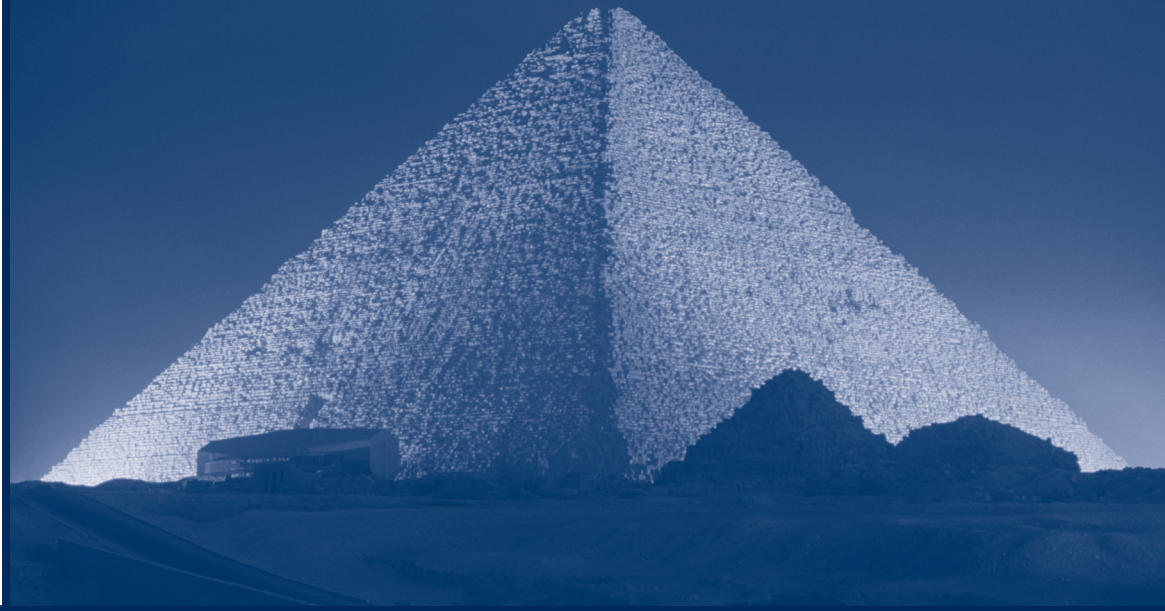


CHAPTER 2

PART 2 Forecasting Demand and Supply

FORECASTING DEMAND AND SUPPLY



LEARNING OBJECTIVES

- Understand and select information required to forecast HRP
- Identify members of the HR planning team
- Understand the four steps in the HRP process
- Apply techniques to forecast HR demand and supply
- Describe various methods for assessing labour planning (quantitative and qualitative)
- Discuss key challenges in forecasting HR demand and supply

■ PROFILE

The Great Pyramid of Giza

The Great Pyramid of Giza has fascinated the world for centuries and is revered as one of the greatest mysteries of time. When it was first built it was 145 metres tall, making it the tallest structure on the earth for over 4,300 years. Egyptologists argue that even with all of the human and computer advancements achieved to date, it would be near impossible to replicate the production of these pyramids. The HR planning scale of the project would be among the biggest challenges to face.

Archaeologists have their own methods for determining how many workers (mostly slaves) were employed at Giza, but a majority agree that the Great Pyramid was built by approximately 4,000 primary labourers—quarry workers, haulers, and masons. These primary labourers would have been supported by 16,000 to 20,000 secondary workers—ramp builders, tool-makers, mortar mixers, and those providing back-up services such as supplying food, clothing, and fuel. These estimates suggest a total of 20,000 to 25,000 employees who laboured for 22 years to build the pyramids.

Although the concept of HRP as it is currently known did not exist at this time, determining how many employees, at what time, in which location, and with which specific skill sets was in fact a function of HRP. Multiple factors affected the HR planning forecasts, including the number of blocks delivered and installed per day via mud ramps, the number of trips to the quarry per day, the length of the workday and workweek, the amount of food distributed, and the amount of housing needed.

One theory suggests that the workers may have been subdivided into a permanent workforce of approximately 5,000 salaried employees who lived together with their families and dependents in a well-established pyramid village. In addition, there were up to 20,000 temporary workers who arrived to work three- or four-month shifts. These temporary workers lived in a less sophisticated camp established alongside the pyramid village.

Another theory suggests that the employees were split into one of three groups for the production of the pyramids. One group went to Giza to work on the pyramids, the second worked in the fields to farm the food required for the workers, and the third would rest. These groups of employees would rotate every four months to ensure that within a one-year span the full cycle would be completed.

What unique challenges are presented in the HR planning for the pyramids? What factors influenced the supply of labour for the building of the pyramids and how could these be prevented or responded to?

This chapter will provide a clear awareness of the human resource planning process, specifically focusing on the forecasting of labour supply and labour demand. Both qualitative and quantitative methods of forecasting will be outlined.

■ WHY IS HUMAN RESOURCE PLANNING IMPORTANT?

As discussed in Chapter 1, a key goal of HRP is to get the right number of people with the right skills, experience, and competencies in the right jobs at the right time and at the right cost. This ensures that the business production requirements are met in an efficient and effective manner. Having too many employees is problematic due to the risk of high labour expenses, downsizing, or layoffs. Having too few employees is also problematic due to high overtime costs, the risk of unmet production requirements, and the challenge of finding the instant human resources needed to get the job done. According to the Government of Canada, human resource planning links people management to the organization's mission, vision, goals and objectives, as well as its strategic plan and budgetary resources. A critical component of an

forecasting

The interaction between the decision maker's perceptual and cognitive processes and the objective characteristics of their environment



effective HR plan is the method of forecasting. **Forecasting** refers to the interaction between the decision maker's perceptual and cognitive processes and the objective characteristics of their environment.

The opening case in this chapter identifies the HRP issues associated with the building of the Great Pyramid of Giza in 2620 BC, where tens of thousands of workers were employed for almost 22 years. Since then, the nature of organizations has changed, but HRP issues remain imperative in the establishment and maintenance of a successful organization. In recent times of hyper-competition and knowledge-based economies, more complex models of HR planning are needed to account for more dynamic business models. Additionally, as labour expenses become a large portion of the costs of operation, planning the appropriate “mix” of human resources becomes a priority for the organization.

Securing management and staff commitment to the HRP process is fundamental to the development of a successful workforce plan. Before launching the HRP process, it is important to build commitment and awareness in the process at multiple levels in the organization.

■ INFORMATION REQUIRED TO SUCCESSFULLY FORECAST HUMAN RESOURCES DEMAND AND SUPPLY

There are three important elements to consider in order to successfully forecast labour demand and supply: identifying stakeholders who will be involved, determining the appropriate planning horizon, and defining the internal and external labour force.

The Human Resources Planning Team

groupthink

The tendency for group members to avoid introducing novel ideas that are outside of the group's normal mode of thinking for fear that they will disrupt the group consensus process

The HRP team should include all relevant stakeholders across multiple functional areas and organizational levels. Explicitly developing a team for the HRP process helps ensure success of the strategies within the plan and holds those who are not meeting the goals accountable. Also, the diversity in the team will reduce **groupthink**, the tendency for group members to avoid introducing novel ideas that are outside of the group's normal mode of thinking for fear that they will disrupt the group consensus process. Listed in Exhibit 2.1 are suggestions for whom to include.

For example, senior leaders must understand the value of the HR plan to the organization in order to build their commitment to the execution of the plan. It is critical not only to align the HR plan to the organization's strategic plan, but to also communicate how the plan will affect future operations, financial goals, and market position of the company. Doing so will build the confidence of the leaders and convince them that the change is required.

Determining the Appropriate Planning Horizon

appropriate planning horizon

A judgement about how far into the future predictions can be made, taking into consideration acceptable levels of operational, organizational, and environmental uncertainties

Similar to the development of an organizational strategy, a human resources strategy must have a horizon or timeline. The **appropriate planning horizon** is a judgement about how far into the future predictions can be made, taking into consideration acceptable levels of operational, organizational, and environmental uncertainties. This is highly subjective as it is based on the decision maker's cognitive processes and perceptions of the organization's position in the market.

As discussed in Chapter 1, the typical planning horizon is two-tiered. The first horizon, usually a year in duration, identifies more immediate workforce concerns that can be addressed quickly, such as known employee exits, replacements, promotions, etc. The second horizon is usually longer, approximately 3 to 6 years, allowing for enough lead time to actively recruit, select, train, and transfer staff as needed. Regardless of how sophisticated the planning techniques, the further into the future HR plans are, the higher the level of uncertainty. Planning is not a static

EXHIBIT 2.1 Strategic Partners in HR Planning	
Strategic Partners	Rationale
Senior Leaders or Business Executives	Leaders are accountable for recognizing the need for workforce planning, demonstrating commitment, and making it happen.
Line or Department Managers	Department managers are responsible for using the HR plan as a process for aligning the right people actions, such as recruitment and selection, with strategic goals and objectives.
HR Professionals	HR professionals provide support, workforce data, and HR strategic goals. They should work closely with department managers to implement the process.
IT Professionals	IT professionals aid in data collection, especially when the process is automated.
Strategic Planners	Strategic planners ensure linkages between the organizational strategic plans and the HR plans.
Finance or Accounting Budget Analysts	Budget analysts ensure linkages between the organizational financial limits or goals and the HR plans.

activity; HR plans are frequently updated and should be reviewed annually to ensure they are still appropriate for the organization.

