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Sustaining jobs and environment? The value-added wood industry in Metro Vancouver, British Columbia

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This paper addresses claims that the value-added wood industries contribute towards an economically and environmentally sustainable forest economy in British Columbia, Canada. The small firms that comprise the value-added industries have grown in number, are relatively labour intensive, draw upon diverse, small volume timber supplies, and serve a wide variety of niche markets. Conceptually, the study is informed by an integration of the flexible specialisation model with green entrepreneurship. Empirically, the study adopts an extended case study approach and is based on in-depth semi-structured interviews with respondents of 41 small firms that represent various value-added wood processing activities in Metro Vancouver and with industry associations. The study found that these firms are modestly flexibly specialised and locally embedded but inter-firm networking is weak. As green entrepreneurs, they reveal variation in environmental awareness and performance but are adopters rather than leaders.

Keywords: flexible specialisation; green entrepreneurship; wood value-added; Metro Vancouver

Introduction

Historically, the mass production and export of primary forest product commodities, especially lumber, plywood and pulp and paper, has been a major engine of economic growth throughout British Columbia (BC), Canada. However, as the resource base has deteriorated in recent decades, the growth rates of these commodities have levelled off or declined and become highly volatile while job losses have been relentless (Edenhoffer and Hayter 2013). This secular decline in the commodity base has been partially compensated by growth of the so-called value-added (secondary manufacturing) industries that process sawn lumber and bulk pulp and paper into more finished products. Indeed, these activities are important to government hopes and policies to provide jobs in an environmentally sustainable way. Economically, the small firms that comprise the value-added industries have grown in number, are relatively labour intensive, draw upon diverse, small volume timber supplies, serve a wide variety of niche markets, and their growth has been linked to Piore and Sabel’s (1984) advocacy of flexible specialisation as the basis for economic rejuvenation (Rees and Hayter 1996, Reiffenstein and Hayter 2006). Environmentally, arguments in favour of small firms and value-added activities are highlighted

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by M’Gonigle and Parfitt’s (1994) *Forestopia* that proposed that BC’s forest economy shift from a “volume-driven to a value-added approach” in which more jobs and a wider range of products are provided from smaller timber harvests. Indeed, these pleas resonate with recent discussions of “green entrepreneurship” (O’Neill and Gibbs 2013).

This paper’s objective is to address the claims that value-added wood industries contribute towards an economically and environmentally sustainable forest economy in BC, in effect providing a pragmatic assessment of the polemics of *Forestopia*. More generally, the paper offers an assessment of green entrepreneurship, especially in relation to small firms. Conceptually, this study contemplates the neglected relationships between flexible specialisation and green entrepreneurship. While neither the flexible specialisation nor environmental literatures have crossed paths to any extent there are obvious potentially mutually reinforcing complementarities that are intimates in the concept of green entrepreneurship (Tagar and Cocklin 2005). Thus, both flexible specialisation and green entrepreneurship are critical of energy-intensive mass production, and both emphasise the “social virtues” of entrepreneurship, often (if not always) with respect to new and small firms (Piore and Sabel 1984, Schaper 2005). Indeed, the networking among small firms to realise collective advantages that strengthen regional development, which are at the heart of the flexible specialisation model, can readily incorporate green entrepreneurship that emphasises increased environmental awareness among firms, especially small firms. In turn, environmental awareness can be strengthened by recognising shared institutional arrangements and information among localised populations of small firms. The greening of flexible specialisation is one particular lens to focus debates about the interdependencies between economy and environment as they vary from place to place.

Empirically, this paper investigates the extent to which the value-added wood industries in Metropolitan (Metro) Vancouver illustrate flexibly specialised green entrepreneurship, based on interviews contextualised within broader trends occurring across BC. The growth of these activities has been strongly concentrated in Metro Vancouver and to some extent in the rapidly urbanising Okanagan region of BC’s southern interior, not in more remote forest-commodity-based communities. Importantly, this paper does not support Piore and Sabel’s (1984) claims of a general shift in the pattern of industrialisation towards flexible specialisation. Such a shift has clearly not occurred, while hopes for a green future or sustainability transition largely rest on roles played by large corporations. Even so, small firms continue to be widely prevalent in all economies and in some places, times and industries there are important clusters or agglomerations of small firms that potentially have roles to play in sustainable futures.

The remainder of the paper first examines the relationships between flexible specialisation and green entrepreneurship. Second, BC’s value-adding industries in Metro Vancouver are defined, classified, and the research design outlined, followed by a summary of overall trends in their growth, and geographic distribution. Third, the article explores the economic and environmental performance of the surveyed firms.

**Flexible specialisation and green entrepreneurship**

While the flexible specialisation and green entrepreneurship literatures evolved from different roots within political economy and business studies, respectively (cf. Piore and Sabel 1984 with Schaper 2005), without formal recognition of each other, they rest on complementary thinking and their integration may be mutually empowering. In general terms, both claim roots in the need for contemporary “paradigm” change in economic organisation and technological practices. Thus, Piore and Sable (1984) advocate flexible specialisation
as an antidote to Fordist-style industrialisation based on mass production controlled by increasingly large corporations while Schaper (2005) envisages green entrepreneurship as another example of “creative destruction” and how industrial economies will transition to sustainable development, or some related label. Whether or not either framework provides an effective signpost of paradigmatic change, both flexible specialisation and green entrepreneurship highlight the role of entrepreneurial firms, their adaptability, flexibility, and innovativeness. Flexible specialisation, unlike green entrepreneurship, builds on more explicit geographic foundations and recognises the power of place in realising localisation economies, networking, and various forms of social embeddedness. Yet, green entrepreneurship has recognised the influence of local cultures and “social norms” in shaping green strategies by firms (Meek et al. 2010) and O’Neill and Gibbs (2013) argue that the elaboration of this influence is an important research priority. Admittedly, green entrepreneurship is vitally concerned with those firms playing leadership roles in achieving sustainable development, while flexible specialisation has not directly addressed environmental imperatives. But can the external economies and networking activities involved in flexibly specialised production help reinforce and diffuse green innovations?

