

Business Costs in Iceland

A Comparative Study of 87 Cities in Europe, North America and Japan



Reykjavik Resources

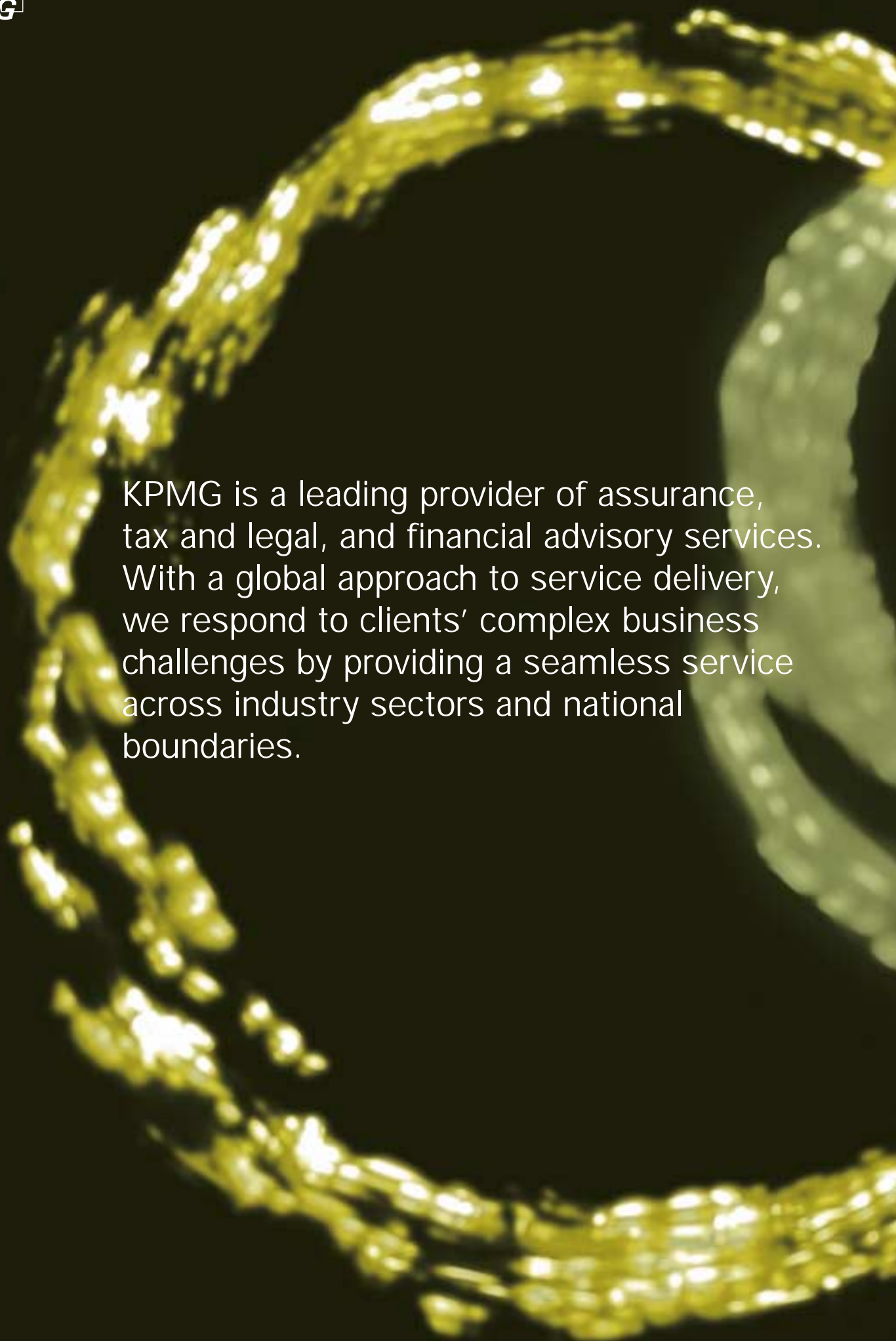


Landsbanki Islands




Invest In Iceland Agency

2002 EDITION

A large, abstract, golden-yellow circular graphic dominates the background. It appears to be a thick, textured ring or a series of overlapping, slightly irregular golden lines that form a circle. The lighting creates bright highlights and deep shadows, giving it a three-dimensional, metallic appearance. The background is a dark, almost black color, which makes the golden ring stand out prominently.

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The analysis in this publication is based on cost information collected primarily between June 2001 and April 2002. Taxes reflect tax rates in effect on January 1, 2002, and incorporate any changes announced by that time and scheduled to take effect at a later specified date. Exchange rates and interest rates, as well as other important 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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The authors, publishers, and contributors will not assume any responsibility for the results of business decisions made based on the information contained in this report. We encourage the reader to use this publication as one of several resources in considering business location decisions and to seek professional assistance in addressing all relevant decision factors.

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August 2002

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Published by KPMG



Doing business in Iceland

– now with 18% corporate income tax

Official Attitude and Incentives

Iceland has systematically made its business environment increasingly attractive for investment and location, among other things with the series of tax cuts, which now give Iceland one of the lowest levels of corporate income tax in Europe.

Iceland offers highly skilled labour, including experts in software and a wide range of research fields. Icelanders have embraced new telecom opportunities and Internet usage, mobile phone ownership and payment card transactions are among the highest in the world with state of the art telecom infrastructure.

Advantages offered by Iceland for industrial investors include the most competitive electricity prices in Europe at 2–3 UScents/kWh for large industrial users depending upon delivery terms, and industrial steam at 6 barg or USD 3 per metric tonne. Industrial sites with good natural harbours, for small and large ventures, are available in many parts of the country, and many local authorities have designed development strategies and scenarios, which provide for new investments.

In principle, foreign ownership of business is unrestricted. However, some limitations apply to specific sectors, namely fishing, primary fish processing, energy production and aviation.

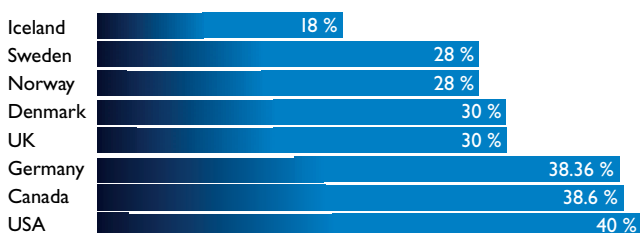
Incentives for film and TV production

Special incentives are granted for film and TV production in Iceland, whereby 12% of total costs are refundable. Production cost incurred in other EEA countries is also refundable within certain limits.

Regulatory Constraints and Reliefs

As a member of the 18-nation European Economic Area (all EU states and three of the four EFTA states), Iceland implements the same basic liberal business philosophy as the European Union. Except in a few limited areas, all EU commercial legislation and directives take effect in Iceland. Consequently, Iceland makes an ideal springboard for tariff-free access to the major EU market area, as well as a fully competitive location for EU companies to operate.

Corporate taxes



Source: KPMG's Corporate Tax Rate Survey - January 2002

Flying time from Reykjavík to some major cities

	Number of flights per week (Summer)	Flying time from Reykjavík
Minneapolis	6	06:20
New York	5	06:00
Boston	7	05:35
London	14	03:00
Paris	7	03:20
Frankfurt	7	03:25
Amsterdam	6	03:00
Copenhagen	25	03:00
Stockholm	8	03:00
Oslo	9	02:30

Scheduled shipping routes from Reykjavík to some destinations – transit time

	Nautical distance from Reykjavík (miles)	Sailing time from Reykjavík (days)
Europe		
Tórshavn (Faeroe Islands)	497	2
Immingham (UK)	1050	4
Rotterdam (Netherlands)	1179	4
Hamburg (Germany)	1229	5
Cuxhaven (Germany)	1182	6
Aarhus (Denmark)	1230	7
Frederikstad (Norway)	1141	8
Gothenburg (Sweden)	1146	8
Varberg (Sweden)	1180	8
Moss (Norway)	1150	8
North – America		
Argentina (Newfoundland)	1580	6
Halifax (Canada)	1947	9
Boston / Everett (USA)	2295	10
New York (USA)	2723	10
Portsmouth / Norfolk (USA)	2887	12



Invest in Iceland Agency

The Invest in Iceland Agency is an independent agency of the Ministry of Industry and Commerce and the National Power Company

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Invest in *Reykjavík*



Opportunities for investors and companies



From the green geothermal powerplant at Nesjavellir. see: www.or.is

Reykjavik is a dynamic international city with a developed infrastructure and a well educated labour force. Iceland's unique location on the Atlantic ridge, midway between the "old" and the "new" world, explains its abundant sources of green energy obtained from hydroelectric and geothermal power.

Reykjavik is also the place where unspoilt nature meets hightech industry - where global trends in science, education and culture meet the rich cultural roots of the Icelanders. Reykjavik is a bridge between two of the world's strongest markets and offers tariff-free access to the growing European market.

When these assets are supported by good universities and the willingness to embrace new technology, the result is an ideal location for knowledge-based industries. Reykjavik is home to leading enterprises in biotechnology, genetics, medical research and product development, IT, energy solutions, design and construction for extreme conditions, fishing, food processing, and maritime service and transport.

Security in the global village

Reykjavik offers its inhabitants security, first-class education, health care & social services, a clean & beautiful environment, an advanced infrastructure, excellent communications with the rest of the world, a lively cultural scene, & leisure activities for everyone.

Why Reykjavík?

- Developed infrastructure and educated labour force, quick to embrace new technology.
- Strategic location between Europe and North-America, bridging two of the world's strongest markets.
- Tariff-free access to the European single market and free trade agreements giving tariff-free access to a market of 500 million people.
- Home to world leaders in the field of medical and genetic research and product development.
- Reykjavik harbour, a major transport and service hub in the Atlantic.
- Green energy, with great stability in delivery, at competitive prices. Reykjavik Energy operates the world's largest and most sophisticated geothermal district-heating system, an electricity distribution network and a water distribution system with pure water.
- Low corporate income tax of only 18%
- Low business cost.
- Democratic, stable political environment.
- Clean natural environment with plenty of outdoor possibilities.
- Scandinavian-type health and education service and great daycare facilities.
- Straight-forward investment set-up procedures for OECD residents.
- Stable economy with one of the world's highest growth rates over the past few years.
- New science and innovation park for knowledge-based industries planned near the city centre.
- Exciting future industrial areas, including some located next to a major hub in the electric grid, near geothermal areas, and offering sweeping views of the mountains surrounding Reykjavik.



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It's not just the air that's fresh up here...
It's also the thinking.

A rapidly diversifying economy, a wealth of renewable resources, a highly-educated population and skilled labour force - in addition to sturdy Icelandic common sense and a reputation for innovation - are among the factors that have put Iceland on the map as an attractive investment proposition.

Landsbanki Íslands hf. is Iceland's leading bank in FX, MM, derivative products, project finance and venture finance. We are at the forefront in securities brokerage, private banking and asset management.

We have extended our product and service base to London through our subsidiary, Heritable Bank Ltd., located in the heart of Mayfair, and we also operate our own offshore funds in Guernsey, C.I.

With the introduction of an 18% corporate tax on 1 January 2002, Iceland's fast pace is bound to quicken.

So if you're thinking about Iceland, talk to us.
We'll show you what a fresh breath of air can really do.

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Business Costs in Iceland

- A Comparative Study of 87 Cities in Europe, N-America and Japan

2002 EDITION

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Preface

Business Costs in Iceland is an extensive study featuring 87 cities in ten countries. Twenty-seven location-specific cost factors have been thoroughly researched, and their impact on business operating costs have been analysed for 14 standard business-operating models. More than 30,000 location-specific cost items have been analysed.

This study, released in September 2002, reflects cost data gathered primarily between June 2001 and April 2002.

The key organizations and individuals involved in this study include:

- **KPMG Consulting Iceland** has overseen the completion of the study, gathered all cost information for Iceland, and acted as the editor of the final report:
 - **Ingvi Thor Ellidason**, Partner with KPMG Consulting Iceland.
 - **Unnar Hermannsson**, Senior Consultant with KPMG Consulting Iceland, Director of Business Costs in Iceland, led the Icelandic research programme and is co-author of the report.
 - **Gudbjorn Arnason**, Consultant with KPMG Consulting Iceland, provided additional research, analysis, and production assistance and is co-author of the report.
- **MMK Consulting Inc., Canada**, co-operated with KPMG Iceland on this report, providing study design and execution of cost comparisons for the ten participating countries using KPMG's Comparative Cost Model (CCM-2002).
 - **Glenn Mair**, Director of the 2002, 1999, and 1997 editions of KPMG's Competitive Alternatives, led the Canadian research programme. Mr. Mair is the lead developer for KPMG's Comparative Cost Model (CCM-2002) and the www.CompetitiveAlternatives.com Website.
 - **Treena Cook**, was MMK's main liaison person with Iceland, along with Mr. Mair.
 - **Stuart McKay**, founder of the Competitive Alternatives, provided additional assistance.

KPMG Iceland would like to thank MMK Consulting for their excellent cooperation on this project.

- **KPMG** in Austria, France, Germany, Italy, the Netherlands, the United Kingdom, and Japan provided assistance and conducted cost and tax research in their respective countries.

KPMG would also like to thank the many individuals and organizations that assisted in developing the information on which this study is based.

Business Costs in Iceland is made possible through the support of numerous sponsors. These sponsors are listed on the following pages.

Contact details for obtaining further information about this study are included below.

Study Contacts

Further copies of this report can be downloaded from www.kpmg.is or www.invest.is or purchased in printed format from KPMG Iceland. For further information about this study and its results, visit www.CompetitiveAlternatives.com, or contact any of the individuals listed below.

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LAND

Executive Summary

"Business Costs in Iceland" is a comprehensive guide for comparing business costs in Iceland to those in North America, Europe, and Japan. This KPMG report measures the combined impact of 27 cost components that are most likely to vary by location, as applied to specific business operations. This report has been produced by using the proprietary KPMG CCM-2002 Costing Model, which was developed by MMK Consulting for the January 2002 publication "Competitive Alternatives". That 10-month research programme covered cities throughout Austria, France, Italy, Germany, the Netherlands, the United Kingdom, Canada, the United States, and Japan. More than 1,000 individual business scenarios were examined and more than 30,000 items of data analysed. The basis for comparison is the after-tax cost of startup and operation for 12 specific types of business, over a 10-year time horizon.

For the purpose of this study, two additional operations were examined - server farms and medical devices - in addition to the standard 12 operations modelled in the Competitive Alternatives January 2002 publication. The two additional operations were carefully selected by the chief sponsor of the project, Invest in Iceland Agency; therefore, a total of fourteen operations are examined in this report.

The report is the result of an eight-month joint research project conducted from October 2001 until April 2002 by KPMG Consulting in Iceland and MMK Consulting. The analysis has been performed independently by KPMG Consulting and MMK Consulting and represents a thorough and objective analysis of comparative business costs in Iceland and other countries.

As is demonstrated in Exhibit A, the overall results are positive for Iceland, as it is the lowest-cost country in Europe. Particular strengths include software, research & development operations, three manufacturing operations and the operation of server farms. Particular weaknesses are in some manufacturing operations like food processing and plastic products mainly due to high transportation costs. Iceland benefits from low energy costs, low labour costs, (especially in skilled labour), low land acquisition costs, and a favourable corporate tax structure. Due to its geographical position, Iceland has high transport costs and telecommunication costs.

The results for Iceland in the two additional operations are very positive. The server farm operation is energy- and capital-intensive, and its work force consists mainly of skilled technicians. These factors, in addition to limited transport requirements, work in Iceland's favour. The medical devices operation depends heavily on skilled labour; this factor, in addition to the beneficial corporate tax structure, works in favour of Iceland.

It is important to note, however, that recent developments in exchange rates have weakened the competitive position of Iceland while strengthening the comparative position of the US against other participating countries. These developments were too recent to be taken into account in the main conclusions of the project, but a detailed analysis of the impact of exchange rates is included in the report. In addition, the impact of exchange rate changes can be examined in detail online at www.CompetitiveAlternatives.com by registered users.

International Results

Canada (CA) is the overall cost leader, i.e. has the lowest cost structure, with a cost index of 85.9, representing a 14.1 percent cost advantage over the United States (US = 100.0).

Iceland (IS, 87.0) is ranked second overall, closely behind the cost leader, Canada, with costs 13.0 percent lower than those in the US, making Iceland the cost leader in Europe.

The United Kingdom (UK, 87.4), with costs 12.6 percent lower than those in the US, is ranked third overall.

Italy (IT, 89.5) has improved its 1999 cost position against every other G7 country, due in part to significant reductions in employer costs for legally required employee benefits.

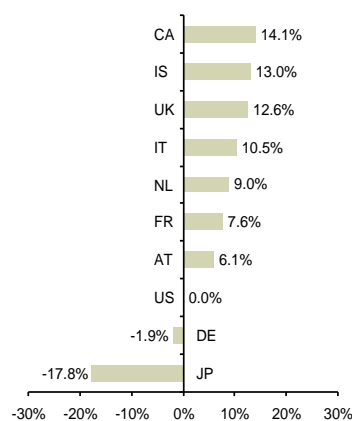
The Netherlands (NL, 91.0) ranks in fifth place, ahead of **France** (FR, 92.4).

Austria (AT, 93.9) has a cost structure similar to that in France; it has a significant cost advantage over neighbouring **Germany** (DE, 101.9).

The relative cost position of the **United States** (US, 100.0) has declined since 1999 due to the appreciation of the US dollar against major global currencies.

As in 1999, **Japan** (JP, 117.8) has the highest business cost structure among the countries examined in this study.

Exhibit A. OVERALL RESULTS FOR FOURTEEN OPERATIONS



Cost Trends, 1999 - 2002

The competitiveness of all countries in the Euro currency zone has improved significantly due to the decline of the euro (EUR) against the US dollar (USD) since early 1999. Most European countries now rank ahead of the US in cost competitiveness. Other major currencies have also weakened relative to the US dollar, allowing all other countries to improve their cost positions compared to the United States.

The Icelandic krona (ISK) is pegged to a basket of eight currencies and is weighed annually with respect to the share of each country's currency in the trade of goods and services. The krona floats freely relative to a calculated inverse index of these currencies.

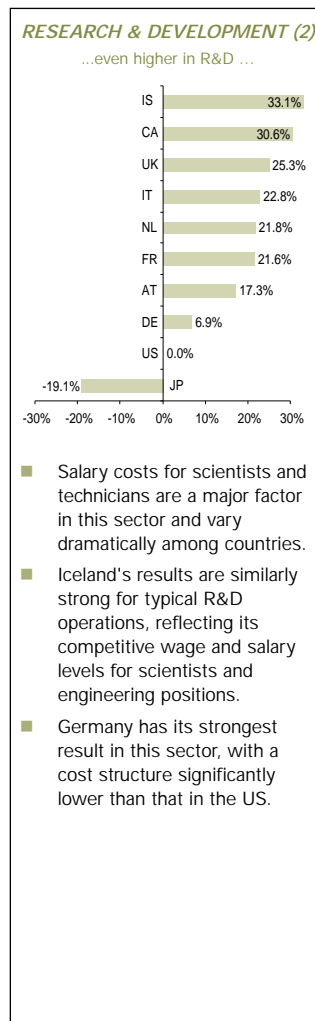
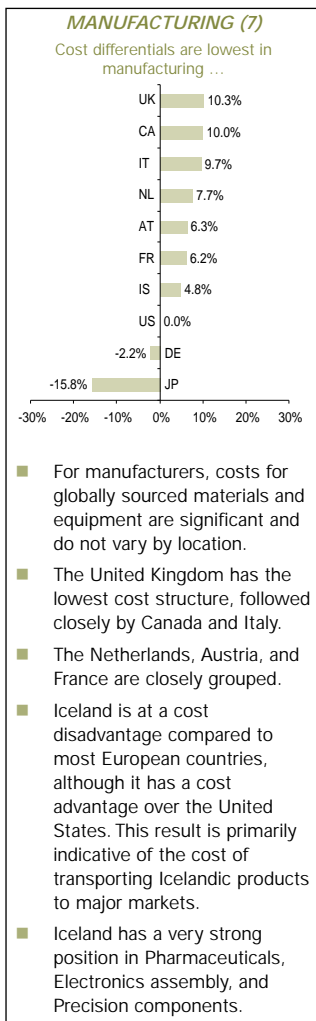
In March 2001, the Central Bank of Iceland adopted an inflation target for the krona and abandoned a policy of stable exchange rates. Traditionally, volatility has been rather low in the past few years. However, oscillations have increased with the introduction of the new monetary regime. A gradual weakening of the krona was also witnessed which peaked in November but has since appreciated somewhat. At present, the krona seems to have stabilised. The Central Bank of Iceland has expressed its view that currency

oscillations should be considered normal in light of the substantial shift of monetary policy that has taken place. From an historic perspective, the real exchange rate of the krona has been stable in spite of nominal exchange rate fluctuations, thus lowering the currency risk for a long-term investor. The krona is traded on the Icelandic currency interbank market, with four market makers, all local.

Regarding other cost factors, trends have been downward in some cost areas. European utility and telecommunications costs have dropped due to deregulation. In addition, many jurisdictions have implemented sizeable tax reductions since 1999.

Costs by Industry Sector

Results for the standard 12 business operations modelled from the basis for comparing major industry sectors as well as individual industries. Results for these 12 operations, by industry sector, plus the two additional operations, are as follows.



Cost Components

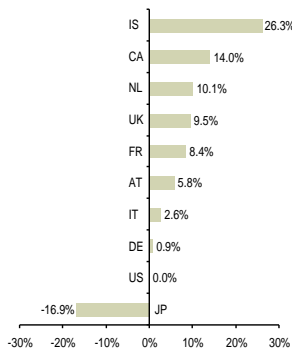
Labour is a key location-sensitive component, averaging 59 percent of location-sensitive costs for manufacturing and 81 percent for non-manufacturing operations. Total labour costs, including wages and salaries, statutory plans, and other benefits, are lowest in Canada, Iceland, the United Kingdom, Italy, and the Netherlands.

Taxes represent the second largest location-sensitive cost. On average, effective corporate income tax rates are lowest in Iceland, Canada, and the United Kingdom. Property-based taxes are lowest in Austria and the Netherlands.

Transportation costs represent 2 to 14 percent of costs for the manufacturing operations examined. Transportation costs-to-market are lowest in the Netherlands for road, sea, and air freight.

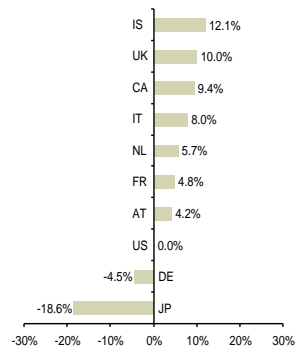
Energy costs represent 2 to 8 percent of costs for the manufacturing operations examined. Iceland offers the lowest electricity costs, while natural gas costs are lowest in France. For manufacturing, industrial **land** costs are lowest in Iceland, France, and the United States, while building **construction** costs are lowest in Italy and Canada. For non-manufacturing operations, **leasing** costs for suburban office space are lowest in Italy, Austria, France, and Iceland.

SERVER FARMS (1)



- Labour and energy are the main cost factors in this sector (cost of bandwidth was not taken into account in the study).
- Iceland has a decisive cost advantage over other countries in this study, mainly due to low energy costs.
- Canada is in second place and has a 4% cost advantage over the Netherlands.
- Japan has a very high cost index, reflecting relatively high labour and energy cost levels.

MEDICAL DEVICES (1)



- The medical devices sector focuses on prosthetics manufacturing and is driven mainly by wage and salary levels.
- Iceland is the overall cost leader because of its favourable corporate tax structure and competitive labour costs. It is closely followed by the UK, Canada, and Italy.
- The Netherlands, France, and Austria are closely grouped, with higher labour costs than the cost leaders.
- The US, Germany, and Japan are less competitive.

BUSINESS OPERATIONS MODELLED, BY SECTOR

Manufacturing

Metal components
Plastic products
Food processing
Electronics assembly
Precision components
Pharmaceuticals
Specialty chemicals

Software

Advanced software
Content development

R&D

Biomedical R&D
Electronic systems development and testing

Corporate services

Shared services centre

Additional operations

Medical devices
Server farms

1. Objectives, Scope, and Methodology

A. Objectives

Selecting the appropriate site for a business operation requires careful consideration of both cost factors and business environment. Where the decision also requires the relocation or recruitment of key individuals, personal factors such as cost of living and quality of life may also be important. Exhibit 1.1 illustrates some of the major factors that influence the site location decision. The relative importance of these factors will vary, not only among different industries, but also among individual firms within a particular industry. For many firms, the logical first step in locating or relocating a business operation is to perform a "quick scan" of which jurisdictions represent cost-competitive locations. Through this process, firms can identify quickly which cities are most worthy of more detailed investigation of factors such as business environment, cost of living, and quality of life.

1. Objectives of this project

This report is the result of a study and research programme undertaken by KPMG, in cooperation with MMK Consulting, and is designed to:

- Enable firms to perform a quick initial scan of how business costs compare among selected countries and jurisdictions, for their specific type of business operation.
- Assist economic developers to work with potential investors, using cost data that are compiled by an independent third party, yet can be tailored to the operations of a specific client.
- Enable policy makers to help determine the impact of a proposed tax and/or incentive policy change on the cost-competitiveness of their jurisdiction in relation to others.

The objective of this report is to compare the relative costs of operating various types of business in cities in Iceland, the G7 countries, Austria, and the Netherlands. This report is available both in hard copy and online.

The Website www.CompetitiveAlternatives.com contains helpful details plus an interactive costing model. Subscription to the interactive costing model can be obtained via KPMG Consulting Iceland. This report can be downloaded in PDF format from either www.kpmg.is or www.invest.is or purchased in hard copy from KPMG Consulting Iceland.

B. Scope of the Study

This study is based on the KPMG CCM-2002 Costing Model, which was developed by MMK Consulting for the January 2002 publication "Competitive Alternatives". The scope of the study includes:

- 87 cities in ten countries.
- 27 location-sensitive cost factors in each city.
- 14 business operations encompassing a wide range of manufacturing and service industry sectors.
- More than 30,000 individual cost items.

1. Countries and cities

The eighty-seven cities listed in Exhibit 1.2 are featured in this report. The analysis is not focused solely on these cities, but rather on the wider metropolitan area that each city represents. This allows for a more realistic comparison among locations and takes into account the fact that many larger-scale industrial and commercial facilities choose to locate in suburban areas. Results for each of these cities are presented in Chapter 5.

Detailed results for all cities can also be found online at www.CompetitiveAlternatives.com. Additional cities and countries may also be added periodically to the online comparisons.

Exhibit 1.1
KEY SITE LOCATION FACTORS

	COST FACTORS	OTHER KEY FACTORS
BUSINESS	<p>Business costs</p> <ul style="list-style-type: none"> ■ Land/building/office costs ■ Labour wage/salary/benefits costs ■ Transportation and distribution costs ■ Utilities costs ■ Financing costs ■ Federal/state/local taxes <p style="text-align: center; border: 1px solid black; padding: 2px;">FOCUS OF THIS STUDY</p>	<p>Business environment</p> <ul style="list-style-type: none"> ■ Labour availability and skills ■ Access to markets, customers, and suppliers ■ Road, rail, port, and airport infrastructure ■ Utilities and telecom service reliability ■ Suitable land sites ■ Regulatory environment ■ Inflation ■ Stability
PERSONAL	<p>Cost of living</p> <ul style="list-style-type: none"> ■ Personal taxes ■ Cost of housing ■ Cost of consumer products ■ Health care costs ■ Education costs 	<p>Quality of life</p> <ul style="list-style-type: none"> ■ Crime rates ■ Health care facilities ■ Schools and universities ■ Climate ■ Culture and recreation

Exhibit 1.2
FEATURED CITIES

Europe	North America	
Austria	New England/Atlantic	Midwest
Graz	Burlington, VT	Calgary, AB
Linz	Halifax, NS	Cape Girardeau, MO
Wien	Hartford, CT	Cedar Rapids, IA
France	Lewiston, ME	Chicago, IL
Grenoble	Moncton, NB	Colorado Springs, CO
Mulhouse		Dallas-Fort Worth, TX
Toulouse	Northeast	Edmonton, AB
Germany	Boston, MA	Houston, TX
Chemnitz	Columbus, OH	Minneapolis, MN
Darmstadt	Indianapolis, IN	Oklahoma City, OK
Düsseldorf	Kitchener-Waterloo-Cambridge, ON	Phoenix, AZ
Iceland	Lexington, KY	Salt Lake City, UT
Reykjavik	Montreal, QC	Saskatoon, SK
Italy	New York, NY	Sioux Falls, SD
Catania	Newark, NJ	St. Louis, MO
Livorno	Northern Virginia (Metro DC), VA	Wichita, KS
Napoli	Ottawa, ON	Winnipeg, MB
Torino	Philadelphia, PA	
Vicenza	Quebec City, QC	Pacific
Netherlands	Saginaw, MI	Boise, ID
Groningen	Scranton-Wilkes Barre-Hazleton, PA	Honolulu, HI
Maastricht-Heelen Region	Syracuse, NY	Kelowna, BC
Tilburg	Toronto, ON	Las Vegas, NV
West Holland Region (The Hague and nearby cities)	Southeast	Portland, OR
Zolle Region	Atlanta, GA	Riverside-San Bernardino, CA
United Kingdom	Dothan, AL	Sacramento, CA
Birmingham	Greenville-Spartanburg, SC	San Diego, CA
Cardiff	Jacksonville, FL	San Jose, CA
Edinburgh	Nashville, TN	Seattle, WA
Glasgow	Raleigh, NC	Vancouver, BC
Manchester	San Juan, PR	
Plymouth		Japan
Stoke-on-Trent		Fukuoka
Telford		Hamamatsu
		Yokohama

2. Location-sensitive cost components

This study differentiates among costs in various jurisdictions based on 27 location-sensitive cost components, as identified in Exhibit 1.3. These components are discussed in detail in Chapter 5, and they represent all of the significant location-sensitive costs for the operations examined in this study. Other costs, such as major plant and equipment expenses, and "commodity" inputs to the manufacturing process, tend to be governed by world market prices and are quoted in US dollars. Thus changes in costs for these goods will not affect relative cost rankings among countries and cities.

