



# Competitive Alternatives

KPMG's Guide to International Business Location  
2010 Edition

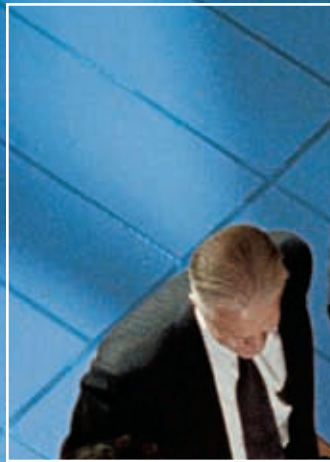
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KPMG LLP has conducted an analysis of the relative costs of doing business in 10 countries in North America, Europe, and Asia Pacific. This report was made possible through the support of our research contributors and sponsors, as identified in this report.

The analysis in this publication is based on cost information collected primarily between July 2009 and January 2010. Taxes reflect tax rates in effect on January 1, 2010, and also incorporate any announced changes at that time to take effect at specified later dates. Exchange rates and other cost factors will, of course, change over time. Tax rates and other tax-related information are also subject to change as a result of new legislation, judicial decisions, and administrative pronouncements.

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# Competitive Alternatives

KPMG's Guide  
to  
International Business Location  
2010 Edition

Produced in association with



Contributions from



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# Preface and Study Contacts

## About KPMG's Global Location and Expansion Services

In most industries today, companies have to operate internationally to stay successful and grow. The need to enter new markets, serve major customers, or reduce costs and risks are just some of the reasons why businesses decide to establish a presence overseas. KPMG's Global Location and Expansion Services (GLES) group was formed to assist clients in the location and establishment of operations around the world. GLES professionals can provide objective advice that can help companies:

- Develop an approach for international expansion that can support overall business objectives
- Determine the requirements of a new operation and translate these into criteria for evaluating locations
- Identify and compare countries, regions, and cities as potential locations for relocating or establishing new operations
- Select and evaluate potential properties, buildings, or sites for a new facility
- Negotiate and secure grants, tax breaks, and other types of government incentives and support
- Set up new operations in a tax-efficient manner.

Based in all regions of the globe, KPMG's GLES professionals offer locally relevant, industry-specific knowledge that can help support expansion and relocation decisions.

## About Competitive Alternatives

The 2010 edition of *Competitive Alternatives* is the most extensive edition of this study to date, covering 136 cities in 10 countries. Key organizations and individuals involved in developing this study are detailed below.

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Thanks also to Angela Rey, Lynn Arychuk, Dragana Vojakovic, and Mark Wilson.

- **Colliers International** supplied real estate costs for all locations examined.
- **Mercer** supplied labor cost data for all study countries.
- **ERI Economic Research Institute** supplied labor cost data for Canada and the United States.
- **Galaxy Transport Corp.** coordinated the collection of freight cost data for all study countries.
- **Mexico Consulting Group**, and its partner **Cosmex International**, supplied operational cost data for Mexico.

KPMG also thanks the many other individuals and organizations that assisted in developing the information on which this study is based. Selected bibliography and data sources are detailed in Appendix D.

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- A. Details of Study Methodology and Business Model Assumptions
- B. Tax Rate Assumptions and Comparisons, by Jurisdiction
- C. Other Competitiveness Factors: Regional Data and Data Source Notes
- D. Selected Bibliography and Sources of Data

# Executive Summary

**Competitive Alternatives** represents KPMG's guide to comparing business locations in North America, Europe, and Asia Pacific. With a primary focus on international business costs, this report measures the combined impact of 26 significant cost components that are most likely to vary by location, as applied to specific industries and business operations. The report also includes secondary comparisons of other factors that influence the competitiveness of international business locations.

The 6-month research program covered 112 cities in 10 countries: Australia, Canada, France, Germany, Italy, Japan, Mexico, the Netherlands, the United Kingdom, and the United States. More than 1,900 individual business scenarios were examined, analyzing more than 40,000 items of data.

The basis for the cost comparison is the after-tax cost of startup and operation for representative business operations in 17 industries over a 10-year planning horizon.

Results are based on the combined results for business costs in each country's major metropolitan regions. Results for the four largest cities in the United States—New York City, Los Angeles, Chicago, and Dallas-Fort Worth—represent the baseline against which business costs in other countries and cities are compared.

## A. International Results

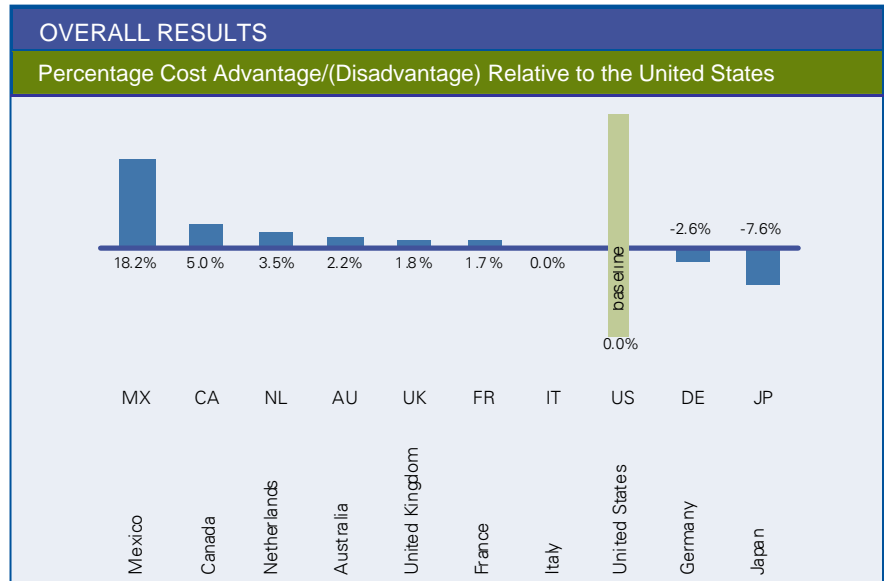
As the only emerging country included in the study, **Mexico** represents the lowest cost country examined. Mexico's major cities have a business cost advantage of 18.2 percent, on average, relative to the US baseline.

**Canada** and the **Netherlands** are the cost leaders among the nine established industrialized countries examined with business costs 5.0 and 3.5 percent below the US, respectively.

**Australia**, the **United Kingdom**, and **France** rank fourth, fifth, and sixth, respectively. Costs in Australia are 2.2 percent below the US baseline, while costs in the UK and France are very similar, at 1.8 and 1.7 percent below the US, respectively.

Costs in **Italy** are virtually equivalent to the study baseline—the **United States**.

**Germany** and **Japan** have the highest cost structures among the 10 countries examined, with costs 2.5 and 7.4 percent (respectively) higher than the United States.



**EXCHANGE RATES USED IN THIS STUDY**

	Exchange Rates		Two-year Appreciation Relative to US\$
	2008 Edition	2010 Edition	
Euro	€ 0.68 (US \$1.47)	€ 0.68 (US \$1.47)	0.0%
UK Pound	£0.50 (US \$2.00)	£0.61 (US \$1.64)	-18.0%
Canadian Dollar	CA \$1.00 (US \$1.00)	CA \$1.06 (US \$0.94)	-5.7%
Mexican Peso <sup>1</sup>	MX\$10.87 (US \$0.09)	MX\$13.07 (US \$0.08)	-16.8%
Australian Dollar	AU \$1.14 (US \$0.88)	AU \$1.10 (US \$0.91)	3.6%
Japanese Yen	¥111.27 (US \$0.01)	¥89.86 (US \$0.01)	23.8%

## B. Cost Components

**Labor** is the most significant component of location-sensitive costs. Total labor costs, including wages, salaries, and all benefits, are lowest in Mexico, followed by Canada and the United Kingdom.

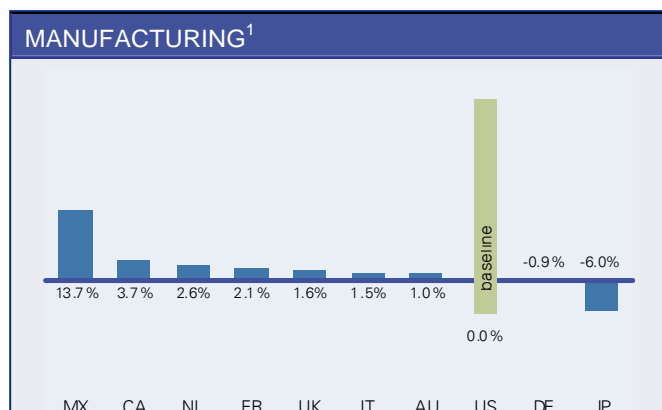
Among other major cost components, **factory lease** costs are lowest in Mexico, the United States, and Canada; **office leasing** costs are lowest in Mexico, the Netherlands, and the United States; and **transportation** costs are lowest in the United Kingdom, Germany, and Japan.

**Effective income tax rates** vary by sector, but are generally lowest in the Netherlands, Australia, and Canada.

Taxes are the subject of a separate KPMG report, *Competitive Alternatives Special Report: Focus on Tax*, which analyzes international tax issues in greater depth than this report. The *Special Report: Focus on Tax* will be available from May 2010 at [www.CompetitiveAlternatives.com](http://www.CompetitiveAlternatives.com), along with all other study results and publications.

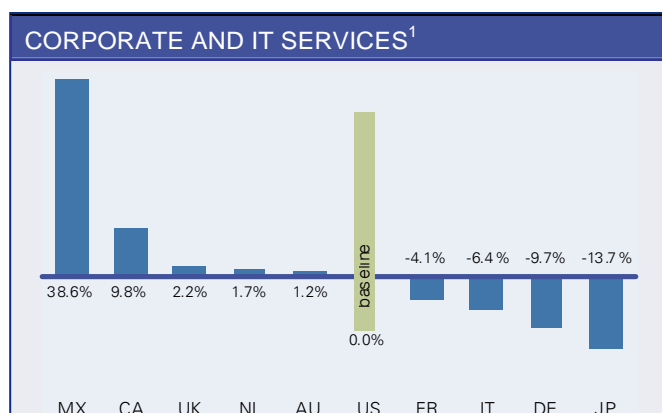
## C. Costs by Industry Sector

International business cost relationships vary by industry sector.



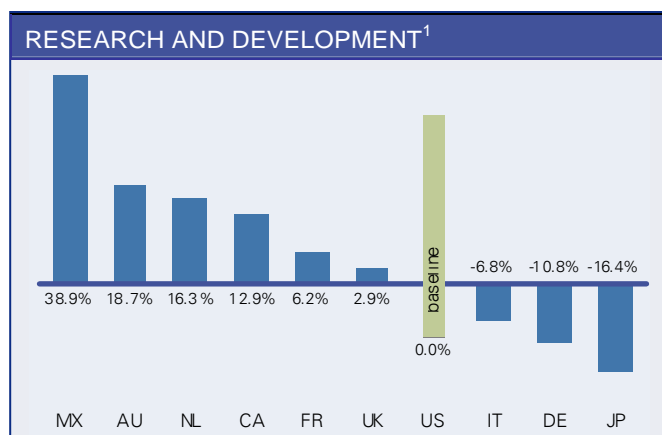
For **manufacturers**, costs for globally sourced materials and equipment do not vary by location, resulting in lower cost differentials relative to other sectors. As manufacturing has become more capital intensive, cost variations between locations have decreased over the 15-year history of *Competitive Alternatives*.

Italy, Germany, and Japan achieve their strongest results in this sector.



Labor costs are more significant in the **corporate and IT services** sector, and vary considerably by country and by region. This results in generally higher cost differentials in this sector, as seen most prominently in the cost results for Mexico.

Among the industrialized countries studied, Canada, the United Kingdom, and the United States all achieve their strongest results in this sector.



Cost differentials are generally highest for **research and development (R&D)** activities due to differences in labor costs for scientific and technical employees, as well as differences in tax treatment of R&D costs. Indeed, many of the jurisdictions studied offer specific tax incentives designed to encourage R&D activities.

Australia, the Netherlands, and France all have their strongest results in this sector, assisted in part by their respective R&D tax incentive programs.

## D. Other Competitiveness Factors

In addition to business costs, many other factors also influence the business competitiveness of locations. For example, one factor that has become more relevant to many businesses since the 2008 edition of *Competitive Alternatives* is the time and cost of laying off redundant workers. The time period during which an employer has a financial commitment to its workforce after making a decision to downsize, including mandated union negotiations and statutory notice, plus typical severance payments, varies greatly among countries—from 4 weeks in Japan, to potentially more than 1 year in Italy.

Government responses to the recent economic downturn are also playing a key role in shaping national business environments, in both the short and long terms. Countries where governments have responded most strongly with stimulus spending—Australia, Japan, and the United States—are seeing more short-term stimulus activity for business. However, stimulus spending comes at the cost of deficits, and large deficits may result in increased corporate tax burdens in the medium to longer term.

1. Percentage cost advantage/(disadvantage) relative to the United States. Country abbreviations are defined in the chart on Page i. The average result for each sector is based on specific industries identified in Exhibit 1.3.

# 1. Objectives, Scope, and Methodology

## A. Study Objectives

Selecting the best site for a business operation requires careful consideration of both cost and other factors. Exhibit 1.1 illustrates some of the major factors that influence the site location decision.

The relative importance of these factors vary not only among different industries, but also for individual firms within a particular industry.

For many firms, the logical first step in locating or relocating a business operation is to perform an initial scan of:

- How jurisdictions compare in terms of cost competitiveness
- How jurisdiction compare in terms of other key competitiveness factors.

The 2010 edition of *Competitive Alternatives* is the most thorough comparison of international business locations ever undertaken by KPMG, and is designed to provide valuable information to business executives, economic developers, and policy makers. The study objectives are:

- To develop a comprehensive database of locational data for 112 cities in the G7, NAFTA, and selected other countries
- To measure the cost competitiveness of each jurisdiction, both in terms of total business costs and specific cost components
- To provide sector-specific cost analysis for 17 industries and representative operations

- To provide information on important non-cost competitiveness factors
- To provide a detailed interactive model for undertaking customized location cost analysis of specific business opportunities
- To provide a tool for evaluating the impact of taxes, tax relief, and other incentives on the cost-competitiveness of different jurisdictions.

This report provides a thorough overview of the study results for all countries, cities, and industries. Interactive access to more detailed results is available online at [www.CompetitiveAlternatives.com](http://www.CompetitiveAlternatives.com).

EXHIBIT 1.1		
Key Site Location Factors		
	Cost Factors	Other Key Factors
Business	<b>Business Costs</b> Land/building/office Labor wage/salary/benefits Transportation and distribution Utilities Financing Federal/regional/local taxes	<b>Business Environment</b> Labor availability and skills Access to markets, customers, and suppliers Road, rail, port, airport infrastructure Utility and telecom/internet service reliability Suitable land sites Regulatory environment
Personal	<b>Cost of Living</b> Personal taxes Cost of housing Cost of consumer products and services Healthcare costs Education costs	<b>Quality of Life</b> Crime rates Healthcare facilities Schools and universities Climate Culture and recreation

## B. Scope of the Study

This report is based on a 6-month research program. The scope of the study includes:

- 112 cities in 10 countries
- 17 industries and business operations
- 26 location-sensitive cost factors in each city
- More than 40,000 individual cost items.

### 1. Countries and Cities

This study represents an analysis of business costs in nine developed countries—the G7 countries, Australia, and the Netherlands; and one emerging industrial country—Mexico. The 2010 edition of *Competitive Alternatives* includes the three NAFTA countries (US, Canada, Mexico), as well as all 50 US states and all 10 Canadian provinces.

Of the 112 cities examined, this report presents an analysis and discussion of 95 featured cities, as listed in Exhibit 1.2. Results for each of these cities are discussed in Chapter 4.

Detailed results have also been developed for the 17 additional locations on the same basis as the featured cities. Summary results for these cities are presented in Chapter 7.

The analysis is based on the wider metropolitan area that each city represents. This approach allows a realistic comparison between locations, recognizing that many industrial and commercial facilities choose to locate in suburban areas.

## EXHIBIT 1.2

### Featured Cities

#### Europe

##### France

Lyon  
Paris

##### Italy

Milan  
Rome

##### United Kingdom

London  
Manchester

##### Germany

Berlin  
Frankfurt

##### Netherlands

Amsterdam  
Brabant Stad  
The Hague  
Utrecht

#### North America

##### Canada—Atlantic

Charlottetown, PE  
Fredericton, NB  
Halifax, NS  
Moncton, NB  
St. John's, NL

##### Canada—East

Montreal, QC  
Quebec City, QC  
Sherbrooke, QC  
St. Catherines-Niagra, ON  
Toronto, ON

##### Canada—West

Edmonton, AB  
Saskatoon, SK  
Winnipeg, MB

##### Canada—Pacific

Prince George, BC  
Vancouver, BC

##### Mexico

Mexico City  
Monterrey

##### US—New England

Bangor, ME  
Boston, MA  
Burlington, VT  
Hartford, CT  
Manchester, NH  
Providence, RI

##### US—Northeast

Baltimore, MD  
Buffalo, NY  
Charleston, WV  
Detroit, MI  
Harrisburg, PA  
Indianapolis, IN  
Lexington, KY  
New York City, NY  
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Shreveport, LA  
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Cedar Rapids, IA  
Cheyenne, WY  
Chicago, IL  
Dallas-Fort Worth, TX  
Denver, CO  
 Fargo, ND  
Houston, TX  
McAllen, TX  
Milwaukee, WI  
Minneapolis, MN  
Oklahoma City, OK  
Omaha, NE  
Phoenix, AZ  
Salt Lake City, UT  
Sioux Falls, SD  
St. Louis, MO  
Wichita, KS

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## 2. Industries

Seventeen industries have been analyzed in this study, as illustrated in Exhibit 1.3. For each industry, one representative business operation has been defined, modeled, and analyzed in detail. Results for all 17 business operations are presented in Chapter 3.

The 17 business operations represent a broad mix of different business types, including manufacturing, corporate and IT services, and research and development (R&D). They also cover a wide range of operating requirements, such as labor, facility, and capital requirements.

For manufacturing industry operations, the analysis is based on leasing a new industrial facility in a suburban industrial area. For non-manufacturing operations, the analysis is based on leasing Class "A" office space in a suburban office building.

## 3. Location-Sensitive Cost Components

This study compares costs among jurisdictions based on 26 location-sensitive cost components, as identified in Exhibit 1.4. These components, which are discussed in detail in Chapter 5, represent the most significant location-sensitive costs for the types of operations examined in this study.

The 26 location-sensitive cost factors studied generally represent between 35 and 90 percent of total operating costs for the manufacturing and service operations examined in this study.

Some significant costs (major plant and equipment, "commodity" inputs to the manufacturing process) tend to be governed by world market prices and do not vary substantially by location. These costs are held constant (in US dollars) for comparison purposes.

A number of less significant cost factors, such as advertising, accounting services, and office supplies, may be location-sensitive, but do not have a material impact on the overall comparison and are not examined in this study.

### EXHIBIT 1.3

#### Industries

Industry	Business Operation Modeled
<b>MANUFACTURING</b>	
Aerospace	Aircraft parts
Agri-food	Food processing
Automotive	Auto parts
Chemicals	Specialty chemicals
Electronics	Electronics assembly
Medical devices	Medical device manufacturing
Metal components	Metal machining
Pharmaceuticals	Pharmaceutical products
Plastics	Plastic products
Precision manufacturing	Precision components
Telecommunications	Telecom equipment
<b>CORPORATE &amp; IT SERVICES</b>	
Back office/call centers	Shared services center
Software design	Software development
Web and multimedia	Content development
<b>R&amp;D</b>	
Biotechnology	Biomedical R&D
Clinical trials	Clinical trials management
Product testing	Electronic systems development and testing

### EXHIBIT 1.4

#### Location-Sensitive Cost Components

<p><b>Labor Costs</b></p> <ul style="list-style-type: none"> <li>• Salaries &amp; wages               <ul style="list-style-type: none"> <li>– 42 job positions</li> </ul> </li> <li>• Statutory plans               <ul style="list-style-type: none"> <li>– Government pension plans</li> <li>– Public medical plans</li> <li>– Unemployment insurance</li> <li>– Workers' compensation</li> </ul> </li> <li>• Employer-sponsored benefits               <ul style="list-style-type: none"> <li>– Paid time not worked (holidays and vacation)</li> <li>– Private health insurance</li> <li>– Other discretionary benefits</li> </ul> </li> </ul> <p><b>Facility Costs</b></p> <ul style="list-style-type: none"> <li>• Industrial land</li> <li>• Industrial construction</li> <li>• Industrial leasing</li> <li>• Office leasing</li> </ul> <p><b>Transportation costs</b></p> <ul style="list-style-type: none"> <li>• Air freight</li> <li>• Surface freight (road &amp; sea)</li> </ul>	<p><b>Utility Costs</b></p> <ul style="list-style-type: none"> <li>• Electricity</li> <li>• Natural gas</li> </ul> <p><b>Depreciation Charges</b></p> <p><b>Financing Costs (Interest)</b></p> <p><b>Taxes Other Than Income</b></p> <ul style="list-style-type: none"> <li>• Capital</li> <li>• Property</li> <li>• Sales &amp; transactions</li> <li>• Land transfer</li> <li>• Sundry local taxes</li> </ul> <p><b>Income Taxes</b></p> <ul style="list-style-type: none"> <li>• Federal</li> <li>• Regional (state, provincial, etc.)</li> <li>• Local</li> </ul>
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## C. Key Assumptions

### 1. Currency Exchange Rates

All figures in this report are expressed in US dollars unless otherwise stated.

Exchange rates used in this study, along with comparative rates from the previous 2008 edition of *Competitive Alternatives*, are illustrated in Exhibit 1.5. The rates used in 2010 are based on average daily rates for the US Federal Reserve Board for October through December 2009.

The results of this study are sensitive to exchange rate changes. Exchange rate sensitivity is discussed further in Chapter 2, and can also be analyzed online at [www.CompetitiveAlternatives.com](http://www.CompetitiveAlternatives.com).

### 2. Cities Used in National Results

The cities selected to calculate the national results for each country are illustrated in Exhibit 1.6. National results are based on the average results for comparable cities within each country, reflecting business costs in the major metropolitan regions of each country.

As illustrated in Exhibit 1.6, two major cities are used to calculate the national results for each country, with the exception of the United States. The four largest US cities—New York, Los Angeles, Chicago, and Dallas Fort Worth—are used to calculate the US national results and form the baseline against which business costs in other countries and cities are compared.

EXHIBIT 1.5			
Exchange Rates Used in this Study			
	Exchange Rates		Two-year Appreciation Relative to US\$
	2008 Edition	2010 Edition	
Euro	€ 0.68 (US \$1.47)	€ 0.68 (US \$1.47)	0.0%
UK Pound	£0.50 (US \$2.00)	£0.61 (US \$1.64)	-18.0%
Canadian Dollar	CA \$1.00 (US \$1.00)	CA \$1.06 (US \$0.94)	-5.7%
Mexican Peso	MX\$10.87 (US \$0.09)	MX\$13.07 (US \$0.08)	-16.8%
Australian Dollar	AU \$1.14 (US \$0.88)	AU \$1.10 (US \$0.91)	3.6%
Japanese Yen	¥111.27 (US \$0.01)	¥89.86 (US \$0.01)	23.8%

EXHIBIT 1.6		
Cities Selected for Calculation of National Results		
Country	Cities	
<b>EUROPE</b>		
France	Lyon	Paris
Germany	Berlin	Frankfurt
Italy	Milan	Rome
Netherlands	Amsterdam	The Hague
United Kingdom	London	Manchester
<b>NORTH AMERICA</b>		
Canada	Montreal	Toronto
Mexico	Mexico City	Monterrey
United States	Chicago	Dallas
	New York	Los Angeles
<b>ASIA PACIFIC</b>		
Australia	Melbourne	Sydney
Japan	Osaka	Tokyo

## D. Methodology

### 1. KPMG's Cost Model

This study is based on KPMG's proprietary CompetitiveAlternatives.com cost model used to analyze costs for many different types of business operations across multiple geographic locations. The model applies current business cost data for each location to a set of business operating specifications that are held constant for all locations. The result is a comparison of the estimated cost of establishing and operating an equivalent facility in each location.

Using standard financial assumptions, the model generates 10-year pro forma reports, including income statements, cash flow statements, and detailed tax calculations. These reports form the basis of the cost comparisons contained in this report.

### 2. Physical Productivity

This study is based on specific comparisons of different types of individual business operations from the viewpoint of a business investor. It should *not* be interpreted as comparing overall levels of performance and physical productivity among countries.

For this report, three major sources of productivity variations—time worked, technology employed, and workforce training—have been included in the analysis, while the physical productivity of labor has been assumed to be equal in all locations. A more detailed discussion of productivity is contained in Chapter 5.

### 3. Income Statement Analysis

The comparisons presented in this report are based on income statement analysis. All items are treated on a cash basis, except for the initial investment in capital assets, which is reflected in annual depreciation, as well as in interest on the debt associated with facility start-up.

This measurement approach has been chosen in part due to its widespread use in business, and its usefulness in highlighting the sources of cost differences among locations.

### 4. Incentives

Significant, generally-applicable incentives, with clearly defined eligibility criteria, are included in the scope of this study. These incentives include certain tax rate reductions, tax abatements, sales tax exemptions, favorable interstate income apportionment rules, investment tax credits, research and development incentives, and job tax credits available in various jurisdictions.

For major business investments, it is not uncommon for governments to also offer incentive packages negotiated on a discretionary basis. These packages typically comprise a complex set of financing assistance and/or tax abatements tailored to specific investment and job creation proposals. The analysis in this report does *not* distinguish among jurisdictions based on such discretionary incentives, because:

- There is generally no before-the-fact basis for forecasting the value of incentives a jurisdiction may ultimately provide, without entering into negotiations over a specific investment proposal
- The primary focus of the cost analysis is on the fundamental business cost structures that apply to representative operations within different industries.

### 5. Interpretation of Results

While great care has been taken in performing this analysis and developing the findings, the resulting comparisons are of a general nature. All factors examined in this study are subject to change over time due to changes in local laws, regulations, and/or market conditions. The results of this study should not be interpreted as a definitive or final opinion on the merits of locating any specific facility in one jurisdiction over another. Further analysis is required to determine the preferred site for a specific facility or operation.

### 6. Further Information on Methodology

Further details on methodology are contained in the Appendices to this report, available online at [www.CompetitiveAlternatives.com](http://www.CompetitiveAlternatives.com).

## 2. The International Comparison

### A. Overall Results by Country

Business costs in each country are estimated based on the analysis of:

- Representative business operations in 17 industries (Exhibit 1.3)
- 26 individual cost components (Exhibit 1.4)
- A representative group of major cities in each country chosen to provide comparable national averages (Exhibit 1.6).

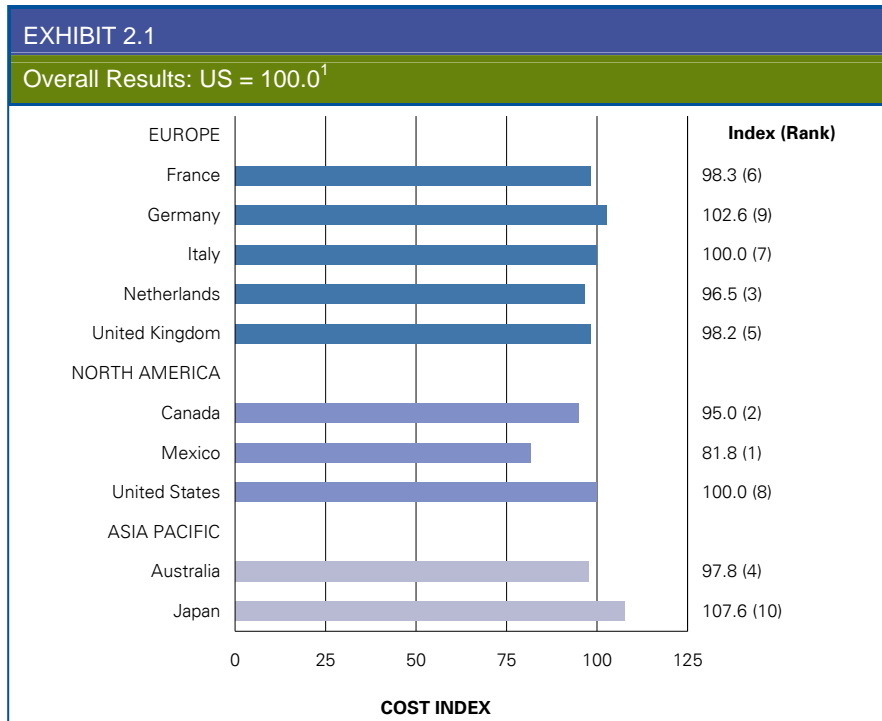
Overall results are illustrated in Exhibit 2.1. Total business costs in each country are expressed as an index, with the baseline index of 100.0 being assigned to the United States. Countries with business costs lower than the US baseline have a cost index less than 100, while countries with business costs higher than the US baseline have a cost index greater than 100. Rankings are based on ascending business costs, with the lowest cost country ranking first.

**Mexico** is ranked first among the 10 countries. With a cost index of 81.8, this represents an 18.2 percent cost advantage over the United States benchmark. This rating reflects Mexico's status as the sole emerging industrial country among the 10 nations studied.

**Canada**, the **Netherlands**, and **Australia** are the cost leaders among the nine industrialized countries, with cost indices of 95.0, 96.5, and 97.8, respectively.

Business costs in the **United Kingdom** and **France** are nearly equivalent at 98.2 and 98.3, respectively. Costs in **Italy**, at 100.0, are virtually equivalent to the study baseline—the **United States**.

**Germany** and **Japan** have the highest business cost structures among the 10 countries examined, with costs 2.6 and 7.6 percent higher (respectively) than the United States.



<sup>1</sup> Average for 17 operations. (Refer to Exhibit 1.3 and related text.)

## B. Cost Trends 2008-2010

Exhibit 2.2 compares the rankings of all countries in the 2010 edition of *Competitive Alternatives* to their rankings in the previous 2008 edition, and details key cost trends that have influenced the results of each country in the 2010 study.

Rankings for most countries are generally consistent between 2008 and 2010. The two exceptions are the Netherlands, which has seen a notable improvement in its ranking, and the United States, which has seen a notable decline.

These changes are due in part to the shift in study focus for the 2010 edition of *Competitive Alternatives*, to base the national comparisons on business costs for the largest cities in each country, rather than the mix of different sized cities compared in previous editions. This change has improved the national ranking of the Netherlands due to its relatively homogeneous cost structures across the country, while worsening the ranking of the United States, which sees much greater variation in costs between its largest cities and smaller regional ones. This issue is explored further in Chapter 4.

While most variations in country results are explained by the trends identified in Exhibit 2.2, some caution must be applied in the interpretation of historical trends due to ongoing refinements to the costing methodology used in successive editions of *Competitive Alternatives*.

EXHIBIT 2.2				
Cost Trends Since 2008				
Country	Significant Cost Trends	2010		2008
		Index	Rank	Rank
Australia	<ul style="list-style-type: none"> <li>- 4% currency appreciation against the US\$</li> <li>- Decrease in sea and air freight rates</li> <li>- Increase in electricity rates</li> <li>- Decrease in natural gas rates</li> <li>- New refundable R&amp;D tax credit replaces old deduction-based R&amp;D tax incentives</li> </ul>	97.8	4	4
Canada	<ul style="list-style-type: none"> <li>- 6% currency depreciation against the US\$</li> <li>- Increase in employee benefit costs</li> <li>- Federal and provincial tax reductions</li> </ul>	95.0	2	2
France	<ul style="list-style-type: none"> <li>- Local tax reform with new tax on value added</li> <li>- Decrease in sea and air freight rates</li> <li>- Increase in office lease costs<sup>1</sup></li> </ul>	98.3	6	5
Germany	<ul style="list-style-type: none"> <li>- Decrease in sea freight rates</li> <li>- Decrease in electricity and gas rates</li> <li>- Increase in office lease costs<sup>1</sup></li> </ul>	102.6	9	10
Italy	<ul style="list-style-type: none"> <li>- Special tax incentives for investments in 2010</li> <li>- Decrease in sea and air freight rates</li> <li>- Decrease in employee benefit costs</li> <li>- Increase in office lease costs<sup>1</sup></li> </ul>	100.0	7	8
Japan	<ul style="list-style-type: none"> <li>- 24% currency appreciation against the US\$</li> <li>- Decrease in sea and air freight rates</li> <li>- Decrease in electricity and gas rates</li> <li>- Decrease in employee benefit costs</li> </ul>	107.6	10	9
Mexico	<ul style="list-style-type: none"> <li>- 17% currency depreciation against the US\$</li> <li>- Increase in federal corporate and sales tax rates to counter growing government deficit</li> <li>- Final phase-in of new minimum tax regime</li> <li>- Decrease in natural gas rates</li> <li>- Increase in office lease costs<sup>1</sup></li> </ul>	81.8	1	1
Netherlands	<ul style="list-style-type: none"> <li>- Enhancement of existing R&amp;D tax incentives</li> <li>- Decrease in sea freight rates</li> <li>- Decrease in natural gas rates</li> <li>- Decrease in employee benefit costs</li> </ul>	96.5	3 <sup>1</sup>	7
United Kingdom	<ul style="list-style-type: none"> <li>- 18% currency depreciation against the US\$</li> <li>- Decrease in sea and air freight rates</li> <li>- Increase in electricity rates</li> <li>- Tax depreciation on industrial buildings is being eliminated</li> <li>- Increase in office lease costs<sup>1</sup></li> </ul>	98.2	5	6
United States	<ul style="list-style-type: none"> <li>- Some tax increases due to state deficits</li> <li>- Largest increase in salary costs<sup>1</sup></li> <li>- Increase in employee benefit costs</li> <li>- Decreases in real estate costs in some cities</li> <li>- Increase in electricity rates</li> <li>- Decrease in natural gas rates</li> </ul>	100.0	8 <sup>1</sup>	3

<sup>1</sup> Reflects shift in study focus to major cities in the 2010 edition. (See text for details.)

## C. Sensitivity to Exchange Rates

Exchange rates are a key consideration for business investors when comparing international locations, and the international comparisons provided in this study are sensitive to currency exchange rates. Exhibit 2.3 illustrates the sensitivity of the 2010 results to future shifts in exchange rates.

The percentage impact on business costs (converted to US dollars) is less than the percentage change in exchange rates because:

- Some cost factors—such as major plant equipment, commodity raw materials, and international transportation—are generally priced globally in US dollars. Changes in local exchange rates do not alter the cost of these factors when expressed in US dollars
- Corporate income taxes tend to dampen the after-tax effects of exchange rate shifts.

The analysis presented here reflects the output of the CompetitiveAlternatives.com cost model, which compares all costs in US dollars. While exchange rate changes do not directly vary local business costs expressed in local currency, they do impact international competitiveness when converted to a common currency.

### 1. European Countries

Based on the 2010 study exchange rates, business costs in the European countries studied range from 3.5 percent (the Netherlands) lower to 2.6 percent (Germany) higher than the United States.

A depreciation of just 10 percent in the European currencies (Euro and Pound) would result in all European countries falling below the US benchmark.

Conversely, if the European currencies were to appreciate by 10 percent relative to the US dollar, the US would move ahead of all European countries, with the exception of the Netherlands.