Thus, flexible specialisation features populations of small, entrepreneurial, and interdependent firms that employ pools of skilled labour and provide competitive advantages based on external economies of scale and networking. Flexibilities are realised at both the level of the firm and cluster. Thus, small, typically owner-managed firms, as opposed to corporate bureaucracies, can make fast decisions in response to market needs or crisis and in terms of organising effective use of capital and human resources, the latter typically non-union. For Christopherson and Storper (1989, p. 331) the “purpose of flexible production organization is to make labour and capital inputs more variable.” Indeed, the ability of firms to respond to market and supply uncertainties is an important feature of flexibly specialised firms and clusters (Rees and Hayter 1996). At the level of the cluster, flexibility and speed of response is achieved by the presence of alternative rival firms and suppliers in meeting input and output requirements, and by external economies such as industrial associations that provide collective marketing, research and development (R&D) and lobbying expertise, and forums for information sharing that are beyond the ability or willingness of firms to provide themselves (Kingsbury and Hayter 2006). The flexible specialisation literature, however, has shown little interest in how small and medium-size enterprises (SMEs) cope with environmental concerns, the central priority of green entrepreneurship approaches. Thus, Isaak (2005) distinguishes “green firms” from “green green firms”; the former comprising existing firms that are striving to meet environmental obligations and the latter comprising “ecopreneurs” that are “designed to be green in processes and products from scratch, as start-up, and, furthermore, is intended to socially transform the industrial sector” (Isaak 2005, p. 14). Although concerned with firms of all sizes, green entrepreneurship studies have placed emphasis on entrepreneurship within SMEs and the founding of new firms (Tagar and Cocklin 2005, Walley and Taylor 2005). This emphasis is also implied in O’Neill and Gibbs (2013, p. 3) recent suggestion that green entrepreneurs are individuals “who combine environmental awareness with entrepreneurial action will form a key driver in any move towards a green or low carbon economy.”

Further Tagar and Cocklin (2005, p. 150) debate the possibilities for developing green entrepreneurship to the networking activities within clusters of SMEs, specifically within Australia’s environment industry, in a way that resonates closely with flexible specialisation, as they observe. Thus, their general argument is that SMEs can offset the disadvantages of limited capital, human resources and knowledge networks by clustering together
and sharing the benefits of networking. In effect they note that individual SMEs with limited capabilities of realising internal economies of scale can collectively access external economies of scale and scope through clustering. In this regard, their discussion (Tagar and Cocklin 2005, p.150) of the benefits of networking, such as the sharing equipment, pools of skilled labour; the exchange of information and know-how via personal contact based on high levels of trust, cooperation in marketing, exporting and R&D; the development of a collective identity; fast adaptation; and strong commitments to product differentiation and economies of scope, indicates the key characteristics of flexible specialisation.

Tagar and Cocklin (2005) recognise that clustering is not a magic bullet solution to the search for best practice behaviour among SMEs with respect to the environment (or from other perspectives). As they note (Tagar and Cocklin 2005, p. 151), spatial association itself does not imply information sharing and trust, there are disadvantages in locating in clusters and large agglomerations, and innovative SMEs may depend crucially on non-local relations. In addition, even when networking exists, shared routines may institutionalise obsolescent as well as innovative behaviour. Furthermore, environmental certification poses awkward issues, especially for SMEs. Thus, compliance with environmental certification is encouraged by the promise of market access, price premiums and a more abstract sense of social licence. However, for SMEs certification adds especially burdensome costs and rules constraining behaviour, and higher prices may reduce demand. In wood products, for example, the evidence regarding the impact of certification on consumer preference is ambiguous with willingness to pay higher prices limited, dependent on income and levels of information available to the consumer (Anderson et al. 2005, Aguilar and Vlosky 2007).

There is also confusion about the appropriate forms of certification. Thus in the forest sector where environmental certification is an important trend (Stringer 2006), several environmental certification schemes begun in the early 1990s as a means of protecting endangered forests primarily in tropical countries. Organised by Environmental Non-Government Organizations (ENGOs), the Forest Stewardship Council (FSC) certification scheme attempts to trace products via a “chain of custody” from logging activities to the final consumer. Less costly and bureaucratic alternatives to the FSC have since developed, led globally by the Programme for the Endorsement of Forest Certification (PEFC) set up in 1999 and including other initiatives such as the Canadian Standards Association (CSA) and the (US-based) Sustainable Forestry Initiative (SFI). In addition, ISO 14000 focuses on certifying environmental management systems within factories. In addition, the US Green Building Council (USGBC) is a non-profit that sets Leadership in Energy and Environmental Design (LEED) requirements in buildings. With respect to timber supplies, only FSC certification is recognised by the LEED system which is a source of contention among other certification systems. (Even so, FSC-certified timber has very little weight in LEED ranking systems.)

Notwithstanding concerns over the value of certification, networking and cooperation among SMEs within clusters may encourage its adoption by shared, progressive expectations, the creation of a green identity, cost sharing, and perhaps even by stimulating innovative behaviour. Moreover, Tagar and Cocklin’s (2005) focus on the environment industry can be readily extended to other clusters of SMEs that seek to become or intensify their greenness. In this context, flexible specialised clusters provide a geographic foundation to green entrepreneurship by the importance attached to adaptability, networking, and innovation. This geographic perspective is enriched by recognition that pro-environmental sympathies and attitudes vary by regional context, and that the more favourable contexts in this regard would be more likely to generate stronger environmental policies and commitments.
among firms to become green (Meek et al. 2010, O’Neill and Gibbs 2013). From these twin geographical perspectives, namely clustering in the context of positive pro-environment social norms, the greening of SMEs within Metro Vancouver wood processing activities may be anticipated.