Immediate versus Long-Term Workforce Considerations When Determining the Appropriate Planning Horizon Here are some examples of immediate workforce concerns:

- Replacing personnel known to be retiring
- Promoting employees within departments when positions become available
- Filling vacancies due to turnover

Here are some examples of long-term workforce concerns:

- Succession planning for key management positions
- Developing employee skill sets to launch new products or processes
- Working with colleges or universities to increase the number of graduates with a specific desirable educational background
- Responding to future government or union policy changes

Evaluating the Current Human Resources Situation

Defining the Internal Labour Force When assessing the current HR situation, it is important to define who is included in the **internal labour force**. A fatal flaw in the HR planning process is conducting a human resources audit on a limited or non-representative sample of employees. When determining which persons should be considered employees, a good measure is those who perform the work or provide services within the company under the control or supervision of the organization’s management team. This includes contingent employees.

internal labour force
Those who perform the work or provide services within the company under the control or supervision of the organization’s management team

contingent workforce

The class of individual workers who are not regular, full-time employees of a company

The **contingent workforce**, while having no precise definition, essentially encompasses the class of individual workers who are not regular, full-time employees of a company.¹ This includes part-time, temporary, seasonal, contractual, and intern employees. These employees are hired by staffing organizations, through independent contracts, or by the company itself. Currently, almost one-third of Canadian workers are defined as part of a contingent workforce.² Organizations typically rely on a contingent workforce to address short-term labour needs or when they are in need of a specific expertise. Chapter 3 will discuss this in more detail.

HR Inventory

**skills inventory**

A computerized or manual system designed to take stock of information about current employees' experience, education, compensation history, and/or unique abilities

Identifying current workforce dynamics is a critical step in the development of an HR plan. A **skills inventory** is a computerized or manual system designed to take stock of information about current employees' experience, education, compensation history, and/or unique abilities. A skills inventory can be useful in revealing what skills are immediately available in an organization by providing a snapshot view of the existing talent in an organization.

As an alternative or complement to the skills inventory, a **human resource audit** is a systematic examination and analysis of an organizational workforce in an effort to create an understanding of the current staffing situation. The HR audit compares the past with the present labour specifications to identify trends and patterns in multiple aspects, including turnover, training, absence, and diversity. An HR audit can identify key information about HR operations, including how well they work, and where improvement may be needed. It is an extremely useful tool in HR planning.

The information provided in an audit or skills inventory (as shown in Exhibit 2.2) can be useful in identifying a number of workforce trends. For example, is turnover increasing or decreasing? Is the organization becoming more or less diverse? What factors influence the turnover

human resource audit

A systematic examination and analysis of an organizational workforce in an effort to create an understanding of the current staffing situation

EXHIBIT**2.2****Information Commonly Included in an HR Audit or Skills Inventory**

The following information should be included in current staffing plans:

- Budget information
- Classification information
- Compensation and benefits information
- Demographic data
- Diversity issues
- Employee experience (internal and external)
- Health and safety issues
- Identification of unionization and bargaining units
- Job analysis information (e.g., employee knowledge, skills, and abilities)
- Labour market analyses
- Performance data and evaluations
- Recruiting sources
- Redeployment plans
- Retention data
- Retirement plans
- Selection and staffing information
- Succession planning information
- Technology use
- Training and development information
- Turnover data
- Work-life balance issues

rate? Are these short-term or long-term factors? What types of positions have been filled recently within the company and which ones have recently been vacated? Developing an awareness of these factors can help predict change in an organization's human resources.

Some organizations conduct active HR audits or skills inventories as part of specific legislation requirements (e.g., occupational health and safety, pay equity, employment equity), as part of a human resources information system (HRIS), or as part of another HR activity (e.g., merger, acquisition, downsizing, etc.). If no HR audit or skills inventories exist, creating one can be very labour-intensive and time-consuming. Sources of information for an HR audit or skills inventory are the same as the sources for collecting job analysis information.

Defining the External Labour Force

external labour force

Potential sources of human resources outside of an organization that can affect the future supply of employees

The **external labour force** refers to potential sources of human resources outside of an organization that can affect the future supply of employees. Evaluation of the external labour force relies on labour market estimates based on regional and global economic, environmental, and demographic changes. Economic and environment factors include interest rates, unionization, economic growth, unemployment rates, and political climate. Demographic factors include population-based information such as retirement rates, birth/mortality rates, educational attainment, primary language, labour shifts (location), etc. Chapter 11 provides a detailed discussion of the major external labour force changes that are affecting HR planning.

Since the external labour force provides designated group members from which the employer can reasonably be expected to recruit, any changes to that population must be considered when conducting an HR planning exercise to help develop an understanding of projected HR supply. Human Resources and Social Development Canada (HRSDC) recommends that the external labour force representation (availability) include the most accurate estimates by using information on the Canadian workforce in specific occupational groupings and analysing that information based on qualifications, eligibility, and geography.

Qualifications for inclusion in the external workforce analysis can include the use of census data (e.g., education levels, industry of employment) to align with the desired skill level and skill type required by the organization. In addition, organizations use eligibility and geography as criteria for determining whom to include in the external workforce. Eligibility can include professional designations (e.g., Chartered Management Accountants) or licenses required by the organization. Geography refers to the area from which the organization can be reasonably expected to recruit. Generally, more critical positions, such as CEOs or executive management positions, involved a wider geographic search than less critical positions in an organization.

In the 2006 Canadian Census, the fastest growth industry in terms of employment was the mining and oil and gas extraction industry. In this industry, employment increased nearly four times the national average. Alberta accounted for 70 percent of the employment growth in this industry. An Alberta organization in this industry can interpret this data to indicate heavy competition for labour in the external workforce and due to the employment growth in this industry, low future HR supply of labour. Comparably, the decline of manufacturing jobs in Ontario in recent years indicates a high supply of potential labour in the external workforce for organizations in this industry.

There are also general trends in the external labour force that can affect future HR supply. For example, a mix of low birth rates, the baby-boom generation, and increasing average life expectancy in Canada increased the average age of members of the labour force from 37.1 years old in 1991 to 41.2 years old in 2006. At the same time, the Canadian labour force grew by 9.5 percent (from 15.6 million to 16.9 million), with immigrants accounting for 70 percent of the labour force growth.³ Thus, the Canadian labour force is growing significantly while becoming older and more diverse.

An awareness of external labour force pressures, changes, and trends can aid an organization in understanding its potential to recruit labour in the future, and thus is a critical component of forecasting future HR supply.



THE HUMAN RESOURCE PLANNING PROCESS

strategic plan

A macro-level set of directives that identify how the organization will achieve its mission and move toward its vision



An organization's **strategic plan** leads the overall HR strategic plan. The strategic plan is a macro-level set of directives that identifies how the organization will achieve its mission and move toward its vision. Workforce planning offers a means of systematically aligning organizational and program priorities with the budgetary and human resources needed to accomplish them. By beginning the planning process with identified strategic objectives, managers and their organizations can develop workforce plans that will help them accomplish those objectives. At the same time, these plans provide a sound basis for justifying budget and staffing requests, since there is a clear connection between objectives, the budget, and the human resources needed to accomplish them.

The strategic plan for human resources should follow organizational goals, including the types of projects and activities that the organization aims to execute. For example, if the organization aims to grow its market and expand sales by 25 percent, HR planning should align itself to grow the organization. Likewise, if the strategic plan is for maximizing efficiencies and lowering overhead costs, the HR plan should have the same goals.

As we learned in Chapter 1, the HR planning process involves four steps. Forecasting labour demand and supply is the first step and can be accomplished using multiple methods. The second step is the establishment of human resource objectives as ascertained by comparing demand and supply forecasts and assessing workforce imbalances. The third step is the design and implementation of HR programs to achieve objectives. The fourth and final step is the evaluation of the effectiveness of the programs, which feeds back into the first step. The result is a cyclical HR planning process.

STEP 1: FORECAST LABOUR DEMAND AND SUPPLY

Decisions made about projections of future labour supply and demand are affected by the decision maker's environment (organizational characteristics) and their own beliefs or perceptions relating to the environmental uncertainty. Labour forecasting is key to an organization's ability to achieve its operational, production, and strategic goals.

Forecasting HR Supply

The purpose of identifying future HR supply requirements is to determine the number of employees in each job and their knowledge, skills, abilities, and other characteristics (KSAOs). In addition, forecasting HR supply is essential in determining the characteristics of hiring sources within the predetermined planning horizon in order to establish whether future HR supply is sufficient to match future HR demands. To forecast HR supply, an organization needs to evaluate both their internal and external labour force. This step is dependent on an accurate assessment of the current workforce situation.

Forecasting HR supply involves an understanding of internal and external potential human resource supplies. Due to the availability of data and the multiple methods that can be used, internal supply is usually easier to establish than external supply. However, it is still important to try to determine external supply as accurately as possible.



