

## **Better by Design? Capturing the Role of Design in Innovation**

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### **Abstract:**

The essence of innovation is the process of bringing to market new products or processes which, if successful, generate new economic value. Traditionally, we have come to view this process as one in which the primary inputs are scientific, technological, or commercial. Scientists working in university, corporate or public labs generate new knowledge in a variety of forms that may lead to commercializable outputs. Institutions of higher learning produce highly qualified personnel who transmit knowledge in embodied form throughout the economy, enhancing the innovative capacity of firms. Engineers, technical workers and organizational specialists develop new production processes and improvements to existing processes. Interaction with customers and suppliers provides important knowledge inputs that further contribute to the innovation process.

Despite the increasing sophistication in our ability to conceive of and measure innovative activity – inputs, interaction, and outputs – the traditional approach fails to capture an important dimension of the innovation process that leads to the creation of economic value: design. This paper reviews the accumulated evidence – both quantitative and qualitative – that documents the growing importance of design as a key input in the innovation process and as a source of value added in a wide range of sectors. We review a set of conceptual arguments that help us understand the more fundamental transformation underlying these recent empirical trends. Included here is a set of recent literatures on the 'cultural economy' and creativity, as well as a related literature on the 'business of design'. We demonstrate that design employment is growing more quickly than the labour force as a whole, and document how the design workforce is becoming more widespread in a wide range of sectors right across the economy, although its geographical distribution is strongly concentrated in larger metropolitan areas.

The rise of design as a source of innovative content and economic value also poses significant challenges for the measurement and statistical documentation of innovative activity. We enumerate these challenges and suggest some strategies for modifying existing innovation surveys to capture the role of design in the innovation process. Our analysis is informed by a recent study of employment dynamics, contracting relationships, freelance activity, and longitudinal mobility in industrial and graphic design in the Toronto economy.

**Keywords:** design, creativity, innovation, indicators

## 1. Introduction

There is an emerging consensus that innovation does not simply occur in the realm of scientific discovery. Innovation is not simply the result of research and development activities. Neither is it the sole purview of emerging, high technology and science-based industries. Rather, innovation takes place throughout the economy and rests upon a variety of inputs, including design related activities. Scholars of innovation and policymakers are beginning to recognize the critical role of design to the creation of economic value and the competitiveness of firms, regions and nations. Given that design is increasingly viewed as a key aspect of the innovation process, it is crucial to ask ourselves: how can we capture and measure the role and contribution of design in the creation of economic value and the competitiveness of firms, regions and nations?

This paper addresses this question by examining the recent evidence on the role of creativity and design in fostering innovation. The paper begins by recognizing that innovation is the outcome of a social process involving a range of economic actors. While this literature has traditionally focused on the role of universities and laboratories, as well as agents such as scientists, engineers and R&D workers, we identify designers as an important and often overlooked agent in the process of firm learning and innovation. We outline recent contributions that highlight the role of creativity and design in the innovation process. Following this discussion, we review the recent international evidence that demonstrates the linkages between design, innovative capacity, and economic performance. We draw upon recent research on designers in Ontario and Canada to illustrate that design is being used in emerging high-technology industries, as well as traditional industries. However, there remains little systematic evidence of how Canadian firms are using design. Therefore, we consider how to best capture the role of design in the innovation process. Using examples from Statistics Canada's existing surveys, we provide some suggestions on how to evaluate the contribution of design and designers to the economic and innovative performance of firms in Canada. We argue that making even incremental modifications to existing surveys such as the *Survey of Innovation* will provide a comprehensive, national overview of how design is being used by Canadian firms.

## 2. Design, creativity, and innovation

### **2.1 Key actors in the innovation process**

There is now a vast literature addressing various aspects of learning and innovation at the firm, regional and national level. There is widespread recognition that the innovation process is a *social process* that takes place within a broader regional and national context. While there is still significant disagreement within literature about the relative importance of sectoral, regional or national innovation systems, collectively these literatures highlight the importance of interactions between firms and a host of institutional and non-institutional economic actors that contribute to the innovation process within and outside of the firm (Lundvall 1992; Nelson 1993; Edquist 1997; Lundvall and Maskell 2000).

The literature highlights many factors including the availability of venture capital funds, specialized services and suppliers, a 'thick' local labour market that provide deep pools of

highly skilled, specialized labour, and the presence of universities and research laboratories that help to provide the background conditions necessary for the innovative success of firms (Maskell and Malmberg 1999; Wolfe and Gertler 2004). It is now well-documented that, in high-technology regions such as Silicon Valley and science-intensive clusters such as Washington DC's biotechnology industry, key research institutions and universities are a critical part of the infrastructure facilitating knowledge spillovers, learning and innovation (Saxenian 1994; Feldman 2003). Universities are increasingly viewed as an important dimension of the knowledge infrastructure supporting innovation by playing a dual role as host to scientists conducting leading edge research and as a generator of a highly skilled and educated workforce (Gertler and Vinodrai 2005). Recent work highlighting the role of 'star scientists' underscores the importance of universities and other research institutions. 'Star scientists' are highly productive individuals who possess significant intellectual capital and have access to break through or leading edge technologies. Zucker, et al. (1998) demonstrate that the presence of these scientists at local universities provides benefits in terms of localized knowledge spillovers generated through their collaborative practices with local firms. These findings suggest that having highly qualified personnel at key institutions can benefit local firms.

However, as noted, universities also play an important role in generating a highly skilled and talented workforce, including scientists and engineers, who are traditionally viewed as some of the most critical actors in fostering innovation. Angel's (1991) study of engineers in Silicon Valley demonstrates how these highly skilled workers act as an embodied knowledge flow transferring ideas between local firms. Almeida and Kogut's (1997) work on the mobility of patent holders provides further empirical evidence that knowledge spillovers are contained locally.

Given these findings, it is not surprising that indicators of the innovative capacity of firms, industries and regions commonly include various aggregate measures of the number of R&D workers, scientists, engineers, or workers in other highly educated occupational categories. However, we argue that it is necessary to consider a broader range of highly skilled workers and creative workers in order to capture more fully the nature of contemporary innovation processes.

## ***2.2 Creativity and the cultural economy***

While the innovation literature has traditionally focused on the role of universities and laboratories, as well as agents such as scientists, engineers and R&D workers, we identify *designers* as an important and often overlooked agent in the process of firm learning and innovation. Our argument for incorporating a wider range of actors, including those in creative fields such as design, resonates with a recent literature on creativity and the emerging cultural economy. This literature provides some insight into why a focus on design and other creative inputs requires our attention when studying – and measuring – innovation and the innovative capacity of firms, industries, regions and nations.