In addition, a number of less significant cost factors, such as advertising, accounting services, and office supplies, may be location-sensitive, but these do not have a material impact on the overall comparison and are not examined in this study. The 27 location-sensitive cost factors under scrutiny generally represent between 35 and 90 percent of total operating costs for conventional manufacturing operations and service operations, respectively.

3. Sectors and business operations

For this report, 14 business operations have been defined and profiled, as is illustrated in Exhibit 1.4. These operations represent a mix of capital- and labour-intensive manufacturing enterprises, high-tech research and development (R&D) facilities, knowledge-based software service operations, and corporate service centres. For manufacturing operations, the analysis is based on constructing a new facility on a purchased site located in a suburban area zoned for industrial use. For non-manufacturing operations, the analysis is based on the leasing of Class A office space in a suburban office building. These business operations are fully described in Chapter 3.

4. Industries

The 14 operations examined in this study were selected because of their relevance to a wide variety of industries. For example:

- With the increasing sophistication of many product types, **electronics assembly** is an important activity not only in the electronics equipment industry, but also in 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 specialisation, these industries also share many common operating parameters.
- With the increasing importance of information systems and data storage and security, **server farms** have become interesting options for firms in a wide range of sectors wishing to outsource this important aspect of their operation. Server farms require a copious energy supply and were therefore of special interest to Iceland due to its natural energy resources.

Exhibit 1.3
LOCATION-SENSITIVE COMPONENTS

<p>Labour costs</p> <ul style="list-style-type: none"> ■ Salaries and wages (40 positions) ■ Statutory plans <ul style="list-style-type: none"> Government pension plans Public medical plans Unemployment insurance Workers' compensation ■ Employer-sponsored benefits <ul style="list-style-type: none"> Paid time not worked (holidays and vacation) Private health insurance Other discretionary benefits 	<p>Utilities costs</p> <ul style="list-style-type: none"> ■ Electricity ■ Natural gas ■ Telecommunications <p>Depreciation charges</p>
<p>Facility costs</p> <ul style="list-style-type: none"> ■ Industrial land ■ Industrial construction ■ Office leasing 	<p>Financing costs (interest)</p> <p>Taxes other than income</p> <ul style="list-style-type: none"> ■ Capital ■ Property ■ Sales and transactions ■ Land transfer ■ Sundry local taxes <p>Income taxes</p> <ul style="list-style-type: none"> ■ Federal ■ Regional (state, provincial) ■ Local
<p>Transportation costs</p> <ul style="list-style-type: none"> ■ Road freight ■ Air freight ■ Sea freight 	

Exhibit 1.4
BUSINESS OPERATIONS MODELLED

Sectors	Modelled operations
Manufacturing	<ul style="list-style-type: none"> Metal components Plastic products Food processing Electronics assembly Precision components Pharmaceuticals Specialty chemicals
R&D	<ul style="list-style-type: none"> Biomedical R&D Electronic systems development and testing
Software services	<ul style="list-style-type: none"> Advanced software Content development
Corporate services	<ul style="list-style-type: none"> Shared services centre
Additional operations	<ul style="list-style-type: none"> Medical devices Server farms

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 are illustrated in Exhibit 1.5 and are based on rates reported by the US Federal Reserve Board for the months of July, August, and September 2001. Exchange rates for Iceland are based on rates reported by the Central Bank of Iceland in February, March, and April 2002. These exchange rates correspond to the time period during which cost information was collected in participating countries. It should be noted that the USD/ISK exchange rate in July - September 2001 was not significantly different than that in February - April 2002.

The impact of using alternate exchange rates is illustrated in Chapter 2. This can be further analysed using the interactive model available online at www.CompetitiveAlternatives.com.

2. Calculation of national results

National results for each country are based on the results for selected comparable cities in each country. The cities used to calculate results for each country have been selected to reflect a cross-section of comparable locations in each country. In addition to geography, population, and industry sectors, the economic circumstances of each city have also been considered. Each selected city can be classified in one of three ways:

- **Emerging city:** a city that is experiencing strong economic growth; a current "rising star."
- **Restructuring city:** a city in a region that has undergone significant economic restructuring, giving rise to the likelihood of lower production costs and higher availability of incentives.
- **Mature city:** a significant metropolitan area that represents an industrially developed region within the country.

The cities used to calculate the national results for each country were selected on the basis of these criteria. They are listed in Exhibit 1.6.

Exhibit 1.5
EXCHANGE RATES USED IN THIS STUDY

Country	Monetary unit	Value per US dollar
Austria, France, Germany,		
Italy, Netherlands	Euro	1.122
Canada	Canadian dollar	1.546
Iceland	Icelandic krona	100.21
Japan	Yen	121.50
United Kingdom	Pound	0.695

Exhibit 1.6
CITIES SELECTED FOR CALCULATION OF NATIONAL RESULTS

Country	Emerging city	Restructuring city	Mature city
Austria	Linz	Graz	Wien
Canada	Calgary Ottawa	Halifax Kelowna	Montreal Toronto
France	Toulouse	Mulhouse	Grenoble
Germany	Darmstadt	Chemnitz	Dusseldorf
Iceland	Reykjavik	n/a	n/a
Italy	Vicenza	Livorno	Torino
Japan	Fukuoka	Hamamatsu	Yokohama
Netherlands	Tilburg	Groningen	West Holland Region
United Kingdom	Plymouth Telford	Cardiff Stoke-on-Trent	Glasgow Manchester
United States	Colorado Springs Salt Lake City San Diego	Dothan Lewiston Scranton-Wilkes Barre- Hazleton	Atlanta Boston St. Louis

D. Methodology

1. *The CCM2002 Model*

This study is based on KPMG's Comparative Cost Model (CCM2002), used to analyse 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 jurisdictions. The result is a comparison of the estimated cost of establishing and operating a 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 document.

2. *Physical productivity in different locations*

This study is based on specific comparisons of different types of business operations, from the viewpoint of a business investor. It should not be interpreted as comparing overall levels of performance and productivity among countries. For this report, three major causes of productivity variations - time worked, technology employed, and work force training - have been accounted for, and physical productivity of operations has been assumed to be equal in all locations. A more detailed discussion of productivity issues is contained in Chapter 5.

3. *Income statement vs. net present value analysis*

The comparisons presented in this report are based on an income statement analysis. All items are treated on a cash basis except for the initial investment in land, buildings, and equipment. Initial investment is reflected in depreciation of buildings and equipment, as well as interest on the debt associated with facility startup. Using this approach, differences in initial investment costs are factored into operating costs over time. This measurement approach has been chosen for two reasons: because of its widespread use in business and because of its role in identifying the sources of cost differences among locations.

Another widely used approach is to calculate the net present value (NPV) of all projected cash flows, applying a discount rate to future cash flows. NPV techniques are often applied in investment analysis and decision-making. In addition to the income statement approach presented in this report, the results have also been analysed on an NPV basis, yielding similar relative results for all countries.

4. *Special incentives*

For major business investments, it is common practice for governments to offer incentive packages on a discretionary basis. These packages typically comprise a complex set of financing assistance and tax abatements tailored to specific investment and job creation proposals. For the following reasons, the analysis in this report does not distinguish among jurisdictions based on discretionary incentives:

- There is no defensible basis for assuming in advance whether any jurisdiction will be more or less willing than another jurisdiction to provide discretionary financial incentives.
- There is generally no before-the-fact basis for estimating accurately the value of the incentives that any jurisdiction will ultimately provide, without entering into negotiations over a specific investment proposal.
- The primary focus of this study is on the underlying business cost fundamentals that apply to operations.

While discretionary incentives are not included in this study, significant non-discretionary incentives with clearly defined eligibility criteria have been included. These incentives consist of certain tax rate reductions, tax abatements, sales tax exemptions, favourable inter-state income apportionment rules, investment tax credits, research and development incentives, and job tax credits available in various jurisdictions.

5. *Interpreting the results*

While great care has been taken in performing this analysis and developing the findings, the resulting comparisons are of a general nature. They should not be interpreted as a definitive or final opinion on the merits of locating any specific facility in one jurisdiction rather than another. Further analysis is required, considering both business costs and other factors, to determine the appropriate site for a specific facility.

Iceland (population 290,000) is much smaller than any of the other countries to which it is compared, and Reykjavik (metropolitan population of approximately 180,000) is much smaller than most of the cities used to determine national costs indices in the Competitive Alternatives project. Given that there is a general tendency for smaller communities to have lower cost characteristics than do larger communities, this may introduce a slight cost bias (less than 1%) in favour of Iceland.

Nonetheless, this analysis has been performed independently by MMK Consulting and KPMG and represents a thorough and objective analysis of comparative business costs in Iceland and other countries.

6. *Further information on methodology*

A number of assumptions have been incorporated into the modelling of each operation for the various locations. Details of assumptions are provided in Appendices available online at www.CompetitiveAlternatives.com.

2. Iceland and the International Comparison

This chapter presents Iceland and the international comparison of participating countries based on the combined results for the 14 business operations examined in this report.

A. The Icelandic Business Environment¹

Iceland is a modern welfare state, that guarantees its citizens access to universal health care, education, and a high degree of social security. The advanced status of health care in Iceland is borne out by a life expectancy among the highest in the world and the lowest infant mortality rate (2.6 per 1000 live births in 1998). The standard of education is high, and command of English and the Scandinavian languages is widespread.

Iceland has a tradition of political stability. Since gaining autonomy from Denmark in 1918, governments have normally been formed by a coalition of two or more political parties that have held a majority in Parliament. Since 1995, the same coalition government has been in power, and the current Prime Minister has been in office since 1991.

As in other developed countries, services (which are, to a large degree non-tradable) form the bulk of economic activity (roughly two-thirds). While the marine sector is the most important source of export revenue (63% of merchandise exports in 2000), its share of GDP has declined considerably in recent years, from 16.9% in 1980 to 10.1% in 2000. The largest manufacturing industries in Iceland are power-intensive industries based on the use of electric power. Iceland has extensive hydroelectric and geothermal resources, estimated at 50,000 GWh/year, and is the only country in Western Europe that still has large-scale, competitively priced power remaining to be harnessed from such sources. A number of smaller-scale export-oriented manufacturing industries have emerged in recent years, in areas such as pharmaceuticals, capital goods for fisheries and food processing, medical equipment, and other IT-intensive high-tech activities.

Iceland has participated actively in international co-operation. Iceland is a member of the Nordic Council and specialised institutions such as the Nordic Investment Bank. Iceland became a member of the United Nations in 1946 and is an active participant in most of its affiliated agencies, such as the IMF and the World Bank. Iceland is one of the original members of the Organisation for Economic Security and Co-Operation in Europe (OECD). In 1964, Iceland became a party to the General Agreement on Tariffs and Trade (GATT), the predecessor to the World Trade Organization (WTO). Iceland joined the European Free Trade Association (EFTA) in 1970, and in 1992, the member countries of EFTA and the European Union signed an agreement to establish a free-trade zone, the Economic Area (EEA), which took effect on January 1, 1994.

The small size of the population has not inhibited economic growth and prosperity in Iceland, as its GDP per capita in 2000 amounted to USD 30,600, the fifth highest in the world. In recent years, the economy of Iceland has experienced, on average, one of the highest growth rates of GDP among OECD countries. Growth over the period 1996-2000 averaged 4.8%. The growth was investment-led in the beginning, but it became increasingly characterised by a consumption boom in 1998 and 1999.

In 2001, economic growth began to slow down; in 2002, the outlook is for a contraction in output. Although the current account deficit has begun to shrink, it still has some way to go before reaching a sustainable position, compounded with an outflow of portfolio capital and direct investment. These imbalances were the underlying reason for a sharp depreciation of the Icelandic krona (ISK) in the latter half of 2000 and in 2001. This depreciation rekindled inflation, which, in June 2001, exceeded the 6% upper tolerance limit of the Central Bank of Iceland.

The imbalances that prevailed in Iceland's economy during the latter half of the upswing have largely disappeared in the first half of 2002. The fundamentals for economic stability have therefore been restored, with GDP growth expected within the sustainable rate of 2 to 3 percent. The tight monetary stance of recent times has played the greatest part in the success that has been achieved. High interest rates reduced investment and private consumption, bolstering the exchange rate of the krona after pessimism gave way to confidence, especially on the labour market. Lower demand in the goods and labour markets, coupled by a stronger exchange rate, then dampened inflation from both domestic and foreign sources. The inflation outlook has improved significantly, mainly due to the strengthening of the krona. Therefore, in July 2002, the Central Bank issued a statement declaring that the fundamentals are in place for a further reduction in its policy interest rate, if subsequent events confirm that the Central Bank inflation target (2.5%) will be attained and demand develops along the lines currently foreseen.

1. Source: Central Bank of Iceland, "The Economy of Iceland", Winter 2001/2002.

B. International Results

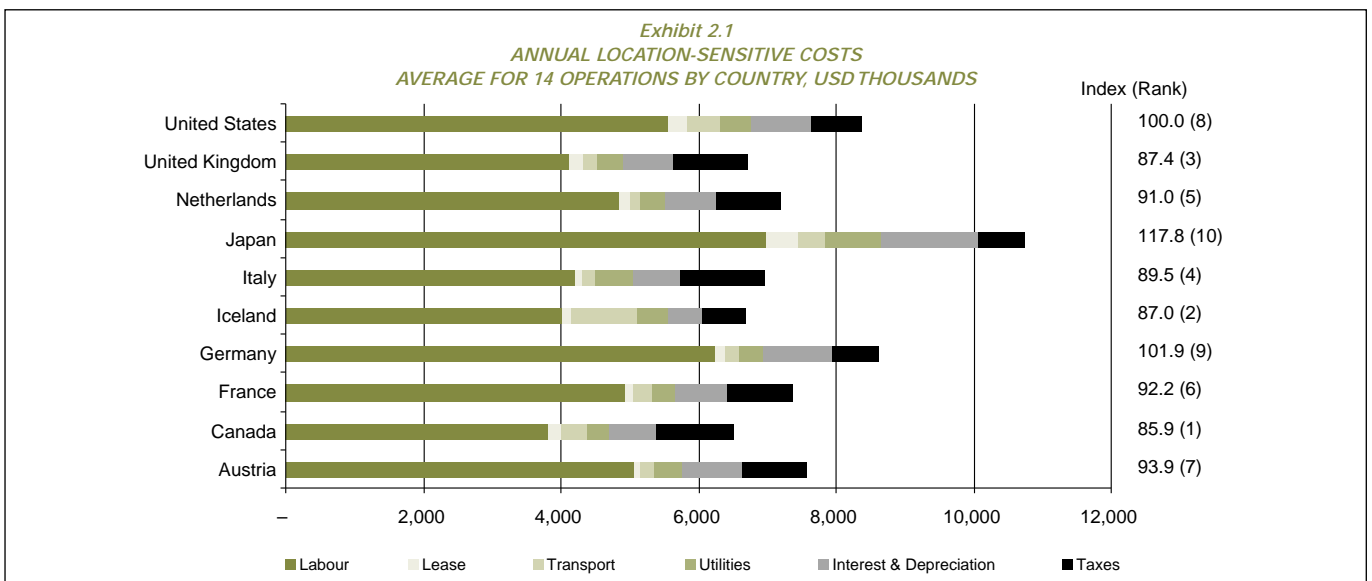
Exhibit 2.1 compares the overall results for each country, including all taxes, from startup through the first 10 years of operation. These figures represent the average results for:

- All 14 representative business operations examined (Exhibit 1.4).
- The selected comparable cities in each country (Exhibit 1.6).

The index rating system in this report compares the costs in each location to the US baseline index of 100.0.

The highlights of each country's comparative results are as follows:

- **Canada** (85.9) is the overall lowest-cost country and has a cost advantage over the other countries in two of the fourteen operations: corporate services and manufacturing (specialty chemicals). Canada's cost advantage over the US ranges from 7 percent for food processing to 33 percent for electronic systems development and testing.
- **Iceland** (87.0) is the second lowest-cost country overall and the lowest-cost country in Europe. It has the lowest costs among all countries for nine of the fourteen operations examined, including all four software and R&D operations, as well as three manufacturing operations: Pharmaceuticals, electronics assembly, precision components, and in the operation of server farms and medical devices production.
- **The United Kingdom** (87.4) is the second lowest-cost country in Europe and has the lowest costs among all countries for three of the seven manufacturing operations examined. The UK's cost advantage over the continental European countries ranges up to 20 percent, depending on the country and operation under scrutiny.
- **Italy** (89.5) has the lowest cost structure among the continental European countries examined. Italy's position has improved more than that of any other country since 1999, due in large measure to significant reductions in the cost to employers of providing statutory employee benefits.
- **The Netherlands** (91.0) has a lower overall cost structure than France or Germany. The Netherlands' greatest cost advantages are in industries with significant product distribution requirements, reflecting both its central location among major European markets and its low transportation rates.
- **France** (92.2) has a significantly lower cost structure than Germany. France's cost advantage is strongest in knowledge-intensive operations such as software and R&D.
- **Austria** (93.9) has an average cost advantage of more than 8 percent over Germany. Austria's best results are in R&D and high-tech manufacturing.
- **The United States** (100.0) has experienced a decline in cost competitiveness since 1999, driven by the strength of the US dollar and its relatively high salaries for technical and professional positions. The US is most cost-competitive in providing corporate services, where it ranks fourth among the nine countries due to relatively low clerical and administrative salaries.
- **Germany** (101.9) has the highest business cost structure among the European G7 countries. Germany is most competitive in R&D, where it has a seven percent cost advantage over the United States.
- **Japan** (117.8) continues to have the highest business cost structure among the G7 countries, but the size of its cost disadvantage relative to the US has decreased since 1999. Japan's greatest cost-competitiveness is in knowledge-intensive operations such as advanced software development.



C. Cost Trends since 1999

Cost relationships among countries have changed dramatically since 1999. This is due to changes in both exchange rates and business costs for each country.

1. Exchange rate trends

Since 1999, the value of the US dollar has increased in relation to all other G7 currencies. Exhibit 2.2 illustrates the exchange rates used in the March 1999 edition of Competitive Alternatives and shows how they differ from the rates used in this report.

Exhibit 2.2
EXCHANGE RATE TRENDS, 1999 - 2002

	1999 report	2002 report	Percentage change
Euro	0.855	1.122	24
British pound	0.605	0.695	13
Canadian dollar	1.500	1.546	3
Japanese yen	112.0	121.5	8
Icelandic krona	72.38*	100.21	39

* Not included in 1999 report. ISK exchange rate in March 1999, from the Central Bank of Iceland.

The euro has lost 24 percent of its value in relation to the US dollar, while the British pound and Japanese yen have dropped by 13 and 8 percent respectively. The value of the Canadian dollar has increased against the euro, pound and yen, but has decreased three percent relative to the US dollar.

2. Business cost trends

Some of the major trends affecting business costs since 1999 relate to electricity, transportation, telecommunications, and income taxes.

2.1. Electricity

Due to changing regulatory structures, electricity costs have been quite volatile in some jurisdictions over the last three years. Deregulation in Austria and Germany has resulted in decreases in electricity costs (in local currency terms) of about 20 percent since 1999. More modest decreases were seen in France and Japan. In North America, some states and provinces are also in the process of deregulating their electricity markets. The typical impact is seen in significant initial increases in electricity costs as prices are deregulated, followed by cost reductions as a competitive market evolves. On the whole, average electricity costs in North America are up slightly from 1999.

2.2. Transportation

In general, transportation costs for road freight have increased since 1999, due to high fuel prices in 2001. Cost increases in North America are in the range of 40 to 50 percent. In Europe and Japan, the benefits of deregulation have allowed these fuel increases to be mitigated in part or in whole. In Austria, France, and the UK, cost increases (in local currency terms) were approximately 20 percent, while Germany and Italy managed to achieve net cost reductions of about ten percent

despite higher fuel costs. In Japan, road freight costs have been halved due to significant regulatory changes.

For air freight, costs have fallen across the board, despite the new cargo security surcharges implemented by North American airlines following the events of September 11, 2001. For European countries, air freight cost reductions since 1999 are in excess of 50 percent. This is due primarily to major US-based courier companies' offering steep discounts in European markets as they try to fill backhaul capacity on US-bound flights.

2.3. Telecommunications

Telecom costs continue their downward trend due to global deregulation. The largest cost decreases were in Europe, which is now seeing major gains from deregulation similar to those experienced in North America in the mid-to-late 1990s. Calling costs in all European countries examined are down by 65 to 85 percent, as compared to 1999. Cost reductions in North America and Japan are more modest, at about 40 percent.

2.4. Income taxes

Income taxes continue their downward trend in most countries. The most significant changes have been in Iceland, where the corporate tax rate was cut from 30 to 18 percentage points (40 percent tax cut), and in Germany, where the federal corporate income tax rate has been slashed by more than 20 percent. Smaller tax cuts have also been seen in Canada, France, Italy, Japan, and the United Kingdom, as well as in a number of state/provincial and local jurisdictions.

3. Overall cost impacts

Five of the seven manufacturing operations examined in this study are unchanged from the 1999 Competitive Alternatives study performed by KPMG for the G7 countries and Austria.

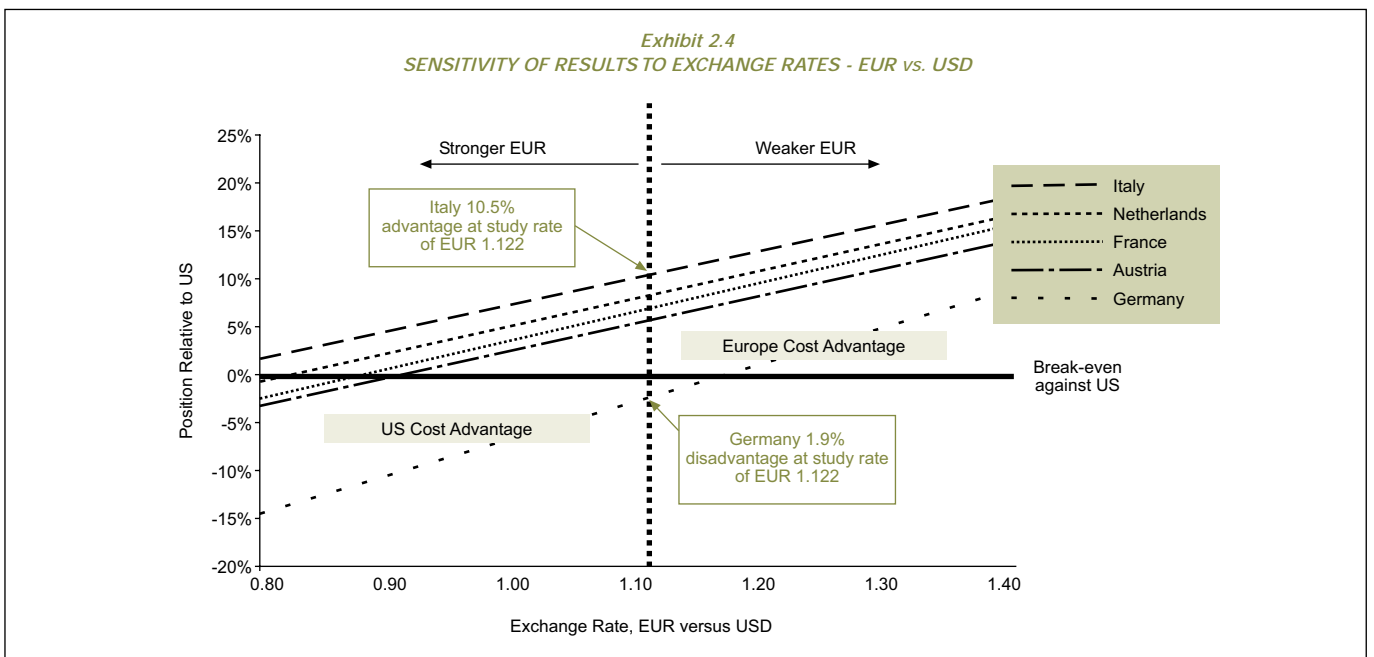
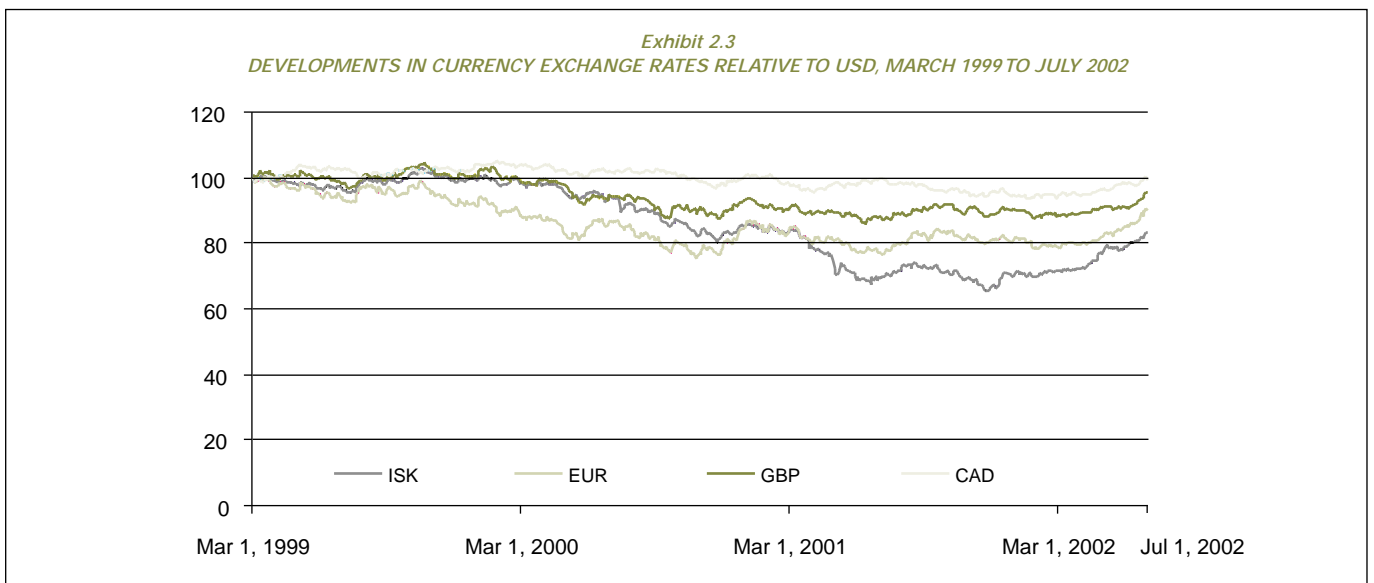
- **Italy** has improved its cost position by 12 percent relative to the **United States** and has also improved in relation to all other G7 countries. These gains reflect both the drop in the euro and reductions in employer costs of providing statutory employee benefits.
- **France, Austria, and Japan** have all made gains in the range of eight to nine percent relative to the US.
- The **United Kingdom** and **Germany** have seen their manufacturing cost positions improve by about five percent relative to the US.
- **Canada's** cost position relative to the US has improved by about three percent.
- **Iceland** and the **Netherlands** did not participate in the 1999 research project. In general, however, Iceland's position relative to the US has strengthened in the past three years because of developments in currency exchange rates and drastically lower corporate income tax rates, as is noted above. On the other hand, high interest rates have undermined Iceland's position versus the US.

For two reasons, percentage gains in after-tax manufacturing costs tend to be lower than those in exchange rates:

- Some cost factors (major plant equipment and commodity raw materials) are priced globally in US dollars. Changes in local currency exchange rates do not alter the cost of these factors.
- Corporate income taxes on before-tax profits tend to dampen the after-tax effects of exchange rate gains.

