

# SEDAP

A PROGRAM FOR RESEARCH ON

## **SOCIAL AND ECONOMIC DIMENSIONS OF AN AGING POPULATION**

**Management Experience and  
Diversity in an Ageing Organisation:  
A Microsimulation Analysis**

**Ted Wannell and Martin Gravel**

**SEDAP Research Paper No. 48**

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The Program for Research on Social and Economic Dimensions of an Aging Population (SEDAP) is an interdisciplinary research program centred at McMaster University with participants at the University of British Columbia, Queen's University, Université de Montréal, and the University of Toronto. It has support from the Social Sciences and Humanities Research Council of Canada under the Major Collaborative Research Initiatives Program, and further support from Statistics Canada, the Canadian Institute for Health Information, and participating universities. The SEDAP Research Paper series provides a vehicle for distributing the results of studies undertaken by those associated with the program. Authors take full responsibility for all expressions of opinion.

## ABSTRACT

The ageing of the Canadian population is a well recognized phenomenon and has received considerable policy research attention, particularly in the health and public pension domains. Very little work has been focused on the impacts of ageing at the organisational level. Foot and Venne studied the advancement of the baby boom through traditional organisational hierarchies, noting its impacts on human resource policies that encourage horizontal career development. Saba et al looked more particularly at the management of older professionals in the Quebec public service, finding that employee recognition was an important human resource strategy for motivating this group. We extend these studies further along the ageing ladder -- to the point where retirement and replacement become the major concerns.

Looking at the management hierarchy within Statistics Canada, we use a microsimulation model first to estimate the expected level of retirements over the next 10 years. We then detail the adjustments to promotion and hiring rates required to replace outgoing managers. We then examine simulated microdata to estimate the experience effects of increasing turnover. Finally, we use the demographic features of the model to examine whether the increasing turnover is likely to increase the representation of women and visible minorities among Statistics Canada managers.

Given the assumptions outlined in the paper, we find that increasing turnover rates in the next 10 years will generally not reduce management experience to below recently observed levels. We also find that given equal promotion rates for men and women, the representation rate of women among Statistics Canada managers is likely to increase rapidly in coming years. On the other hand, visible minority representation among managers will likely stall for several years, even with proactive recruitment and advancement policies.

**Management Experience and Diversity in an Ageing Organisation:  
A Microsimulation Analysis**

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## Table of Contents

<b>INTRODUCTION</b> -----	<b>3</b>
<b>MANAGEMENT STRUCTURE AND DEVELOPMENT AT STATISTICS CANADA</b> -----	<b>4</b>
<b>THE SIMULATION MODEL</b> -----	<b>4</b>
<b>SCENARIO DEVELOPMENT</b> -----	<b>6</b>
<b>SCENARIO RESULTS</b> -----	<b>7</b>
<b>Baseline Scenario</b> -----	<b>7</b>
<b>Adjusted Scenario – Experience Effects</b> -----	<b>8</b>
<b>Gender Scenario</b> -----	<b>11</b>
<b>Visible Minority Scenarios</b> -----	<b>13</b>
<b>DISCUSSION</b> -----	<b>15</b>
<b>REFERENCES</b> -----	<b>17</b>

## Introduction

As in many industrialised countries, the Canadian population is ageing. With the baby boomers greying and smaller cohorts of young people entering the labour market, the composition of the workforce is changing. According to recent Statistics Canada projections, 40 percent of the labour force will be over the age of 45 by 2010, compared to just 23 percent as recently as 1993 (Statistics Canada, 1995).

Even as the overall labour force ages, circumstances in particular sectors or organisations can accelerate the process. Cousineau (2000) detailed the effects of years of budgetary cutbacks and workforce reductions on the age composition of the federal public service. The layoffs and years of hiring freezes resulted in a compressed age distribution compared to the general labour force, with a particular concentration in the 45-54 year-old age group. Although Statistics Canada did not experience the steep staff reductions suffered by some other federal government organisations, its age distribution is similar to the rest of the public service.

Although most research on the ageing population has focused on broader societal issues such as the consequences for health care, some have looked at the organisational context. David Foot and co-authors (1990, 1996, 1998) have studied the relationship between the ageing of the baby boomers and the hierarchical pyramid structure of many large organisations. They argue that this relationship was at its zenith in the 1970s when young boomers formed the broad base of the pyramid. As this large cohort matured in the workplace, according to these studies, their advancement prospects collided with the relatively poor labour market conditions of the 1980s and 1990s. As a result, careers for many boomers plateaued and the age at which people reached successive rungs on the hierarchical ladder increased. The authors suggested that organisations should flatten their pyramids in response to the demographic situation and implement human resource policies that encouraged lateral career development.

In a more detailed study on the management of older professionals in the Quebec public service, Saba et al (1998) suggested that human resource policies and practices have to be adapted for an ageing population. The authors argue that employee recognition is the most important workplace value for older workers. They show that environments encouraging training, development and mobility (perceived by employees as elements of recognition) enhance performance, job satisfaction and organisational involvement. Thus, workforce demographics can have important repercussions for human resource policies.

The existing studies focus on the implications of moving a large generation *through* organisations, but the boomers are rapidly approaching the age where they will be moving *out* of organisations. The first post-war birth cohort will reach age 55 this year – the age at which many public service pension plans offer unreduced pension benefits for employees with 30 years of service. Thus many organisations are likely to see retirement rates turn upward this year and keep climbing for some time. Since long-tenured workers have, on average, advanced further up the organisational hierarchy, the highest level occupational groups will be the first affected. This paper presents a case study of the likely numerical outcomes of increasing retirements on the organisational hierarchy of Statistics Canada, both in terms of challenges and opportunities. Although these results are specific to Statistics Canada, they may prove instructive to human resource planners in many large organisations, but particularly to those in other public sector organisations (provincial governments, health and education institutions) that experienced similar budgetary pressures during the 1990s.

The remainder of this paper is divided into six sections. In the first, we outline the management system at Statistics Canada and propose a simplified hierarchy that forms the basis for the empirical analyses. The second section briefly describes the simulation model used to project the outcomes of demographic changes in the organisation. The following three sections present projections on the expected increase in retirements and its likely impacts on promotion rates, experience levels and the representation of women and visible minorities in the management ranks. We conclude with a discussion on the means by which such simulation studies are integrated into the human resource planning process at Statistics Canada.

## Management Structure at Statistics Canada

Management activities at Statistics Canada have both vertical and horizontal components. Statistical, ancillary and support programs are managed through a vertical hierarchy of fields, branches and divisions. Crosscutting issues – human resources, communications, confidentiality, legislation and official languages, to name a few – are managed through a network of management committees. A smaller network of syndicates carries out long-term planning. These syndicates are comprised of program areas that share long-term goals and/or are interdependent in the allocation of resources. Although senior managers are expected to participate in each of the components, our primary focus will be on the vertical pathways that lead to senior management.