**Place-based greening: towards a sustainable forest industry in BC**

As a periphery, the industrialisation of BC was predicated on the export of commodities to the world’s markets. Resource policy, for example, as related to forests, was industrial policy, and trees were seen primarily in terms of market values. In recent decades, however, there has been a comprehensive re-imagining of BC’s resources and global role that has given increased priority to environmental values. This transformation is captured by the birth of Greenpeace in Vancouver in 1971 and its rise as the world’s biggest ENGO. If Greenpeace’s head-office is now in Amsterdam, BC is home to a large, vibrant environmental movement. Another indication of BC’s embrace of environmentalism is the re-election of Gregor Robertson as the city of Vancouver’s mayor and his avowed intention to make the city the “greenest” in the world. More fundamentally, over recent decades successive BC governments have legislated wide ranging environmental initiatives that have included the remapping of extensive forested areas from timber supply to conservation areas (Affolderbach 2011, Affolderbach et al. 2012), and the introduction of carbon taxes and pricing schemes that are distinctive initiatives in a North American context.

The higher policy priority given to environmental values with respect to BC’s resources admittedly has been highly contested, reflected by relentless wars in the woods (Hayter 2003), and presently by vigorous ENGO-led opposition to the building of oil pipelines through the province from Alberta. But the conflicts exist because they have much public support, and public opinion in BC is clearly strongly “pro-green” and increasingly so. In the case of the forest sector, in addition to the substantial creation of conservation areas that comprise extensive forest resources there has been a plethora of policies that have dramatically changed logging and forest product operations to improve environmental performance (Hayter 2000). From a situation of no certification in the early 1980s, as of 2010, FSC has 2.7 million hectares (4.7% of total forest area) while SFI, CSA, and PEFC have 50 million hectares under certification (86% of the total forest area) in BC (McDermott 2011, p. 8).

Moreover, pleas for adding value in wood processing to resuscitate the BC’s forest sector as it has matured and become high cost have been advocated by industry consultants as well as academic observers since the deep recession of the early 1980s (Woodbridge Reid and Associates 1984). Over the past two decades, these pleas have been reinforced by environmental arguments that stress the role of small firms in adding value and creating jobs while using fewer timber inputs (Druskha et al. 1993, p. 185, M’Gonigle and Parfitt 1994, Wilson et al. 2001). According to Parfitt (2011a, 2011b) increased emphasis on product diversity and value not only adds jobs and reduces timber requirements but helps stabilise the forest economy that has been plagued with commodity-based boom and bust cycles. Small wood processing firms in BC also have abilities to utilise small quantities of timber with highly variable and changing characteristics (Rees and Hayter 1996). Furthermore, the pine beetle epidemic, which has damaged vast swaths of interior forests since the early 2000s has encouraged the government to temporarily increase harvest levels before wood values are lost, but with the implication that harvest levels will soon be reduced more than expected. This development may also be seen as encouraging BC’s forest economy to shift towards smaller-scale value-added operations.
There is statistical support for the view that the wood value-added sector can add jobs with fewer timber inputs, at least partially offsetting declines in the commodity industries. According to Natural Resources Canada (NRC) (2012a, 2012b, 2012c), for example, across Canada the sales value of secondary manufacturing products per cubic metre of harvest wood rose by 75%, from $51/m³ in 1993 to $89/m³ in 2007 while these products increased their share of total forest product sales from 15% in 1995 to 35% in 2007 (NRC, 2012a, 2012b, 2012c). Some observers believe BC is under-performing in this regard. Parfitt (2011a, 2011b, p. 5), for example, notes that in 2010 while Ontario achieved one full-time forest industry job for every 205 m³ and Quebec one job for every 298 m³, BC only achieved one job for every 1189 m³ (see also Druskha et al. 1993). However, the above claims and abilities of small-scale, value-added wood activities to generate sustainable jobs have been questioned (Dufour 2009, NRC 2012a, 2012b, 2012c). Thus, critics argue that the low jobs to wood cut ratios in BC indicate high levels of productivity, while potentials for growth of the value-added wood industries need to be related to market opportunities. It also cannot be assumed that existing activities are immune to market fluctuations. For Dufour (2009), the market access problems facing added-value wood industries in Canada, including protectionist pressures from its main trading partner the USA, are compounded by the acceleration of technological innovation and the need to comply with the principles of sustainable development. Moreover, the green entrepreneurship credentials, tacitly assumed in Forestopia, (M’Gonigle and Parfitt 1994), need to be assessed. The ability of value-added wood activities to compensate for declines in commodity production in economically and environmentally sustainable ways is therefore contentious.

**BC’s value-added wood industries**

Value-added or secondary wood products manufacturing have been defined as “production activities that transform primary products (lumber and panels) into other wood products” (DeLong et al. 2007, p. 2212); adding incremental value to wood products through additional processing steps (Kozak and Mannes 2005, p. 4); crafting a piece of wood into a useful, saleable product that is more value than the original material plus associated costs (Cousins 2000); increasing the overall net economic value generated by forest products through incremental additions per unit of raw material used (Schultz and Gorley 2006, p. 4); and an array of items that begin as “primary” wood products that are then re-processed by “secondary manufacturing” (Parfitt 2011a, 2011b, p. 4). Schultz and Gorley (2006, p. 7) recognise that value can be added at any stage of the manufacturing process and prefer instead to use the term secondary manufacturing. In practice, however, the terms value-added and secondary manufacturing are used interchangeably in the context of the Canadian wood industries. The range of products that fall under the category of value-added lumber is diverse, and include treated lumber, engineered wood products, finished building products, pre-fabricated houses and components, shakes and shingles, posts, poles, log-framed homes, moldings, pallets, flooring, fencing, architectural millwork, furniture, cabinetry, art, and semi-finished goods.

