Old News from the "New Economy"

Women's Work in ICT

KRISTA SCOTT-DIXON

Cet article se penche sur le travail des Canadiennes attirées par les TIC (Technologies de l'information et des communications) avec une attention particulière sur trois points : la ségrégation industrielle et occupationnelle, et les disparités économiques. Oublieuses des promesses des TIC qui devaient transformer le travail, les Canadiennes en TIC continuent d'être moins bien payées, connaissent une ségrégation des sexes persistante et travaillent dans un milieu stratifié selon le sexe, l'ethnie, le statut d'émigrante et l'âge.

In the 1990s, it appeared that affluent regions of North America were poised on the edge of a "new economy" that would bend and break the rules of the old. This "new economy" would be founded upon "knowledge work," or more specifically, information and communications technology (ICT) work. Wealth would be generated easily through technical knowhow. Drudgery would become fulfilling, creative, well-compensated labour, which would be performed when and where the worker preferred. Old signifiers such as gender, race-ethnicity, and class would be left behind as people connected virtually. Technological developments were the key to this "new economy"; technological change was seen as valuable and more importantly, inevitable.[1] Despite the drastic downturn in the ICT sector, such ideas and rhetoric about the inherent value of the "new economy," and what that "new economy" looks like, continue to shape policies and obscure existing relations of inequality.

Regardless of the promise that ICTs would transform work, as we settle comfortably into the twenty-first century, many elements of women's work have not changed much.[2] Women workers continue to experience industrial and occupational segregation combined with devaluation of their labour, and persistent wage disparities based on gender as well as other intersecting identities such as race-ethnicity, immigrant status, class, age, actual and perceived skill level, immigrant status, and geographical location. Though the development and implementation of ICTs have altered the content as well as the location of women's work in some ways, in other ways this work has remained stubbornly familiar. For example, clerical work remains one of the predominant fields for women's employment. While the expectations of technical expertise and credentials for clerical work have increased drastically, the status and pay have not. The persistence of gendered disparities in the labour market reveal that Canadian women's employment in ICT work represents a tension between new technologies and old ways of doing business. This article examines the current trends in ICT work for Canadian women, with particular attention to three central trends: industrial and occupational segregation, and economic disparities. The persistence of women's inequality in this field is particularly provocative, given that the concept of the egalitarian "new economy," in which skilled "knowledge workers" contribute to a vibrant and productive society, continue to have a high value in Canadian policy and ICT industry rhetoric.[3]

The Nature of ICT Work

Though ICT work is diverse, it shows distinct trends. It represents a convergence of three industrial and occupational streams: engineering/applied sciences, manufacturing, and clerical/communications work. The first two streams have historically been male-dominated, and have informed much of the culture and expectations of the ICT field. The third stream became female dominated around the early twentieth century, and informed much of the current objects and practice of the field, such as word processors and data entry (van Oost). With the development of ICT, and the evolution of the ICT field beyond the nuts-and-bolts world of technical work, many new positions and occupations were produced. Jobs such as information architect, intranet developer, or content manager did not exist a decade ago. Many of these new jobs were offshoots of traditionally female fields such as

librarianship and public relations. As a result, new opportunities for women to work in technical fields, and in technical jobs, were created. Indeed, the ICT field has expanded so that a variety of types of workers can be said to be ICT workers. The conventional image of an ICT worker, perhaps a stereotypical white male computer hermit, has given way to both "knowledge workers"—people whose job is, in some way, to create, manage and/or distribute information using technology—and factory workers who create the actual technological objects. These new groups of workers may be from occupational sectors that are familiar with unionization, such as telecommunications workers, or they may be from occupational sectors previously not considered "high-tech", which erodes the mystique of ICT work that is performed only by a special group of people.