A well-established literature in geography and related social sciences now recognizes that creative, symbolic, and aesthetic content and inputs are critical in the production of goods and services in the contemporary economy (Lash and Urry 1994; Scott 2001). Within this

literature there are two focal points. The first of these documents the specific industrial dynamics of a set of creative and cultural industries, including film and television, new media, fashion, publishing, music and advertising (see Scott 2001; Scott and Power 2004). These activities tend to cluster in a relatively small number of larger urban regions, in a manner similar to highly knowledge-intensive sectors such as biotechnology and information and communications technologies. Studies of these creative and cultural industries consistently demonstrate that firms in these industries are often highly innovative, yet their innovative capabilities rely less on scientific discovery and R&D in the traditional sense and more on a variety of other inputs, including artistic and design inputs.

Second, while the creative and cultural industries are themselves important sources of innovative products, and can also enhance the innovative capacity of other industries, another perspective emphasizes the role that highly skilled, creative workers play in the innovation process. This analytical perspective suggests that creativity is applied in a number of different business and industrial contexts extending well beyond the creative and cultural industries themselves. This resonates with the current thinking of a number of prominent scholars who focus on the role of highly skilled creative workers – or talent – in contributing to innovation (Saxenian 1994; Florida 2002; Markusen et al. 2004). Florida (2002) argues that there is an increasingly important role in the contemporary economy for workers in creative occupations that he refers to collectively as the ‘creative class’. This group includes:

scientists and engineers, university professors, poets and novelists, artists, entertainers, actors, *designers* and architects, as well as the thought leadership of modern society: nonfiction writers, editors, cultural figures, think-tank researchers, analysts and other opinion-makers. ... [as well as] creative professionals who work in a wide range of knowledge-intensive industries such as high-tech sectors, financial services, the legal and health care professions, and business management.

He argues that through creating new products and processes and engaging in creative problem solving, these workers become critical to the economic performance of firms and regions. While Florida’s thesis is controversial and not without its critics<sup>1</sup>, his work has done much to highlight the important links between creativity, innovation, competitiveness, and the role that cities play in fostering the environment for these activities.

### 3. Design as a critical input into the innovation process? A review of the evidence

Overall, the literature on creativity and the cultural economy suggests that we need to broaden our scope to consider other actors in the innovation process. As noted above, it is now widely accepted that creative, symbolic, and aesthetic inputs are critical in the production of goods and services in the contemporary economy. Lash and Urry (1994: 15) claim that “the design component comprises an increasing component of the value of goods” resulting in the centrality of the design process and the increasing ‘design intensity’ of

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<sup>1</sup> See Malanga, S. 2004. The curse of the creative class. *City Journal*, Winter: 36-45 and Peck, J. 2005. Struggling with the creative class. *International Journal of Urban and Regional Research* 29: 740-770.

products and services across the economy. A recent literature on the ‘business of design’ echoes this sentiment (Nussbaum 2004a). For example, Pink (2004) suggests that “the MFA is the new MBA”, noting that firms now value creative and design inputs as never before:

businesses are realizing that the only way to differentiate their goods and services in today’s overstocked, materially abundant marketplace is to make their offerings transcendent – physically beautiful and emotionally compelling.

In fact, the phenomenal market success of products such as Apple’s iPod and other electronics made by companies such as Sony, LG and Samsung is widely attributed to their ability to use design effectively throughout their business strategies (Nussbaum 2004b, 2005).<sup>2</sup> However, it is not just technology-intensive industries that have been able to use design to bolster their global competitiveness and secure their position in the marketplace. Firms in more traditional industries such as furniture, textiles and apparel have also been able to re-invent themselves through the effective use of design (Lorenzen 1998; Rantisi 2002; Leslie and Reimer 2003).

Power (2004) makes the case that design must now be understood as a strategic resource used to enhance firms’ competitiveness. He notes that design is central to innovation and encompasses

not just the aesthetic aspects of a product but also their overall technological performance and character. The act of design involves not just shaping a product’s appearance but also involves a range of inputs into the creation of the form and function of a product and its production, marketing and appeal to the consumer.

Within the firm, design can be incorporated throughout the research and product development phase, applied to manufacturing processes to reduce costs, as well as used in the creation of retail environments and in the branding, packaging and marketing of products and services, enabling firms to differentiate their products and services in local and global markets. Firms can take advantage of design capabilities through a variety of means, including 1) having their own in-house design department or employing designers as part of multidisciplinary teams in various facets of their business (e.g. concurrent engineering, product development, marketing); 2) hiring freelance designers on a contract basis to work on specific projects; 3) purchasing the services of an outside design consultancy; or 4) using some combination of the above three options.

The accumulated evidence suggests that design is a critically important source of economic value. It can enhance sales by improving both the functional and aesthetic qualities of a product. It can also reduce production costs, simplify and enhance the sustainability of the

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<sup>2</sup> A recent article by Roger Martin further emphasizes this point. Design-led innovations and strategies are being pursued by companies around the globe, not only in North America and Europe, but also in emerging economies such as India and China. See Martin, R. 2006. What innovation advantage? *Business Week*, January 16, 2006. See also the various articles in the Spring/Summer 2006 *Rotman Magazine* special issue on ‘The Creative Age’, published by the Rotman School of Management, University of Toronto.

production process, and be used to differentiate and brand products in the market. The discussion below highlights the major findings from recent studies that demonstrate this point clearly.

### **3.1 Design and innovation: International evidence**

A recent comparative study commissioned by Industry New Zealand demonstrates the link between competitiveness and design-led innovation.<sup>3</sup> Using data produced by the World Economic Forum, the authors constructed a Design Index based on national rankings on five measures: extent of branding; capacity for innovation; uniqueness of product designs; production process sophistication; and extent of marketing. They demonstrate that there is a very strong, positive correlation between national rankings on the use of design and their overall level of competitiveness across 75 countries. Most notably, without exception, the 25 countries that rank highest on the Global Competitiveness Index also rank the highest on the Design Index (Figure 1).<sup>4</sup>

Power's (2004) comparative study of the industrial dynamics of the design sector across the five Nordic countries (Sweden, Denmark, Finland, Norway, Iceland) reveals that, despite the small size of the design industry, design represents a strategic area of business crucial to the competitiveness of firms in other industries. Power provides evidence to show that the use of design by Nordic companies greatly assisted their profitability and level of innovation. Furthermore, the Nordic design industry has experienced high levels of growth in recent years and tends to concentrate in the largest cities.