Forecasting External HR Supply There are multiple levels at which external HR supply can be predicted, including global, national, provincial, regional, and local. Information that will help develop an understanding of external HR supply includes:

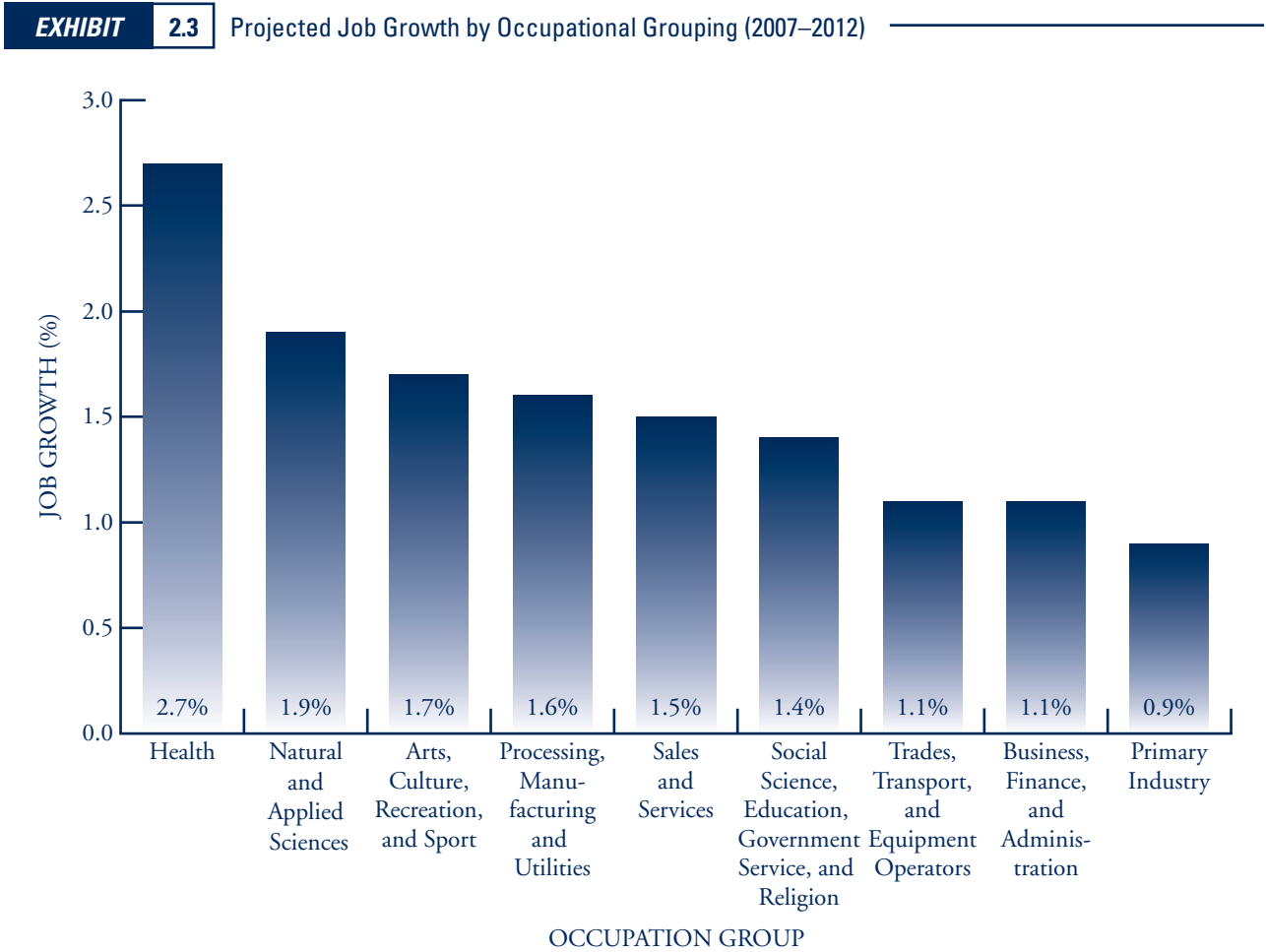
- Supply and demand of jobs or skills
- Educational attainment levels within a region
- Compensation patterns based on experience, education, or occupation
- Immigration and emigration patterns within an area
- Forecasts of economic growth or decline
- Competition for talent
- Industry or occupational expected growth levels

- Public policy, government, and legal changes
- Trends in labour force participation (including entry and exit)
- Technological development patterns

National information is available through a number of departments in the Government of Canada, including Statistics Canada, the Ministry of Labour, and the Human Resources and Social Development Canada (HRSDC) department.

Information may also be available at specific levels. For example, predictions of enrolment and graduation levels in specific majors from academic institutions can identify the number of new entrants in the external labour force who possess a specific skill set. The Canadian Occupational Projection System (COPS) has developed a Job Futures databank with supply and demand information for 265 occupational groups and 155 fields of study. In addition, industry specific information can be secured from industry associations and subsets. For example, the Canadian construction industry can access updated labour market supply information from the Construction Sector Council website (www.csc-ca.org). Similarly, labour market information on the tourism labour sector in Canada can be explored with the help of the Canadian Tourism Human Resource Council (www.cthrc.ca).

This type of information can be very useful in developing an understanding of future HR supply. Exhibit 2.3 presents an example from a Job Futures article in 2007.⁴ Organizations in the



Source: Policy Research and Coordination Directorate, HRSDC.

HRP IN THE NEWS**Doctor Shortage at a Crisis Stage in Canada⁵****The History**

- Based on a 1991 federal and provincial government report aimed at reducing growing health care expenses, recommendations were made to cut medical school admissions by 10 percent and impose limits on the recruitment of foreign-educated doctors. At the time, there was no doctor surplus or imbalance, and these recommendations were adopted. Due to a lack of HR planning, there was no awareness of the impact that these changes, along with economic and demographic changes, would have in creating a severe labour shortage of qualified doctors in Canada.
- Since 1993, provincial governments have decreased enrolment in medical schools and associated postgraduate training programs. There were 1,825 medical school graduates in Canada in 1985, which dwindled down to 1,599 graduates in 2007, representing a 12.4 percent decline in medical school graduation rates. In contrast, the Canadian population in 1985 was 25.8 million, compared with 33.1 million in 2007, representing a 30 percent growth in population.

The Existing Situation

- Among industrialized nations identified as OECD (Organization for Economic Co-operation and Development) countries, the Canadian doctor-patient ratio is among the lowest ranked (24 out of 28). In 2008, there were 2.2 doctors for every 1,000 patients. To meet the OECD *average*, the Canadian Medical Association (CMA) suggests a need to hire 26,000 new doctors immediately.
- Almost five million Canadians in 2008 have no family doctor, and 25 percent of the population is unable to schedule an appointment to see a doctor within a day. Among those without a regular physician, 64 percent opt for walk-in clinics, 12 percent visit the hospital emergency room, and 10 percent visit community health centres. Those who are wait-listed for family doctors may experience undiagnosed or chronic health issues, thus adding pressure to an already extended health care system in Canada. It is estimated that the wait-lists for family doctors is responsible for \$14 billion in lost economic activity at the national level. The scarcity of labour is so pronounced that in areas such as Belleville and Bancroft, Ontario, new recruits are offered \$250,000 bonuses.
- The past and current physician population is male-dominated (in 2007, 67 percent of physicians were males), but at the same time, 52 percent of doctors under the age of 35 are female. The age factor impacts work commitment with doctors aged 55–65 years averaging 54 hours per week, and those under 35 years averaging 47.3 hours per week.
- Presently, 47 percent of general practitioners in Canada are female. Despite training and skill set, female doctors are still given a bigger proportion of child-care, eldercare, and housekeeping responsibilities. In an average week, male doctors dedicate 79 hours to tasks and professional duties outside of their work requirements, while females average 103 hours per week on the same tasks. Directly related to this, female doctors work an average of 48 hours per week, while male doctors average 56 hours per week. It is not surprising that burnout is a severe issue among physicians in Canada. Almost 46 percent of the physician population is near burnout, and Canadian doctors are twice as likely to commit suicide as the general population.

Continued

HRP IN THE NEWS**Doctor Shortage at a Crisis Stage in Canada**

- Not only are the working hours different between genders, productivity rates differ as well. A female physician will average 12 minutes per patient, while male physicians average 10 minutes per patient. Patients do appreciate the greater time investment, and the results are evident in the higher patient satisfaction scores for physicians who spend more time with each patient. However, lower productivity in female doctors (in this measure, patients per hour) increases demand factors for doctors.
- The majority of current medical students in Canada are female, including 70 percent of Laval University's medical student population and 66 percent of the University of Montreal's medical cohort. From an HR planning perspective, there is a leakage problem with the training programs offered in Canada. Although there are 2,400 medical school admissions annually in Canada, in 2007, the number of graduates from these programs was only 1,599. In addition, 1 in 9 doctors who graduated from Canada have now migrated to the United States. The imbalance becomes even more prevalent because for every 19 doctors who emigrate from Canada to the United States, only 1 doctor from the United States immigrates into Canada.
- Each year, 1,500 Canadians enrol in medical schools outside of Canada, demonstrating the severity of the supply and demand imbalance in Canada. Education fees are significantly higher for international students, resulting in heavy debt loads (upwards of \$500,000 per graduate) for foreign-trained medical graduates. Canadians educated abroad are still considered International Medical Graduates (IMG's) and therefore compete with non-Canadians for the limited number of IMG categorized residency positions. As a result, 50 to 75 percent of foreign trained Canadians do not return to Canada.
- In 2004/2005, the average gross pay for a family doctor was \$202,219, for specialists it was \$269,606, and for surgeons was \$347,720 per year. A challenge for family doctors is the fact that that overhead costs are estimated at \$80,000, significantly reducing the gross earning of this group.
- Recently, Brian Day, the President of the Canadian Medical Association, stated, "Until more openings exist in Canadian schools, repatriation of Canadian students is a cost-effective way of addressing the shortage." However, Canadians with foreign training express discontent with this proposal since they were initially displaced and forced to pay higher international education fees, while those with Canadian medical training had their education subsidized through government funding.