While the advantage of this expansion of ICT is that there are new opportunities for groups of people previously segregated into "non-technical" fields, the disadvantage is that concomitantly, the nature of ICT work is also changing to reflect the work patterns of this formerly technically marginalized demographic. In other words, for example, as more women move into technical jobs, the more those jobs will likely begin to resemble other traditionally female jobs in their relatively lower status and pay. ICT work, therefore, presents a contradiction for women workers. On one hand, for affluent, educated women in industrialized countries such as Canada, ICT work offers many opportunities for challenging, interesting, professional work. Many of these jobs are "good jobs": full-time, permanent, often with benefits, and a fair degree of worker autonomy and control over the work (Duffy, Glenday and Pupo). For other women workers, ICT work reproduces the instability, drudgery, repetitiveness, low status, and low pay that characterize much of women's paid employment globally. For example, vast armies of data entry firms and call centres are springing up in poorer regions such as the Caribbean and mainland China, as well as less affluent areas of Canada, such as the Maritimes (Buchanan and Koch-Schulte; Freeman; Huws). The vast majority of workers at these firms are female. Even many of the "good jobs" in ICT are coming to resemble traditional "women's

Table 1: Shares of men and women, and relative wages in ICT-related industries, 2003

	Percentage of Workers in Each Industry		Wages		
Industry	Men	Women	Men	Women	Wage Gap
Computer and Electronic Product Manufacturing					
Semiconductor & Other Electronic Component Manufacturing	54.30	45.70	$19.66	$13.75	69.9%
Audio & Video Equipment Manufacturing	57.10	42.90	$20.00	—	n/a
Computer & Peripheral Equipment Manufacturing	59.80	39.80	$25.00	$19.23	76.9%
Communications Equipment Manufacturing	66.20	33.80	$30.77	$18.13	58.9%
Commercial & Service Industry Machinery Manufacturing	68.80	31.20	$21.15	$18.22	86.1%
Other Electrical Equipment & Component Manufacturing	69.20	30.10	$19.81	$12.00	60.6%
Navigational, Medical & Control Instruments Manufacturing	75.90	23.50	$20.00	$16.00	80.0%
Information and Communications Technologies Services					
Data Processing Services	37.90	62.10	—	$11.00	n/a
Telecommunications	56.10	43.90	$25.00	$21.00	84.0%
Software Publishers	62.40	36.60	$24.89	$18.00	72.3%
Computer & Communication Equipment & Supplies Wholesalers/Distributors	66.40	33.60	$21.54	$16.83	78.1%
Computer Systems Design & Related Services	70.30	29.70	$25.00	$21.79	87.2%
Electronic & Precision Equipment Repair & Maintenance	82.40	17.60	$16.83	—	n/a

Source: Statistics Canada, *Labour Force Survey*, custom tabulation, 2003.

jobs" in their precariousness. Many ICT professionals in North America have been surprised to find themselves "downsized," "outsourced," or transformed into "independent contractors" who are considered to be self-employed, on-call workers to whom the employer has minimal responsibility.

The occupational diversity of ICT workers plus the frequent reliance on non-standard employment practices in the field, such as contract work, has shifted the demographic and dynamic of the ICT workforce. In lower-end and entry-level ICT positions such as call centres, worker turnover, task tedium, and employer surveillance has traditionally been high, and salaries, status, promotion potential, and worker autonomy low. These types of jobs depend on the high turnover and low skill/experience level of their workforce to facilitate enforcement of non-standard hours, low compensation, and a lack of worker protections and benefits (Bibby). As opposed to the professional high-tech positions, which remain largely male, low-end ICT work is primarily performed by the traditional groups of non-standard workers: young people, women, recent immigrants. The common thread in both high- and low-end ICT work is the increasing lack of worker protection and adequate remuneration.

As opposed to professional high-tech positions, which remain largely male, low-end ICT work is primarily performed by the traditional groups of non-standard workers: young people, women, recent immigrants. The common thread in both is the increasing lack of worker protection and adequate remuneration.

Thus, women's work in ICT is a blend of new and old. New occupations are emerging, and new possibilities for women, but they tend to be shaped by traditionally gendered inequalities. The remainder of this article takes up this theme of new and old in greater depth by examining three elements that have traditionally organized women's work: industrial and occupational segregation, and salary disparity.