EXHIBIT 2.3

### Sensitivity of Results to Exchange Rates

	If Local Currency Decreases in Value vs. US \$		2010 Study Results	If Local Currency Increases in Value vs. US \$	
	-20%	-10%	0%	10%	20%
<b>Euro<sup>1</sup></b>	<b>€0.82</b>	<b>€0.75</b>	<b>€0.68</b>	<b>€0.61</b>	<b>€0.54</b>
France	93.7	95.8	98.3	101.6	106.0
Germany	96.9	99.5	102.6	106.9	113.4
Italy	94.7	97.1	100.0	103.7	109.1
Netherlands	91.5	93.8	96.5	99.9	104.1
<b>UK Pound<sup>1</sup></b>	<b>£0.73</b>	<b>£0.67</b>	<b>£0.61</b>	<b>£0.55</b>	<b>£0.49</b>
United Kingdom	93.0	95.4	98.2	101.8	107.0
<b>Canadian Dollar<sup>1</sup></b>	<b>CA \$1.27</b>	<b>CA \$1.17</b>	<b>CA \$1.06</b>	<b>CA \$0.95</b>	<b>CA \$0.85</b>
Canada	90.5	92.5	95.0	98.0	102.2
<b>Mexican Peso<sup>1</sup></b>	<b>MX \$15.68</b>	<b>MX \$14.38</b>	<b>MX \$13.07</b>	<b>MX \$11.76</b>	<b>MX \$10.46</b>
Mexico	79.4	80.5	81.8	83.4	85.3
<b>Australian dollar<sup>1</sup></b>	<b>AU \$1.32</b>	<b>AU \$1.21</b>	<b>AU \$1.10</b>	<b>AU \$0.99</b>	<b>AU \$0.88</b>
Australia	92.9	95.1	97.8	101.2	106.0
<b>Japanese Yen<sup>1</sup></b>	<b>¥107.83</b>	<b>¥98.85</b>	<b>¥89.86</b>	<b>¥80.87</b>	<b>¥71.89</b>
Japan	101.4	104.1	107.6	112.9	120.8

<sup>1</sup> Local currency value per US dollar.

### 2. Canada and Mexico

Canada holds a business cost advantage of 5 percent relative to the United States at current exchange rates. If the Canadian dollar were to appreciate by about 15 percent to approximately CA \$0.90 per US dollar, Canada's cost advantage would be eliminated and business costs would be equivalent to the US.

Mexico's cost competitiveness holds across a wide range of future exchange rates. Even if Mexico's currency was to appreciate by 20 percent against the US dollar, the resulting cost index of 85.3 would still be more than 14 percent lower than the US benchmark.

### 3. Asia Pacific

Australia's current cost advantage over the US of 2.2 percent is quite sensitive to exchange rate changes. An appreciation of the Australian dollar by 10 percent would place Australia at a 1.2 percent business cost disadvantage to the United States.

Japan's cost index is higher than the US benchmark over a wide range of exchange rates. Relative to Europe, the Japanese yen would have to devalue by approximately 15 percent vis-à-vis the Euro to make Japan's cost structures competitive with those of Germany.

### 4. Further Sensitivity Analysis

Further analysis of the impact of exchange rates on the results of this study, as applied to specific cities and industries, can be obtained by visiting the Detailed Results section of the study website at [www.CompetitiveAlternatives.com](http://www.CompetitiveAlternatives.com).

## 3. Results by Industry and Operation

Chapter 3 details the analysis and results for the 17 industries and representative operations examined in this study.

Exhibit 3.1 identifies each of the 17 industries examined, along with the representative operation that has been modeled for each industry.

The specific operations modeled in this study are also relevant to a wide range of other industries. For example:

- The metal machining operation is relevant to the manufacture of building products (hardware), industrial equipment, agricultural equipment, and transportation equipment
- With the increasing sophistication of many product types, electronics assembly applications are relevant not only to the electronics equipment industry, but also to other industries, such as automotive, aerospace, medical devices, and telecom equipment
- Biomedical R&D is broadly applicable to such industries as biotechnology, pharmaceuticals, agricultural biotechnology, and marine biotechnology. While representing different fields of specialization, these industries also share many common operating parameters.

Exhibit 3.1 illustrates further examples of the many types of operations for which the results of this study may be relevant.

EXHIBIT 3.1	
Industries and Modeled Operations	
Industry	Modeled Operations Are Relevant To:
<b>Manufacturing</b>	
Aerospace	Aircraft parts <sup>1</sup>
Agri-Food	Food processing <sup>1</sup> Packaged, dried, or canned food products Confectionery products
Automotive	Auto parts <sup>1</sup> Auto parts assembly
Chemicals	Specialty chemicals <sup>1</sup> Specialty adhesives and solvents Specialty fragrances and essences
Electronics	Electronics assembly <sup>1</sup> Automotive electronics systems Electronics manufacturing services Electro-medical device manufacturing
Medical Devices	Medical device manufacturing <sup>1</sup>
Metal Components	Metal machining <sup>1</sup> Building products (hardware) Industrial equipment components Agricultural equipment components Transportation equipment components
Pharmaceuticals	Pharmaceutical production <sup>1</sup> Prescription drug manufacturing Non-prescription drug manufacturing Vitamin and health supplement manufacturing
Plastics	Plastic products <sup>1</sup> Plastic auto parts Electronic device casings Furniture components
Precision Manufacturing	Precision components <sup>1</sup> Engine parts manufacturing Precision component casings and housings
Telecommunications	Telecom equipment <sup>1</sup>
<b>Corporate and IT Services</b>	
Back Office/Call Centers	Shared services center <sup>1</sup> Call center Back office facilities Data processing center
Software Design	Software development <sup>1</sup> Digital animation development Biometric applications development Voice recognition applications development
Web and Multimedia	Content development <sup>1</sup> (web, multimedia, gaming) Multimedia content development Routine software maintenance
<b>R&amp;D</b>	
Biotechnology	Biomedical R&D <sup>1</sup> Agri-food R&D Marine biotech R&D Pharmaceutical R&D
Clinical Trials	Clinical trials management <sup>1</sup> Phase II/III clinical trials
Product Testing	Electronics systems development and testing <sup>1</sup> Aerospace systems R&D and testing Telecom systems R&D and testing

<sup>1</sup> Indicates the representative operation modeled in each study.

# A. Manufacturing

## 1. Aerospace

The aerospace industry produces commercial and military aircraft and parts, military weapons, space rockets, and satellites. The Aerospace Industries Association of America estimates that revenues for the US aerospace industry totaled \$240 billion in 2008.

### a) Representative Operation – Aircraft Parts

The membership of the Aerospace Industries Association of America (excluding aircraft assemblers and service providers) comprises approximately 45 percent precision metal component manufacturers, 40 percent electronic assemblers, and 15 percent plastics producers. The representative operation modeled, a manufacturer of aircraft parts, is based on this mix of production.

As outlined in Exhibit 3.2, this type of operation is characterized by:

- Moderate land and building requirements, and relatively low equipment requirements
- A workforce consisting primarily of skilled technicians and operators
- Moderate energy requirements.

The business is assumed to operate as a stand-alone profit center.

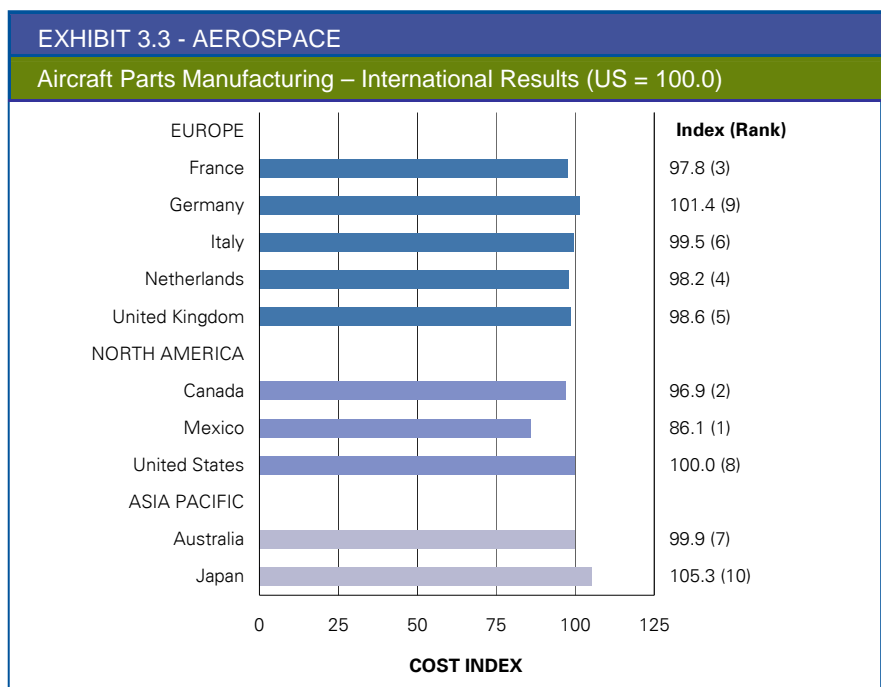
### b) International Results

International results are illustrated in Exhibit 3.3. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.4.

### c) Selected Cities

Exhibit 3.5 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.2 – AEROSPACE	
Aircraft Parts Manufacturing – Summary of Operating Parameters	
<b>Facilities Requirements</b>	
Leased industrial facility	5 acres (20,234 m2)
Size of factory built	76,500 ft2 (7,107 m2)
<b>Other Initial Investment Requirements</b>	
Machinery and equipment – US \$'000	\$7,000
Office equipment – US \$'000	\$250
R&D equipment – US \$'000	\$300
Inventory – US \$'000	\$8,000
Equity financing – % of project costs	50%
<b>Workforce</b>	
Management	4
Sales and administration	10
Production/non-dedicated product development	
- Professional, technical	36
- Operators	27
- Unskilled laborers	5
Other	3
<b>Total employees</b>	<b>85</b>
<b>Energy Requirements</b>	
Electricity monthly consumption/peak demand	177,000 kWh and 675 kW
Gas monthly consumption	7,250 CCF (20,538 m3)
<b>Other Annual Operating Characteristics</b>	
Sales at full production – US \$'000	\$31,000
Materials and other direct costs – % of sales	48%
Other operating costs – % of sales	4%
Investment in tax-eligible R&D – % of sales	1.8%



## EXHIBIT 3.4 – AEROSPACE

## Aircraft Parts Manufacturing – Costs by Major Component, US '\$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	29,800	29,800	29,800	29,800	29,800	29,800	29,800	29,800	29,800	29,800
<b>Costs</b>										
- Salaries & Wages	4,289	5,951	4,714	5,146	4,658	4,913	2,074	5,109	5,118	6,341
- Statutory Plans	1,938	1,003	1,001	671	447	498	147	485	662	610
- Other Benefits	900	1,281	1,371	1,447	1,564	1,256	601	1,985	1,157	1,579
- Total Labor & Benefits	7,127	8,235	7,086	7,264	6,669	6,668	2,821	7,579	6,938	8,529
- Facility Lease	523	653	627	696	1,066	406	369	387	549	1,212
- Transportation	1,907	1,850	2,086	2,164	1,784	2,540	2,573	2,278	3,196	1,914
- Utilities	334	448	648	419	414	272	264	261	420	423
- Interest & Depreciation	1,463	1,559	1,506	1,485	1,536	1,462	916	1,483	1,400	1,607
- Non-Income Taxes	431	203	47	43	615	352	52	423	167	763
- Location-Insensitive Costs	15,421	15,421	15,421	15,421	15,421	15,421	15,421	15,421	15,421	15,421
<b>Profit Before Income Tax</b>	2,595	1,433	2,379	2,310	2,296	2,680	7,385	1,968	1,711	(69)
- Income Taxes <sup>1</sup>	611	457	877	419	524	443	2,053	602	327	63
Effective Rate	23.5%	31.9%	36.9%	18.1%	22.8%	16.5%	27.8%	30.6%	19.1%	n/a
<b>After-Tax Profit</b>	1,984	975	1,502	1,891	1,772	2,237	5,331	1,366	1,384	(133)
<b>Total Annual Costs</b>	27,816	28,825	28,297	27,909	28,028	27,562	24,469	28,435	28,417	29,931
<b>Index (US=100.0)</b>	<b>97.8</b>	<b>101.4</b>	<b>99.5</b>	<b>98.2</b>	<b>98.6</b>	<b>96.9</b>	<b>86.1</b>	<b>100.0</b>	<b>99.9</b>	<b>105.3</b>
<b>Rank</b>	<b>3</b>	<b>9</b>	<b>6</b>	<b>4</b>	<b>5</b>	<b>2</b>	<b>1</b>	<b>8</b>	<b>7</b>	<b>10</b>

<sup>1</sup> Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.5 – AEROSPACE

## Aircraft Parts Manufacturing – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Selected Cluster Cities</b>		
<b>AU</b> Adelaide	100.5	83	<b>JP</b> Osaka	104.2	92	<b>CA</b> Montreal, QC	96.8	16
Brisbane	100.5	82	Tokyo	106.3	93	Toronto, ON	97.1	23
Melbourne	99.1	64			Winnipeg, MB	95.5	6	
Sydney	100.8	86	<b>MX</b> Mexico City	86.3	2	Vancouver, BC	97.1	24
			Monterrey	85.9	1			
<b>FR</b> Lyon	97.4	28			<b>US</b> Atlanta, GA	97.5	31	
Paris	98.2	51	<b>NL</b> Amsterdam	98.1	44	Hartford, CT	100.2	81
			Brabant Stad	97.8	40	Indianapolis, IN	98.1	46
<b>GE</b> Berlin	100.6	85	The Hague	98.2	50	Oklahoma City, OK	97.0	21
Frankfurt	102.1	90	Utrecht	98.2	47	Phoenix, AZ	99.5	71
					Seattle, WA	100.0	77	
<b>IT</b> Milan	98.8	62	<b>UK</b> London	101.5	88	St. Louis, MO	98.6	58
Rome	100.2	79	Manchester	95.7	7	Wichita, KS	98.2	49

<sup>1</sup> Rank among 95 cities.

## 2. Agri-Food

The agri-food industry encompasses the production of food, beverage, and tobacco products. In the United States alone, the industry provided more than 1.5 million jobs 2007. The industry is highly fragmented, with thousands of small independent food processors competing for market share with some of the world's largest conglomerates.

### a) Representative Operation – Food Processing

The representative operation modeled is a small independent food processor, producing medium-value, non-perishable products, such as packed, dried, or canned foods; or confectionary products. As illustrated in Exhibit 3.6, this operation is characterized by:

- Moderate facility and equipment requirements
- A workforce with a relatively high proportion of lesser-skilled employees
- Moderate energy requirements.

The business is assumed to operate as a stand-alone profit center.

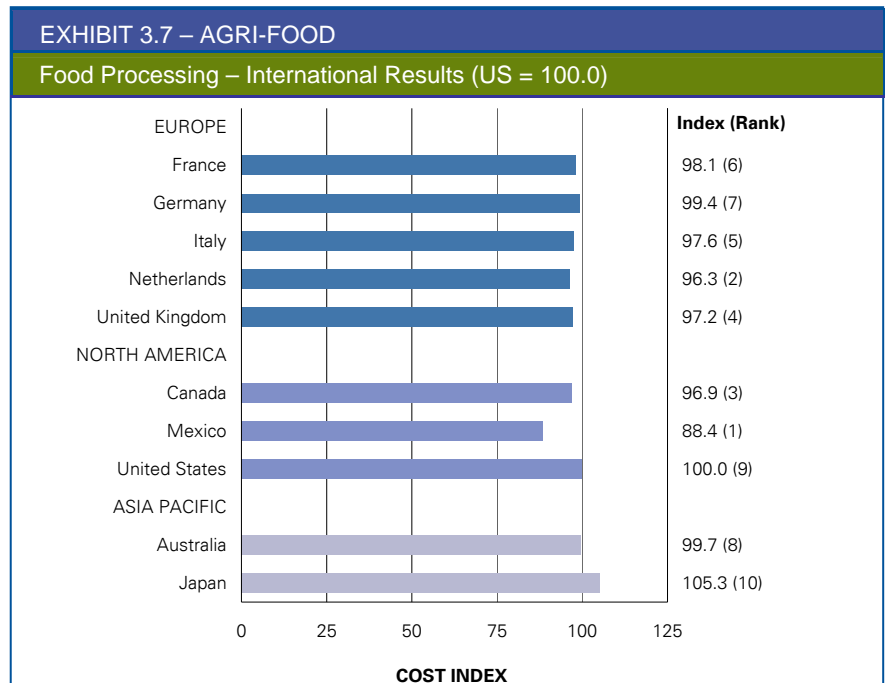
### b) International Results

International results are illustrated in Exhibit 3.7. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.8.

### c) Selected Cities

Exhibit 3.9 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.6 – AGRI-FOOD	
Food Processing – Summary of Operating Parameters	
<b>Facilities Requirements</b>	
Leased industrial facility	3 acres (12,141 m <sup>2</sup> )
Size of factory built	50,000 ft <sup>2</sup> (4,645 m <sup>2</sup> )
<b>Other Initial Investment Requirements</b>	
Machinery and equipment – US \$'000	\$18,000
Office equipment – US \$'000	\$300
R&D equipment – US \$'000	–
Inventory – US \$'000	\$2,000
Equity financing – % of project costs	50%
<b>Workforce</b>	
Management	6
Sales and administration	12
Production/non-dedicated product development	
- Professional, technical	8
- Operators	44
- Unskilled laborers	37
Other	3
Total employees	110
<b>Energy requirements</b>	
Electricity monthly consumption/peak demand	370,000 kWh and 1,260 kW
Gas monthly consumption	30,000 CCF (84,986 m <sup>3</sup> )
<b>Other Annual Operating Characteristics</b>	
Sales at full production – US \$'000	\$40,000
Materials and other direct costs – % of sales	44%
Other operating costs – % of sales	6%
Investment in tax-eligible R&D – % of sales	–



## EXHIBIT 3.8 – AGRI-FOOD

## Food Processing – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000
<b>Costs</b>										
- Salaries & Wages	4,303	5,932	4,574	5,302	4,821	5,202	1,742	5,103	5,350	6,955
- Statutory Plans	1,985	1,076	1,000	710	447	590	123	637	700	680
- Other Benefits	901	1,246	1,305	1,318	1,628	1,330	529	1,983	1,209	1,813
- Total Labor & Benefits	7,189	8,254	6,879	7,330	6,896	7,122	2,394	7,723	7,259	9,448
- Facility Lease	342	427	410	455	697	265	242	253	359	792
- Transportation	1,971	1,687	2,063	1,747	1,750	2,766	4,039	2,781	3,219	2,339
- Utilities	892	1,134	1,503	1,036	987	655	611	624	1,043	1,049
- Interest & Depreciation	2,762	2,823	2,752	2,741	2,813	2,814	2,085	2,835	2,571	2,968
- Non-Income Taxes	591	147	31	29	428	235	42	528	96	681
- Location-Insensitive Costs	19,000	19,000	19,000	19,000	19,000	19,000	19,000	19,000	19,000	19,000
<b>Profit Before Income Tax</b>	5,255	4,530	5,362	5,664	5,431	5,145	9,588	4,257	4,454	1,724
- Income Taxes <sup>1</sup>	1,663	1,377	1,598	1,412	1,511	1,125	2,597	1,320	1,411	629
Effective Rate	31.6%	30.4%	29.8%	24.9%	27.8%	21.9%	27.1%	31.0%	31.7%	36.4%
<b>After-Tax Profit</b>	3,592	3,153	3,764	4,252	3,920	4,020	6,991	2,937	3,043	1,096
<b>Total Annual Costs</b>	34,408	34,847	34,236	33,750	34,081	33,981	31,010	35,063	34,958	36,905
<b>Index (US=100.0)</b>	<b>98.1</b>	<b>99.4</b>	<b>97.6</b>	<b>96.3</b>	<b>97.2</b>	<b>96.9</b>	<b>88.4</b>	<b>100.0</b>	<b>99.7</b>	<b>105.3</b>
<b>Rank</b>	<b>6</b>	<b>7</b>	<b>5</b>	<b>2</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>9</b>	<b>8</b>	<b>10</b>

<sup>1</sup> Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.9 – AGRI-FOOD

## Food Processing – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Lowest Cost Cities</b>		
<b>AU</b> Adelaide	100.2	73	<b>JP</b> Osaka	104.9	92	<b>CA</b> Sherbrooke, QC	95.9	4
Brisbane	100.2	74	Tokyo	105.6	93	Quebec City, QC	96.6	11
Melbourne	98.9	56				Moncton, NB	96.7	13
Sydney	100.5	76	<b>MX</b> Mexico City	89.1	2	Montreal, QC	96.8	14
			Monterrey	87.8	1			
<b>FR</b> Lyon	98.4	39				<b>US</b> Charleston, WV	96.4	8
Paris	97.9	27	<b>NL</b> Amsterdam	96.1	5	Youngstown, OH	96.5	10
			Brabant Stad	96.3	6	Lexington, KY	96.6	11
<b>GE</b> Berlin	98.8	52	The Hague	96.4	9	Greenville-Spartanburg, SC	96.9	15
Frankfurt	100.0	72	Utrecht	96.4	7	Shreveport, LA	97.0	16
						Atlanta, GA	97.3	22
<b>IT</b> Milan	97.3	21	<b>UK</b> London	98.8	55	Buffalo, NY	97.4	23
Rome	98.0	28	Manchester	95.6	3	Raleigh, NC	97.7	25

<sup>1</sup> Rank among 95 cities.

### 3. Automotive

The global automotive industry is dominated by world-scale manufacturers, such as Toyota, General Motors, Ford, Chrysler, Honda, Nissan, and others. These manufacturers outsource much of their parts production to larger "Tier 1" suppliers, who, in turn, often subcontract production to smaller "Tier 2/3" manufacturers. Parts manufacturers may supply both Original Equipment Manufacturers (OEMs) and the replacement parts market.

#### a) Representative Operation – Auto Parts

Most "Tier 2/3" suppliers manufacture a specialty or some combination of metal components (approximately 75 percent of a vehicle), plastic components (15 percent), and electronic components (10 percent). The representative operation modeled is a "Tier 2/3" supplier of manufactured auto parts assemblies. As illustrated in Exhibit 3.10, this operation is characterized by:

- Moderate facility and equipment requirements
- A balanced workforce of skilled and unskilled workers
- Moderate energy requirements
- Relatively high costs for materials, reflecting the significant use of components and sub-assemblies
- .

The business is assumed to operate as a stand-alone profit center.

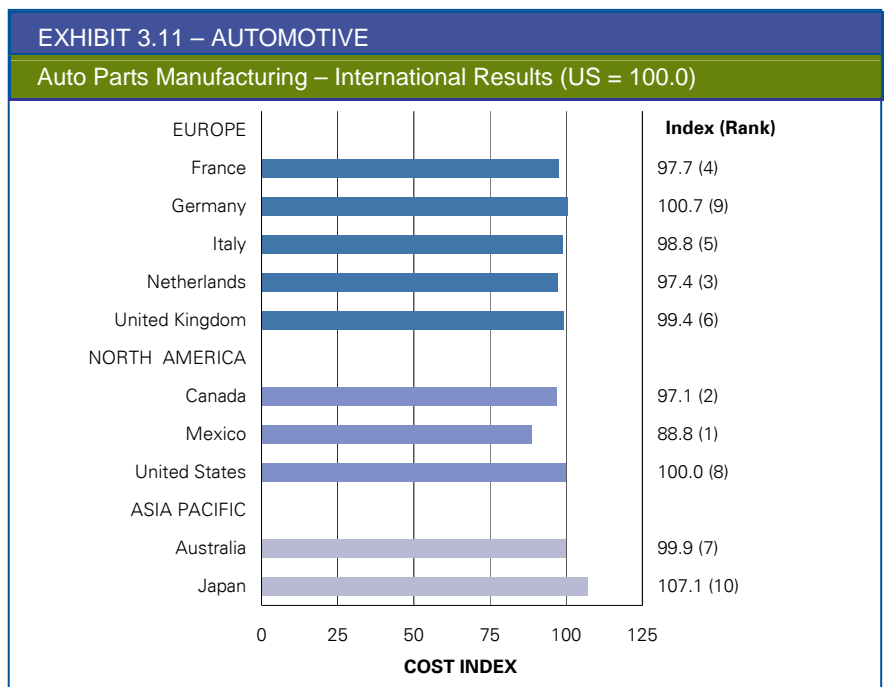
#### b) International Results

International results are illustrated in Exhibit 3.11. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.12.

#### c) Selected Cities

Exhibit 3.13 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.10 – AUTOMOTIVE	
Auto Parts Manufacturing – Summary of Operating Parameters	
<b>Facilities Requirements</b>	
Leased industrial facility	6 acres (24,281 m2)
Size of factory built	100,000 ft2 (9,290 m2)
<b>Other Initial Investment Requirements</b>	
Machinery and equipment – US \$'000	\$13,000
Office equipment – US \$'000	\$500
R&D equipment – US \$'000	\$75
Inventory – US \$'000	\$2,500
Equity financing – % of project costs	50%
<b>Workforce</b>	
Management	4
Sales and administration	15
Production/non-dedicated product development	
- Professional, technical	22
- Operators	36
- Unskilled laborers	18
Other	5
Total employees	100
<b>Energy requirements</b>	
Electricity monthly consumption/peak demand	352,500 kWh and 1,152 kW
Gas monthly consumption	13,295 CCF (37,663 m3)
<b>Other Annual Operating Characteristics</b>	
Sales at full production – US \$'000	\$40,000
Materials and other direct costs – % of sales	55%
Other operating costs – % of sales	6%
Investment in tax-eligible R&D – % of sales	2.5%



## EXHIBIT 3.12 – AUTOMOTIVE

## Auto Parts Manufacturing – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	38,200	38,200	38,200	38,200	38,200	38,200	38,200	38,200	38,200	38,200
<b>Costs</b>										
- Salaries & Wages	4,192	5,802	4,501	5,149	4,639	4,981	1,791	4,997	5,143	6,646
- Statutory Plans	1,925	1,042	971	695	435	559	128	505	670	642
- Other Benefits	879	1,226	1,290	1,332	1,565	1,273	538	1,942	1,146	1,705
- Total Labor & Benefits	6,995	8,070	6,761	7,175	6,639	6,813	2,458	7,444	6,959	8,994
- Facility Lease	683	853	820	909	1,394	531	483	506	718	1,584
- Transportation	1,079	940	1,170	980	982	1,625	2,184	1,568	2,335	1,149
- Utilities	587	789	1,137	737	727	480	498	458	816	744
- Interest & Depreciation	2,119	2,231	2,159	2,133	2,237	2,147	1,529	2,178	2,057	2,484
- Non-Income Taxes	516	261	59	56	796	452	49	649	217	1,029
- Location-Insensitive Costs	23,302	23,302	23,302	23,302	23,302	23,302	23,302	23,302	23,302	23,302
<b>Profit Before Income Tax</b>	2,920	1,755	2,793	2,909	2,125	2,851	7,698	2,095	1,798	(1,085)
- Income Taxes <sup>1</sup>	571	536	864	461	405	288	2,095	600	250	38
Effective Rate	19.5%	30.6%	31.0%	15.8%	19.1%	10.1%	27.2%	28.6%	13.9%	n/a
<b>After-Tax Profit</b>	2,349	1,219	1,929	2,449	1,720	2,563	5,603	1,495	1,548	(1,123)
<b>Total Annual Costs</b>	35,852	36,981	36,272	35,751	36,481	35,637	32,597	36,705	36,652	39,323
<b>Index (US=100.0)</b>	<b>97.7</b>	<b>100.7</b>	<b>98.8</b>	<b>97.4</b>	<b>99.4</b>	<b>97.1</b>	<b>88.8</b>	<b>100.0</b>	<b>99.9</b>	<b>107.1</b>
<b>Rank</b>	<b>4</b>	<b>9</b>	<b>5</b>	<b>3</b>	<b>6</b>	<b>2</b>	<b>1</b>	<b>8</b>	<b>7</b>	<b>10</b>

1 Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.13 – AUTOMOTIVE

## Auto Parts Manufacturing – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Selected Cluster Cities</b>		
<b>AU</b> Adelaide	99.7	74	<b>JP</b> Osaka	105.8	92	<b>CA</b> Montreal, QC	96.7	10
Brisbane	99.7	76	Tokyo	108.5	95	Sherbrooke, QC	95.3	4
Melbourne	99.0	67				St. Catharines-Niagara, ON	97.2	18
Sydney	100.7	86	<b>MX</b> Mexico City	89.2	2	Toronto, ON	97.4	25
			Monterrey	88.4	1			
<b>FR</b> Lyon	97.5	26	<b>NL</b> Amsterdam	97.3	20	<b>US</b> Charleston, WV	96.8	12
Paris	97.9	37	Brabant Stad	97.1	17	Detroit, MI	98.8	62
			The Hague	97.5	28	Greenville-Spartanburg, SC	97.0	16
<b>GE</b> Berlin	100.1	80	Utrecht	97.4	23	Jackson, MS	98.0	41
Frankfurt	101.4	88				Lexington, KY	96.9	13
			<b>UK</b> London	102.1	90	Montgomery, AL	97.8	35
<b>IT</b> Milan	98.3	52	Manchester	96.7	9	Nashville, TN	98.2	46
Rome	99.3	69				Saginaw, MI	98.0	40

1 Rank among 95 cities.

## 4. Chemicals

The chemicals industry encompasses the production of basic organic and inorganic chemicals, synthetic rubber and fibers, pesticides and fertilizers, pharmaceuticals, paints and adhesives, soaps, and cleaning compounds. In the United States alone, the total value of shipments for the chemicals industry exceeded \$650 billion in 2006, and in 2007 the industry provided almost 800,000 jobs.

### a) Representative Operation – Specialty Chemicals Manufacturing

The representative operation modeled is a smaller producer of specialty chemicals in limited volumes for niche markets, such as the production of industrial and consumer cleaning products, solvents, adhesives, and fragrances. As illustrated in Exhibit 3.14, this operation is characterized by:

- Modest land and building requirements
- Moderate initial machinery and equipment requirements
- A workforce consisting of predominantly professional and technical staff, and skilled operators.
- Moderate energy requirements.

The business is assumed to operate as a stand-alone profit center.

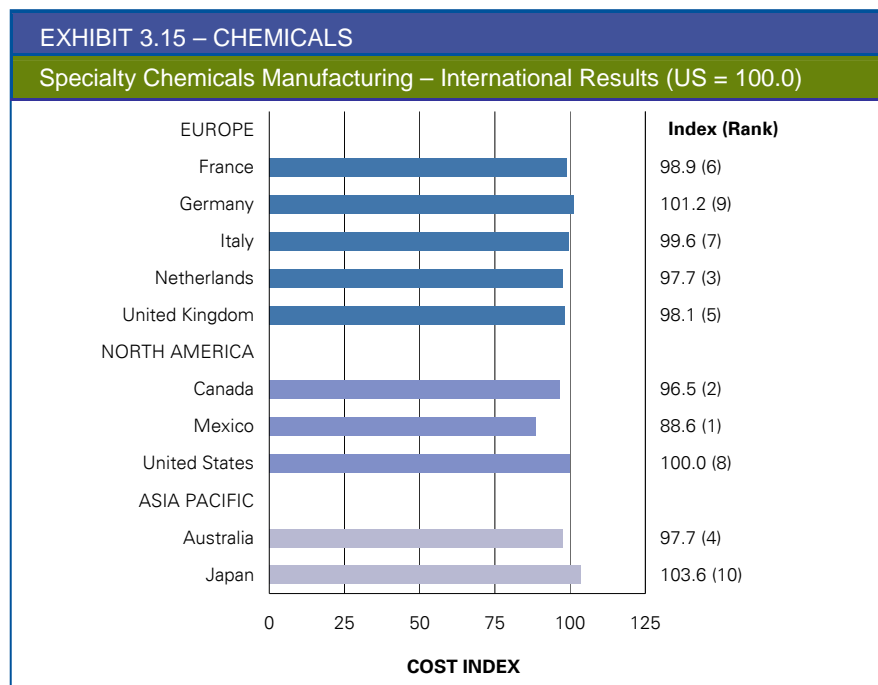
### b) International Results

International results are illustrated in Exhibit 3.15. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.16.

### c) Selected Cities

Exhibit 3.17 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.14 – CHEMICALS	
Specialty Chemicals Manufacturing – Summary of Operating Parameters	
<b>Facilities Requirements</b>	
Leased industrial facility	3 acres (12,141 m2)
Size of factory built	50,000 ft2 (4,645 m2)
<b>Other Initial Investment Requirements</b>	
Machinery and equipment – US \$'000	\$14,000
Office equipment – US \$'000	\$500
R&D equipment – US \$'000	\$500
Inventory – US \$'000	\$5,000
Equity financing – % of project costs	50%
<b>Workforce</b>	
Management	5
Sales and administration	11
Customer support	5
Production/non-dedicated product development	
- Professional, technical	34
- Operators	33
- Unskilled laborers	10
Other	2
<b>Total employees</b>	<b>100</b>
<b>Energy Requirements</b>	
Electricity monthly consumption/peak demand	300,000 kWh and 1,080 kW
Gas monthly consumption	41,300 CCF (116,997 m3)
<b>Other Annual Operating Characteristics</b>	
Sales at full production – US \$'000	\$50,000
Materials and other direct costs – % of sales	53%
Other operating costs – % of sales	8%
Investment in tax-eligible R&D – % of sales	2.1%



## EXHIBIT 3.16 – CHEMICALS

## Speciality Chemicals Manufacturing – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	48,200	48,200	48,200	48,200	48,200	48,200	48,200	48,200	48,200	48,200
<b>Costs</b>										
- Salaries & Wages	4,872	6,758	5,341	5,849	5,301	5,573	2,316	5,706	5,870	7,261
- Statutory Plans	2,204	1,137	1,134	755	506	528	167	518	764	705
- Other Benefits	1,022	1,452	1,552	1,615	1,781	1,425	678	2,217	1,333	1,821
- Total Labor & Benefits	8,098	9,347	8,027	8,219	7,588	7,526	3,162	8,441	7,968	9,788
- Facility Lease	342	427	410	455	697	265	242	253	359	792
- Transportation	546	489	564	514	508	1,042	1,134	874	1,061	465
- Utilities	1,028	1,258	1,562	1,131	1,045	704	597	665	1,055	1,147
- Interest & Depreciation	2,328	2,437	2,357	2,312	2,375	2,371	1,386	2,409	1,937	2,547
- Non-Income Taxes	590	147	31	29	428	238	53	623	96	632
- Location-Insensitive Costs	29,402	29,402	29,402	29,402	29,402	29,402	29,402	29,402	29,402	29,402
<b>Profit Before Income Tax</b>	5,868	4,694	5,848	6,138	6,158	6,653	12,226	5,532	6,324	3,429
- Income Taxes <sup>1</sup>	1,588	1,443	1,856	1,317	1,496	1,279	3,383	1,736	1,503	1,249
Effective Rate	27.1%	30.7%	31.7%	21.5%	24.3%	19.2%	27.7%	31.4%	23.8%	36.4%
<b>After-Tax Profit</b>	4,281	3,251	3,992	4,821	4,663	5,375	8,843	3,797	4,821	2,181
<b>Total Annual Costs</b>	43,920	44,950	44,209	43,379	43,537	42,826	39,357	44,403	43,379	46,020
<b>Index (US=100.0)</b>	<b>98.9</b>	<b>101.2</b>	<b>99.6</b>	<b>97.7</b>	<b>98.1</b>	<b>96.5</b>	<b>88.6</b>	<b>100.0</b>	<b>97.7</b>	<b>103.6</b>
<b>Rank</b>	<b>6</b>	<b>9</b>	<b>7</b>	<b>3</b>	<b>5</b>	<b>2</b>	<b>1</b>	<b>8</b>	<b>4</b>	<b>10</b>

1 Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.17 – CHEMICALS

## Specialty Chemical Manufacturing – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Lowest Cost Cities</b>		
<b>AU</b> Adelaide	97.2	24	<b>JP</b> Osaka	103.4	93	<b>CA</b> Moncton, NB	94.2	3
Brisbane	97.9	38	Tokyo	103.9	94	Fredericton, NB	94.5	4
Melbourne	96.9	21	<b>MX</b> Mexico City	88.8	2	St. John's, NL	95.2	5
Sydney	98.5	54	Monterrey	88.5	1	Sherbrooke, QC	95.3	6
<b>FR</b> Lyon	98.5	52	<b>NL</b> Amsterdam	97.6	30	<b>US</b> Shreveport, LA	96.4	14
Paris	99.3	72	Brabant Stad	97.7	31	Cheyenne, WY	96.8	20
<b>GE</b> Berlin	100.7	86	The Hague	97.7	34	McAllen, TX	96.9	22
Frankfurt	101.8	90	Utrecht	97.7	33	Charleston, WV	97.1	23
<b>IT</b> Milan	99.1	68	<b>UK</b> London	99.5	74	Sioux Falls, SD	97.3	25
Rome	100.0	82	Manchester	96.6	18	Greenville-Spartanburg, SC	97.5	26
						Omaha, NE	97.5	27
						Youngstown, OH	97.6	28

1 Rank among 95 cities.

## 5. Electronics

The global size of the electronics assembly industry has been estimated by Electronic Trend Publications as approximately US \$964 billion in 2008. In the United States alone, the value of shipments for the electronics industry totaled more than \$390 billion in 2006, and the industry provided over 1 million jobs in 2007.