While the two aforementioned studies highlight the importance of design at the macro-level, a number of other studies have examined how design affects performance at the micro-level. For example, recent research in New Zealand has found that 67% of exporters identify design as a key factor in their commercial success and 80% of companies surveyed agreed that design would add further value to their business (New Zealand Design Taskforce 2003). A study conducted by the Danish Design Centre (2003) notes that

there is marked correlation between the use of design and the economic performance of companies and subsequent macroeconomic growth. Furthermore, it is apparent that companies where design is a core issue and which purchase design services both internally and externally perform better.

The research, based on a survey of Danish firms, found that job creation, revenues, and exports were higher in firms that used design compared to those that did not. Finally, the British Design Council commissioned a comprehensive sample survey of firms throughout the UK economy to ascertain how firms were using design and the extent to which they felt design contributed to their success (Design Council 2004). The study found that firms

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<sup>3</sup> New Zealand Institute of Economic Research. 2003. *Making the case for added value through design*. Report to Industry New Zealand.

<sup>4</sup> The study relies on the World Economic Forum's *Global Competitiveness Report 2002-2003*. These data place Canada 11<sup>th</sup> on the global competitiveness index and 15<sup>th</sup> on the composite design index.

indicating that design was integral or significant to their business were more than twice as likely to come up with new products, services or processes based on major innovations, compared to all firms: “Only 32 percent of UK companies have introduced a new product or service in the last three years. Where design is integral, 67 percent have done so” (p. 14). The study also found a strong association between company growth and the intensity of design use. While only 15 percent of all firms reported using designers at all stages of the innovation process, the comparable figure for those companies that grew rapidly during the past year was 38 percent.

Finally, the same study produced what has become one of the most widely cited analyses to demonstrate the positive impact of design on firms’ economic performance. The study tracked the share prices of a group of 63 UK companies that were identified as effective users of design based on their consistent record of design-related awards. These firms represented a cross-section of industries, including both traditional and emerging manufacturing and service activities. The study found that between 1994 and 2003 these companies outperformed the FTSE 100 (Figure 2). An additional 103 UK companies whose success in winning design awards approached that of these design-led companies enjoyed a similar level of performance on the stock market. These findings suggest that effective users of design outperform their peers on the stock market, and provide compelling evidence of the economic value of design and its contribution to innovation.<sup>5</sup> Moreover, British evidence (Lambert 2006) indicates that design inputs into the innovation process appear to have the most impact when they accompany other, more technology-based innovation inputs, suggesting a strong complementarity between these two different forms of activity.

### ***3.2 Design and innovation: Evidence from Canada***

While most of the evidence concerning the effective use of design as a tool for fueling innovation and ultimately securing value-added for the firm has emerged from Europe and a handful of other developed and developing countries, a few recent studies have examined design in Canada. Within the Canadian context, design has not been particularly prominent within cultural or economic policy, nor has it been systematically targeted as a source of innovation for Canadian firms.<sup>6</sup> Some of our own recent research begins to fill this gap in our understanding of the contribution of design within the Canadian context. In particular, we draw on evidence from two studies. First, we draw upon an analysis of the size, composition, growth, and socio-economic and demographic characteristics of the design workforce in Ontario (Gertler and Vinodrai 2004; see also DIAC 2004). Second, we provide evidence from a recent in-depth study of the employment dynamics of industrial and graphic designers (Vinodrai 2005, 2006)

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<sup>5</sup> Business schools are also increasingly recognizing the importance of creativity and design to innovation. For this reason, there is a growing trend amongst business schools to incorporate design thinking and strategy into their curriculum, as well as collaborating with design schools to allow for cross-disciplinary collaboration and learning. See Merritt, J. and Lavelle, L. 2005. Tomorrow’s B-School? It Might Be A D-School. *Business Week* August 1, 2005.

<sup>6</sup> It is worth noting that, in contrast to most Canadian jurisdictions, Montreal and the Province of Quebec have successfully incorporated design into their economic development strategies (Leslie and Rantisi 2006). In Ontario, design has only recently been acknowledged as an important source of innovation and value-added (Design Exchange 1995; DIAC 2004; City of Toronto 2006)

Gertler and Vinodrai's (2004) recent study *Designing the Economy*, conducted in collaboration with the Design Industry Advisory Committee (DIAC), documents the extent of design work within Ontario's and Canada's economy, as well as the contributions that design skills and creativity make within a wide range of established and emerging sectors.<sup>7</sup> Figure 3 shows that the growth of Canada's design workforce (defined occupationally to include industrial, interior, graphic, fashion, theatre and other designers, as well as architects and landscape architects) outpaced that of the overall labour force between 1987 and 2004.<sup>8</sup> Canada's design workforce grew at a rate of 3.7% per year, compared to only 1.7% for the overall labour force. Furthermore, as Figure 4 shows, design employment is primarily concentrated in Canada's largest cities; a finding that is consistent with other studies of the geography of creative and cultural activity (Scott 2001; Power 2002; Florida 2002; Markusen et al. 2004).

Figure 5 compares employment change in Canada's design *industry* to employment change in design *occupations* between 1987 and 2002. Overall, Figure 5 suggests that the design workforce (defined occupationally) is growing at a faster rate than employment in the design industry, suggesting that other industries outside of the design industry are availing themselves of design-related expertise by employing designers *directly*. Figure 6 confirms this finding by showing the sectoral distribution of people working in design occupations. Fewer than half of all designers work within specialized design firms. In other words, designers are employed in a *wide range of traditional and emerging industries*. Designers work in many other sectors of Canada's economy including various manufacturing sectors, retail, business and financial services, and other professional and scientific services.

The importance of this finding is emphasized elsewhere. For example, other research has demonstrated how Ontario firms in a range of industries have used design to produce new, environmentally sustainable products and secure themselves a position within niche markets (Gould 2003). Vinodrai's (2005, 2006) research further explores how design expertise is transferred between the design industry and other sectors of the economy. Through an analysis of employment dynamics, contracting relationships, freelance activity, and the longitudinal labour market mobility of industrial and graphic designers, she demonstrates how designers work in various industrial settings over the course of their careers. Figures 7 and 8 provide a small but representative sample of results from this analysis. Figure 7 shows the career paths of four industrial designers and highlights their longitudinal employment mobility. In all four cases, the designers had spent time working in the design industry, as well as in other industries. Similarly, Figure 8 shows the career paths of two graphic designers. Again, these illustrate that designers work for a variety of employers in different industrial contexts throughout their career. For example, Designer 6 most recently worked for an equipment manufacturer, but prior to that had experienced stints of employment in the

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<sup>7</sup> The Design Industry Advisory Committee (DIAC) is a group comprised of representatives from the design-related professional associations and institutions. Its mandate is to understand better the links between design, innovation and economic competitiveness and leverage Ontario's design capacity towards the goals of increasing levels of innovation and competitiveness.