Statistics Canada is headed by the Chief Statistician whose occupational classification is equivalent to a Deputy Minister in other federal government departments. Other senior managers are classified to the Executive (EX) group, ranging from EX-1 (new divisional directors) to EX-5 (assistant chief statisticians). The intra-division management structure varies widely across the organisation, but the occupational classification system allows for equivalencies to be generally defined. The hierarchy runs from assistant directors to chiefs to section heads.

For the analysis in this paper, we combine all senior managers into a single group labelled EX. This avoids small number problems at the higher levels, but also reflects the full participation of all senior managers in committees and planning syndicates. The other groups we define in relation to the EX group: assistant directors comprise the EX minus 1 level (EXmin1), chiefs and equivalents occupy the EX minus 2 level (EXmin2), while unit heads and equivalents are defined as EX minus 3 (EXmin3). All other employees are aggregated into a residual group (Resid) that is retained to capture all possible transitions, but will not be reported on in this paper. We have thus defined a simplified hierarchical framework with five successive levels.

## The Simulation Model

The simulation model employed in this study – PERSIM (short for Personnel Simulation Model) – was developed in Statistics Canada some ten years ago out of concern over the very issue that is the focus of this paper: management succession. Since that time, the model has been used to inform a broad range of human resource policies, including: staffing targets for professional recruitment programs, the maintenance of a no-layoff policy during a period of government cutbacks, and, the representation of employment equity groups. These and a number of other personnel issues are amenable to study with analytical techniques that combine information on personnel stocks and flows with demographic information on employees.

PERSIM is a demographically driven, micro-simulation model: it simulates at the individual employee level, conditioning the simulated events on the individual's demographic characteristics. The model is quite simple at its core, simulating just four types of events: retirements, other exits, promotions and hiring. The simulated occurrence of these events is governed by conditional probability tables – with the conditions related both to the ordering of events and demographics characteristics. The probability tables can be generated from historical data and modified by the user to create alternative scenarios. The model simulates just one event per year, so multiple events are represented by the start and finish positions. For example, two promotions for an individual in one year would generate a single two-level promotion in the model.

A simulation, then, is generated by adding one to all the time-based individual characteristics (age, years in the public service, years at Statistics Canada and years in position) and putting each individual at risk of retiring, quitting or being promoted. A separate operation “hires” new employees with demographic characteristics similar to past hires. Whether an individual transition actually occurs is based on a random

number process (i.e. the conditional probability is compared to a random variate between 0 and 1), conditioned by demographic factors (age, years in position, years in department, etc.).

Since the transitions are based on a random process, results can vary across simulations run under the same assumptions. Our normal practice is to run multiple iterations of the same scenario and capture the mean estimates of the variables of interest to the particular exercise. These means are asymptotically equivalent to macro-simulation results run under the same assumptions, but micro-simulation provides two advantages. First, the model can calculate the variation around the mean estimates, which provides a reasonable proxy for the variability of future events. As a practical example, it is of interest to human resource operations staff to have an idea of the possible *maximum* annual number of retirements as well as the expected *mean*. The second benefit of a micro-simulation model is that the simulated individual records can be analysed in the same manner as historical records: distributions of any of the outcome variables and demographic characteristics can be tabulated. Thus there is no need to redesign the model to look at demographic outcomes, as would be the case with a macro model. In this study, for example, we present the changes to the age and experience distributions associated with a key scenario.

The model has a number of other features that enhance its flexibility (but also lengthen the learning curve). For this study two of those features are particularly important. The first is a classification conversion tool. It is used to convert the some 300 occupational groups and levels within Statistics Canada into more parsimonious schemes designed to address particular issues. In this study, the conversion tool is used to set up the management progression scheme outlined in the previous section. The second tool allows the user to define domains (or subsets) based on static, individual characteristics. So, for example, the user can calculate separate probability tables and run separate simulations for men and women. Once created, the probability tables are interchangeable and can be used to create multiple “what if” scenarios: What if women had the same promotion rates as men? What if targeted programs could increase the relative promotion rates of visible minorities? As it happens, these are two of the issues we go on to address in this paper.



## Scenario Development

Knowledge of the past is the most important element in developing simulation scenarios that effectively address human resource issues. In designing simulation studies using Persim, we are most interested in trends and policies that affect the four operations simulated in the model : retirement, quits for other reasons, promotion and hiring. A brief summary of the cogent trends related to each operation follows.

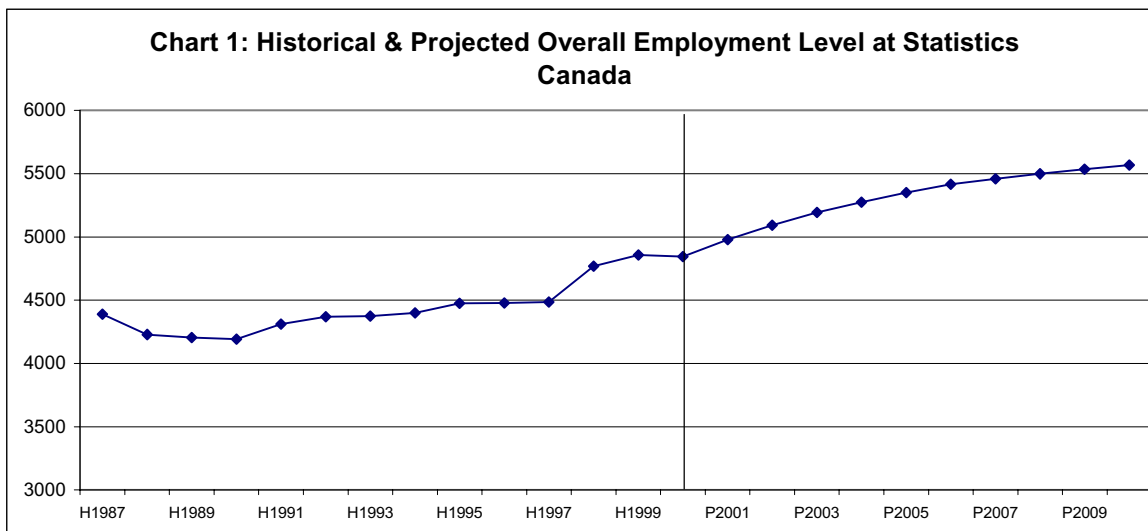
**Retirements :** Retirement in the model is conditioned by age and years of service. Retirement rates within age and years-of-service groups have been very stable since retirement inducements were last offered in 1993. Retirements in all scenarios are therefore based on age and years-of-service specific rates calculated from the 1994-2000 period.