Challenges to Balancing Supply and Demand in the Future

- By 2015, without adequate integration and availability of foreign trained doctors, the number of physicians per capita in Canada will continue to decline.
- By 2015, women will make up 40 percent of the total physician workforce in Canada.
- The Canadian population is estimated to continue to increase by 2 to 3 percent per year.
- By 2056, 1 in 4 Canadians will be over the age of 65 (currently 13 percent of the population is over 65).

Continued

HRP IN THE NEWS

Doctor Shortage at a Crisis Stage in Canada

Based on the historical, current, and projected information provided above, how would you address the following questions?

1. Using your expertise in HR planning, what factors should have been included in projecting HR demand and supply that may have been overlooked?
2. Based on the current situation, what additional HR planning challenges do you foresee in the future? How might you address the challenges presented in the article, as well as any other challenges you foresee?
3. If you were part of an HR planning team in the health care industry, what actions would you recommend to help balance supply and demand for doctors in Canada?

actuarial losses

Life events that affect all populations (i.e., death, disability, and retirement)

turnover

Termination of an individual's employment with an organization

total turnover

Total number of employees leaving an organization divided by the total number of employees in an organization, regardless of whether the turnover was voluntary or involuntary

voluntary turnover

Employee-initiated turnover, mainly in the form of quits or resignations

involuntary turnover

Employer-initiated turnover, mainly in the form of dismissals or layoffs

health industry can predict high competition for talent. Thus, they may make changes to internal efforts such as training and educational support, as well as to external efforts, including university relationships and recruitments techniques, in an effort to help combat a potentially low level of forecasted HR supply over the next six years.

Forecasting Internal HR Supply By reviewing the data in the HR audits, projections can be made for future HR supply. The internal labour force may be affected by temporary absences such as leaves of absence (e.g., educational leave, maternity/paternity leave), permanent absences (e.g., death, disability, retirement), or turnover (e.g., resignations, dismissals, layoffs). Death, disability, and retirement are considered **actuarial losses** in that these are life events that affect all populations. These can be predicted with some degree of accuracy by using mortality rates, understanding occupational health and safety risks, or reviewing demographic information about the population.

Turnover refers to the termination of an individual's employment with an organization.⁶ The standard definition of **total turnover** is the total number of employees leaving an organization divided by the total number of employees in an organization, regardless of whether the turnover was voluntary or involuntary. Turnover can be classified into two sub groups—voluntary and involuntary. **Voluntary turnover** is defined as employee-initiated turnover, mainly in the form of quits or resignations. In this instance, the decision to terminate employment with the firm is made by the employee, without management enticement. **Involuntary turnover** is defined as employer-initiated turnover, mainly in the form of dismissals or layoffs. The employee has little or no personal say in this turnover decision.⁷

It is possible to estimate labour supply changes for the specified planning horizon by estimating labour movement, absences, and turnover. There are a variety of methods to forecast future HR supply. They include trend analysis, skills/competency inventories, replacement charts, succession planning, staffing tables, and Markov analysis. In the following section, these methods will be explained with some examples.

Trend Analysis **Trend analysis** is considered one of the simplest methods of forecasting future HR supply. It assumes that past trends and ratios in employee movement are stable and indicative of future trends and ratios in employee movement. The information collected in the HR audit is used to identify labour patterns—hiring patterns, retirement patterns, productivity patterns, and turnover patterns. By examining the trends of the past, the HR department can predict the effect of the same activity on the future of the organization, because it is assumed that these patterns will

trend analysis

A method of forecasting that assumes past trends and ratios in employee movement are stable and indicative of future trends and ratios in employee movement



competency

A set of behaviours that encompass skills, knowledge, abilities, and personal attributes, that taken together, are critical to successful work accomplishment

competency model

A future-oriented model that first reviews competencies that are aligned with an organization's mission, vision, and strategy, and then aims to identify an ideal workforce in terms of these competencies



replacement chart

A chart used to estimate vacancies in higher level jobs and identify how potential HR supply can fill these vacancies via internal movements from lower levels jobs

remain stable. In more complex models, trend analysis is not used alone, rather is treated as a necessary step in understanding the current workforce profile and the assumptions that can be made.

For example, an organization reviewing historical data may realize that every year, approximately five percent of their staff retire, six percent resign, and three percent are dismissed. Using a simple trend analysis, future HR supply forecasts can be established by assuming an average reduction in internal HR supply of 14 percent per year.

Skills/Competency Models Building on the skills inventory, the skills/competency models focus on matching the right skills or competencies needed for each job with the skills available within the organization. Unlike other models that predict headcount (e.g., trend analysis or Markov models), the skills/competency models focus on identifying the skills/competency supply within the organization, and helping focus future recruitment, selection, retention, and training activity in core areas of key skills/competencies needed for the organization to succeed.

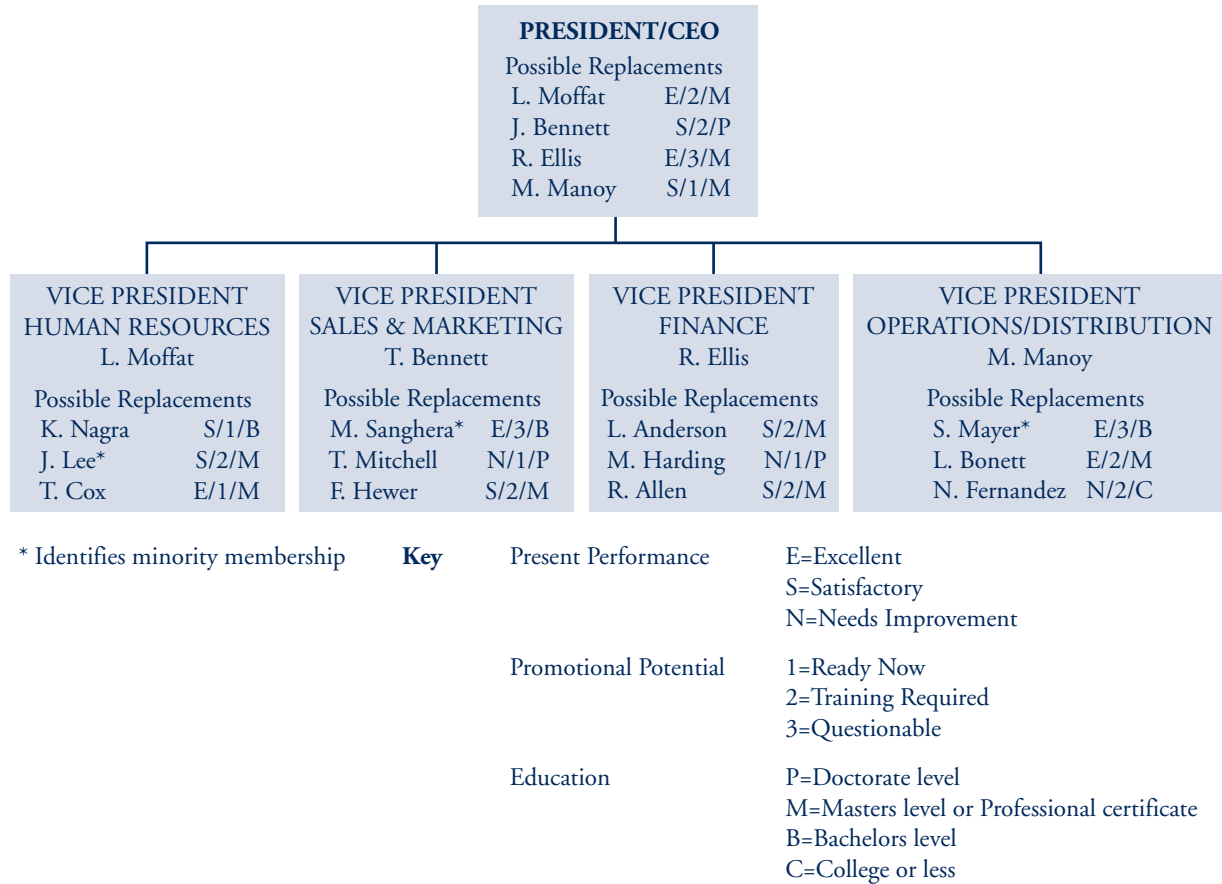
Recently, organizations have been moving away from a focus on skills to a focus on competencies. A **competency** is a set of behaviours that encompass skills, knowledge, abilities, and personal attributes, that taken together, are critical to successful work accomplishment. These are usually determined by studying top performers' activity within their job context, which identifies the attributes that separate top performers from other employees within the organization.

