industries, the interactions of TNCs with regional economies or the way in which global 'best practice' or innovation are adopted and implemented in specific ways in different local contexts.

1.3 Theorising the green economy

Thus far we have set out our case for foregrounding the role of service industries in the greening of the global economy, and considered how current theoretical debates about the nature of services themselves impact on that topic. However, a further key task of this introductory chapter is to consider the conceptual issues that exist around the concept of green economy itself.

Of course, the starting point of this discussion is to highlight that the concept remains a contested and to some extent controversial one. We do not therefore seek to argue for a strong definition of the green economy, and many of the contributors in this book engage with (sometimes subtly) different perspectives on the idea. In broad terms the concept has developed from political international discussions and it is about the interactions and integrations of ecological sustainability,economic growth and social inclusion. Environmental and climate challenges are important backdrops for this direction of political action and at its heart the idea of the green economy aims to develop more sustainable societies and resource solutions. UNEP offer a recent definition that has been increasingly widely adopted:

> *In its simplest expression, a green economy is low-carbon, resource-efficient and socially inclusive. In a green economy, growth in income and employment are driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services (UNEP 2011: 16)*

Such as definition give room for alternative development scenario (ADS) whereby economic activities bring the promise of a transformation in the way business is done as they dynamically engage with social relations (around the environment) (c.f. Gibbs & O'Neill 2014). It moves beyond earlier definitions of the green economy through an ecological modernization lens that represented 'business as usual', whereby 'greening the economy' was confined to new products and processes that used less energy and resource inputs, but without addressing issues of growing consumption or rebound effects (c.f Bina 2013; Lorek & Spangenberg 2013;). What has happened more recently is an imperative to move beyond current economic thinking around a range of number of different theoretical directions. We highlight three here that we suggest are important current conceptual considerations in understanding what a green economy might be and how it might be achieved, and all of which in different ways are variously drawn upon by the contributors to this book.

The first is what might be termed 'transition management theories' (c.f. Elzen *et al* 2004), seeking to understand the economic conditions under which economic systems innovate and change, leading to a transition to a more sustainable form of economy. Much of the growing literature has focused on how specific industries or production processes are evolving towards delivering more environmentally sustainable economic outcomes (e.g. Markard *et al* 2012). Transition theory seek to move to a green economy as co-constituted through the co-evolution of social, economic, political and scientific-technological subsystems (Smith *et al* 2010; Foxon 2011; Farla *et al* 2012). This 'socio-technical' approach (Geels 2010) thus does not see the economy as easily disentangled from society, politics, institutions or culture and therefore aims to adopt a holistic theoretical approach to how a green economy might develop. However, whilst we and many of the contributors to this collection find this a useful epistemological framing of how economic systems might change, it represents more an entry point rather than an approach we simply seek to apply. Transition management theories have been applied to a wider range of elements to the green development debate but despite much application to concepts of the green economy, the greening of firms, green technologies and green entrepreneurship, there has been little or no direct engagement with the role of service industries in the evolution of the green economy. We suggest that this is surprising and significant absence in the debate about the nature of any transition to sustainable economic development. Furthermore, we would argue that a service-based perspective (incorporating services as products, servitization as a process and service-like activities) provides a new and potentially powerful way of understanding key elements of the socio-technical nature of a sustainable transition. Many of the contributions to this book use transition management theories as an entry point which allows a reframing of the drivers and mechanisms of transition.

A second approach of considerable importance is the substantial (largely geographical) literature that has been concerned with the development of sustainable urban and regional economies (c.f. Altenberg & Pegels 2012; Cooke 2013), and in particular has focused on how urban sustainability might be achieved. This literature is not purely concerned with the economy of firms or industries either, seeking to take the city or region as the unit of analysis for environmental sustainability (c.f. Bulkeley & Betsill 2005; Rutherford & Coutard 2014; Childers *et al* 2014). Importantly, however, this literature shares much in common with work on service economies and the role of (global) city regions in the development of the service sector (e.g. Chang & Sheppard 2013). It is we would argue a useful conceptual context in which to think about how green service firms and industries are

embedded in specific urban and institutional contexts that shape the capacity and direction of green service development. The urban sustainability literature also is helpful in framing the role of non-commercial institutions, labour markets and public sector actors in the constitution of green service activity since it seeks to adopt a place-bound and multi-actor perspective on how urban sustainability is achieved.