D. Developments in Currency Exchange Rates

As can be seen in Exhibit 2.3, where currency exchange rates are examined beginning on March 1, 1999 (Index = 100.0), the US dollar strengthened against the European currencies during the years 2000 and 2001, when the index for the Icelandic krona reached 65.4. Since that time, the index has risen, reaching 83.0 on July 1, 2002. In the three months from April - July 2002, the krona has strengthened considerably with respect to the dollar. During this recent period of increasing strength of the krona versus the dollar, interest rates have been cut considerably in Iceland.



E. Sensitivity to Exchange Rates

Effective January 1, 1999, Austria, France, Germany, Italy, and the Netherlands adopted the euro in place of their former national currencies. Therefore, exchange rates are no longer a factor in comparing costs among these countries. For all other country comparisons, the results are sensitive to changes in exchange rates. This section discusses how each country's competitive position relative to the US will vary with changes in its exchange rate relative to the US dollar.

1. EUR versus USD

For the average of the standard 14 operations, the relationship between the EUR/USD exchange rate and relative costs is illustrated in Exhibit 2.4. The results show that:

- **Italy, the Netherlands, France, and Austria** will all continue to have a cost advantage over the **United States**, as long as the euro does not strengthen by more than 20 percent above this study's exchange rate of 1.122 per US dollar.
- **Germany's** small overall cost disadvantage relative to the US could disappear with further weakening of the euro against the US dollar. Results for specific operations will vary. Sensitivity comparisons for specific operations are available online at www.CompetitiveAlternatives.com.

2. ISK versus USD

Exhibit 2.5 illustrates the sensitivity of Iceland's cost advantage over the United States in the event of changes in the exchange rate. Even if the Icelandic krona were to appreciate against the US dollar by around 20 percent (so that ISK 80 were needed to purchase one US dollar), Iceland would still enjoy an overall cost advantage over the United States. Iceland's cost advantage holds over a wide range of exchange rates.

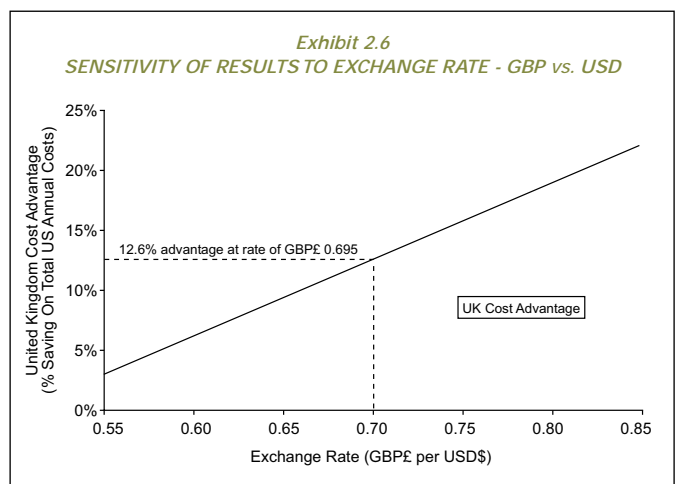
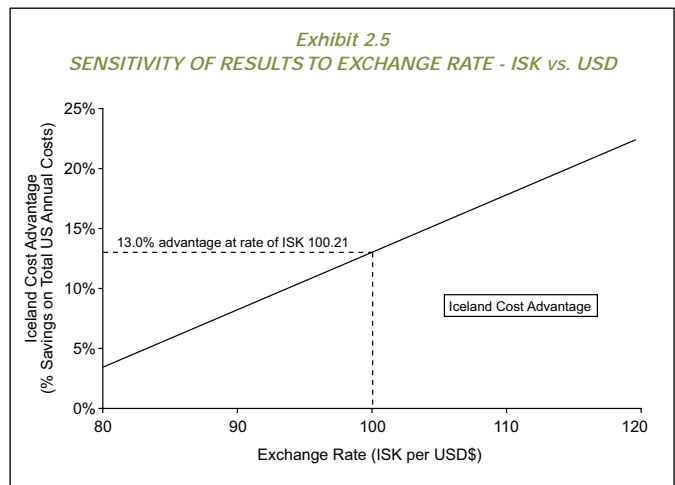
3. British pound (GBP) versus USD

Exhibit 2.6 illustrates that the United Kingdom has a significant cost advantage over the US across a wide range of exchange rates. The relative size of the UK's cost advantage varies with exchange rates as follows:

- 12.6 percent at the exchange rate of GBP 0.695 per US dollar, as is used in this report.
- 3.0 percent if the pound were to increase in value by 20 percent to GBP 0.55 per US dollar.
- 18.6 percent if the pound were to decrease in value by 20 percent to GBP 0.834 per US dollar.

4. Other currency comparisons

Additional information on the sensitivity of national results to exchange rate changes may be viewed online at www.CompetitiveAlternatives.com.



3. Results by Operation

For each of the 14 business operations profiled in this report, this chapter provides:

- A description of the type of operation and its operating specifications.
- A comparison of national results for the ten countries.
- Individual results for cities selected from among the 87 cities featured in this report.

Exhibit 3.1 summarises the international results for each operation and for major industry sectors. These results are based on the detailed specifications for each operation, as is illustrated in Exhibit 3.2.

Exhibit 3.1
SUMMARY OF RESULTS BY BUSINESS OPERATION

	Europe							North America		Asia
	Austria	France	Germany	Iceland	Italy	Nether-lands	United Kingdom	Canada	United States	Japan
Manufacturing										
Metal components	91.1 (6)	91.3 (7)	101.3 (9)	87.2 (2)	87.4 (3)	89.0 (5)	86.6 (1)	88.9 (4)	100.0 (8)	122.0 (10)
Plastic products	90.9 (5)	91.1 (6)	100.4 (8)	103.9 (9)	87.9 (2)	87.9 (3)	86.4 (1)	89.0 (4)	100.0 (7)	121.7 (10)
Food processing	93.4 (5)	94.4 (6)	99.5 (7)	108.0 (9)	91.3 (2)	92.1 (3)	90.9 (1)	92.5 (4)	100.0 (8)	109.6 (10)
Electronics assembly	95.7 (7)	95.5 (6)	105.9 (9)	88.9 (1)	91.1 (4)	95.0 (5)	91.1 (3)	89.4 (2)	100.0 (8)	121.6 (10)
Precision components	91.2 (7)	89.8 (6)	102.7 (9)	82.4 (1)	83.9 (3)	87.5 (5)	83.9 (2)	86.0 (4)	100.0 (8)	117.5 (10)
Pharmaceuticals	95.4 (7)	95.3 (6)	103.2 (9)	89.8 (1)	91.9 (4)	94.4 (5)	90.7 (2)	90.9 (3)	100.0 (8)	115.0 (10)
Specialty chemicals	95.2 (5)	95.5 (7)	103.2 (9)	93.5 (4)	92.6 (3)	95.3 (6)	92.4 (2)	89.6 (1)	100.0 (8)	111.4 (10)
Manufacturing average	93.7 (6)	93.8 (7)	102.2 (9)	93.4 (5)	90.3 (3)	92.3 (4)	89.7 (1)	90.0 (2)	100.0 (8)	115.8 (10)
R&D										
Biomedical R&D	84.1 (7)	82.0 (6)	97.8 (8)	71.5 (1)	80.4 (4)	82.0 (5)	78.7 (3)	72.2 (2)	100.0 (9)	124.5 (10)
Electronic systems testing	81.4 (7)	75.2 (6)	88.8 (8)	62.7 (1)	74.3 (4)	74.8 (5)	71.0 (3)	66.9 (2)	100.0 (9)	114.3 (10)
R&D average	82.7 (7)	78.4 (6)	93.1 (8)	67.1 (1)	77.2 (4)	78.2 (5)	74.7 (3)	69.4 (2)	100.0 (9)	119.1 (10)
Software										
Advanced software	93.9 (7)	91.5 (6)	99.6 (8)	66.8 (1)	89.1 (4)	90.1 (5)	82.0 (3)	77.8 (2)	100.0 (9)	108.8 (10)
Content development	96.6 (7)	87.1 (5)	97.1 (8)	66.4 (1)	85.4 (4)	87.6 (6)	80.7 (3)	77.6 (2)	100.0 (9)	115.6 (10)
Software average	95.1 (7)	89.5 (6)	98.4 (8)	66.6 (1)	87.4 (4)	89.0 (5)	81.4 (3)	77.7 (2)	100.0 (9)	111.9 (10)
Corporate services										
Shared services	111.8 (8)	104.2 (7)	123.4 (9)	93.8 (4)	91.6 (3)	100.9 (6)	90.0 (2)	80.3 (1)	100.0 (5)	154.2 (10)
Additional operations										
Medical devices	95.8 (7)	95.2 (6)	104.5 (9)	87.9 (1)	92.0 (4)	94.3 (5)	90.0 (2)	90.6 (3)	100.0 (8)	118.6 (10)
Server farms	94.2 (6)	91.6 (5)	99.1 (8)	73.7 (1)	97.4 (7)	89.9 (3)	90.5 (4)	86.0 (2)	100.0 (9)	116.9 (10)
Additional operations average	95.0 (7)	93.4 (5)	101.8 (9)	80.8 (1)	94.7 (6)	92.1 (4)	90.2 (3)	88.3 (2)	100.0 (8)	117.8 (10)
All operations	93.4 (7)	92.4 (6)	101.9 (9)	87.0 (2)	89.5 (4)	91.0 (5)	87.4 (3)	85.9 (1)	100.0 (8)	117.8 (10)

Exhibit 3.2
SUMMARY OF STANDARDISED OPERATING PARAMETERS

		Manufacturing				
		Metal components	Plastic products	Food processing	Electronics assembly	Precision components
Labour requirements						
Management		4	3	6	7	3
Sales and administration		16	11	12	12	3
Dedicated product development						
Customer support						
Production/non-dedicated product dev.						
Professional, technical		10	12	7	46	8
Operators		46	46	65	18	55
Unskilled labourers		19	15	17	13	1
Other		5	3	3	4	1
Total		100	90	110	100	70
Utilities requirements						
Electricity, peak demand	kVa	1,300	1,500	1,400	800	450
Electricity, monthly consumption	kWh	360,000	400,000	370,000	225,000	60,000
Gas, monthly consumption	CCF	15,200	8,900	40,000	800	1,500
	m ³	43,059	25,212	113,314	2,266	4,249
Facility requirements						
Industrial site purchased	acres	8	10	5	14	3
	hectares	3.2	4.0	2.0	5.6	1.2
Size of factory built	ft ²	100,000	100,000	50,000	120,000	30,000
	m ²	9,290	9,290	4,645	11,148	2,790
Class A office leased	ft ²					
	m ²					
Other initial investment requirements						
Machinery and equipment	USD thousands	3,130	1,980	4,500	8,000	3,000
Inventory	USD thousands	400	700	1,500	1,000	2,400
R&D equipment	USD thousands				750	
Office equipment	USD thousands	570	220	300	270	150
Equity financing	% of project cost	50%	25%	33%	60%	50%
Annual operating characteristics						
Sales at full production	USD thousands	15,000	15,000	26,000	17,000	7,500
Investment in tax - eligible R&D	% of sales				2.9%	1.5%
Materials and other direct costs	% of sales	25%	30%	55%	30%	20%
Other operating characteristics	% of sales	10%	7%	7%	4%	4%
	USD thousands					
Product distribution % of total output						
Region of origin		70%	70%	85%		
Neighbouring regions in same continent		20%	20%	15%		
Continent of origin					95%	90%
Overseas export	sea	10%	10%			
Overseas export	air				5%	10%
Internet						
Total		100%	100%	100%	100%	100%
Value of product per unit of shipment - USD		0.83/kg	4.00/ft³	6.50/ft³	65/ft³	100/kg

	Software			R&D		Corporate services	Additional operations	
Pharmaceuticals	Specialty chemicals	Advanced software	Content development	Biomedical R&D	Electronic syst. testing	Shared services	Medical devices	Server farms
7	5	13	11	6	2	10	6	4
16	11	33	12	11	12	105	14	4
		52	84	46	56		77	25
	5	12	3			29		4
30	71							
43	2							
20	4			2				
4	2			1		1	3	3
120	100	110	110	66	70	145	100	40
600	2,000	450	400	310	310	450	540	4,320
160,000	500,000	120,000	120,000	112,600	112,600	125,000	160,000	3,456,000
5,600	41,300						800	
15,864	116,997						2,266	
6	6						6	3
2.4	2.0						2.0	1.2
70,000	50,000						70,000	53,820
6,503	4,645						6,503	5,000
		22,500	22,500	45,500	45,000	22,500		
		2,090	2,090	4,180	4,180	2,090		
6,000	14,000			175	180		2,700	14,000
2,000	5,000	500					2,500	50
500	500	150		2,500	2,600		300	700
200	500	1,350	1,500	850	850	1,800	200	600
50%	40%	67%	67%	100%	100%	100%	55%	40%
21,000	22,000	15,000	11,000				16,000	14,592
2.9%	2.3%	5.0%		25%	32%		3.8%	
30%	43%						30%	
20%	6%	10%	18%				14%	10%
				2,000	1,325	1,250		
70%	50%	50%					61%	
30%	50%						39%	
		40%						
		10%						
100%	100%	100%					100.0%	
28/ft³	244/kg	150/ft³						

A. Manufacturing

1. Metal components

This type of operation involves the fabrication of machined metal components on a high-volume, lower-value-added basis. The plant would typically manufacture parts for the automotive, agricultural, drilling/mining, transportation, appliance, or other industries.

The specific operation modelled has 100 employees, is located in a suburban industrial plant of 100,000 square feet (9,290 m²), and has annual sales of USD 15 million. The operation is moderately capital-intensive, and its work force profile is relatively low-skilled. This firm is assumed to operate independently as a stand-alone business.

1.1. National results

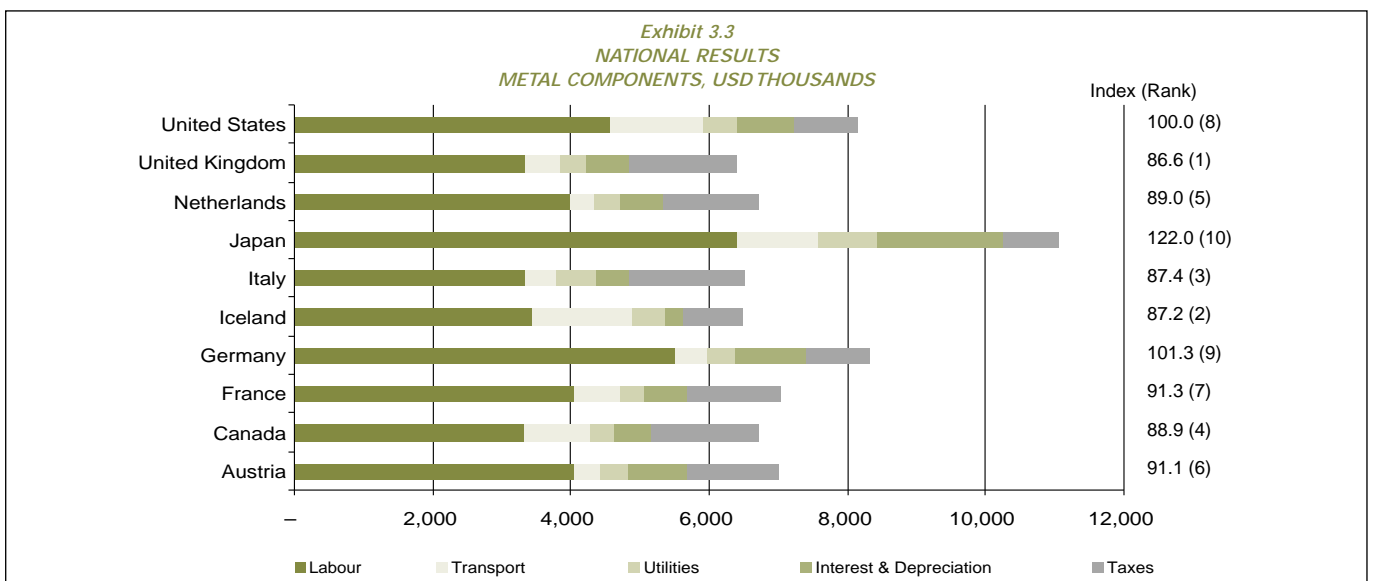
As is illustrated in Exhibit 3.3, due to the low-value, high-volume nature of the operation, transportation costs represent a relatively significant component of total costs. The overall cost leader is the United Kingdom (1), whose cost advantage results from its combination of low labour and transportation costs. Iceland (2) is a close second, as competitive labour costs and tax structure outweigh high transportation costs; it is followed by Italy (3). Canada (4) comes fourth, as savings from competitive labour costs are eroded by higher transportation costs due to greater distances to markets. Proximity to markets is particularly important for this type of operation. The Netherlands (5) has higher labour costs, but these are partly offset by its lower transportation costs. Austria (6) and France (7) have higher labour costs than the first four countries, but their cost advantage over the US is still almost nine percent. The United States (8) has a cost advantage over Germany (9) because of lower labour costs. Japan (10) has high costs for most cost components.

1.2. Leading cities

Exhibit 3.4 profiles the results for selected lower-cost cities, by country, from among the 87 cities featured in this report.

Exhibit 3.4
RESULTS FOR SELECTED CITIES
1. METAL COMPONENTS

Country	City	Index	Rank among 87 cities
Austria	Linz	90.7	33
	Graz	91.0	34
France	Mulhouse	90.2	29
	Grenoble	90.5	31
Germany	Chemnitz	96.6	47
	Darmstadt	102.9	72
	Reykjavik	87.2	10
Italy	Napoli	86.3	5
	Livorno	87.2	11
	Torino	87.5	12
	Groningen	88.4	18
Netherlands	Zolle Region	88.9	22
	Tilburg	89.0	25
United Kingdom	Telford	85.3	1
	Stoke-on-Trent	86.1	2
	Cardiff	86.2	3
Canada	Quebec City	86.4	7
	Montreal	86.9	8
	Edmonton	87.5	13
United States	San Juan	92.4	36
	Greenville-Spartanburg	94.2	40
	Lexington	95.2	41
	Dothan	95.3	42
	Nashville	95.6	43
Japan	Fukuoka	116.0	84
	Hamamatsu	118.6	85



2. Plastic products

This operation involves the manufacture of moulded plastic products on a low-value, high-volume basis. These products would be provided to customers in the automotive, electronics, furniture, and other industries.

The specific operation modelled has 90 employees, is located in a suburban industrial plant of 100,000 square feet (9,290 m²), and has annual sales of USD 15 million. The operation is moderately capital-intensive, and its work force profile is weighted towards lower-skilled positions. This firm is assumed to operate independently as a stand-alone business.

2.1. National results

As is illustrated in Exhibit 3.5, transportation and utilities costs are proportionately more significant than for other manufacturing operations, while labour costs are less important.

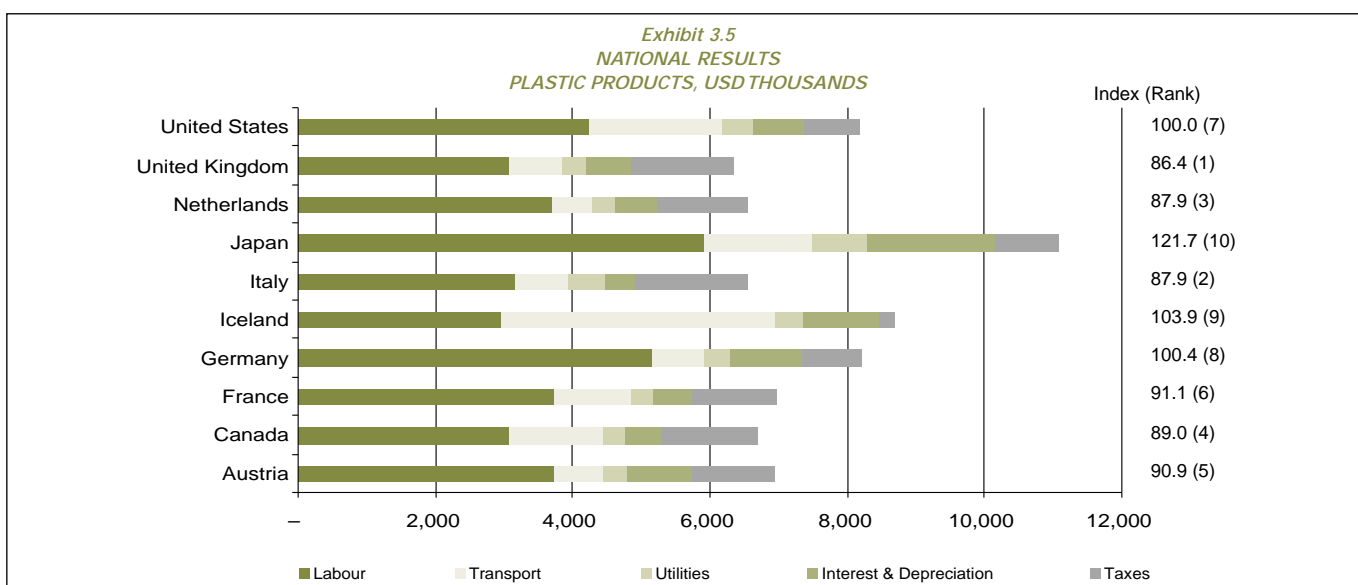
The United Kingdom (1) and Italy (2) have comparable transport costs, but the UK leads, primarily because of its lower labour costs. The Netherlands (3) has the lowest transportation costs, which offsets its higher labour costs. Results for Canada (4), Austria (5), and France (6) are similar. The United States' (7) labour cost advantage over Germany (8) more than offsets its higher transportation costs. Iceland (9) has the highest transportation costs, while Japan (10) has the highest costs in labour and in most other cost components.

2.2. Leading cities

Exhibit 3.6 profiles the results for selected lower-cost cities, by country, from among the 87 cities featured in this report.

Exhibit 3.6
RESULTS FOR SELECTED CITIES
2. PLASTIC PRODUCTS

Country	City	Index	Rank among 87 cities
Austria	Linz	90.5	30
	Graz	91.1	33
France	Mulhouse	89.8	26
	Grenoble	89.9	27
Germany	Chemnitz	95.6	44
	Darmstadt	101.5	66
Iceland	Reykjavik	103.9	76
Italy	Napoli	87.2	9
	Livorno	87.7	13
	Torino	87.9	15
Netherlands	Groningen	87.5	11
	Tilburg	87.8	14
	Maastricht-Heerlen Region	88.0	16
United Kingdom	Telford	84.8	1
	Stoke-on-Trent	85.7	2
	Cardiff	86.0	3
Canada	Quebec City	86.2	5
	Montreal	86.2	6
	Kitchener-Waterloo-Camb.	87.1	8
United States	Greenville-Spartanburg	93.7	38
	Lexington	94.5	39
	Indianapolis	94.7	40
	Dothan	94.8	41
Japan	Nashville	95.3	42
	Fukuoka	115.1	82
	Hamamatsu	117.2	85



3. Food processing

This type of operation involves the production of medium-value, non-perishable products such as packed, dried, or canned foods, or confectionery products. Typical customers for this type of operation are grocery wholesale and retail chains, as well as food product wholesalers and distributors.

The processing operation is assumed to have 110 employees, be located in a suburban industrial facility of 50,000 square feet (4,645 m²), and have annual sales of USD 26 million. The operation is moderately capital-intensive and relatively energy-intensive, and it has a work force profile that is heavily weighted towards unskilled and semi-skilled workers. This firm is assumed to operate independently as a stand-alone business.

3.1. National results

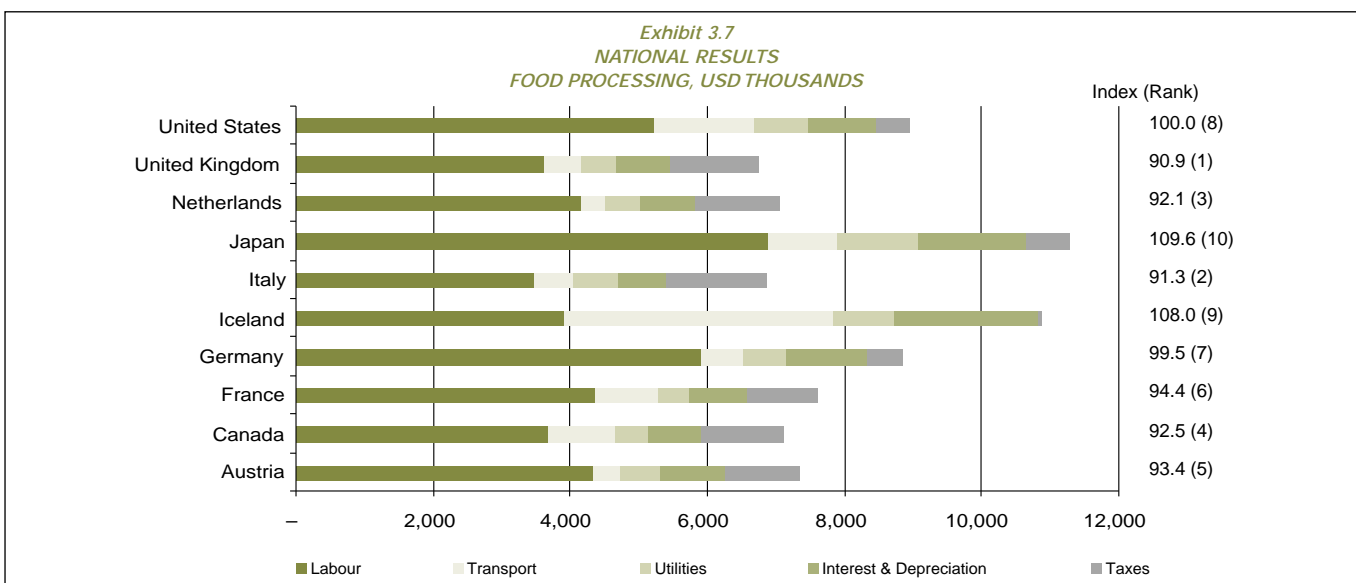
As is illustrated in Exhibit 3.7, cost differences are significant in several areas. Proximity to customers, as well as energy costs, is particularly important in this operation. The United Kingdom (1) combines competitive labour costs with low utilities costs. Italy (2) has lower labour costs than the UK, but these are offset by higher utilities costs. The Netherlands (3) benefits from its low transportation costs, while Canada's (4) higher transportation costs are counterbalanced by very competitive labour and energy costs. Austria (5) benefits from low transportation costs, while France (6) has very competitive energy costs. Germany (7) and the United States (8) are virtually tied, with higher US transportation costs offsetting its lower labour costs. Iceland (9) has the highest transportation costs. As transport patterns are defined in relation to major international markets, transport costs are comparatively very high for Iceland due to its geographical position. Japan (10) has the highest labour costs among the countries examined.

3.2. Leading cities

Exhibit 3.8 profiles the results for selected lower-cost cities, by country, from among the 87 cities featured in this report.

Exhibit 3.8
RESULTS FOR SELECTED CITIES
3. FOOD PROCESSING

Country	City	Index	Rank among 87 cities
Austria	Linz	93.2	29
	Graz	93.4	30
France	Mulhouse	93.5	31
	Grenoble	93.9	34
Germany	Chemnitz	96.9	43
	Darmstadt	100.6	63
Iceland	Reykjavik	108.0	83
Italy	Napoli	90.8	7
	Livorno	91.2	9
	Vicenza	91.4	12
Netherlands	Groningen	91.8	14
	Zolle Region	92.2	19
United Kingdom	Tilburg	92.2	20
	Telford	90.0	1
	Stoke-on-Trent	90.1	2
	Birmingham	90.4	3
Canada	Edmonton	90.4	5
	Calgary	91.3	11
United States	Quebec City	91.8	13
	Indianapolis	95.8	38
	San Juan	96.2	39
	Lexington	96.3	40
	Greenville-Spartanburg	96.3	41
	Nashville	96.7	42
Japan	Fukuoka	105.9	80
	Hamamatsu	107.8	82



4. Electronics assembly

This type of operation manufactures high-value finished electronic devices or completed electronic sub-assemblies, such as computer systems, assembled components and peripheral devices, video-touch screens, GPS field equipment, and handheld electronic devices. Typical customers for this type of operation include brand-name manufacturers and distributors of electronic equipment, as well as original equipment manufacturers (OEMs) who install these devices into their products (e.g., automobile manufacturers).

The specific operation modelled represents a plant that has 100 employees, is located in a suburban industrial facility of 120,000 square feet (11,150 m²), and has annual sales of USD 17 million. The operation is capital-intensive, and its work force profile is weighted towards skilled technicians and workers. This firm is assumed to operate independently as a stand-alone business.