The **competency model** is a future-oriented model that first reviews competencies that are aligned with an organization's mission, vision, and strategy, and then aims to identify an ideal workforce in terms of those competencies. However, a competency model cannot be applied without the previous information obtained in the HR audit. Thus, the reliability and validity of the information collected earlier in the process is important in determining the accuracy of a competency model.

Replacement Charts A **replacement chart** is used to estimate vacancies in higher level jobs and identify how potential HR supply can fill these vacancies via internal movements from lower levels jobs. A comprehensive replacement chart will include information regarding possible replacements for vertical or horizontal movement. Generally, a replacement chart includes information about employees' performance, readiness to fill the position, and education. Exhibit 2.4 shows a detailed example of a replacement chart. In some cases, a replacement chart will include information about an employee's age, tenure, gender, and visible minority status in addition to required experiences, education, or skills needed for the position. The demographic information provided is an effort to manage firm diversity, but HR and management teams must be careful when conducting a replacement plan not to allow such information to result in any potential illegal discrimination.

In Canada, the aging workforce presents a unique challenge to replacement planning. According to the 2007 HRSDC Job Futures report, over 45 percent of all retirements in Canada from 2007 to 2012 will be in the areas of sales and service, business, finance, and administration. Over the same time periods, there will be over two million jobs that need replacing due to the aging of the workforce and the accompanying retirement of employees.⁸ Replacement planning to prepare for these departures—through recruitment, orientation, training, and skills development of the replacements—will be critical to ensure an organization's ability to meet their goals.

Succession Planning While replacement charts provide identification of potential replacements for vacancies within an organization, succession planning focuses on identifying, developing, and tracking future leaders for executive positions or positions that are critical to the success of the organization. Succession planning is a longer-term process of grooming a successor (selected from a pool of candidates on the basis of perceived competency) for management or critical positions. An organization can use the skills inventory, HR audit, or a succession summary to help identify potential successors and skill gaps that can be addressed through succession planning.⁹

EXHIBIT 2.4 Sample Replacement Chart**staffing table**

A clear graphical view of all organizational jobs and the current number of employees at each job

**Markov analysis**

Analysis that helps predict internal employee movement from one year to another by identifying percentages of employees who remain in their jobs, get promoted or demoted, transfer, and exit out of the organization

Staffing Tables To assess internal HR supply, a **staffing table** provides a clear graphical view of all organizational jobs and the current number of employees at each job. It presents a simple visual understanding of an organization's staffing level within each department and the organization as a whole, in an effort to help understand the combination of employees that make up an organization's internal workforce. This information is useful in evaluating staffing levels by department, branch, or project; the types of staff at each level; and the combination of staff in all categories.

Developed using information collected in the assessment of the existing labour force in the HR inventory, an organization can predict future HR supply by assuming a constant mix of employees in the organization, based on the staff table, or they can make adjustments based on projected growth or decline at each staffing level within the organization. Since staffing tables are relatively simple, they are frequently used as a precursor to more complex methods of forecasting future HR supply, such as a Markov analysis.

Markov Analysis A **Markov analysis** extends beyond the staffing table to help predict internal employee movement from one year to another by identifying percentages of employees who remain in their jobs, get promoted or demoted, transfer, and exit out of the organization. By tracking and predicting employment movement within an organization, the Markov analysis allows for the development of a transition matrix to forecast internal labour supply.

The Markov analysis extends beyond a simple exit and retention understanding to provide valuable information on employee movement within the firm, clearly identifying projected labour supply for the following year. This represents both a stock approach (quantities in a point of time) and a flow approach (comparing quantities that change over a period of time). Exhibit 2.5 provides a sample of a Markov analysis. In this example, the stock approach is represented in the number of employees for each job in 2009, and the flow approach is represented in the predicted movements from 2009 to 2010. Through merging a stock-and-flow approach, the analysis allows for forecasting future supply of labour for each job within the organization for a period of time.

The Markov analysis example in Exhibit 2.5 includes estimates of employee movement within each level for a hypothetical manufacturing firm. As can be seen in this example, 67 percent of the employees in a general labourer position will continue in this position next year. One in ten general labourers (10 percent) will be eligible for a promotion next year, and should be promoted accordingly. The remaining 23 percent of general labourers will be exiting the firm. It is clear that some employees should be eligible for a promotion next year, while others should actually be demoted based on their performance and skill set. As well, the exit predictions highlight



EXHIBIT 2.5 A Markov Analysis for a Hypothetical Manufacturing Firm

<div> <div>2010</div> <div>2009</div> </div>	PLANT MANAGER	DEPARTMENT SUPERVISOR	FOREMAN	MACHINE OPERATOR	GENERAL LABOUR	EXITS
PLANT MANAGER n=3	87% 3	7% 0				6% 0
DEPARTMENT SUPERVISOR n=15	7% 1	76% 11	12% 2			5% 1
FOREMAN n=60		3% 2	75% 45	9% 5		13% 8
MACHINE OPERATOR n=102			15% 15	48% 49	12% 12	25% 26
GENERAL LABOUR n=306				10% 31	67% 205	23% 70
PROJECTED SUPPLY 2010	4	13	62	85	217	105

Percentages represent estimated transactions for next year

Actual numbers represent projections for next year of actual employee count

that both the machine operator and general labour levels suffer from high turnover via exits, which identifies an area for HR to explore and explain.

The Markov analysis identifies a need for 31 machine operators next year in order to accommodate for losses at that level. In this case, 31 general labourers will be eligible for a promotion next year. The organization can fill these positions with internal candidates or external candidates. If the organization does not promote an internal candidate who is available, it may experience employee demotivation, distrust in management, or turnover. However, if the company fills all of the positions with internal candidates, they may forfeit new perspectives and ideas that could be brought to the machine operator level.

In the case where there are not enough openings in the higher levels to accommodate those who eligible for a promotion, the organization must determine the best course of action to ensure productivity, job satisfaction, and performance management of all the employees involved.

The downward flow of an employee in an organization is known as a demotion. Situations are also highlighted where an employee's performance and skill set are below the level that they currently work at, leading to some expectation of a demotion next year. This is a challenge for the organization. The organization may choose to invest in training to ensure that these employees are capable of performing at their assigned levels next year, or they could demote the employees according to skill level. Few organizations would choose the latter option.

The Markov analysis also identifies areas of high turnover, specifically at general labourer and machine operator levels. It may be of interest to the organization to assess the causes of turnover at these levels and identify whether the turnover can be minimized.

While this provides a very clear approach to forecasting HR supply, there are two key challenges to using a Markov analysis. First, the organization must be large enough to provide information on different jobs and occupations. Second, organizations that are experiencing periods of change or very high turnover might find that this model does not accurately predict future supply. However, with reasonably stable skill sets and fair scenarios about the economy, historical time series analyses of labour supply can be used to predict the numbers for each cell in the diagram, allowing for accurate and clear predictions of future labour movement and supply.

Forecasting HR Demand

demand analysis

Analysis that identifies the future workforce requirements needed to maintain the organization's mission and goals

Demand analysis identifies the future workforce requirements needed to maintain the organization's mission and goals. The end result of a demand analysis is the identification of the required number of employees in an organization and the necessary functions that the employee must perform to meet organizational objectives. In HR planning, labour demand is determined separately from supply estimates because it facilitates a re-examination of embedded assumptions about the labour force. As well, different variables affect demand analysis. Due to the high number of factors that influence demand, demand is often more difficult to predict than supply. Factors that need to be considered when forecasting demand include the following:

- Environmental scanning, including economic, legislative, and competitive pressures
- The organization's future strategic goals and plans
- Expected demand for products or services, including expected sales (across the organization or at the business unit level)
- Estimated productivity measures of workforce (can be stable, increase, or decrease)
- Organizational design or job design, including technological advancements and administrative changes
- Projected budgets or financial resource availability
- New products/processes/ventures that the organization will be launching in the future

Due to the high number of environment- and organization-specific variables that influence demand analysis, there is no single correct way to estimate future HR demand. Instead, a number of quantitative and qualitative methods, as shown in Exhibit 2.6, are available to

EXHIBIT 2.6 Summary of Methods Used to Forecast HR Demand	
Quantitative Techniques	Qualitative Techniques
<ul style="list-style-type: none">• Trend analysis• Ratio analysis• Regression analysis	<ul style="list-style-type: none">• Delphi method• Nominal group technique• Scenario analysis

aid HR professionals in this step. Ultimately, the decision of which method to use will be dependant on the size of the organization, the resources available, and the expertise of the HR planning team. Quantitative techniques for determining HR requirements include trend analysis, ratio analysis, and regression analysis. Qualitative approaches to forecasting HR demand require managers to use their experiences to make expert judgements about future forecasts. This can occur in the form of a Delphi method, a nominal group technique, or a scenario analysis.