<sup>8</sup> While the analysis presented in Gertler and Vinodrai (2004) uses data for Ontario, in this paper we present a similar analysis conducted at the national level. In general, the results are quite similar.

software, printing, retail and photography industries, as well as freelancing for periods of time. Vinodrai's findings revealed that designers often spend time participating in non-standard employment forms such as freelancing, various forms of contract work and self-employment. The implication is that designers apply their skills to clients in a variety of industrial sectors (including the design industry) while engaging in such employment and work practices (see also Zeman 2001).

Overall, the findings from Vinodrai's (2005) analysis lead her to conclude that design expertise and knowledge developed in working for a variety of employers can be transferred between firms and industrial sectors via labour market mobility. Firms benefit from designers' circulation in the labour market since designers can bring new knowledge into the firm, thereby acting as an important 'embodied' knowledge flow, much in the same way as engineers, scientific researchers and technical workers (see also Angel 1991; Almeida and Kogut 1999; Henry and Pinch 2000).

#### 4. Challenges in measuring the contribution of design to innovation in Canada

In the preceding sections of this paper, we have demonstrated the growing role of design as a source of economic value and innovativeness in a wide range of sectors throughout the economy. The empirical findings reviewed above suggest that Canadian firms in many industrial settings are hiring designers and that this has become more widespread in recent years. However, it remains an open question as to how *effectively* Canadian firms are using design expertise. It is also imperative to differentiate between users and non-users of design to determine if some firms and/or industrial sectors have made more extensive and effective use of design, as well as to determine how and where design expertise is being utilized and applied within the firm.

Given this mounting evidence, it is clear that the existing panoply of indicators of innovative activity need to be modified to capture the growing importance of designers and design inputs to the innovation process. In other words, those actors who are responsible for providing design inputs need to be counted amongst the usual list of agents – scientists, engineers, managers, technical/skilled workers, university and private researchers, consultants, customers, and competitors – who are routinely regarded as active participants in the innovation system. How then can we measure the extent and impact of design's contribution to the innovativeness and competitive success of firms? How can we assess how firms are integrating design into their innovation and production practices? In this section, we consider existing approaches to this measurement question in Canada by examining two key Statistics Canada surveys.

Within Canada, there are few comprehensive data sources that explore the various aspects of design or that attempt to understand the business use of design. The quantitative analysis presented in the previous sections relies on data from Statistics Canada's *Census of Population and Labour Force Survey* (Gertler and Vinodrai 2004). These data sources allow analysts to understand the socio-economic and demographic characteristics of people working in design occupations or the design industry. However, this does not tell us about the industrial dynamics of these sectors, nor does it focus on how design is being utilized within particular industries. Furthermore, these are cross-sectional data which therefore tell

us very little about employment mobility and other factors that can be revealed through longitudinal analysis. Vinodrai's (2005, 2006) analysis relies on a qualitative methodology to understand the longitudinal labour market dynamics of industrial and graphic designers.

The only comprehensive, national survey that explicitly examines the business of design is the *Survey of Service Industries: Specialized Design*, which has been conducted annually since 1998. This survey is based on a sample of establishments in the specialized design services industry, which includes:

- landscape architectural services (541320);
- interior design services (541410);
- industrial design services (541420);
- graphic design services (541430); and
- other specialized design services (541490).<sup>9</sup>

The survey provides basic information about the number of establishments, establishment size, and sources of revenue (design consultation, design services, project management, other), as well as some broad-brush information about the types of clients (government, businesses, individuals and/or families) and where these clients are located (same province, different province, international).

However, there are a number of drawbacks to the survey. First, there is no detailed geography of the design services firms below the provincial level. Given the demonstrated tendency for design employment to cluster in metropolitan regions, this is a significant shortcoming. Second, there is very limited information provided about the clients and users of design services, including their industrial or sectoral classification and the nature of the relationships between design service providers and the design users. Hence, we are unable to identify leading and lagging sectors in the use of design services. Third, recalling the key finding reported above that roughly half of all designers *do not* work in specialized design service firms, the survey fails to capture the in-house design activities within non-design firms. Given the evidence that this level of activity has been increasing in relative and absolute terms in recent years, this too is a critical gap in our understanding of design use in the economy more broadly. Finally, there are few direct ways to assess the business practices and innovative performance of firms in the design services industry, and to link these to their economic performance.

Statistics Canada's *Survey of Innovation* (hereafter SOI) solicits important information about product and process innovation within manufacturing, natural resources, and specialized service firms. In fact, the sample for the 2003 SOI included establishments in the industrial design services industry. While including the design services industry in the survey has the advantage of revealing the sources of innovative ideas and the level of innovation for

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<sup>9</sup> Statistics Canada has only been able to readily identify establishments in the specialized design services industry beginning with the adoption of the 1997 North American Industrial Classification System (NAICS). Prior to this, the Standard Industrial Classification (SIC) did not allow for the easy identification of firms in the design services. Architectural firms are covered under a separate survey: the *Annual Survey of Architectural Services*.

establishments in one part of the design industry, this still has the limitation of not being able to capture how design is being used in other industries.

The SOI gathers very useful data on the sources of innovative ideas, both internal and external to the firm<sup>10</sup>. However, there is no explicit recognition of the role that designers (in-house or from outside the firm) play in enhancing the innovative potential of the firm.<sup>11</sup> Furthermore, while the SOI links innovative activity to firm performance (measured in terms of sales revenues, quality, process improvements, productivity, market share, *inter alia*), it does not illuminate the impact of design inputs on firm performance. In other words, it leaves unaddressed a key question: how does design add value to firms' products and services and enhance firms' competitive success?

Despite these shortcomings, we would argue that the SOI holds considerable potential as a tool for addressing these questions in the future. Perhaps its most important characteristic is the breadth of its target population, since it covers a wide range of sectors in the Canadian economy.<sup>12</sup> This means that it includes both newer and older industries, incorporating both more and less knowledge-intensive forms of economic activity. Such a sample structure would support the analysis of how the use of design varies by sector, firm size, and other pertinent characteristics.