### a) Representative Operation – Electronics Assembly

This industry manufactures both finished electronic devices and electronic sub-assemblies. Typical products include assembled components and peripheral devices for brand-name manufacturers and distributors of electronic equipment, as well as for manufacturers in other industries who install electronic devices into their own products (e.g., automobile manufacturers).

The representative operation modeled is an electronics sub-assembly plant. As illustrated in Exhibit 3.18, this operation is characterized by:

- Significant land, building, and equipment requirements
- A workforce weighted heavily toward technical employees, plus a mix of skilled and unskilled staff
- Modest energy requirements
- Relatively high costs for materials, reflecting the significant use of components and sub-assemblies
- Modest in-house R&D activities.

The business is assumed to operate as a stand-alone profit center.

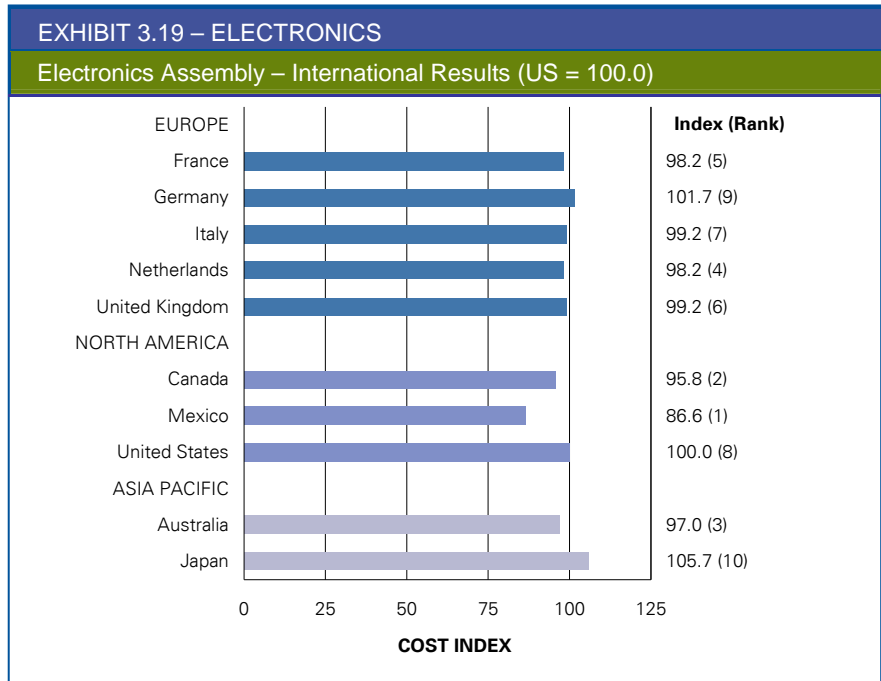
### b) International Results

International results are illustrated in Exhibit 3.19. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.20.

### c) Selected Cities

Exhibit 3.21 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.18 – ELECTRONICS	
Electronics Assembly – Summary of Operating Parameters	
<b>Facilities Requirements</b>	
Leased industrial facility	7 acres (28,328 m2)
Size of factory built	120,000 ft2 (11,148 m2)
<b>Other Initial Investment Requirements</b>	
Machinery and equipment – US \$'000	\$18,000
Office equipment – US \$'000	\$270
R&D equipment – US \$'000	\$750
Inventory – US \$'000	\$5,000
Equity financing – % of project costs	60%
<b>Workforce</b>	
Management	7
Sales and administration	12
Production/non-dedicated product development	
- Professional, technical	51
- Operators	20
- Unskilled laborers	6
Other	4
<b>Total employees</b>	<b>100</b>
<b>Energy Requirements</b>	
Electricity monthly consumption/peak demand	225,000 kWh and 720 kW
Gas monthly consumption	5,600 CCF (15,864 m3)
<b>Other Annual Operating Characteristics</b>	
Sales at full production – US \$'000	\$45,000
Materials and other direct costs – % of sales	48%
Other operating costs – % of sales	4%
Investment in tax-eligible R&D – % of sales	2.8%



## EXHIBIT 3.20 – ELECTRONICS

## Electronics Assembly – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	43,300	43,300	43,300	43,300	43,300	43,300	43,300	43,300	43,300	43,300
<b>Costs</b>										
- Salaries & Wages	4,920	6,851	5,405	5,950	5,307	5,634	2,354	5,830	5,901	7,402
- Statutory Plans	2,228	1,167	1,156	783	508	487	168	551	769	710
- Other Benefits	1,032	1,471	1,568	1,664	1,783	1,440	689	2,265	1,333	1,852
- Total Labor & Benefits	8,180	9,489	8,130	8,397	7,599	7,562	3,211	8,647	8,002	9,964
- Facility Lease	820	1,024	984	1,091	1,672	637	579	607	861	1,901
- Transportation	1,672	1,737	1,891	2,116	1,604	2,051	2,111	1,889	2,067	1,341
- Utilities	321	442	662	418	420	290	302	263	493	422
- Interest & Depreciation	2,692	2,838	2,735	2,732	2,807	2,778	1,679	2,816	2,293	2,990
- Non-Income Taxes	669	311	65	63	937	508	62	718	240	1,294
- Location-Insensitive Costs	22,408	22,408	22,408	22,408	22,408	22,408	22,408	22,408	22,408	22,408
<b>Profit Before Income Tax</b>	6,537	5,052	6,427	6,077	5,855	7,068	12,949	5,953	6,937	2,980
- Income Taxes <sup>1</sup>	1,670	1,551	1,963	1,206	1,384	1,260	3,560	1,805	1,611	1,051
Effective Rate	25.5%	30.7%	30.5%	19.8%	23.6%	17.8%	27.5%	30.3%	23.2%	35.3%
<b>After-Tax Profit</b>	4,868	3,501	4,464	4,871	4,471	5,809	9,389	4,149	5,326	1,929
<b>Total Annual Costs</b>	38,432	39,800	38,837	38,429	38,830	37,492	33,910	39,152	37,975	41,371
<b>Index (US=100.0)</b>	<b>98.2</b>	<b>101.7</b>	<b>99.2</b>	<b>98.2</b>	<b>99.2</b>	<b>95.8</b>	<b>86.6</b>	<b>100.0</b>	<b>97.0</b>	<b>105.7</b>
<b>Rank</b>	<b>5</b>	<b>9</b>	<b>7</b>	<b>4</b>	<b>6</b>	<b>2</b>	<b>1</b>	<b>8</b>	<b>3</b>	<b>10</b>

1 Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.21 – ELECTRONICS

## Electronics Assembly – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Lowest Cost Cities</b>		
<b>AU</b> Adelaide	96.9	27	<b>JP</b> Osaka	105.0	93	<b>CA</b> Moncton, NB	93.9	3
Brisbane	97.0	30	Tokyo	106.4	95	St. John's, NL	94.0	4
Melbourne	96.2	19			Sherbrooke, QC	94.0	5	
Sydney	97.8	46	<b>MX</b> Mexico City	86.5	1	Fredericton, NB	94.2	6
			Monterrey	86.7	2			
<b>FR</b> Lyon	97.6	42			<b>US</b> Shreveport, LA	95.7	15	
Paris	98.7	67	<b>NL</b> Amsterdam	98.1	50	McAllen, TX	96.6	21
			Brabant Stad	97.7	43	Cheyenne, WY	96.7	22
<b>GE</b> Berlin	100.9	87	The Hague	98.2	55	Sioux Falls, SD	96.7	23
Frankfurt	102.4	90	Utrecht	98.1	52	Lexington, KY	96.8	24
					Tampa, FL	96.9	25	
<b>IT</b> Milan	98.5	61	<b>UK</b> London	102.3	89	Oklahoma City, OK	96.9	26
Rome	99.9	82	Manchester	96.0	18	Omaha, NE	96.9	28

1 Rank among 95 cities.

## 6. Medical Devices

The medical devices industry produces a wide range of medium- and high-technology products, such as prosthetics, artificial joints, stents, and braces. In the United States alone, the medical equipment, technology, and supplies industries, of which medical device manufacturing is one component, provided over 300,000 jobs in 2007, with shipments valued at approximately \$75 billion.

### a) Representative Operation – Medical Device Manufacturing

The representative operation modeled is a manufacturer of mechanical medical devices, such as prosthetics. As illustrated in Exhibit 3.22, this operation is characterized by:

- Moderate facility and equipment requirements
- A workforce strongly weighted toward professional/technical staff and skilled operators
- Relatively low energy requirements
- Modest in-house R&D activities.

The business is assumed to operate as a stand-alone profit center.

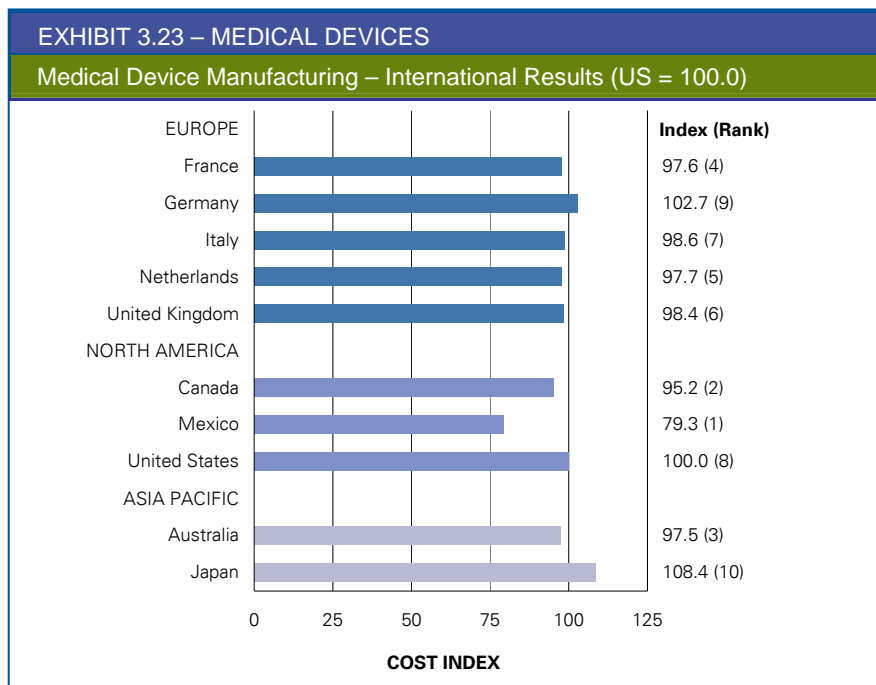
### b) International Results

International results are illustrated in Exhibit 3.23. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.24.

### c) Selected Cities

Exhibit 3.25 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.22 – MEDICAL DEVICES	
Medical Device Manufacturing – Summary of Operating Parameters	
<b>Facilities Requirements</b>	
Leased industrial facility	4 acres (16,187 m <sup>2</sup> )
Size of factory built	70,000 ft <sup>2</sup> (6,503 m <sup>2</sup> )
<b>Other Initial Investment Requirements</b>	
Machinery and equipment – US \$'000	\$14,500
Office equipment – US \$'000	\$200
R&D equipment – US \$'000	\$300
Inventory – US \$'000	\$3,400
Equity financing – % of project costs	55%
<b>Workforce</b>	
Management	6
Sales and administration	15
Production/non-dedicated product development	
- Professional, technical	29
- Operators	34
- Unskilled laborers	13
Other	3
<b>Total employees</b>	<b>100</b>
<b>Energy Requirements</b>	
Electricity monthly consumption/peak demand	140,000 kWh and 475 kW
Gas monthly consumption	2,400 CCF (6,799 m <sup>3</sup> )
<b>Other Annual Operating Characteristics</b>	
Sales at full production – US \$'000	\$24,000
Materials and other direct costs – % of sales	30%
Other operating costs – % of sales	5%
Investment in tax-eligible R&D – % of sales	3.5%



## EXHIBIT 3.24 – MEDICAL DEVICES

## Medical Device Manufacturing – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	22,800	22,800	22,800	22,800	22,800	22,800	22,800	22,800	22,800	22,800
<b>Costs</b>										
- Salaries & Wages	4,620	6,401	5,038	5,579	5,050	5,353	2,145	5,450	5,600	6,997
- Statutory Plans	2,097	1,091	1,080	724	479	509	152	489	729	680
- Other Benefits	969	1,370	1,459	1,510	1,698	1,368	631	2,118	1,269	1,771
- Total Labor & Benefits	7,686	8,863	7,577	7,813	7,227	7,230	2,928	8,058	7,599	9,448
- Facility Lease	478	597	574	637	975	372	338	354	503	1,109
- Transportation	1,047	1,056	1,156	1,248	1,002	1,466	1,515	1,304	1,529	889
- Utilities	188	266	409	253	257	176	184	161	291	255
- Interest & Depreciation	2,354	2,461	2,376	2,379	2,432	2,358	1,678	2,382	2,173	2,519
- Non-Income Taxes	470	181	41	38	554	313	52	488	140	792
- Location-Insensitive Costs	7,866	7,866	7,866	7,866	7,866	7,866	7,866	7,866	7,866	7,866
<b>Profit Before Income Tax</b>	2,713	1,512	2,801	2,568	2,488	3,021	8,241	2,187	2,700	(79)
- Income Taxes <sup>1</sup>	575	450	869	451	532	376	2,236	560	533	67
Effective Rate	21.2%	29.7%	31.0%	17.6%	21.4%	12.4%	27.1%	25.6%	19.7%	n/a
<b>After-Tax Profit</b>	2,138	1,062	1,932	2,117	1,956	2,645	6,005	1,627	2,167	(145)
<b>Total Annual Costs</b>	20,663	21,738	20,867	20,684	20,844	20,155	16,797	21,173	20,634	22,944
<b>Index (US=100.0)</b>	<b>97.6</b>	<b>102.7</b>	<b>98.6</b>	<b>97.7</b>	<b>98.4</b>	<b>95.2</b>	<b>79.3</b>	<b>100.0</b>	<b>97.5</b>	<b>108.4</b>
<b>Rank</b>	<b>4</b>	<b>9</b>	<b>7</b>	<b>5</b>	<b>6</b>	<b>2</b>	<b>1</b>	<b>8</b>	<b>3</b>	<b>10</b>

1 Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.25 – MEDICAL DEVICES

## Medical Device Manufacturing – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Lowest Cost Cities</b>		
<b>AU</b> Adelaide	96.9	46	<b>JP</b> Osaka	107.1	94	<b>CA</b> Moncton, NB	91.5	3
Brisbane	97.0	47	Tokyo	109.6	95	Fredericton, NB	92.0	4
Melbourne	96.4	39			Sherbrooke, QC	92.2	5	
Sydney	98.5	71	<b>MX</b> Mexico City	79.5	2	St. John's, NL	92.6	6
			Monterrey	79.2	1			
<b>FR</b> Lyon	96.8	42			<b>US</b> Shreveport, LA	93.7	11	
Paris	98.4	67	<b>NL</b> Amsterdam	97.6	54	McAllen, TX	94.6	14
			Brabant Stad	97.4	50	Cheyenne, WY	95.1	18
<b>GE</b> Berlin	101.7	87	The Hague	97.8	60	Oklahoma City, OK	95.1	19
Frankfurt	103.7	90	Utrecht	97.7	58	Bangor, ME	95.3	20
					Sioux Falls, SD	95.3	21	
<b>IT</b> Milan	97.7	57	<b>UK</b> London	102.2	88	Charleston, WV	95.3	22
Rome	99.4	77	Manchester	94.7	15	Tampa, FL	95.3	23

1 Rank among 95 cities.

## 7. Metal Components

The fabricated metal products industry encompasses both a wide range of products and production techniques, producing metal components for such applications as building products (hardware), automotive, agricultural, drilling/mining, transportation, appliances, and others. In the United States alone, this industry provided over 1.5 million jobs in 2007, with shipments valued at more than \$300 billion.

### a) Representative Operation – Metal Machining

The representative operation modeled is a small manufacturer of metal building products using machining tools. As illustrated in Exhibit 3.26, this operation is characterized by:

- Moderately high facility and equipment requirements
- A workforce with some professional/technical positions, many skilled operators, and some unskilled positions
- Moderate energy requirements.

The business is assumed to operate as a stand-alone profit center.

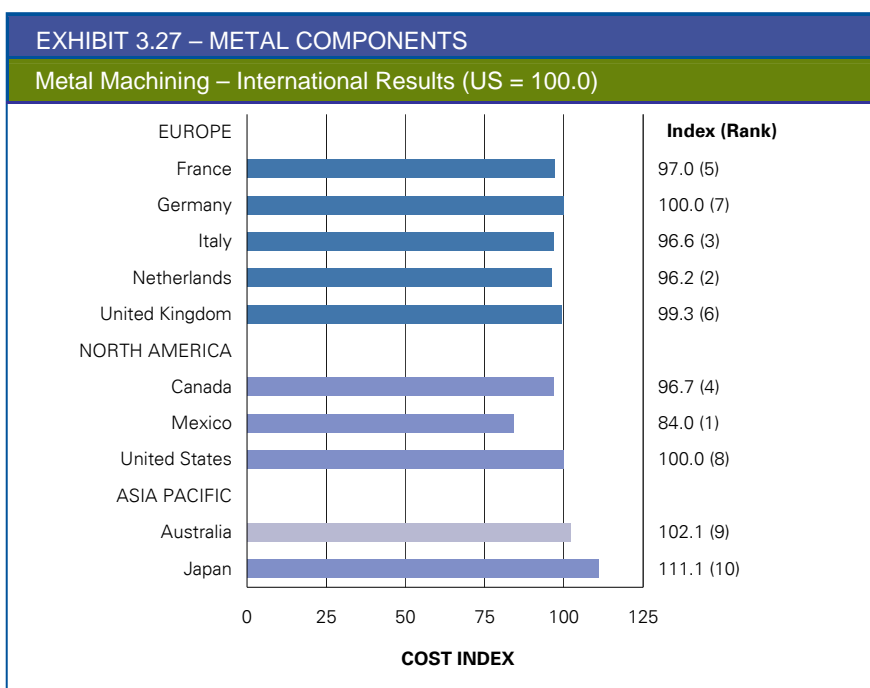
### b) International Results

International results are illustrated in Exhibit 3.27. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.28.

### c) Selected Cities

Exhibit 3.29 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.26 – METAL COMPONENTS	
Metal Machining – Summary of Operating Parameters	
<b>Facilities Requirements</b>	
Leased industrial facility	6 acres (24,281 m <sup>2</sup> )
Size of factory built	100,000 ft <sup>2</sup> (9,290 m <sup>2</sup> )
<b>Other Initial Investment Requirements</b>	
Machinery and equipment – US \$'000	\$19,500
Office equipment – US \$'000	\$500
R&D equipment – US \$'000	–
Inventory – US \$'000	\$2,700
Equity financing – % of project costs	50%
<b>Workforce</b>	
Management	4
Sales and administration	16
Production/non-dedicated product development	
- Professional, technical	11
- Operators	45
- Unskilled laborers	19
Other	5
<b>Total employees</b>	<b>100</b>
<b>Energy Requirements</b>	
Electricity monthly consumption/peak demand	240,000 kWh and 780 kW
Gas monthly consumption	10,200 CCF (28,895 m <sup>3</sup> )
<b>Other Annual Operating Characteristics</b>	
Sales at full production – US \$'000	\$27,000
Materials and other direct costs – % of sales	36%
Other operating costs – % of sales	3%
Investment in tax-eligible R&D – % of sales	–



## EXHIBIT 3.28 – METAL COMPONENTS

## Metal Machining – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000
<b>Costs</b>										
- Salaries & Wages	4,124	5,687	4,402	5,063	4,606	4,918	1,719	4,904	5,078	6,580
- Statutory Plans	1,897	1,028	953	684	430	550	122	503	661	638
- Other Benefits	864	1,198	1,259	1,288	1,555	1,257	519	1,906	1,123	1,697
- Total Labor & Benefits	6,884	7,913	6,614	7,034	6,592	6,724	2,361	7,313	6,862	8,915
- Facility Lease	683	853	820	909	1,394	531	483	506	718	1,584
- Transportation	1,495	1,303	1,622	1,358	1,360	2,255	3,035	2,175	3,232	1,591
- Utilities	421	560	795	521	511	346	349	322	575	526
- Interest & Depreciation	2,391	2,474	2,394	2,407	2,527	2,398	1,913	2,416	2,369	2,706
- Non-Income Taxes	500	261	59	56	796	450	48	635	217	1,174
- Location-Insensitive Costs	10,140	10,140	10,140	10,140	10,140	10,140	10,140	10,140	10,140	10,140
<b>Profit Before Income Tax</b>	3,486	2,497	3,557	3,577	2,682	3,156	7,672	2,491	1,889	(635)
- Income Taxes <sup>1</sup>	771	500	749	670	513	381	1,832	502	404	42
Effective Rate	22.1%	20.0%	21.1%	18.7%	19.1%	12.1%	23.9%	20.2%	21.4%	n/a
<b>After-Tax Profit</b>	2,715	1,997	2,808	2,907	2,169	2,775	5,840	1,989	1,485	(677)
<b>Total Annual Costs</b>	23,285	24,003	23,193	23,093	23,832	23,225	20,161	24,010	24,515	26,678
<b>Index (US=100.0)</b>	<b>97.0</b>	<b>100.0</b>	<b>96.6</b>	<b>96.2</b>	<b>99.3</b>	<b>96.7</b>	<b>84.0</b>	<b>100.0</b>	<b>102.1</b>	<b>111.1</b>
<b>Rank</b>	<b>5</b>	<b>7</b>	<b>3</b>	<b>2</b>	<b>6</b>	<b>4</b>	<b>1</b>	<b>8</b>	<b>9</b>	<b>10</b>

1 Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.29 – METAL COMPONENTS

## Metal Machining – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Lowest Cost Cities</b>		
<b>AU</b> Adelaide	102.3	87	<b>JP</b> Osaka	109.0	92	<b>CA</b> Sherbrooke, QC	94.1	3
Brisbane	102.1	86	Tokyo	113.2	93	Moncton, NB	94.8	4
Melbourne	101.0	80			Quebec City, QC	95.4	10	
Sydney	103.2	90	<b>MX</b> Mexico City	84.9	2	Charlottetown, PE	95.5	11
			Monterrey	83.0	1			
<b>FR</b> Lyon	96.9	29			<b>US</b> Youngstown, OH	94.9	5	
Paris	97.0	31	<b>NL</b> Amsterdam	96.0	17	Shreveport, LA	95.1	6
			Brabant Stad	95.8	14	Lexington, KY	95.3	7
<b>GE</b> Berlin	99.0	65	The Hague	96.4	27	Charleston, WV	95.3	9
Frankfurt	100.9	79	Utrecht	96.2	23	Atlanta, GA	95.7	13
					Greenville-Spartanburg, SC	95.9	15	
<b>IT</b> Milan	95.9	16	<b>UK</b> London	103.2	89	Bangor, ME	96.0	18
Rome	97.2	38	Manchester	95.3	7	Raleigh, NC	96.0	20

1 Rank among 95 cities.

## 8. Pharmaceuticals

IMS Health estimated that the pharmaceuticals industry had global sales of more than \$770 billion in 2008. In the United States alone, the value of shipments for the industry totaled over \$180 billion in 2006, up 9.1 percent from 2005. Production facilities may be owned by pharmaceuticals firms, or by independent firms producing brand-name drugs (under license) and/or generic products.

### a) Representative Operation – Pharmaceutical Production

The representative operation modeled is an independent plant producing prescription drugs on behalf of brand-name and/or generic distributors. As illustrated in Exhibit 3.30, this operation is characterized by:

- Substantial facility and equipment requirements
- A workforce weighted toward professional/technical employees, but also including a significant number of both skilled operators and unskilled staff
- Relatively low energy requirements
- Modest in-house R&D activities.

The business is assumed to operate as a stand-alone profit center.

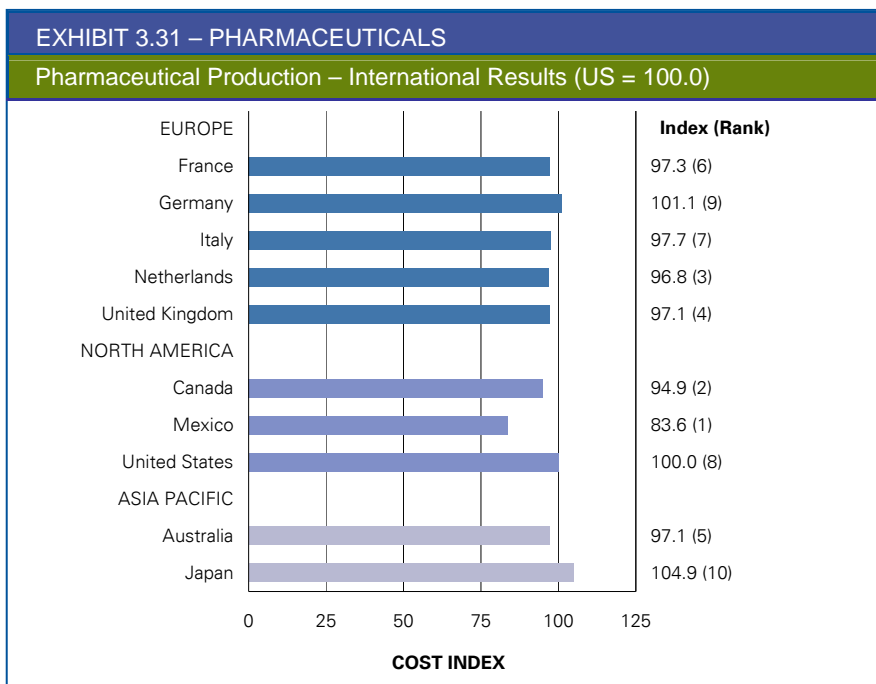
### b) International Results

International results are illustrated in Exhibit 3.31. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.32.

### c) Selected Cities

Exhibit 3.33 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.30 – PHARMACEUTICALS	
Pharmaceutical Production – Summary of Operating Parameters	
<b>Facilities Requirements</b>	
Leased industrial facility	5 acres (20,234 m <sup>2</sup> )
Size of factory built	70,000 ft <sup>2</sup> (6,503 m <sup>2</sup> )
<b>Other Initial Investment Requirements</b>	
Machinery and equipment – US \$'000	\$24,000
Office equipment – US \$'000	\$200
R&D equipment – US \$'000	\$500
Inventory – US \$'000	\$10,000
Equity financing – % of project costs	50%
<b>Workforce</b>	
Management	7
Sales and administration	16
Production/non-dedicated product development	
- Professional, technical	54
- Operators	23
- Unskilled laborers	20
Other	4
<b>Total employees</b>	<b>124</b>
<b>Energy Requirements</b>	
Electricity monthly consumption/peak demand	160,000 kWh and 540 kW
Gas monthly consumption	10,000 CCF (28,329 m <sup>3</sup> )
<b>Other Annual Operating Characteristics</b>	
Sales at full production – US \$'000	\$40,000
Materials and other direct costs – % of sales	27%
Other operating costs – % of sales	15%
Investment in tax-eligible R&D – % of sales	2.6%



## EXHIBIT 3.32 – PHARMACEUTICALS

## Pharmaceutical Production – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	38,150	38,150	38,150	38,150	38,150	38,150	38,150	38,150	38,150	38,150
<b>Costs</b>										
- Salaries & Wages	5,702	7,936	6,223	6,921	6,185	6,621	2,615	6,733	6,922	8,714
- Statutory Plans	2,594	1,371	1,330	912	587	602	192	600	910	845
- Other Benefits	1,195	1,695	1,798	1,883	2,081	1,693	778	2,616	1,577	2,205
- Total Labor & Benefits	9,492	11,002	9,350	9,716	8,853	8,916	3,585	9,950	9,409	11,763
- Facility Lease	478	597	574	637	975	372	338	354	503	1,109
- Transportation	1,635	1,649	1,803	1,948	1,564	2,288	2,365	2,036	2,383	1,386
- Utilities	341	441	599	405	390	271	251	246	419	410
- Interest & Depreciation	4,115	4,256	4,132	4,141	4,231	4,108	3,331	4,150	3,767	4,291
- Non-Income Taxes	783	189	45	40	568	334	62	886	158	954
- Location-Insensitive Costs	16,022	16,022	16,022	16,022	16,022	16,022	16,022	16,022	16,022	16,022
<b>Profit Before Income Tax</b>	5,285	3,994	5,626	5,243	5,547	5,840	12,196	4,507	5,490	2,215
- Income Taxes <sup>1</sup>	1,172	1,216	1,651	949	1,346	880	3,297	1,326	1,303	744
Effective Rate	22.2%	30.4%	29.3%	18.1%	24.3%	15.1%	27.0%	29.4%	23.7%	33.6%
<b>After-Tax Profit</b>	4,113	2,779	3,976	4,293	4,201	4,960	8,899	3,181	4,186	1,470
<b>Total Annual Costs</b>	34,038	35,371	34,175	33,857	33,949	33,190	29,250	34,969	33,964	36,680
<b>Index (US=100.0)</b>	<b>97.3</b>	<b>101.1</b>	<b>97.7</b>	<b>96.8</b>	<b>97.1</b>	<b>94.9</b>	<b>83.6</b>	<b>100.0</b>	<b>97.1</b>	<b>104.9</b>
<b>Rank</b>	<b>6</b>	<b>9</b>	<b>7</b>	<b>3</b>	<b>4</b>	<b>2</b>	<b>1</b>	<b>8</b>	<b>5</b>	<b>10</b>

1 Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.33 – PHARMACEUTICALS

## Pharmaceutical Production – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Lowest Cost Cities</b>		
<b>AU</b> Adelaide	97.0	41	<b>JP</b> Osaka	104.4	92	<b>CA</b> Moncton, NB	91.9	3
Brisbane	97.1	44	Tokyo	105.4	95	Fredericton, NB	92.2	4
Melbourne	96.4	23	<b>MX</b> Mexico City	83.7	2	Sherbrooke, QC	92.9	5
Sydney	97.8	53	Monterrey	83.6	1	St. John's, NL	93.0	6
<b>FR</b> Lyon	96.8	34	<b>NL</b> Amsterdam	96.7	32	<b>US</b> Shreveport, LA	95.3	17
Paris	97.9	55	Brabant Stad	96.7	31	McAllen, TX	96.0	20
<b>GE</b> Berlin	100.4	86	The Hague	96.9	38	Bangor, ME	96.3	21
Frankfurt	101.9	90	Utrecht	96.9	36	Youngstown, OH	96.4	22
<b>IT</b> Milan	97.0	40	<b>UK</b> London	99.5	79	Cheyenne, WY	96.4	24
Rome	98.4	65	Manchester	94.6	12	Lexington, KY	96.5	25
						Oklahoma City, OK	96.5	26
						Tampa, FL	96.5	27

1 Rank among 95 cities.

## 9. Plastics

The plastic products industry encompasses a wide range of products, including bags, films, pipes, bottles, coverings, foam products, and more. In the United States alone, the value of shipments for the plastic products industry in 2006 totaled almost \$175 billion, and in 2007 the industry provided over 700,000 jobs. Typical firms range from large high-volume manufacturers of standard products, to small-volume contract manufacturers.

### a) Representative Operation – Plastic Product Manufacturing

The representative operation modeled is an independent plastic products manufacturer. As illustrated in Exhibit 3.34, this operation is characterized by:

- Substantial land and building requirements, with moderate equipment requirements
- A workforce mix weighted toward skilled operators
- Relatively high energy requirements.

The business is assumed to operate as a stand-alone profit center.

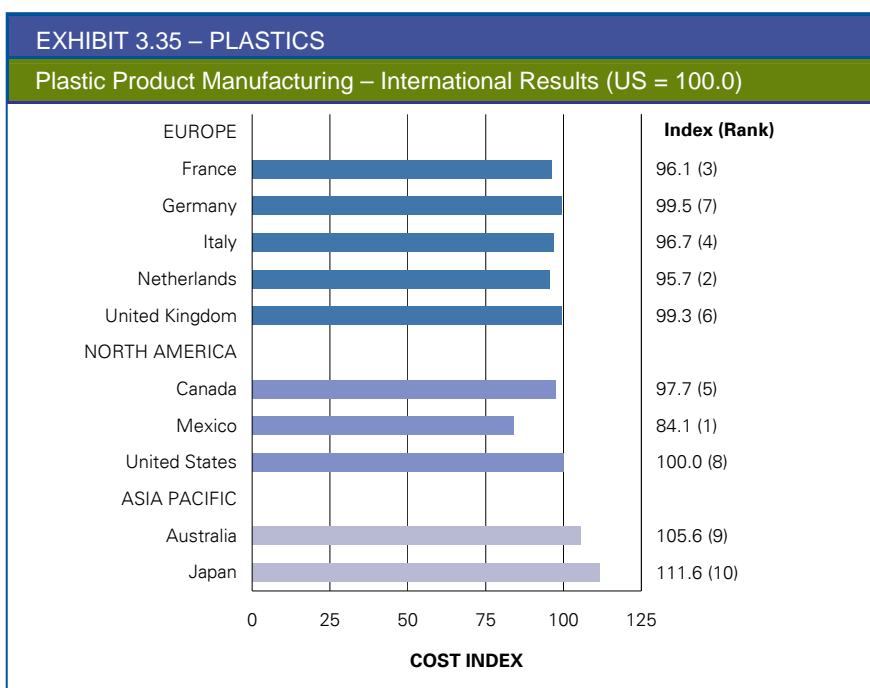
### b) International Results

International results are illustrated in Exhibit 3.35. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.36.