Industrial Segregation

Men and women tend to work in different industries, a phenomenon known as *industrial segregation* (Armstrong and Armstrong 24). In general, industries with a higher proportion of women tend to be service industries rather than manufacturing industries, and are often characterized by lower status, benefits, job security, and pay. However, in terms of ICT work specifically, while women are indeed found in ICT-related service work, they are also clustered in manufacturing industries such semiconductor and electronics component manufacturing. ICT is often thought of as service work such as programming, but manufacturing of ICT objects is a critical component of the ICT "life cycle." The juxtaposition of manufacturing and service industries, as in California's Silicon Valley in the 1990s, often highlights the gendered and racialized polarization between good ICT jobs and bad ICT jobs (Hossfeld).

In general, ICT industries as a whole remain male-dominated. In 2003, women made up about 35 per cent of the workforce in both ICT manufacturing and service industries (Statistics Canada 2003).[4] In terms of sheer quantities of women workers, the top five ICT-related industries where women are found are telecommunications, computer systems design, semiconductor and other electronic component manufacturing, computer and communications equipment distribution, and computer and peripheral manufacturing. However, if we look at women's work relative to men, we can see that although the percentage of women working in the aforementioned industries is high, the most female-dominated ICT-related industry is the data processing industry, where in 2003, women made up about 62 per cent of the workers (see Table 1). Jobs in the data processing industry look similar to their cousins in the female-dominated clerical industry, and these jobs include data entry tasks such as electronic transcription or entering credit card data. Just like their clerical predecessors, they are among the most menial, repetitive, and poorly compensated jobs in the IT-related field. In 2003, the median hourly wage for a woman in the data processing industry was $11.00, well below the $20.51 median hourly wage for women in the ICT service sector as a whole (see Table 1).[5] In this case, ICT work closely parallels other forms of traditionally female clerical work.

Not only are there relatively higher percentages of women overall in the data processing and electronics/computer component manufacturing sectors, but there are also higher percentages of immigrant women.[6] For example, immigrant women comprise one-half to one-third of the female workforce in ICT manufacturing industries, and just over one-third of the data processing industry. Interestingly, although telecommunications has a significant percentage of women workers, it has the lowest percentage of immigrant women; only 19.1 per cent of women in the telecommunications industry are immigrants (and only 15.8 per cent of women in telecommunications are identified as women of colour). Among

immigrant women, the likelihood of working in industries such as computer manufacturing is greater with a more recent date of arrival. In other words, newer immigrants such as those arriving in Canada in the last five years are more likely to be working in ICT manufacturing than those in Canada longer, with a striking exception of immigrant women who entered Canada more than twenty years ago. The proportion of women of colour in Canadian ICT manufacturing industries is also high.[7] Forty per cent of women workers making wiring devices for communications technologies are women of colour, as are 39 per cent of women in audio and video manufacturing, and 35 per cent of women making computer and peripheral equipment. The ICT manufacturing industry has traditionally been clearly stratified by race-ethnicity and gender, and occupational and wage polarization is significant (Hossfeld).

Women are less likely to be found in ICT industries where the pay is higher (see Table 1). For example, computer systems design and related services has the highest median hourly wage, and a relatively smaller wage gap between women and men. However, although in absolute numbers there are more women working in this industry, they comprise only about 29 per cent of the workforce. A significant exception to this is the telecommunications sector, where despite a prevalence of many traditionally female-dominated occupations, women generally enjoy the benefits of union coverage, and have won many key pay equity battles.

Despite this provocative data, industrial categorization alone is not enough to clearly establish patterns of Canadian women's work in the ICT industry. ICT work can span a variety of industrial categories. Still, given ICT's roots in particular industries, particularly telecommunications and manufacturing, industrial segregation can provide both an ideological and occupational lens through which to understand part of women's work practices in ICT.

Occupational Segregation

The term *occupational segregation* refers to the underrepresentation of women in high-status, high-paid positions within an industry. Unlike industrial segregation, which is an expression of where women are found across all jobs, occupational segregation is an expression of where women are found within one particular job group. As with industrial segregation, occupational segregation results in women clustered into low-status, low-paid, insecure jobs that exploit what are seen as traditionally "feminine"

Table 2: Shares of men and women, and annual salaries in ICT-Related Occupations, 2001