Empirically, this study is based on personal interviews with 41 firms operating across the value-added wood industries in Metro Vancouver, supplemented by interviews with supporting research, marketing, and lobbying associations. A semi-structured interviewing technique was employed in which a template set of questions invited respondents to elaborate, even digress. In general, the “economic” questions explored the origins, structure and
size of firms, location rationales, resource supplies and market dynamics, nature of innovation, contacts with associations, and hopes for the future. Specific environmental questions focused on certification issues and levels of environmental awareness or interest. The surveyed firms were chosen according to a stratified random sample for three zones across Metro Vancouver (inner city and suburbs; outer suburbs; and beyond). To provide broader context for these interviews, employment trends by sub-industry between 1970 and 2009 and the provincial distribution of value-added activities between 1980 and 2008 were derived from a data base constructed by Edenhoffer (2012) from directories and related sources. Within these trends, entrepreneurial origins and the ability of the interviewed firms to serve diverse markets, use diverse species, derive economies from networking, innovate and respond to crisis are important parameters of economic performance and sustainability. From an environmental perspective, the construction of a classification scheme of environmental awareness based on the actual and potential use of certification, an understanding of certification, recycling behaviour and related practices provides a benchmark for summarising green entrepreneurship.

**Provincial trends**

Over the past 30 years, the main forest commodities have experienced significant permanent job loss and very considerable volatility (Table 1). Indeed, since 1980 employment in logging, lumber, plywood and pulp, and paper had dropped 40–60% by 2008, and these trends are likely to continue because of continued weak US housing markets, the high valuation of the Canadian dollar and decrease in fibre supplies (Tulloch 2008). Generally speaking, among the commodity industries production levels have remained much the same as factories have become larger and more capital intensive. In contrast, there has been noteworthy job growth in the value-added wood sector, especially between 1990 and 2005. Jobs in “other paper” – secondary converting operations – have declined. These activities, for example, fine paper, paper bags, tissue paper, were manufactured in bigger factories compared to wood-added value industries, supplied local markets, and have largely been replaced by imports from even larger plants in the USA. That is “value-added” potentials in BC’s forest economy have been realised with respect to solid wood processing (but not in paper converting).

Statistics Canada’s (Table 1) estimates of peak employment levels in BC’s value-added wood industries of almost 7000 employees in 2005 is probably conservative, bearing in

<table>
<thead>
<tr>
<th>Year</th>
<th>Forestry and logging</th>
<th>Sawmills, planning and shingle mills</th>
<th>Veneer and plywood mills</th>
<th>Other wood industries</th>
<th>Pulp and paper mills</th>
<th>Other paper industries</th>
<th>Forest industries in total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>18,581</td>
<td>28,212</td>
<td>6986</td>
<td>3131</td>
<td>14,831</td>
<td>2258</td>
<td>73,999</td>
</tr>
<tr>
<td>1980</td>
<td>24,270</td>
<td>37,564</td>
<td>6928</td>
<td>5216</td>
<td>19,066</td>
<td>2474</td>
<td>95,518</td>
</tr>
<tr>
<td>2005</td>
<td>19,390</td>
<td>21,924</td>
<td>6298</td>
<td>6896</td>
<td>10,406</td>
<td>1717</td>
<td>66,631</td>
</tr>
<tr>
<td>2009</td>
<td>11,545</td>
<td>12,043</td>
<td>4534</td>
<td>6052</td>
<td>7126</td>
<td>1331</td>
<td>42,631</td>
</tr>
</tbody>
</table>
mind the number of small firms involved, high levels of entry and exit and some difficulties in identifying secondary from primary wood processing (the former can be a unit of the latter, for example). Possibly value-added wood industries employed 10,000 people at the 2005–2006 peak with the number of firms around 700–800. Moreover, in terms of spatial distribution, wood value-added growth has been predominantly in Metro Vancouver and the rapidly urbanising Okanagan region (Figure 1).

Figure 1. Distribution of value-added mills in BC, 2008.
The level of employment among many small firms, along with their high death rates offset by even higher birth rates and strong clustering tendencies (Edenhoffer and Hayter 2013), indicates that wood processing activities have collectively reached a critical, self-sustaining mass in Metro Vancouver in the immediate future. Since 2005, value-added activities have lost jobs (and sales) because of the severe recession beginning in 2007 induced by the global financial crisis, but they should bounce back to at least 2005 levels. More problematically, the wood value-added activities have not located in more remote, specialised forest communities, such as Prince George, Quesnel and Williams Lake, where closures of large mills have been especially devastating. Indeed, these communities lost value-added jobs after 1980. The reasons for the clustering of wood value-added activities in Metro Vancouver relate to the supply of entrepreneurship, skilled labour, accessibility to fibre supplies especially to desired coastal species, and access to local and US markets. Whether or not value-added activities can be promoted in BC’s interior (beyond the Okanagan region) is an interesting question.

Local embeddedness

From a flexible specialisation perspective, community development and resilience is inspired by locally based ownership and control, the creation of a skilled social division of labour, strong, diverse local supply networks, access to external economies, and at least domestic market access. These competitive strengths can be potentially extended by market diversification and exports, adaptability to change and innovation. In these respect how do the survey firms perform?