### c) Selected Cities

Exhibit 3.37 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.34 – PLASTICS	
Plastic Product Manufacturing – Summary of Operating Parameters	
<b>Facilities Requirements</b>	
Leased industrial facility	6 acres (24,281 m2)
Size of factory built	100,000 ft2 (9,290 m2)
<b>Other Initial Investment Requirements</b>	
Machinery and equipment – US \$'000	\$17,750
Office equipment – US \$'000	\$250
R&D equipment – US \$'000	–
Inventory – US \$'000	\$2,000
Equity financing – % of project costs	50%
<b>Workforce</b>	
Management	3
Sales and administration	11
Production/non-dedicated product development	
- Professional, technical	9
- Operators	46
- Unskilled laborers	18
Other	3
Total employees	90
<b>Energy Requirements</b>	
Electricity monthly consumption/peak demand	400,000 kWh and 1,350 kW
Gas monthly consumption	8,900 CCF (25,212 m3)
<b>Other Annual Operating Characteristics</b>	
Sales at full production – US \$'000	\$24,000
Materials and other direct costs – % of sales	33%
Other operating costs – % of sales	2%
Investment in tax-eligible R&D – % of sales	–



## EXHIBIT 3.36 – PLASTICS

## Plastic Product Manufacturing – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000
<b>Costs</b>										
- Salaries & Wages	3,610	4,980	3,842	4,454	4,041	4,357	1,487	4,309	4,469	5,819
- Statutory Plans	1,665	909	829	604	375	499	106	474	578	565
- Other Benefits	756	1,047	1,097	1,114	1,365	1,114	451	1,675	979	1,505
- Total Labor & Benefits	6,031	6,936	5,768	6,172	5,781	5,970	2,044	6,459	6,027	7,889
- Transportation	683	853	820	909	1,394	531	483	506	718	1,584
- Utilities	1,746	1,551	1,862	1,625	1,621	2,853	3,406	2,567	4,247	1,817
- Interest & Depreciation	577	804	1,221	761	771	494	537	483	858	768
- Non-Income Taxes	2,118	2,199	2,141	2,140	2,258	2,151	1,723	2,156	2,237	2,452
- Location-Insensitive Costs	464	261	59	56	796	449	43	591	217	1,123
- Location-Insensitive Costs	8,050	8,050	8,050	8,050	8,050	8,050	8,050	8,050	8,050	8,050
<b>Profit Before Income Tax</b>	3,331	2,348	3,078	3,289	2,331	2,504	6,716	2,189	648	(682)
- Income Taxes <sup>1</sup>	756	480	625	618	436	252	1,593	436	84	38
Effective Rate	22.7%	20.5%	20.3%	18.8%	18.7%	10.1%	23.7%	19.9%	13.0%	n/a
<b>After-Tax Profit</b>	2,575	1,867	2,454	2,671	1,895	2,252	5,123	1,753	564	(720)
<b>Total Annual Costs</b>	20,424	21,134	20,546	20,329	21,106	20,748	17,878	21,247	22,437	23,720
<b>Index (US=100.0)</b>	<b>96.1</b>	<b>99.5</b>	<b>96.7</b>	<b>95.7</b>	<b>99.3</b>	<b>97.7</b>	<b>84.1</b>	<b>100.0</b>	<b>105.6</b>	<b>111.6</b>
<b>Rank</b>	<b>3</b>	<b>7</b>	<b>4</b>	<b>2</b>	<b>6</b>	<b>5</b>	<b>1</b>	<b>8</b>	<b>9</b>	<b>10</b>

1 Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.37 – PLASTICS

## Plastics Product Manufacturing – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Lowest Cost Cities</b>		
<b>AU</b> Adelaide	106.3	90	<b>JP</b> Osaka	109.3	92	<b>CA</b> Sherbrooke, QC	95.0	4
Brisbane	105.6	88	Tokyo	114.0	93	Moncton, NB	96.5	23
Melbourne	104.1	87			Quebec City, QC	96.6	27	
Sydney	107.1	91	<b>MX</b> Mexico City	85.3	2	Montreal, QC	96.8	30
			Monterrey	83.0	1			
<b>FR</b> Lyon	96.2	21			<b>US</b> Youngstown, OH	94.4	3	
Paris	96.0	19	<b>NL</b> Amsterdam	95.4	10	Charleston, WV	95.1	6
			Brabant Stad	95.3	8	Shreveport, LA	95.3	7
<b>GE</b> Berlin	98.5	54	The Hague	96.0	17	Atlanta, GA	95.3	9
Frankfurt	100.4	74	Utrecht	95.8	14	Lexington, KY	95.5	11
					Greenville-Spartanburg, SC	95.6	12	
<b>IT</b> Milan	96.0	18	<b>UK</b> London	103.6	85	Raleigh, NC	95.7	13
Rome	97.4	36	Manchester	95.0	5	Baltimore, MD	95.9	15

1 Rank among 95 cities.

## 10. Precision Manufacturing

**Precision manufacturing is a process-related concept, rather than being defined by specific industry definitions or products. Applications that require precision manufacturing exist in many industries and operations, including aerospace (aircraft parts and engines), R&D (laboratory and testing equipment), and automotive (auto engine parts), among others.**

### a) Representative Operation – Precision Component Manufacturing

The representative operation modeled is a small-volume manufacturer of high-value metal products with very low tolerance (e.g., a producer of precision components, casings, and housings). As illustrated in Exhibit 3.38, this operation is characterized by:

- Relatively small land and building requirements, and moderate equipment requirements
- A workforce consisting almost entirely of highly skilled operators
- Modest energy requirements
- High costs for materials, reflecting the high value of alloys used in production.

The business is assumed to operate as a stand-alone profit center.

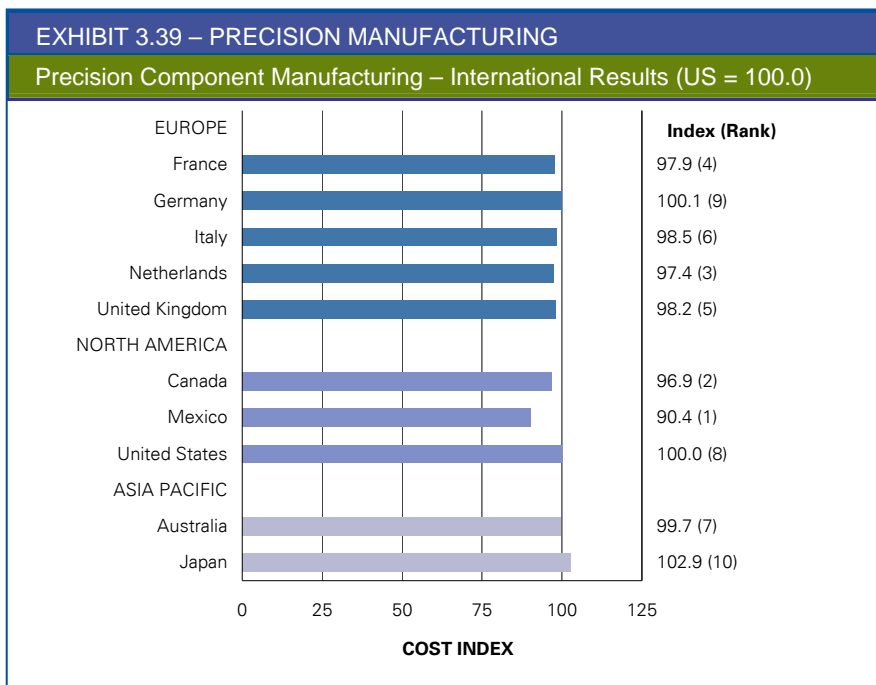
### b) International Results

International results are illustrated in Exhibit 3.39. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.40.

### c) Selected Cities

Exhibit 3.41 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.38 – PRECISION MANUFACTURING	
Precision Component Manufacturing – Summary of Operating Parameters	
<b>Facilities Requirements</b>	
Leased industrial facility	2 acres (8,094 m2)
Size of factory built	30,000 ft2 (2,787 m2)
<b>Other Initial Investment Requirements</b>	
Machinery and equipment – US \$'000	\$14,800
Office equipment – US \$'000	\$200
R&D equipment – US \$'000	–
Inventory – US \$'000	\$2,400
Equity financing – % of project costs	50%
<b>Workforce</b>	
Management	3
Sales and administration	3
Production/non-dedicated product development	
- Professional, technical	4
- Operators	54
- Unskilled laborers	5
Other	1
Total employees	70
<b>Energy Requirements</b>	
Electricity monthly consumption/peak demand	150,000 kWh and 1,025 kW
Gas monthly consumption	7,500 CCF (21,246 m3)
<b>Other Annual Operating Characteristics</b>	
Sales at full production – US \$'000	\$31,000
Materials and other direct costs – % of sales	60%
Other operating costs – % of sales	2%
Investment in tax-eligible R&D – % of sales	1.3%



## EXHIBIT 3.40 – PRECISION MANUFACTURING

## Precision Component Manufacturing – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	30,400	30,400	30,400	30,400	30,400	30,400	30,400	30,400	30,400	30,400
<b>Costs</b>										
- Salaries & Wages	3,270	4,484	3,522	3,966	3,667	3,759	1,479	3,840	3,920	5,018
- Statutory Plans	1,491	783	762	528	347	392	97	417	500	479
- Other Benefits	686	956	1,017	1,060	1,234	961	434	1,492	842	1,269
- Total Labor & Benefits	5,447	6,224	5,301	5,554	5,247	5,112	2,011	5,749	5,262	6,766
- Facility Lease	205	256	246	273	418	160	145	152	215	475
- Transportation	1,012	880	1,095	918	916	1,536	2,011	1,442	2,151	865
- Utilities	369	500	731	469	467	286	252	293	361	474
- Interest & Depreciation	2,470	2,537	2,490	2,475	2,534	2,459	2,123	2,489	2,384	2,557
- Non-Income Taxes	363	89	20	18	259	143	34	320	53	454
- Location-Insensitive Costs	18,848	18,848	18,848	18,848	18,848	18,848	18,848	18,848	18,848	18,848
<b>Profit Before Income Tax</b>	1,688	1,068	1,670	1,846	1,711	1,858	4,978	1,109	1,128	(39)
- Income Taxes <sup>1</sup>	274	309	432	288	380	165	1,348	321	242	36
Effective Rate	16.2%	28.9%	25.9%	15.6%	22.2%	8.9%	27.1%	28.9%	21.5%	n/a
<b>After-Tax Profit</b>	1,414	760	1,237	1,558	1,331	1,694	3,630	788	885	(75)
<b>Total Annual Costs</b>	28,987	29,641	29,163	28,842	29,070	28,708	26,771	29,613	29,514	30,474
<b>Index (US=100.0)</b>	<b>97.9</b>	<b>100.1</b>	<b>98.5</b>	<b>97.4</b>	<b>98.2</b>	<b>96.9</b>	<b>90.4</b>	<b>100.0</b>	<b>99.7</b>	<b>102.9</b>
<b>Rank</b>	<b>4</b>	<b>9</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>2</b>	<b>1</b>	<b>8</b>	<b>7</b>	<b>10</b>

1 Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.41 – PRECISION MANUFACTURING

## Precision Component Manufacturing – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Lowest Cost Cities</b>		
<b>AU</b> Adelaide	99.7	71	<b>JP</b> Osaka	102.4	91	<b>CA</b> Moncton, NB	95.7	3
Brisbane	99.8	73	Tokyo	103.4	93	Sherbrooke, QC	95.7	4
Melbourne	99.2	58			Fredericton, NB	96.1	5	
Sydney	100.2	77	<b>MX</b> Mexico City	91.0	2	Quebec City, QC	96.3	6
			Monterrey	89.8	1			
<b>FR</b> Lyon	97.9	27			<b>US</b> Youngstown, OH	97.2	11	
Paris	97.9	28	<b>NL</b> Amsterdam	97.3	14	Charleston, WV	97.3	13
			Brabant Stad	97.4	18	Shreveport, LA	97.3	17
<b>GE</b> Berlin	99.6	70	The Hague	97.5	20	Greenville-Spartanburg, SC	97.6	23
Frankfurt	100.5	83	Utrecht	97.5	19	Lexington, KY	97.6	24
					Buffalo, NY	97.7	25	
<b>IT</b> Milan	98.3	38	<b>UK</b> London	99.4	65	Atlanta, GA	97.8	26
Rome	98.7	45	Manchester	96.9	9	Tampa, FL	97.9	29

1 Rank among 95 cities.

## 11. Telecommunications

The telecommunications industry includes both service providers and equipment manufacturers, with equipment manufacturers producing both transmitting and receiving equipment for traditional wired networks and modern optical and wireless networks. In the United States alone, employment in the communications equipment industry grew by almost 20 percent between 2006 and 2007, to a total of more than 150,000 employees.

### a) Representative Operation – Telecom Equipment Manufacturing

The representative operation modeled is a manufacturer of specialized telecom equipment in either a wired or a wireless environment. As illustrated in Exhibit 3.42, this operation is characterized by:

- Moderate land, building, and equipment requirements
- A workforce heavily weighted toward highly skilled professional/technical staff and skilled operators
- Modest energy requirements
- Relatively high costs for materials, reflecting the significant use of components and sub-assemblies
- Modest in-house R&D activities.

The business is assumed to operate as a stand-alone profit center.

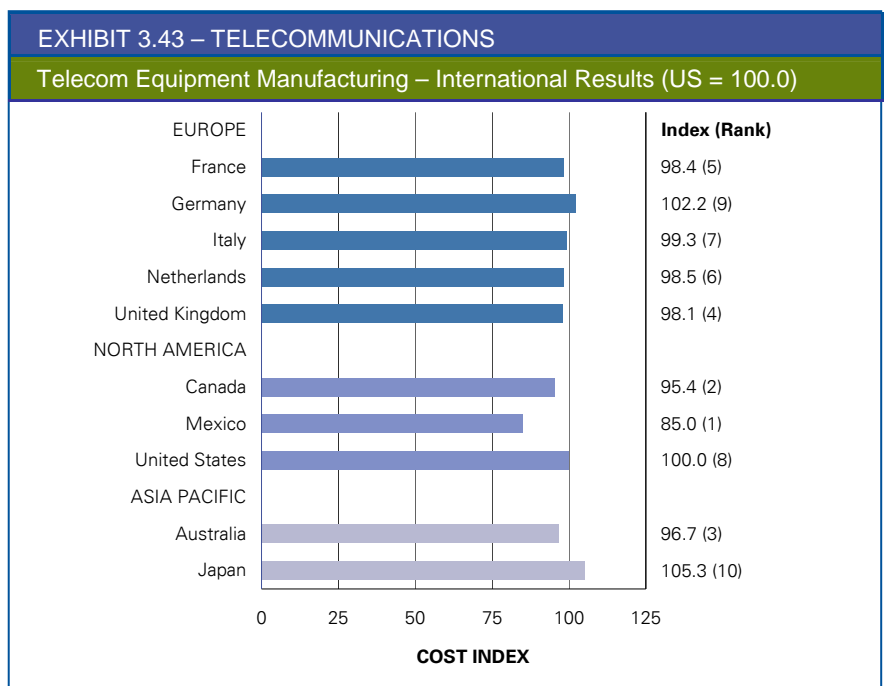
### b) International Results

International results are illustrated in Exhibit 3.43. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.44.

### c) Selected Cities

Exhibit 3.45 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.42 – TELECOMMUNICATIONS	
Telecom Equipment Manufacturing – Summary of Operating Parameters	
<b>Facilities Requirements</b>	
Leased industrial facility	4 acres (16,187 m <sup>2</sup> )
Size of factory built	60,000 ft <sup>2</sup> (5,574 m <sup>2</sup> )
<b>Other Initial Investment Requirements</b>	
Machinery and equipment – US \$'000	\$17,000
Office equipment – US \$'000	\$400
R&D equipment – US \$'000	\$500
Inventory – US \$'000	\$5,000
Equity financing – % of project costs	50%
<b>Workforce</b>	
Management	7
Sales and administration	20
Production/non-dedicated product development	
- Professional, technical	34
- Operators	30
- Unskilled laborers	25
Other	4
<b>Total employees</b>	<b>120</b>
<b>Energy Requirements</b>	
Electricity monthly consumption/peak demand	200,000 kWh and 680 kW
Gas monthly consumption	5,600 CCF (15,864 m <sup>3</sup> )
<b>Other Annual Operating Characteristics</b>	
Sales at full production – US \$'000	\$40,000
Materials and other direct costs – % of sales	45%
Other operating costs – % of sales	8%
Investment in tax-eligible R&D – % of sales	5.3%



## EXHIBIT 3.44 – TELECOMMUNICATIONS

## Telecom Equipment Manufacturing – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	37,700	37,700	37,700	37,700	37,700	37,700	37,700	37,700	37,700	37,700
<b>Costs</b>										
- Salaries & Wages	5,570	7,714	6,061	6,707	6,104	6,445	2,530	6,601	6,714	8,426
- Statutory Plans	2,533	1,332	1,295	888	581	564	185	598	882	818
- Other Benefits	1,168	1,648	1,752	1,835	2,054	1,647	746	2,565	1,527	2,129
- Total Labor & Benefits	9,270	10,694	9,108	9,429	8,740	8,657	3,461	9,764	9,122	11,373
- Facility Lease	410	512	492	546	837	318	290	304	431	951
- Transportation	1,103	1,145	1,247	1,392	1,057	1,358	1,399	1,250	1,361	882
- Utilities	305	419	622	394	395	266	272	248	439	397
- Interest & Depreciation	2,939	3,068	2,967	2,963	3,008	2,901	2,155	2,949	2,652	3,092
- Non-Income Taxes	587	179	40	36	518	288	60	689	127	793
- Location-Insensitive Costs	19,981	19,981	19,981	19,981	19,981	19,981	19,981	19,981	19,981	19,981
<b>Profit Before Income Tax</b>	3,106	1,703	3,244	2,960	3,165	3,932	10,084	2,515	3,587	232
- Income Taxes <sup>1</sup>	539	508	1,013	435	494	311	2,744	520	414	116
Effective Rate	17.4%	29.9%	31.2%	14.7%	15.6%	7.9%	27.2%	20.7%	11.5%	50.5%
<b>After-Tax Profit</b>	2,566	1,195	2,231	2,525	2,671	3,621	7,341	1,994	3,173	115
<b>Total Annual Costs</b>	35,134	36,506	35,469	35,176	35,031	34,080	30,360	35,706	34,526	37,586
<b>Index (US=100.0)</b>	<b>98.4</b>	<b>102.2</b>	<b>99.3</b>	<b>98.5</b>	<b>98.1</b>	<b>95.4</b>	<b>85.0</b>	<b>100.0</b>	<b>96.7</b>	<b>105.3</b>
<b>Rank</b>	<b>5</b>	<b>9</b>	<b>7</b>	<b>6</b>	<b>4</b>	<b>2</b>	<b>1</b>	<b>8</b>	<b>3</b>	<b>10</b>

1 Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.45 – TELECOMMUNICATIONS

## Telecom Equipment Manufacturing – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Lowest Cost Cities</b>		
<b>AU</b> Adelaide	96.2	22	<b>JP</b> Osaka	104.6	94	<b>CA</b> Moncton, NB	92.7	3
Brisbane	96.4	23	Tokyo	105.9	95	Fredericton, NB	92.9	4
Melbourne	96.0	20	<b>MX</b> Mexico City	85.0	2	St. John's, NL	92.9	5
Sydney	97.4	38	Monterrey	85.0	1	Sherbrooke, QC	93.6	6
<b>FR</b> Lyon	97.8	50	<b>NL</b> Amsterdam	98.5	57	<b>US</b> Shreveport, LA	95.6	17
Paris	99.0	72	Brabant Stad	98.4	55	McAllen, TX	96.1	21
<b>GE</b> Berlin	101.6	88	The Hague	98.6	63	Cheyenne, WY	96.5	24
Frankfurt	102.9	91	Utrecht	98.5	60	Sioux Falls, SD	96.6	25
<b>IT</b> Milan	98.8	69	<b>UK</b> London	100.2	85	Tampa, FL	96.7	26
Rome	99.9	82	Manchester	96.0	19	Lexington, KY	96.7	27
						Oklahoma City, OK	96.7	28
						Billings, MT	96.8	29

1 Rank among 95 cities.

## B. Corporate and IT Services

### 1. Back Office/Call Centers

**This industry includes any business support operation that interacts primarily through electronic communication. Typical operations would include inbound call centers (e.g., customer enquiries, internal helpdesks), outbound call centers (e.g., telemarketing, telerecherche), IT/data processing, and other administrative functions. Back office/call center operations may be subsidiary operations of a parent firm, or may be outsourced to an independent service provider.**

#### a) Representative Operation – Shared Services Center

The representative operation modeled is a corporate shared services center incorporating centralized accounting, customer call center, and internal IT support functions.

As illustrated in Exhibit 3.46, this operation is characterized by:

- Leased office space
- A workforce consisting mostly of lesser-skilled administrators, such as clerks, teleservice representatives, and helpdesk agents.

The business is assumed to operate as a fully owned subsidiary of a parent firm, with revenue allocated to the business on a “cost-plus-10 percent” basis.

EXHIBIT 3.46 – BACK OFFICE/CALL CENTERS		
Shared Services Center – Summary of Operating Parameters		
<b>Facilities Requirements</b>		
Class A office space leased	22,500 ft <sup>2</sup>	(2,090 m <sup>2</sup> )
<b>Other Initial Investment Requirements</b>		
Office equipment – US \$'000	\$3,000	
Equity financing – % of project costs	100%	
<b>Workforce</b>		
Management	10	
Sales and administration	88	
Customer support	42	
Other	5	
<b>Total employees</b>	<b>145</b>	
<b>Energy Requirements</b>		
Electricity monthly consumption/peak demand	125,000 kWh and 360 kW	
<b>Other Annual Operating Characteristics</b>		
Sales at full production – US \$'000	– <sup>1</sup>	
Operating costs – US \$'000	\$1,250	

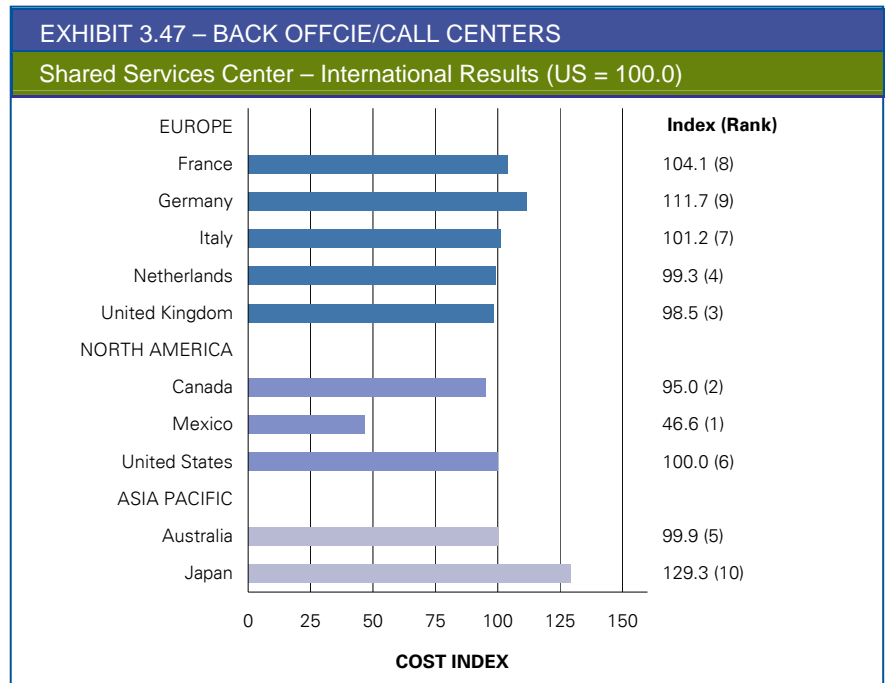
<sup>1</sup> This operation represents a cost center. For taxation purposes, corporate revenue allocated to the operation is assumed to be cost-of-operation, plus 10 percent markup.

#### b) International Results

International results are illustrated in Exhibit 3.47. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.48.

#### c) Selected Cities

Exhibit 3.49 profiles results selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.



## EXHIBIT 3.48 – BACK OFFICE/CALL CENTERS

## Shared Services Center – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	14,943	16,051	14,174	14,354	14,213	13,733	6,632	14,269	14,348	18,391
<b>Costs</b>										
- Salaries & Wages	6,347	8,795	6,843	7,772	6,983	7,564	2,749	7,562	7,785	9,967
- Statutory Plans	2,907	1,551	1,502	1,028	655	669	194	636	1,031	975
- Other Benefits	1,330	1,864	1,966	2,037	2,354	1,750	827	2,267	1,780	2,579
- Total Labor & Benefits	10,584	12,209	10,311	10,837	9,991	9,982	3,770	10,464	10,595	13,520
- Facility Lease	1,092	635	614	454	1,169	717	424	582	741	1,312
- Transportation	-	-	-	-	-	-	-	-	-	-
- Utilities	110	166	278	162	171	130	214	138	188	163
- Interest & Depreciation	340	332	376	340	340	389	318	391	270	397
- Non-Income Taxes	208	-	56	7	-	16	54	146	-	75
- Location-Insensitive Costs	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250
<b>Profit Before Income Tax</b>	1,359	1,459	1,289	1,305	1,292	1,249	603	1,298	1,305	1,675
- Income Taxes <sup>1</sup>	450	462	758	343	357	326	254	510	421	721
Effective Rate	33.1%	31.6%	58.8%	26.3%	27.6%	26.1%	42.1%	39.3%	32.3%	43.0%
<b>After-Tax Profit</b>	909	998	532	962	936	923	349	787	884	955
<b>Total Annual Costs</b>	14,034	15,053	13,642	13,392	13,277	12,810	6,283	13,482	13,465	17,436
<b>Index (US=100.0)</b>	<b>104.1</b>	<b>111.7</b>	<b>101.2</b>	<b>99.3</b>	<b>98.5</b>	<b>95.0</b>	<b>46.6</b>	<b>100.0</b>	<b>99.9</b>	<b>129.3</b>
<b>Rank</b>	<b>8</b>	<b>9</b>	<b>7</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>6</b>	<b>5</b>	<b>10</b>

<sup>1</sup> Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.49 – BACK OFFICE/CALL CENTERS

## Shared Services Center – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Lowest Cost Cities</b>		
<b>AU</b> Adelaide	95.0	59	<b>JP</b> Osaka	126.6	94	<b>CA</b> Moncton, NB	82.6	5
Brisbane	95.9	61	Tokyo	132.0	95	Fredericton, NB	83.7	8
Melbourne	97.6	71			Charlottetown, PE	83.9	9	
Sydney	102.1	82	<b>MX</b> Mexico City	47.4	2	Sherbrooke, QC	84.7	15
			Monterrey	45.8	1			
<b>FR</b> Lyon	96.0	62	<b>NL</b> Amsterdam	100.6	79	<b>US</b> McAllen, TX	79.1	3
Paris	112.1	92	Brabant Stad	99.2	76	Cheyenne, WY	81.9	4
			The Hague	98.1	73	Shreveport, LA	82.7	6
<b>GE</b> Berlin	108.9	90	Utrecht	98.4	74	Sioux Falls, SD	83.1	7
Frankfurt	114.4	93			Fargo, ND	84.0	10	
			<b>UK</b> London	105.3	88	Charleston, WV	84.1	11
<b>IT</b> Milan	99.4	77	Manchester	91.7	45	Billings, MT	84.1	12
Rome	103.0	84			Little Rock, AR	84.5	13	

<sup>1</sup> Rank among 95 cities.

## 2. Software Design

The packaged software industry serves a wide range of markets, including business enterprise software, office software, educational software, and entertainment software. In the United States alone, software publishers employed over 350,000 staff in 2007.

### a) Representative Operation – Advanced Software Development

Software business operations typically range in size from hundreds of programmers providing sophisticated new products, to very small groups serving niche customer markets.

The representative operation performs original technology development and ongoing application development for packaged software applications. As illustrated in Exhibit 3.50, this operation is characterized by:

- Leased office space
- A workforce consisting mostly of very highly skilled product development staff, with heavy sales and administration support.

The business is assumed to operate as a stand-alone profit center.

EXHIBIT 3.50 – SOFTWARE DESIGN

#### Software Development – Summary of Operating Parameters

##### Facilities Requirements

Class A office space leased	22,500 ft <sup>2</sup>	(2,090 m <sup>2</sup> )
-----------------------------	------------------------	-------------------------

##### Other Initial Investment Requirements

Machinery and equipment – US \$'000	–
Office equipment – US \$'000	\$3,000
R&D equipment – US \$'000	\$150
Inventory – US \$'000	–
Equity financing – % of project costs	67%

##### Workforce

Management	17
Sales and administration	33
Dedicated product development	50
Customer support	10
Total employees	110

##### Energy Requirements

Electricity monthly consumption/peak demand	120,000 kWh and 360 kW
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##### Other Annual Operating Characteristics

Sales at full production – US \$'000	\$22,000
Operating costs – % of sales	10%
Investment in tax-eligible R&D – % of sales	–

### b) International Results

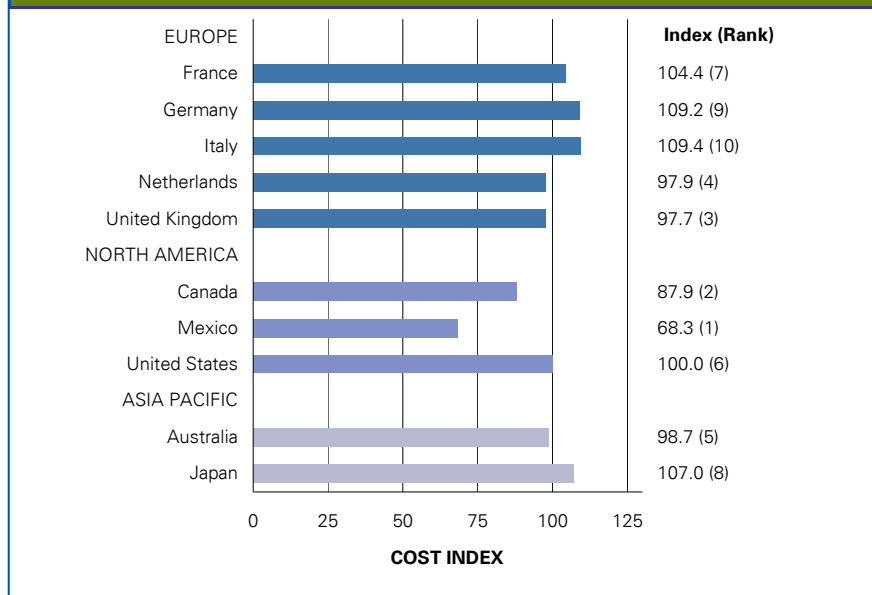
International results are illustrated in Exhibit 3.51. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.52.

### c) Selected Cities

Exhibit 3.53 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.51 – SOFTWARE DESIGN

#### Software Development – International Results (US = 100.0)



## EXHIBIT 3.52 – SOFTWARE DESIGN

## Software Development – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	20,800	20,800	20,800	20,800	20,800	20,800	20,800	20,800	20,800	20,800
<b>Costs</b>										
- Salaries & Wages	8,742	12,068	10,127	9,814	9,157	8,886	5,455	9,762	9,994	10,984
- Statutory Plans	3,770	1,543	2,249	1,000	908	610	333	764	1,296	1,068
- Other Benefits	1,841	2,726	3,064	3,183	3,036	2,055	1,479	2,926	2,481	2,629
- Total Labor & Benefits	14,353	16,338	15,440	13,997	13,101	11,550	7,267	13,453	13,771	14,681
- Facility Lease	1,092	635	615	454	1,169	717	424	582	741	1,312
- Transportation	-	-	-	-	-	-	-	-	-	-
- Utilities	107	162	271	158	167	122	200	134	174	159
- Interest & Depreciation	460	541	539	347	350	335	(795)	433	215	523
- Non-Income Taxes	325	-	56	7	-	17	107	260	-	77
- Location-Insensitive Costs	2,080	2,080	2,080	2,080	2,080	2,080	2,080	2,080	2,080	2,080
<b>Profit Before Income Tax</b>	2,383	1,045	1,801	3,759	3,934	5,981	11,517	3,859	3,821	1,970
- Income Taxes <sup>1</sup>	786	324	1,113	954	1,108	1,347	3,270	1,447	1,170	843
Effective Rate	33.0%	31.0%	61.9%	25.4%	28.2%	22.5%	28.4%	37.5%	30.6%	42.8%
<b>After-Tax Profit</b>	1,596	722	687	2,805	2,826	4,634	8,247	2,413	2,651	1,127
<b>Total Annual Costs</b>	19,204	20,079	20,114	17,996	17,974	16,167	12,554	18,388	18,150	19,673
<b>Index (US=100.0)</b>	<b>104.4</b>	<b>109.2</b>	<b>109.4</b>	<b>97.9</b>	<b>97.7</b>	<b>87.9</b>	<b>68.3</b>	<b>100.0</b>	<b>98.7</b>	<b>107.0</b>
<b>Rank</b>	<b>7</b>	<b>9</b>	<b>10</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>6</b>	<b>5</b>	<b>8</b>

1 Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.53 – SOFTWARE DESIGN

## Software Development – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Selected Cluster Cities</b>		
<b>AU</b> Adelaide	94.5	42	<b>JP</b> Osaka	105.6	88	<b>CA</b> Edmonton, AB	87.7	16
Brisbane	96.2	56	Tokyo	108.4	92	Montreal, QC	86.0	13
Melbourne	96.8	59				Toronto, ON	89.8	20
Sydney	100.6	82	<b>MX</b> Mexico City	68.5	2	Vancouver, BC	87.4	15
			Monterrey	68.0	1			
<b>FR</b> Lyon	98.8	76				<b>US</b> Boston, MA	102.0	84
Paris	110.1	93	<b>NL</b> Amsterdam	98.6	73	Denver, CO	97.7	70
			Brabant Stad	97.6	69	Los Angeles, CA	102.4	85
<b>GE</b> Berlin	107.5	91	The Hague	97.2	64	New York City, NY	103.3	86
Frankfurt	110.8	94	Utrecht	97.4	68	North Virginia (Metro DC)	98.3	72
						Portland, OR	96.9	61
<b>IT</b> Milan	107.0	90	<b>UK</b> London	103.9	87	San Francisco, CA	105.9	89
Rome	111.7	95	Manchester	91.6	27	Seattle, WA	100.0	78

1 Rank among 95 cities.

### 3. Web and Multimedia

The increased affordability of computers with full multimedia capabilities, the growth of broadband internet services, and the dramatic growth of both gaming and mobile internet devices has caused demand for web and multimedia services to grow tremendously in the past decade. Typical services include sophisticated website development and maintenance, development of content for video games, preparation of multimedia presentations, and development of new internet-based educational programs.

#### a) Representative Operation – Content Development

The representative operation modeled performs process-oriented services, such as compiling basic multimedia content and developing standard websites. As illustrated in Exhibit 3.54, this operation is characterized by:

- Leased office space
- A technically oriented workforce that is heavily weighted toward junior programmers.

The business is assumed to operate as a stand-alone profit center.

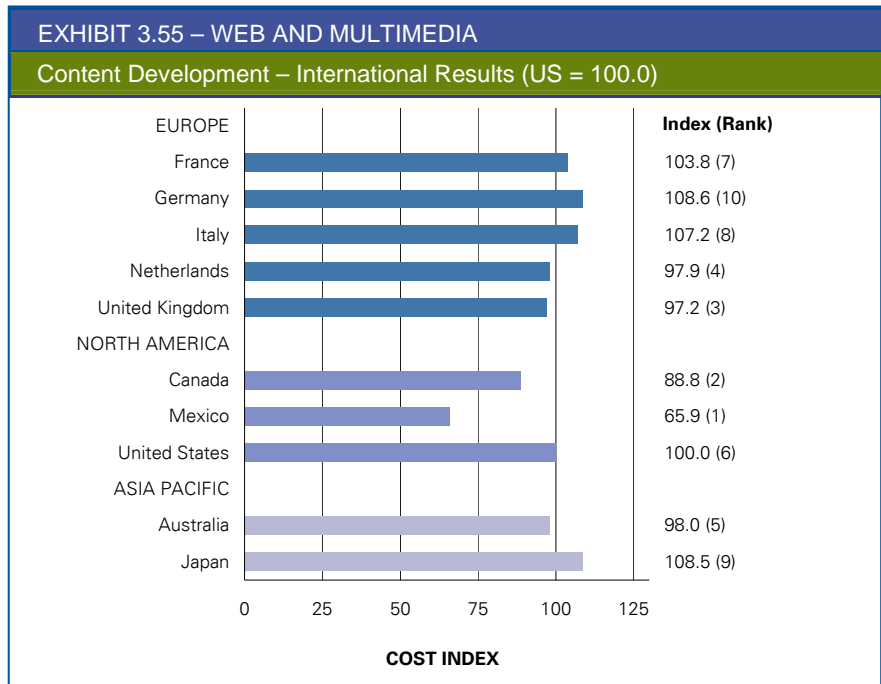
#### b) International Results

International results are illustrated in Exhibit 3.55. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.56.