Finally, and related, a significant body of social scientific work has specifically examined the nature of green economic development through an institutional theory approach. Drawing on 'new institutional theory' in political science and other theories of governance (c.f. Geels 2004; Zhu & Sarkis 2007; Bosselman *et al* 2012; Pinkse & Kolk 2013), a range of different disciplinary contributions have sought to understand how local, national and supranational institutional contexts shape the possibilities and capacities for economic development to become more environmentally sustainable. Examples are the negotiation activities linked to the development of international environmental standards (eg. ISO certification schemes). Institutional theory permeates much of the current social scientific literature on green development and in particular link policy ideas and initiatives which seek to achieve environmental sustainability to the institutional and governance contexts. With regard to the objectives of this book, and in the case of many of the contributions, institutional theory provides an important basis to understand how services are entwined in the transitional to a green economy. It enables an understanding, for example, of how policy and regulatory contexts both shape and are shaped by service products, the strategies of green service firms and the way in which innovation is fostered. Many of the chapters that follow thus draw insight from institutional theoretical perspectives although many also seek to move beyond a narrow institutional focus in developing the service-led perspective on the green economy we advocate in this book.

1.4 The structure of this book

The different chapters in this book are organised around three major areas of contribution, focused around different thematic aspects to the relationship of service activity with the green economy. These themes loosely progress from more generalised (e.g. green transition processes) to more specific topics (particular industry sectors) in three successive parts reflecting the areas of different contributor expertise. The first part examines the broader nature of service contributions to green economic development with Brita Hermelin's chapter beginning with an examination of the wider issues of scale around the way in which service-informed green economic development occurs within local and regional economies. She

explores a regional Swedish case examining how the interaction of local institutions, governance structures, corporate networks are all caught up in service inputs into the 'greening' of economic processes. The chapter considers how competing discourses around Local Agenda 21 (LA21) initiatives in different Swedish municipalities shape both service firm involvement and the scope for an innovative contribution by a wider array of service industries. The key argument developed is that the concept of a 'green services' in fact refers to a wide range activities that are present in many different industries and in the private and public sectors. It also demonstrates that local policy has a powerful influence in shaping the development of firms providing 'green services, and that the creation of green services is constituted through cross-sector interactions..

Such an argument provides a good context for the third chapter in which Grete Rusten turns to the Norwegian case and the significance of regulatory and institutional frameworks in shaping the development of certains types of green services within a national economy. The chapter examines the role of certification management systems which accredit service firms with certain levels of environmental credentials and thus facilitate access to certain markets. The chapter presents an empirical analysis of three certification schemes, examining the level of uptake by firms in different service sectors and how they are geographically distriibuted across the different sub-national regions. The study reveals the rationales and motivations for companies to adopt environmental certification and also reveals the important role an environmental certification consultancy industry within the economy which both facilitiates and develops the prevalence of certification as a ‚greening' mechanism across a range of industries. It thus provides signfiicant insight into how green KIBS are important in catylising green economic transition rather than these transformations being purely internally driven within firms of different industry sectors.

The fourth chapter then moves to consider the relationship of servitization and greening processses in the economy, in particular looking the role of services in remanufacturing processes. Mitsutaka Matsumoto and his colleagues argues that knowledge intensive service sector inputs play a crucial role in the development of remanufacturing systems that recycle manufactured components and (potentially radically) shift the sustainability of manufacturing industry activity. The contribution importantly also explores the blurred boundaries between services and manufacturing, focusing primarily on the way that many manufacturing TNCs are entering the service business rather than outsourcing service inputs. The chapter examines through a number of Japanese industry case studies including the photocopier manufacturing and automotive components industries. It finds that

servitization is playing an important role in the shift to green remanufacturing production systems in many of the cases it considers, although the process in and of itself will not necessarily lead to remanufacturing processes developing. Following this, chapter five provides a complementary but contrasting view by considering the role of external knowledge intensive service firms in fostering a similar but different form of green economic transformation in production: the development of green information and communication technologies (Green ICT). It does this through a regional economy case, presenting research into the nature of Green ICT development in the Gothenburg region of Sweden. The chapter reveals however that despite these green service being providing by specialist ICT firms, they are constituted through multiple actors and need to be understood as the products of a network of stakeholders including producers, users and regional institutions. The agency of service firms in developing green economic activity lies in a range of intangibles around their role in bringing these multiple actors together.

The final chapter in Part I provides yet a further cut at understanding the broader nature of service activity contribution to green economic development. Here Helge Lea Tvedt considers not green service firms or servitization within non-service firms, but the role of what he terms 'green support services'. These, the chapter argues, are service activities conducted with the purpose of increasing an organization's (e.g. private companies, hospitals) environmental performance. Importantly, it further argues that this service activity is not *per se* necessarily environmental in nature, but the service input nevertheless contributes to a better environmental performance by the users. The nature of this aspect to green service activity is examined through research into two case studies in the Norwegian economy, firms both specialized in knowledge-intensive services that few other organizations conduct internally. The chapter considers the role of regulatory context within Norway in the development of the complex marketplaces for these companies' services, and thus shows the significance of local and national institutional context in developing specialist green service activity.