**Other exits :** This transition category is dominated by voluntary quits, both to the private sector and other government departments. Quits to both destinations have been increasing in recent years due to favourable economic conditions in the private sector and renewed recruitment by other government departments. Quit rates tend to vary by both age and occupational group. However, since we have collapsed horizontal occupational groups in this study, we use only age to condition quit rates. We also make the judgement call that the elevated quit rates of the past three years are likely to continue due to increasing replacement demand in both the private and public sectors.

**Promotions rates and hiring :** Statistics Canada was jolted out of the retrenchment of the early and mid-1990s with the approval of a number of new statistical programs in 1997 (see Chart 1 below). The largest is the Program to Improve Provincial Economic Statistics (PIPES) developed to support revenue splitting from the Harmonised Sales Tax. Other new surveys were developed to fill statistical gaps related to health, education and workplace policies. The staffing requirements of these programs nearly doubled both the hiring and promotion rates from the mid- to the late-1990s (see Table 1). A combination of factors – some of the programs remain understaffed, staffing demand for the 2001 Census and the increasing importance of retirement replacement – make it unlikely that promotion rates will fall back significantly from their recent highs. Thus our base scenario projects current promotion and hiring patterns across the next ten years, while accounting for the demographic changes in the population over that period.

**Table 1: Overall Promotion and Entry Rates**

	1994-1996	1997-1999
<b>Entry</b>	4.00%	7.80%
<b>Promotion</b>	7.30%	14.70%



Representation of women and visible minorities : The ageing of the labour force has not been the only major demographic trend in the past twenty years. At the same time, women have entered and remained in the labour force in ever greater numbers. Similarly, changing patterns of immigration have rapidly increased the presence of visible minorities in the labour market. The juxtaposition of these trends with the retrenchment at Statistics Canada has resulted in relatively low representation rates of women and visible minorities, particularly at the higher levels of the organisation. Statistics Canada has stated its commitment to increasing representation of women and visible minorities in senior management to their level of labour market availability within a reasonable time frame. In light of this commitment, no assessment of the projected composition of management ranks would be complete without addressing employment equity issues.

To account for the salient trends and address the issues of interest we developed four main scenarios.

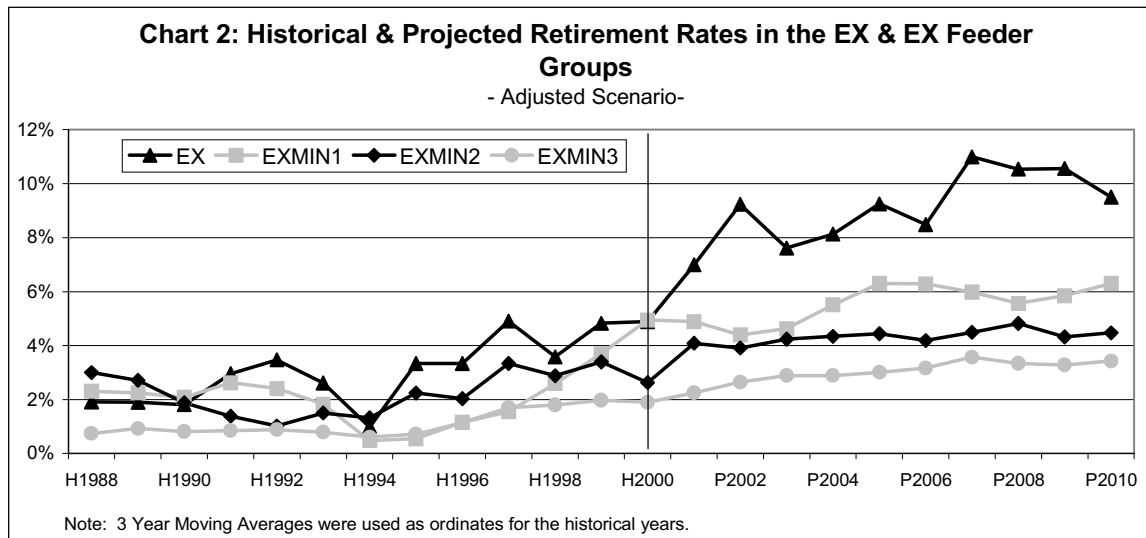
1. Base Scenario : The base scenario is a straight projection of the recent trends outlined above with the model automatically accounting for the effects of demographic change. Due to the increasing retirements associated with an ageing population, this scenario will result in declining numbers of senior managers.
2. Adjusted Scenario : The adjusted scenario is the result of iteratively increasing promotion and hiring rates to maintain approximately steady employment levels in the management rank. The microdata from this scenario are used to estimate the effect increasing promotion rates will have on experience levels.
3. Gender Scenario : This scenario is a variant of the adjusted scenario in which the promotion rates of men and women are set to equality. This scenario is used to estimate future trends in female representation in management. These can be considered conservative estimates since over the past few years, women have had higher promotion rates than men in the management feeder groups.
4. Visible Minorities Scenarios : Although we present a visible minority scenario that is identical in spirit to the gender scenario, it does not reflect current public service policy initiatives. An alternative scenario attempts to numerically simulate the policy recommendations of a federal task force on the representation of visible minorities in the public service. It can be considered an optimistic scenario since it entails increasing the promotion rate of visible minorities relative to others in the management feeder groups, increasing direct hiring to senior management from outside the organisation and ensuring that visible minorities comprise 20 percent of that hiring.

## Scenario Results

### Baseline Scenario

The baseline scenario results in a 2% annual rate of increase in overall employment over the next 10 years. This overall growth in this scenario is mirrored in the middle management groups (EXmin3 and EXmin2, see Chart 3), but the main feeder group to senior management (EXmin1) remains flat under these assumptions. Despite the overall increase in employment, the scenario exhibits a rapid decline in the number of senior managers (EX) - from 78 in 2000 to 32 in 2010. The main reason for the sharp drop in the number of managers is, of course, the anticipated increase in the retirement rate (see Chart 2). The annual retirement rate of senior managers averaged three percent in the mid-1990s, climbed to just over four percent in the late 1990s and is forecast to peak at over 10 percent between 2007 and 2009. Of course this "disappearing managers" scenario does not represent what we expect to occur, it merely illustrates that current promotion rates are not sufficient to replace the increased outflow of EXs. The obvious question,

then, is how much do promotion rates have to change to maintain a constant complement of senior managers?<sup>1</sup>