#### c) Selected Cities

Exhibit 3.57 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.54 – WEB AND MULTIMEDIA		
Content Development – Summary of Operating Parameters		
<b>Facilities Requirements</b>		
Class A office space leased	22,500 ft <sup>2</sup>	(2,090 m <sup>2</sup> )
<b>Other Initial Investment Requirements</b>		
Office equipment – US \$'000	\$2,500	
Equity financing – % of project costs	67%	
<b>Workforce</b>		
Management	14	
Sales and administration	12	
Dedicated product development	82	
Customer support	2	
Total employees	110	
<b>Energy Requirements</b>		
Electricity monthly consumption/peak demand	120,000 kWh	and 360 kW
<b>Other Annual Operating Characteristics</b>		
Sales at full production – US \$'000	\$20,000	
Operating costs – % of sales	10%	
Investment in tax-eligible R&D – % of sales	–	



## EXHIBIT 3.56 – WEB AND MULTIMEDIA

## Content Development – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	18,900	18,900	18,900	18,900	18,900	18,900	18,900	18,900	18,900	18,900
<b>Costs</b>										
- Salaries & Wages	7,694	10,666	8,808	8,821	8,081	8,196	4,516	8,763	8,857	10,040
- Statutory Plans	3,361	1,492	1,933	980	797	589	288	696	1,153	984
- Other Benefits	1,619	2,379	2,637	2,788	2,689	1,896	1,241	2,627	2,174	2,445
- Total Labor & Benefits	12,674	14,536	13,378	12,589	11,568	10,681	6,045	12,086	12,184	13,469
- Facility Lease	1,092	635	614	454	1,169	717	424	582	741	1,312
- Transportation	-	-	-	-	-	-	-	-	-	-
- Utilities	107	162	271	158	167	122	200	134	174	159
- Interest & Depreciation	318	387	362	230	224	228	(876)	311	88	408
- Non-Income Taxes	299	-	56	7	-	15	88	188	-	77
- Location-Insensitive Costs	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890
<b>Profit Before Income Tax</b>	2,521	1,292	2,329	3,573	3,883	5,249	11,129	3,710	3,824	1,587
- Income Taxes <sup>1</sup>	822	391	1,195	897	1,082	1,062	3,153	1,378	1,156	670
Effective Rate	32.6%	30.4%	51.3%	25.1%	27.9%	20.2%	28.3%	37.2%	30.2%	42.3%
<b>After-Tax Profit</b>	1,699	900	1,135	2,676	2,802	4,187	7,977	2,332	2,668	916
<b>Total Annual Costs</b>	17,202	18,001	17,765	16,224	16,099	14,714	10,924	16,569	16,233	17,984
<b>Index (US=100.0)</b>	<b>103.8</b>	<b>108.6</b>	<b>107.2</b>	<b>97.9</b>	<b>97.2</b>	<b>88.8</b>	<b>65.9</b>	<b>100.0</b>	<b>98.0</b>	<b>108.5</b>
<b>Rank</b>	<b>7</b>	<b>10</b>	<b>8</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>6</b>	<b>5</b>	<b>9</b>

<sup>1</sup> Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.57 – WEB AND MULTIMEDIA

## Content Development – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Selected Cluster Cities</b>		
<b>AU</b> Adelaide	94.0	41	<b>JP</b> Osaka	107.2	91	<b>CA</b> Halifax, NS	87.2	13
Brisbane	95.4	55	Tokyo	109.9	94	Saskatoon, SK	86.6	11
Melbourne	96.2	58			St. Catharines-Niagara, ON	88.3	15	
Sydney	99.8	78	<b>MX</b> Mexico City	66.1	2	Winnipeg, MB	86.6	12
			Monterrey	65.8	1			
<b>FR</b> Lyon	98.0	71			<b>US</b> Albuquerque, NM	94.5	44	
Paris	109.7	93	<b>NL</b> Amsterdam	98.7	76	Boise, ID	93.8	39
			Brabant Stad	97.7	70	Harrisburg, PA	94.8	47
<b>GE</b> Berlin	106.9	90	The Hague	97.1	64	Honolulu, HI	100.6	82
Frankfurt	110.4	95	Utrecht	97.4	68	Las Vegas, NV	96.9	61
					Oklahoma City, OK	91.6	29	
<b>IT</b> Milan	104.9	88	<b>UK</b> London	103.1	86	Salt Lake City, UT	94.6	46
Rome	109.5	92	Manchester	91.2	26	Wilmington, DE	97.3	67

<sup>1</sup> Rank among 95 cities.

## C. Research and Development

### 1. Biotechnology

The biotechnology industry encompasses a wide range of applications, such as pharmaceuticals, medical testing, agriculture, environmental management, and DNA fingerprinting. Biotechnology is one of the most research-intensive industries in the world. The global biotech industry spent \$31.7 billion on R&D in 2008, up over 60 percent from 2005.

#### a) Representative Operation – Biomedical R&D

The representative operation modeled is a “pure” biomedical research facility with no commercial sales. As illustrated in Exhibit 3.58, this operation is characterized by:

- A leased office/laboratory facility with significant investment in R&D equipment
- A workforce consisting primarily of research scientists and technicians
- A significant level of tax-eligible R&D activities.

The business is assumed to operate as a fully owned subsidiary of a parent firm, with revenue allocated to the business on a “cost-plus-10 percent” basis.

#### b) International Results

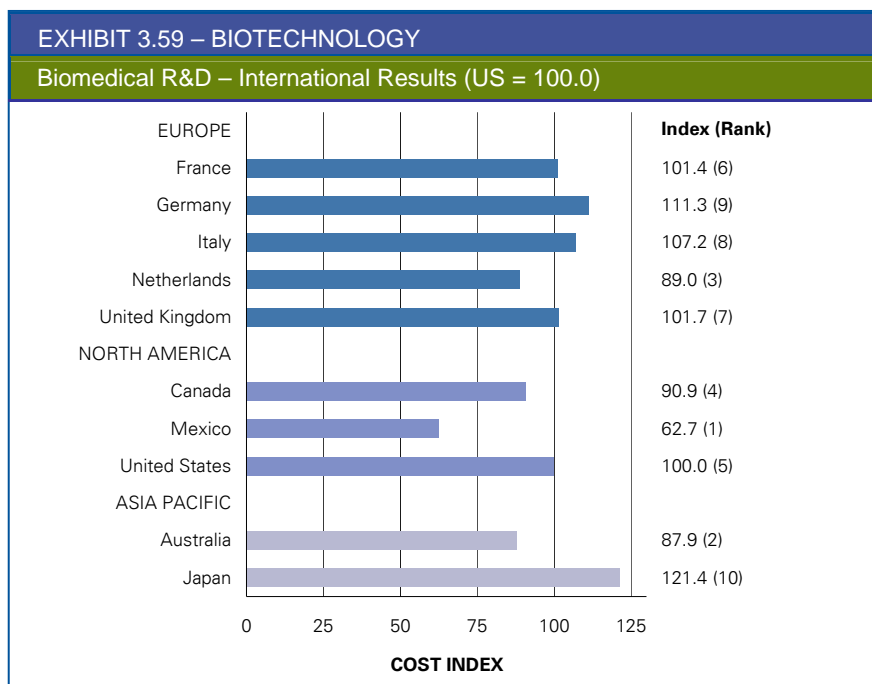
International results are illustrated in Exhibit 3.59. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.60.

#### c) Selected Cities

Exhibit 3.61 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.58 – BIOTECHNOLOGY		
Biomedical R&D – Summary of Operating Parameters		
<b>Facilities Requirements</b>		
Class A office space leased	45,000 ft <sup>2</sup>	(4,181 m <sup>2</sup> )
<b>Other Initial Investment Requirements</b>		
Machinery and equipment – US \$'000	\$500	
Office equipment – US \$'000	\$500	
R&D equipment – US \$'000	\$4,000	
Inventory – US \$'000	–	
Equity financing – % of project costs	100%	
<b>Workforce</b>		
Management	6	
Sales and administration	11	
Dedicated product development	47	
Other	2	
Total employees	66	
<b>Energy Requirements</b>		
Electricity monthly consumption/peak demand	112,600 kWh	and 280 kW
<b>Other Annual Operating Characteristics</b>		
Sales at full production – US \$'000	– <sup>1</sup>	
Operating costs – US \$'000	\$2,000	
Investment in tax-eligible R&D – % of sales	20%	

<sup>1</sup> This operation represents a cost center. For taxation purposes, corporate revenue allocated to the operation is assumed to be cost-of-operation, plus 10 percent markup.



## EXHIBIT 3.60 – BIOTECHNOLOGY

## Biomedical R&amp;D – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	12,821	12,852	12,181	10,350	12,206	10,897	7,227	11,675	11,473	13,951
<b>Costs</b>										
- Salaries & Wages	4,113	5,725	4,674	4,776	4,338	4,502	2,328	4,809	4,818	5,481
- Statutory Plans	1,811	842	974	552	425	333	162	391	614	536
- Other Benefits	865	1,266	1,390	1,450	1,446	1,041	651	1,442	1,163	1,318
- Total Labor & Benefits	6,789	7,834	7,039	6,778	6,210	5,876	3,141	6,642	6,595	7,336
- Facility Lease	2,184	1,269	1,230	907	2,338	1,433	848	1,165	1,482	2,624
- Transportation	-	-	-	-	-	-	-	-	-	-
- Utilities	91	138	231	135	142	106	175	115	161	135
- Interest & Depreciation	510	544	564	551	507	583	460	587	293	606
- Non-Income Taxes	182	-	112	14	-	9	46	205	-	80
- Location-Insensitive Costs	1,900	1,900	1,900	1,900	1,900	1,900	1,900	1,900	1,900	1,900
<b>Profit Before Income Tax</b>	1,166	1,168	1,107	66	1,110	990	657	1,062	1,043	1,271
- Income Taxes <sup>1</sup>	(656)	387	547	(637)	(67)	(55)	224	229	(900)	480
Effective Rate	(56.3%)	33.1%	49.5%	(973.3%)	(6.0%)	(5.5%)	34.0%	21.6%	(86.3%)	37.7%
<b>After-Tax Profit</b>	1,822	781	560	703	1,177	1,045	434	832	1,943	792
<b>Total Annual Costs</b>	10,999	12,071	11,622	9,647	11,030	9,852	6,794	10,843	9,530	13,160
<b>Index (US=100.0)</b>	<b>101.4</b>	<b>111.3</b>	<b>107.2</b>	<b>89.0</b>	<b>101.7</b>	<b>90.9</b>	<b>62.7</b>	<b>100.0</b>	<b>87.9</b>	<b>121.4</b>
<b>Rank</b>	<b>6</b>	<b>9</b>	<b>8</b>	<b>3</b>	<b>7</b>	<b>4</b>	<b>1</b>	<b>5</b>	<b>2</b>	<b>10</b>

1 Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.61 – BIOTECHNOLOGY

## Biomedical R&amp;D – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Selected Cluster Cities</b>		
<b>AU</b> Adelaide	83.5	15	<b>JP</b> Osaka	115.8	93	<b>CA</b> Montreal, QC	87.8	36
Brisbane	84.7	20	Tokyo	127.0	95	Saskatoon, SK	81.2	10
Melbourne	85.0	22			Toronto, ON	93.9	64	
Sydney	90.8	50	<b>MX</b> Mexico City	63.0	2	Vancouver, BC	87.4	32
			Monterrey	62.3	1			
<b>FR</b> Lyon	86.5	29			<b>US</b> Atlanta, GA	91.8	56	
Paris	116.4	94	<b>NL</b> Amsterdam	92.1	59	Baltimore, MD	94.3	65
			Brabant Stad	87.6	33	Boston, MA	106.9	87
<b>GE</b> Berlin	108.3	88	The Hague	85.9	25	Chicago, IL	97.5	74
Frankfurt	114.4	92	Utrecht	86.8	30	Indianapolis, IN	91.1	54
					Minneapolis, MN	94.8	69	
<b>IT</b> Milan	103.7	85	<b>UK</b> London	112.7	91	Raleigh, NC	90.5	48
Rome	110.6	90	Manchester	90.8	51	San Diego, CA	102.2	83

1 Rank among 95 cities.

## 2. Clinical Trials

**Clinical trials are the result of promising new biotech and biomedical research. Once a new drug has been developed and tested on animals, the next step is clinical trials. Phase I clinical trials are conducted to confirm that a drug is not harmful. Phase II clinical trials measure the drug's effectiveness, while Phase III clinical trials further confirm a drug's efficacy, compare it to alternate treatments, and evaluate side effects.**

### a) Representative Operation – Clinical Trials Management

The representative operation modeled is a clinical trials management firm. As illustrated in Exhibit 3.62, this operation is characterized by:

- A leased office facility. (Because the representative operation is a management firm, hospital/clinical operations and related costs are not included in the operational model.)
- A workforce consisting primarily of clinical trial administrators
- Activities that mostly represent tax-eligible R&D activities.

The business is assumed to operate as a stand-alone profit center.

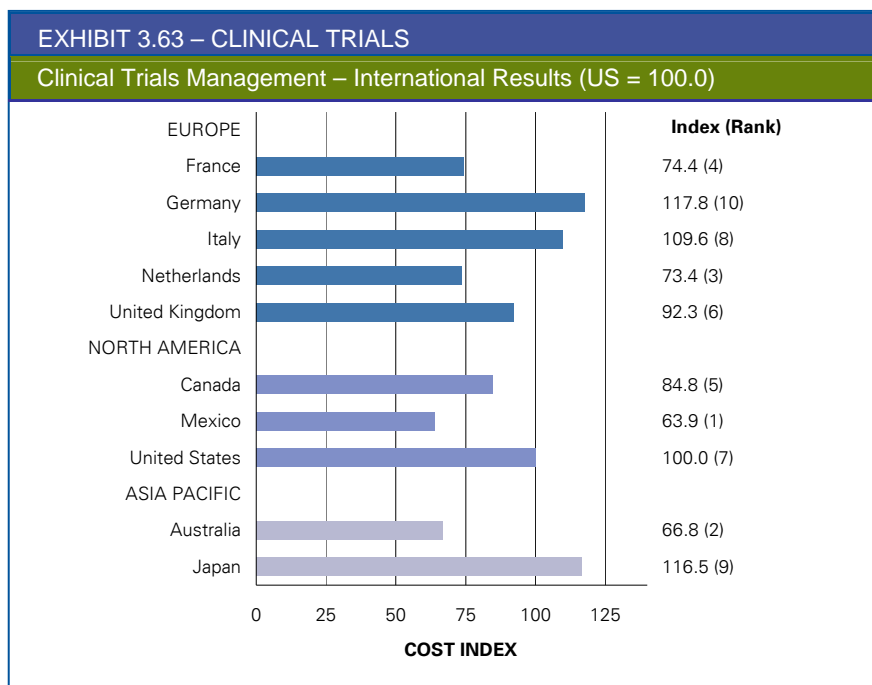
EXHIBIT 3.62 – CLINICAL TRIALS		
Clinical Trials Management – Summary of Operating Parameters		
<b>Facilities Requirements</b>		
Class A office space leased	10,000 ft2	(929 m2)
<b>Other Initial Investment Requirements</b>		
Office equipment – US \$'000	\$150	
R&D equipment – US \$'000	–	
Inventory – US \$'000	–	
Equity financing – % of project costs	85%	
<b>Workforce</b>		
Management	3	
Sales and administration	9	
Dedicated product development	38	
Other	–	
Total employees	50	
<b>Energy Requirements</b>		
Electricity monthly consumption/peak demand	50,000 kWh and 195 kW	
<b>Other Annual Operating Characteristics</b>		
Sales at full production – US \$'000	\$7,750	
Operating costs – % of sales	5%	
Investment in tax-eligible R&D – % of sales	60%	

### b) International Results

International results are illustrated in Exhibit 3.63. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.64.

### c) Selected Cities

Exhibit 3.65 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.



## EXHIBIT 3.64 – CLINICAL TRIALS

## Clinical Trials Management – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	6,500	6,500	6,500	6,500	6,500	6,500	6,500	6,500	6,500	6,500
<b>Costs</b>										
- Salaries & Wages	2,933	4,087	3,311	3,356	3,103	3,242	1,553	3,401	3,420	3,916
- Statutory Plans	1,299	627	699	413	306	233	117	286	436	389
- Other Benefits	616	898	978	1,041	1,037	750	438	1,020	818	950
- Total Labor & Benefits	4,849	5,612	4,989	4,809	4,446	4,225	2,108	4,707	4,675	5,255
- Facility Lease	520	293	293	216	557	314	238	293	353	599
- Transportation	-	-	-	-	-	-	-	-	-	-
- Utilities	53	80	134	78	82	52	85	67	87	79
- Interest & Depreciation	105	200	58	(126)	(33)	(28)	(399)	20	(269)	171
- Non-Income Taxes	50	-	27	3	-	1	31	33	-	10
- Location-Insensitive Costs	325	325	325	325	325	325	325	325	325	325
<b>Profit Before Income Tax</b>	599	(10)	675	1,195	1,124	1,612	4,113	1,056	1,330	62
- Income Taxes <sup>1</sup>	(1,767)	41	267	(1,225)	(246)	(176)	1,166	115	(1,459)	39
Effective Rate	(295.2%)	n/a	39.5%	(102.6%)	(21.9%)	(10.9%)	28.3%	10.9%	(109.7%)	61.8%
<b>After-Tax Profit</b>	2,366	(51)	409	2,420	1,370	1,788	2,947	941	2,789	24
<b>Total Annual Costs</b>	4,135	6,551	6,091	4,081	5,131	4,713	3,553	5,559	3,711	6,477
<b>Index (US=100.0)</b>	<b>74.4</b>	<b>117.8</b>	<b>109.6</b>	<b>73.4</b>	<b>92.3</b>	<b>84.8</b>	<b>63.9</b>	<b>100.0</b>	<b>66.8</b>	<b>116.5</b>
<b>Rank</b>	<b>4</b>	<b>10</b>	<b>8</b>	<b>3</b>	<b>6</b>	<b>5</b>	<b>1</b>	<b>7</b>	<b>2</b>	<b>9</b>

<sup>1</sup> Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.65 – CLINICAL TRIALS

## Clinical Trials Management – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Selected Cluster Cities</b>		
<b>AU</b> Adelaide	64.4	2	<b>JP</b> Osaka	114.4	93	<b>CA</b> Halifax, NS	72.5	14
Brisbane	65.2	5	Tokyo	118.7	94	Montreal, QC	78.1	19
Melbourne	65.4	6				Toronto, ON	91.4	42
Sydney	68.1	9	<b>MX</b> Mexico City	63.3	1	Vancouver, BC	85.8	26
			Monterrey	64.5	3			
<b>FR</b> Lyon	67.7	8				<b>US</b> Boston, MA	102.2	85
Paris	81.1	22	<b>NL</b> Amsterdam	74.5	18	Indianapolis, IN	93.1	51
			Brabant Stad	73.2	17	Minneapolis, MN	96.9	73
<b>GE</b> Berlin	114.0	92	The Hague	72.3	13	North Virginia (Metro DC)	98.7	81
Frankfurt	121.7	95	Utrecht	72.6	15	Philadelphia, PA	98.7	80
						Providence, RI	95.8	68
<b>IT</b> Milan	107.2	89	<b>UK</b> London	99.5	83	Raleigh, NC	93.6	55
Rome	112.0	91	Manchester	85.1	25	Trenton, NJ	100.2	84

<sup>1</sup> Rank among 95 cities.

### 3. Product Testing

**Product testing, for both functionality and safety, is an essential component of bringing new products to market. In addition to the safety testing performed by regulatory agencies, many labs and testing agencies perform product testing on behalf of manufacturers. These entities may be independent labs or, alternately, may be in-house testing operations of a larger parent firm.**

#### a) Representative Operation – Electronic Systems Development and Testing

The representative operation modeled develops and tests electronic systems and devices, such as computer components or systems, telecommunications equipment, and electronic systems for automotive or aerospace applications.

As illustrated in Exhibit 3.66, this operation is characterized by:

- A leased office/laboratory facility with significant investment in R&D equipment
- A non-management workforce consisting almost entirely of professional and technical staff
- A significant level of tax-eligible R&D activities.

The business is assumed to operate as a fully-owned subsidiary of a parent firm, with revenue allocated to the business on a "cost-plus-10 percent" basis.

#### b) International Results

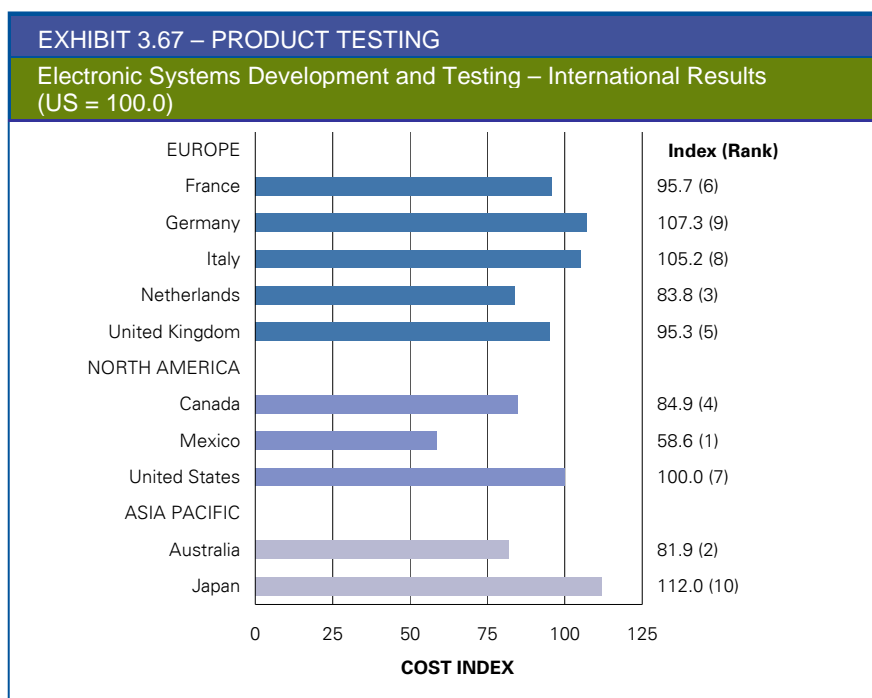
International results are illustrated in Exhibit 3.67. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.68.

#### c) Selected Cities

Exhibit 3.69 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.66 – PRODUCT TESTING		
Electronic Systems Development and Testing – Summary of Operating Parameters		
<b>Facilities Requirements</b>		
Class A office space leased	45,000 ft <sup>2</sup>	(4,181 m <sup>2</sup> )
<b>Other Initial Investment Requirements</b>		
Machinery and equipment – US \$'000	\$500	
Office equipment – US \$'000	\$500	
R&D equipment – US \$'000	\$4,000	
Inventory – US \$'000	–	
Equity financing – % of project costs	100%	
<b>Workforce</b>		
Management	5	
Sales and administration	12	
Dedicated product development	53	
Other	–	
Total employees	70	
<b>Energy Requirements</b>		
Electricity monthly consumption/peak demand	112,600 kWh	and 280 kW
<b>Annual operating characteristics</b>		
Sales at full production – US \$'000	– <sup>1</sup>	
Operating costs – US \$'000	\$1,325	
Investment in tax-eligible R&D – % of sales	21%	

<sup>1</sup> This operation represents a cost center. For taxation purposes, corporate revenue allocated to the operation is assumed to be cost-of-operation, plus 10 percent markup.



## EXHIBIT 3.68 – PRODUCT TESTING

## Electronic Systems Development and Testing – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
<b>Revenues</b>	14,131	14,363	13,820	11,302	13,293	11,822	7,796	13,547	12,555	14,918
<b>Costs</b>										
- Salaries & Wages	5,237	7,255	6,045	5,928	5,486	5,551	3,208	6,041	6,016	6,628
- Statutory Plans	2,271	971	1,308	633	543	393	204	631	769	648
- Other Benefits	1,103	1,630	1,821	1,895	1,822	1,419	869	2,347	1,478	1,581
- Total Labor & Benefits	8,611	9,857	9,174	8,456	7,852	7,363	4,281	9,019	8,264	8,857
- Facility Lease	2,184	1,269	1,230	907	2,338	1,433	848	1,165	1,482	2,624
- Transportation	-	-	-	-	-	-	-	-	-	-
- Utilities	91	138	231	135	142	106	175	115	161	135
- Interest & Depreciation	500	536	561	545	495	577	462	578	249	604
- Non-Income Taxes	203	-	112	14	-	9	63	179	-	80
- Location-Insensitive Costs	1,259	1,259	1,259	1,259	1,259	1,259	1,259	1,259	1,259	1,259
<b>Profit Before Income Tax</b>	1,284	1,305	1,255	(14)	1,208	1,075	708	1,232	1,142	1,359
- Income Taxes <sup>1</sup>	(815)	430	652	(782)	(106)	(74)	272	253	(1,117)	515
Effective Rate	(63.5%)	33.0%	51.9%	n/a	(8.8%)	(6.8%)	38.4%	20.5%	(97.9%)	38.0%
<b>After-Tax Profit</b>	2,100	875	604	769	1,315	1,149	436	980	2,259	843
<b>Total Annual Costs</b>	12,032	13,489	13,217	10,533	11,979	10,673	7,360	12,567	10,297	14,075
<b>Index (US=100.0)</b>	<b>95.7</b>	<b>107.3</b>	<b>105.2</b>	<b>83.8</b>	<b>95.3</b>	<b>84.9</b>	<b>58.6</b>	<b>100.0</b>	<b>81.9</b>	<b>112.0</b>
<b>Rank</b>	<b>6</b>	<b>9</b>	<b>8</b>	<b>3</b>	<b>5</b>	<b>4</b>	<b>1</b>	<b>7</b>	<b>2</b>	<b>10</b>

1 Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

## EXHIBIT 3.69 – PRODUCT TESTING

## Electronic Systems Development and Testing – Results for Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Selected Cluster Cities</b>		
<b>AU</b> Adelaide	77.1	12	<b>JP</b> Osaka	106.8	90	<b>CA</b> Edmonton, AB	82.5	25
Brisbane	78.8	13	Tokyo	117.1	95	Quebec City, QC	74.4	9
Melbourne	79.0	15			Toronto, ON	87.7	41	
Sydney	84.8	33	<b>MX</b> Mexico City	59.1	2	Vancouver, BC	81.8	19
			Monterrey	58.1	1			
<b>FR</b> Lyon	82.0	22			<b>US</b> Albuquerque, NM	89.2	51	
Paris	109.5	92	<b>NL</b> Amsterdam	86.5	37	Dallas-Fort Worth, TX	92.9	63
			Brabant Stad	82.5	24	Denver, CO	95.4	72
<b>GE</b> Berlin	104.5	86	The Hague	81.1	18	Phoenix, AZ	92.0	61
Frankfurt	110.2	93	Utrecht	81.9	21	Portland, OR	93.3	66
<b>IT</b> Milan	101.6	84	<b>UK</b> London	106.2	89	Raleigh, NC	89.5	53
Rome	108.7	91	Manchester	84.4	31	Salt Lake City, UT	90.8	58
					San Diego, CA	101.3	83	

1 Rank among 95 cities.

## 4. Regional and City Comparisons

Site searches often differ in the range of geographic locations considered. Whether the search is global or regional, there is often a trade-off between larger and smaller cities. Larger cities tend to provide larger labor pools, better access to customers and suppliers, and better support infrastructure, while smaller cities tend to offer lower labor and facility costs.

This chapter presents results by city, first for larger international cities, and then all featured cities on a regional basis.

### A. Results for Large International Cities

Many companies prefer to locate in larger international cities to gain such benefits as:

- Access to a larger and higher skilled workforce
- Access to universities and colleges
- Proximity to clusters of customers, suppliers, and competitors
- Access to major ports and airports
- Greater ability to relocate and recruit senior management personnel.

The 41 largest international cities included in this study all have a metropolitan population of at least 2 million people. Results for these cities are illustrated in Exhibit 4.1:

- In **Europe**, Manchester, The Hague, Lyon, and Amsterdam are the cost leaders, with a clear cost advantage over all of the other large European cities studied. London and Frankfurt have the highest business costs among the European cities studied.
- In **North America**, Monterrey and Mexico City offer the lowest business costs. The three largest Canadian cities—Toronto, Montreal, and Vancouver—rank ahead of all the large US cities. Among the US cities, Tampa, Atlanta, and Miami are the cost leaders, while Los Angeles, New York, and San Francisco represent the most expensive major North American cities in which to do business.

#### EXHIBIT 4.1

##### Results for Large International Cities<sup>1</sup>

City	Country	Cost Index
<b>EUROPE</b>		
Manchester	United Kingdom	94.7
The Hague <sup>2</sup>	The Netherlands	96.4
Lyon <sup>2</sup>	France	96.4
Amsterdam <sup>2</sup>	The Netherlands	96.7
Milan	Italy	99.0
Paris	France	100.1
Rome	Italy	100.9
Berlin	Germany	101.6
London	United Kingdom	101.7
Frankfurt <sup>2</sup>	Germany	103.6
<b>NORTH AMERICA</b>		
Monterrey	Mexico	81.5
Mexico City	Mexico	82.1
Montreal	Canada	94.2
Vancouver	Canada	94.9
Toronto	Canada	95.8
Tampa	United States	96.0
Atlanta	United States	96.3
Miami	United States	97.0
Baltimore	United States	97.1
Dallas-Fort Worth	United States	97.7
St. Louis	United States	97.8
Houston	United States	97.9
Phoenix	United States	98.1
Philadelphia	United States	98.3
Detroit	United States	98.5
Chicago	United States	98.8
Portland	United States	98.9
Minneapolis	United States	99.0
North Virginia (Metro DC)	United States	99.0
Riverside-San Bernardino	United States	99.5
Denver	United States	99.6
Seattle	United States	100.1
Boston	United States	100.8
San Diego	United States	100.9
Los Angeles	United States	101.4
New York City	United States	102.0
San Francisco	United States	104.1
<b>ASIA PACIFIC</b>		
Melbourne	Australia	96.7
Sydney	Australia	98.9
Osaka	Japan	106.4
Tokyo	Japan	108.9

<sup>1</sup> Cities with a metro area population of more than 2 million.

<sup>2</sup> Based on estimated metro/regional population within reasonable commuting distance of at least 2 million people within easy commuting distance. (No official measures of metro population are available).

- In **Asia Pacific**, Melbourne has lower costs than Sydney in Australia, with both cities being relatively affordable compared to their peers elsewhere in the world. By contrast, in Japan, Osaka and Tokyo have the highest business costs among all cities studied.

## B. Results for Regional Cities

While large cities may be of greater interest for some global investment projects, smaller regional cities can offer a more attractive investment location for other investment projects.

*Competitive Alternatives* examines more than 100 cities, and regional comparisons can be made among cities within each country. When comparing results for larger and smaller cities, cost differences vary greatly. As illustrated in Exhibit 4.2, in the compact market of the Netherlands, for example, there is little in the way of cost differences between cities. However, in the United States, the average cost of operating in a regional city is more than 5 percentage points lower than in New York City, and in the United Kingdom, business costs in Manchester are 7 percentage points lower than London.

EXHIBIT 4.2			
Cost Index Comparison: Larger and Smaller Cities			
	Largest City	Smaller City	Differential
<b>Netherlands</b>			
• Amsterdam	96.7		
• Brabant Stad		96.3	0.4
<b>Australia</b>			
• Sydney	98.9		
• Adelaide		97.0	1.9
<b>Canada</b>			
• Toronto	95.8		
• Average of 12 regional cities		93.3	2.5
<b>France</b>			
• Paris	100.1		
• Lyon		96.4	3.7
<b>United States</b>			
• Average of four largest cities <sup>1</sup>	100.0		
• New York City	102.0		
• Average of 36 regional cities		96.8	5.2
<b>United Kingdom</b>			
• London	101.7		
• Manchester		94.7	7.0

<sup>1</sup> Study comparison baseline.

## 1. Cities Over 1 Million in Population

Cities with populations between 1 and 2 million are sometimes referred to as "Tier 2" cities. These cities are generally large enough to attract interest and investment on some globally-oriented projects, yet small enough to offer a more competitive cost environment than the largest cities in their respective countries.

The 17 cities examined that have metropolitan populations of between 1 and 2 million are detailed in Exhibit 4.3. All of these cities have business costs below the national results for their respective countries (based on major cities), and also below the US baseline of 100.0:

- In the **Netherlands**, Brabant Stad (96.3) and Utrecht (96.4) both have costs more than 3.5 percent below the US baseline, and equal to or lower than any of the other continental European cities examined.
- In **North America**, Oklahoma City (95.6) and Edmonton (95.7) have the lowest business costs among the 13 comparably sized cities studied, with business costs 4.4 and 4.3 percent (respectively) below the US baseline. At the other end of the spectrum, costs in Hartford (99.7), Las Vegas (99.8), and Trenton (99.8) are barely below the US baseline.
- In **Australia**, Adelaide (97.0) and Brisbane (97.3) both have costs below the Australian average, and below the average of the 17 similarly sized cities presented in Exhibit 4.3.

### EXHIBIT 4.3

#### Results for Cities with Population 1 to 2 Million

City	Country	Cost Index
<b>EUROPE</b>		
Brabant Stad	The Netherlands	96.3
Utrecht	The Netherlands	96.4
<b>NORTH AMERICA</b>		
Oklahoma City	United States	95.6
Edmonton	Canada	95.7
Raleigh	United States	96.4
Buffalo	United States	96.5
Nashville	United States	97.0
Indianapolis	United States	97.2
Salt Lake City	United States	97.4
Wilmington	United States	97.6
Milwaukee	United States	97.8
Providence	United States	98.0
Hartford	United States	99.7
Las Vegas	United States	99.8
Trenton	United States	99.8
<b>ASIA PACIFIC</b>		
Adelaide	Australia	97.0
Brisbane	Australia	97.3

## 2. Cities Under 1 Million in Population

A total of 37 cities with populations of less than 1 million have been included in this study. The results for these cities are detailed in Exhibit 4.4 and are stratified by:

- **By Population**, as large differences in size exist between the smallest cities examined—Charlottetown, Prince Edward Island; Prince George, British Columbia; and Cheyenne, Wyoming—each with populations of less than 100,000, and the largest of these regional cities—Honolulu, Hawaii—which has a population of just over 900,000.
- **By Region**, as these cities are often of strongest interest in regionally-oriented site searches.

The cost leaders in the **New England/Atlantic Canada** region are the Atlantic Canada cities of Moncton (91.3), Fredericton (91.8), Halifax (93.3), Charlottetown (93.8), and St. John's (also 93.8), all with costs below any of the US cities compared in this region. Costs are somewhat higher in Bangor, Maine (95.6); Burlington, Vermont (97.7); and Manchester, New Hampshire (98.6).

In the **Northeast US/Canada** region, costs are the lowest in Sherbrooke, Quebec (91.2), Quebec City (92.4); and St. Catharines-Niagara (94.7), with these Canadian cities all having costs below their US counterparts. Among the US cities examined, costs in Charleston, West Virginia (95.0); Youngstown, Ohio (95.2); and Lexington, Kentucky (95.5) are relatively closely grouped, while costs are somewhat higher in Harrisburg, Pennsylvania (96.6), and Saginaw, Michigan (97.0).

In the **Southeast US** region, Shreveport, Louisiana (94.3) is the clear cost leader and represents the lowest cost US city examined in this study. Within this region, Shreveport is followed by Greenville-Spartanburg, South Carolina (95.6); Little Rock,

### EXHIBIT 4.4

#### Results for North American Cities with Population Under 1 Million

Population of Less Than 500,000		Population of 500,000 to 1,000,000	
<b>New England/Atlantic Canada</b>			
Moncton, NB	91.3		
Fredericton, NB	91.8		
Halifax, NS	93.3		
Charlottetown, PE	93.8		
St. John's, NL	93.8		
Bangor, ME	95.6		
Burlington, VT	97.7		
Manchester, NH	98.6		
<b>Northeast US/Canada</b>			
Sherbrooke, QC	91.2	Quebec City, QC	92.4
St. Catharines-Niagara, ON	94.7	Youngstown, OH	95.2
Charleston, WV	95.0	Harrisburg, PA	96.6
Lexington, KY	95.5		
Saginaw, MI	97.0		
<b>Southeast US</b>			
Shreveport, LA	94.3	Little Rock, AR	95.9
Greenville-Spartanburg, SC	95.6	Jackson, MS	96.5
Montgomery, AL	96.2		
<b>Midwest US/Western Canada</b>			
Saskatoon, SK	94.0	Winnipeg, MB	93.9
Cheyenne, WY	94.9	McAllen, TX	94.8
Sioux Falls, SD	95.5	Omaha, NE	96.5
Billings, MT	95.9	Wichita, KS	97.3
Fargo, ND	96.2	Albuquerque, NM	98.3
Cedar Rapids, IA	96.9		
<b>Pacific US/Canada</b>			
Prince George, BC	94.3	Boise, ID	97.2
Spokane, WA	98.4	Honolulu, HI	107.3
Anchorage, AK	106.3		

Arkansas (95.9); Montgomery, Alabama (96.2); and Jackson, Mississippi (96.5).