A new question could be added to the SOI to measure the *prevalence* of design use by gathering information on:

- the number of full-time and part-time, as well as permanent and contract, design staff employed in-house<sup>13</sup>; and
- the use of designers external to the firm (freelancers, design firms), measured in terms of the dollar value of expenditures to purchase these design services.

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<sup>10</sup> For the 2005 SOI, the internal sources include: R&D staff, sales and marketing staff, production workers, management, and other plants or research labs in the same firm. Sources external to the firm include: suppliers, customers, competitors, consultants, commercial, public, or non-profit R&D labs, universities and colleges, conferences and trade fairs, journals and trade publications, investors, industry associations, the internet, and experienced entrepreneurs.

<sup>11</sup> The *Survey of Innovation 2005* includes three questions that make passing reference to design. In question 8 ("Please rate the importance of each of the following factors for the success of your plant during the three years 2002 to 2004"), one of the response categories is "Developing custom-designed products (goods or services) for clients". In question 31 ("Please indicate which of the following methods were used by your plant to protect its intellectual property during the three years 2002 to 2004"), the response categories include "Trademark" and "Complexity of design". Question 33 asks "Please estimate (as best you can) the percentage of your products (goods or services) that were protected by trademarks (in terms of their contribution to total revenue) in 2004".

<sup>12</sup> Each of the past SOIs has aimed at a slightly different sample. The 1999 SOI covered approximately 6,000 businesses in the manufacturing, construction and natural resources sectors, while the 2003 SOI focused on approximately 1,700 establishments in specialized services (including industrial design). The 2005 SOI returns to the broader coverage of the 1999 survey, with a sample of approximately 8,000 firms.

<sup>13</sup> This could be further disaggregated by type of designer, using accepted categories such as industrial, graphic, interior, fashion, architect, landscape architect, and other.

Relatively modest, incremental modifications to existing SOI questions<sup>14</sup> would enable the collection of vital information concerning the *importance* of designers in contributing to innovative ideas, by gauging:

- the importance of design staff in-house in generating innovations; and
- the importance of external design firms and freelancers in generating innovations.

More probing analyses would require new questions exploring *how* design contributes to the innovation process. For example:

- At what stage in the innovation/production process is design used?
  - initial stages of product/process development
  - later stages (e.g. customization)
  - packaging, marketing

Additional questions could explore the link between design activity, innovative capacity, and firm performance more explicitly. For example, the national study commissioned by the British Design Council (Design Council 2004) reviewed above asked firms across the UK economy a number of questions related to the use of design within the firm:

- How have design, innovation and creativity contributed to your business over the last three years?
- Has design become more important in maintaining your competitive edge over the past 10 years?
- What role does design play in your business?
- How is design used in new product or service development?
- What are your main reasons for not using more external design expertise?

Clearly, as one adds incrementally to the existing SOI from this list of new questions (in the absence of offsetting removal of other questions in the survey), the risk of adding unduly to the response burden of firms increases. This raises the possibility of a separate, new national survey on the use of design across the economy. While an expensive and time-consuming proposition, one advantage of this approach is that the survey base could be broadened still further, to include sectors such as retail, hospitality, tourism, and other services not already covered by the SOI. While firms in these sectors are unlikely to engage in the more traditional forms of science and technology-based innovation activities, the use of design is likely to contribute significantly to their development of innovations.

Nevertheless, we would argue that the growing body of international evidence concerning the strategic importance of design across the economy warrants at the very least a serious reconsideration of the content and structure of the SOI in order to reflect these recently

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<sup>14</sup> Question 25 in the *Survey of Innovation 2005* asks “During the three years 2002 to 2004, how important to your plant’s innovation activities were each of the following information sources?”.

emerging developments. Furthermore, by linking this kind of data to other measures of firm characteristics and performance, including those collected through other establishment-based surveys, one could determine the extent to which a firm's use of design is correlated with employment and sales growth, export activity, growth in market share, and other key performance outcomes.

## 5. Conclusions

In this paper, we have reviewed the accumulated arguments, both conceptual and empirical, concerning the growing importance of design as a determinant of firms' innovative capacity and competitive success. It is clear from this review that the economies of the OECD countries are becoming increasingly reliant upon the use of design as a way to enhance market success of their goods and services. As part of the more general trend towards identifying and exploiting non-price forms of competition, firms in many of these countries appear to be discovering the importance of design as a source of economic value.

While some countries – most notably in Northern Europe and the UK – have led the way in devising the means to document this phenomenon statistically, these approaches have not yet been standardized in international manuals of innovation measurement. Our exploratory analysis, using available employment data reported by occupation and industry, as well as more qualitative approaches, appears to indicate that design activity is expanding rapidly in Canada, and that it is spreading well beyond the design industry itself. It is also highly concentrated in metropolitan regions, supporting recent conceptual arguments linking creative activity to urban environments. And yet, Canada's current array of national surveys does not collect the relevant information on a systematic basis to allow us to document the prevalence of design use and its importance to the innovation process in sectors across the Canadian economy. Moreover, the current approach to documenting the structure and interrelationships between elements within the innovation system – in Canada and elsewhere – is hampered by an unduly restrictive set of participants. Designers are conspicuous by their absence from the list of innovation agents and sources of innovative ideas, which are – following established practice – strongly scientific and technological in nature.

If the secular trends documented in this paper are indeed as fundamental and widespread as they appear to be, then it is of obvious critical importance for the high-wage, developed economies of the OECD member nations to be able to collect information on design use and its role in the innovation process. For the Canadian case, we have argued in this paper that a number of modest but important incremental modifications to Statistics Canada's existing *Survey of Innovation* would go a very long way toward achieving this goal, while also complementing the useful information already available through other national surveys and the Census. Given the agency's well-deserved international reputation as a leader in the development of measures of innovative activity, now would seem to be a very good time to initiate a rethinking – and redesign – of our existing instruments for the measurement of innovation.