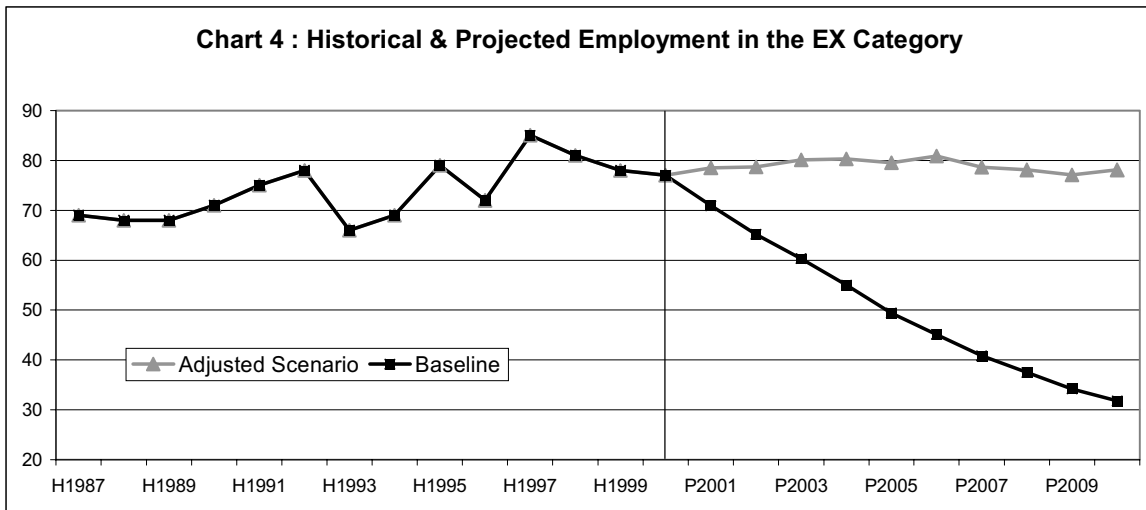
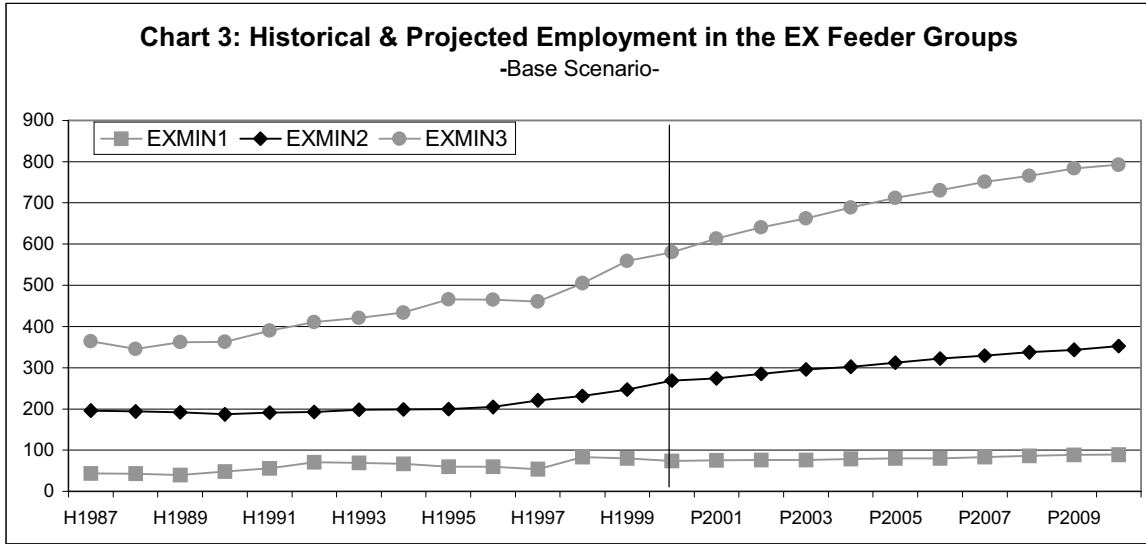


### Adjusted Scenario – Experience Effects

Persim is essentially a flow-driven model rather than a vacancies model - it was not designed to fill a static set of positions vacated due to retirements and quits. However, through a combination of spreadsheet and back-of-the-envelope calculations the user can determine the approximate changes to flow patterns to stabilise populations. These approximations can then be fine tuned with iterative adjustments to scenario parameters. Since the Baseline Scenario exhibited growing employment levels at the lower two levels of the management hierarchy and declining (stable) employment at the EX (EXmin1) level(s), the adjusted scenario essentially borrows growth from the lower levels to stabilise the population at the higher levels. Our initial calculations indicated that a dramatic increase in the promotion rate from EXmin1 to EX, along with a smaller increase from EXmin2 to EXmin1 would be required. In the final iteration, the EXmin2 to EXmin1 promotion rate was adjusted from the recent average of 4.6 percent per year to 6.6 percent per year in the simulation. In contrast, the promotion rate into the EX group had to be increased fivefold - from the previous four-year average of 2.3 percent to 12 percent in the adjusted scenario<sup>2</sup>. These simulated increases in the promotion rates into management, particularly into the EX, raise the possibility that incoming managers in the simulation period may not have the same level of experience of past cohorts of new managers.

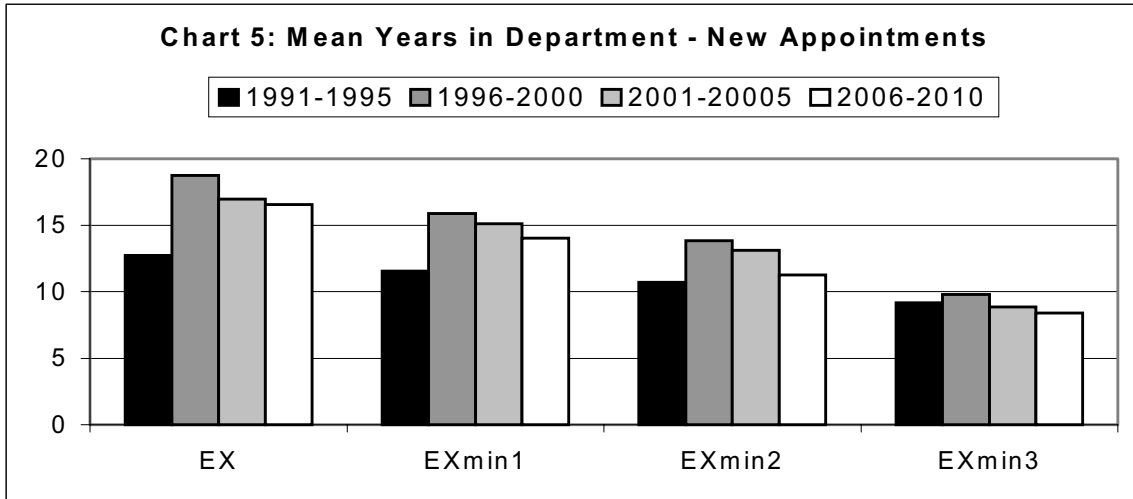
<sup>1</sup> Historically very few senior managers have been hired from outside Statistics Canada, so the adjusted scenario uses only increased promotion rates to meet the replacement demands.