Quantitative Techniques for Forecasting HR Demand

Trend Analysis Similar to trend analysis used to forecast internal HR supply, past trends and ratios can also be used to forecast HR demand. For this purpose, **trend analysis** predicts the demand for labour based on projections of past relationship patterns over a number of years between an operational index (e.g., revenue per employee, productivity per employee) and the demand for labour (number of employees). As one of the simpler methods of forecasting HR demand, trend analysis assumes that an organization’s past employment needs are indicative of future needs when linked with an operational index.

There are a number of steps required to successfully complete a trend analysis. First, it is critical to select the right business or operational index. A hotel chain may select the number of rooms a housekeeper can clean in a set time frame to predict the number of housekeepers needed. A service provider may select the number of customers each customer service representative can effectively deal with to estimate the number of customer service representatives needed. A large business may select sales volume per sales employee to predict the number of employees needed.

Next, the organization tracks the business index and the size of the workforce over time. Typically, five years of historical data is sufficient in a trend analysis, but this can vary based on organization history and industry. With this information, the planning team can calculate the average ratio of the business or operational index and the workforce size in the past. This information is used to forecast HR demand.

As a simple example, a hotel determines that each housekeeper can clean 20 rooms a day (an operational index). The hotel has 1,000 rooms and is projected to be at 100 percent capacity in the summer season, but 80 percent capacity in the fall season. In this example, the hotel would use trend analysis to determine that it will need 50 housekeepers for the summer season and 40 in the fall season (rooms occupied daily/index of 20 rooms per housekeeper per day).

Ratio Analysis **Ratio analysis** determines future HR demand based on ratios between assumed casual factors and the number of employees needed. Ratio analysis appears very similar to trend analysis, but the primary difference is that there is no requirement for significant historical data collection. This allows organizations that do not have easy access to multiple years’ worth of data to use current ratios to help estimate future demand. In addition, while trend analysis links one business or operational index over time, ratio analysis allows for multiple causal factors to



ratio analysis
Analysis that determines future HR demand based on ratios between assumed casual factors and the number of employees needed

HRP AND ETHICS**Quantitative and Qualitative Forecasting**

There are ethical issues with both quantitative forecasting techniques and qualitative forecasting techniques. An optimistic perspective is that no technique can be completely void of ethical issues and therefore an organization must select the most appropriate technique given their strategic alignment as well as resource and time limitations. A pessimistic perspective is that all of the many alternatives offer results with ethical implications and therefore HR planning as an activity has embedded ethical dilemmas.

For quantitative techniques, the ethical challenges include the limitations associated with viewing human resources based on measures or quantities. When conducting quantitative methods, mathematical equations can help determine how many more or how many fewer human resources are needed in an organization, without ever considering the human element of the employee–organization relationship. For example, when forecasting a labour surplus, an organization can determine that there are 15 percent more employees in a department than needed, leading to an effort to lay off 15 percent of the employees in the department. In this simple example, it is evident that when using quantitative techniques, what does not factor into the decision is the human element, the expectations of the employer to provide a stable work environment, and an awareness of the human relationships that have existed within the teams.

In contrast, the qualitative techniques associated with HR planning can be viewed as open to higher levels of personal bias or subjectivity. For example, with the Delphi technique, a manager can purposely over-predict the productivity of a department or the projected growth rate of the HR needs to secure additional resources or employees, or conversely they can deflate these values if they are interested in reducing headcount. In qualitative techniques, there is a risk that the expert's personal agenda is influencing the results. Through the use of accountability measures, these risks can be reduced or mitigated.

be used to predict demand. Ratio analysis is also useful in benchmarking organizational efforts with industry or competitive standards to help identify areas of strength or weakness in an organization.

Extending on the example from the Markov analysis (see Exhibit 2.5), a ratio analysis can be used to determine HR requirements for the following year (see Exhibit 2.7). In this example, the organization's estimated rate of sales growth rate is 25 percent from 2009 to 2010. Assuming the same employee distribution from 2009, HR requirements at each level can be predicted, as shown in Exhibit 2.7. (Note: Growth rate can be calculated by using 2009 actual employee count at each level multiplied by 1.25 to represent a 25 percent projected growth.)

The next example, in Exhibit 2.8, provides a more complicated prediction of HR demand, but still relies on ratio analysis. In 2009, the organization needed 486 employees to meet the requirements for \$9.72 million in sales. The result is a revenue-to-employee ratio of \$200,000:1. In 2010, the organization predicts sales of \$11 million. Therefore, using ratio analysis, the organization estimates a requirement of 550 employees. In addition, another level of ratio analysis can be used to determine where employees will be needed, in an effort to predict HR demand.

EXHIBIT 2.7 Ratio Analysis on a Hypothetical Manufacturing Firm (25 Percent Growth)

Level	2009 Actual Employee Count	Est. 25% Growth Requirements for 2010
Plant manager	3	4
Department supervisor	15	19
Foreman	60	75
Machine operator	105	128
General labourer	306	383
Total	486	609

EXHIBIT 2.8 Ratio Analysis on a Hypothetical Manufacturing Firm, 550 Employees

Level	2009 Actual Employee Count	% of Workforce (2009)	Demand for 550 Employees in 2010
Plant manager	3	0.6	3
Department supervisor	15	3.1	17 ⁽¹⁾
Foreman	60	12.3	68
Machine operator	105	20.9	115
General labourer	306	62.9	346
Total	486	99.8*	549

*due to rounding, values do not add up to 100%

Note: In 2009, 3.1% of the internal labour force was supervisors. Using an organizational forecast of 550 employees in 2010, the organization would need 17 supervisors (3.1% of 550)

Specifically, in this example, the ratio of employees at each level within the organization (percentage of workforce) can help predict demand. Assuming the ratio of employees within each level of the workforce is fixed, estimates about how many employees are needed at each level can be secured.

regression analysis

A method of estimating HR demand that provides statistical projections using mathematical formulas to determine the correlation between multiple measureable output factors (independent variables) and an organization’s employment level (dependent variable)

Regression Analysis Regression analysis is a more complicated method of estimating HR demand, but allows for adjustment of seasonal fluctuation, long-term trends, and random movement when forecasting. This method provides statistical projections using mathematical formulas to determine the correlation between multiple measureable output factors (independent variables) and an organization’s employment level (dependent variable). A regression analysis is useful in predicting the strength and direction of a linear relationship between two variables, but in situations of a non-linear relationship, estimates would not be valid.

When there is one independent variable, there is one regression. When there are multiple independent variables, there are multiple regressions. A correlation depicts a value between -1 and 1. The closer the value is to 0, the less predictive of the relationship between the two variables. The closer the value is to either -1 or 1, the more predictive the relationship between two variables. The positive or negative sign in front of the correlation number indicates the nature or direction of the relationship.

For example, if the correlation between sales and the number of employees is 0.897, then an organization can interpret that an increase in sales is accompanied by an increase in the number of employees. In contrast, a correlation between investment in technology and the number of employees of -0.713 suggests that an increase in technology investments in the company would decrease the number of employees in the organization. Similarly, a correlation level of 0.012 between productivity and the number of employees represents no significant relationship between the two variables.

To effectively conduct a regression analysis, the planning team must have access to a large sample size of data (individual or group level data); have or be able to acquire the statistical skill set required to run the regression (most often completed using regression software); and be educated on the interpretation and use of this data. As a result, regression analysis is most often used in large organizations. This approach is also purely statistical, assuming that the past is the best predictor of the future. Any changes that alter this assumption while forecasting HR demand (e.g., new product lines, new ventures, technology, etc.) should be adjusted for accordingly.

Qualitative Techniques for Forecasting HR Demand

Delphi method

A method of forecasting HR demand that involves a panel of experts using their judgements to make estimates of short-term future demands

Delphi Method The origins of the **Delphi method** can be traced back to the late 1940s when the RAND Corporation used a famed “think tank” to estimate how future events effected HR projections for an organization.¹⁰ This process involves a panel of experts using their judgements to make estimates of short-term future demands. Experts use a variety of factors to make their judgements, including economical, demographical, technological, legal, and social conditions outside of the organization, as well as production, sales, turnover, experiences, and education levels of the workforce within the organization.

This method involves a number of steps. During the process, experts are not permitted to engage in direct face-to-face contact or communication. This is in an effort to prevent groupthink, influence of others, or confrontation of experts, which can influence the results. First, experts must be identified to participate in this task. Second, each expert is asked to submit HR demand forecasts, including specification of sources of information and assumptions used to estimate demand. Next, each submission is gathered by the HR planning group, which then summarizes the results. The aggregated results are sent back to the experts, who are given an opportunity to adjust their forecasts based on the information provided in the summaries. These steps are repeated until the expert opinions converge, something that may occur after three to five rounds.¹¹ Each feedback loop provides an opportunity for experts to understand their position relative to others and the reactions of others to the summaries provided.