Part II of the book turns to consider the particular key role of services in the transition to green forms of energy. In chapter seven Johanna Dichtl and Hans-Martin Zademach examine the issues around green finance in relation to energy, arguing that the financial sector has shifted its focus in the last several decades toward the (renewable) energy sector, driven by the motivation to place its liquid assets profitably in renewable energy projects and participate in the growth of the renewable energy. This financialization of the renewable energy sector is explored by contrasting the case of the German and Polish economies, with

the chapter developing the conclusion that a stable, reliable and long-term legal and policy framework for renewable energy at the national level is fundamental for investors. In particular it focuses on what shapes the behaviour of financial service firms, and how this behaviours shape the overall direction of green energy financing. Analysis of both case study economies reveals that where there is either legal or policy uncertainty, the capacity for a green energy sector to develop is greatly restricted and that financial service firms are unable or unwilling to drive the process.

This echoes to some extent with the argument of chapter eight where Britta Klagge and Sebastian Reimer consider the nature of carbon offsetting as a financial vehicle at the centre of a green energy transition. However, the chapter takes a service product / activity as its focusing, examining how firms in a range of industry sectors based in the German economy engage with offsetting as part of their operations. The chapter shows that firms' approaches to carbon offsetting are clearly context-dependent, but also firm- and industry-specific. It argues that this service product / activity has developed quite dynamically with the large German firms studied, both as a reaction to changing context conditions and resulting from experience and learning more about the opportunities, but also the risks associated with carbon offsetting.

Chapter nine then shifts our attention around service and energy sustainability to an urban regional context in examining the nature of the 'smart city' initiative and the involvement of service firms, inputs and activities in its development. The analysis by Harvard Haarstad here again demonstrates the value of a multi-stakeholder perspective to understanding the role of services in a green economic transition, as well as the blurred nature of firm / product / institutional boundaries around where service activities are created and delivered. The chapter presents research into the Norwegian case, showing how the broad 'smart city' agenda represents key strategies for making urban energy systems more sustainable. It examines in particular the role of high-tech business service firms in developing the smart city agenda, although arguing that they form part of an assemblage of actors involved in service-like activities that all need to be considered if the implementation of this approach is to be understood fully.

The final major part of the book comprises three chapters which move to the more specific scale of individual industries in order to examine how green services are created and delivered. In the first of these, Kentaro Watanabe and his colleagues examine the Japanese engineering industry and in particular the development of ‚service engineering' in relation to the goal of a more sustainable economy. The chapter presents research into the development

of service engineering as a paradigm for servitization within engineering and manufacturing. The uniqueness of the Japanese context provides an important comparator for other national cases studies considered elsewhere in the book, and the chapter examines a number of different approaches to service engineering in the Japanense case including energy, footwear apparel and transportation. It contrasts the relative effectiveness of two approaches deployed within the Japanese economy – a model-based approach based on theoretical understanding of product usage and one driven by data drawn from consumers actual use of products. Overall the argument developed is that service engineering that makes use of both approaches is likely to be most successful in achieving sustainability goals.

Chapter eleven then moves to a different industry in a different region of the world: wine production in the Chilean economy. Andrew Berry and his co-authors examine the development of environmental sustainable practices in the industry over the last 15 years, showing how external specialised public and private service providers have been the prominent players in increasing sustainability. These providers not only deliver services directly to vineyards and wineries, but are also central parts of the upstream and downstream segments of the wine value chain. The chapter argues that high value added services such as R&D are assisting wine makers to produce sustainable wine through alternative sources of electricity generation, sustainable water management as well as genetically modified wines that do not require toxic chemicals to protect them from pests and diseases. A key driver of this process is producers and consumers' demand for sustainable products. Thereafter, in chapter twelve Christian Schulz and Berenice Preller examine how service firms and service inputs are a central element of the transition to sustainable construction industry activity. They seek to develop a management transition approach to the construction industry arguing that a relational and multi-agency approach is crucial to understanding the complexity of green development in this sector. The chapter highlights the role service plays in three particular ways in the greening process: increasing the number of service firms adapted to new building sustainability, enabling more building firms to transition; service provision contributing itself to the greening of the final product, and third by transmitting the approach of early adapters across the industry which inspires more hesitant firms to move in this direction. As with the other industry case studies, this contribution again reveals the central but also multi-dimensional role of service activity in the greening process.

Finally, we end the book with a short concluding chapter that seeks to draw together some of the common insights from the contributions around areas of future research and theoretical development in relation to services and the green economy. In particular we point

to the key challenges that conceptualising green service activity poses given the complex nature of service embeddedness in the current trends towards environmental sustainability with future prospects for the economy and society.

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