<sup>2</sup> In fact, the promotion rate entered into the model in the adjusted scenario was 16 percent, but this is lowered to an effective rate of 12 percent due to the high average age (age being negatively related to promotion probability) in the EX minus 1 group.

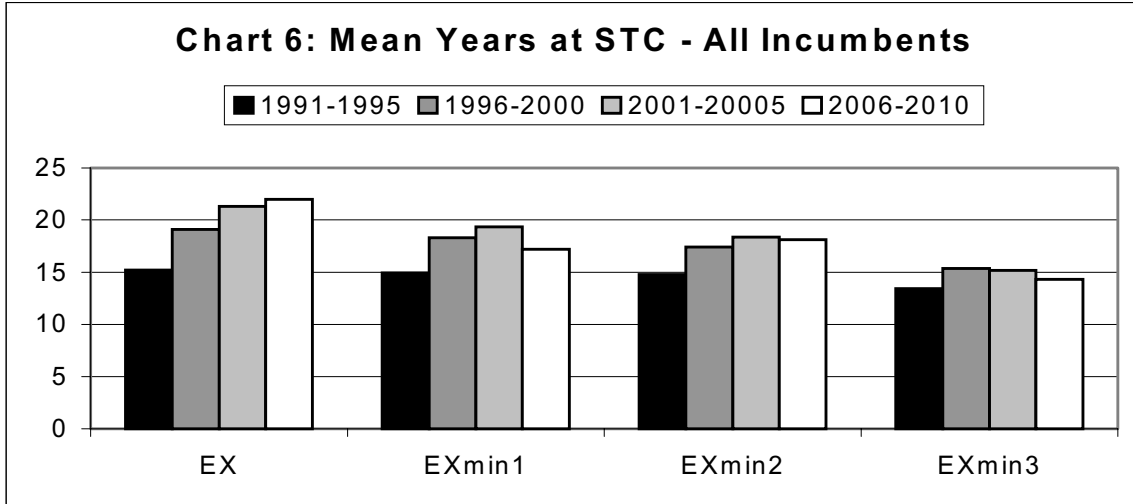


To test the declining experience hypothesis, we calculated the mean years of Statistics Canada experience among incoming cohorts (aggregated across five years) at each level.<sup>3</sup> Although the mean level of experience falls by approximately two years from the most recent historical period to the second simulated period among the top three groups, the simulated experience level of new managers in these groups is well above the mean levels of the early 1990s (see Chart 5). Simulated experience levels only fall below historical precedents in the EX minus 3 groups, 8.4 years in 2006-2010 compared to 9.2 years in 1991-95.

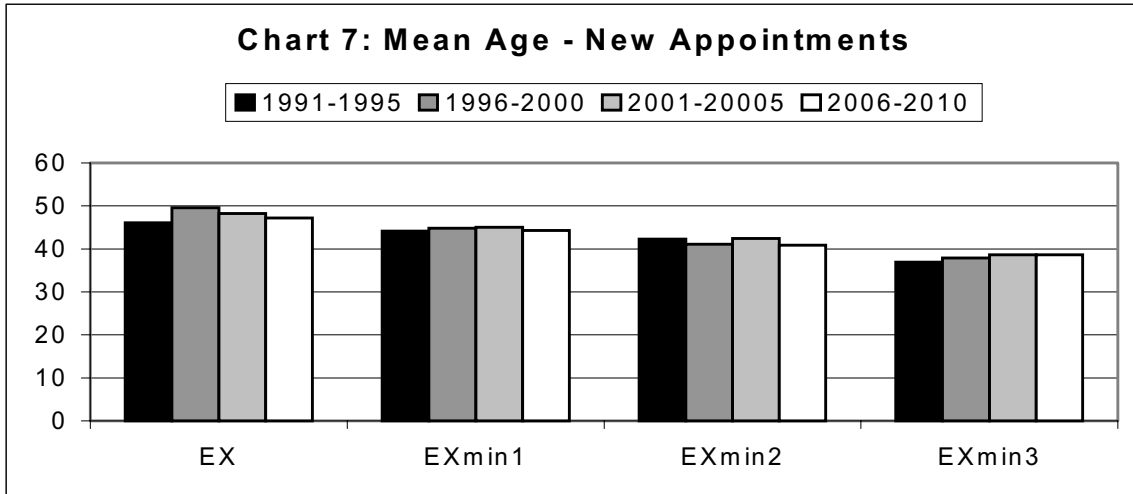
<sup>3</sup> The level to level promotion rates are conditioned solely on age. Past analyses have indicated that there exist some weak duration effects on the probability of promotion, but they have not been calculated for this scenario.



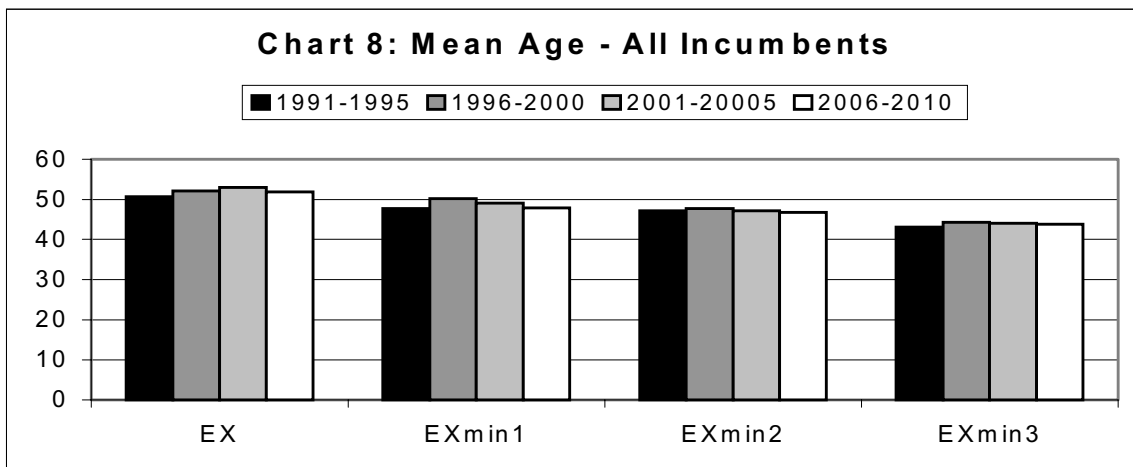
Note that the average experience of newly promoted managers represents their marginal impact on the overall experience distribution. If the size of the entrant cohorts is small relative to the overall number of incumbents or their experience levels are similar, then they may not have a great impact on group-wide mean experience levels. The adjusted scenario indicates that the stability of incumbents will likely predominate over the influx of new blood into the top three groups, with their mean experience increasing over the coming five years (see Chart 6). In fact, the experience level of the EX group continues to increase in the second half of the simulated decade. Note that the experience level of the EX minus 1 group does begin to fall off after 2005, due to the increased promotion outflow to the EX group. But again, experience levels in the simulated period are higher than the levels of the early 1990s.