In the **Midwest US/Western Canada** region, Winnipeg, Manitoba (93.9), and Saskatoon, Saskatchewan (94.0), are the cost leaders, with almost identical business costs. Costs are also very closely grouped in McAllen, Texas (94.8), and Cheyenne, Wyoming (94.9). Behind these leaders, costs in Sioux Falls, South Dakota (95.5); Billings, Montana (95.9); Fargo, North Dakota (96.2); and Omaha, Nebraska (96.5), are all 3.5 to 4.5 percentage points below the US baseline. Costs are slightly higher in Cedar Rapids, Iowa (96.9); Wichita, Kansas (97.3); and Albuquerque, New Mexico (98.3).

Finally, in the **Pacific US/Canada** region, Prince George, British Columbia (94.3), is the clear cost leader, ahead of both Boise, Idaho (97.2), and Spokane, Washington (98.4). Costs in the two cities examined that are not in the "Lower 48" US states—Anchorage, Alaska (106.3), and Honolulu, Hawaii (107.3)—are significantly higher than in any other US cities, and represent the most expensive US cities examined in this study.

## C. NAFTA Border Region Comparisons

With the inclusion of Canada, Mexico, and the United States, *Competitive Alternatives 2010* provides a full picture of business costs throughout all three NAFTA member countries.

Given the strong trade ties that exist between these countries, especially in the border regions, this section compares the business cost results for five groups of cities that straddle the Canada-US and US-Mexico borders. Exhibit 4.5 illustrates the locations of these border region cities, and Exhibit 4.6 compares the cost results for each group of cities.

### 1. US-Canada Comparisons

There are four pairs of US-Canada border cities included in this study. In each case, the Canadian city holds an overall cost advantage over its US counterpart:

- Burlington, Vermont, and Sherbrooke, Quebec, are similarly sized communities only 127 miles apart. However, Sherbrooke holds a cost advantage of 6.5 percentage points over Burlington.
- St. Catharines-Niagara, Ontario, occupies the Canadian side of the Niagara Falls region, slightly downriver from Buffalo, New York. With almost three times the population of St. Catharines-Niagara, and border-free access to the large US market, it is not surprising that business costs in Buffalo are slightly higher (1.8 percentage points) than in St. Catharines-Niagara.

EXHIBIT 4.5

NAFTA Border Region Cities



- With their downtowns facing each other across the Detroit River, and strong integration in the automotive industry, Detroit, Michigan, and Windsor-Essex, Ontario, are as close as any pair of cities on the US-Canada border. Indeed, the Detroit-Windsor border represents the busiest commercial crossing point on the Canada-US border. Comparing business costs between the two cities, Windsor-Essex holds a 4.0 percentage point cost advantage over its much larger neighbor.
- Seattle, Washington, and Vancouver, British Columbia, are both large cities that share a background in forestry and transportation, and both have strong high-tech clusters. However, business costs in Vancouver are 5.2 percentage points lower than in Seattle.

## 2. US-Mexico Comparison

In the US-Mexico border region, three cities are compared. While Dallas-Fort Worth and Monterrey are separated by almost 600 miles, they are closely connected with common interests in high-technology industries and coordinating cross-border trade along the I-35 NAFTA corridor. Business costs in Monterrey are 16.2 percentage points lower than in Dallas-Fort Worth.

McAllen, Texas, is located on the US-Mexico border 550 miles from Dallas-Fort Worth and 140 miles from Monterrey. McAllen serves as a hub for cross-border manufacturing and logistics, and represents one of the lowest cost cities examined in the United States, with business costs more than 5 percent below the US average. However, despite its much larger size, Monterrey offers a cost advantage over McAllen of 13.3 percentage points.

EXHIBIT 4.6				
NAFTA Border Region City Comparisons				
City	Population	Cost Index	Cost Difference	Distance
<b>US-Canada Border Region Cities</b>				
Burlington	0.2 M	97.7	6.5	127 miles (205 km)
Sherbrooke	0.2 M	91.2		
Buffalo	1.1 M	96.5	1.8	30 miles (48 km)
St. Catharines-Niagara	0.4 M	94.7		
Detroit	4.5 M	98.5	4.0	2 miles (3 km)
Windsor-Essex	0.3 M	94.5		
Seattle	3.3 M	100.1	5.2	141 miles (227 km)
Vancouver	2.1 M	94.9		
<b>US-Mexico Border Region Cities</b>				
Monterrey	3.6 M	81.5	13.3	140 miles (225 km)
McAllen	0.7 M	94.8		
Dallas-FortWorth	6.3 M	97.7		

## D. Detailed City Results, by Industry Operation

Exhibit 4.7 contains the index results for all featured cities, by region, for each of the 17 business operations examined in this study. Further detailed results for each city, by cost component, are also available online at [www.CompetitiveAlternatives.com](http://www.CompetitiveAlternatives.com).

EXHIBIT 4.7																		
Results by City – Europe and Asia Pacific																		
	Manufacturing											Corporate & IT Services			R&D			Overall Result
Industry	Aero-space	Agri-food	Auto-motive	Chemicals	Electronics	Medical Devices	Metal Compon.	Pharmaceuticals	Plastics	Precision Mfg	Telecom	Back Office/Call Center	Software Design	Web/Multi-media	Biotech	Clinical Trials	Product Testing	17 Operations
Operation	Aircraft Parts	Food Proc.	Auto Parts	Spec. Chem.	Electr. Assbly	Medical Devices	Metal Mach.	Pharmaceuticals	Plastic Prod.	Precision Comp.	Telecom Equip.	Shared Services	Software Dvlt	Content Dvlt	Bio-medical R&D	Clinical Trials Mgt	Electronic Systems Dvlt/Test	
<b>EUROPE</b>																		
<b>France</b>																		
Lyon	97.4	98.4	97.5	98.5	97.6	96.8	96.9	96.8	96.2	97.9	97.8	96.0	98.8	98.0	86.5	67.7	82.0	96.4 (5)
Paris	98.2	97.9	97.9	99.3	98.7	98.4	97.0	97.9	96.0	97.9	99.0	112.1	110.1	109.7	116.4	81.1	109.5	100.1 (8)
<b>Germany</b>																		
Berlin	100.6	98.8	100.1	100.7	100.9	101.7	99.0	100.4	98.5	99.6	101.6	108.9	107.5	106.9	108.3	114.0	104.5	101.6 (10)
Frankfurt	102.1	100.0	101.4	101.8	102.4	103.7	100.9	101.9	100.4	100.5	102.9	114.4	110.8	110.4	114.4	121.7	110.2	103.6 (12)
<b>Italy</b>																		
Milan	98.8	97.3	98.3	99.1	98.5	97.7	95.9	97.0	96.0	98.3	98.8	99.4	107.0	104.9	103.7	107.2	101.6	99.0 (7)
Rome	100.2	98.0	99.3	100.0	99.9	99.4	97.2	98.4	97.4	98.7	99.9	103.0	111.7	109.5	110.6	112.0	108.7	100.9 (9)
<b>Netherlands</b>																		
Amsterdam	98.1	96.1	97.3	97.6	98.1	97.6	96.0	96.7	95.4	97.3	98.5	100.6	98.6	98.7	92.1	74.5	86.5	96.7 (6)
Brabant Stad	97.8	96.3	97.1	97.7	97.7	97.4	95.8	96.7	95.3	97.4	98.4	99.2	97.6	97.7	87.6	73.2	82.5	96.3 (2)
The Hague	98.2	96.4	97.5	97.7	98.2	97.8	96.4	96.9	96.0	97.5	98.6	98.1	97.2	97.1	85.9	72.3	81.1	96.4 (3)
Utrecht	98.2	96.4	97.4	97.7	98.1	97.7	96.2	96.9	95.8	97.5	98.5	98.4	97.4	97.4	86.8	72.6	81.9	96.4 (4)
<b>United Kingdom</b>																		
London	101.5	98.8	102.1	99.5	102.3	102.2	103.2	99.5	103.6	99.4	100.2	105.3	103.9	103.1	112.7	99.5	106.2	101.7 (11)
Manchester	95.7	95.6	96.7	96.6	96.0	94.7	95.3	94.6	95.0	96.9	96.0	91.7	91.6	91.2	90.8	85.1	84.4	94.7 (1)
<b>ASIA PACIFIC</b>																		
<b>Australia</b>																		
Adelaide	100.5	100.2	99.7	97.2	96.9	96.9	102.3	97.0	106.3	99.7	96.2	95.0	94.5	94.0	83.5	64.4	77.1	97.0 (2)
Brisbane	100.5	100.2	99.7	97.9	97.0	97.0	102.1	97.1	105.6	99.8	96.4	95.9	96.2	95.4	84.7	65.2	78.8	97.3 (3)
Melbourne	99.1	98.9	99.0	96.9	96.2	96.4	101.0	96.4	104.1	99.2	96.0	97.6	96.8	96.2	85.0	65.4	79.0	96.7 (1)
Sydney	100.8	100.5	100.7	98.5	97.8	98.5	103.2	97.8	107.1	100.2	97.4	102.1	100.6	99.8	90.8	68.1	84.8	98.9 (4)
<b>Japan</b>																		
Osaka	104.2	104.9	105.8	103.4	105.0	107.1	109.0	104.4	109.3	102.4	104.6	126.6	105.6	107.2	115.8	114.4	106.8	106.4 (5)
Tokyo	106.3	105.6	108.5	103.9	106.4	109.6	113.2	105.4	114.0	103.4	105.9	132.0	108.4	109.9	127.0	118.7	117.1	108.9 (6)

**EXHIBIT 4.7 (cont'd)**

**Results by City – North America**

	Manufacturing											Corporate & IT Services			R&D			Overall Result
Industry	Aero-space	Agri-food	Auto-motive	Chemicals	Electronics	Medical Devices	Metal Compon.	Pharmaceuticals	Plastics	Precision Mfg	Telecom	Back Office/Call Center	Software Design	Web/Multi-media	Biotech	Clinical Trials	Product Testing	17 Operations
Operation	Aircraft Parts	Food Proc.	Auto Parts	Spec. Chem.	Electr. Assbly	Medical Devices	Metal Mach.	Pharmaceutical	Plastic Prod.	Precision Comp.	Telecom Equip.	Shared Services	Software Dvlt	Content Dvlt	Bio-medical R&D	Clinical Trials Mgt	Electronic Systems Dvlt/Test.	
<b>NORTH AMERICA</b>																		
<b>New England/Atlantic Canada</b>																		
Bangor, ME	97.5	98.6	97.5	98.0	97.3	95.3	96.0	96.3	96.6	98.3	96.8	85.1	91.4	91.1	85.1	90.7	84.3	95.6 (6)
Boston, MA	100.1	100.9	100.2	100.6	100.0	99.7	99.9	99.8	99.7	100.3	99.7	104.6	102.0	102.2	106.9	102.2	105.5	100.8 (11)
Burlington, VT	98.7	99.6	98.9	98.6	98.7	97.9	98.9	98.1	99.3	99.5	98.6	91.8	94.8	94.6	89.3	93.2	90.1	97.7 (7)
Charlottetown, PE	96.2	98.5	96.9	96.7	95.2	92.8	95.5	94.5	97.8	97.0	94.6	83.9	84.9	86.0	83.4	84.6	76.7	93.8 (4)
Fredericton, NB	95.4	97.0	95.8	94.5	94.2	92.0	95.7	92.2	97.9	96.1	92.9	83.7	80.9	82.3	75.6	65.7	70.5	91.8 (2)
Halifax, NS	96.0	97.6	96.4	95.8	95.6	93.5	96.0	94.0	97.0	96.5	94.3	86.2	85.9	87.2	79.6	72.5	73.7	93.3 (3)
Hartford, CT	100.2	100.8	100.3	99.9	100.0	99.9	100.7	99.7	101.1	100.6	100.2	97.8	98.1	98.1	94.4	96.9	94.8	99.7 (10)
Manchester, NH	99.3	100.8	99.5	99.9	99.3	98.5	99.3	98.6	99.8	100.1	98.9	93.2	97.0	97.0	91.5	97.2	92.5	98.6 (9)
Moncton, NB	95.0	96.7	95.3	94.2	93.9	91.5	94.8	91.9	96.5	95.7	92.7	82.6	80.3	81.7	74.5	64.8	69.4	91.3 (1)
Providence, RI	98.4	99.5	98.6	99.1	98.3	97.6	97.4	98.0	97.3	98.8	98.5	95.4	97.3	97.3	95.1	95.8	94.6	98.0 (8)
St. John's, NL	96.1	101.2	98.2	95.2	94.0	92.6	100.7	93.0	103.9	98.9	92.9	85.1	84.5	85.7	77.3	70.3	71.9	93.8 (5)
<b>Northeast US/Canada</b>																		
Baltimore, MD	98.0	98.3	97.8	98.3	97.7	96.7	96.3	97.2	95.9	98.1	97.7	93.8	96.4	96.3	94.3	95.5	93.1	97.1 (12)
Buffalo, NY	97.6	97.4	98.0	98.3	97.8	96.6	96.2	97.2	95.9	97.7	97.6	89.9	94.7	94.5	91.1	94.2	89.2	96.5 (9)
Charleston, WV	97.2	96.4	96.8	97.1	97.1	95.3	95.3	96.6	95.1	97.3	97.0	84.1	90.8	90.7	86.4	89.4	84.3	95.0 (5)
Detroit, MI	99.1	98.7	98.8	99.0	98.9	98.7	98.4	98.7	98.1	99.2	99.1	97.0	97.2	97.2	98.2	96.4	97.0	98.5 (16)
Harrisburg, PA	97.7	98.0	97.9	98.1	97.6	96.3	96.6	97.0	96.3	98.1	97.4	89.8	95.1	94.8	90.0	93.9	89.1	96.6 (10)
Indianapolis, IN	98.1	98.1	98.0	99.0	98.6	97.7	97.2	98.5	97.1	98.5	98.2	91.4	95.4	95.2	91.1	93.1	89.6	97.2 (13)
Lexington, KY	97.0	96.6	96.9	97.6	96.8	95.4	95.3	96.5	95.5	97.6	96.7	86.5	93.4	93.1	87.8	92.5	86.5	95.5 (7)
Montreal, QC	96.8	96.8	96.7	96.4	95.3	94.3	96.0	94.3	96.8	96.6	95.0	93.4	86.0	86.2	87.8	78.1	82.1	94.2 (3)
New York City, NY	102.0	100.7	102.1	101.0	101.9	102.6	102.5	101.4	102.1	100.6	101.7	105.7	103.3	103.5	103.3	104.0	103.8	102.0 (19)
North Virginia (Metro DC), VA	99.2	98.6	98.9	99.3	99.8	99.3	98.9	99.5	98.2	99.1	99.4	97.0	98.3	98.5	99.9	98.7	97.7	99.0 (17)
Philadelphia, PA	98.6	98.5	98.5	98.9	98.6	97.9	97.3	98.1	96.7	98.7	98.6	97.3	98.7	98.7	98.2	98.7	97.6	98.3 (15)
Quebec City, QC	96.2	96.6	96.2	95.8	94.8	93.2	95.4	93.6	96.6	96.3	94.1	86.7	79.4	78.0	79.7	73.1	74.4	92.4 (2)
Saginaw, MI	98.6	98.2	98.0	98.4	98.1	97.6	97.1	98.0	96.7	98.9	98.6	90.6	94.0	93.7	88.7	95.0	88.5	97.0 (11)
Sherbrooke, QC	95.4	95.9	95.3	95.3	94.0	92.2	94.1	92.9	95.0	95.7	93.6	84.7	75.7	73.1	76.3	71.4	71.4	91.2 (1)
St. Catharines-Niagara, ON	96.9	97.0	97.2	96.2	96.0	95.5	97.2	95.2	98.5	97.2	95.6	91.3	86.9	88.3	85.8	86.9	80.4	94.7 (4)
Toronto, ON	97.1	97.0	97.4	96.5	96.2	96.1	97.4	95.6	98.5	97.3	95.9	96.6	89.8	91.4	93.9	91.4	87.7	95.8 (8)
Trenton, NJ	99.8	99.8	99.7	99.9	99.7	99.5	98.8	99.4	98.6	99.6	99.9	101.7	100.6	100.6	101.6	100.2	101.3	99.8 (18)
Wilmington, DE	98.2	98.5	98.1	99.0	98.2	97.2	97.0	97.4	96.5	98.5	98.0	94.8	97.3	97.3	94.4	96.3	93.7	97.6 (14)
Youngstown, OH	97.0	96.5	96.9	97.6	97.2	95.8	94.9	96.4	94.4	97.2	97.3	86.2	91.5	91.1	84.9	91.1	84.9	95.2 (6)
<b>Southeast US</b>																		
Atlanta, GA	97.5	97.3	97.3	98.0	97.2	96.1	95.7	96.9	95.3	97.8	97.4	91.0	94.2	94.1	91.8	93.6	91.5	96.3 (6)
Greenville-Spartanburg, SC	97.0	96.9	97.0	97.5	97.1	95.9	95.9	96.7	95.6	97.6	97.1	86.3	92.5	92.3	87.9	91.1	86.6	95.6 (2)
Jackson, MS	97.4	98.7	98.0	98.3	97.6	96.3	97.8	97.6	98.4	98.8	97.4	87.2	92.6	92.4	90.1	91.3	87.9	96.5 (8)
Little Rock, AR	97.3	98.3	97.9	98.1	97.3	95.8	97.3	97.1	98.0	98.4	96.9	84.5	91.8	91.6	86.3	90.6	84.6	95.9 (3)
Miami, FL	97.5	98.3	98.2	98.6	98.2	96.8	97.2	97.5	96.6	98.2	97.7	90.6	95.1	95.0	92.6	94.8	90.7	97.0 (10)
Montgomery, AL	97.8	98.2	97.8	97.8	97.0	96.0	97.1	97.0	97.7	98.5	97.1	86.8	93.0	92.5	89.2	92.7	88.2	96.2 (5)
Nashville, TN	98.3	98.6	98.2	98.5	97.8	96.8	97.7	97.8	98.3	98.7	97.8	89.0	94.2	94.0	90.8	93.3	89.5	97.0 (9)
Raleigh, NC	97.9	97.7	97.4	98.1	97.5	96.2	96.0	97.1	95.7	97.9	97.5	89.7	95.1	94.9	90.5	93.6	89.5	96.4 (7)
Shreveport, LA	96.1	97.0	96.5	96.4	95.7	93.7	95.1	95.3	95.3	97.3	95.6	82.7	90.7	90.5	83.8	89.6	82.6	94.3 (1)
Tampa, FL	96.7	98.2	97.5	98.0	96.9	95.3	96.4	96.5	96.2	97.9	96.7	87.7	93.4	93.2	90.0	92.4	88.0	96.0 (4)

## EXHIBIT 4.7 (cont'd)

## Results by City – North America

	Manufacturing											Corporate & IT Services			R&D			Overall Result
Industry	Aero-space	Agri-food	Auto-motive	Chemicals	Electronics	Medical Devices	Metal Compon.	Pharmaceuticals	Plastics	Precision Mfg	Telecom	Back Office/Call Center	Software Design	Web/Multi-media	Biotech	Clinical Trials	Product Testing	17 Operations
Operation	Aircraft Parts	Food Proc.	Auto Parts	Spec. Chem.	Electr. Assbly	Medical Devices	Metal Mach.	Pharmaceutical	Plastic Prod.	Precision Comp.	Telecom Equip.	Shared Services	Software Dvlt	Content Dvlt	Bio-medical R&D	Clinical Trials Mgt	Electronic Systems Dvlt/Test	
<b>NORTH AMERICA</b>																		
<b>Mexico</b>																		
Mexico City	86.3	89.1	89.2	88.8	86.5	79.5	84.9	83.7	85.3	91.0	85.0	47.4	68.5	66.1	63.0	63.3	59.1	82.1 (2)
Monterrey	85.9	87.8	88.4	88.5	86.7	79.2	83.0	83.6	83.0	89.8	85.0	45.8	68.0	65.8	62.3	64.5	58.1	81.5 (1)
<b>Midwest US/Western Canada</b>																		
Albuquerque, NM	99.6	100.7	99.6	99.2	99.3	98.5	100.9	99.4	102.0	100.3	98.6	88.3	94.6	94.5	90.3	93.1	89.2	98.3 (19)
Billings, MT	97.8	99.0	97.9	97.7	97.4	95.8	98.0	96.7	98.6	98.8	96.8	84.1	91.0	90.7	84.6	90.0	85.2	95.9 (8)
Cedar Rapids, IA	98.8	99.0	98.8	98.2	98.0	97.4	98.5	97.9	99.5	99.3	97.8	88.2	92.5	92.1	87.7	90.4	86.7	96.9 (11)
Cheyenne, WY	97.6	98.5	97.5	96.8	96.7	95.1	97.2	96.4	97.9	98.3	96.5	81.9	87.9	87.7	82.6	87.7	81.0	94.9 (4)
Chicago, IL	99.2	98.9	98.8	99.6	99.0	98.6	97.7	99.0	97.5	99.2	99.2	98.5	99.2	99.1	97.5	97.9	97.9	98.8 (20)
Dallas-Fort Worth, TX	98.2	99.3	98.6	98.4	98.4	97.8	98.6	98.5	99.2	99.4	98.5	91.6	95.1	94.9	93.0	94.4	92.9	97.7 (14)
Denver, CO	99.7	100.6	100.1	99.5	99.3	99.5	101.5	99.8	102.4	101.1	99.6	96.5	97.7	97.6	95.9	97.3	95.4	99.6 (22)
Edmonton, AB	97.5	98.6	98.3	96.5	96.0	95.6	99.7	95.8	101.7	98.4	95.4	93.7	87.7	89.3	88.5	84.2	82.5	95.7 (7)
Fargo, ND	98.1	99.8	98.6	97.8	97.8	96.4	98.8	97.3	99.8	99.2	97.0	84.0	90.8	90.3	83.4	89.4	81.8	96.2 (9)
Houston, TX	98.0	98.9	98.5	98.5	98.2	97.7	98.3	98.1	98.1	99.1	98.5	93.7	96.4	96.2	95.2	95.7	95.3	97.9 (17)
McAllen, TX	96.5	98.2	97.5	96.9	96.6	94.6	97.3	96.0	97.9	98.1	96.1	79.1	89.1	88.7	82.0	88.4	82.6	94.8 (3)
Milwaukee, WI	98.9	99.5	98.7	98.9	98.5	97.9	98.1	98.4	98.5	99.2	98.4	92.6	95.7	95.4	91.8	94.5	91.6	97.8 (16)
Minneapolis, MN	99.5	101.1	99.6	99.0	98.8	99.0	100.0	99.0	101.0	100.2	99.0	96.3	97.0	96.9	94.8	96.9	94.5	99.0 (21)
Oklahoma City, OK	97.0	98.4	97.4	97.8	96.9	95.1	96.3	96.5	96.9	98.2	96.7	84.6	91.8	91.6	86.4	90.8	85.9	95.6 (6)
Omaha, NE	97.5	98.9	98.1	97.5	96.9	95.8	98.1	96.8	98.6	99.7	96.8	88.6	92.6	92.3	89.9	92.7	88.7	96.5 (10)
Phoenix, AZ	99.5	99.7	99.2	98.9	98.5	98.2	99.6	98.6	100.2	99.6	98.3	92.3	95.3	95.1	93.1	94.5	92.0	98.1 (18)
Salt Lake City, UT	98.3	99.9	98.7	98.4	97.5	96.8	99.0	97.7	99.5	99.4	97.5	90.5	94.7	94.6	92.1	92.9	90.8	97.4 (13)
Saskatoon, SK	96.7	97.9	97.6	95.8	95.6	94.5	98.4	94.6	99.6	97.5	94.6	87.9	85.2	86.6	81.2	70.5	75.0	94.0 (2)
Sioux Falls, SD	97.0	98.8	98.2	97.3	96.7	95.3	98.1	96.6	98.9	98.9	96.6	83.1	89.6	89.0	84.0	89.5	83.3	95.5 (5)
St. Louis, MO	98.6	98.6	98.2	99.0	98.8	98.0	97.8	98.8	97.4	98.9	98.9	92.5	95.7	95.6	93.8	94.9	93.1	97.8 (15)
Wichita, KS	98.2	99.9	98.9	98.6	98.4	97.5	99.6	98.3	100.3	99.8	98.3	87.9	93.3	92.9	87.3	92.7	87.7	97.3 (12)
Winnipeg, MB	95.5	98.8	96.8	95.7	94.7	93.1	97.5	94.3	98.3	97.3	94.0	87.0	85.5	86.6	84.5	80.4	78.8	93.9 (1)
<b>Pacific US/Canada</b>																		
Anchorage, AK	107.4	112.8	105.9	102.2	103.9	106.6	113.8	104.8	123.4	107.1	103.6	104.2	100.2	100.3	101.1	103.1	100.8	106.3 (12)
Boise, ID	98.5	99.9	98.7	98.7	98.1	97.1	98.9	98.0	99.4	99.4	97.7	88.3	94.0	93.8	89.1	92.6	87.9	97.2 (3)
Honolulu, HI	109.7	118.2	108.4	104.3	105.1	105.8	113.4	104.7	123.1	108.9	103.7	102.3	100.3	100.6	101.3	92.8	99.6	107.3 (13)
Las Vegas, NV	100.2	101.0	100.3	99.9	99.4	99.7	101.3	99.8	102.2	100.8	99.7	96.4	96.8	96.9	100.2	97.0	98.2	99.8 (7)
Los Angeles, CA	100.6	101.1	100.6	100.9	100.7	101.0	101.2	101.1	101.2	100.8	100.7	104.2	102.4	102.6	106.1	103.7	105.4	101.4 (10)
Portland, OR	99.3	101.3	99.6	99.7	99.3	98.7	100.5	99.0	100.3	100.3	98.7	94.6	96.9	97.0	94.3	95.8	93.3	98.9 (5)
Prince George, BC	97.6	98.3	97.8	96.2	95.6	94.9	99.1	95.1	100.2	98.2	95.0	88.3	84.3	85.7	79.0	80.1	74.0	94.3 (1)
Riverside-San Bernardino, CA	99.7	100.5	99.8	100.2	99.7	99.5	99.9	100.0	100.2	100.1	99.5	97.0	98.7	98.5	97.4	96.7	96.5	99.5 (6)
San Diego, CA	100.8	101.3	100.9	100.7	100.9	100.8	101.9	100.9	102.5	100.8	100.3	100.1	100.4	100.3	102.2	99.4	101.3	100.9 (9)
San Francisco, CA	102.8	103.4	103.0	102.3	102.6	103.9	105.3	103.2	105.7	102.9	102.7	110.0	105.9	105.8	110.0	108.9	110.3	104.1 (11)
Seattle, WA	100.0	101.4	100.3	100.2	99.2	99.7	101.0	100.0	100.2	100.9	99.8	101.5	100.0	100.1	99.1	98.3	98.0	100.1 (8)
Spokane, WA	99.4	101.1	99.9	99.5	98.6	98.4	100.7	99.1	100.5	100.5	98.7	93.2	95.2	95.1	90.7	94.1	88.9	98.4 (4)
Vancouver, BC	97.1	97.2	97.4	96.3	95.5	95.0	98.1	95.0	98.5	97.5	95.2	92.8	87.4	88.8	87.4	85.8	81.8	94.9 (2)

## 5. Comparison by Cost Component

This chapter compares the results among the 10 countries for each of the major location-sensitive cost components. Results for individual cities are available at [www.CompetitiveAlternatives.com](http://www.CompetitiveAlternatives.com).

### A. Relative Importance of Cost Components

Exhibit 5.1 illustrates the relative significance of each cost component for both manufacturing and non-manufacturing operations.

The significance of each cost factor varies by both operation and location. Figures shown here represent the average results for all 10 countries.

**Labor costs**, including employer-paid statutory plans and other benefits, represent 46 to 60 percent of location-sensitive costs for manufacturing operations, and 74 to 85 percent of location-sensitive costs for non-manufacturing (service) operations.

**Facility costs** represent the second most significant cost factor for non-manufacturing operations with office lease cost, representing 5 to 18 percent of total location-sensitive costs. For manufacturing operations, industrial leasing costs range from 2 to 7 percent of total location-sensitive costs.

For manufacturing operations, **transportation** is another major factor, representing 5 to 18 percent of total location-sensitive costs.

**Utility costs** represent 1 to 7 percent of location-sensitive costs. Electricity and natural gas costs are both more significant for manufacturers than for non-manufacturers.

**Costs related to capital**, include both depreciation and interest. These represent a major cost item for manufacturers, ranging from 11 to 24 percent of location-sensitive costs. These costs are much less significant for non-manufacturers, at 1 to 6 percent of location sensitive costs.

**Taxes** represent 5 to 14 percent of total location-sensitive costs for manufacturing operations, and 0 to 9 percent for non-manufacturing operations.

EXHIBIT 5.1

#### Relative Importance of Key Location-Sensitive Cost Factors

	Manufacturing Operations <sup>1</sup>	Non-Manufacturing Operations <sup>2</sup>
<b>Labor Costs</b>		
Salaries & wages	32% – 42%	53% – 60%
Statutory plans	5% – 6%	8% – 9%
Other benefits	9% – 11%	14% – 16%
<b>Total labor</b>	<b>46% – 60%</b>	<b>74% – 85%</b>
<b>Lease Costs</b>	2% – 7%	5% – 18%
<b>Transportation Costs (Road, Air, Sea)</b>	5% – 18%	n/a
<b>Electricity &amp; Natural Gas</b>	2% – 7%	1% – 2%
<b>Cost of Capital (Depreciation, Financing)</b>	11% – 24%	1% – 6%
<b>Taxes</b>		
Property	1% – 3%	0% – 0%
Other	1% – 1%	1% – 1%
Income taxes <sup>3</sup>	4% – 12%	-1% – 8%
<b>Total taxes</b>	<b>5% – 14%</b>	<b>0% – 9%</b>

<sup>1</sup> Range for 11 manufacturing operations included in the overall results. (Refer to Exhibit 1.3.)

<sup>2</sup> Range for six non-manufacturing operations included in the overall results. (Refer to Exhibit 1.3.) Clinical trials management has been exchanged from this exhibit due to atypical cost patterns for that operation.

<sup>3</sup> Varies with revenue. Modeled operations are assigned revenues in line with typical industry targets.

## B. Labor Costs

Labor costs represent the most important group of cost factors examined in this study.

The labor force required for each business operation has been compiled from 42 benchmark job positions used consistently throughout this study. These positions reflect the full range of skills and responsibilities typically required in each of the business operations. A summary of the workforce profile for each operation can be found in Chapter 3.

### 1. Total Labor Costs

Total labor costs are the sum of:

- Base wages and salaries
- Employer-paid statutory plans
- Other employer-sponsored benefits.

Exhibit 5.2 compares each of these components, along with total labor costs for the 10 countries examined in this study. The results are as follows:

- Salaries and wages – **Mexico** has the lowest salary and wage structure by far among the 10 countries examined. **France** ranks second, followed by the **United Kingdom, Italy,** and **Canada**.
- Statutory plans – Expressed as a percentage of payroll, statutory plans are lowest in **Mexico**, followed by **Canada** and the **United States**.
- Other employer-sponsored benefits – Expressed as a percentage of payroll, other benefit costs are lowest in **France** and **Germany**, followed closely by **Australia, Canada,** and **Japan**.
- Total labor – Total labor costs are lowest in **Mexico**, followed by **Canada**, the **United Kingdom,** and **Australia**.

EXHIBIT 5.2								
Labor Cost Comparison								
	Salaries & Wages		Benefits				Total Labor	
			Statutory Plans		Other Benefits			
	Average per Employee <sup>1</sup> (US\$)	Rank	Percent of Payroll	Rank	Percent of Payroll	Rank	Average per Employee <sup>1</sup> (US\$)	Rank
<b>EUROPE</b>								
France	\$52,898	2	45%	10	21%	1	\$87,764	5
Germany	\$73,268	9	16%	8	22%	2	\$101,000	9
Italy	\$58,462	4	22%	9	29%	8	\$88,186	6
Netherlands	\$62,919	7	12%	6	28%	6	\$88,583	7
United Kingdom	\$57,271	3	10%	4	34%	9	\$81,970	3
<b>NORTH AMERICA</b>								
Canada	\$59,880	5	9%	2	25%	4	\$80,079	2
Mexico	\$26,319	1	7%	1	29%	7	\$35,696	1
United States	\$61,897	6	9%	3	36%	10	\$89,791	8
<b>ASIA PACIFIC</b>								
Australia	\$63,183	8	13%	7	23%	3	\$86,032	4
Japan	\$77,074	10	10%	5	25%	5	\$103,867	10

<sup>1</sup> Average for 17 operations included in the overall results (Refer to Exhibit 1.3) Represents 42 different job positions.

### 2. Physical Productivity Factors

Physical productivity is the result of four main factors. These factors have been addressed in this study as follows:

- **Actual hours worked**, including the costs associated with paid time not worked (vacation and holidays), have been included in the analysis on the assumption that absent workers must be covered by temporary labor, overtime, or additional staffing to keep the facility running year round. The total labor costs shown in this study represent the cost for each facility to have full staffing, 52 weeks per year.
- **Capital and technology** applied are assumed to be equal in all countries examined, as the model compares the costs of establishing and operating an identical facility in every location. The ability to recruit workers with the required industrial and technology skills may vary from country to country and region to region, and is not included in this analysis. However, all countries and regions included in this study, including Mexico, have modern sophisticated industrial sectors, suggesting that suitably skilled labor pools (of varying size) exist in each region studied.
- **Specific workplace training** provided to employees is also assumed to be equal for this comparison of identical facilities in each location.
- **Physical productivity of workers** is another key determinant of physical productivity. This factor recognizes the possibility that, given the same tools and training, workers in some countries may work more productively (e.g., achieve higher output per worker hour). However, this factor is extremely difficult to assess in an objective manner, and the comparisons in this study do not differentiate between countries on this basis.

## C. Facility Costs

For the manufacturing operations examined in this study, facilities are assumed to be established in a leased suburban industrial building.

For the non-manufacturing operations examined, facilities are assumed to be established in leased Class "A" office space.

### 1. Factory Leasing

Manufacturing operations have a range of land and factory size requirements. Land requirements range from 2 to 7 acres (0.8 to 2.8 hectares) and factory sizes range from 30,000 to 120,000 square feet (2,790 to 11,148 square meters).

Factory lease costs for each location are based on rented costs for prime bulk industrial space. Lease costs only include net rent. Additional costs, including utilities and property taxes, are borne directly by the manufacturing firm and are considered in other sections of this chapter.

As illustrated in Exhibit 5.3, factory lease costs are lowest in **Mexico**, followed by the **United States** and **Canada**.

### 2. Office Leasing

Office size requirements range from 10,000 to 45,000 square feet (929 to 4,180 square meters) for the non-manufacturing operations examined.

Office lease costs for each location are based on costs for Class "A" office space located, where possible, in a suburban office park or equivalent location. Lease costs include all operating costs, taxes, and insurance costs generally passed on by the landlord to the tenant in each location.

As illustrated in Exhibit 5.3, office lease costs are lowest in **Mexico**, followed by the **Netherlands** and the **United States**.

#### EXHIBIT 5.3

#### Facility Costs<sup>1</sup>: Industrial Land/Facility and Office Leasing Costs, by Country

	Manufacturing Operations		Other Operations	
	Factory Lease <sup>2</sup>		Office Leasing <sup>3</sup>	
	US\$ per sq.ft. <sup>4</sup>	Rank	US\$ per sq.ft. <sup>4</sup>	Rank
<b>EUROPE</b>				
France	\$6.83	4	\$49.11	8
Germany	\$8.53	7	\$28.38	5
Italy	\$8.20	6	\$27.64	4
Netherlands	\$9.09	8	\$20.40	2
United Kingdom	\$13.94	9	\$52.57	9
<b>NORTH AMERICA</b>				
Canada	\$5.31	3	\$31.77	6
Mexico	\$4.83	1	\$19.66	1
United States	\$5.06	2	\$26.45	3
<b>ASIA PACIFIC</b>				
Australia	\$7.18	5	\$33.33	7
Japan	\$15.84	10	\$58.55	10

1 Results are the average for the comparable cities selected for the international results. (Refer to Exhibit 1.6.) Care should be exercised in interpreting the country averages due to the significant variations in costs among cities within each country.

2 Net rent only for a prime bulk industrial facility. All operating costs are in addition and borne directly by the tenant.