4.1. National results

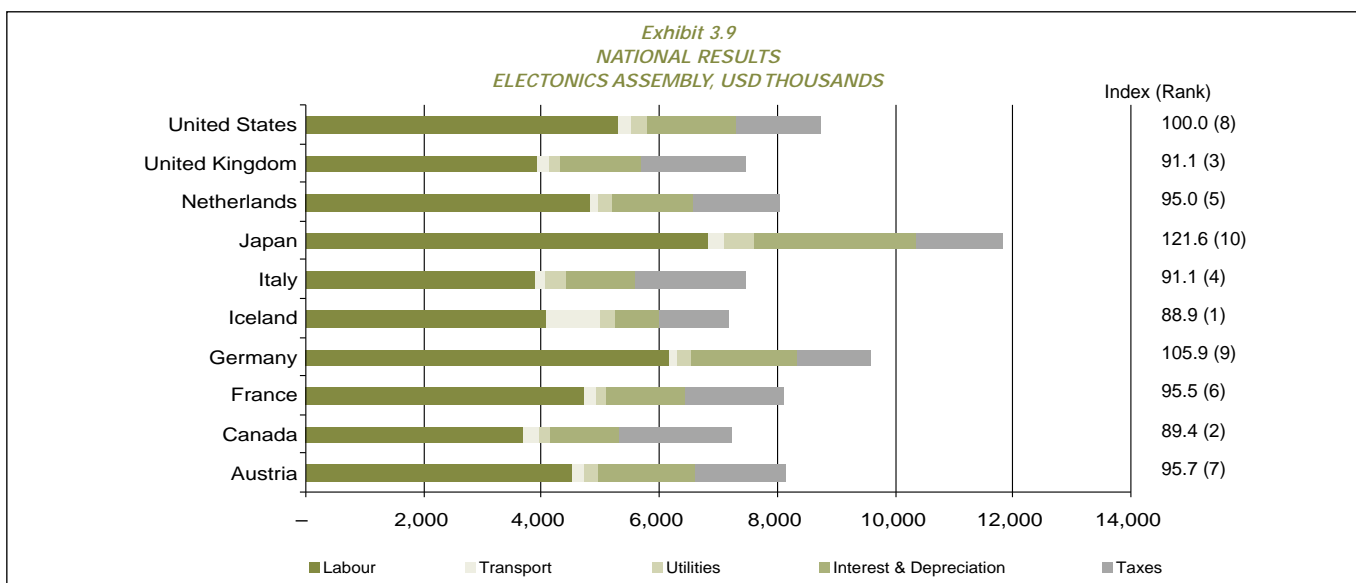
As is illustrated in Exhibit 3.9, the distinguishing location-sensitive cost components in this industry are labour and capital costs (reflected in the size of annual interest and depreciation charges). Iceland's (1) overall cost advantage over Canada (2), the United Kingdom (3), and Italy (4) results from lower taxes. The UK and Italy have the same cost index and are virtually tied. The Netherlands (5), France (6), and Austria (7) are closely ranked within one percentage point of each other, approximately five percent ahead of the US. The United States (8) has a substantial advantage over Germany (9) because of its lower labour rates. Japan (10) has the highest labour costs among the countries examined.

4.2. Leading cities

Exhibit 3.10 profiles the results of selected lower-cost cities, by country, from among the 87 cities featured in this report.

Exhibit 3.10
RESULTS FOR SELECTED CITIES
4. ELECTRONICS ASSEMBLY

Country	City	Index	Rank among 87 cities
Austria	Linz	95.2	34
	Graz	95.4	36
France	Mulhouse	94.4	30
	Grenoble	95.2	35
Germany	Chemnitz	100.5	59
	Darmstadt	107.6	79
Iceland	Reykjavik	88.9	8
Italy	Catania	89.6	11
	Napoli	90.1	15
	Livorno	90.7	19
Netherlands	Groningen	94.1	29
	Zolle Region	94.8	31
	Maastricht-Heerlen Region	94.8	32
United Kingdom	Plymouth	90.0	13
	Telford	90.2	17
	Cardiff	90.6	18
Canada	Edmonton	86.4	2
	Halifax	87.3	3
	Saskatoon	87.8	4
United States	San Juan	85.9	1
	Dothan	95.5	37
	Sioux Falls	96.5	39
	Cape Girardeau	96.5	40
	Greenville-Spartanburg	96.7	42
	Japan	Fukuoka	116.6
	Hamamatsu	116.6	86



5. Precision components

This operation produces high-precision machined components on a low-volume, high-value-added basis. This type of operation is found in a variety of high-tech industries, such as aerospace, electronics, telecommunications, and medical equipment.

The specific operation modelled is an aircraft small-parts manufacturing plant with 70 employees. Located in a suburban industrial facility of 30,000 square feet (2,790 m²), the firm has annual sales of USD 7.5 million. The operation is moderately capital-intensive, and its work force is more highly skilled than that of a conventional metal components plant. This firm is assumed to operate independently as a stand-alone business.

5.1. National results

As is illustrated in Exhibit 3.11, labour costs represent a larger share of costs for this operation than for the conventional metal components operation. Because of the relatively high-value and low-volume nature of this business, transportation costs are proportionately less significant.

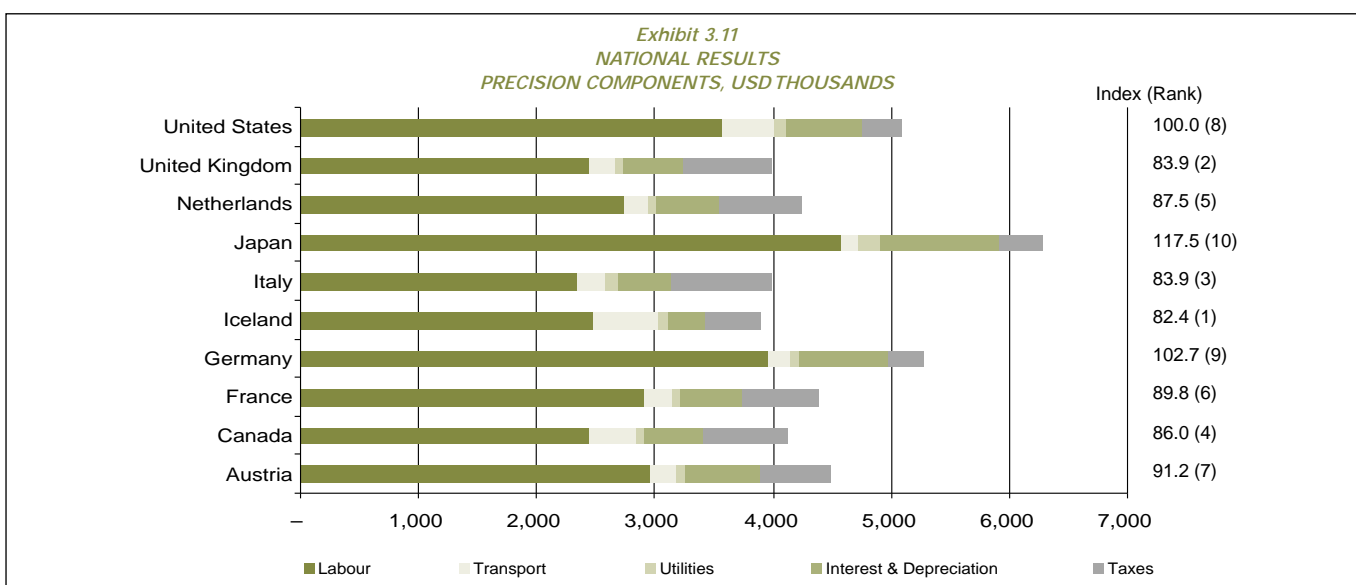
Due to its favourable labour costs and tax structure, Iceland (1) is the cost leader. The United Kingdom (2) and Italy (3) have similar cost structures and are virtually tied in terms of overall costs. Canada (4) has comparable labour costs but higher transportation costs. Rankings for the other countries primarily reflect the differences in labour costs. The Netherlands (5), France (6), and Austria (7) have cost structures that are 9 to 13 percent lower than the United States (8). Germany (9) has costs marginally higher than the US. As with all other operations, costs for Japan (10) are highest, although the size of Japan's cost disadvantage for this operation is smaller than for many of the other operations examined.

5.2. Leading cities

Exhibit 3.12 profiles the results for selected lower-cost cities, by country, from among the 87 cities featured in this report.

Exhibit 3.12
RESULTS FOR SELECTED CITIES
5. PRECISION COMPONENTS

Country	City	Index	Rank among 87 cities
Austria	Linz	90.4	35
	Graz	90.7	36
France	Mulhouse	87.9	31
	Grenoble	89.5	33
Germany	Chemnitz	96.8	44
	Darmstadt	104.9	76
	Reykjavik	82.4	1
Iceland	Napoli	82.6	2
	Catania	82.9	4
Italy	Livorno	83.6	9
	Groningen	86.6	25
	Zolle Region	87.3	28
Netherlands	Maastricht-Heerlen Region	87.6	29
	Telford	82.8	3
	Plymouth	83.2	7
United Kingdom	Cardiff	83.4	8
	Quebec City	82.9	5
Canada	Halifax	83.1	6
	Moncton	83.9	13
	San Juan	85.1	19
United States	Cape Girardeau	95.3	40
	Sioux Falls	95.6	41
	Dothan	95.9	42
	Greenville-Spartanburg	96.5	43
Japan	Fukuoka	111.0	81
	Hamamatsu	111.4	82



6. Pharmaceuticals

This operation involves the manufacture of prescription and/or non-prescription drugs. It would typically manufacture generic products for grocery or pharmaceutical wholesalers and retailers, or brand-name products under contract to major pharmaceuticals firms.

The specific operation modelled is a plant with 120 employees that is located in a suburban industrial facility of 70,000 square feet (6,500 m²). Annual sales are USD 21 million. The operation is moderately capital-intensive, and its work force profile includes a wide mix of technical skills. Transportation costs are moderately significant, and the operation is assumed to operate independently as a stand-alone business.

6.1. National results

As is illustrated in Exhibit 3.13, the key location-sensitive components for this operation are labour, transportation, and capital requirements (measured through annual interest and depreciation costs).

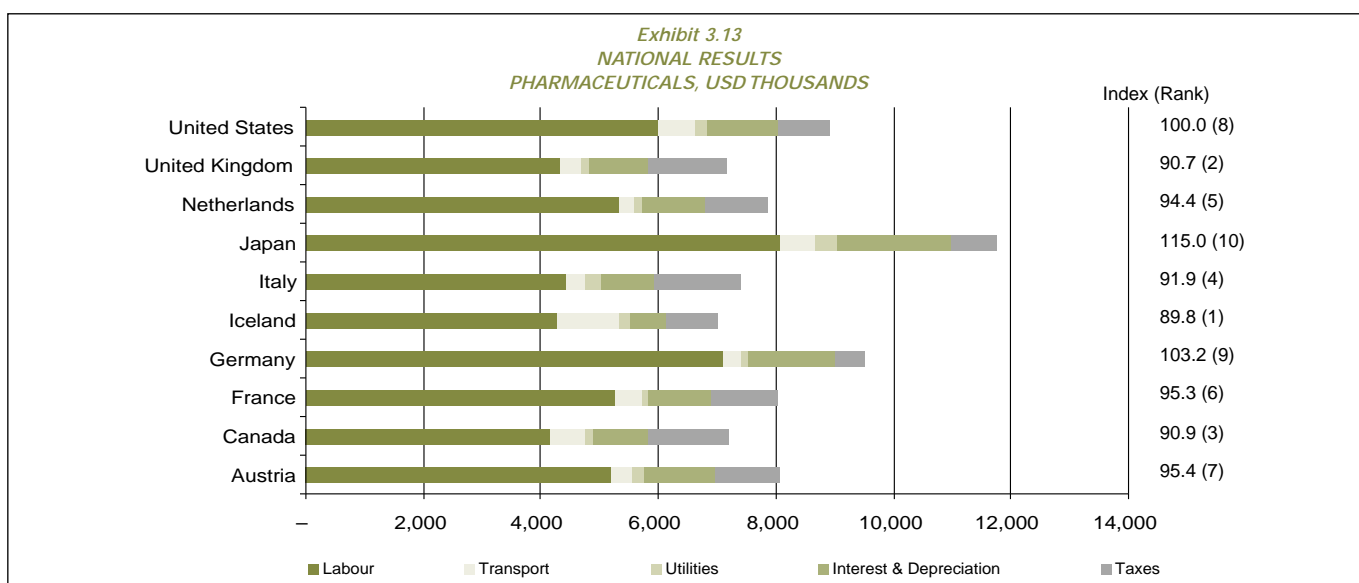
Iceland (1) has a cost advantage of just under one percent over the United Kingdom (2), which in turn has a small cost advantage over Canada (3) because of lower transportation costs. Italy (4) benefits from low transportation costs and has a significant labour cost advantage over the Netherlands (5). France (6) and Austria (7) are very closely ranked. The United States (8) has a modest cost advantage over Germany (9) because Germany's transportation cost advantages are not enough to overcome its higher labour costs. Japan (10) has the highest labour and utilities costs among the countries examined.

6.2. Leading cities

Exhibit 3.14 profiles the results for selected lower-cost cities, by country, from among the 87 cities featured in this report.

Exhibit 3.14
RESULTS FOR SELECTED CITIES
6. PHARMACEUTICALS

Country	City	Index	Rank among 87 cities
Austria	Linz	95.0	35
	Graz	95.2	37
France	Mulhouse	94.3	30
	Grenoble	95.2	36
Germany	Chemnitz	99.0	50
	Darmstadt	104.8	79
Iceland	Reykjavik	89.8	5
Italy	Napoli	90.8	15
	Catania	91.1	18
	Livorno	91.7	24
Netherlands	Groningen	93.8	29
	Zolle Region	94.3	31
United Kingdom	Tilburg	94.4	32
	Telford	89.9	7
	Plymouth	90.3	10
	Cardiff	90.5	11
Canada	Edmonton	89.0	2
	Halifax	89.3	3
	Quebec City	89.6	4
United States	San Juan	88.5	1
	Dothan	96.9	40
	Cape Girardeau	97.4	41
	Sioux Falls	97.6	42
	Greenville-Spartanburg	97.7	43
Japan	Hamamatsu	111.1	84
	Fukuoka	111.3	85



7. Specialty chemicals

This type of operation involves the manufacture of low-volume, high-value specialty chemicals. These products are used as inputs to industrial and consumer products such as cleaners, solvents, adhesives, and fragrances.

The specific operation modelled has 100 employees. It is located in a suburban industrial plant of 50,000 square feet (4,645 m²) and has annual sales of USD 22 million. This operation is highly capital-intensive, and its work force has a very high mix of technically skilled workers. It is assumed to operate independently as a stand-alone business. Due to its low production volumes, it does not require direct supply of feedstocks from a major petrochemical facility; therefore, it is not constrained to locating in an existing petrochemical cluster.

7.1. National results

As is illustrated in Exhibit 3.15, the main location-sensitive cost factors for specialty chemicals are labour, utilities, and capital requirements.

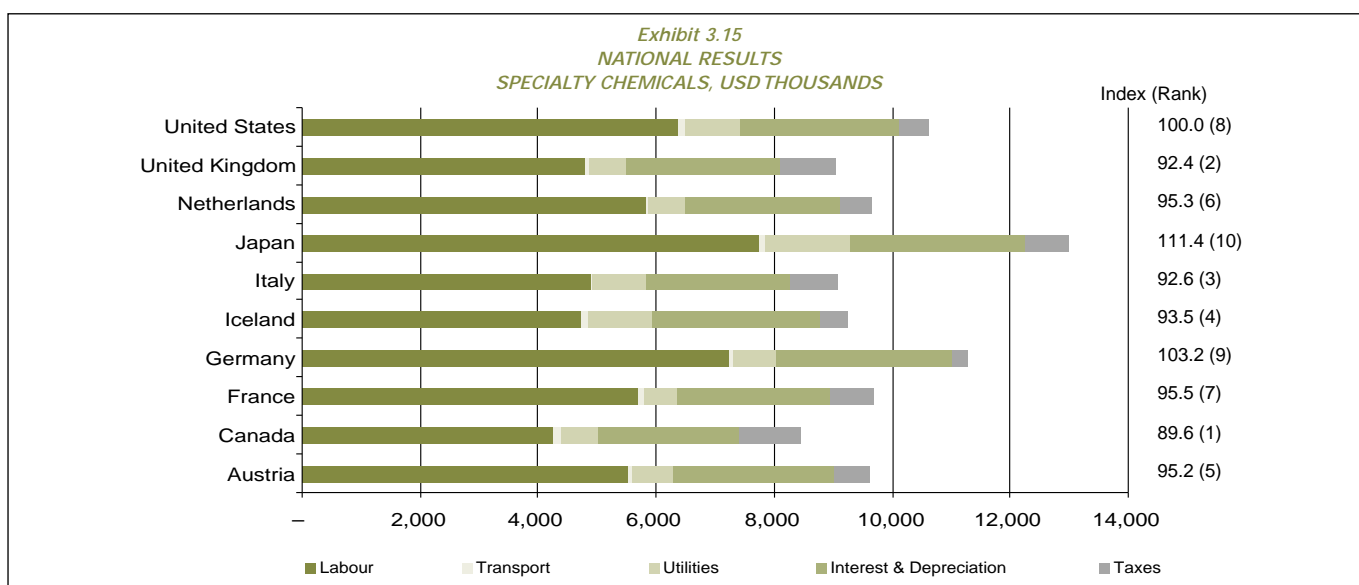
Because of lower labour costs and an abundance of natural gas, Canada (1) has a significant cost advantage over the closely ranked United Kingdom (2) and Italy (3). Iceland (4) ranks fourth, as its utilities costs compare unfavourably with those of the cost leaders. Austria (5), the Netherlands (6), and France (7) have similar total cost structures, between four and five percent below the US benchmark. The United States (8) has a cost advantage over Germany (9) because of lower labour costs. Japan (10) has the highest labour and utilities costs among the countries examined.

7.2. Leading cities

Exhibit 3.16 profiles the results for selected lower-cost cities, by country, from among the 87 cities featured in this report.

Exhibit 3.16
RESULTS FOR SELECTED CITIES
7. SPECIALTY CHEMICALS

Country	City	Index	Rank among 87 cities
Austria	Graz	94.9	31
	Linz	94.9	32
France	Mulhouse	94.4	29
	Grenoble	95.5	36
Germany	Chemnitz	97.7	47
	Darmstadt	105.6	77
Iceland	Reykjavik	93.5	28
Italy	Catania	91.2	13
	Napoli	91.4	14
	Livorno	92.3	20
Netherlands	Zolle Region	95.1	33
	Maastricht-Heerlen Region	95.2	34
United Kingdom	Tilburg	95.2	35
	Telford	92.0	16
	Plymouth	92.1	17
Canada	Edmonton	87.3	1
	Halifax	87.4	2
	Moncton	88.1	3
	Boise	97.0	43
United States	San Juan	91.5	15
	Dothan	96.1	39
	Cape Girardeau	96.5	40
	Sioux Falls	96.6	42
	Hamamatsu	108.6	82
Japan	Fukuoka	108.4	81
	Hamamatsu	108.6	82



B. Research & Development

1. Biomedical R&D

This type of operation is a clinical facility dedicated to the development and testing of biomedical products and procedures. This operation would typically develop products such as prescription drugs, non-prescription drugs, and medical devices, as well as performing clinical trials.

The specific operation modelled consists of 66 employees and is located in a leased suburban Class A office facility of 45,000 square feet (4,180 m²). The operation is knowledge-intensive, and its work force profile is heavily weighted towards scientific and professional staff. The facility is assumed to operate as a division of a pharmaceutical or medical devices firm. It is treated as a cost centre, with revenue allocated to the company on a "cost plus 10 percent" basis. Lease costs are relatively important because of the amount of floor space that is required per employee to accommodate labs and testing areas, in addition to individual offices for most staff.

1.1. National results

As is illustrated in Exhibit 3.17, labour and facility lease costs represent the two chief cost factors for this operation. Cost levels are dramatically different among countries because of the large differences in salaries for scientific and professional positions in each country.

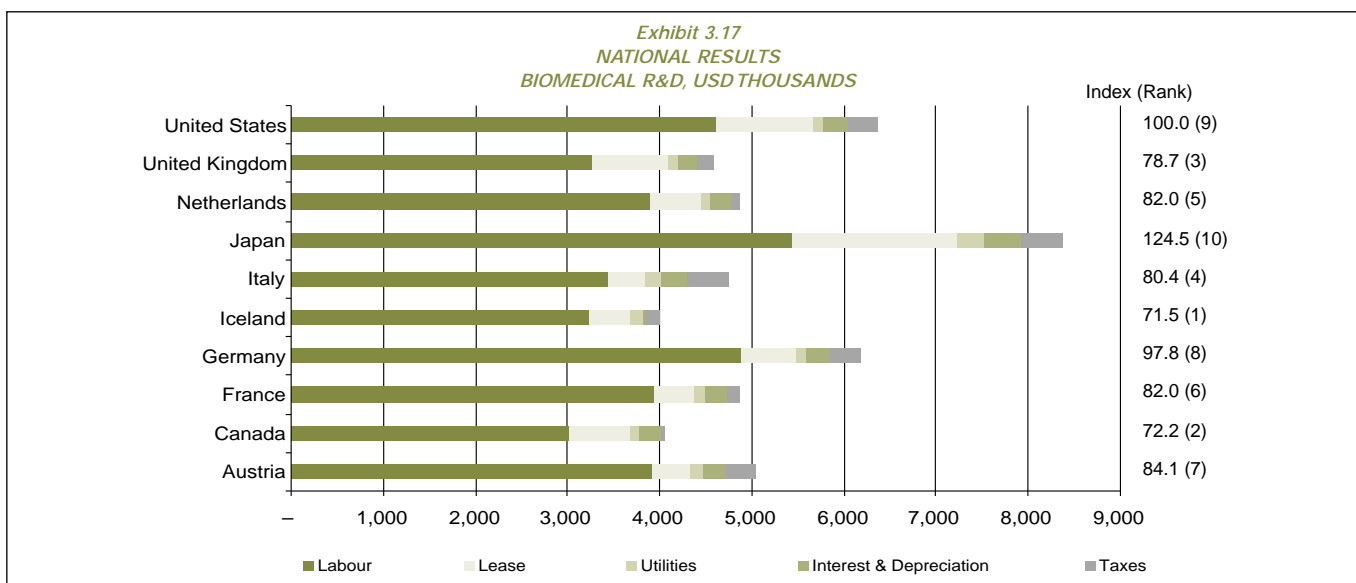
Iceland (1) is the cost leader for this operation, especially due to low labour costs and low cost of office lease, while Canada (2) has lower labour costs than the United Kingdom (3). Italy (4) has higher labour costs than the UK, but these are partly offset by low office lease costs. Similar labour costs in the Netherlands (5) and France (6) result in their being closely ranked. Austria (7) has a cost advantage of approximately 14 percent over Germany (8), while Germany's lower lease costs provide it with a modest cost advantage over the United States (9). Costs in Japan (10) reflect both high labour and lease costs.

1.2. Selected cities

Exhibit 3.18 profiles the results for selected cities from among the 87 cities featured in this report. All of these cities are home to firms with significant operations in biomedical and related research fields.

Exhibit 3.18
RESULTS FOR SELECTED CITIES
1. BIOMEDICAL R&D

Country	City	Index	Rank among 87 cities
Austria	Wien	85.8	37
France	Toulouse	85.6	36
Germany	Düsseldorf	105.7	73
Iceland	Reykjavik	71.5	1
Italy	Torino	81.4	22
	Vicenza	81.4	23
Netherlands	Maastricht-Heerlen Region	82.4	28
	Tilburg	81.5	24
United Kingdom	Birmingham	89.8	39
	Plymouth	80.1	20
Canada	Montreal	72.1	8
	Ottawa	76.3	15
	Saskatoon	68.7	5
	Vancouver	74.6	12
United States	Atlanta	99.2	59
	Boston	119.1	82
	Chicago	106.5	74
	Columbus	97.9	55
	Hartford	103.8	66
	Honolulu	108.8	77
	Indianapolis	95.8	49
	Minneapolis	104.2	69
	Newark	118.0	81
	Raleigh	97.0	54
	San Diego	105.5	72
	San Juan	82.5	30



2. Electronic systems development and testing

This type of operation develops and tests electronic systems and devices such as computer components or systems, telecommunications equipment, and/or electronic systems for automotive or aerospace applications.

The specific operation modelled consists of 70 employees and is located in a leased suburban Class A office facility of 45,000 square feet (4,180 m²). The operation is knowledge-intensive, and its work force profile is highly skilled, weighted towards engineering and technical positions. This facility is assumed to operate as a division of an electronics firm. It is treated as a cost centre, with revenue allocated to the company on a "cost plus 10 percent" basis.

2.1. National results

As is illustrated in Exhibit 3.19, the main distinguishing cost factors are labour and office lease costs. This operation has the greatest cost differences among countries, reflecting salary variations between countries for electrical engineering professionals and technicians.

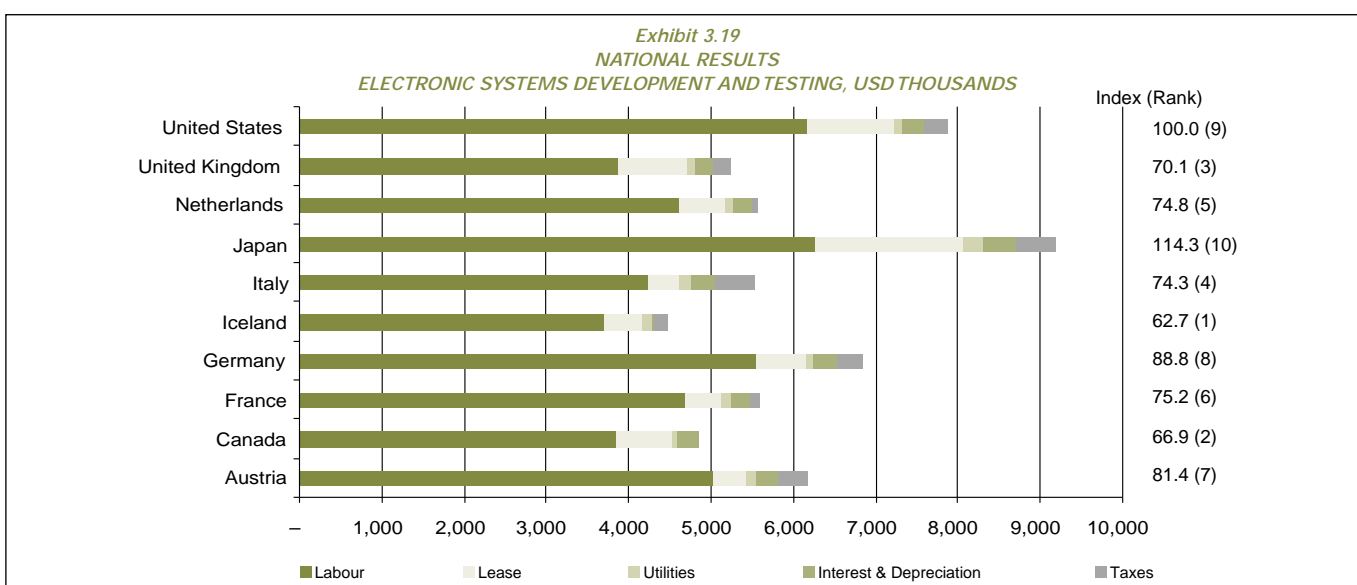
Iceland (1) has the lowest combination of labour and office lease costs. Canada (2) benefits from a favourable tax structure. The United Kingdom (3) has comparable labour costs but higher lease costs than Canada. Italy (4) has low labour costs and very low office lease costs, providing it with a cost advantage over the Netherlands (5) and France (6). Costs in Austria (7) are much lower than those in Germany (8). The United States (9) has relatively weak results for this type of operation, reflecting its current high salary levels for electronic engineers and technicians. Japan's (10) labour costs are comparable to those in the US, but its office lease costs are higher.

2.2. Selected cities

Exhibit 3.20 profiles the results for selected cities from among the 87 cities featured in this report. All of these cities are home to firms with significant electronics operations.

Exhibit 3.20
RESULTS FOR SELECTED CITIES
2. ELECTRONIC SYSTEMS DEVELOPMENT AND TESTING

Country	City	Index	Rank among 87 cities
Austria	Graz	80.7	36
France	Grenoble	74.7	27
	Toulouse	78.8	34
Germany	Darmstadt	95.3	51
	Reykjavik	62.7	4
Italy	Napoli	75.3	30
Netherlands	Groningen	74.0	22
	Zolle Region	74.3	24
United Kingdom	Edinburgh	81.5	39
	Telford	67.3	10
Canada	Calgary	69.3	13
	Kitchener-Waterloo-Cambridge	68.1	12
	Ottawa	70.7	16
	Toronto	71.7	18
	Winnipeg	64.7	8
United States	Atlanta	99.4	61
	Boston	117.9	83
	Colorado Springs	98.8	60
	Dallas-Fort Worth	109.6	80
	Oklahoma City	99.8	63
	Phoenix	100.8	64
	Portland	99.7	62
	Raleigh	97.1	57
	Salt Lake City	95.2	49
	San Diego	105.6	74
	San Jose	134.9	87
	San Juan	81.0	38
	Seattle	108.2	77
Syracuse	105.0	72	
Japan	Fukuoka	112.4	81



C. Software

1. Advanced software

This operation develops and distributes sophisticated packaged ("shrink wrap") software applications. Part of its activities includes research and development of new programming techniques, such as enhanced digital animation, digital special effects, voice recognition, and other similar cutting-edge technologies.