Age is another indicator of labour market experience, particularly in the absence of information about experience outside of the federal government. The mean ages within the management hierarchy are more stable than mean experience levels. The only notable change among the cohorts of new entrants is a 2.5-year decrease in the average age of new EXs from the late 1990s to the second half of the current decade (see Chart 7). Again, we note that this decline does not reduce the average age to below the precedent of the early 1990s.



The average ages of all incumbents within the management hierarchy are even more stable than among the incoming cohorts. We note a small decline in the average age in the EX minus 1 group, but the change among the other groups is negligible (see Chart 8).

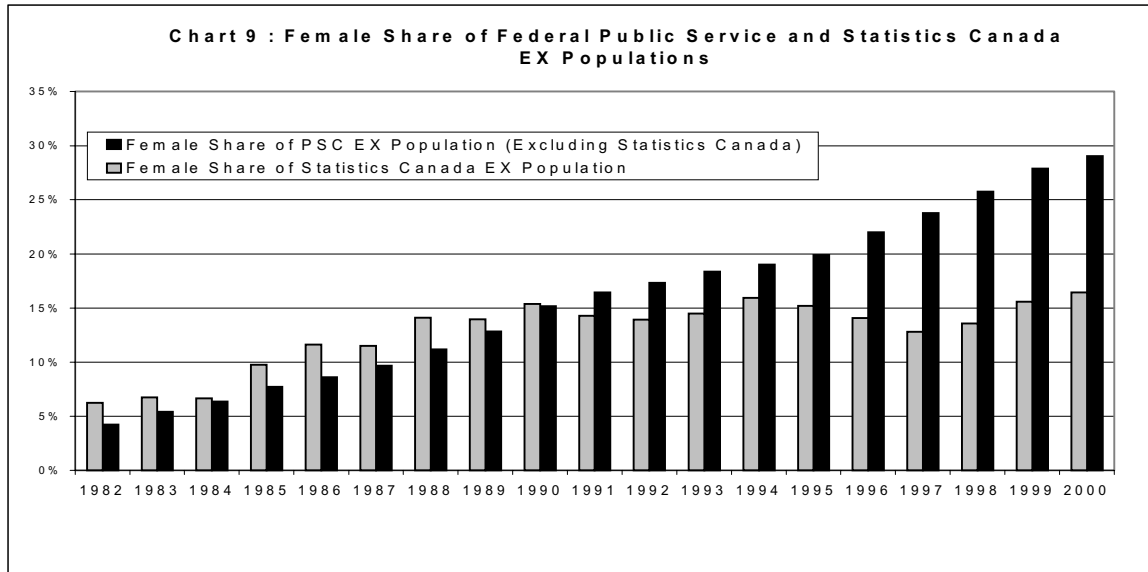


In summary, we find little cause for concern regarding the impact of increasing promotion rates on management experience levels, even though we have assumed the relatively high exit and promotion rates observed in the past three years will continue for the next decade. Although the experience levels of newly promoted managers are forecast to decrease somewhat in the next ten years, they will likely remain above the experience levels of managers appointed in the early 1990s. There is even less cause for alarm when the scope is broadened to measure the experience levels of all incumbents. Nor does the average age of managers in coming years seem likely to be a significant issue in the coming decade.

### Gender Scenario

Statistics Canada had a higher proportion of female senior managers than the rest of the public service until 1990. In the 1990s, female representation stalled in Statistics Canada while it grew quickly in other departments. Although the trend in Statistics Canada has been positive in the period of renewed growth, the disparity with other departments was noted in a recent employment equity audit by the Canadian

Human Rights Commission. The Commission requested projections of the expected change in female EX representation over three- and six-year periods. Since the parameters to stabilise the EX population had recently been calculated, the exercise merely required making an additional assumption about the relative promotion rates of men and women (see Chart 9).

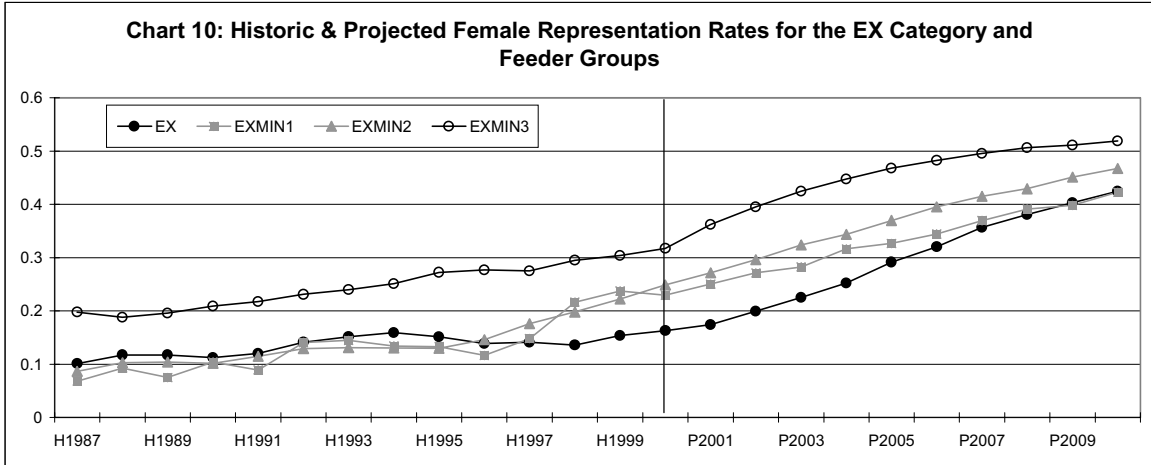


Recalculating recent promotion rates separately for men and women indicated that women have been promoted at higher rates than men (see Table ). Note too that the differential in favour of women increases at each level of the hierarchy. However, it is important to remember two things. First, the historical promotion rates are not sufficient to replace outgoing senior managers. Second, that the promotion rates (particularly for women) are based on small sample sizes. Therefore in shaping the gender scenario, we felt that it was more prudent to assume equal promotion rates for men and women as they are increased to stabilise the population.