In terms of origins, all surveyed firms were started and controlled by entrepreneurs who were mostly born and had lived in Metro Vancouver. Half the firms began operations since 1990. Only 4 of the 41 respondents had no previous experience in wood products before starting their firms, and many were employees of sawmills, other corporations, or from families whose fathers had been employed in some aspect of the lumber business. As one owner said, “Lumber is in my blood, there are six boys in our family and all of us followed in my father’s footsteps and became lumber men. My dad worked at the largest mill in the Commonwealth.” As another respondent said, “When my parents moved from Holland, my dad used our garage as a shop and started making cabinets. That is where I learned to be a cabinet maker.” Indeed, the firms were owner-managed and all have remained SMEs. According to revenue figures for 2010 (Canadian dollars), 25% of the respondents reported earning less than $1 million; 39% earned between $1 and $5 million, with just over one-third earning more than $5 million. As expected the larger firms are in the suburbs (Figure 2). Thus, the median firm in Vancouver, suburbs and beyond progressively increased in size from $1 to $5 million, $4 to $5 million, and $9 to $10 million. With respect to employment (2010), the largest firm interviewed only had 55 full-time employees, and the average number of production workers per firm was 8 in Vancouver, 16 in suburb, and 25 in Fraser Valley firms, with an overall average of 16 employees. While most surveyed firms were specialised collectively they are highly diverse, representing 10 different categories, with the two largest involving remanufacturing and mill work, each accounting for 22% of the firms.

As expected, most firms are non-union. Of the just three union firms, one began as a unionised sawmill in the 1950’s while the other two firms unionised in the 1990’s, in response to worker requests, both owners regretted this change and noted that union contracts hindered their flexibility. As previous research has indicated for remanufacturing firms (Rees and Hayter 1996) employment relations, in terms of wages, non-wage benefits,
job flexibility, among the interviewed varied considerably. However, many firms, especially those with stable workforces, emphasised job flexibility. As a respondent commented:

One of our successes is that we are flexible. It’s a function of our size and a function of a huge change in the industry and the value of a job. We have a guy on a trim saw and then put him on a re-saw crew. They are flexible because they have done all of the jobs because they have been here so long, all of that makes us really flexible.

Workers employed by the interviewed firms are overwhelmingly full time and when demand increases rapidly these firms typically subcontract extra business rather than hire part-time workers. Part-time workers, however, are hired occasionally for administrative and design purposes. In the recent, deep recession (2008–2011) most firms laid off workers. Technological improvements can also lessen the need for labour even among small firms. As one owner commented, “What took two to three guys to do 10 years ago you can now do with one man and an investment in a $150,000 piece of equipment.”

Unexpectedly, apart from a handful of one-person shops with no growth ambitions, most firms indicated that, despite a glut of unskilled workers made available in the recent recession, skilled workers were not easy to find. Indeed, there are widespread concerns for skilled labour shortages throughout BC and the forest sector faces particular difficulties in attracting young trainees because of its perception as a declining industry and because of higher income opportunities in other resource sectors, notably oil and gas (O’Connor 2013). As one respondent noted: “There are a lot of people looking for work, I get many people who stop by with their resumes, but none of them are trained cabinet makers.” Many firms stressed their industry was not attractive to young people compared to higher wage alternatives. According to an owner “The wood industry is slow because the wages are low. You can make much more money as a carpenter than as a cabinetmaker” and “We have a very old workforce, young guys aren’t interested in getting their hands dirty, it’s hard to hire good people. We hire Europeans because they are trained properly; it is hard to find local people who are well-trained.” Finally, “You can make money in lumber but it is really tough and young guys just don’t want to work that hard.” Most acknowledged few young-trained workers are entering the industry. Moreover, BC Institute of Technology’s (BCIT) popular two year training programme in secondary manufacturing

Figure 2. Firm revenues by region 2010.
has experienced declining enrolment, has been downsized recently and most surviving segments put online.

**Market and supply networks**

The interviewed firms are strongly connected to local supplier networks and material supplies, the latter mainly processed lumber but including some wood fibre (Figure 3). Many firms obtained lumber from mostly local market purchases within BC, 71% in 2005 and 64% in 2010, while 8% of the firms purchased fibre from BC timber sales (2005 and 2010). While wood and fibre imports increased from 17% in 2005 to 21% in 2010, most came from nearby Washington State and Oregon. Just a few manufacturers (primarily the furniture makers) that use hardwoods obtained supplies from the US East Coast. Indeed, most interviewed firms used wood from coastal (softwood) species, especially Douglas fir, cedar, and hemlock. Only six firms reported using lodgepole pine from BC’s interior, and in four cases the amount was minor. One firm commented that the pine beetle epidemic in BC’s interior impacted their business negatively.

Indeed, consistent with flexible specialisation principles fast access to a diverse range of wood products derived from desired coastal species and sources is an important location rationale for the clustering of wood processing firms in Metro Vancouver. Many owners commented favourably on their relationship with their local suppliers, according to one:

> We have a great relationship with all of our local suppliers. I can place an order on their website at 7 am and the product will be delivered here today. Our suppliers are our partners. Without our suppliers, we are out of business and vise versa.

Moreover, many firms used a varied species mix of wood products, and could adapt to variations in supply availability. Concerns regarding availability and desired species, especially referred to hemlock:

> it’s hard to get hemlock, if you want hemlock, you can’t get it. Our hemlock competes with Scandinavian white woods. It costs a company $60 to harvest hemlock and they can only

![Figure 3. Primary source of wood supplies among interviewed firms, 2010.](image-url)
get $45 for it on the market because of the global competition. Companies don’t bother to cut it; they leave it in the forest because they can’t compete on price globally so there is no hemlock for the local guys.