The specific operation modelled has 110 employees, is located in a leased suburban Class A office facility of 22,500 square feet (2,090 m²), and has annual sales of USD 15 million. The operation is knowledge-intensive, and its work force profile is weighted towards employees with very high technical software design skills. It is assumed to operate independently as a stand-alone business.

1.1. National results

As is illustrated in Exhibit 3.21, the driving cost factor is labour.

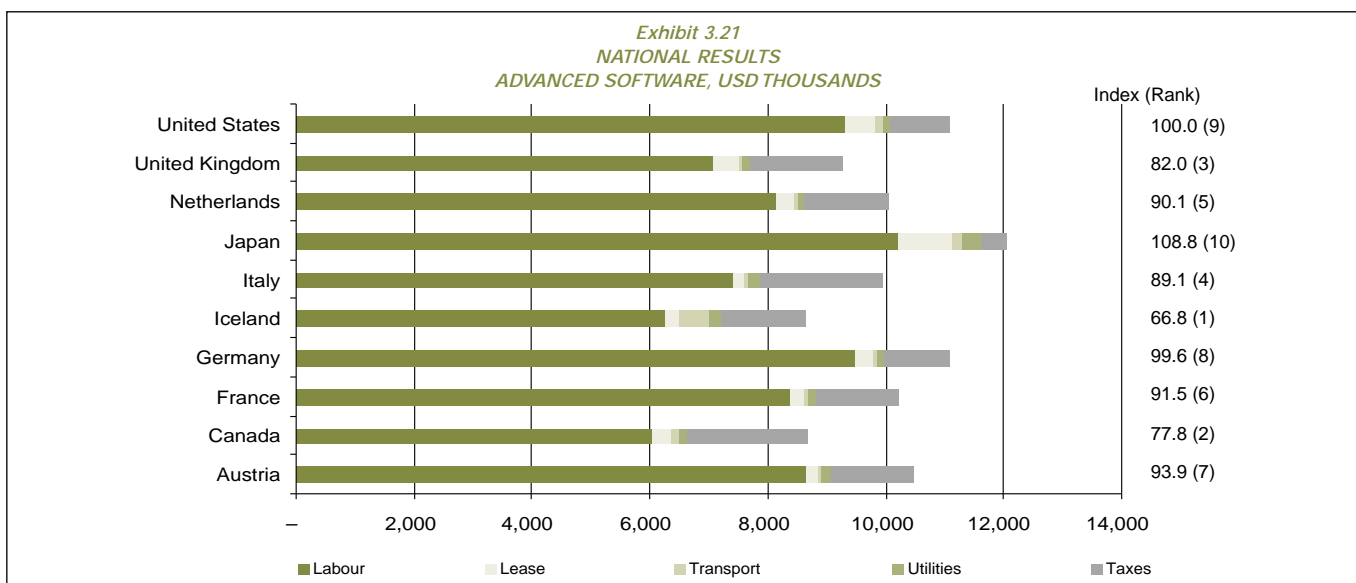
Though the two countries have similar labour costs, Iceland (1) benefits from its favourable tax structure as compared with Canada. Canada (2) has a significant cost advantage over the UK because of lower labour costs. The United Kingdom (3), in turn, has a substantial cost advantage over Italy (4), again driven by labour cost differentials. While low labour costs can be attractive for firms establishing new operations, they can also present challenges to firms in terms of retaining their best workers. This issue is particularly relevant to advanced software operations, given the highly mobile nature of - and global demand for - skilled IT professionals. The Netherlands (5), France (6), and Austria (7) have cost indices that are between 6 percent and 10 percent lower than the US. Germany (8) edges out the United States (9) because of its lower office lease costs. Japan (10) has the highest labour and lease costs among the ten countries.

1.2. Selected cities

Exhibit 3.22 profiles the results for selected cities from among the 87 cities presented in this report. All of these cities are home to firms with significant software development operations.

Exhibit 3.22
RESULTS FOR SELECTED CITIES
1. ADVANCED SOFTWARE

Country	City	Index	Rank among 87 cities
Austria	Wien	95.5	43
France	Grenoble	91.3	36
	Toulouse	93.9	39
Germany	Düsseldorf	104.8	76
Iceland	Reykjavík	66.8	1
Italy	Torino	89.6	32
Netherlands	West Holland Region	91.3	35
United Kingdom	Edinburgh	86.1	23
Canada	Montreal	78.3	9
	Toronto	80.2	15
	Vancouver	80.6	16
United States	Atlanta	99.4	58
	Boston	107.3	82
	Colorado Springs	99.0	54
	Dallas-Fort Worth	104.1	74
	New York City	116.3	87
	Northern Virginia (Metro DC)	101.3	64
	Raleigh	98.8	52
	Riverside-San Bernardino	102.5	67
	San Diego	102.2	66
	San Jose	114.8	86
Seattle	103.9	73	
Japan	Fukuoka	107.3	81
	Yokohama	112.8	84



2. Content development

This type of operation designs and develops Web and multimedia products based on existing software applications, client-supplied information, and internally developed media elements.

The specific operation modeled consists of 110 employees, is located in a leased suburban Class A office facility of 22,500 square feet (2,090 m²), and has annual sales of USD 11 million. The operation is knowledge-intensive, with the majority of its work force consisting of digital-graphics artists and junior-to-midlevel programmers. The firm is assumed to operate independently as a stand-alone business.

2.1. National results

As is illustrated in Exhibit 3.23, labour represents the dominant cost factor for this type of operation, and the overall rankings are virtually identical to the ranking for labour costs.

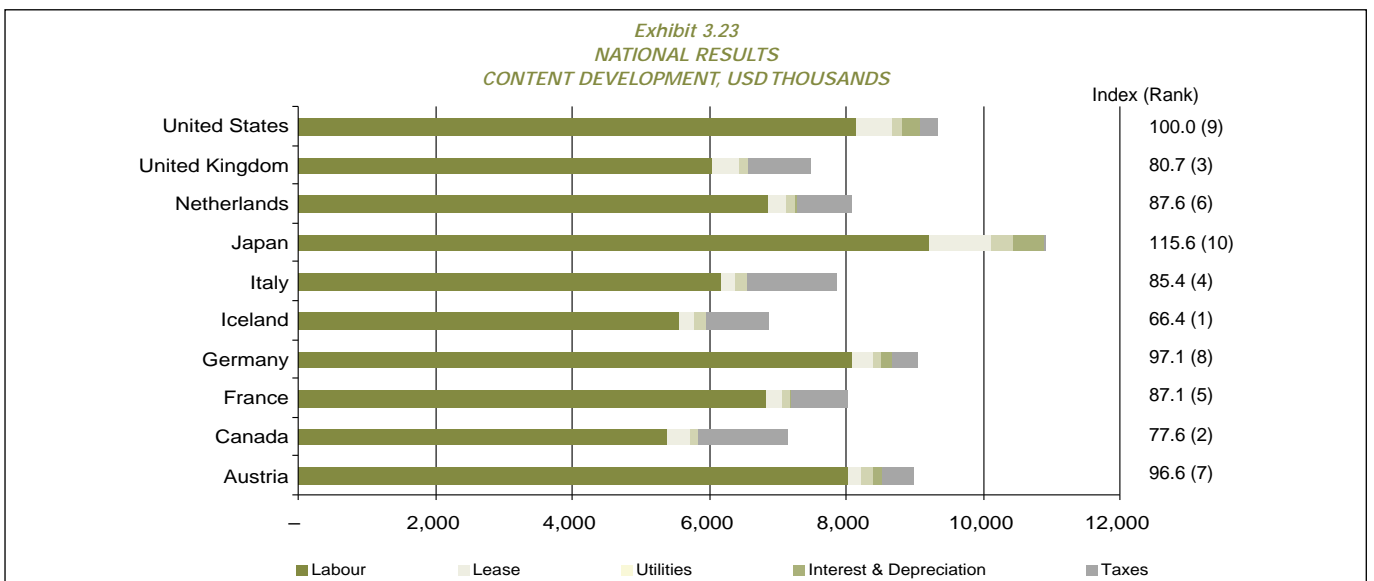
Iceland (1) is the dominant cost leader, aided particularly by its favourable tax structure, with Canada (2) second, followed by the United Kingdom (3) and Italy (4). France (5) and the Netherlands (6) are closely ranked, as are Austria (7) and Germany (8). They are followed by the United States (9) and Japan (10).

2.2. Selected cities

Exhibit 3.24 shows the results for selected cities from among the 87 cities featured in this report. All of these cities are home to firms with significant IT operations.

Exhibit 3.24
RESULTS FOR SELECTED CITIES
2. CONTENT DEVELOPMENT

Country	City	Index	Rank among 87 cities
Austria	Linz	95.5	46
	Vienna	98.5	56
France	Grenoble	87.0	32
	Toulouse	89.7	37
Germany	Düsseldorf	102.6	69
Iceland	Reykjavík	66.4	1
Italy	Torino	86.0	28
Netherlands	West Holland Region	89.0	36
United Kingdom	Edinburgh	85.5	27
Canada	Kelowna	74.8	3
	Montreal	79.0	15
	Toronto	80.5	17
	Vancouver	80.2	16
United States	Atlanta	99.2	59
	Boston	115.0	82
	Colorado Springs	98.1	55
	Dallas-Fort Worth	106.8	75
	New York City	129.1	87
	Northern Virginia (Metro DC)	101.0	64
	Raleigh	98.0	54
	Riverside-San Bernardino	102.1	68
	San Diego	101.7	65
	San Jose	128.3	86
Seattle	107.2	76	
Japan	Fukuoka	112.1	80
	Yokohama	124.7	84



D. Corporate Services

1. Shared services centre

This type of operation provides a range of "back-office" corporate services, including centralised accounting, direct customer service (e.g., call-centre service), and IT support services.

The operation modeled has 145 employees and is located in a leased suburban Class A office facility of 22,500 square feet (2,090 m²). The shared services operation is very labour-intensive, and its work force profile is primarily clerical and administrative. As a division of a large corporate group, it is assumed to operate as a cost centre and is allocated revenue on a "cost plus 10 percent" basis.

1.1. National results

As is illustrated in Exhibit 3.25, costs for this type of operation are driven mainly by wage and salary levels. Because of the relatively large work force in relation to office space and other cost factors, labour can represent more than 80 percent of location-sensitive costs.

The cost leader, Canada (1), has a significant cost advantage over the United Kingdom (2), Italy (3) and Iceland (4); this is driven by its lower labour costs. The United States (5) has its relatively strongest result in this operation, reflecting larger differences between skilled and unskilled wage levels in the US as compared to other G7 countries (see also Chapter 6).

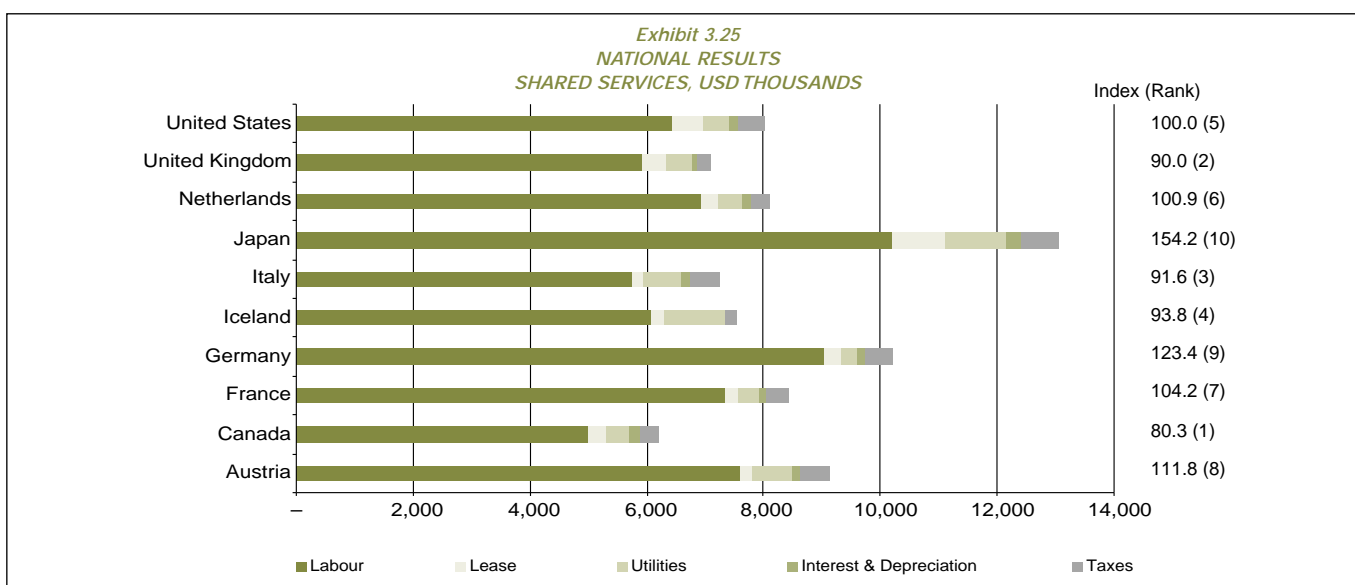
Costs for the Netherlands (6), France (7), Austria (8), and Germany (9) reflect the clerical and administrative wage levels in each country, with such positions commanding relatively more in European countries than in North America. Japan (10) has a very high cost index, reflecting relatively high clerical and administrative compensation levels.

1.2. Leading cities

Exhibit 3.26 profiles the results for selected lower-cost cities, by country, from among the 87 cities featured in this report.

Exhibit 3.26
RESULTS FOR SELECTED CITIES
1. SHARED SERVICES

Country	City	Index	Rank among 87 cities
Austria	Linz	110.0	74
	Graz	110.8	75
France	Mulhouse	100.2	49
	Grenoble	104.0	60
Germany	Chemnitz	107.3	71
	Darmstadt	131.0	83
Iceland	Reykjavik	93.8	31
Italy	Catania	86.6	15
	Napoli	89.3	19
	Livorno	89.7	20
Netherlands	Groningen	98.6	46
	Zolle Region	100.2	50
United Kingdom	Tilburg	101.2	52
	Telford	87.0	16
	Stoke-on-Trent	87.7	17
	Cardiff	90.0	21
Canada	Edmonton	73.8	1
	Halifax	74.5	2
	Moncton	75.1	3
United States	San Juan	78.7	8
	Dothan	89.0	18
	Cape Girardeau	91.2	23
	Sioux Falls	91.2	24
	Greenville-Spartanburg	93.0	28
Japan	Hamamatsu	148.7	85
	Fukuoka	150.5	86



E. Additional Operations

1. Server farms

This type of operation is an independent co-location service provider, predominantly of standard N-, but with limited N+1 (parallel) co-location space availability. Typical customers for this type of operation may include small and medium international corporations in addition to domestic customers.

The specific operation modelled represents a facility with 40 employees, is located in a suburban industrial facility of 54,000 square feet (5,020 m²), and has annual sales of USD 15 million. The operation is especially energy- and capital-intensive, and its work force profile is weighted towards skilled technicians and workers. This firm is assumed to operate independently as a stand-alone business. It is important to note that, due to its complexity, the cost of bandwidth (fibre) is not taken into account in the study.

1.1. National results

As is illustrated in Exhibit 3.27, costs for this type of operation are driven mainly by wage and salary levels, in addition to energy costs and capital requirements.

The cost leader, Iceland (1), has a decisive cost advantage over Canada (2), largely due to a favourable corporate tax structure and low energy costs. Canada, in turn, has a four percent cost advantage over the Netherlands (3). The United Kingdom (4) and France (5) have similar cost structures, while Austria (6), Italy (7), and Germany (8) rank ahead of the United States (9). Japan (10) has a very high cost index, reflecting relatively high labour and energy cost levels.

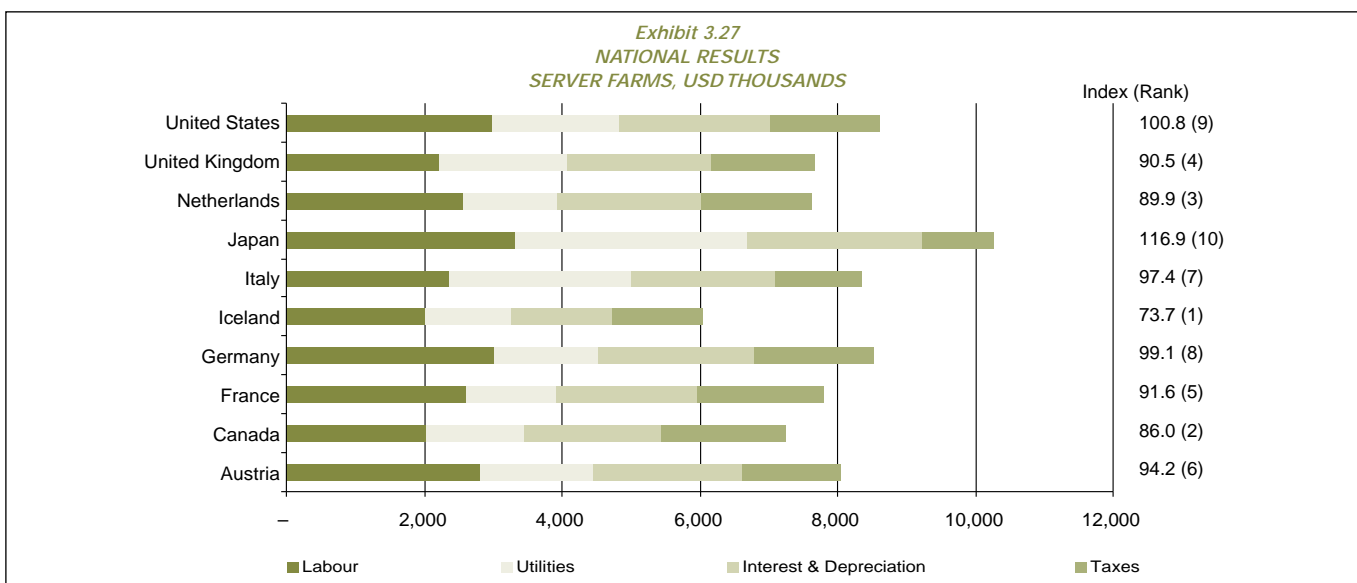
The feasibility of locating server farms in Iceland will increase with the proposed FARICE-connection between Iceland and mainland Europe, in addition to the current Cantat 3-connection, estimated in use by 2003/2004.

1.2. Leading cities

Exhibit 3.28 profiles the results for selected lower-cost cities, by country, from among the 87 cities featured in this report.

Exhibit 3.28
RESULTS FOR SELECTED CITIES
1. SERVER FARMS

Country	City	Index	Rank among 87 cities
Austria	Linz	94.4	40
	Vienna	94.0	38
France	Grenoble	91.8	27
	Toulouse	92.6	31
Germany	Düsseldorf	101.8	64
Iceland	Reykjavik	73.7	1
Italy	Torino	96.3	50
Netherlands	West Holland Region	90.6	25
United Kingdom	Edinburgh	91.8	27
Canada	Kelowna	82.5	4
	Montreal	81.7	3
	Toronto	89.9	20
	Vancouver	84.3	6
United States	Atlanta	95.9	47
	Boston	110.6	81
	Colorado Springs	96.2	49
	Dallas-Fort Worth	101.3	62
	New York City	122.7	87
	Northern Virginia (Metro DC)	98.5	56
	Raleigh	98.3	55
	Riverside-San Bernardino	122.6	86
	San Diego	95.0	43
	San Jose	107.5	78
Seattle	103.3	69	
Japan	Fukuoka	114.7	83
	Yokohama	121.0	85



2. Medical devices

KPMG's Comparative Cost Model, developed for this study, is also capable of comparing specific operations based on user-specified operating parameters. For example, a medical device manufacturing operation (as featured in previous editions of this report) focusing on prosthetics manufacturing might typically have the following operating characteristics:

- A highly skilled work force profile of 100 employees, including:
 - Six management staff;
 - Fifteen sales/administrative staff;
 - Thirty professional/technical staff;
 - Thirty-four skilled operators;
 - Twelve unskilled workers; and
 - Three sundry employees.
- Moderate electricity requirements, with 600 kVa peak demand and 160,000 kWh monthly consumption.
- Minimal natural gas requirements.
- Moderate facility requirements, with a 70,000 ft² (6,500 m²) facility located on a six-acre (2.4-hectare) site.

For this type of operation, results are as is illustrated in Exhibit 3.30. Other industries and operations may be specified and analysed by licenced users of KPMG's Comparative Cost Model, accessible at www.CompetitiveAlternatives.com.

2.1. National results

As is illustrated in Exhibit 3.29, costs for this type of operation are driven mainly by wage and salary levels, in addition to transportation costs.

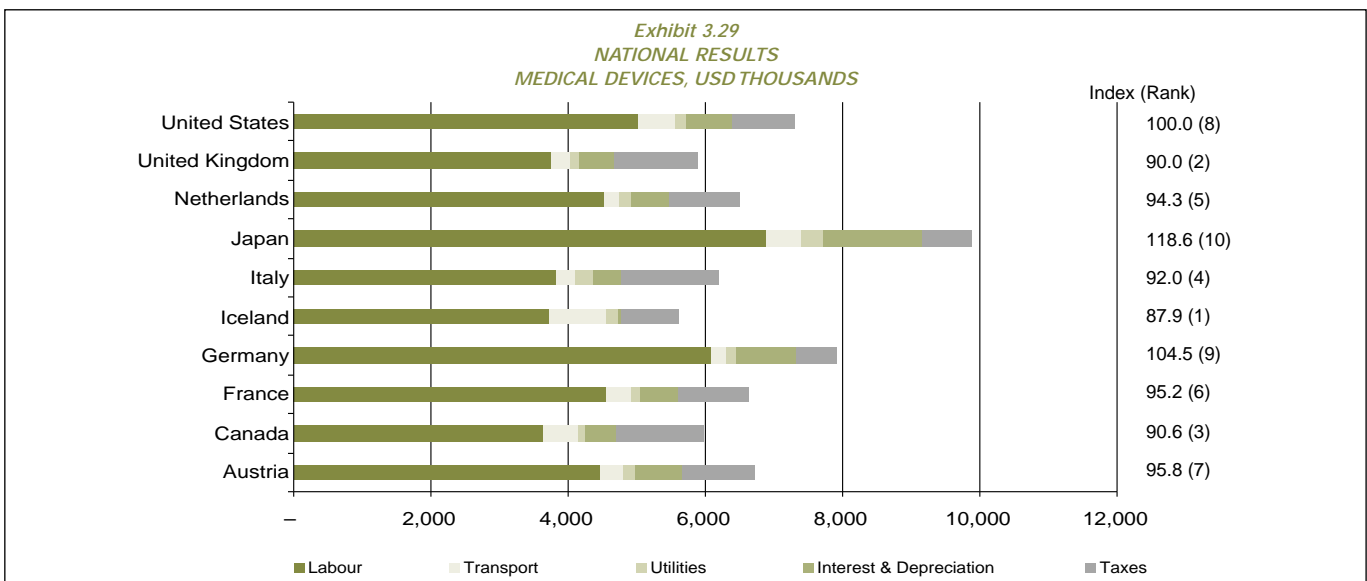
Iceland (1) is the overall cost leader because of its favourable corporate tax structure and competitive labour costs. It is closely followed by the United Kingdom (2), Canada (3), and Italy (4). The Netherlands (5), France (6), and Austria (7) are closely grouped, with higher labour costs than the cost leaders, while the US (8) and Germany (9) are less competitive. Japan (10) has the highest cost structure for most cost items.

2.2. Leading cities

Exhibit 3.30 profiles the results for selected lower-cost cities, by country, from among the 87 cities featured in this report.

Exhibit 3.30
RESULTS FOR SELECTED CITIES
2. MEDICAL DEVICES

Country	City	Index	Rank among 87 cities
Austria	Linz	93.2	28
	Graz	95.6	29
France	Mulhouse	94.1	22
	Grenoble	95.0	27
Germany	Chemnitz	99.5	54
	Darmstadt	106.4	79
Iceland	Reykjavik	87.9	2
Italy	Napoli	90.6	12
	Catania	90.9	13
	Livorno	91.7	16
Netherlands	Groningen	93.6	21
	Zolle Region	94.1	23
	Maastricht-Heerlen Region	94.3	25
United Kingdom	Telford	95.6	30
	Plymouth	96.1	31
	Cardiff	96.5	33
Canada	Quebec City	89.3	6
	Halifax	89.1	4
	Moncton	89.5	8
United States	San Juan	87.2	1
	Cape Girardeau	98.6	46
	Sioux Falls	97.2	40
	Dothan	96.5	32
	Greenville-Spartanburg	97.2	39
Japan	Fukuoka	113.9	86
	Hamamatsu	113.6	85



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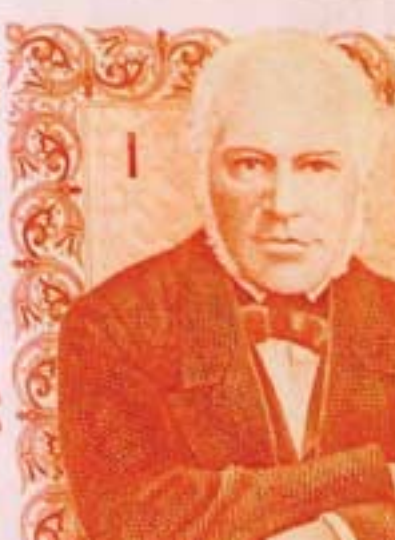


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4. Comparison of Cities

Site location decisions may differ in their geographic scope from global to strictly local. The focus of this study is to assist companies with location comparisons, both at an international level among industrialised countries and at a regional level within those countries.

Whether the search is international or regional in scope, there is often a trade-off between larger cities, with deeper labour pools and better support infrastructure, and smaller cities, which tend to have lower labour and facility costs. This chapter presents results by city, first considering all 87 cities on a regional basis and then examining the larger international cities.

Maps showing the locations of all 87 cities can be found online at www.CompetitiveAlternatives.com.

A. Europe

1. Iceland

Iceland (population 290,000) is much smaller than any of the other countries to which it is compared, and Reykjavik is much smaller than most of the cities used to determine national costs indices in the Competitive Alternatives project. Given that there is a general tendency for smaller communities to have lower cost characteristics than do larger communities, this may introduce a slight cost bias (less than 1%) in favour of Iceland.

*Exhibit 4.1
RESULTS BY SIZE OF CITY, ICELAND*

	Population		
	100,000 to 500,000	500,000 to 1.5 million	Over 1.5 million
Reykjavik	87.0	n/a	n/a

1.1. Population 100,000 to 500,000

With a metropolitan area of approximately 180,000, Reykjavik (87.0) is among the smaller cities included in this research project. Energy costs and cost of land, in addition to generally low labour costs, are among Reykjavik's main strengths, further reinforced by a favourable corporate tax structure in Iceland. On the other hand, transport and construction costs are high in Reykjavik. Overall, Reykjavik has a very attractive cost structure compared to any European, North American, or Japanese cities. It has low costs for professional and technical staff, due in part to the presence of one major university and several smaller universities and colleges in the city. Reykjavik is therefore particularly attractive for labour-intensive knowledge-based operations with limited transportation costs.

1.2. Population 500,000 to 1.5 million

Because of Iceland's small population, no cities fall into this size category.

1.3. Population over 1.5 million

Because of Iceland's small population, no cities fall into this size category.

2. United Kingdom

Results for eight United Kingdom cities are illustrated in Exhibit 4.2. These cities all have cost indices ranging from 85.4 to 90.7, which compare very favourably with the range for cities in continental Europe (87.8 to 105.7). Low costs for skilled and unskilled labour are a key advantage for all UK cities.

2.1. Population 100,000 to 500,000

Among the five smaller cities examined, the West Midlands cities of Telford (86.4) and Stoke-on-Trent (86.9) are the cost leaders. These cities are closely followed by Cardiff (87.7) and Plymouth (87.7). All four of these cities have very similar total costs, with cost index ratings within a range of just 1.4 percent. The Scottish city of Edinburgh (90.7) has higher transportation costs than the southern English and Welsh cities examined. However, Edinburgh, with a population of 450,000, is the largest city in this group and has a significantly larger labour pool than the other cities it is grouped with. Edinburgh's costs are also lower than those in most comparably sized cities in continental Europe.