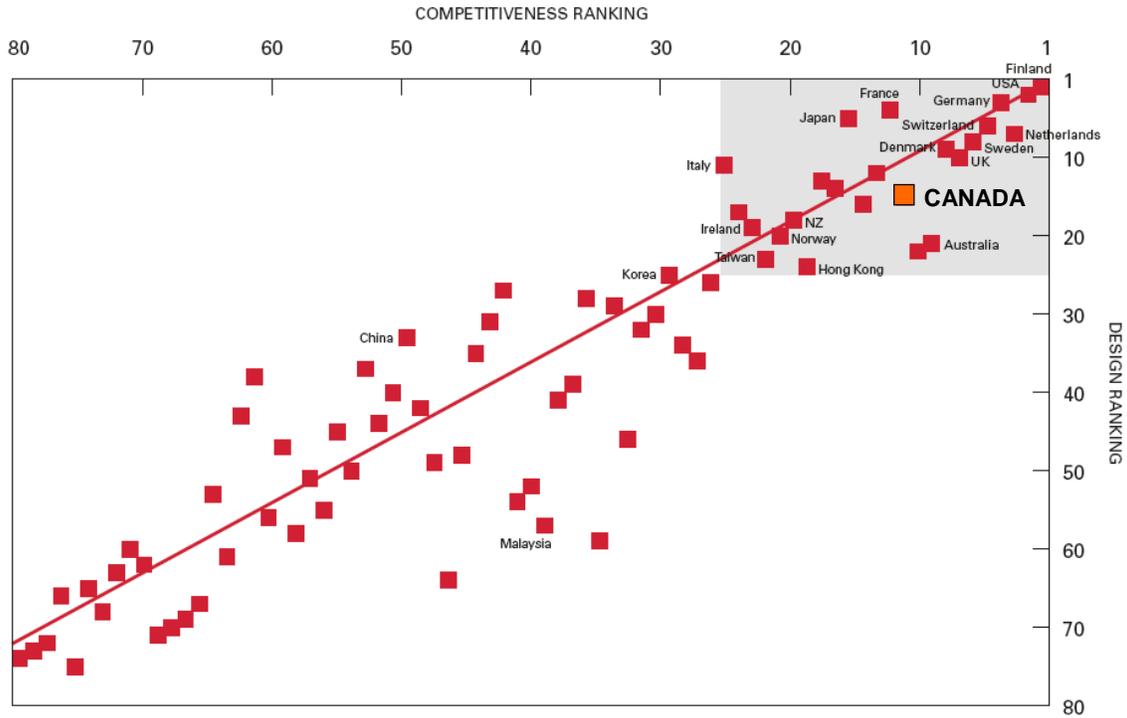
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**Figure 1: Correlation between competitiveness and design**



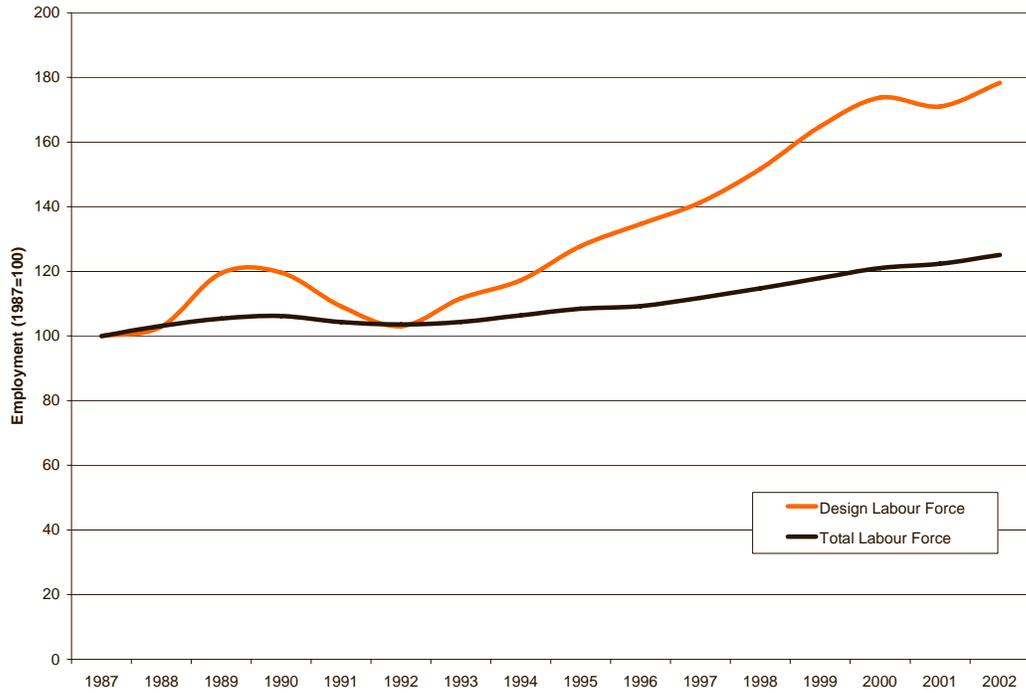
Source: New Zealand Design Taskforce 2003.

**Figure 2: The impact of design on stock market performance in the United Kingdom, 1994-2003**



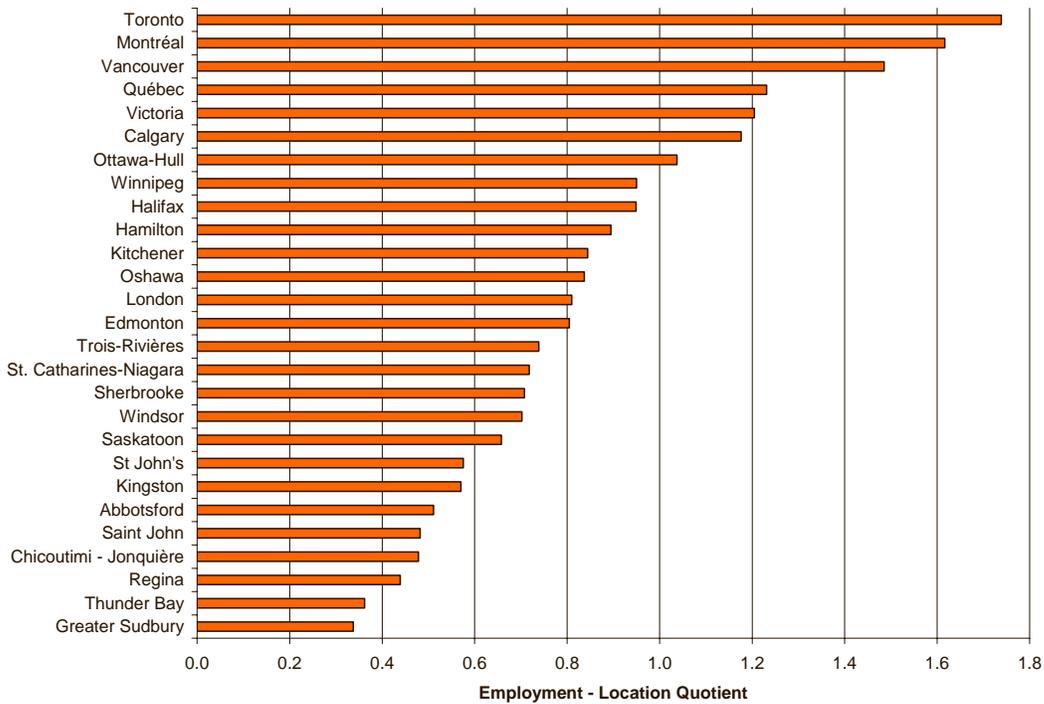
Source: British Design Council 2004.