3 Including tenant-borne operating, tax, and insurance costs.

4 Equals 0.09 m<sup>2</sup>.

## D. Transportation Costs

All of the manufacturing operations examined in this study are assumed to deliver their physical products by some combination of surface (land and sea) and air freight. Exhibit 5.4 illustrates the transportation modes typically used by each type of operation, as well as the relative significance of transportation costs.

Transportation costs are estimated on the general assumption that each firm delivers product to major distribution centers in full load or standardized less than full load quantities using normal delivery schedules. (In other words, the model assumes that firms are not selling to customers requiring just-in-time (JIT), just-in-order (JIO), or other specialized warehousing and delivery services, which can significantly affect transportation costs.)

The comparisons are based on costs-to-market, combining transportation rates for each distribution channel and the proximity of each location to major markets for the various products. Figures shown here for all freight modes include relevant fuel and security surcharges.

Exhibit 5.5 illustrates representative transportation costs for manufacturing operations based on specific distribution patterns for each operation. These results should be interpreted only as general indicators of transportation cost relationships among countries, since they are based on assumed global and regional product distribution patterns for each operation within each country. Operations with different product distribution patterns may have significantly different average transportation costs.

The European countries have the lowest costs for surface freight—40' containers to global destinations and equivalent road freight to regional destinations. The average cost per load for surface freight is lowest in **Germany**, followed by the **Netherlands**, the **United Kingdom**, and **France**.

Costs for air freight to a range of global destinations vary more by region. Average air freight costs are lowest from **Japan**, the **United Kingdom**, **France**, and the **United States**.

Combining these two distribution channels, total global freight costs are lowest in the **United Kingdom**, followed by **Germany**, **Japan**, and **France**.

EXHIBIT 5.4

### Summary of Distribution Channel Assumptions and Significance of Transportation Costs<sup>1</sup>, by Operation

Business Operation	Global Distribution Channels Used		Transport as a Percent of Total Location-Sensitive Costs <sup>2</sup>
	Surface	Air	
<b>Manufacturing</b>			
Aircraft parts	√	√	18%
Auto parts	√		11%
Electronics assembly	√	√	12%
Food processing	√		16%
Medical devices	√	√	10%
Metal components	√		14%
Pharmaceuticals	√	√	11%
Plastic products	√		18%
Precision components	√		13%
Specialty chemicals	√	√	5%
Telecom equipment	√	√	8%

1 Only those operations that distribute products are included.

2 Includes all modes of transport.

EXHIBIT 5.5

### Transportation Costs, by Country and Mode

	Global Distribution		Total Annual Cost	
	Surface Freight per Load <sup>1,2</sup>	Air Freight per Kg <sup>1</sup>	US\$'000 <sup>3</sup>	Rank
<b>EUROPE</b>				
France	\$1,028	\$1.77	\$1,383	4
Germany	\$902	\$1.87	\$1,299	2
Italy	\$1,087	\$2.02	\$1,505	6
Netherlands	\$940	\$2.32	\$1,456	5
United Kingdom	\$941	\$1.69	\$1,286	1
<b>NORTH AMERICA</b>				
Canada	\$1,655	\$1.91	\$1,980	8
Mexico	\$2,074	\$1.91	\$2,343	9
United States	\$1,533	\$1.79	\$1,833	7
<b>ASIA PACIFIC</b>				
Australia	\$2,169	\$1.96	\$2,435	10
Japan	\$1,108	\$1.43	\$1,331	3

1 Average for those manufacturing operations that utilize full load delivery logistics for each mode of distribution.

2 Per standard 40' container, or equivalent.

3 Average for 11 manufacturing operations included in the overall results. (Refer to Exhibit 1.3.)

## E. Utility Costs

### 1. Electricity

The operations examined in this study are not particularly energy-intensive, and electricity costs typically represent only 1.0 to 4.7 percent of total location-sensitive costs. Details of electricity demand and consumption requirements for each operation can be found in Chapter 3.

Exhibit 5.6 illustrates the relative cost for electricity in each country, expressed in US cents per kilowatt-hour. The lowest electricity costs are in **Canada, France,** and the **United States**.

### 2. Natural Gas

Natural gas costs are analyzed only for manufacturing operations, as natural gas costs are generally irrelevant or immaterial for service operations. For the manufacturing operations examined, natural gas costs typically represent 0.3 to 3.8 percent of total location-sensitive costs. Details of natural gas consumption requirements for each operation can be found in Chapter 3.

Care should be exercised in interpreting national results, since there may be significant regional differences in availability and costs. For the few locations where natural gas is not readily available, costs of alternate fuel sources (propane, diesel, heating oil, or additional electricity) have been substituted based on energy equivalencies for the fuel source representing the most economical alternative in each location.

With these qualifiers, Exhibit 5.6 illustrates the relative cost for natural gas in each country, expressed in US dollars per 100 cubic feet (CCF). The lowest natural gas costs are in **Mexico,** followed by the **United States** and **Canada**.

EXHIBIT 5.6

#### Utility Costs: Electricity and Natural Gas Per Unit, by Country

	Electricity <sup>1</sup>		Natural Gas <sup>2</sup>	
	US¢ per kWh	Rank	US\$ per CCF <sup>3</sup> (100ft <sup>3</sup> )	Rank
<b>EUROPE</b>				
France	8.9 ¢	2	\$1.48	8
Germany	13.4 ¢	7	\$1.62	10
Italy	22.4 ¢	10	\$1.54	9
Netherlands	13.1 ¢	5	\$1.37	6
United Kingdom	13.8 ¢	8	\$1.13	5
<b>NORTH AMERICA</b>				
Canada	8.9 ¢	1	\$0.86	3
Mexico	11.2 ¢	4	\$0.48	1
United States	9.0 ¢	3	\$0.73	2
<b>ASIA PACIFIC</b>				
Australia	15.5 ¢	9	\$1.01	4
Japan	13.1 ¢	6	\$1.40	7

<sup>1</sup> Average for 17 operations included in the overall results. (Refer to Exhibit 1.3.)

<sup>2</sup> Average for 11 manufacturing operations included in the overall results. (Refer to Exhibit 1.3.)

Natural gas costs have not been analyzed for non-manufacturing operations.

<sup>3</sup> Equals 2.83 m<sup>3</sup> or 29.87 gJ.

## F. Financing Costs

The base interest rates used in this study, representing typical cash deposit rates and mid-class commercial bond rates in each country in Q4 2009, are illustrated in Exhibit 5.7. The cash deposit rates are significantly lower than those in the 2008 edition of *Competitive Alternatives*, while borrowing rates are higher than in 2008—which reflects the increased spread in interest rates seen as a result of the 2008-09 financial crisis.

For operations in volatile industries or with limited fixed assets to offer as security, additional interest rate premiums have been added to these base borrowing rates, as appropriate.

## G. Non-Income-Based Taxes

### 1. Property-Based Taxes

#### a) Manufacturing Operations

Property taxes typically account for about 2 percent of location-sensitive costs. Property taxes include not only taxes on land and buildings, but also (where applicable) on machinery and equipment, inventory, and other physical assets.

Exhibit 5.8 illustrates the average property taxes paid in each country, expressed in US dollars per square foot of building space. The lowest property tax costs for manufacturing operations are in **Mexico**, followed by the **Netherlands, Italy**, and **Australia**.

National results should be interpreted with caution, as property taxes can vary dramatically based on local tax rates and property values.

#### b) Non-Manufacturing Operations

For non-manufacturing operations occupying leased office space, property taxes on real estate are typically levied on the landlord. Any amount of this tax passed on to the tenant is captured indirectly as part of total office leasing costs, but is not separately identifiable.

As Exhibit 5.8 illustrates, the non-manufacturing operations examined are still subject to direct property taxes on equipment and/or business occupancy in six of the countries examined. In **Germany**, the **United Kingdom**, **Mexico**, and **Australia**, none of the cities examined levy taxes on equipment or business occupancy. In **Canada**, a few jurisdictions do tax equipment and/or business occupancy, but not any of the cities included in the calculation of the national result.

### EXHIBIT 5.7

#### Interest Rates Used in This Study

	Cash Deposit Rate	Commercial Borrowing Rate
<b>EUROPE</b>		
France	2.00%	8.72%
Germany	2.00%	8.72%
Italy	2.00%	8.72%
Netherlands	2.00%	8.72%
United Kingdom	2.00%	9.30%
<b>NORTH AMERICA</b>		
Canada	1.15%	7.73%
Mexico	4.17%	11.82%
United States	1.28%	7.51%
<b>ASIA PACIFIC</b>		
Australia	3.30%	8.36%
Japan	0.99%	7.58%

Refer to Electronics, which has no interest rate premium and therefore represents the base interest rates.

### EXHIBIT 5.8

#### Total Property-Based Taxes Average US \$ per Square Foot of Building Space

	Manufacturing Operations <sup>1</sup> (Leased Facilities)		Non-Manufacturing Operations <sup>2</sup> (Leased Facilities)	
	US\$ per sq.ft.	Rank	US\$ per sq.ft.	Rank
<b>EUROPE</b>				
France	\$4.72	7	\$0.95	8
Germany	\$2.74	5	\$0.00	1
Italy	\$0.61	3	\$2.50	10
Netherlands	\$0.56	2	\$0.30	6
United Kingdom	\$8.19	9	\$0.00	1
<b>NORTH AMERICA</b>				
Canada	\$4.55	6	\$0.00	1
Mexico	\$0.15	1	\$0.00	1
United States	\$5.15	8	\$0.59	7
<b>ASIA PACIFIC</b>				
Australia	\$2.05	4	\$0.00	1
Japan	\$11.47	10	\$1.96	9

<sup>1</sup> Average for 11 manufacturing operations included in the overall results. (Refer to Exhibit 1.3.)

<sup>2</sup> Average for 6 non-manufacturing operations included in the overall results. (Refer to Exhibit 1.3.)

## 2. Capital Taxes

As illustrated in Exhibit 5.9, and detailed below, capital taxes only apply in certain countries and regions:

- In **Canada**, the former national capital tax has been eliminated, as have some provincial capital taxes. The remaining provinces are currently in the process of phasing out their capital taxes on corporations other than financial institutions, and by the end of 2012, all such taxes are expected to be eliminated.
- In the **United States**, capital taxes apply (in various forms) in about 40 percent of all locations examined.
- In **Japan**, prefectural and municipal capital taxes apply in both locations considered in this study.

## 3. Transaction Taxes

Transaction taxes include:

- **Non-refundable sales taxes**  
Non-refundable sales taxes apply in most US states and in half of all Canadian provinces. However, two major Canadian provinces—Ontario and British Columbia—are converting their existing non-refundable sales taxes to refundable GST-style sales taxes on July 1st, 2010. This change will leave just three of the 10 Canadian provinces (Manitoba, Saskatchewan, and Prince Edward Island) imposing non-refundable sales taxes.

Where non-refundable sales taxes apply, exemptions are generally available for many of the costs incurred by a manufacturer to avoid the compounding of taxes into the price of goods at each stage of the production process.

The tax burden in the locations where sales taxes apply is typically between US \$85,000 and US \$350,000 per annum, or approximately 0.6 to 2.8 percent of location-sensitive costs.

EXHIBIT 5.9		
Capital Taxes		
	US\$'000 per Annum <sup>1</sup>	Percent of Location-Sensitive Costs
<b>EUROPE</b>		
France	nil	–
Germany	nil	–
Italy	nil	–
Netherlands	nil	–
United Kingdom	nil	–
<b>NORTH AMERICA</b>		
Canada <sup>2</sup>	<\$3	<0.03%
Mexico	nil	–
United States <sup>2</sup>	<\$1 – \$64	<0.01% – 0.50%
<b>ASIA PACIFIC</b>		
Australia	nil	–
Japan <sup>2</sup>	\$33 – \$36	0.21% – 0.24%

<sup>1</sup> Average over 10 years.

<sup>2</sup> Range for those locations where capital taxes apply.

- **Gross receipts taxes.** Gross receipts taxes apply in a small but growing number of jurisdictions in the United States, either instead of, or in addition to, state or local income taxes. In 2010, France also introduced a new modified gross receipts tax based on gross value added.

The tax burden in the locations where gross receipts taxes apply is typically up to US \$200,000 per annum, or up to approximately 1.5 percent of location-sensitive costs.

- **Refundable value-added taxes (VAT or GST)** For this analysis, value-added taxes have been excluded, since their refundable nature means there is no net cost to a business once input tax credits (refunds) have been claimed. Although these taxes impose a cost on companies in terms of cash flow timing and administration, such costs are not considered material to this study.

## 4. Local Business Taxes

Sundry local business taxes, in a wide variety of forms, also apply in many of the jurisdictions studied, and are included in the total cost calculations for this study.

## H. Income Taxes

Exhibit 5.10 illustrates the effective combined corporate income tax rates (federal, regional, and local) for three different business situations:

- Manufacturing operations
- Corporate and IT Service operations
- R&D operations.

Effective income tax rates are calculated net of generally applicable tax credits, grants, and other government incentives.

The national results presented in Exhibit 5.10 represent the average for the representative cities within each country (Exhibit 1.6).

Effective tax rates may vary by regional (state, provincial, etc.) and local jurisdiction.

### 1. Manufacturing Operations

For manufacturing operations, the country with the lowest effective income tax rate is **Canada**, followed by the **Netherlands** and **Australia**.

### 2. Corporate and IT Services Operations

For other operations (non-manufacturing, non-R&D), the lowest effective income tax rates are offered by **Canada**, followed by the **Netherlands** and the **United Kingdom**.

### 3. R&D Operations

The **Netherlands**, **France**, **Australia**, the **United Kingdom**, and **Canada** all offer significant R&D tax incentives, which may be fully or partially refundable in certain cases or locations. This can result in "negative" income tax (or net government subsidies) for R&D operations in some jurisdictions. Other jurisdictions that offer favorable tax treatment for R&D operations include many **US states**.

EXHIBIT 5.10

### Effective Combined Corporate Income Tax Rate<sup>1</sup> Percentage of Net Profit Before Tax for Representative Operations

	Manufacturing Average <sup>2</sup>		Non-Manufacturing			
			Corporate and IT Services Average <sup>3</sup>		R&D Average <sup>4</sup>	
<b>EUROPE</b>						
France	23.8%	5	32.9%	7	-106.2%	2
Germany	28.9%	8	31.0%	6	34.8%	8
Italy <sup>5</sup>	29.2%	9	56.6%	10	48.2%	10
Netherlands	19.3%	2	25.4%	2	-211.9%	1
United Kingdom	22.7%	4	28.0%	3	-12.2%	4
<b>NORTH AMERICA</b>						
Canada	15.1%	1	21.9%	1	-8.3%	5
Mexico	26.8%	6	28.7%	4	30.3%	7
United States	28.0%	7	37.6%	8	17.8%	6
<b>ASIA PACIFIC</b>						
Australia	22.0%	3	30.7%	5	-98.9%	3
Japan	36.4%	10	42.7%	9	38.4%	9

1 Net of government grants and incentives.

2 Average for 11 manufacturing operations included in the overall results. (Refer Exhibit 1.3.) For Japan, such results are not meaningful due to marginal average profitability, and instead, results have been shown for the single industry reporting the highest net income before tax (and therefore the most "normalized" income tax calculation).

3 Average for three operations included in the overall results. (Refer Exhibit 1.3.)

4 Average for three R&D operations included in the overall results. (Refer Exhibit 1.3.) Most activities represent tax-eligible R&D activities. Negative effective income tax rates are the result of refundable R&D income tax credits, grants, or other incentive programs. These amounts may be substantial in some countries or locations.

5 Effective tax rates for service operations are higher due to the limited deductibility of payroll costs for regional income tax (IRAP) purposes.

### 4. Further Tax Analysis

Taxes are the subject of a separate KPMG report, *Competitive Alternatives Special Report: Focus on Tax*, that analyzes international tax issues in greater depth than this report on business costs. The *Focus on Tax* report will be available from May 2010 at [www.CompetitiveAlternatives.com](http://www.CompetitiveAlternatives.com), along with all other study results and publications.

### 5. Nature of Results

The results described here are sensitive to operating specifications, including revenue assumptions. Effective tax rates will also vary for different operations, regions, and cities within countries, and over time, due to changes in tax laws and regulations. These results are of a general nature, and further detailed analysis is required to draw a conclusion about comparative tax rates for a particular operation in alternate locations.

## 6. Other Competitiveness Factors

The primary focus of the preceding chapters has been to compare business costs across all study locations. While business costs represent an important factor in any site selection process, a wide variety of other factors also influence the competitiveness of locations. A range of major competitiveness factors are illustrated in Exhibit 6.1.

*Competitive Alternatives* presents a secondary comparison of some of these non-cost factors across study locations. The relative importance of each cost and non-cost factor will vary by firm—even for similar firms in the same industry. Therefore, the results and ratings presented in this chapter should be interpreted by each individual company in relation to its specific needs.

This chapter presents information on a variety of other competitiveness factors, but does not attempt to draw any overall conclusions regarding the “total competitiveness” of each location.

While this chapter primarily compares other competitiveness factors at the country level, select key competitiveness metrics are also available at the regional and/or city level, as referenced in this chapter and as detailed in Appendix C.

EXHIBIT 6.1		
Key Site Location Factors		
	Cost Factors	Other Key Factors
<b>Business</b>	<b>Business Costs</b> Land/building/office Labor wage/salary/benefits Transportation and distribution Utilities Financing Federal/regional/local taxes	<b>Business Environment</b> Labor availability and skills Access to markets, customers, and suppliers Road, rail, port, airport infrastructure Utility and telecom/internet service reliability Suitable land sites Regulatory environment
<b>Personal</b>	<b>Cost of Living</b> Personal taxes Cost of housing Cost of consumer products and services Healthcare costs Education costs	<b>Quality of Life</b> Crime rates Healthcare facilities Schools and universities Climate Culture and recreation

## A. Relative Importance of Site Selection Factors

### 1. Business Factors

Exhibit 6.2 compares the business-related site selection factors most frequently cited as "important" in *Area Development Magazine's* December 2009 and 2007 US Corporate Surveys. The exhibit shows some significant changes and some similarities in the ranking of these site selection factors between 2009 and 2007:

- Tax exemptions have become the factor third most frequently cited as important, up from 10th in 2007, while corporate tax rate ranks fifth in 2009, up from seventh in 2007. Both developments no doubt reflect the general trend in increased importance of cost-related factors in the difficult economic climate. Concerns of businesses about potential tax rises, in the context of growing government debt, may have also contributed to the prominence of the taxation-related factors.
- Reflecting the slowdown in business investment and declining real estate prices in the last couple of years, availability of land now ranks 12th among these site selection factors, down from sixth in 2007.
- As unemployment rates have risen, concerns about the availability of labor have declined in importance. Availability of skilled labor ranks as the sixth most frequently cited issue in 2009, as compared to the fourth in 2007. Availability of unskilled labor is now considered important by only 55.5 percent of respondents, down from 65.2 percent in 2007.

Exhibit 6.2 also identifies which cost-related factors are included within the scope of the *Competitive Alternatives* cost analysis, and which other competitiveness factors are discussed in this chapter.

EXHIBIT 6.2				
Site Selection Factors, by Indicated Frequency of Importance <sup>1</sup>				
	Percentage of Respondents Citing as Important (Rank)		Analyzed in <i>Competitive Alternatives</i> Chapter	
	2009	2007	Ch 5	Ch 6
Labor costs	96.7 (1)	92.3 (2)	√	
Highway accessibility	92.9 (2)	96.9 (1)		√
Tax exemptions	88.4 (3)	82.8 (10)	√ <sup>2</sup>	
Energy availability and costs	88.0 (4)	89.0 (3)	√	√
Corporate tax rate	87.0 (5)	83.8 (7)	√	
Availability of skilled labor	86.9 (6)	88.7 (4)		√
Occupancy or construction costs	86.7 (7)	88.2 (5)	√	
State and local incentives	84.9 (8)	83.4 (8)	√ <sup>2</sup>	
Availability of advanced ICT services	83.2 (9)	82.2 (12)		√
Inbound/outbound shipping costs	81.7 (10)	n/a	√	
Low union profile	75.8 (11)	80.6 (13)		√
Availability of land	75.7 (12)	85.4 (6)	√ <sup>3</sup>	
Availability of buildings	75.7 (12)	79.3 (14)	√ <sup>3</sup>	
Right-to-work state	74.0 (14)	72.1 (15)		
Proximity to major markets	73.3 (15)	82.8 (10)		√
Expedited or "fast-track" permitting	72.2 (16)	71.5 (17)		√
Environmental regulations	71.2 (17)	83.2 (9)		√
Availability of long-term financing	65.4 (18)	63.0 (19)		
Proximity to suppliers	63.9 (19)	71.8 (16)		
Training programs	61.7 (20)	56.6 (21)		
Availability of unskilled labor	55.5 (21)	65.2 (18)		√

<sup>1</sup> *Area Development Magazine*, December 2009 and 2007. Factors considered by more than 60 percent of total respondents in either year to be "very important" or "important."

<sup>2</sup> All significant non-discretionary incentives and exemptions have been incorporated in the tax calculations and overall results for this study. Refer also to Chapter 1 for discussion of incentives methodology.

<sup>3</sup> Due to the strong influence of supply and demand in real estate markets, costs of land and buildings provide a good indication of relative availability.

## 2. Personal Factors

While the quality of business environment is a significant factor at the organizational level, personal quality of life factors can also impact on site selection decisions. These factors tend to be particularly relevant for owner-managed enterprises, for knowledge-intensive businesses that need to attract and retain key highly skilled workers in an increasingly global labor market, and for companies that are trying to provide incentives to staff to move to a new location.

Exhibit 6.3 illustrates the personal cost and quality of life factors that are most frequently identified as important in the *Area Development Magazine* Corporate Surveys. In terms of quality of life factors, health facilities have increased in their rankings among the factors identified as being important in 2009.

The balance of this chapter examines specific competitiveness indicators across the countries and cities studied, including a number of measures specifically related to the factors indicated here as being of increased importance in current site selection decision making.

## B. General Business Environment

### 1. Macro-economic Conditions

Exhibit 6.4 illustrates some key macro-economic indicators for each country for 2008-2009. The global economic crisis that unfolded during this period greatly affected the stability of the macro-economic environment in all of the countries examined in this report. Of the 10 countries studied, Australia was the only country to achieve positive economic growth in the year ended June 30, 2009, and the only country to avoid dipping into recession. Japan and Mexico have been particularly severely affected, with GDP in these countries decreasing by 7.2 percent and 9.7 percent, respectively between mid-2008 and mid-2009.

Inflation rates are at historic lows in most countries, with several countries suffering price deflation. In Japan, inflation measured -2.2 percent in Q3 2009, followed by -1.6 percent in the US. On a more positive note, in 2008, the United States still led all countries in terms of GDP per capita.

Detailed data on GDP growth rates and GDP per capita for all featured cities, based on the state/regional data, are available in Appendix C.

EXHIBIT 6.3			
Quality of Life Factors, by Indicated Frequency of Importance <sup>1</sup>			
	Percentage of Respondents Citing as Important (Rank)		Analyzed in <i>Competitive Alternatives</i> Chapter
	2009	2007	Ch 6
Low crime rate	79.0 (1)	74.0 (1)	√
Health facilities	68.4 (2)	57.4 (5)	√
Housing availability	62.4 (3)	62.1 (3)	√
Housing costs	61.5 (4)	58.8 (4)	√
Ratings of public schools	61.4 (5)	62.6 (2)	√
Climate	55.0 (6)	51.6 (6)	
Recreational opportunities	52.7 (7)	43.4 (9)	
Colleges and universities in area	50.7 (8)	47.3 (8)	
Cultural opportunities	46.0 (9)	48.7 (7)	

<sup>1</sup> *Area Development Magazine*, 2009 and 2007. Percentage of total respondents who consider a factor to be either "very important" or "important."

EXHIBIT 6.4					
Key Macro-Economic Indicators, 2008-2009					
Country	GDP/capita (US\$, PPP) <sup>1</sup>		GDP Growth Rate <sup>2</sup>		Inflation Rate <sup>2</sup>
		Rank		Rank	
Australia	36,918	4	0.6%	1	1.3%
Canada	39,098	3	-3.2%	3	-0.9%
France	34,205	7	-2.8%	2	-0.4%
Germany	35,539	6	-5.9%	7	-0.2%
Italy	30,631	9	-6.0%	8	0.1%
Japan	34,116	8	-7.2%	9	-2.2%
Mexico	14,534	10	-9.7%	10	5.1%
Netherlands	40,558	2	-5.2%	5	0.3%
United Kingdom	36,358	5	-5.5%	6	1.5%
United States	47,440	1	-3.8%	4	-1.6%

<sup>1</sup> World Economic Outlook Database, IMF, October 2009. Reporting data for 2008.

<sup>2</sup> Key Economic Indicators Database, OECD, November 2009. Reporting annual GDP growth rate as at Quarter 2 2009 and inflation rate for Quarter 3 2009.

Since 2008, national governments have been faced with economic issues of an unprecedented magnitude in recent history. The meltdown of the global financial system and the ensuing economic crisis have prompted governments to intervene in the economy on an extraordinary scale.

Significant funds have been allocated to emergency stimulus packages in the hope of reviving national economies. Australia and Japan have led the way with 2009–2010 stimulus packages measuring 4.9 percent and 4.2 percent of GDP, respectively.

Government spending has, however, weakened the financial health of national accounts, with the level of government debt rising and projected to remain high over the coming years in most countries.

This is particularly concerning in the case of economies that were already heavily indebted before the crisis, particularly Japan and Italy. By 2014, the United States is expected to join these countries in carrying a government debt load greater than 100 percent of GDP, with the United Kingdom and France also nearing this threshold. Australia and Mexico are the countries carrying the lowest levels of government debt among the countries examined in this report.

The ability of governments to continue to adapt their policies to the changes in the economy will remain of utmost importance in ensuring a successful recovery. Within the group of countries analyzed in this report, the governments of Australia, the Netherlands, and Canada are perceived as being the best able to adapt their policies in response to economic change.

## 2. Overall Competitiveness

The *Global Competitiveness Index* (GCI), by the World Economic Forum (WEF), and the *World Competitiveness Yearbook* (WCY), by the International Institute for Management Development (IMD), both examine broad ranges of economic, institutional, and social factors at the country level to produce two indices that reflect slightly different perspectives on overall international competitiveness. Exhibit 6.6 presents the 2009 results of these two indices, along with a combined result based on the average of the two. The combined opinions of these two influential international organizations indicate that the United States, followed by Canada, the Netherlands, and Australia, offer the most broadly competitive business environments among the 10 countries included in *Competitive Alternatives*.

EXHIBIT 6.5

## National Government Response to the Crisis

Economy	Scale of Intervention		General Government Debt <sup>1</sup>				Government Responsiveness <sup>3</sup>	
	Stimulus Package as % GDP (2009–2010) <sup>1</sup>		2007 (pre-crisis)				Policy Adaptability to Economic Change	
	% GDP	Rank	2009	2014	Rank	Change	Rank	
Australia	4.9%	1	10%	17%	28%	1	6.3	1
Canada	3.6%	5	64%	78%	69%	3	5.1	3
France	1.5%	8	64%	78%	96%	5	4.0	7
Germany	3.6%	4	63%	79%	89%	4	4.6	4
Italy	0.3%	9	104%	116%	129%	8	2.7	10
Japan	4.2%	2	188%	219%	246%	9	3.0	9
Mexico	2.5%	6	38%	48%	44%	2	3.0	8
Netherlands	n/a	n/a	46%	68% <sup>2</sup>	n/a	n/a	5.1	2
United Kingdom	1.6%	7	44%	69%	98%	6	4.3	5
United States	3.8%	3	62%	85%	108%	7	4.1	6

1 General Government debt as % of GDP. IMF, Eurostat November 2009. 2009–2010 stimulus package as percent of pre-crisis 2007 GDP.

2 Forecast general government debt in 2010.

3 Index: 0 = low and 10=high. *World Competitiveness Yearbook* copyright © 2009, IMD International, Switzerland, World Competitiveness Center, [www.imd.ch/wcc](http://www.imd.ch/wcc).

EXHIBIT 6.6

## Indices of Overall Economic Competitiveness, 2009

Country	GCI Score <sup>1</sup>	WCY Score <sup>2</sup>	Average Score	Rank
Australia	69.17	88.93	79.05	4
Canada	72.17	88.71	80.44	2
France	68.83	68.07	68.45	8
Germany	72.83	83.51	78.17	5
Italy	55.17	52.06	53.61	9
Japan	72.83	78.24	75.54	6
Mexico	53.17	53.90	53.53	10
Netherlands	72.00	87.76	79.88	3
United Kingdom	69.83	76.07	72.95	7
United States	76.50	100.00	88.25	1

1 *Global Competitiveness Index* (GCI) by the World Economic Forum, 2009, rescaled.

2 *World Competitiveness Yearbook* (WCY) copyright © 2009, IMD International, Switzerland, World Competitiveness Center, [www.imd.ch/wcc](http://www.imd.ch/wcc).

## C. Labor Markets

### 1. Population Demographics

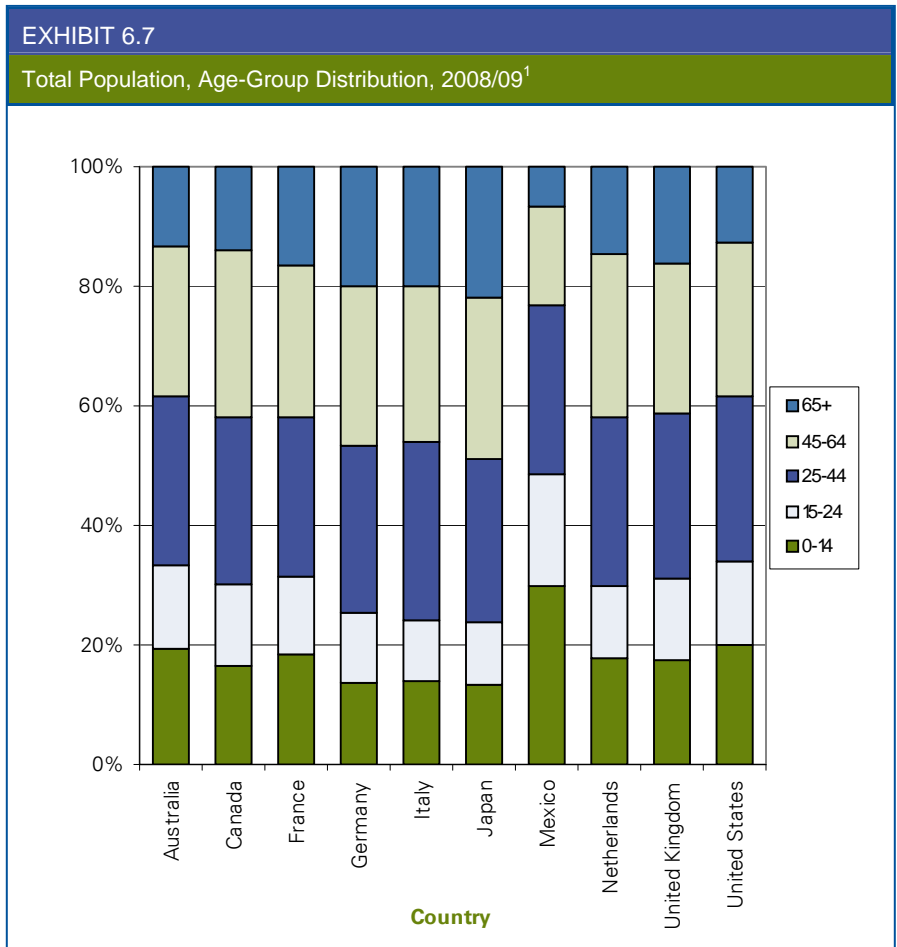
With an aging population and the large “baby boomer” generation beginning to retire, future labor supply is an issue of concern in most developed countries. Exhibit 6.7 provides an overview of the age distribution of the population in each of the study countries. Unless there are increases in fertility and/or immigration rates in the near future, the pool of available labor is expected to diminish over the coming decade(s) in all developed countries (excluding Mexico).

The population that is already retired or is nearing retirement (45 years of age and above) represents 38.4 to 48.9 percent of the total population in the nine countries studied, other than Mexico. This represents an increase of about 1 percent in this older age group since 2006/07. In Mexico, this older age group accounts for just 23.3 percent of the population. At the same time, the population below the age of 25—the future labor force—represents only 23.9 to 34.1 percent of total population in most countries, except in Mexico, where almost 50 percent of the population is under the age of 25.

Germany, Italy and Japan face the most immediate challenges in terms of aging population. These three countries have the largest proportions of population older than 44, and the smallest shares of population younger than 25.

There is a significant degree of variation in these age profiles, both across countries and within individual countries. For example, within the United States, the states of Alaska, Colorado, Georgia and Utah all have a ratio of population over 65 to the working age population of less than 15 percent. In Florida, Iowa, Pennsylvania and West Virginia, however, this ratio exceeds 22.5 percent.

A table containing detailed data on this topic can be found in Appendix C.



<sup>1</sup> Eurostat, International Labour Organization, Statistics Canada, and the US Census Bureau. Refer to Appendix C for full details on sources.

## 2. Labor Force Activity

The unemployment rate of a country or region represents a key indicator of the health of the labor markets and the economy overall. However, unemployment rates only tell one part of the labor market story, and should be interpreted within the broader context of economic activity rates.

Unemployment rates indicate the proportion of the labor force that is currently looking for work. Economic activity rates represent the proportion of the adult population that is either employed, or unemployed but looking for work. Adults who are neither employed nor looking for work are considered inactive. Individuals can be inactive due to a variety of personal reasons, such as studying, staying at home to look after family, etc. However, low activity rates can also be symptomatic of sluggish labor markets that do not provide enough incentive for people to look for work.

Exhibit 6.8 details the economic activity rates, unemployment rates, and total adult population employment rates for each of the countries examined in 2009. Germany and Italy illustrate the difference between assessing unemployment versus total adult employment. Looking at unemployment rates alone, Germany and Italy have relatively similar unemployment rates. However, a much higher proportion of the German adult population is participating in the labor force (59.5 percent) than in Italy (48.8 percent), meaning that a larger proportion of the population is actually employed. This implies a larger active and experienced labor pool relative to the national population. Overall, the Netherlands, Canada, and Australia have the highest rates of total adult employment.

Detailed data on economic activity rates and unemployment rates for all featured cities are available in Appendix C.

EXHIBIT 6.8				
Labor Force Size and Activity, 2009				
Country	Economic Activity Rate <sup>1</sup>	Unemployment Rate <sup>2</sup>	Total Employed Adult Population <sup>3</sup>	Rank
Australia	65.1%	5.5%	61.5%	3
Canada	67.3%	8.5%	61.6%	2
France	57.1%	9.7%	51.6%	9
Germany	59.5%	7.5%	55.0%	8
Italy	48.8%	7.2%	45.3%	10
Japan	60.2%	5.4%	56.9%	6
Mexico	59.3%	6.3% <sup>4</sup>	55.6%	7
Netherlands	66.7%	3.5%	64.4%	1
United Kingdom	62.4%	7.6%	57.7%	5
United States	65.4%	9.6%	59.1%	4

1 National and international statistical agencies. Refer to Appendix C for full details on sources.

2 Labour Force Statistics, OECD. Reporting data for Quarter 3 2009 (Quarter 2 2009 for UK).

3 Equals economic activity rate x (1-unemployment rate).

4 While Mexican definitions for measurement of unemployment appear consistent with all other countries, it is highly likely that this low unemployment rate reflects differences in actual reporting practices and/or masks significant rates of underemployment.

### 3. Availability of Skilled Labor

The economic shift towards knowledge-driven growth requires a well educated labor force that is able to work with advanced technologies and easily adapt to innovative business processes.

Completion of secondary education and often some post-secondary education has become the norm even in occupations that in the past might have required a lower level of qualifications. To sustain innovation-driven growth, the demand for a workforce educated to the tertiary level will continue to grow. Therefore, identifying locations that can provide a sufficient pool of skilled labor has become very important for businesses. Exhibit 6.9 presents several indicators related to education:

- Education attainment (i.e., the highest level of education achieved) is a key indicator of skill levels in the workforce
- Education expenditure is an indicator of the general priority that education has on the national agenda
- Education outcomes, measured by high school science skills, is an indicator of the quality of the educational system.