Other respondents were concerned about the stability of their supplies from sawmills either because of production cutbacks or increased sales to Chinese markets. Another firm with a large government contact also noted, “Getting the desired species can be a problem. When we were working on the Olympic Village, they wanted FSC walnut and we could not find enough FSC walnut for that particular job so we ended up using something else.” Similarly, a respondent who only manufactures BC hardwoods was concerned about obtaining birch. On the other hand, price was generally not regarded as a problem in large part because, as a furniture shop stated, Price really isn’t an issue because the cost of the wood only makes up about 15% of the cost of the job. If one type of wood is too expensive for the client than you find a cheaper alternative but this rarely happens because the cost of wood is such a small percentage of the overall job.

Again broadly consistent with flexible specialisation principles, the interviewed firms obtained diverse wood inputs to produce a varied range of products and markets in which sales to BC and the USA were complemented by secondary sales links to the rest of Canada, Japan, and Europe. Between 2005 and 2010, the most important trend is the increased dependency on BC markets (Figure 4). This shift has occurred entirely at the expense of dependency on US markets which nevertheless remain important. The relative importance of other markets stayed almost the same from 2005 to 2010. After the US market crashed in 2008, one firm refocused their efforts locally, “We were no longer able to deliver commodity products to the US anymore so we had to focus on specialty products that are higher-value added and market them close to home.” Another respondent reported, “I got burned once when I did a job in the US. The company went bankrupt a week after I did the install and I never got paid. I could not repossess because it was in a foreign country.” In contrast, another owner stated that even though growth had slowed he was still going to focus on US market:

![Figure 4. Geographic distribution of sales to BC and American markets among interviewed firms, 2005 and 2010.](image-url)
As a small firm, am I going to invest my time chasing 10 BC design firms with all the other manufacturers chasing the same business? Or do I spend the same marketing dollars and focus on big US design firms that have big projects and big budgets? Despite the economic downturn, the US is still full of millionaires and billionaires.

However, among the interviewed little or no interest was expressed in exporting to more uncertain markets such as India, China, or the Middle East.

As noted in previous studies of wood processing activities in Metro Vancouver (Rees and Hayter 1996), direct buying and selling among the interviewed firms is not strong. However, business associations, both local (BC-based) and non-local (primarily US-based, have evolved to meet their collective needs, deepening flexible specialisation. Indeed, most firms (>90%), including all those in the Fraser Valley (where BC Wood is located), reported belonging to at least one association while 40% of interviewed firms in the suburb and Fraser Valley have or have had leadership positions in at least one association. Locally, BC Wood, established in 1989 to provide marketing, information and political lobbying services, is the most important with around 120 members in 2012, while the smaller Independent Lumbers Remanufacturers Association represents its members in trade issues that in recent decades have been dominated by a softwood lumber dispute with the USA. FPInnovations has been a strong local (Vancouver-based) presence for some time (under different names) that is dedicated towards stimulating innovations among its members throughout the forest industry, including small value-added firms.

BC Wood is the most oft used association and benefits of membership are strongly related to marketing and sales, especially related to support for contacts in foreign countries, organising seminars/workshops, sponsoring tradeshows, relationships with competitors, advertising and cost-sharing marketing, certification and accreditation, lobbying governments and networking (Figure 5). The Architectural Wood Manufacturers Association of Canada (AWMAC) was also valued for its help in promoting collaboration and competitiveness, collective learning and creativity. As one respondent said:

![Figure 5. Benefits of membership in business associations among interviewed plants, 2010.](image_url)
We compete in the bidding process, but what also happens if I am too busy, I can call up a competitor and ask him to help by doing a portion of the job. We don’t have large firms around here, so if one of us gets a big contract for millwork, say $5 million, we contact each other and put a group together to get the large job done. We know each other and our specialities and that is how we coordinate to get big projects done.

Another owner shared, “Through the associations you become friends with people, I talk to my competitors. If I have a problem with something, I call them up and they help me solve my problem. We do it all the time.” According to a respondent:

One association I belong to is an educational lobby group, and they make sure wood stays front and centre when they change building codes and especially promoting it with LEED buildings. Another one makes a huge amount of information available to us through subsidized seminars, trade shows and provides multiple networking opportunities throughout the year.

Some industries are regulated and membership in specific associations was mandatory and seen to be valuable for providing quality assurances to consumers: “Our association provides quality guarantees as well as a warranty program so customers are more likely to do business with you because they see it as less risk. Many customers are comforted knowing you belong to an association.”

A few firms cited problems with associations, and reasons for not participating: too expensive/no real value, not relevant for their business, too focused on large corporations and not a source of revenue. “Ten years ago I joined for marketing purposes, but I don’t see any real advantage today. I am not sure why we are still members other than we’ve done it for almost a decade” and

The association is good because it promotes cedar as a whole, but does not promote our company specifically so I think the overall benefits are negligible. I would rather spend the money to hire a salesman to promote our company.

Most disappointing the interviews revealed little or no interest in or even knowledge of the services of FP Innovations, despite its long standing presence and emphasis on innovation. While a few firms had found the organisation helpful most respondents expressed concern over cost and a failure to address specific needs.

**Variations in green entrepreneurship**

With one possible exception, none of the interviewed firms represent Isaak’s (2005) green green entrepreneurship, or firms that pursue explicit strategies of environmental sustainability from start-up. However, there are considerable variations among the interviewed plants in terms of environmental awareness as reflected in their knowledge, motivations, and practices that in this study focused on environmental certification and wood waste and pollution problems. Thus with respect to environmental certification three main categories of firms can be recognised (Figure 6).