	Percentange of Workers in Each Occupation		Wages		
Occupation	Men	Women	Men	Women	Wage Gap
Engineering Managers	89.10	10.90	$84,600	$52,324	61.85%
Computer Engineers (Except Software Engineers)	85.20	14.90	$62,195	$47,024	75.61%
Software Engineers	81.60	18.40	$62,687	$49,539	79.03%
Computer Programmers and Interactive Media Developers	76.50	23.50	$44,175	$39,398	89.19%
Computer and Network Operators and Web Technicians	74.60	25.50	$39,799	$33,825	84.99%
Computer and Information Systems Managers	73.50	26.50	$76,202	$61,304	80.45%
User Support Technicians	68.90	31.10	$36,197	$32,890	90.86%
Information Systems Analysts and Consultants	68.60	31.40	$55,624	$49,054	88.19%
Web Designers and Developers	66.70	33.30	$29,431	$28,815	97.91%
Supervisors, Electronics Manufacturing	62.90	37.10	$43,762	$30,532	69.77%
Systems Testing Technicians	60.00	40.10	$38,178	$38,796	101.62%
Database Analysts and Data Administrators	57.70	42.30	$50,695	$39,024	76.98%
Electronics Assemblers, Fabricators, Inspectors and Testers	46.10	54.00	$25,440	$21,887	86.03%
Desktop Publishing Operators and Related Occupations	33.50	66.50	$31,327	$23,440	74.82%
Telephone Operators	19.80	80.10	$18,830	$21,073	111.91%
Data entry clerks	18.40	81.60	$18,932	$21,052	111.20%

Source: Statistics Canada, *Census of Population*, 2001

skills, such as interpersonal skills and "nimble fingers" for fine motor tasks. Much of women's work in ICT-related occupations follows this model. Women are making some inroads into male-dominated, high-status positions, but this often means that the work is being transformed into jobs resembling traditionally feminized work (Armstrong and Armstrong 40). In the case of ICT work, this appears to be true: as certain types of ICT jobs becomes less associated with "hard technology" and academic computer science, more women appear to be performing them. Moreover, some formerly high status occupational groups are experiencing an overall downgrading of skill and salary expectations. As women are more likely than men to work part-time, particularly to meet unpaid labour demands, or find their jobs casualized (including short-term contract work), this downgrading of salary often combined with fewer hours overall results in a double burden of lower wages.

Canadian women in ICT continue to be paid less, experience persistent and gendered industrial and occupational work segregation, and labour in a workforce that is stratified along lines of gender, race-ethnicity, immigrant status, and age.