2.2. Population 500,000 to 1.5 million

Birmingham and Glasgow are closely ranked, with cost indices of 89.3 and 89.7 respectively. Birmingham, with good ground and air transportation links, is particularly strong in operations where transportation represents a significant cost factor. Glasgow, on the other hand, has its lowest costs in operations that rely on skilled labour to produce products for which transportation costs are a relatively small part of overall costs.

2.3. Population over 1.5 million

Manchester (88.9), the largest UK city examined, also has a very attractive cost structure, both within the UK and in comparison to continental European cities. Its labour costs are very competitive for a city of its size, and it has moderately low office lease costs as compared to the other main UK cities.

*Exhibit 4.2
RESULTS BY SIZE OF CITY, UNITED KINGDOM*

	Population				
	100,000 to 500,000	500,000 to 1.5 million	Over 1.5 million		
Edinburgh	90.7	Glasgow	89.7	Manchester	88.9
Plymouth	87.7	Birmingham	89.3		
Cardiff	87.7				
Stoke-on-Trent	86.9				
Telford	86.4				

3. Continental Europe

The results for cities in continental Europe are illustrated in Exhibit 4.3. Results for individual cities are generally consistent with those of their country, with a few exceptions as noted.

3.1. Population 100,000 to 500,000

Eight of the 19 continental European cities examined in this study have populations of less than 500,000, reflecting the significance of smaller regional centres in Europe. Total "metro" populations for these cities may exceed 500,000, but this is difficult to determine because of the lack of statistically defined metropolitan areas in most European countries.

Among the smaller cities, the cost leaders are the northern Italian cities of Livorno (88.6) and Vicenza (90.0). This result is driven by low salary and wage costs, as well as moderately low costs for most other key components. Costs are slightly higher in the French communities of Mulhouse (90.8) and Grenoble (92.0), which are followed by the Austrian cities of Linz (93.3) and Graz (93.6). Due to significantly lower labour and facility costs, Chemnitz (95.2) in eastern Germany has a cost index that is nearly 10 percent lower than the western German city of Darmstadt (104.6).

3.2. Population 500,000 to 1.5 million

Of the five mid-sized cities studied, the southern Italian city of Catania (87.8) is the cost leader. Catania also has the lowest cost index among all continental European cities examined in this study. Among all cities featured in this report, Catania has the lowest salary, wage, and office lease costs, and the second-lowest industrial construction costs. The three Netherlands locations of Groningen (90.2), Zwolle Region (90.8), and Maastricht-Heerlen Region (91.1) have very closely ranked cost structures. Costs in these cities are similar to those in Mulhouse, the lowest-cost French city, and well below the costs of any of the German cities examined. Toulouse (94.3) has moderate costs, about seven percent higher than in Catania and approximately two to four percent higher than the smaller French cities of Grenoble and Mulhouse, but lower than any of the three German cities examined.

Exhibit 4.3
RESULTS BY SIZE OF CITY/REGION, CONTINENTAL EUROPE

Population					
100,000 to 500,000		500,000 to 1.5 million		Over 1.5 million	
Darmstadt, DE	104.6	Toulouse, FR	94.3	Düsseldorf, DE	105.7
Chemnitz, DE	95.2	Maastricht-Heerlen Region, NL	91.1	Wien, AT	94.8
Graz, AT	93.6	Zwolle Region, NL	90.8	West Holland Region, NL	91.9
Linz, AT	93.3	Groningen, NL	90.2	Tilburg, NL	90.9
Grenoble, FR	92.0	Catania, IT	87.8	Torino, IT	89.7
Mulhouse, FR	90.8			Napoli, IT	88.3
Vicenza, IT	90.0				
Livorno, IT	88.6				

3.3. Population over 1.5 million

Consistent with national results, the Italian cities of Napoli (88.3) and Torino (89.7) are the cost leaders among larger cities, followed closely by the Netherlands' Tilburg Region (90.9). The West Holland Region (91.9) (representing The Hague and nearby cities) is fourth among the larger cities examined, with costs slightly higher than those in the other Netherlands cities. Business costs in Wien (94.8) are relatively low given its size and proximity to major German markets. Wien's cost index is approximately 10 percent lower than that of Darmstadt or Düsseldorf. Costs in Düsseldorf (105.7) are the highest among the European cities examined, reflecting western Germany's relatively high cost structure. Costs in both of the western German cities examined (Darmstadt and Düsseldorf) are approximately five to six percent above the US benchmark.

B. North America

1. New England/Atlantic

Results for Boston and the five cities examined in this region are shown in Exhibit 4.4.

Boston has been grouped in the "Northeast US/Canada" region in this study due to its size and the nature of its economy, and because the "obvious" comparison cities for Boston include New York City, Philadelphia, and Toronto. However, it also represents the largest metropolitan centre in the New England area and thus has been included here for comparative purposes.

1.1. Population 100,000 to 500,000

Costs in two Canadian cities, Halifax (84.5) and Moncton (85.3), are among the lowest in North America. Moncton is particularly cost-competitive in labour-intensive operations such as manufacturing and corporate services. Halifax is particularly competitive for knowledge-based operations. In New England, Lewiston (99.4) has costs nearly two percentage points below the US benchmark and has the fourth lowest land costs among all cities examined in this study. Burlington (100.0) has costs marginally below the US benchmark, with a cost structure only slightly higher than that in Lewiston. Both Burlington and Lewiston are most cost-competitive in operations where transportation and utilities costs are relatively less significant.

1.2. Population over 500,000

Hartford (103.0) has the highest cost index of the cities grouped in this region, with costs almost three percent above the US baseline. However, costs in Hartford are still well below those of Boston (107.6), where costs are significantly higher than the US baseline.

Exhibit 4.4
RESULTS BY SIZE OF CITY, NEW ENGLAND/ATLANTIC

Population					
100,000 to 500,000		500,000 to 1.5 million		Over 1.5 million	
Burlington, VT	100.0	Hartford, CT	103.0	Boston, MA	107.6
Lewiston, ME	99.4				
Moncton, NB	85.3				
Halifax, NS	84.5				

2. Northeast US/Canada

This region has the greatest population concentration in both the United States and Canada and is represented by 16 cities in this study. Results for these cities are shown in Exhibit 4.5.

2.1. Population 100,000 to 500,000

Costs in the Canadian metro area of Kitchener-Waterloo-Cambridge (86.2) are much lower than those in any of the US cities in this region and are 14.3 percent below the US benchmark. Lexington (96.8) has the lowest cost index of all US cities in this region, with the lowest labour, office lease, electricity, and property tax costs among the US cities examined in this region. Saginaw's (99.7) cost index is marginally below the US benchmark, but it represents a relatively low-cost location in this region, where average costs tend to be well above the US national benchmark.

2.2. Population 500,000 to 1.5 million

Consistent with national results, the two Canadian cities of Quebec City (83.7) and Ottawa (86.6) both have cost structures significantly below their US counterparts. In the US, costs in the Scranton-Wilkes Barre-Hazleton metro area (100.9) are slightly higher than the US benchmark, but they are nonetheless lower than the majority of US cities in this region. Costs in Syracuse (103.8) are above the US benchmark but approximately on par with results for the US cities examined in this region. Syracuse has the lowest land costs among the US cities examined in this region, while Scranton has the lowest construction costs. Both cities have quite low property tax costs. Scranton and Syracuse are both located inland but within reasonable proximity of major east coast cities such as New York, Philadelphia, and Boston. This proximity to major markets, coupled with significantly lower costs, makes Scranton and Syracuse particularly cost-competitive in manufacturing operations that need to be situated close to major customers in these large cities.

2.3. Population over 1.5 million

The Canadian cities of Montreal (85.4) and Toronto (88.4) have significantly lower costs than their US counterparts, with low costs for labour, construction, office leasing, and corporate taxes driving the advantage.

Exhibit 4.5
RESULTS BY SIZE OF CITY, NORTHEAST US/CANADA

Population					
100,000 to 500,000		500,000 to 1.5 million		Over 1.5 million	
Saginaw, MI	99.7	Syracuse, NY	103.8	New York, NY	115.7
Lexington, KY	96.8	Scranton-Wilkes Barre-Hazleton, PA	100.9	Newark, NJ	110.1
Kitchener-Waterloo-Cambridge, ON	86.2	Ottawa, ON	86.6	Boston, MA	107.6
		Quebec City, QC	83.7	Philadelphia, PA	106.5
				Northern Virginia (Metro DC), VA	100.6
				Columbus, OH	98.3
				Indianapolis, IN	97.2
				Toronto, ON	88.4
				Montreal, QC	85.4

In the United States, the lowest-cost major cities are Indianapolis (97.2) and Columbus (98.3), with costs approximately two to three percent below the US benchmark and well below costs in most other major US cities in this region. Both cities represent major distribution hubs, and they have the lowest transportation costs among the US cities examined in this region. Costs for Northern Virginia (Metro DC) (100.6) are close to the US benchmark and are significantly lower than for the other major eastern seaboard cities examined in this study.

Cost structures in Philadelphia (106.5) and Boston (107.6) are significantly higher than the US benchmark, due to labour and facility costs that are well above the US average. Newark (110.1) and New York City (115.7) have very high cost indices, reflecting the position of these two cities within the largest metropolitan area in the United States.

3. Southeast US

Exhibit 4.6 illustrates the results for the seven cities examined in the Southeast US. The Southeast represents the lowest-cost region within the United States, and all of the cities examined have costs lower than the US benchmark index.

3.1. Population 100,000 to 500,000

Dothan (94.4) has the lowest costs among the 42 continental US cities examined. Dothan's overall cost structure reflects its low labour costs, as well as very low land, office lease, and property tax costs. Like most other cities in this region, significant economic development tax incentives also contribute to low overall costs for this city.

3.2. Population 500,000 to 1.5 million

Among medium-sized cities, Greenville-Spartanburg (95.5) is the cost leader, with the lowest construction and electricity costs, as well as the second-lowest land costs and effective income tax rate among the cities in this region. Results for Nashville (97.5) and Jacksonville (98.0) are very similar, with Nashville's central location relative to the East and Midwest US giving it the lowest transportation costs of all cities in the region. Costs in Raleigh (98.7) are slightly higher than those in all other cities in this region, reflecting the higher facility and labour costs associated with the large high-tech industry located there. Overall, however, costs in Raleigh are still below US benchmark costs.

Exhibit 4.6
RESULTS BY SIZE OF CITY, SOUTHEAST US

Population					
100,000 to 500,000		500,000 to 1.5 million		Over 1.5 million	
Dothan, AL	94.4	Raleigh, NC	98.7	Atlanta, GA	98.2
		Jacksonville, FL	98.0	San Juan, PR	88.9
		Nashville, TN	97.5		
		Greenville-Spartanburg, SC	95.5		

3.3. Population over 1.5 million

San Juan, Puerto Rico (88.9) has by far the lowest cost index among the US cities examined. San Juan's labour costs are almost 20 percent lower than those in second-ranked Dothan and more than 27 percent below the US average. In addition, businesses locating in Puerto Rico are generally exempt from US federal income tax, and companies established to serve customers outside Puerto Rico are eligible for very favourable rates and abatements on most Puerto Rican taxes. These savings are partially offset in operations where product transportation requirements are significant. However, the freight transportation infrastructure between Puerto Rico and the US mainland is well developed and remarkably cost effective. Despite its Caribbean location, San Juan's transportation costs are only 30 percent above the US average. Atlanta (98.2), the largest city in the Southeast US, has a cost index that is significantly lower than that of comparably sized cities located elsewhere in the United States.

4. Midwest US/Canada

Results for the 17 cities examined in the North American Midwest are shown in Exhibit 4.7.

4.1. Population 100,000 to 500,000

Costs in Saskatoon (85.4) are about 11 percent below those in comparable US locations, due primarily to lower Canadian labour costs. In the US, Sioux Falls (96.1) and Cape Girardeau (96.3) are very closely ranked, with the lowest labour costs among the US cities in this region. Cape Girardeau's costs for industrial land are the lowest among all cities examined in this study. Sioux Falls' cost position is assisted by low overall corporate taxes, with no state income tax and the lowest property taxes among all cities in this region. Cedar Rapids (97.8) is only slightly more expensive than these two cities, and it benefits from the second-lowest land prices and the lowest office lease costs among US cities examined in this region.

Exhibit 4.7
RESULTS BY SIZE OF CITY, MIDWEST US/CANADA

Population					
100,000 to 500,000		500,000 to 1.5 million		Over 1.5 million	
Cedar Rapids, IA	97.8	Oklahoma City, OK	99.3	Houston, TX	104.9
Cape Girardeau, MO	96.3	Colorado Springs, CO	98.9	Dallas-Ft. Worth, TX	103.1
Sioux Falls, SD	96.1	Wichita, KS	99.3	Minneapolis, MN	102.3
Saskatoon, SK	85.4	Salt Lake City, UT	97.6	Chicago, IL	102.0
		Winnipeg, MB	86.2	St. Louis, MO	101.3
		Calgary, AB	85.5	Phoenix, AZ	100.1
		Edmonton, AB	83.3		

4.2. Population 500,000 to 1.5 million

The Canadian Midwest cities of Edmonton (83.3), Calgary (85.5), and Winnipeg (86.2) all have costs significantly lower than those of their US counterparts. Natural gas costs are particularly low in Edmonton and Calgary, which also have no provincial sales tax and the lowest effective corporate income tax rates among all cities in this region. In the United States, Salt Lake City (97.6) is the cost leader among the mid-sized cities. Its benefits include the lowest electricity and gas costs among US cities in this region and the lowest labour costs from among this region's mid-sized US cities. Closely ranked Wichita (99.3), Colorado Springs (99.1), and Oklahoma City (99.3) all have cost structures marginally below the US benchmark. Their results are attributable to moderate costs across all cost factors rather than to any single cost component.

4.3. Population over 1.5 million

The six large US cities in this region all have cost structures at or above the US benchmark. Phoenix (100.1) has labour costs slightly below the US average and offers the lowest industrial construction costs among the US cities in this region, but it also has the highest property taxes in the region. St. Louis (101.5) and Chicago (101.9) offer costs that are very competitive for cities of their size. St. Louis benefits from moderate labour costs, and Chicago has the lowest transportation costs among all cities in this region. While Minneapolis (102.6), Dallas-Fort Worth (103.3), and Houston (105.0) have the highest costs in the region, costs in each of these large cities are within five percent of the US benchmark. They are also lower than those for large cities in the Northeast US and are comparable with, or lower than, those for large cities in the Pacific US region.

5. Pacific

Costs in both US and Canadian cities in the Pacific region tend to be relatively higher than those in other regions of each respective country. Results for these cities are illustrated in Exhibit 4.8.

5.1. Population 100,000 to 500,000

In Canada, Kelowna (84.9) has a very low cost index, particularly for operations with relatively high requirements for skilled labour. Kelowna ranks as the second-lowest cost location among the 87 cities examined for content development and electronic testing operations, both of which are represented in that city's developing high-tech industry. Boise (97.3) is another smaller Pacific region city that has made a name for itself in the high-tech industry. Boise has the lowest cost structure among US cities in the Pacific region, reflecting its modest size and its inland location.

5.2. Population 500,000 to 1.5 million

Honolulu (115.6), the only city in this category, has the highest cost index among all US cities. Honolulu's costs are generally above average in terms of labour, facilities, transportation, and energy. Honolulu's greatest competitive strengths are in knowledge-intensive operations such as software development, where lifestyle advantages may assist in recruiting and retaining top talent.

5.3. Population over 1.5 million

In Canada, Vancouver (88.2) has a cost advantage of more than 12 percent over comparable Pacific US cities. This advantage is primarily due to lower labour, electricity, and natural gas costs. In the US, Portland (100.5) is the cost leader, with costs just above the US benchmark. The absence of state sales tax in Oregon helps give Portland an edge over other Pacific US cities.

Three California cities, San Diego (101.7), Sacramento (103.3), and Riverside-San Bernardino (105.0) are closely ranked, all within 5 percent of the US benchmark and within about 3 percent of each other. Wide variations exist in electricity rates among the Californian cities because major utilities in each location are at different stages in the deregulation process. This issue affects the relative rankings of these three cities, which in most other regards have quite comparable costs. Costs in Las Vegas (101.7) are similar to those in most of the Californian cities examined. Firms in many industries have found Las Vegas attractive in recent years due to a work force accustomed to 24/7 operations, no state income taxes, and the lowest property taxes among US cities examined in this region. However, these cost advantages are offset by labour costs that are moderately high by US standards, although similar to those in most other cities in the Pacific US region.

Seattle (105.7) has a higher cost index than the Southern Californian cities, while San Jose (115.5) has one of the highest business cost structures in the United States. In both cases, these high costs are due to high real estate costs and salary levels for skilled IT professionals. As home to Microsoft and Intel respectively, these cities have leading positions in the US high-tech industry, which makes them appealing despite their high cost structures.

*Exhibit 4.8
RESULTS BY SIZE OF CITY, PACIFIC*

Population					
100,000 to 500,000		500,000 to 1.5 million		Over 1.5 million	
Boise, ID	97.3	Honolulu, HI	115.6	San Jose, CA	114.3
Kelowna, BC	84.9			Seattle, WA	105.4
				Riverside-San Bernardino, CA	105.0
				Sacramento, CA	103.3
				Las Vegas, NV	103.0
				San Diego, CA	101.7
				Portland, OR	100.5
				Vancouver, BC	88.2

C. Japan

Results for the three Japanese cities examined are illustrated in Exhibit 4.9.

1.1. Population 100,000 to 500,000

Because of Japan's extremely high population density, no cities examined fall into this size range.

1.2. Population 500,000 to 1.5 million

While Fukuoka (114.0) and Hamamatsu (113.9) have costs well above the US benchmark, their cost indices are actually lower than those of higher-cost US cities such as Honolulu, San Jose, and New York City. These cities are most cost-competitive with the US in non-manufacturing operations that require a knowledge-based work force, such as advanced software development. Labour costs in these Japanese cities for these types of operations are actually lower than those in San Jose, California.

1.3. Population over 1.5 million

Yokohama (125.5) has the highest cost index among the cities studied, reflecting both the generally high cost of business operations in Japan and, particularly, Yokohama's proximity to Tokyo. As is the case for Fukuoka and Hamamatsu, Yokohama is most cost-competitive in advanced software.

*Exhibit 4.9
RESULTS BY SIZE OF CITY, JAPAN*

Population				
100,000 to 500,000	500,000 to 1.5 million		Over 1.5 million	
n/a	Fukuoka	114.0	Yokohama	125.5
	Hamamatsu	113.9		

D. Results for Large International Cities

Business costs in smaller cities tend to be lower than those in larger cities, due to lower wage, salary, land, and office lease costs. However, many operations still prefer to locate in larger cities to gain benefits such as:

- Access to a larger and more highly skilled work force.
- Access to universities and other educational resources.
- Proximity to clusters of customers, suppliers, and competitors.
- Access to major ports, airports, and other transportation infrastructure.
- Greater ability to relocate and recruit senior management personnel.

Chapter 5 contains further discussion of these and other non-cost-related factors that may influence a company's relocation decision.

The 26 largest cities featured in this study all have an estimated metropolitan/regional population of at least two million people within easy commuting distance. These cities may be of particular interest to large companies conducting international site searches, particularly to include high-tech companies that tend to seek many of the advantages outlined above. Index results for these cities are illustrated in Exhibit 4.10.

The cities with the highest costs - Yokohama, New York, San Jose, and Newark - represent some of the largest metropolitan areas examined in this study. Costs for the "smaller" metropolitan areas (i.e., closer to the two million cut-off for this listing) tend to be lower than those in the largest centres.

Exhibit 4.10
RESULTS FOR LARGE INTERNATIONAL CITIES

City	Country	Region	Cost Index
Yokohama	Japan		125.5
New York	United States	Northeast	115.7
San Jose	United States	Pacific	114.3
Newark	United States	Northeast	110.1
Boston	United States	Northeast	107.6
Philadelphia	United States	Northeast	106.5
Düsseldorf	Germany		105.7
Seattle	United States	Pacific	105.4
Riverside-San Bernardino	United States	Pacific	105.0
Houston	United States	Midwest	104.9
Dallas-Fort Worth	United States	Midwest	103.1
Minneapolis	United States	Midwest	102.3
Chicago	United States	Midwest	102.0
San Diego	United States	Pacific	101.7
St. Louis	United States	Midwest	101.3
Northern Virginia	United States	Northeast	100.6
Phoenix	United States	Midwest	100.1
Atlanta	United States	Southeast	98.2
Wien	Austria		94.8
West Holland Region	Netherlands		91.9
Torino	Italy		89.7
Birmingham	United Kingdom		89.3
Manchester	United Kingdom		88.9
Toronto	Canada	Northeast	88.4
Vancouver	Canada	Pacific	88.2
Montreal	Canada	Northeast	85.4

E. Detailed City Results, by Business Operation

Exhibit 4.11 contains the detailed index results for all 87 featured cities, by region, for each of the 14 business operations examined in this study. Further detailed results for each city, by cost component, are also available online at www.CompetitiveAlternatives.com.

Exhibit 4.11
CITY RESULTS BY REGION - EUROPE AND JAPAN

	Manufacturing							R&D		Software		Corp. services		Additional operations		Overall average 14	Rank
	Metal comp.	Plastic products	Food processing	Electronics assembly	Precision comp.	Pharmaceuticals	Specialty chemicals	Biomedical R&D	Elec.syst. testing	Advanced software	Content developm.	Shared services	Medical devices	Server farms			
CONTINENTAL EUROPE																	
Austria																	
Graz	91.0	91.1	93.4	95.4	90.7	95.2	94.9	83.4	80.7	93.3	95.9	110.8	95.6	94.4	93.6	37	
Linz	90.7	90.5	93.2	95.2	90.4	95.0	94.9	83.0	80.2	92.9	95.4	110.0	95.3	94.2	93.3	36	
Wien	91.6	91.2	93.6	96.6	92.5	96.1	95.7	85.8	83.4	95.5	98.5	114.7	96.6	94.0	94.8	40	
France																	
Grenoble	90.5	89.9	93.9	95.2	89.5	95.2	95.5	81.6	74.7	91.3	87.0	104.0	95.0	91.8	92.0	35	
Mulhouse	90.2	89.8	93.5	94.4	87.9	94.3	94.4	79.0	72.0	89.2	84.7	100.2	94.1	90.5	90.8	30	
Toulouse	93.3	93.5	95.8	96.8	92.0	96.5	96.5	85.6	78.8	93.9	89.7	108.3	96.6	92.6	94.3	38	
Germany																	
Chemnitz	96.6	95.6	96.9	100.5	96.8	99.0	97.7	83.6	74.4	89.5	86.6	107.3	99.5	95.3	95.2	41	
Darmstadt	102.9	101.5	100.6	107.6	104.9	104.8	105.6	104.2	95.3	104.4	102.0	131.0	106.4	100.1	104.6	74	
Düsseldorf	104.3	103.9	101.2	109.5	106.3	105.7	106.4	105.7	96.7	104.8	102.6	131.8	107.6	101.8	105.7	78	
Italy																	
Catania	87.6	89.4	92.0	89.6	82.9	91.1	91.2	76.0	69.9	86.5	82.2	86.6	90.9	92.4	87.8	17	
Livorno	87.2	87.7	91.2	90.7	83.6	91.7	92.3	78.5	72.4	88.1	84.2	89.7	91.7	94.4	88.6	21	
Napoli	86.3	87.2	90.8	90.1	82.6	90.8	91.4	82.0	75.3	87.9	84.0	89.3	90.6	92.7	88.3	19	
Torino	87.5	87.9	91.3	91.3	83.8	92.0	92.9	81.4	75.3	89.6	86.0	92.7	92.1	96.3	89.7	25	
Vicenza	87.6	88.1	91.4	91.3	84.4	92.1	92.7	81.4	75.3	89.6	86.0	92.4	92.2	101.5	90.0	27	
Netherlands																	
Groningen	88.4	87.5	91.8	94.1	88.6	93.8	94.7	81.3	74.0	89.2	86.5	98.6	93.6	89.4	90.2	28	
Maastricht-Heerlen Region	89.1	88.0	92.3	94.8	87.6	94.5	95.2	82.4	75.1	90.0	87.7	101.6	94.3	89.7	91.1	33	
Tilburg	89.0	87.8	92.2	94.9	87.6	94.4	95.2	81.5	74.3	89.8	87.5	101.2	94.3	89.8	90.9	32	
West Holland Region	89.6	88.5	92.5	96.0	88.2	94.8	95.9	83.2	76.1	91.3	89.0	103.0	94.9	90.6	91.9	34	
Zwolle Region	88.9	88.0	92.2	94.8	87.3	94.3	95.1	81.6	74.3	89.6	87.1	100.2	94.1	89.7	90.8	31	
Iceland																	
Reykjavik	87.2	103.9	108.0	88.9	82.4	89.8	93.5	71.5	62.7	66.8	66.4	93.8	87.9	73.7	87.0	14	
United Kingdom																	
Birmingham	86.4	86.4	90.4	92.0	83.6	90.5	92.4	89.8	80.9	84.1	83.3	93.8	97.0	90.4	89.3	24	
Cardiff	86.2	86.0	90.6	90.6	83.4	90.5	92.2	79.1	71.3	81.7	80.6	90.0	96.5	91.0	87.7	16	
Edinburgh	88.6	88.5	92.4	91.5	85.7	91.4	93.1	90.0	81.5	86.1	85.5	96.8	98.2	91.8	90.7	29	
Glasgow	88.7	88.7	92.5	91.7	85.8	91.5	93.1	82.5	74.7	84.1	83.1	83.5	98.5	91.9	89.7	26	
Manchester	87.1	87.3	90.8	92.9	84.6	91.2	93.0	82.4	74.4	93.2	82.0	91.6	98.3	90.1	88.9	23	
Plymouth	86.3	86.2	91.0	90.0	83.2	90.3	92.1	80.1	72.2	81.9	80.8	90.4	96.1	89.8	87.7	15	
Stoke-on-Trent	86.1	85.7	90.4	91.2	83.7	90.6	92.5	73.5	66.3	80.6	79.0	87.7	96.9	90.4	86.9	13	
Telford	85.3	84.8	90.0	90.2	82.8	89.9	91.9	74.8	67.3	80.2	78.5	87.0	95.6	89.8	86.4	11	
Japan																	
Fukuoka	116.0	115.1	105.9	116.6	111.0	111.3	108.4	122.7	112.4	107.3	112.1	150.5	113.9	114.7	114.0	83	
Hamamatsu	118.6	117.2	107.8	116.6	111.4	111.1	108.6	117.9	108.0	106.4	110.0	148.7	113.6	115.0	113.9	82	
Yokohama	131.4	133.0	115.2	131.5	129.9	122.7	117.0	132.8	122.4	112.8	124.7	163.4	128.2	121.0	125.5	87	