Briefly, Category 1 firms have little or no knowledge of, or interest in, environmental certification; Category 2 firms have invested in environmental certification and are reasonably aware of its execution; and Category 3 firms are environmentally certified, have good knowledge about certification, and seek to ensure they meet chain of custody requirements. Overall, 22 firms are in Category 1, 13 firms in Category 2, and just 6 firms in Category 3. However, the amount of certified wood used by Categories 2 and 3 firms was never
more than 20% of total wood inputs. Among the 19 firms who had certified, 10 had chosen FSC and 9 from alternatives, and there is a modest tendency for environmental awareness from this perspective to be associated with location and size of firm. Thus, Categories 2 and 3 firms are more likely located in the Fraser Valley than in Vancouver or even the suburbs; just four of 13 Fraser Valley firms are in Category 1 while 18 of 28 Vancouver and suburban firms are Category 1 (Figure 6). With respect to firm size in terms of (2010) sales in three of the four smallest size groups Category 1 firms dominate while all but one of the five firms with annual sales in excess of $15 million are in Categories 2 and 3 (Figure 7). Clearly, in addition to location and size other factors are associated with green entrepreneurship.

Among the six Category 3 firms, one has potential to become a Category 4 or even a (Category 1) green green firm with a strong, explicit commitment to environmental sustainability. The owner of this firm (sales < 5 million) has been in the millwork business for over two decades in the Fraser Valley. He noticed more and more customers asking for products that were more environmentally friendly so he spent months researching the various

Figure 6. Environmental awareness: The commitment to certification by location.

Figure 7. The commitment to certification by size of firm.
certification schemes to better understand the benefits to his firm. He realised that none of the certification programmes worked for his company because they “were a huge expense in terms of time and money” and he did not see the extra value it was adding for customers. His goal to provide products that are environmentally friendly was subsequently achieved with assistance, as a member, from AWMAC’s BC office that led to a programme in 2011 called SAW (Sustainable Architectural Woodwork). While certification programmes such as FSC only certifies wood, SAW certifies the entire product, taking into account the wood inputs, manufacturing process, disposal of the waste, finishing of the product and the level of off-gassing of the final product. This programme focuses on educating the consumer about the environmental impact of the product and not just certification of wood inputs. It is now a national programme endorsed by AWMAC and was launched in 2011 in two American sister associations.

As another Category 3 example, the owner of a small furniture firm (sales < 5 million) located in the suburbs was inspired by his 13-year-old son to be conscious of environmental impacts, leading to him to be an early adopter of FSC certification. He recalls his son, who frequently would spend his summer vacation at the plant, watching two of his workers use the veneer press. When the press is in operation, toxic fumes are released and his son’s eyes began to burn. He asked his father why that happened and the father explained that it was a result of the noxious off-gassing which occurs in the process of veneering. The son showed great concern for the health of the employees operating the press and asked his father to make his shop a “healthy” place to work. Stimulated to improve the quality of the work environment for his employees, the owner has now switched all his veneers to a water-based product which is non-toxic and has invested in becoming an FSC-certified shop to “green” his entire operation.

In contrast, the 22 Category 1 firms have no environmental certification, and 19 expressed no interest in becoming certified. These firms are located in either Vancouver or the suburbs and are typically tiny in size. Of the 10 firms in the suburbs, 5 indicated interest in certification in the future, in most cases because it was seen as a “cost of doing business.” Several Category 2 firms often expressed difficulty in remembering with whom they were certified. Moreover, Category 2 firms indicated that they were FSC certified, that is they were certified shops (FSC designation is only given if it applies to the entire operation), but in practice they also used non-certified wood. One owner responded when asked what type of certification his firm used, “The green one, and the sustainable one, I am not sure what they are called. I think it’s FSC. Yes, we use FSC and some other certified wood too.”

For the interviewed firms advantage over competitors, market demand/access and requirements for doing business were the main perceived benefits from certification. Several reasons were also cited by 19 firms for not certifying, including 7 who considered themselves too small (Figure 8). The three firms citing “too much paperwork” is also size related. The high cost of FSC certification in particular is obviously important to very small firms. Thus, FSC costs between $3500 and $10,000 to join and then there is annual fee (starting around $1500) plus paperwork and the possibility of inspections. The larger firms are able to absorb these costs compared to the smaller firms. Indeed, the small, 1–2 person shops in Vancouver tended to not see the necessity of certification and found it an economic and administrative burden. One owner said, “I don’t see the value in certification, the time and effort spent filling out the paperwork makes it costly for the small guys.” A few who have been in the business for decades commented that certification of Canadian forests was a moot point because they believed that Canadian forestry practices are some of the most sustainable in the world. As one owner claimed, “We have the best
forest practices in the world in Canada, in my mind it’s all certified anyways. I see added costs in certification.” The larger firms in the Fraser Valley, however, tended to see certification as the “cost of doing business.” According to one owner, “The value of certification is that we get work that wouldn’t otherwise be available, it is pure marketing.” There was a belief by the certified firms that it would differentiate them from their competitors and access markets such as LEED. For one respondent certification “is more of a requirement that will enable us to engage with a more sophisticated customer and higher-end markets.” Another shared, “What drives me are my customers, if they don’t ask for it, then what is the purpose? My customers are the only reason to use certified wood; I don’t see any other need to use it.”

Interestingly, there were a few firms that dropped FSC certification because an increase in business did not occur (because they are still certified in other programmes these firms are classified in Category 2). One Fraser Valley firm (sales >16 million) said, “We were FSC certified for seven years and it probably cost us $3,000 per year but we did not see a benefit for the added expense so we dropped it.”