One of the criticisms of the Delphi method is that it is subjective in nature, and thus may be difficult for those who prefer quantitative approaches to fully commit to. In addition, the organization should be explicit with experts not to discuss their estimates with others, something that can happen when experts have strong working relationships or work in close proximity to others.

nominal group technique (NGT)

A method of forecasting HR demand that involves multiple experts (usually line and department managers) meeting face to face to discuss independently formulated positions of an organizational issue, with the ultimate aim of securing an accurate assessment of a given situation

Nominal Group Technique The **nominal group technique (NGT)** was first developed by Delbecq and VandeVen as an alternative to simple, individual brainstorming of ideas.¹² This process involves multiple experts (usually line and department managers) meeting face to face to discuss independently formulated positions of an organizational issue, with the ultimate aim of securing an accurate assessment of a given situation. NGT can be used to help forecast HR demand for an organization or can be used to solve other organizational issues (e.g., decisions about launching new products or processes, managing change, establishing sales targets, etc.).

This technique differs from the Delphi technique in that it encourages face-to-face meetings and discussions about an issue as a critical step in the decision-making process. There are four main steps in this process:

1. **Step 1:** Generally five or six experts are solicited to participate in the NGT. Each expert is asked the same specific question (e.g., What are your predictions for future HR demand in this branch/unit/department/organization for the next X number of years? What are the causes of any expected changes in demand?). Independently, each expert writes down their solutions to the issue or question.
2. **Step 2:** Experts then meet face to face (usually around a table) and are asked to individually present their solutions. These solutions are often recorded on flipcharts or blackboards to allow for comparisons in later steps. During this process, each member is encouraged to freely present their results, and interruption or discussion from other group members on the results is discouraged at this point. This allows for each member to present their ideas completely, without judgement or influence.
3. **Step 3:** After all experts have presented their results, clarification questions are solicited. A facilitator should encourage questions on clarification of information so as to encourage group dialogue and discourage self-protectiveness about estimates.
4. **Step 4:** Each expert is asked to secretly rank estimates. Voting is anonymous and calculated using equal participation from team members. The facilitator then uses the estimate from step 1 that draws the highest ranking as the estimate used to forecast HR demands.

In a case where there are two or more close high ranking estimates of future HR demand, steps 3 and 4 can be repeated, with only these estimates presented, to allow for further discussion and to build confidence in the results.

scenario analysis

A method that provides multiple estimates of future HR demand, contingent on a unique set of assumptions and circumstances for each scenario

Scenario Analysis Due to the high number of factors that can affect predictions of HR demand, some organizations prefer to conduct a scenario analysis rather than determining a single demand scenario (as in the previous methods discussed in this step). **Scenario analysis** provides multiple estimates of future HR demand, contingent on a unique set of assumptions and circumstances for each scenario. This method involves recognizing uncertainties about the future. For example, forecasts are contingent upon the overall economic outlook of the firm's output. An organization could create three different estimates accordingly, one for a constant economic situation (e.g., zero growth), a second for some anticipated economic growth (e.g., five percent growth), and a third for the possibility of economic decline (e.g., five percent reduction).

Expert brainstorming activities help to develop agreement on long-range factors and the impact of changes on the HR forecasts. These can include internal changes (e.g., adoption of new technology, productivity or workforce changes) or external changes (economic position, legal requirements, competitive changes) that cannot be predicted with confidence to have a single effect. The possible result of these changes will create a forecast for each possible scenario that the organization can expect. The group will assess potential uncertainty and estimate realistic potential future scenarios. Generally, there will be three estimates secured, one at the level of continuance with the status quo, one best-case or optimistic scenario, and one worst-case or pessimistic scenario. As a result, the organization secures a range of forecasted HR demand and must continuously monitor influencing factors to narrow that range as time progresses.

While this method is the least effective in determining a single estimate of future HR needs, this option provides some clarity as to future estimates for dynamic organizations, organizations that are experiencing high change, or in cases where the past is not the best predictor of the future.

HRP AND THE SMALL BUSINESS

Human Resource Planning Challenges Unique to Small Businesses

Regardless of how large or small the organization is, all organizations require HR planning to secure the right resources in the right positions at the right time. However, there are unique challenges that small businesses face in terms of the HR planning process.

For small businesses that may be in an initial start-up stage or may be experiencing high growth, there is the option of conducting an HR plan for a horizon that is measured in unique units. For example, if a small business expects 50 percent revenue growth per quarter, then the horizon for HR planning would be a predetermined number of quarters, rather than annual estimates. Similarly, if a small business anticipates growth or decline using six-month periods, then the unit for the HR planning horizon can be each half year.

Small businesses can also track the current workforce using manual measures or off-the-shelf computer software. For smaller organizations, the investment in a proprietary HR auditor skills inventory tool may not be advisable.

Rather than investing in primary research to forecast external HR supply, many small businesses can benefit from reviewing existing secondary data as previously highlighted. However, rather than utilizing national or international data, small businesses might find that regional or local government offices provide data that is more transferable for their needs.

One of the biggest challenges that small businesses face in terms of forecasting HR supply is effectively and proactively managing succession planning. In publicly managed firms, the successor is selected from a pool of qualified applicants by the board of directors. In a small business, little attention is paid to succession planning since it is assumed to be a rare event (once per generation) and the pool of potential successors is very small (often the first-born male).¹³ In family-owned small businesses, tacit, procedural, and social capital is passed on from one generation to another.¹⁴ Due to high levels of loyalty and trust among family members, the succession plan for these businesses is assumed, rather than planned for. As a result, owners take a reactive approach to succession planning in small businesses. Roughly 3 in every 10 small businesses survive when the second generation becomes the successor.¹⁵

The succession plan in small and medium enterprises should be a formal and communicated process whereby the potential successor is trained and integrated into the work efforts with the owner-operator. In order to build commitment from the remaining employees, it should be explicitly discussed why this successor was selected and what unique abilities they possess. Education levels of potential successors should also match the expected education level of the position they will be filling. The training efforts and communications should develop the core competencies and skill sets of the successor, which will also aid in building confidence of the succession plan with the remaining workforce.

Forecasting HR demand is usually completed using qualitative methods in small businesses, rather than quantitative methods, due to the expertise of management in the organization, the lack of historical data in the organization, and the dynamic nature of the businesses. Many small businesses would benefit from combining either an NGT or Delphi technique with a scenario analysis to predict a range of potential needs for the future.

STEP 2: ESTABLISH HUMAN RESOURCE OBJECTIVES

gap analysis
Analysis that identifies the differences between the forecasted HR supply and the forecasted HR demand, focusing on balancing the number and characteristics of employees needed and available to ensure that supply equals demand

solutions analysis
Analysis that creates a strategic plan to address labour surpluses or shortages, including creating an awareness of changes that continually occur in the workforce (e.g., retirements, turnover, etc.)

Organizational objectives help determine what organization action is required to align HR demand with HR supply. Organizational objectives direct the planning process by identifying the desired activity to achieve organizational goals.

A **gap analysis** identifies the differences between the forecasted HR supply and the forecasted HR demand, focusing on balancing the number and characteristics of employees needed and available to ensure that supply equals demand. Ideally, the estimated demand and supply could balance out (identifying no gap in HR forecasts), but this is a rare situation. Most likely, either HR supply exceeds demand, identifying a projected labour surplus, or HR demand exceeds supply, identifying a labour shortage.

Using the hypothetical manufacturing firm previously discussed in the chapter, an example of a gap analysis can be examined. Forecasted HR supply was determined using a Markov analysis in Exhibit 2.5. Forecasted HR demand was determined using a ratio analysis in Exhibit 2.7. Using these forecasts, predicted gaps in the labour force are identified in Exhibit 2.9. In total, a labour shortage of 195 employees is predicted, but this analysis also identifies which levels have a surplus and which have a shortage and by what degree.

Gaps and surpluses are alleviated through solutions analysis. **Solutions analysis** involves creating a strategic plan to address the labour surplus or shortage, including creating an awareness of changes that continually occur in the workforce (e.g., retirements, turnover, etc.). The solutions analysis should clearly identify what actions are required to mitigate the gaps and what the most effective options are for addressing these gaps.

Due to the volume and complexities associated with managing a labour surplus and labour shortage, these issues are dealt with in greater detail in later chapters. Chapter 3 includes an extensive review of strategies, challenges, and alternatives to address labour shortages, while Chapter 4 focuses on solutions for labour surpluses.

STEP 3: DESIGN AND IMPLEMENT HR PROGRAMS

As discussed throughout this text, a comprehensive HR planning team can aid in the successful implementation of the HR plan. The design and implementation of a plan to correct workforce imbalances can include the need to increase productivity or the size of the workforce in a labour shortage situation or the need to change work-terms or decrease the size of the workforce in a labour surplus situation.

Chapters 3 and 4 provide not only a detailed discussion of the multiple options available to correct a workforce imbalance, but also a discussion of the resources, costs, appropriateness, and advantages

EXHIBIT 2.9		Gap Analysis on a Hypothetical Manufacturing Firm, 550 Employees	
Level	2010 Projected Supply	2010 Projected Demand	Gap in Demand for 550 Employees in 2010
Plant manager	4	3	− 1
Department supervisor	16	17	1
Foreman	32	68	36
Machine operator	85	115	30
General labourer	217	346	129
Total	354	549	195
Note: The gap is calculated by subtracting projected demand from projected supply. A negative value indicates a labour shortage and a positive value indicates a labour surplus.			

and disadvantages of these options. Regardless of what methods are used to correct the workforce imbalance, the implementation of the plan must adhere to applicable legislation and regulations.