Exhibit 4.11 (Cont'd)
CITY RESULTS BY REGION - NORTH AMERICA

	Manufacturing							R&D		Software		Corp. services	Additional operations		Overall average	14 Rank
	Metal comp.	Plastic products	Food processing	Electronics assembly	Precision comp.	Pharmaceuticals	Specialty chemicals	Biomedical R&D	Elec. syst. testing	Advanced software	Content developm.	Shared services	Medical devices	Server farms		
NORTH AMERICA																
New England/Atlantic																
Burlington, VT	101.2	101.4	100.0	100.6	99.9	99.9	99.4	96.1	95.9	99.2	97.7	97.5	100.4	106.3	100.0	60
Halifax, NS	89.0	90.4	93.6	87.3	83.1	89.3	87.4	66.3	60.4	77.5	76.5	74.5	89.1	86.7	84.5	3
Hartford, CT	102.9	103.1	101.4	102.1	103.0	101.9	101.9	103.8	104.5	103.0	105.5	106.8	102.5	104.9	103.0	70
Lewiston, ME	101.6	101.8	100.4	100.2	98.7	99.3	100.0	91.1	91.3	96.1	94.3	94.2	99.5	113.6	99.4	58
Moncton, NB	89.0	90.1	93.0	88.6	83.9	89.9	88.1	69.3	64.3	77.9	76.7	75.1	89.5	88.9	85.3	5
Northeast																
Boston, MA	105.7	106.3	103.4	105.3	105.3	103.3	105.3	119.1	117.9	107.3	115.0	114.8	104.1	110.6	107.6	80
Columbus, OH	96.1	95.5	97.3	99.0	100.0	99.4	100.1	97.9	97.3	99.0	98.6	99.2	99.2	96.7	98.3	53
Indianapolis, IN	95.6	94.7	95.8	98.9	98.5	98.8	97.5	95.8	95.4	99.0	98.0	98.4	98.8	95.4	97.2	46
Kitchener-Waterloo-Cambridge, ON	87.8	87.1	91.9	89.9	84.9	91.6	90.4	73.2	68.1	78.3	78.2	83.3	91.2	87.1	86.2	9
Lexington, KY	95.2	94.5	96.3	99.4	98.1	98.7	97.6	94.2	94.4	99.3	97.2	96.0	98.6	93.9	96.8	45
Montreal, QC	86.9	86.2	91.9	89.4	84.4	90.6	89.9	72.1	67.4	78.3	79.0	82.9	90.5	81.7	85.4	7
New York, NY	111.5	115.5	108.4	112.9	119.3	111.9	114.0	122.5	123.2	116.3	129.1	121.3	111.2	122.7	115.7	86
Newark, NJ	106.5	106.4	104.0	108.1	111.8	107.4	108.7	118.0	119.5	112.9	124.8	118.3	106.7	108.8	110.1	81
Northern Virginia (Metro DC), VA	99.2	98.8	98.8	101.1	100.9	100.5	101.0	104.3	103.8	101.3	101.0	103.1	100.4	98.5	100.6	63
Ottawa, ON	88.1	87.7	92.1	90.1	84.3	91.6	90.6	76.3	70.7	78.4	78.3	83.5	91.2	87.0	86.6	12
Philadelphia, PA	104.2	103.8	102.0	104.8	107.1	104.2	106.3	112.4	113.3	108.5	116.4	112.9	104.2	105.3	106.5	79
Quebec City, QC	86.4	86.2	91.8	87.9	82.9	89.6	88.7	67.2	62.3	75.3	75.5	78.3	89.3	80.5	83.7	2
Saginaw, MI	98.4	98.4	97.7	101.1	100.7	100.6	100.0	98.0	98.5	100.7	100.4	101.5	100.7	99.9	99.7	59
Scranton-Wilkes Barre-Hazleton, PA	100.0	99.7	99.1	100.4	100.9	100.8	101.0	101.5	102.4	102.6	102.0	101.7	100.5	102.2	100.9	64
Syracuse, NY	102.2	102.3	100.9	103.0	104.8	103.2	103.6	104.1	105.0	105.0	108.4	106.5	103.0	107.0	103.8	73
Toronto, ON	90.3	89.7	93.1	92.6	87.1	93.0	92.1	76.8	71.7	80.2	80.5	86.4	93.0	89.9	88.4	20
Southeast																
Atlanta, GA	96.4	96.1	97.4	98.5	98.9	98.9	99.0	99.2	99.4	99.4	99.2	99.1	98.6	95.9	98.2	52
Dothan, AL	95.3	94.8	97.1	95.5	95.9	96.9	96.1	87.1	87.2	94.3	92.3	89.0	96.5	93.9	94.4	39
Greenville-Spartanburg, SC	94.2	93.7	96.3	96.7	96.5	97.7	97.8	92.5	92.2	95.6	94.7	93.0	97.2	93.7	95.5	42
Jacksonville, FL	96.9	96.8	98.7	98.1	98.3	98.6	100.1	95.0	95.2	97.3	96.2	94.8	98.0	102.1	98.0	51
Nashville, TN	95.6	95.3	96.7	98.4	97.7	99.1	98.8	96.6	96.5	98.0	97.1	96.6	98.8	98.2	97.5	48
Raleigh, NC	98.5	98.0	98.5	99.3	99.3	99.5	99.6	97.0	97.1	98.8	98.0	98.2	99.6	98.3	98.7	54
San Juan, PR	92.4	95.8	96.2	85.9	85.1	88.5	91.5	82.5	81.0	77.1	78.2	78.7	87.2	103.6	88.9	22
Midwest																
Calgary, AB	88.5	89.1	91.3	87.8	87.0	90.1	88.6	74.4	69.3	76.6	76.5	78.9	89.3	88.1	85.5	8
Cape Girardeau, MO	98.7	99.3	100.1	96.5	95.3	97.4	96.5	91.3	90.8	95.2	93.6	91.2	97.1	95.6	96.3	44
Cedar Rapids, IA	100.0	100.2	100.8	98.2	97.9	98.8	97.9	92.1	92.0	96.8	96.2	95.5	98.6	96.0	97.8	50
Chicago, IL	99.3	99.0	98.9	101.6	101.7	100.9	101.5	106.5	106.6	103.7	105.4	106.6	101.3	104.1	102.0	67
Colorado Springs, CO	99.4	99.3	100.0	99.6	98.7	99.6	98.5	98.1	98.8	99.0	98.1	97.9	99.5	96.2	98.9	55
Dallas-Fort Worth, TX	100.9	100.7	101.1	102.6	103.2	102.2	102.7	107.9	109.6	104.1	106.8	105.0	101.9	101.3	103.1	71
Edmonton, AB	87.5	88.3	90.8	86.4	85.3	89.0	87.3	68.6	63.6	73.7	73.0	73.8	87.9	83.4	83.3	1
Houston, TX	103.5	103.6	103.4	103.9	105.6	103.4	104.4	108.0	109.8	105.0	108.8	107.1	103.2	105.1	104.9	75
Minneapolis, MN	102.9	104.2	103.0	101.9	101.8	101.5	100.8	104.2	103.6	102.1	102.9	104.6	101.6	99.9	102.3	68
Oklahoma City, OK	98.8	98.7	99.7	99.8	99.4	100.0	99.4	98.6	99.8	100.0	98.9	98.0	99.8	97.4	99.3	57
Phoenix, AZ	99.6	99.2	99.8	100.6	101.1	100.4	99.8	100.9	100.8	100.1	99.4	100.8	100.3	100.4	100.1	61
Salt Lake City, UT	98.4	98.4	99.1	97.9	98.2	99.1	97.2	96.0	95.2	97.8	96.8	96.9	98.8	93.4	97.6	49
Saskatoon, SK	89.9	90.5	92.6	87.8	86.4	90.0	88.5	68.7	64.0	79.1	77.7	76.2	89.3	87.5	85.4	6
Sioux Falls, SD	98.6	99.0	99.9	96.5	95.6	97.6	96.6	90.7	90.3	94.1	93.0	91.2	97.2	94.8	96.1	43
St. Louis, MO	102.6	103.1	102.5	101.1	100.1	100.6	100.4	102.4	102.3	101.2	100.8	101.4	100.8	99.1	101.3	65
Wichita, KS	99.5	99.5	100.1	99.8	99.2	99.6	99.2	96.9	96.6	98.6	97.6	97.8	99.4	102.6	99.3	56
Winnipeg, MB	92.1	92.8	94.8	89.8	86.3	91.1	89.5	69.5	64.7	78.4	77.3	76.5	90.5	84.5	86.2	10
Pacific																
Boise, ID	99.4	99.9	99.8	98.6	98.2	98.8	97.0	93.2	93.0	97.0	95.2	93.6	98.8	93.2	97.3	47
Honolulu, HI	117.7	145.6	132.6	108.9	114.8	108.6	109.3	108.8	108.4	106.4	112.8	112.7	108.4	109.2	115.6	85
Kelowna, BC	90.5	90.9	92.7	88.9	89.9	91.0	88.7	67.3	61.9	76.0	74.8	75.6	90.3	82.5	84.9	4
Las Vegas, NV	101.2	101.2	101.3	101.5	103.5	102.0	102.3	105.2	105.6	103.4	105.9	105.8	102.0	106.6	103.0	69
Portland, OR	102.0	102.0	102.1	100.8	101.7	100.3	99.0	100.0	99.7	100.3	99.9	101.7	100.7	96.5	100.5	62
Riverside-San Bernardino, CA	103.8	103.5	103.4	103.6	104.6	102.9	107.4	101.0	101.8	102.5	102.1	105.3	103.4	122.6	105.0	76
Sacramento, CA	103.2	103.0	103.3	102.4	104.2	102.3	104.0	103.7	104.2	102.8	102.8	106.1	102.6	102.6	103.3	72
San Diego, CA	100.8	100.5	100.9	101.6	103.3	101.6	102.6	105.5	105.6	102.2	101.7	104.9	101.7	95.0	101.7	66
San Jose, CA	110.7	115.8	108.5	110.6	113.2	107.2	110.5	136.4	134.9	114.8	128.3	126.0	107.1	107.5	114.3	84
Seattle, WA	105.8	105.8	106.9	102.9	105.5	103.5	104.4	109.6	108.2	103.9	107.2	109.6	103.8	103.3	105.4	77
Vancouver, BC	93.0	93.3	94.4	91.0	94.0	92.8	90.6	74.6	69.6	80.6	80.2	84.1	92.5	84.3	88.2	18

5. Comparison by Cost Component

This chapter compares the results of the ten countries for each of the major location-sensitive cost components.

A. Relative Importance of Cost Components

Exhibit 5.1 illustrates the relative significance of each cost component, both for the 14 operations overall and for each major sector. The relative significance of each cost factor varies both by operation and by location. Figures shown here are for the average of all ten countries over ten years' time.

Labour costs, including statutory and employer-sponsored benefits, represent 32 percent of location-sensitive costs for manufacturing operations and 76 to 83 percent of location-sensitive costs for service operations.

Taxes represent the second most significant location-sensitive cost factor, at 14 percent of total location-sensitive costs for manufacturing operations and 4 to 11 percent for non-manufacturing operations.

The significance of transportation and utilities costs varies by sector while, naturally, depreciation charges are highest for capital-intensive manufacturing operations.

Financing costs (interest earned) reflect the net of interest paid (for fixed and working capital) and interest received (on surplus cash balances) over ten years' time.

Exhibit 5.1
RELATIVE IMPORTANCE OF KEY LOCATION-SENSITIVE COST FACTORS

	Type of operation						
	All operations	Manu- facturing	R&D	Soft- ware	Corp. services	Server farms	Medical devices
Labour costs							
– Salaries and wages (40 positions)	44.8%	40.4%	52.6%	56.3%	57.7%	22.4%	47.0%
– Statutory plans: Includes government pension plans, medical programmes, unemployment insurance, and workers' compensation	7.7%	7.2%	8.7%	9.2%	10.2%	3.5%	8.3%
– Employer-sponsored benefits: Includes paid time not worked (holidays and vacation), private health insurance, and other benefits	12.7%	11.3%	14.9%	17.1%	15.0%	6.4%	12.6%
<i>Subtotal labour</i>	65.2%	58.9%	76.2%	82.6%	82.8%	32.4%	67.9%
Lease costs	2.7%	-	12.7%	4.0%	4.3%	-	-
Transportation costs							
– Road freight	2.6%	4.8%	-	0.1%	-	-	3.0%
– Air freight	0.2%	0.2%	-	0.4%	-	-	-
– Sea freight	0.8%	1.4%	-	-	-	-	2.8%
<i>Subtotal transportation</i>	3.6%	6.4%	-	0.5%	-	-	5.8%
Utilities costs							
– Electricity	3.8%	3.1%	1.6%	1.1%	1.3%	22.5%	1.9%
– Natural gas	1.0%	1.9%	-	-	-	-	0.1%
– Telecommunications	0.7%	0.3%	0.6%	0.6%	4.7%	0.2%	0.6%
<i>Subtotal utilities</i>	5.5%	5.3%	2.2%	1.7%	6.0%	22.7%	2.7%
Depreciation charges	10.6%	13.5%	6.8%	2.1%	3.1%	24.2%	9.4%
Financing costs (interest)	0.6%	2.3%	-2.3%	-2.0%	-1.2%	1.8%	-0.3%
Taxes other than income							
– Property	1.5%	2.3%	0.1%	0.1%	0.1%	1.7%	2.1%
– Capital	0.1%	0.1%	0.1%	-	-	0.3%	0.2%
– Sales and transactions	0.2%	0.2%	0.3%	0.2%	0.2%	0.3%	0.3%
– Local business taxes	0.4%	0.4%	0.5%	0.3%	0.3%	0.2%	0.4%
Income taxes							
– Federal	8.2%	9.2%	2.5%	8.8%	3.2%	13.9%	10.2%
– Regional, state, provincial	1.0%	1.0%	0.5%	1.3%	0.7%	1.3%	1.1%
– Local	0.4%	0.4%	0.3%	0.4%	0.3%	1.1%	0.3%
<i>Subtotal taxes</i>	11.8%	13.6%	4.4%	11.1%	4.9%	18.9%	14.6%
Total location-sensitive factors	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

B. Labour Costs

The single most important cost factor examined in this study is labour. The labour force required for each operation has been compiled from 40 benchmark positions used consistently throughout this study. The positions reflect the full range of skills and responsibilities typically required in each of the business operations.

The work force profile for each operation is summarised in Chapter 3 (Exhibit 3.2).

1. Total labour costs

Labour costs for each position have been determined based on the following components:

- base wages and salaries
- statutory plans
- other employer-sponsored benefits

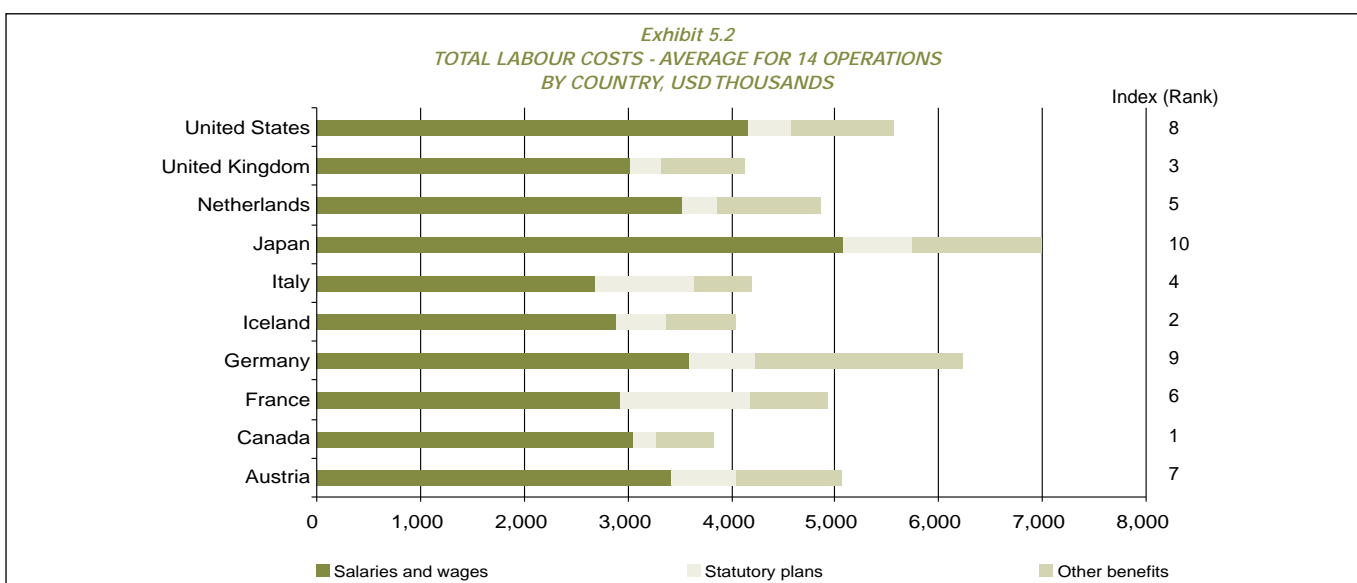
Exhibit 5.2 compares the three labour cost components and total labour costs for each of the countries examined. Exhibit 5.3 expresses the benefits components of labour costs as a percentage of salary and wage costs. The figures shown are averages for the 14 operations examined and represent an average labour force of 99.3 employees. The results indicate that:

- Canada (1) has the lowest overall labour costs, including benefits.
- Iceland (2) has the second-lowest overall labour costs, with higher statutory plans putting them slightly above Canada.
- The United Kingdom (3) has wage and salary levels comparable to those in Canada but has higher benefits costs.

- Italy (4) has the lowest wage and salary levels among the nine countries, but its costs to employers for statutory benefit plans are second highest. However, these costs have decreased considerably since 1999 due to changes in Italy's social security system; this results in an improvement in Italy's overall ranking in this study.
- The Netherlands (5) has higher wage and salary levels but is competitive with regard to benefits costs.
- France (6) has the second-lowest wage and salary levels, counterbalanced by the highest cost of statutory plans and the second-highest cost for all benefits.
- Austria's (7) significant labour cost advantage over Germany results mainly from lower benefits costs.
- The United States (8) has significantly higher nominal wage and salary rates than Germany (9), but it has much lower costs associated with statutory plans and employer benefits. In Germany, the costs of statutory plans and other benefits are the highest among the nine countries examined.
- In Japan (10), relatively low costs related to statutory plans and other benefits are not sufficient to offset very high salary and wage costs.

2. Differences in salary and wage structures

The study also found significant differences in relative salary and wage structures within and among countries. Exhibit 5.4 examines these trends by comparing salary levels for five groups of employees in each country to the salary levels for the same positions in the United States. The five groups are defined based on the salary range for each job in the US.



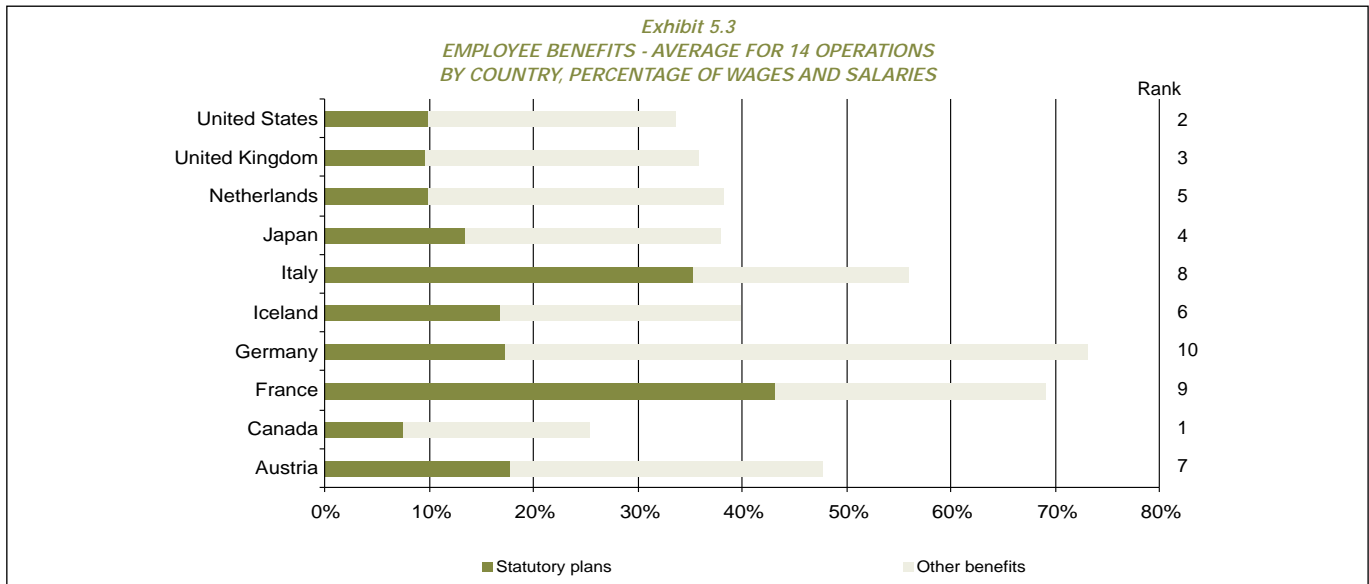


Exhibit 5.4 illustrates that the United States has the steepest increase in salary levels between unskilled and senior management positions. All other countries have a flatter salary profile than the US.

For example, for jobs paying below \$32,000 in the United States, the same positions in Iceland, Canada, France, and the UK pay between 86 and 90 percent of equivalent US salaries. However, for jobs paying over \$96,000 in the United States, salaries in these four countries are only 49 to 66 percent of equivalent US salaries.

In Austria, Germany, the Netherlands, and Japan, the lowest-skilled jobs pay more than they do in the United States. However, senior professional and management positions pay only 70 to 88 percent of equivalent US salaries. As a result, the US is less cost-competitive for operations that demand a greater number of highly paid professional or skilled staff. Much of this differential may be explained by the technology-led economic boom in the US during the late 1990s through 2001, which placed highly skilled technical and professional staff in short supply.

Exhibit 5.4
INDEX OF RELATIVE SALARY LEVELS,
BY SALARY RANGE (US = 100.0)

# of positions in study	Salary levels relative to US				
	US salary less than \$32,000	US salary \$32,000 - \$47,999	US salary \$48,000 - \$74,999	US salary \$75,000 - \$95,000	US salary \$96,000 or more
	9	11	11	6	3
Austria	103.4 (7)	100.7 (9)	77.6 (6)	82.2 (7)	71.9 (7)
France	88.7 (4)	81.7 (4)	63.1 (3)	70.9 (5)	65.2 (4)
Germany	119.6 (9)	98.9 (7)	79.4 (8)	78.7 (6)	69.8 (6)
Iceland	90.6 (5)	80.2 (3)	62.9 (2)	65.4 (1)	48.6 (1)
Italy	77.9 (1)	73.9 (1)	59.5 (1)	67.3 (2)	62.2 (3)
Netherlands	108.9 (8)	98.3 (6)	79.0 (7)	82.2 (8)	74.9 (8)
United Kingdom	88.1 (3)	87.5 (5)	68.5 (4)	68.9 (4)	61.3 (2)
Canada	86.3 (2)	75.7 (2)	69.6 (5)	67.3 (3)	65.7 (5)
United States	100.0 (6)	100.0 (8)	100.0 (9)	100.0 (9)	100.0 (10)
Japan	182.4 (10)	144.1 (10)	110.6 (10)	101.6 (10)	88.3 (9)

3. Labour productivity considerations

Physical productivity is the result of four main factors. These factors, and the ways in which they have been addressed in this study, are as follows:

- Actual hours worked, after allowing for all vacation, holidays, sick leave, etc. The costs associated with paid time not worked have been included in the calculation of benefits; i.e., consideration is given to the fact that absent workers must be covered by temporary labour, overtime, or additional staffing to keep a facility running year-round. The total labour costs shown here represent the costs for a plant running at 100 percent staffing, 52 weeks per year.
- Capital and technology applied to the production process. As all countries examined represent industrialised nations, this model assumes that the same technology and equipment are employed in each of the locations. While this assumption may be reasonable for developed countries, the same assumption should not necessarily be made when comparing facilities established in less industrialised countries.
- Specific workplace training provided to employees. This factor is also assumed to be equal for all countries, with equal training costs.
- Inherent physical productivity of workers and the possibility that workers in some countries will tend to work more productively (i.e., achieve higher output per worker hour) than others. Because all of the countries examined in this study are industrialised, the comparisons in this study do not differentiate on this basis. (In previous editions of this study, detailed analysis has determined that dramatic differences in assumed physical productivity are required to make a significant impact upon the findings.)

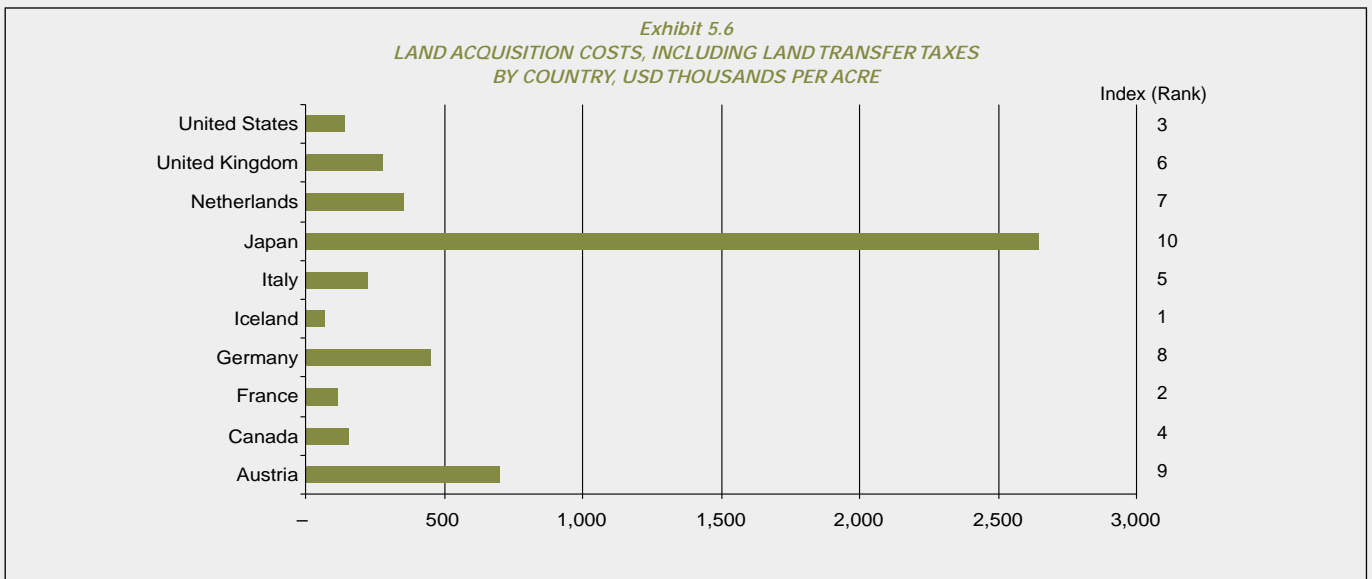
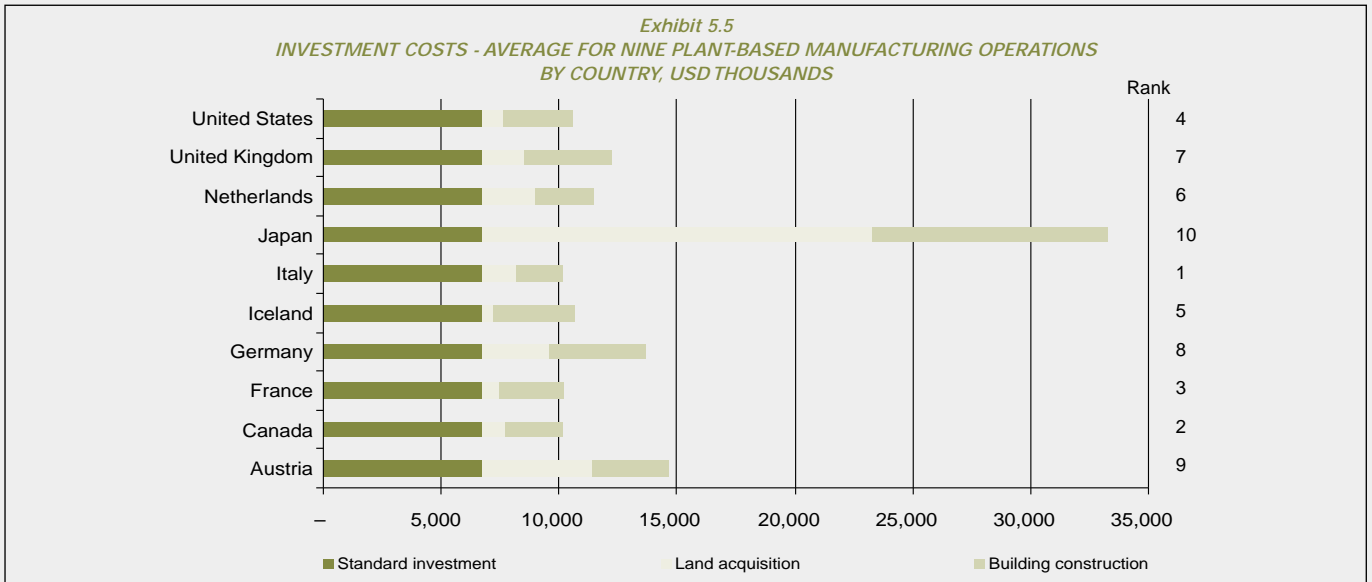
C. Facility Costs

1. Industrial land and construction

For the seven plant-based manufacturing operations modelled in this study, facilities are assumed to be established in a newly constructed, owner-occupied building located on a purchased industrial site.

Land requirements for these seven operations average 7.3 acres (2.9 hectares), with an average building size of 74,286 square feet (6,900 m²). (See Exhibit 3.2 for detailed specifications by operation.)

As is illustrated in Exhibit 5.5, the initial investment includes location-sensitive land purchase and building construction costs, as well as "standard" investment costs that do not vary by location (e.g., major machinery and equipment acquired from limited global suppliers). Overall, land and construction costs are lowest in Canada (1), followed closely by Italy (2), France (3), the United States (4), and Iceland (5). Land and building costs increase noticeably for the Netherlands (6), the United Kingdom (7), Germany (8), and Austria (9). Land and construction costs in Japan (10) are more than six times those in the United States.