**Table 2: Promotion Rate of EX Group**

	Past 3 Years		Adjusted Baseline	
	M	F	M	F
EX-1 to EX	1.7%	4.4%	12.0%	12.0%
EX-2 to EX-1	3.9%	7.1%	6.6%	6.6%
EX-3 to EX-2	5.2%	7.6%	5.2%	5.2%

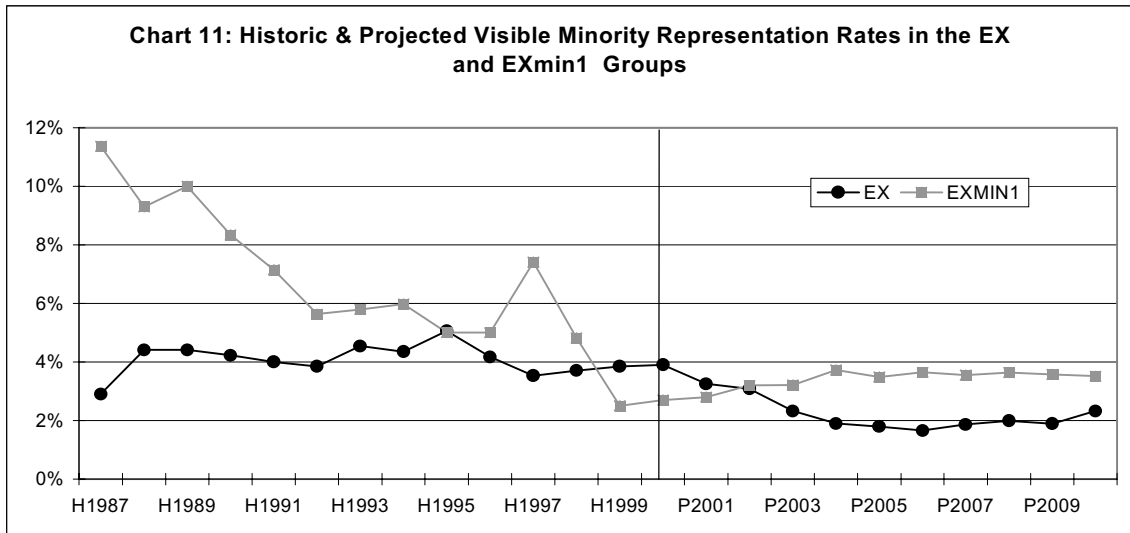
Under the assumptions of the gender scenario, female representation continues to increase at all levels of the hierarchy. (see Chart 10). Note that the EX group (bold line) has the greatest rate of increase. As such, the representation level in the EX group is converging toward the representation level of the feeder groups. The point at which all the lines converge would indicate an “equality equilibrium”: the representation of women is proportionate at all levels and the probability of promotion is equal. The target cited by the Commission – 31 percent female representation in the EX group – would be met by 2006.



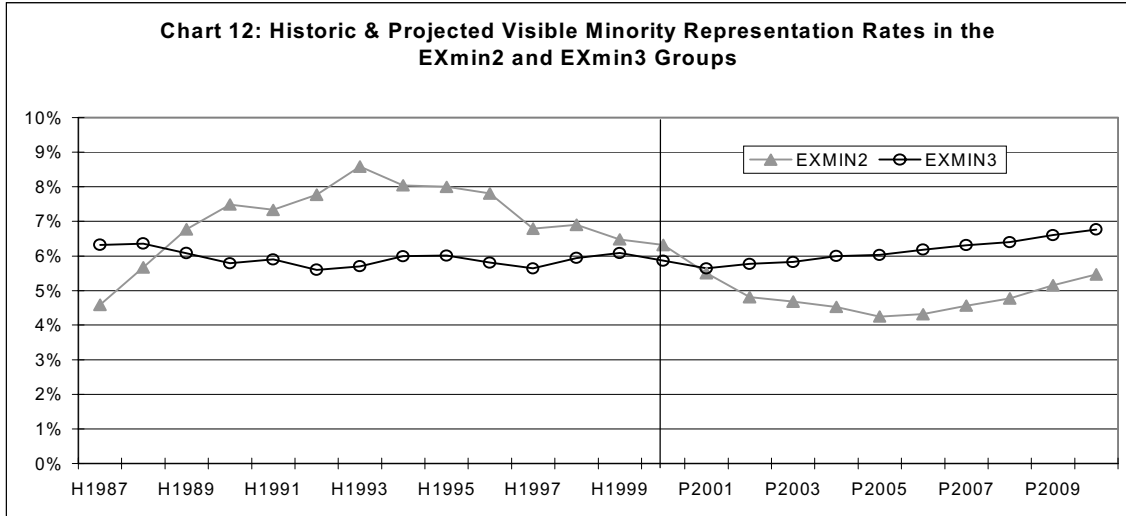
**Visible Minority Scenarios**

Similar to the situation noted for women, Statistics Canada had visible minority representation rates that were higher than the public service average until the late 1980s. Unlike the gender situation, the representation of visible minorities has actually been falling at several levels of the hierarchy (most notably at the EX minus 1 level) in recent years. This situation was also noted by the Canadian Human Rights Commission and projection were requested.

Charts 11 and 12 represent the results of a simulation identical in character to the gender scenario: promotion rates are increased to stabilise the EX population and the promotion rate for visible minorities is the same as for the rest of the population. Under this scenario, visible minority representation in the EX group continues to fall until 2004 and shows no sign of improvement until 2010. This is not an acceptable result for Statistics Canada management, especially in view of the fact that 20 percent of recent recruitment classes identify as visible minorities. Since a federal task force (in the Embracing Change report) recommended a number of measures designed to increase visible minority representation in the public service, which were subsequently accepted by the Treasury Board, we designed an alternative scenario approximating the effects of those recommendations.