■ STEP 4: EVALUATE THE EFFECTIVENESS OF THE PROGRAMS

Evaluating the effectiveness of the programs implemented as part of the HR plan is both the final step and a step that loops back to the first step in the HR planning process. Thus, planning is not linear, but cyclical in that evaluation of the results of one planning cycle establishes input for the next planning cycle. Chapter 10 identifies the importance of knowing what to measure and why, as well as developing an understanding of how systems are used to measure HR metrics (e.g., productivity, turnover, quality, etc.).

In conclusion, the forecasting of human resource supply and demand can project a labour surplus or shortage. The next two chapters will discuss methods to deal with a labour shortage (Chapter 3) and a labour surplus (Chapter 4).



CHAPTER SUMMARY

- HR planning is a critical component of organizational planning that ensures that the right resources are available at the right time to achieve organizational goals, vision, and strategy. HR plans affect many elements of HR, including recruitment, selection, training, development, organizational structure, and compensation.
- There are four steps in the HR planning process. Before embarking on the HR planning process, an organization must determine the appropriate planning horizon. This includes creating an awareness of both immediate and long-term staffing concerns. As well, planners should assess and accurately understand the current staffing situation in the organization. An HR audit is useful for collecting information in a meaningful way, but depends on the level of clarity regarding who is considered to be in the workforce.
- Forecasting HR supply is a component of the first step. There are a number of different triggers for changes in the internal labour force, including actuary losses, voluntary turnover, and involuntary turnover. As well, the supply of human resources available outside of the organization is also in flux. Thus, this step requires the effective mapping of the effects of internal and external labour forces changes to the organization. Tools such as trend analysis, skills/competency models, replacement charts, succession planning, staffing tables, and Markov analysis can be used in this step.
- Also part of the first step, an HR demand analysis predicts the number of required employees (quantity and quality) within the predetermined time horizon. This forecast can use quantitative techniques (trend analysis, ration analysis, regression analysis) or qualitative techniques (Delphi method, nominal group technique, scenario analysis) to increase the accuracy of the HR demand forecast.
- In the second step, evaluation of organizational objectives will drive gap analysis and solutions analysis. The organizational objectives help determine which program is the most appropriate for responding to imbalances in required HR demand and projected HR supply within the organization. In this step, the projected supply is compared to the projected demand to determine if the organization will experience a labour equilibrium, shortage, or surplus in the future.
- The third step is implementation of the HR plan.
- The fourth and final step is the evaluation of the plan's effectiveness, which then loops back to the initial HR planning step. This creates cyclicity in the HR plan. Potential HR metrics that can be used in this step are outlined in Chapter 10.



KEY TERMS

- actuarial losses 35
- appropriate planning horizon 27
- competency 36
- competency model 36
- contingent workforce 29
- Delphi method 43
- demand analysis 39
- external labour force 30
- forecasting 27
- gap analysis 46
- groupthink 27
- human resource audit 29
- internal labour force 28
- involuntary turnover 35
- Markov analysis 37
- nominal group technique (NGT) 43
- ratio analysis 40
- regression analysis 42
- replacement chart 36
- scenario analysis 44
- skills inventory 29
- solutions analysis 46
- staffing table 37
- strategic plan 31
- total turnover 35
- trend analysis 36
- turnover 35
- voluntary turnover 35



REVIEW QUESTIONS

1. Identify the four steps in the HR planning process and discuss the importance of the cyclicity of the process.
2. Who should be included in the HR planning committee and why?
3. What are the various options available for forecasting HR supply?
4. Identify when the use of each option would be feasible.
5. Outline the quantitative and qualitative methods for forecasting HR demand. What are some of the challenges in determining demand and how can these be overcome using the techniques outlined?
6. What are the differences and similarities between the each pair: Delphi technique and nominal group technique; trend analysis and ratio analysis; succession planning and replacement planning?



DISCUSSION QUESTIONS

1. Your organization is launching a brand-new product line, investing a significant amount of resources into technology and eliminating a business line that they feel is not profitable. Given the highly dynamic nature of the business, what method would you recommend to forecast HR supply and demand? Provide a rationale for your selection.
2. A colleague of yours does not support the HR planning activities that the organization is currently engaged in. She suggests that planning is a fruitless exercise for an organization since the results may be outdated by the time the process is complete. Using your expertise in HR planning, either support or refute this argument. Include a discussion of the inherent assumptions in your position and the position of your co-worker.
3. Assume your organization has asked you to help facilitate a nominal group technique. Who would you include in the process and why? What materials might you need for this process? What obstacles or challenges should you be careful to avoid?
4. Your organization has conducted a Markov analysis. Next year, you predict that 42 employees at level 1 will be eligible for a promotion into level 2 jobs. Level 2 is predicted

to have 30 vacancies. Would you hire from within the organization, hire from outside the organization, or use a combination of both for the expected vacancies in level 2 next year? Why? How will you deal with the employees who are predicted to be promoted but are not? How will you keep them motivated?

WEB EXERCISE

Conducting a Nominal Group Technique to Estimate University Professor Forecasts

Assume you are working for a large comprehensive university in Canada. Working in teams of six, use the information below to establish estimates of demand for university professors within Canada. Assign one person to the role of facilitator to help manage the process. In step 1 of the NGT, complete the following:

1. Identify factors that contribute to the demand of university professors in Canada. You can use websites such as www.statscan.com, www.caut.ca, www.aucc.ca, your university or college website, and other websites for information to guide your discussion.
2. Estimate a projected growth or decline rate (percentage) of university professors for 2010 and 2015 using this information and other information you may have available.
3. Determine factors that could impact the accuracy of your HR demand estimates.

CASE INCIDENT

Predicting Supply and Demand for a Call Centre

A call centre out of Halifax, Nova Scotia is currently in the process of conducting an HR planning exercise. They have estimated employee flow throughout the organization and have mapped this information onto the following Markov matrix:

	A	B	C	D	Exits
A. Shift manager (n = 6)	0.70	0.05	0.00	0.00	0.25
B. Department supervisor (n = 18)	0.13	0.82	0.03	0.00	0.02
C. Team leader (n = 105)	0.05	0.10	0.62	0.05	0.08
D. Customer service representatives (n = 590)	0.00	0.00	0.22	0.54	0.24

1. Outline employee movement projections and the supply estimates for each level for next year.
2. What trends in the predicted workforce movement should be highlighted as potentially problematic?

In addition, the HR department suggests that three percent of the workforce this year will be retiring next year. These departures are expected to be experienced proportionately at all levels in the organization. These are not included in the exit estimations. After you have completed your Markov analysis, factor in these exits in your supply estimates based on this year's HR supply to help get a more accurate prediction of next year's estimates.

This year, the call centre had 5,200,000 clients. Due to a new project, the call centre expects an additional 1,500,000 clients next year. They do not anticipate any changes in

the distribution of the workforce. What HR demand estimates would you calculate for the organization?

Comparing the forecasted HR supply and demand, conduct a gap analysis. What levels have a labour surplus and what levels have a labour shortage? How many employees would the company need to meet demands for next year?



CASE INCIDENT

Forecasting HR Supply Using a Ratio Analysis

As an HR manager in a national bank, you have access to historical data about branch activity and employment across Canada from 2001 to 2009. These two variables develop a productivity ratio in terms of how many customers each teller is able to serve per year. You are asked to make a quick and rough estimate of teller projections for the bank using this information, and are expected to apply a ratio analysis.

The bank is expecting a five percent annual growth rate in their number of customers from 2009 to 2012. This is due to an aggressive marketing technique and the launch of a high-interest banking incentive for customers who leave their existing bank to join yours. As well, because of plans to launch a training and orientation program targeted at all employees, the bank also expects an annual increase in productivity over the next two years.

Using this information and the chart with data provided below, predict the organization’s 2010 and 2011 forecasts for HR demand.

Year	Number of Customers	Number of Tellers	Productivity (customers served per teller)
01	650,000	580	1,120.69
02	690,000	610	1,131.15
03	640,000	575	1,130.04
04	585,000	550	1,063.64
05	550,000	515	1,067.96
06	605,000	560	1,080.36
07	625,000	570	1,096.49
08	659,000	590	1,116.95
09	680,000	605	1,123.97
10*			
11*			

*Helpful information: Productivity was calculated by dividing the number of customers by the number of tellers per year. Average productivity can be calculated using previous data to help predict future expected productivity. Expected number of customers can be calculated using growth estimates above.

■ REQUIRED PROFESSIONAL CAPABILITIES REFERENCED IN THIS CHAPTER



11. Gathers, analyzes, and reports relevant business and industry information (including global trends) to influence development of strategic business HR plans.
16. Provides the organization with timely and accurate HR information.
64. Researches, analyzes, and reports on potential people issues affecting the organization.
65. Forecasts HR supply and demand conditions.
67. Develops people plans that support the organization's strategic directions.
69. Maintains an inventory of people talent for the use of the organization.
70. Develops systems and processes that link the career plans and skill sets of employees with the requirements of the organization.
72. Identifies the organization's staffing needs.
73. Identifies the potential source of internal and external qualified candidates.