Education attainment, expenditures, and outcomes vary across the study countries. For example:

- The United States ranks very highly in terms of both education attainment and expenditures. However, the US ranks eighth in terms of average outcomes (as measured by high school science skills: PISA score)
- Canada ranks very highly for education attainment, education expenditures, and for education outcomes.

EXHIBIT 6.9

#### Education Attainment, Expenditure, and Outcomes

Country	Education Attainment		Education Expenditure			Education Outcomes			
	Population With ...				Expenditure as % of GDP <sup>3</sup>	Expenditure per Student as % of GDP per Capita <sup>4</sup>	High School Science Skills (PISA Score) <sup>5</sup>	Rank	
Upper Secondary Education <sup>1</sup>	Rank	Tertiary Education <sup>2</sup>	Rank	Rank					
Australia	68.2%	8	33.7%	4	5.7%	24.0%	9	527	3
Canada	86.6%	2	48.3%	1	6.5%	28.0%	3	534	1
France	68.7%	6	26.8%	7	5.9%	27.1%	6	495	7
Germany	84.4%	3	24.3%	8	4.8%	24.1%	8	516	5
Italy	52.3%	9	13.6%	10	4.9%	28.1%	2	475	9
Japan	84.0%	4	41.0%	2	5.0%	27.7%	4	531	2
Mexico	33.3%	10	15.9%	9	5.7%	18.4%	10	410	10
Netherlands	73.2%	5	30.8%	6	5.6%	25.1%	7	525	4
United Kingdom	68.3%	7	31.8%	5	5.9%	27.3%	5	515	6
United States	87.9%	1	40.3%	3	7.4%	30.7%	1	489	8

1 Percentage of 25–64 population with upper-secondary or higher education, 2007 except Japan (2003), OECD.

2 Percentage of 25–64 population with tertiary education, 2007, OECD.

3 Expenditure on all levels of education (primary and above), from public and private sources. 2006 or latest data available, OECD.

4 Expenditure on educational institutions per student for all services relative to GDP per capita. 2006 or latest data available, OECD. 2002 data for Canada.

5 OECD, Program for International Student Assessment (PISA), 2006 science competencies.

Refer to Appendix C for full details on sources.

The degree of conversion from secondary to tertiary education also tends to vary across countries. For example, 84 percent of the population in both Germany and Japan have at least upper secondary education. However, in Germany only 24 percent have completed tertiary education, as compared to 41 percent in Japan.

Education attainment rates at the regional level generally tend to follow the national attainment rates, although some variations exist in certain countries.

Detailed data on educational attainment for all featured cities, based on the state/regional data, are available in Appendix C.

#### 4. Labor Market Flexibility

Rapidly changing competitive pressures and economic conditions, such as the recent global economic crisis, can necessitate swift action from companies in order to remain competitive. Such action can include restructuring of the workforce—shedding employees, hiring more employees, and/or hiring different types of employees. The speed and ability of businesses to reorganize their workforce depends to a large extent on the flexibility of labor markets.

High unionization rates among workers are often associated with rigid labor markets, but should be observed within a wider context of collective bargaining agreements. For example, in France, only 7.8 percent of workers were members of unions in 2007, but a total of 95.0 percent were covered by collective bargaining agreements.

Widespread coverage by collective agreements implies that there is little scope for direct agreement on employment terms between firms and individual workers.

Regulations governing other aspects of labor markets play an equally important part in maintaining or hindering labor flexibility. Employment protection legislation has an impact on both the processes and costs involved in hiring and firing workers, as well as on employment practices for all workers. Rigid job protection measures can pose a formidable barrier for business in both firing surplus labor and choosing to hire new workers.

The cost of dismissals has been of particular concern to businesses during the recent economic crisis, when significant restructuring was a necessity for many firms. Legal requirements related to the length of notice period, severance pay, and negotiations with various labor authorities can make the firing process protracted and expensive. For example:

EXHIBIT 6.10									
Labor Market Flexibility Indicators									
Country	Unions and Collective Agreements			General Flexibility of Labor Markets					
	Union Density <sup>1</sup>	Collective Bargaining Coverage <sup>1</sup>	Rank	Employment Protection Legislation		Redundancy Cost <sup>3</sup>	Rank	Overall Rigidity of Employment <sup>4</sup>	
				Regular Employment <sup>2</sup>	Rank			Rank	Rank
Australia	18.5%	60%	6	1.4	4	11.0	3	0.0	1
Canada	29.4%	32%	3	1.2	2	14.5	5	0.2	3
France	7.8%	95%	10	2.6	8	21.0	6	3.1	10
Germany	19.9%	63%	7	2.9	10	22.0	8	2.5	8
Italy	33.3%	80%	8	1.7	5	66.5	10	2.3	6
Japan	18.3%	16%	2	2.1	6	4.0	1	1.0	5
Mexico	18.3%	36%	5	2.3	7	28.0	9	2.5	7
Netherlands	19.8%	82%	9	2.7	9	13.0	4	2.5	8
United Kingdom	28.0%	35%	4	1.2	2	21.0	6	0.6	4
United States	11.6%	13%	1	0.6	1	8.5	2	0.0	1

1 Percentage of total workforce, OECD and ILO, 2007 or latest available data.

2 Rating: 0 = Least restrictive, 6 = Most restrictive, OECD 2008.

3 Estimated average weeks of salary from time decision is made to downside. Includes delays for mandatory government approvals or union negotiations, required statutory notice, plus typical severance payments for a collective dismissal scenario. Assumes facility closure with 100–150 employees with an average term of service of 4 years. OECD, Mercer and International Labour Organization. 2009 data or latest available.

4 Rating: 0 = Least restrictive, 6 = Most restrictive, World Bank 2010.

Refer to Appendix C for full details on sources.

- Within the group of countries analyzed in this report, the costs associated with redundancies in the cases of collective dismissals are the lowest in Japan, amounting to approximately 4.0 weeks of salary per worker. The US ranks second, with 8.5 weeks of salary payable in the case of facility closure.
- The cost of collective dismissals is highest in Italy and Mexico, adding up to approximately 66.5 and 28.0 weeks of salary per worker, respectively.

Overall, the labor markets in the United States rank as the least restrictive, according to the indicators presented in Exhibit 6.10, while France and Germany receive consistently low scores for their lack of labor market flexibility.

## D. Innovation

In an increasingly global market place, the ability to innovate is key to maintaining a competitive edge. While the determinants of innovation vary in different contexts, the basic prerequisites include the existence of a highly educated labor force coupled with investment in R&D.

The innovation skills of the workforce can be measured in a number of different ways, two of which are presented in Exhibit 6.11:

- Human resources in science and technology (HRST) is a broad international definition that encompasses persons who graduated at the tertiary level, plus any “unqualified” persons actually employed in science and technology occupations for which a high qualification is normally required. While a significant proportion of graduates may not be directly employed in occupations related to science and technology, this definition views all graduates as an asset in innovative societies, regardless of specialization. An example in this regard would be the motion picture industry, which employs large numbers of people trained in the arts, but is nonetheless driving significant innovation in the field of digital imaging.
- Researchers (as a percentage of total employment) represent a much narrower measure of innovation capabilities, counting only those who are actively involved in R&D.

Exhibit 6.11 also compares the investment that each country makes in R&D, represented as R&D expenditure as a percentage of GDP.

The information presented in Exhibit 6.11 shows in most cases a direct correlation between R&D expenditure and the number of researchers, with Japan, followed by the United States, leading on both of these measures.

EXHIBIT 6.11								
Innovation Indicators <sup>1</sup>								
Country	Science Employment						R&D Spending	
	HRST Workforce as % of Total Employment <sup>2</sup>				Researchers as % of Total Employment Rank		R&D Expenditure as % GDP Rank	
	HRST Professionals	HRST Technicians	Total	Rank				
Australia	20.7%	15.0%	35.7%	3	8.5%	3	2.0%	5
Canada	21.3%	14.3%	35.5%	4	8.2%	5	1.9%	6
France	13.4%	18.9%	32.2%	6	8.3%	4	2.1%	4
Germany	14.5%	21.5%	36.0%	2	7.2%	6	2.5%	3
Italy	10.4%	21.1%	31.5%	7	3.6%	9	1.1%	9
Japan <sup>3</sup>	11.0%	3.9%	14.9%	10	11.0%	1	3.4%	1
Mexico	n/a	n/a	17.5%	9	1.2%	10	0.5%	10
Netherlands	19.6%	18.0%	37.6%	1	5.1%	8	1.7%	8
United Kingdom	14.2%	12.9%	27.1%	8	5.6%	7	1.8%	7
United States	15.8%	16.5%	32.3%	5	9.7%	2	2.7%	2

<sup>1</sup> OECD, reporting 2008 or latest available data.

<sup>2</sup> HRST = Human resources in science and technology.

<sup>3</sup> OECD notes that HRST workforce percentages for Japan are likely understated due to structural reporting issues. Refer to Appendix C for full details on sources.

In most of the countries, HRST workers represent at least 30 percent of the total workforce, with the Netherlands and Germany leading on this measure. A closer examination of the composition of HRST also reveals some differences in the level of skills within this group. For example, while HRST workers make up a similar percentage of the labor force in Canada and Germany, Canada has significantly more professionals than technicians, while Germany has more technicians than professionals.

Within each country, R&D investment tends to be concentrated in research and innovation hubs, which are usually situated in the proximity of large universities, technology clusters operated by large businesses, and/or military/defense research facilities. Therefore, significant regional variations in R&D expenditures exist in most countries.

Exhibit 6.12 lists the "top 20" states/regions included in this study, based on R&D expenditures. The eight leading jurisdictions are all located in the United States and include regions well known for clusters in defense (including New Mexico and California), life sciences (including Maryland and Massachusetts), automotive (Michigan), and aerospace (including Washington State and Connecticut).

Apart from the United States, Exhibit 6.12 also lists, among the states/regions that invest most in R&D, two regions in each of France and Germany, as well as one region each in Canada and the Netherlands. (Although Japan spends more on R&D in comparison to other study countries, regional data for Japan was not available for this comparison.)

Detailed data on R&D expenditure for most featured cities, based on the state/regional data, are available in Appendix C.

EXHIBIT 6.12			
Leading States/Regions for R&D Expenditure as a Percentage of GDP <sup>1</sup>			
Rank	State/Region <sup>2</sup>	Cities in This Study	R&D Expenditure as % GDP
1	New Mexico	Albuquerque	7.55%
2	Maryland	Baltimore	5.78%
3	Massachusetts	Boston	5.55%
4	Michigan	Michigan, Saginaw	4.94%
5	Connecticut	Hartford	4.64%
6	Rhode Island	Providence	4.56%
7	Washington State	Seattle, Spokane	4.37%
8	California	Los Angeles, Riverside-San Bernardino, San Diego, and San Francisco	3.95%
9	Berlin	Berlin	3.82%
10	New Jersey	Trenton	3.48%
	Japan national average	Osaka, Tokyo	3.44%
11	New Hampshire	Manchester	3.28%
12	Ile de France	Paris	3.15%
13	Minnesota	Minneapolis	3.08%
14	Frankfurt region	Frankfurt	2.99%
15	Delaware	Wilmington	2.88%
16	Oregon	Portland	2.76%
17	Colorado	Denver	2.71%
18	Noord Brabant	Brabant Stad	2.68%
19	Quebec	Montreal, Quebec City, Sherbrooke	2.63%
20	Rhone Alpes	Lyon	2.47%

<sup>1</sup> Data represents 2007 or most recent available. Data for Noord Brabant is from 2003 and Rhone Alpes from 2004. Refer to Appendix C for further details on sources.

<sup>2</sup> European regions represent statistical regions defined by Eurostat, rather than political states or regions.

<sup>3</sup> Regional data for Japan is not available for this comparison.

## E. Regulatory Framework

### 1. Business Regulation and Permitting

A cost-efficient and functional business regulatory environment is a key determinant of robust and healthy economies.

Transparent and enforceable rules that provide a level playing field for businesses are a key competitive asset. However, government must also consider business regulation within a broader social context.

A wide range of regulations impact on businesses, both in the countries where they operate and in the countries with which they trade. Exhibit 6.13 presents several indicators of the business regulatory environment, as discussed below.

Permitting for new facilities is one aspect of business regulation that was specifically identified as important in the 2009 *Area Development Magazine* Corporate Survey (refer to Exhibit 6.2). One of the major costs associated with permitting for new facilities is the time taken by the permitting process, and the drag this places on completing a new business facility.

To assess this issue, Exhibit 6.13 compares the countries based on the number of days required to obtain all necessary permits for building a new warehouse. The permitting process is by far fastest in the United States (40 days) and Canada (75 days), while in most other countries permitting would take more than 100 days, and in Italy permitting would take almost 8.5 months (257 days).

In addition to the cost of permitting, transparency of commercial real estate markets is an important consideration in overseas investment or location decisions. Canada, followed by Australia and the United States, lead in this regard, while Mexico and Japan are rated as having the most opaque commercial real estate markets.

Given the importance of global trade to modern business, the *Trade Restrictiveness Index* ranks countries according to the overall openness of their trade policies. As illustrated in Exhibit 6.13, except for Mexico, there are no drastic variations among the countries in terms of trade restrictiveness, with the United States and Australia being the top-ranked countries.

With regard to ethical business practices, the Netherlands, Canada, and Australia are the top-rated countries, with the lowest levels of perceived corruption. Mexico and Italy are the two countries with the greatest perceived problems with corruption. It is notable that the United States ranks sixth among the countries on this measure, in contrast to its top/second highest rating in every other indicator in Exhibit 6.13.

Finally, considering all of these regulatory issues, and more, the World Bank's *Ease of Doing Business Index* compares countries based on their overall business regulatory environment, with the United States receiving top ranking according to this measure, followed by the United Kingdom, Canada, and Australia.

EXHIBIT 6.13										
Indicators of Business Regulatory Environment										
Country	Days to Finalize Permitting for a Warehouse <sup>1</sup>		Commercial Real Estate Transparency Index <sup>2</sup>		Trade Restrictiveness Index <sup>3</sup>		Corruption Perception Index <sup>4</sup>		Ease of Doing Business Ranking <sup>5</sup>	
	Days	Rank	Index	Rank	Index	Rank	Index	Rank	Rank	Rank
Australia	221	8	1.2	2	3.2	2	1.3	2	9	4
Canada	75	2	1.2	1	3.7	3	1.3	2	8	3
France	137	5	1.3	6	4.1	4	3.1	8	31	8
Germany	100	4	1.6	7	4.1	4	2.1	4	25	6
Italy	257	10	1.8	8	4.1	4	5.2	9	78	10
Japan	187	7	2.4	9	4.8	9	2.7	6	15	5
Mexico	138	6	2.9	10	13.4	10	6.4	10	51	9
Netherlands	230	9	1.3	5	4.1	4	1.1	1	30	7
United Kingdom	95	3	1.3	4	4.1	4	2.3	5	5	2
United States	40	1	1.2	2	2.2	1	2.7	6	4	1

1 World Bank 2010.

2 Rating: 1 = strong, 5 = weak, LaSalle Investment Management, 2008.

3 Open-ended scale where 0 is least restrictive, World Bank, 2008.

4 Scale of 0 to 10 where 0 = highly clean and 10 = highly corrupt. Transparency International, 2008.

5 Ranking among 183 countries, World Bank, 2010.

Refer to Appendix C for full details on sources.

## 2. Environmental Regulation

Environmental concerns have received significant attention by policy makers, the general public, and businesses in recent years. Balancing environmental stewardship with regulation that does not stifle enterprise is an ongoing challenge for governments. With environmental issues becoming ever more prominent, companies are having to meet increasingly stringent regulatory requirements, which could significantly raise the cost of running a business. On the other hand, innovative energy-efficient solutions can help cut costs of operating business, while emerging "green" industries open up new business opportunities.

Environmental and business objectives appear not to be mutually exclusive as, for example, France achieves the highest ranking on environmental performance, while also being seen to have environmental laws that are relatively compatible with business competitiveness. Consistent with this, France has also devoted the second-highest percentage of its economic stimulus spending to "green" initiatives, trailing only Australia in this regard.

Exhibit 6.14 presents a comparison of the countries in terms of:

- Their environmental health and ecosystem vitality, as assessed in the *Environmental Performance Index*
- The degree to which environmental regulations support or hinder business competitiveness
- Government commitment to supporting "eco-industries" as indicated by the share of economic stimulus spending set aside for key climate change investment themes.

EXHIBIT 6.14

### Indicators of Environmental Performance and Regulation

Country	Environmental Performance Index <sup>1</sup>	Rank	Environmental Laws and Competitiveness <sup>2</sup>	Rank	Green Fund share of Economic Stimulus (%) <sup>3</sup>	Rank
Australia	65.7	9	66.9	3	21.0%	1
Canada	66.4	7	65.4	4	8.0%	7
France	78.2	1	67.5	2	18.0%	2
Germany	73.2	3	64.5	5	13.0%	4
Italy	73.1	4	57.1	9	1.0%	9
Japan	72.5	5	74.7	1	6.0%	8
Mexico	67.3	6	57.7	8	10.0%	6
Netherlands	66.4	7	59.2	6	n/a	n/a
United Kingdom	74.2	2	57.1	9	17.0%	3
United States	63.5	10	57.9	7	12.0%	5

1 Index: 0 = low, 100 = high, Yale Center for Environmental Law and Policy et. al., 2010.

2 Index: 0 = laws hinder competitiveness, 100 = laws do not hinder competitiveness, *World Competitiveness Yearbook* copyright © 2009, IMD International, Switzerland, World Competitiveness Center, [www.imd.ch/wcc](http://www.imd.ch/wcc).

3 United Nations Environment Program, September 2009.

Refer to Appendix C for full details on sources.

## F. Energy Supply and Demand

A rising long-term global demand for energy, coupled with high prices in recent years, poses a range of energy related challenges for governments, corporations, and individuals. Reflecting this issue, energy availability and costs remain among the top-rated factors in the *Area Development Magazine* Corporate Survey.

Both governments and businesses are increasingly searching for innovative ways to generate energy to reduce emissions, reduce dependence on external suppliers, and to use energy more efficiently.

Exhibit 6.15 compares the situation for each of the study countries with respect to energy self-sufficiency and energy efficiency.

Among the study countries, only Australia, Canada, and Mexico are self-sufficient in energy. These three countries all produce more energy than they need to meet their national energy demand and represent net exporters of energy. Italy, Japan, and Germany represent the countries most dependent upon imports to meet their national energy needs.

Not surprisingly, there is generally a strong inverse correlation between energy self-sufficiency and the efficiency of energy use. Most countries that are highly dependent on external energy supplies are among the most efficient users of energy, with Italy, the United Kingdom, Germany, and Japan leading the way. Meanwhile, the countries with abundant energy supplies tend to use these resources significantly less efficiently, with Australia and Canada ranking eighth and 10th, respectively, for efficiency of energy use. The United States is the one exception to this rule, being significantly dependent on external energy supplies, yet ranking ninth for energy efficiency.

EXHIBIT 6.15				
Energy Self-Sufficiency and Efficiency				
	Energy Self-Sufficiency		Energy Efficiency	
Country	Production/ Demand <sup>1</sup>	Rank	Demand/GDP <sup>2</sup>	Rank
Australia	233%	1	0.19	8
Canada	153%	2	0.26	10
France	51%	7	0.15	5
Germany	41%	8	0.14	3
Italy	15%	10	0.11	1
Japan	18%	9	0.14	3
Mexico	136%	3	0.16	7
Netherlands	76%	5	0.15	5
United Kingdom	83%	4	0.12	2
United States	71%	6	0.20	9

1 Equals domestic energy production as a % of total primary energy supply (TPES, in kilotonnes of oil equivalent), International Energy Association, 2007.

2 Equals total primary energy supply (TPES, in kilotonnes of oil equivalent) divided by GDP (at PPP), International Energy Association, 2007. This measure indicates how efficiently energy is used in generating GDP. Refer to Appendix C for full details on sources.

## G. Quality of Infrastructure

The proliferation of technology in all aspects of business operations has made high-quality ICT (information and communications technology) infrastructure indispensable to business, but has not diminished the importance of traditional infrastructure—most notably highways, which continue to represent the second highest rated site selection factor in the recent *Area Development Magazine* Corporate Surveys.

Exhibit 6.16 compares the quality of ICT and physical distribution infrastructure across the study countries, and shows that these two factors do not necessarily follow the same trend. For example, the Netherlands is the top-ranked country for ICT infrastructure, but ranks sixth for physical distribution infrastructure, while France ranks second for its physical distribution infrastructure, but eighth for ICT networks.

EXHIBIT 6.16				
Indicators of Quality of Infrastructure				
Country	ICT Development Index – Access <sup>1</sup>	Rank	Quality of Distribution Infrastructure <sup>2</sup>	Rank
Australia	7.24	6	7.44	8
Canada	7.43	4	8.50	3
France	7.16	8	8.65	2
Germany	8.39	2	9.05	1
Italy	7.33	5	4.87	10
Japan	6.89	9	8.41	5
Mexico	3.29	10	5.01	9
Netherlands	8.42	1	8.04	6
United Kingdom	8.16	3	7.81	7
United States	7.20	7	8.44	4

<sup>1</sup> Index: 1 = low and 10 = high. *Measuring The Information Society*, ITU, 2009 (reporting 2007 data).

<sup>2</sup> Index: 0 = low and 10 = high. *World Competitiveness Yearbook* copyright © 2009, IMD International, Switzerland, World Competitiveness Center, [www.imd.ch/wcc](http://www.imd.ch/wcc). Refer to Appendix C for full details on sources.

## H. Quality of Life

Crime rates, healthcare facilities, housing availability and cost, and the quality of public schools represent the most important quality of life location factors identified in the 2009 *Area Development Magazine* Corporate Survey.

### 1. Crime Rates

To anyone considering a move to a new location, personal and property safety are key concerns. Crime rates are notoriously difficult to compare across jurisdictions, given differences in the classification of crimes, crime recording practices, and the willingness of the population to actually report crimes. For this reason, homicide rates, as presented in Exhibit 6.17, are considered the most reliable comparator for violent crime between countries. Based on these statistics, Mexico has the highest incidence of homicide, by a wide margin, followed by the United States, also by a wide margin relative to all other countries. Japan has the lowest homicide rate among the countries studied.

### 2. Healthcare

Availability of healthcare resources and health outcomes are key factors to many individuals in personal location decisions, particularly if managers or employees are relocating together with their families. From the perspective of companies, the existence of good healthcare facilities and a positive health record can be indicative of a healthy workforce and lower costs from illness-related absenteeism. Exhibit 6.18 compares several indicators related to healthcare, as discussed below.

Doctors per 100,000 inhabitants represents a basic measure of the accessibility of healthcare to the population. The continental European countries—the Netherlands, Italy, Germany, and France—lead all other countries on this measure. At the city/regional level, the number of doctors generally follows national trends, with limited variation between states/regions. Data on doctors per 100,000 inhabitants at the regional level can be found in Appendix C.

EXHIBIT 6.17

#### Crime: Homicide Rates

Country	Homicides per 100,000 population <sup>1</sup>	Rank
Australia	1.28	5
Canada	1.86	8
France	1.64	7
Germany	0.88	2
Italy	1.06	4
Japan	0.50	1
Mexico	10.97	10
Netherlands	0.97	3
United Kingdom	1.41	6
United States	5.62	9

<sup>1</sup> UN Survey of Crime Trends, 2006 or most recent available data.

EXHIBIT 6.18

#### Healthcare Indicators

Country	Doctors per 100,000 Inhabitants <sup>1</sup>		Health Expenditures <sup>2</sup>				Healthy Life Expectancy <sup>4</sup>	
			Total Expendit. as % of GDP	Private Expendit. as % of Total <sup>3</sup>	Private Expendit. as % of GDP <sup>3</sup>	Rank	Rank	
Australia	266	6	8.7%	32.8%	2.9%	7	74	2
Canada	193	10	10.0%	29.6%	3.0%	8	73	4
France	336	4	11.1%	20.3%	2.3%	5	73	4
Germany	346	3	10.4%	23.4%	2.4%	6	73	4
Italy	364	2	9.0%	22.9%	2.1%	4	74	2
Japan	206	9	7.9%	17.8%	1.4%	2	76	1
Mexico	210	8	6.2%	56.7%	3.5%	9	67	10
Netherlands	384	1	9.3%	18.2%	1.7%	3	73	4
United Kingdom	250	7	8.4%	12.6%	1.1%	1	72	8
United States	271	5	15.3%	54.2%	8.3%	10	70	9

<sup>1</sup> National and international statistical sources for 2006-2007.

<sup>2</sup> World Health Statistics database, World Health Organization, 2009 (reporting 2006 data).

<sup>3</sup> Private expenditures include both expenditures by individuals and corporation (i.e., all non-public expenditures).

Private expenditure as % of GDP = Total expenditure as % GDP × Private expenditure as a % of total.

<sup>4</sup> World Health Organization, 2009 (reporting 2007 data).

Healthcare also represents a point of convergence between personal quality-of-life considerations and direct business costs, given the significant portion of total healthcare costs that are ultimately paid by businesses through statutory medical taxes and/or private health insurance benefits.

The United States spends the largest proportion of GDP on medical care among the countries studied—almost 50 percent more than any other country. Breaking out total medical expenditures between public and private spending, the US and Mexico are the only two countries where more than 50 percent of total medical costs are paid by private sources (individuals and/or businesses). Combining total expenditures and the private spending component, businesses and individuals in the United States spend a full 8.3 percent of GDP on medical care, compared to only 3.5 percent or less in every other country studied. The United Kingdom and Japan have the lowest privately-borne medical costs, at 1.1 and 1.4 percent, respectively.

Looking beyond resources invested in the medical system to consider medical outcomes, healthy life expectancy measures the average number of years a person can expect to live in full health before the onset of debilitating illness. Japan, Italy, and Australia lead the 10 countries in terms of having the longest healthy life expectancy. While the United States invests, by far, the largest share of GDP into healthcare, it ranks ninth in terms of healthy life expectancy, ahead only of Mexico.

It is interesting to note that while healthy life expectancy varies from 67 to 76 years among the countries studied, total life expectancy (not illustrated in Exhibit 6.18) adds a further 7 to 9 years in all 10 countries. Therefore, while the healthcare systems of some countries have provided for a significantly longer healthy life expectancy than in other countries, once severe age-related illness sets in, on average there is not more than 2 years' difference among all 10 countries in terms of how long the healthcare system will postpone death.

### 3. Housing

As the recent crisis in the housing and financial markets has demonstrated, volatility in housing markets can have detrimental consequences for both individuals and national economies. Housing availability and affordability are integrally linked, with any shortage in housing availability in a location soon translating into higher house prices.

Until mid-2007, housing markets had been generally buoyant in most countries, but have since seen steep price declines in some markets. Continuing uncertainty surrounding the housing markets, particularly in the United States, means that housing-related issues are likely to remain a key consideration in personal location decisions for the foreseeable future.

Using the “median multiple” (median house price as a multiple of median household income) as a measure of affordability, Exhibit 6.19 indicates that, in general, housing is much more affordable in the United States and Canada than in either the United Kingdom or Australia. (Equivalent data are not available for other study countries.) Among these four countries, Canada has seen a decline in housing affordability since 2007, while Australia, the UK, and the US have all seen housing affordability improve.

While the ratio between housing prices and income at the country level gives a broad picture of housing affordability, significant variations exist among local markets in each country. Data on housing affordability by city for Australia, Canada, the United Kingdom, and the United States is presented in Appendix C.

### 4. Quality of Public Schools

Exhibit 6.9 above presents the results of an international assessment in science skills among 15 year old students, and helps to gauge the relative quality of schools in the different countries. Canada, Japan, and Australia were the top-ranked countries based on this measure.

EXHIBIT 6.19		
Housing Affordability		
Country	Affordability (Median Multiple) <sup>1</sup>	Rank
Australia	6.0	4
Canada	3.5	2
United Kingdom	5.2	3
United States	3.2	1

<sup>1</sup> *International Housing Affordability Survey*, Demographia, 2009 (reporting 2008 data). Based on an average of 27 local markets surveyed in Australia, 34 in Canada, 16 in the UK, and 175 in the US.

## I. Conclusion

Both business costs and other factors significantly influence the competitiveness of locations for different types of businesses. Ratings presented in this report should be interpreted by firms in relation to their own individual needs.

While great care has been taken in performing this analysis, the resulting comparisons are of a general nature and all factors examined are subject to change over time. The results of this analysis should not be interpreted as a definitive or final opinion on the merits of locating any specific facility in one jurisdiction over another. Further analysis is required, incorporating information and advice from a variety of other sources to determine the best location for any specific facility or operation.

## 7. Other Sponsored Cities

In addition to the 95 cities featured in this report, 17 additional cities in Canada have been sponsored to be benchmarked against the costs of the featured cities. Details of the sponsoring agencies can be found on the following page.

These results are not included in the main body of this report because of space constraints and the need to maintain balance among the countries under discussion.

### A. Results for Other Sponsored Cities

Results for these cities were developed on the same basis as for the featured cities. The results are summarized in Exhibit 7.1.

Detailed results for these cities are available online at [www.CompetitiveAlternatives.com](http://www.CompetitiveAlternatives.com).

EXHIBIT 7.1																		
Results for Other Sponsored Cities																		
Industry	Manufacturing											Corporate & IT Services			R&D			Overall Result
	Aero-space	Agri-food	Auto-motive	Chemicals	Electronics	Medical Devices	Metal Compon.	Pharmaceuticals	Plastics	Precision Mfg	Telecom	Back Office/Call Center	Software Design	Web/Multi-media	Biotech	Clinical Trials	Product Testing	
Operation	Aircraft Parts	Food Proc.	Auto Parts	Spec. Chem.	Electr. Assbly	Medical Devices	Metal Mach.	Pharmaceutic.	Plastic Prod.	Precision Comp.	Telecom Equip.	Shared Services	Software Development	Content Dvlt	Bio-medical R&D	Clinical Trials Mgt	Elec. Syst. Dvlt/Test.	
<b>CANADA</b>																		
<b>Atlantic</b>																		
Pictou, NS	95.9	97.5	96.2	95.9	95.5	93.0	95.8	93.8	97.0	96.2	93.8	80.5	83.1	84.1	72.8	68.3	67.3	17 Operations
Sydney, NS	96.0	98.5	96.7	96.1	95.5	93.3	96.6	94.0	98.2	96.8	93.9	82.7	83.9	84.9	75.6	69.8	69.7	
Truro, NS	95.1	97.1	95.7	95.6	94.8	92.1	94.9	93.2	95.9	95.8	93.3	80.2	82.7	83.7	74.0	68.4	68.0	
<b>Northeast</b>																		
Belleville, ON	96.0	96.3	96.6	95.6	95.2	94.3	96.4	94.3	97.7	96.6	94.6	88.2	85.2	86.4	84.1	85.0	78.5	93.7
Chatham-Kent, ON	96.3	97.5	97.1	95.9	95.2	94.6	97.5	94.6	99.1	97.4	94.8	88.2	84.4	86.0	80.2	83.6	75.0	93.9
Kingston, ON	97.1	96.7	97.5	96.2	96.3	95.8	97.6	95.2	98.9	97.1	95.5	89.1	85.5	86.8	81.2	85.1	76.3	94.4
Peterborough, ON	96.4	96.4	96.9	95.8	95.7	94.9	96.7	94.7	97.9	96.7	95.0	87.5	84.8	86.1	79.7	84.1	75.0	93.7
Victoriaville, QC	95.5	95.7	95.3	95.3	94.5	92.4	93.9	93.1	94.8	95.6	93.8	84.0	80.3	80.4	75.8	70.8	70.9	91.6
Windsor-Essex, ON	96.8	98.1	97.5	96.2	95.6	95.2	98.2	95.1	100.0	97.9	95.2	89.2	85.6	87.0	80.6	85.6	76.0	94.5
<b>West</b>																		
Brandon, MB	96.4	99.0	97.5	95.9	95.6	93.9	98.7	94.8	99.8	97.5	94.4	86.1	84.4	85.6	84.4	78.9	78.3	94.2
Grande Prairie, AB	98.6	99.9	99.3	97.0	97.1	97.1	101.9	96.9	104.0	99.4	96.3	90.7	86.5	87.9	79.7	82.0	75.3	96.0
Lethbridge, AB	96.7	98.2	97.6	96.0	95.1	94.4	98.4	94.8	100.5	98.0	94.7	88.4	85.0	86.3	79.4	79.6	74.6	94.1
Moose Jaw, SK	96.5	98.0	97.6	95.6	95.4	94.2	98.4	94.4	99.7	97.5	94.3	84.1	82.9	84.2	73.6	67.2	68.3	93.1
Prince Albert, SK	96.5	97.7	97.6	95.5	95.5	94.1	98.4	94.3	99.8	97.3	94.2	84.2	83.1	84.3	76.6	69.5	70.7	93.3
Red Deer, AB	97.9	98.3	98.4	96.4	96.4	96.0	100.0	95.9	101.7	98.3	95.5	89.9	86.0	87.4	81.2	81.1	76.4	95.1
Regina, SK	95.6	97.2	96.5	95.3	94.4	93.1	96.6	93.8	97.7	97.0	93.9	87.8	85.5	86.7	82.0	71.2	75.7	93.2
<b>Pacific</b>																		
Victoria, BC	98.3	98.9	98.8	96.9	96.6	96.0	100.5	95.7	101.7	98.4	95.5	91.0	86.2	87.7	87.4	84.0	81.4	95.7

## B. Contact Information for Other Sponsored Cities

Bronze Sponsors	Phone	E-mail	Internet
<b>Bois-Francis Economic Development Corporation</b>			
Victoriaville, QC, Canada	+1 819 758 3172	cdebf@cdebf.qc.ca	www.cdebf.qc.ca
<b>Chatham-Kent Economic Development Services</b>			
Chatham, ON, Canada	+1 519 351 7700	ckeds@chatham-kent.ca	www.ckforbusiness.com
<b>City of Belleville Economic Development</b>			
Belleville, ON, Canada	+1 613 967 3238	ecdev@citybelleville.com	www.city.belleville.on.ca
<b>City of Grande Prairie</b>			
Grande Prairie, AB, Canada	+1 780 538 0475	ecdevinfo@cityofgp.com	www.investgrandeprairie.com
<b>City of Red Deer</b>			
Red Deer, AB, Canada	+1 403 342 8106	econdev@reddeer.ca	www.reddeercorridor.com
<b>Colchester Regional Development Agency</b>			
Truro, NS, Canada	+1 902 893 1694	ajohnson@corda.ca	www.wherebusinessmoves.ca
<b>Economic Development Brandon</b>			
Brandon, MB, Canada	+1 204 729 2131	s.trudel@brandon.ca	www.econdev.brandon.ca
<b>Economic Development Lethbridge</b>			
Lethbridge, AB, Canada	+1 403 331 0022	info@choosethbridge.ca	www.choosethbridge.ca
<b>Enterprise Cape Breton Corporation</b>			
Sydney, NS, Canada	+1 902 564 3600	information@ecbc-secb.gc.ca	www.ecbc-secb.gc.ca
<b>Greater Peterborough Area Economic Development Corporation</b>			
Peterborough, ON, Canada	+1 705 743 0777	rromanin@gpaedc.on.ca	www.gpaedc.on.ca
<b>Greater Victoria Development Agency</b>			
Victoria, BC, Canada	+1 250 383 7191 ext 204	sangus@gvda.ca	www.gvda.ca
<b>Investissement Québec</b>			
Montreal, QC, Canada	+1 514 873 4375	infoiq@invest-quebec.com	www.investquebec.com
<b>Kingston Economic Development Corporation</b>			
Kingston, ON, Canada	+1 613 544 2725	info@kingstoncanada.com	www.kingstoncanada.com
<b>Pictou Regional Development Commission</b>			
New Glasgow, NS, Canada	+1 902 752 6159	info@prdc.com	www.prdc.com
<b>Windsor Essex Development Commission</b>			
Windsor, ON, Canada	+1 519 255 9200	info@choosewindsorsex.com	www.choosewindsorsex.com

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