**Figure 3: Indexed design employment in Canada, 1987-2002 (1987=100)**



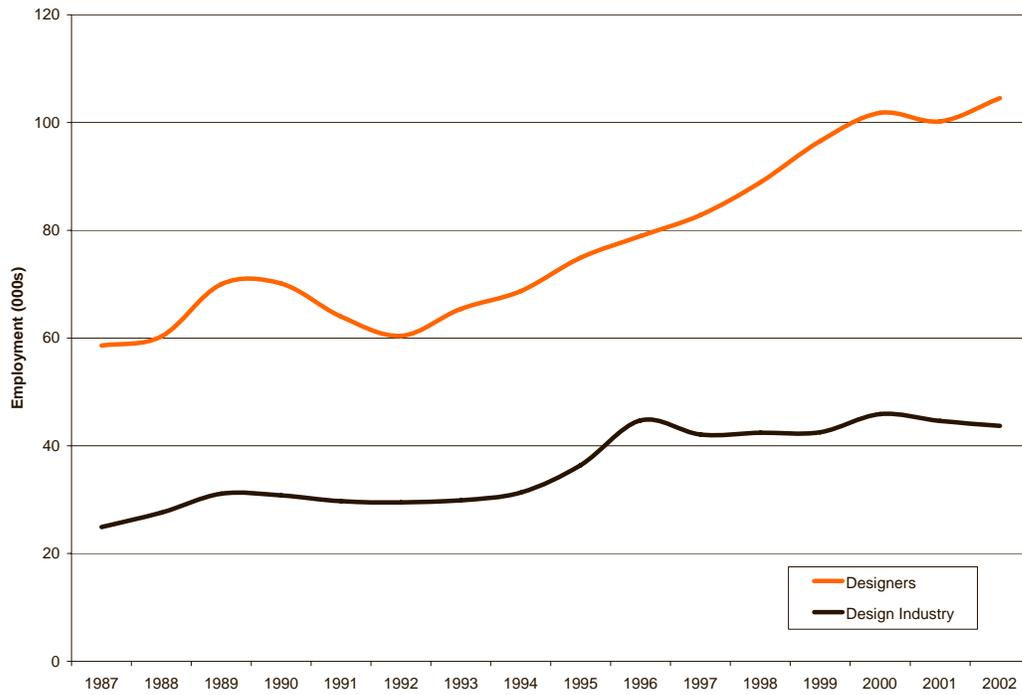
Source: Statistics Canada. *Labour Force Survey, 1987-2002* [custom tabulations].

**Figure 4: Concentration of employment in design occupations in Canadian cities, 2001**



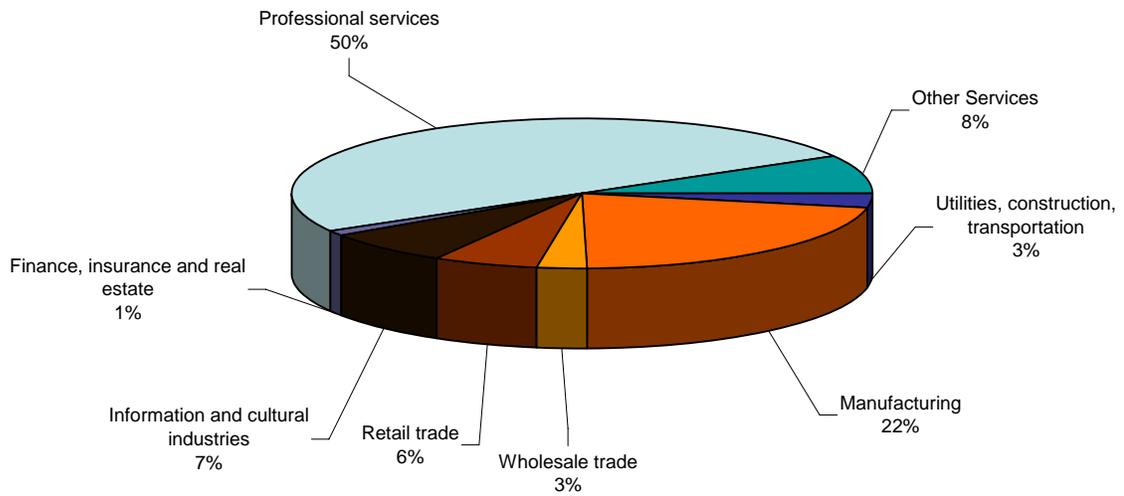
Source: Statistics Canada 2001. [Authors' calculations].