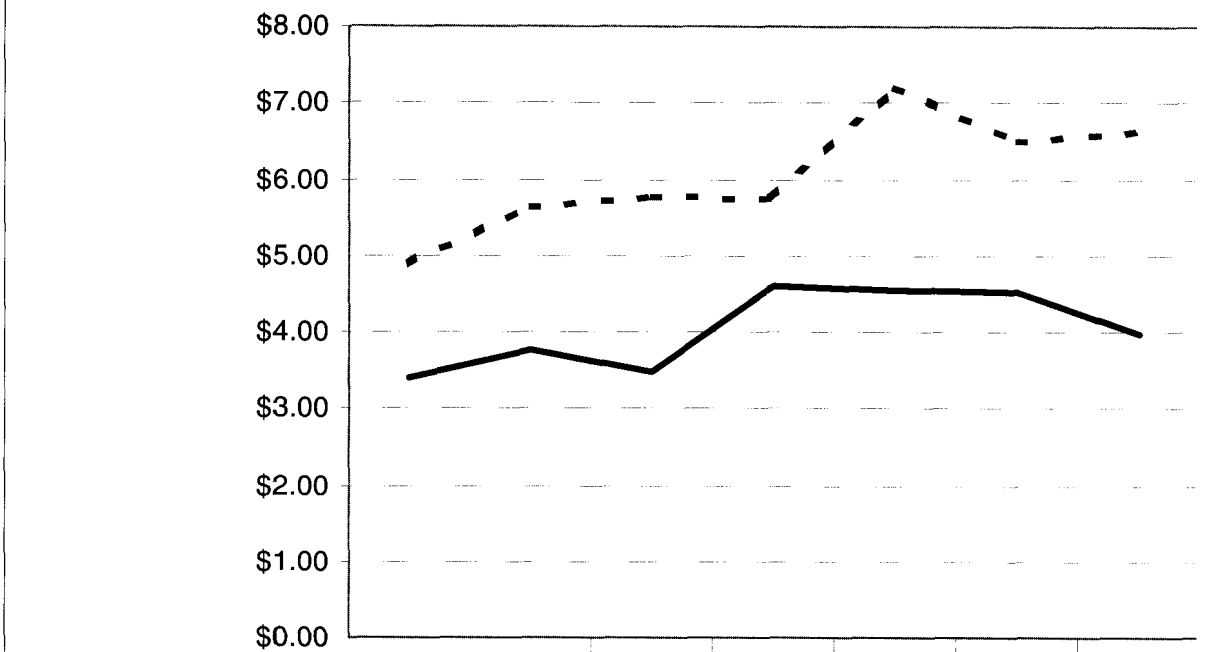
One of the top ICT-related jobs for women strongly resembles the lower-status clerical work from a half century ago. Not surprisingly, given women's role in the data processing sector, 81.6 per cent of data entry clerks are women, and in terms of overall numbers, data entry clerk is the most common ICT-related occupation for women (Statistics Canada 2001). However, it is also the lowest paid occupation of the ICT-related occupations (see Table 2).[8] In 2003, a data entry clerk could expect to make an average annual wage of $21,052. Data entry work is typically casualized, non-standard work that relies on a fluid, low-paid work force, and has little in the way of job security or benefits. Another ICT-related occupation with a higher proportion of women, particularly immigrant women and women of colour, is in electronics assembly. Not surprisingly, it too is poorly paid and low status work. In comparison, ICT occupations that offer the highest wages and job status tend to also be male-dominated. For example, male engineering managers, who make the highest salaries of the ICT-related occupations, also comprise nearly 90 per cent of the profession. This occupation also has the largest wage gaps of the ICT-related occupations: the few female engineering managers can expect to make approximately 62 per cent of the earnings of their male peers. With a few exceptions such as database analysts, the best paid occupations for men have the lowest proportion of women in them.

Age is another important dimension in determining wages, and it intersects with gender. For example, although the relatively few male telephone operators and data entry clerks earn less on average than their female counterparts, this is primarily because they are likely to be much younger, in their early to mid-20s, whereas the bulk of women in these professions are 15 to 20 years older. There is a perception of the ICT field as youth-oriented and full of rich young hipsters. ICT employers are said to discriminate against older workers in favour of younger workers who are able to work long hours, have no dependants, and import the requisite coolness to the ICT workplace. While some occupational categories, such as web designers, computer programmers, and interactive media developers, are indeed younger on average, generally in their twenties and early thirties, the data show that age and gender groups who have traditionally earned higher salaries continue to do so. The aforementioned web designer, male or female, would be lucky to earn $30,000 annually. While interview data indicates that ageism is prevalent in ICT workplaces (Scott-Dixon), since younger workers are often seen as more likely to have particular kinds of technical skills that make them valuable to employers, senior male workers still command the highest salaries overall.

Salary Disparity

Not only do men and women tend to work in different industries and occupations that are disproportionately valued, and experience different levels of job stability, security, and advancement, but they are also likely to make unequal wages for performing the same types of jobs.[9] The ICT sector is no exception to this. While there are some excellent opportunities for women in professional ICT work to make relatively high salaries, the bulk of women working in ICT-related fields, particularly in manufacturing, do not enjoy this luxury. Moreover, even women earning good salaries are likely to experience a significant wage gap when compared to their male counterparts (see Table 2). Indeed, in some areas, the wage gap for women appears to be increasing. Chart 1 shows the median hourly wage gap between male and female workers in both the ICT-related manufacturing and services industry sectors from 1997 to 2003. In both of these sectors, the wage gap has not narrowed, but rather increased, with a sharp upward jump in 2000 and 2001.