While most firms claimed that they would consider certification if the market demanded it, their experience was that once you informed customers about the premium for certified lumber, they were rarely interested. Most interviewed firms have not seen a dramatic increase in the demand for eco-certified wood, but rather reported that only certain niche markets were asking for it. The support for certified wood amongst the firms interviewed was limited.

The interviewed firms also varied greatly with respect to performance and attitude to wood waste and anti-pollution technology (Figure 9). Compared to the distribution of firms across the certification categories (Figure 6) there are many fewer Category 1 firms, just nine. With one exception, Category 3 firms are the same and there are more Category 2 firms.

In general, the modest tendencies for environmental awareness towards wood waste and pollution to be associated with location and size are confirmed. Thus, Category 1 comprises nine firms that have taken no measures to reduce waste, and in most cases these firms are among the smallest interviewed, located in either Vancouver or the suburbs. The reason

Figure 8. Reasons for rejecting certification.
why virtually none of them are actively involved in wood recycling is because the amount of wood waste they produce is minimal no one is willing to pick it up for recycling. One owner noted:

Through my training I have been trained to never throw away things you haven’t used 3–4 times. My scraps are so small and it takes me months to fill one trash can, it’s not economically viable to pay anyone to remove one trash can every few months.

In practice, the majority (26) firms have reduced wood waste and pollution streams. For one owner, “We are 99.9% recyclable, we only produce about four trash bags of waste a year which is usually disposable gloves.” Many firms have found increasing economic benefits to recycling, notably in the suburbs and Fraser Valley from selling their wood waste to local farmers. As one respondent in the Fraser Valley said:

We bought a wood grinder and have gone from approximately spending $800/month on disposal of wood waste to $150/month. A company picks up our sawdust for a small fee and they sell it to local farmers. It’s the right thing to do for various reasons.

The distinguishing feature of the five Category 3 firms stems from their investments in anti-pollution technology as well as in wood recycling. One owner commented that his company examined energy management and installed a computerised waste gate system to improve dust collection. This technology cost the company an extra $25,000 four years ago and he thought it would take 10 years to see a payback in energy savings. Another owner indicated that they improved their insulation, lighting, and installed new HVC units through a programme supported by BC Hydro. The same owner added that he would be interested in installing solar panels or lessen the company’s carbon footprint in other ways if the government would offset the costs. A few firms expressed an interest in investing in various improvements but said the costs were prohibitive especially in this economic climate. A respondent said, “we investigated what it would cost to use our cutoffs and scrap lumber to heat our building in the winter, but it was so prohibitively expensive for the small guy to invest in that technology.”
In general, for these SMEs greening is a financial decision and while location and size matter so do other factors related to the specific activities of firms and their consumer relations, experience with certification and personal considerations.

Reflections on flexibly specialised green entrepreneurship

The main conclusion from this analysis of Metro Vancouver’s value-added wood industries is that mutually reinforcing relationships between green entrepreneurship and flexible specialisation are promising rather than demonstrated. Economically, value-added wood activities in Metro Vancouver have grown in recent decades as the commodity industries controlled by large corporations have declined. In response to the recent global, financially inspired crisis the value-added industries have shown resiliency, downsizing rather than closing and seeking local market opportunities when possible. The industries are highly diversified serving a variety of market niches, and embedded in local entrepreneurial, supply and marketing networks that help sustain several local (and some international) associations that provide services for them. Yet, local networking activities are modest, and inter-firm cooperation outside of loose affiliation to associations is not strong. Dissemination from R&D institutions is weak, and few firms were informed about educational opportunities available, or took advantage of the training programmes or seminars held by various associations or research institutions. As one owner commented, “We in Canada are price takers, we make what the market wants, we are not innovators. That is our problem.”

From an environmental perspective, awareness and commitment to green entrepreneurship, for example, in relations to environmentally certification, on the whole is modest and variable. There is confusion about appropriate forms of certification, its value to the interviewed firms is ambiguous, and its administrative costs high. Little real innovativeness or leadership was evident to support emergence of green green entrepreneurs while several firms either ignored environmental imperatives or responded in purely reactive ways. Indeed, little or no evidence was found regarding the collective creation, sharing, and dissemination of environmental information or consciousness among the firms or in the associations. In general, the ideals proposed for value-adding wood processing activities in Forestopia (M’Gonigle and Parfitt 1994) remain to be realised. While ideals should be abandoned they need to be promoted in pragmatic ways that are based on an understanding of the actual environmental performance and attitudes of SMEs. In this regard, stronger information programmes and leadership by both firms and associations would be helpful. From a policy perspective, the provincial government may wish to tie the funding of local wood associations to the promotion of environmental values. In addition, the big building store chains, such as IKEA, Rona, and Home Depot perhaps could be encouraged to buy more from local small firms.

With respect to further studies on flexibly specialised green entrepreneurship we propose a more rigorous investigation of the criteria for the classification of variations in environmental awareness and performance and application to a wider range of geographical and industrial contexts, and a wider size range of firms, than has been possible in this study. Such investigations – in approach similar to attempts to classify the export commitment and performance of SMEs (Hayter 1986) – have theoretical and practical value. Thus, the classification of firms into different categories or stages of green (and green green) entrepreneurship could be correlated with other aspects of behaviour and social impacts, and used to identify potentials for improvement. Research into how networking within clusters promotes or inhibits the diffusion of green entrepreneurship would also be useful, especially if integrated with the idea of social capital (Kusakabe 2012). Such studies
would contribute to O’Neill and Gibbs (2013) agenda for an economic geography of green entrepreneurship, and to policies that are sensitive to moving populations of SMEs, classified according to different capabilities and attitudes, through the various stages of environmental commitment.

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