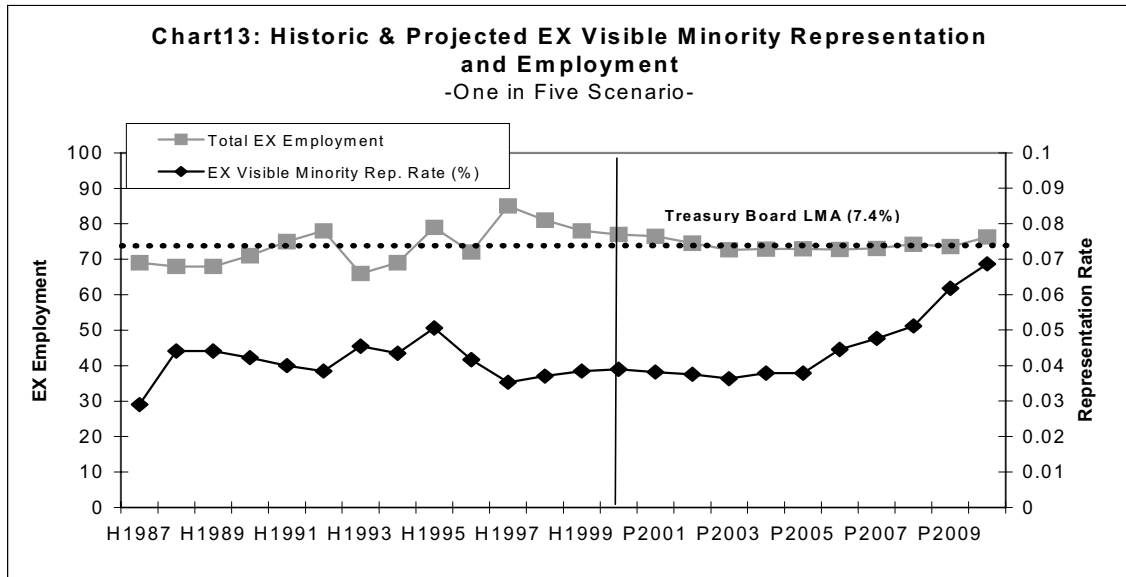






The alternative scenario is similar to the previously described scenarios— it too increases the promotion rate to replace retiring EXs – with some notable differences. The increase in the overall internal promotion rate is somewhat lower, with the difference being made up through increased external hiring – which is doubled from an average of one per year to two per year. Following the recommendations of the Embracing Change report, the scenario sets visible minority hiring to a rate of one in five of all external hires. Furthermore, to simulate the effect of increasing acting opportunities for visible minorities and other proactive policies, the promotion rate of visible minorities is set 30 percent higher than the rest of the population.

These measures still do little to change the representation rate for the next 3-4 years, largely due to a forecast spate of visible minority retirements. After that time, however, the representation rate climbs steadily under these assumptions, nearly reaching the requested target of 7.4 percent by 2010 (see Chart 13).



## Discussion

The results of the simulations presented in this paper are straightforward and intuitive. Given assumptions based for the most part on recent trends, we find that increasing numbers of retirements in the next 10 years will generally not reduce management experience to below recently observed levels. We also find that given equal promotion rates for men and women, the representation rate of women among Statistics Canada managers is likely to increase rapidly in coming years as increasing promotion rates move more gender-balanced cohorts into management. On the other hand, visible minority representation among managers will likely stall for several years, even with proactive recruitment and advancement policies. This result is driven by an expected spate of retirements among the small visible minority population in management and the main feeder groups.

Of course there are human resource challenges associated with these results – particularly in relation to the jump in promotion rates into senior management -- but they have largely been anticipated by Statistics Canada's existing human resource development activities. Over the past two decades, a management-led commitment to training and development has been strengthened by the knowledge of the incipient demographic challenges, not to mention the many other apparent benefits of such a commitment. As a result of this commitment, a bottom-to-top curriculum of programs and activities has been developed. A brief sketch of the programs follows.

- Professional recruitment and development programs select and integrate highly qualified individuals into statistical activities. These programs -- for entry-level economists-sociologists, mathematical statisticians, computer scientists and social science support staff -- include both rotational assignments and a set curriculum of formal training.
- Professional development programs, both specialised and general, support the career development of working level officers.
- A constantly evolving middle management development program includes a wide range of courses, as well as involvement with corporate problem-solving task teams and an annual conference organised from within the middle management community.
- A generic competitive process feeds the assistant director level. Assistant directors are expected to complete several rotational assignments and participate in management committees in preparation for advancement to senior management.
- A developmental period for new appointments to senior management (EX group) was recently introduced. Appointments are made at the EX-1 level, with promotion to the EX-2 level following a tailored learning program under the guidance of an individual mentor.

While recruitment, development and management succession issues have been the foremost human resource planning issues at Statistics Canada over the past decade, new pressures are continually arising. Over the past several years, a buoyant private sector in Ottawa and, most notably, the renewing of recruitment efforts by other federal government departments have resulted in an increase in the departure rate from most occupational groups. Additionally, it is presumed that retirement replacement demand from other departments will be increasing in the near future. In the past 18 months, two new management committees have been struck to deal with retention-related issues. The career streams committee is focused on career planning and information with the goal of informing employees of all the career opportunities available to them. The wellness committee has a mandate to promote a healthy working environment and a reasonable working life-home life balance, as well as examining workload issues.

Although the presence of management committees devoted to human resource issues is not unique to Statistics Canada, its committees probably play a greater role in decision-making than in most organisations. Furthermore, the high level of cross-membership among the human resources-related committees, the business-line committees and the planning syndicates ensures that business and human resource decisions are not made in isolation. This interconnected management environment also provided fertile ground for the development and use of human resources forecasting capacity.

The first prototype of the Persim model was developed 10 years ago in response to the human resources committee's concern over the apparent compressed age distribution of Statistics Canada's management. The usefulness of a demographics-based forecasting tool in addressing that issue, led other management committees (by way of cross-memberships) to recognise issues that could benefit from similar analyses. The corporate planning committee was interested in the maintenance of a no-layoff policy in the face of funding cutbacks. The recruitment and development committee was interested in appropriate hiring levels for professional recruitment drives. Planning syndicates were interested in the human resource consequences of major new statistical programs. In this manner, demographic forecasting became entrenched in the management culture at Statistics Canada.

Does all this mean that an organisation would have to mimic Statistics Canada's management structure to make effective use of demographic forecasting and analysis? Of course not, although there are some important lessons that can be generalised from Statistics Canada's example and our experience in implementing the model in other organisations.

1. There need to be formal or informal mechanisms that bind business planning and human resource planning activities towards a common purpose. These liaisons evolved organically at Statistics Canada, but have been successfully engineered in other organisations.
2. Some analytical capacity is required on the management and business planning side to recognise issues amenable to study with demographic forecasting techniques. Workshops and training packages have proven useful for managers in organisations that lack the empirically focused management found in organisations like Statistics Canada or the Canadian Customs and Revenue Agency.
3. Analytical capacity is required to perform the forecasting and workforce analyses. This capacity rarely exists within the human resource sections of organisations so it must be developed, either through hiring or forming partnerships with analytical groups pre-existing in the organisation. The goal is to have a modelling team that can respond to management requests with studies that are both empirically sound and intuitively compelling.
4. Forums are needed through which management can pose questions to the modelling team and the team can respond to those requests. In Statistics Canada this connection has come mainly through management committees, but one can imagine any number of other consultation mechanisms that would accomplish the same ends.
5. Since most forecasting work is based on historical analysis, it is important to have a long-standing human resource database. With many organisations upgrading their human resource information systems, it is important that they not lose the corporate memory contained in their legacy systems.

With these factors in mind, we are convinced that many other large organisations would benefit from integrating simulation techniques into their human resource and business planning activities. The ageing of organisational populations, with the impending retirement of the baby boom, is bound to increase the demand for such analyses.

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