Chart 1: Wage gap between men and women, ICT-related goods-producing (manufacturing) and services-producing industries, 1997-2003



	1997	1998	1999	2000	2001	2002	2003
Manufacturing	$4.89	$5.64	$5.77	$5.74	$7.21	$6.52	$6.63
Services	$3.40	$3.77	$3.49	$4.59	$4.55	$4.52	$3.97

Source: Statistics Canada, *Labour Force Survey*, custom tabulation, 2003

Conventional explanations for women's relatively lower earnings tend to focus on some intrinsic quality of women or women's work. For example, biological explanations propose that women are simply suited to a narrow range of jobs as a result of some accident of sexual dimorphism. It is often suggested that women are not as physically strong or durable as men, and are unable to handle the apocryphal "heavy lifting" that is said to be an inherent part of men's work. Yet as early as 1919, Marjory MacMurchy argued that "[M]achinery has made it possible for women to perform work for which their strength would otherwise have been insufficient." (v). Over 80 years after MacMurchy celebrated the utility of technology for improving women's work capacities, Canadian women in ICT continue to be paid less, experience persistent and gendered industrial and occupational work segregation, and labour in a workforce that is stratified along lines of gender, race-ethnicity, immigrant status, and age. This dynamic is set in an international context where, facilitated by the technology itself, ICT work is increasingly outsourced to regions where labour costs are lower, and labour regulation more lax. Highlighting these ongoing disparities is critical, given the power of techno-rhetoric such as "new economy" and "knowledge workers" to obscure them. While ICT can indeed represent new opportunities and new forms of work for Canadian women, much of what it still offers in economic terms is old global and local inequalities.

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[1]Characteristic of these viewpoints were writers such as Don Tapscott, Alvin Toffler, and T. G. Lewis' book *The Friction-Free Economy*, and industry publications such as *Wired* and *Fast Company*.

[2]"[T]he increasing visibility of women outside the home and the emphasis on female attainment of jobs at the top of the career ladder have camouflaged the lack of basic change in most women's work" (Armstrong and Armstrong 13).

[3]For a good example of this see HRDC. Also see Buchanan and Koch-Schulte for a discussion of how the notion of

"high tech work" was used to promote call-centres in the Maritimes.

[4]These numbers are about the same as those given in the 2001 Statistics Canada *Census of Population.*

[5]Because Statistics Canada (2003) represents very small sample sizes in particular surveys such as the *Labour Force Survey* as zero, wage data are not available in some categories. This does not mean that there are no people in this category, but rather that the number of people in it was too small to be reliably or confidentially represented. The table is organized in descending order by the percentage of women in each industry.

[6]Data on immigrant women in this paragraph from Statistics Canada, *Census of Population*, 2001.

[7]Statistics Canada uses the term "visible minority."

[8]Census data (Statistics Canada 2001a) is collected only on annual earnings, not hourly wages as in the *Labour Force Survey* (Statistics Canada 2003). As such, comparison is somewhat difficult. However, I have chosen to use Census data here because the Labour Force Survey data available does not use the most recent occupational catgories that more precisely reflect the new professions in the ICT field.

[9]The Statistics Canada *Labour Force Survey* reports that in 2003, across all industries, women made a median hourly wage that was about 80 per cent of men's. However, given that women are much more likely than men to work part time to meet domestic responsibilities, this gap further increases in terms of total annual earnings.

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***About* Janet Stahle-Fraser:**

Janet Stahle-Fraser's art is featured on pages 6, 64 and 170 of this issue.

Janet Stahle-Fraser is a printmaker/painter and graduate of the University of Guelph with a M.A. in Philosophy. Fine art studies were completed at the Dundas Valley School of the Arts, Canadore College, the Haliburton School of the Arts, and the University of Guelph. Janet's love of exploring media is apparent in the diversity of media and techniques found in her work that include colour and monochrome woodcuts, etchings, monotypes, pastel, acrylic, encaustic and mixed media. She also creates handbound/handprinted books and wall hangings that incorporate her blockprints and poetry. She is the recipient of numerous awards and her work has been shown at the Art Gallery of Ontario, the McMichael Gallery as well as internationally in Wales and China. Her work may be found in galleries in Muskoka and throughout Ontario (including her own Tapawingo Studio/Gallery in Baysville, Ontario) as well as in private and corporate collections around the world. Her studio/gallery is open to the public most days from Victoria Day to Thanksgiving and off season by appointment. Contact her at :Tapawingo Studio, Box 125, Baysville, Ontario, P0B 1A0; telephone: 705-767-3594.