**Figure 5: Employment in design occupations vs. design industry, 1987-2002**



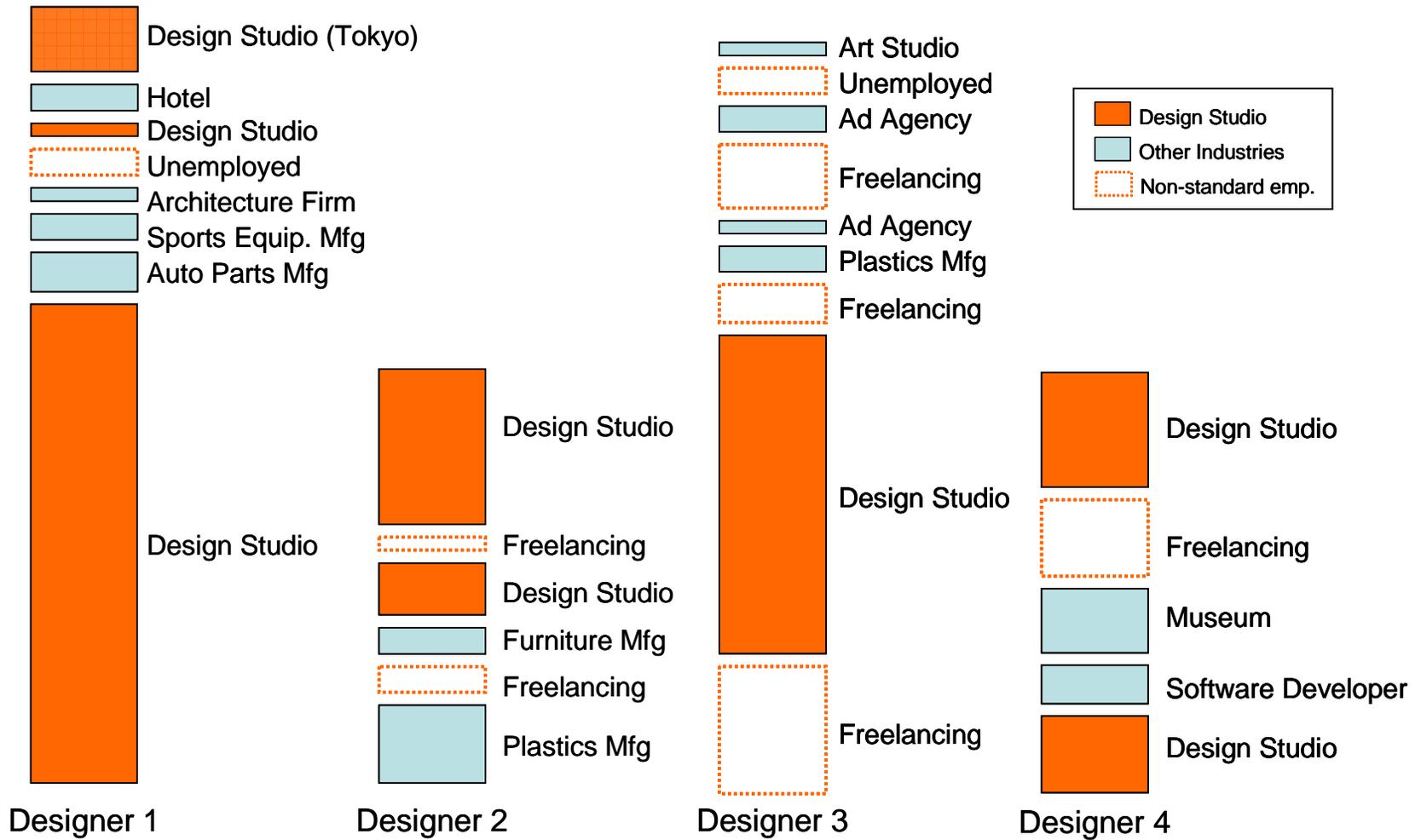
Source: Statistics Canada. *Labour Force Survey, 1987-2002* [custom tabulations].

**Figure 6: Sectoral distribution of designers, 2001**



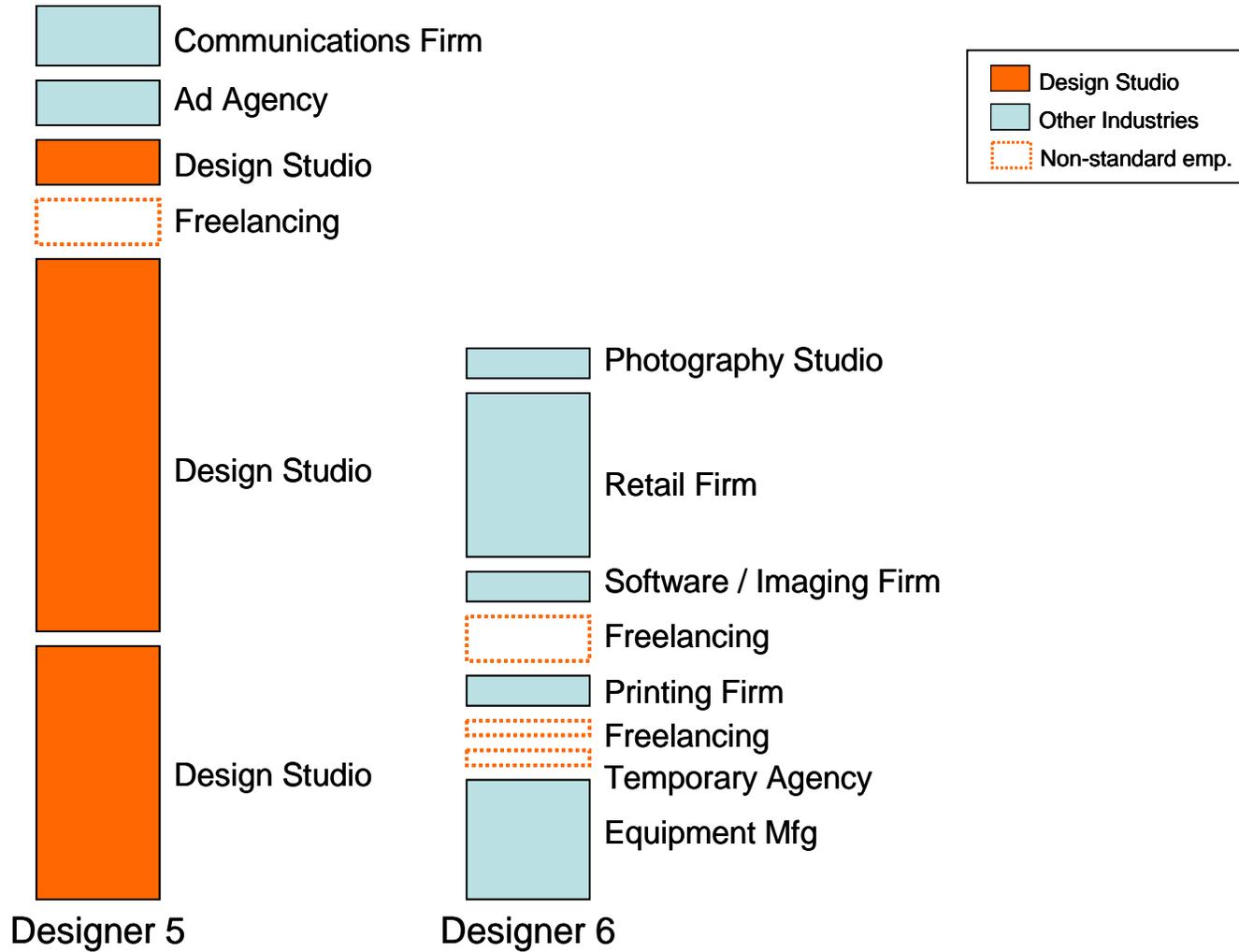
Source: Statistics Canada 2001. [Authors' calculations].

Figure 7: Sectoral diversity in the career paths of industrial designers



Source: Adapted from Vinodrai 2006.

Figure 8: Sectoral diversity in the career paths of graphic designers



Source: Adapted from Vinodrai 2006.