1.1. Land

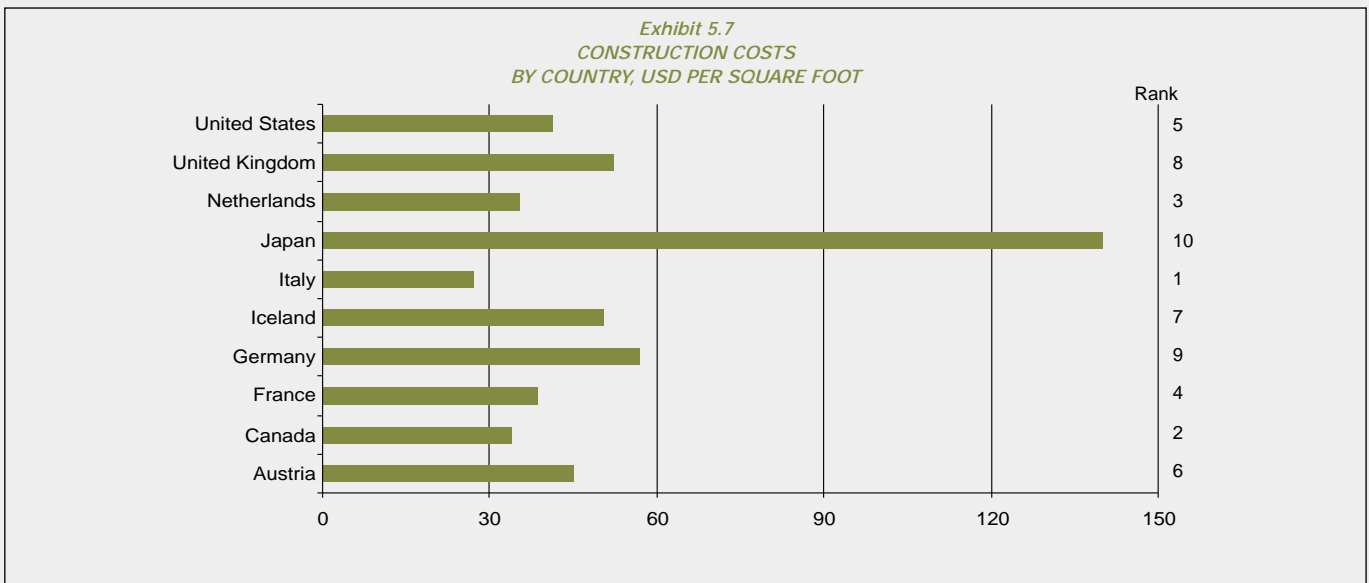
Land costs for each location are based on per-acre costs for purchasing typical greenfield sites of varying sizes (2-6, 8-16, and 25-50 acres) in suburban areas zoned for light to medium industrial use. These prices are then applied to the site requirements of each operation, based on the relative size of the site required. Prices are reflective of suitable available land in each city and may vary significantly by location and the size of site required. Land costs include all land transfer taxes.

As is illustrated in Exhibit 5.6, land costs are lowest in Iceland (1), France (2), the United States (3), and Canada (4), followed by Italy (5) and the United Kingdom (6). Land prices are higher in the Netherlands (7), Germany (8), and Austria (9), and dramatically higher in Japan (10). Industrial land costs in Japan are more than 12 times those in the US.

1.2. Construction

Building construction costs for the countries examined are based on the costs of construction for a built-to-suit industrial facility in each location. The building is assumed to be a single-level turnkey factory, with 10 percent finished office space. Total floor space varies by operation but ranges from 50,000 to 120,000 square feet (4,645 to 11,150 m²). Government development charges and all other "soft" construction costs are included.

As is illustrated in Exhibit 5.7, construction costs are lowest in Italy (1), followed by Canada (2) and the Netherlands (3). France (4) and the United States (5) are closely grouped, followed by Austria (6), Iceland (7), the United Kingdom (8), and Germany (9). Construction costs in Japan (10) are approximately three times those in the United States.

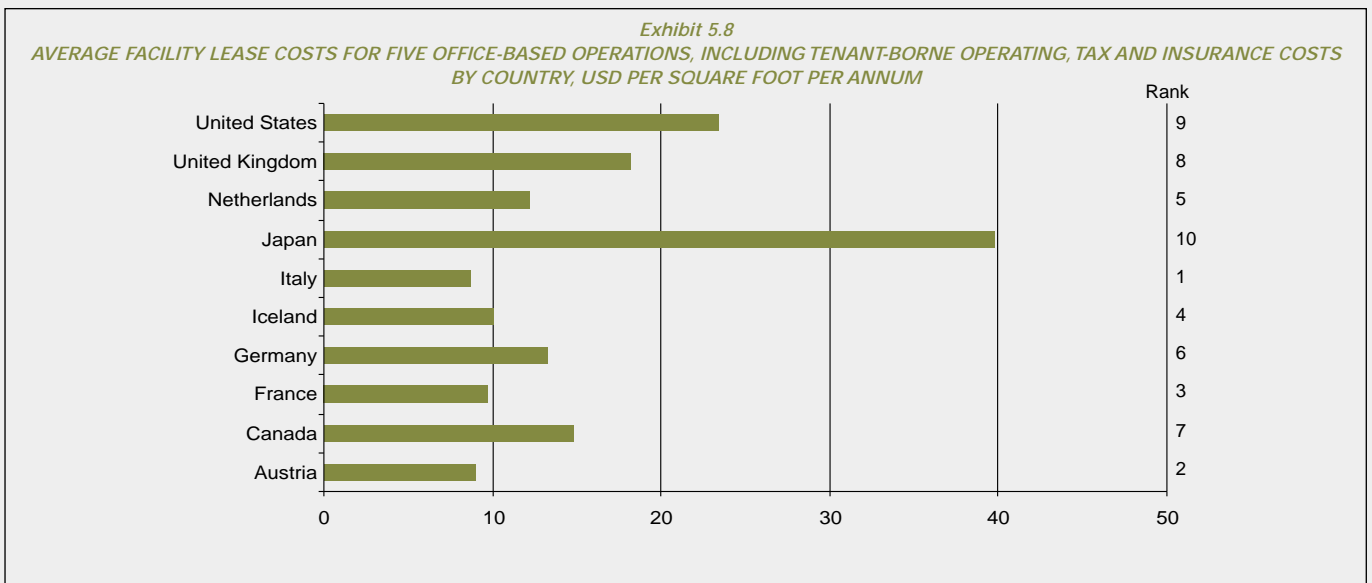


2. Office leasing

Facility costs for the five non-manufacturing operations examined are based on the average cost of leasing 22,500 to 45,000 square feet (2,090 to 4,180 m²) of Class A office space located, where possible, in a suburban office park. (For some smaller cities, leasing of city-centre office space is assumed if no suitable suburban office space exists). Lease costs include all operating, tax, and insurance costs generally passed on to the tenant in each location.

As is illustrated in Exhibit 5.8, office lease costs are lowest in Italy (1), Austria (2), France (3), and Iceland (4). The Netherlands (5) and Germany (6) are closely ranked, followed by Canada (7) and the United Kingdom (8). Office lease costs are highest in the United States (9) and, most significantly, Japan (10), where lease costs are almost double those of ninth-placed US and more than double those of the eighth-placed UK.

In comparison with other studies that have examined office lease costs in the world's major cities (e.g., London and Paris), costs in the European cities featured in this report are relatively low. This result is due to the tendency of office lease costs in Europe to be much lower in regional cities than in the major centre(s) of each country.



D. Transportation Costs

All of the seven manufacturing operations plus the advanced software operation (distributing "shrink-wrapped" applications) are assumed to deliver their products by land, sea, and/or air. Exhibit 5.9 illustrates the transportation modes typically used by each type of operation, as well as the relative significance of transportation costs.

Transportation cost calculations are based on the general assumption that each firm is able to deliver products to its customers in full-load or standardised 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 specialised 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 air freight include cargo security surcharges imposed by North American airlines following the events of September 11, 2001.

As is illustrated in Exhibit 5.10, the Netherlands (1) has the lowest transportation costs, reflecting low freight rates compared to other countries and short distances to major European markets. Due to their proximity to major markets, Austria (2) and Germany (3) are ranked second and third respectively. Italy (4) and the United Kingdom (5) are closely ranked and ahead of France (6), which, despite its favourable location, is disadvantaged by high road freight rates. The rankings for Canada (7) and the United States (9) reflect the greater distances to market for road freight in North America as compared to Western Europe. Costs in Japan (8) reflect a combination of high local transportation rates and distance from offshore markets.

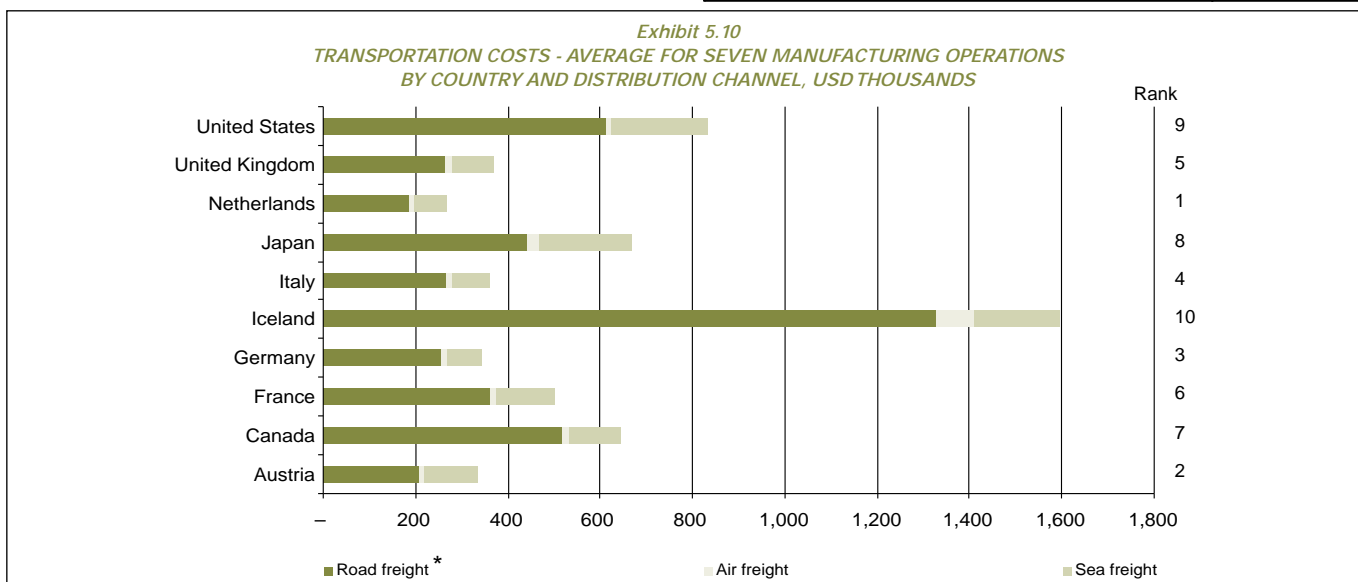
Reflecting Iceland's distance from major population centres and high rates, transportation costs (based on the standard distribution patterns used in the CCM-2002 model) are much higher for Iceland than for other countries. The distribution patterns used in the model assumes

a population base of at least five million. As the operations requiring transport, especially Plastic products, Metal components, and Food processing, are oriented towards local markets, the small domestic market area is a disadvantage to Iceland, necessitating sea- or air transport for a much higher portion of operation output than in other participating countries. Due to Iceland's geographical position, sea freight is the most commonly used means of transporting goods to markets abroad (note that in Exhibit 5.10 "Road Freight" costs refer to all shipments where final delivery is by road and includes the sea freight portion of a combined sea/road shipment). In comparison, Austria also has a small population base, but has shorter distances to cover than Iceland and less complicated logistics, producing significantly lower transport costs.

These results should be interpreted only as general indicators of transportation cost relationships among countries, since they are based on typical product distribution patterns for each operation within each country. Operations with different product distribution patterns can be expected to have significantly different transportation costs.

*Exhibit 5.9
SUMMARY OF DISTRIBUTION CHANNEL ASSUMPTIONS AND
SIGNIFICANCE OF TRANSPORTATION COSTS, BY OPERATION*

Business operation	Distribution channels used				Transport as a % of total location-sensitive costs
	Road	Sea	Air	Internet	
Manufacturing					
Metal components	x	x			9%
Plastic products	x	x			14%
Food processing	x				9%
Electronics assembly	x		x		2%
Precision components	x		x		5%
Pharmaceuticals	x	x			5%
Specialty chemicals	x	x			1%
Software					
Advanced	x			x	1%



* Note: "Road Freight" costs refer to all shipments where final delivery is by road and includes the sea freight portion of a combined sea/road shipment.

E. Virtual Distribution Costs

Although shown as a distribution channel in Exhibit 5.9, costs for distribution of software via Internet-based electronic commerce have not been included as part of this analysis. These costs are not sensitive to the location of the firm requiring the service, since electronic commerce sites can be established anywhere in the world. Relevant decision-making criteria include service costs and download speeds for each service provider, evaluated on a global basis. Due to low service costs and a better-developed Internet infrastructure, many foreign Websites are hosted by US service providers.

F. Utilities Costs

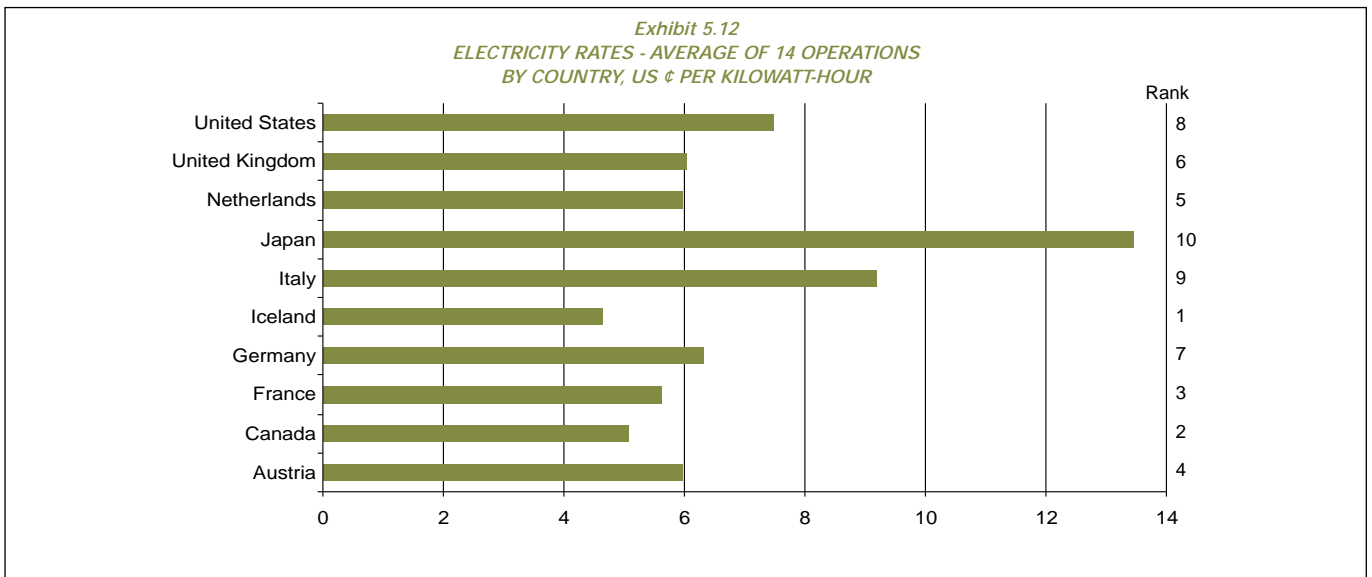
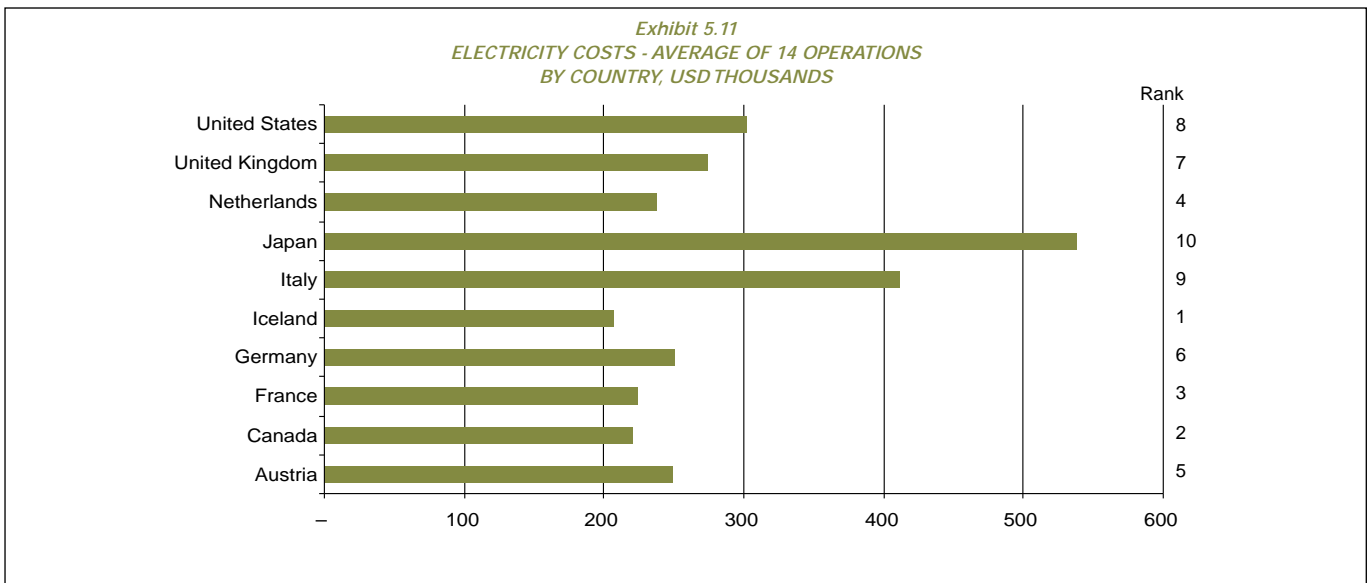
1. Electricity

Electricity costs form a relatively small percentage (two percent) of overall location-sensitive costs, as most of the operations examined in this study are not particularly energy-intensive.

The 14 standard operations have an average demand load of 1,094 kilovolt-amperes (kVa) and consumption of 448,657 kilowatt-hours (kWh) per month.

Exhibit 5.11 illustrates that electricity costs for industrial users are lowest in Iceland (1), followed by Canada (2), France (3), Austria (4), the United Kingdom (5), the Netherlands (8), and Germany (7). Costs for these seven countries are fairly closely grouped. The United States (8), Italy (9), and Japan (10) have higher costs.

Exhibit 5.12 illustrates the relative costs for electricity in terms of US cents per kilowatt hour. Electricity costs per kilowatt hour in the six lowest-cost countries are Iceland (1), under 5¢; Canada (2), 5.1¢; France (3), 5.5¢; Austria (4), 5.8¢; the United Kingdom (5), 5.9¢; and the Netherlands (6), 6.0¢.



2. Telecommunications

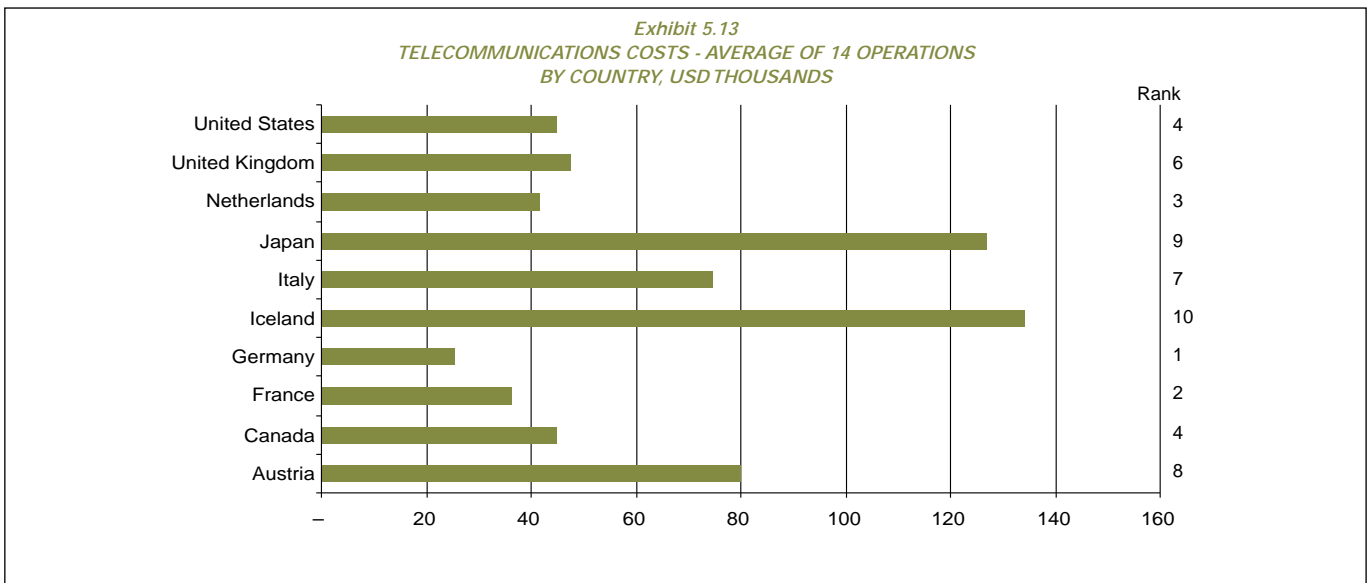
Telecommunications costs represent less than one percent of total location-sensitive costs for the 14 standard operations examined. As is illustrated in Exhibit 5.13, telecommunications costs are lowest in Germany (1), France (2), and the Netherlands (3). Canada (4), the United States (5), and the United Kingdom (6) are closely grouped, while costs are higher in Italy (7), Austria (8), Japan (9), and Iceland (10), due to the strategic distribution of calling minutes rather than generally high rates.

However, local telecommunications rates have been shown to be demonstrably lower in Iceland than in other countries. Due to the fact that this study has defined telecommunications distribution patterns as corresponding to major market areas, firms located in Iceland use only 15-30% on domestic calls (while long-distance calls to Europe account for 55% of telecom use, calls to the US account for 15% of use, and calls to Japan 5%),

while other locations in Europe or the US use as much as 60-100% of telecommunications service within their continental market.

Telecommunications costs in Europe have decreased dramatically since the 1999 edition of Competitive Alternatives, when European costs were significantly higher than those in North America. This shift is due to the deregulation of the telecom sector in Europe and mirrors the dramatic cost reductions seen in North America during the mid-1990s.

The relative significance of telecommunications costs has declined in all G7 countries in recent years, and these costs have generally become an unimportant factor in the site selection process for most types of operations. Telecom service availability and quality are now much more important considerations.



G. Interest Costs and Earnings

The interest rates used in this study, including benchmark LIBOR¹ rates, as well as assumed borrowing and deposit rates for each country as of September 2001 (March 2002 for Iceland), are illustrated in Exhibit 5.14.

To apply these rates in calculating interest charges owing, a constant debt-to-equity ratio was determined for each operation and applied consistently across all countries. Depending on the operation, equity financing represents 25 to 100 percent of all initial investment costs, including property acquisition, construction costs, purchase of machinery and equipment, and investment in base inventory. The balance of the initial investment cost, if any, was assumed to be funded through debt. Using this approach, the actual dollar levels of both debt and equity vary by country, in relation to the required initial investment.

The debt has been assumed to represent mid-term secured commercial borrowings at an interest rate premium of two percent over the appropriate national three-month LIBOR rate. In North America, where LIBOR is not widely used, 90-day commercial paper rates +0.2 percent have been used, giving a rate approximately equal to LIBOR.

For operations in volatile industries, or for those with limited fixed assets to offer as security on borrowings, additional interest rate premiums have been added to borrowing rates, as required. Surplus cash deposits in money market accounts are assumed to earn interest at one percent below LIBOR, representing a typical spread of three percent between debt and cash rates. Over the ten-year period modelled, some operations with low capital requirements earn more in interest than they pay, resulting in net interest revenue.

1. London Interbank Offering Rate

2. Central Bank of Iceland, 90-day CB notes, Rate March 2002

H. Depreciation Charges

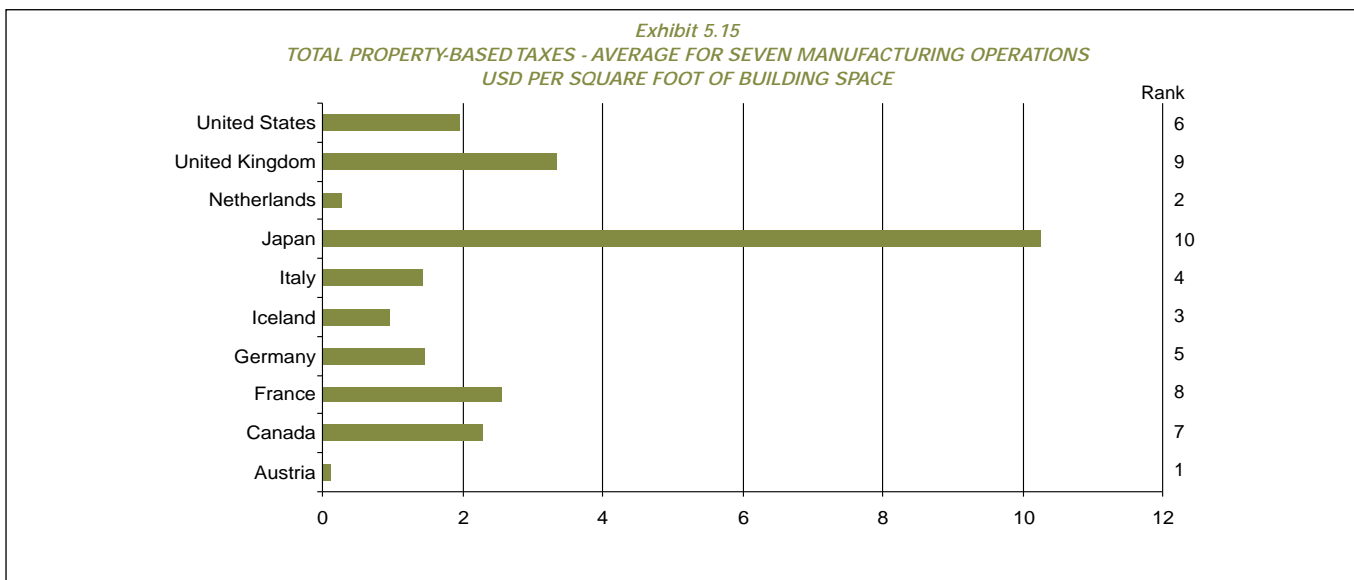
The results in this report are calculated on a standard income statement approach, with depreciation charged on all capital assets in the process of determining profit. While depreciation rates are held constant across all jurisdictions, actual charges may differ as a result of varying real estate acquisition costs. (For tax purposes, depreciation calculations reflect the depreciation or capital allowances permitted under the income tax laws of each country.)

Net present value (NPV) represents an alternative basis for factoring in initial investment costs and yields results that are generally consistent with the overall conclusions of this report.

Exhibit 5.14
INTEREST RATES USED IN THIS STUDY
IN PERCENTAGE TERMS

Country	LIBOR rate ¹	Assumed cash deposit rate	Assumed mid-term secured borrowing rate
Austria	4.267	3.267	6.267
France	4.267	3.267	6.267
Germany	4.267	3.267	6.267
Iceland	9.6 ²	8.800	11.800
Italy	4.267	3.267	6.267
Netherlands	4.267	3.267	6.267
United Kingdom	4.993	3.993	6.993
Canada	4.012	2.990	5.990
United States	3.451	2.473	5.473
Japan	0.073	0.000	2.073

Exhibit 5.15
TOTAL PROPERTY-BASED TAXES - AVERAGE FOR SEVEN MANUFACTURING OPERATIONS
USD PER SQUARE FOOT OF BUILDING SPACE



I. Non Income-Based Taxes

1. Property-based taxes

1.1. Owned facilities

For the seven manufacturing operations that are assumed to own their own premises, property taxes represent, on average, about two percent of location-sensitive costs.

Property taxes include not only taxes on land and buildings, but also (where applicable) taxes on machinery and equipment, inventory, and other physical assets.

Municipalities in Iceland levy a real estate tax on the estimated value of immovable property based on size, etc. The rate of tax varies depending on the municipality, and the maximum rate is 1.32 percent.

As is illustrated in Exhibit 5.15, property taxes are very low in Austria (1) and the Netherlands (2). Iceland (3), Italy (4), and Germany (5) are closely ranked, followed by the United States (6) and Canada (7). France (8) and the United Kingdom (9) have significantly higher property taxes, while Japan (10) has property tax rates that are more than five times those in the US, due mainly to Japan's extremely high real estate values.

1.2. Leased facilities

For non-manufacturing operations occupying leased office space, property taxes on real estate are levied on the landlord. Any amount of this tax passed on to the tenant is captured as part of the total office lease costs illustrated in Exhibit 5.8.

However, as Exhibit 5.16 demonstrates, these operations are still subject to property-based taxes (either taxes on equipment or business occupancy taxes) in six of the nine countries examined.

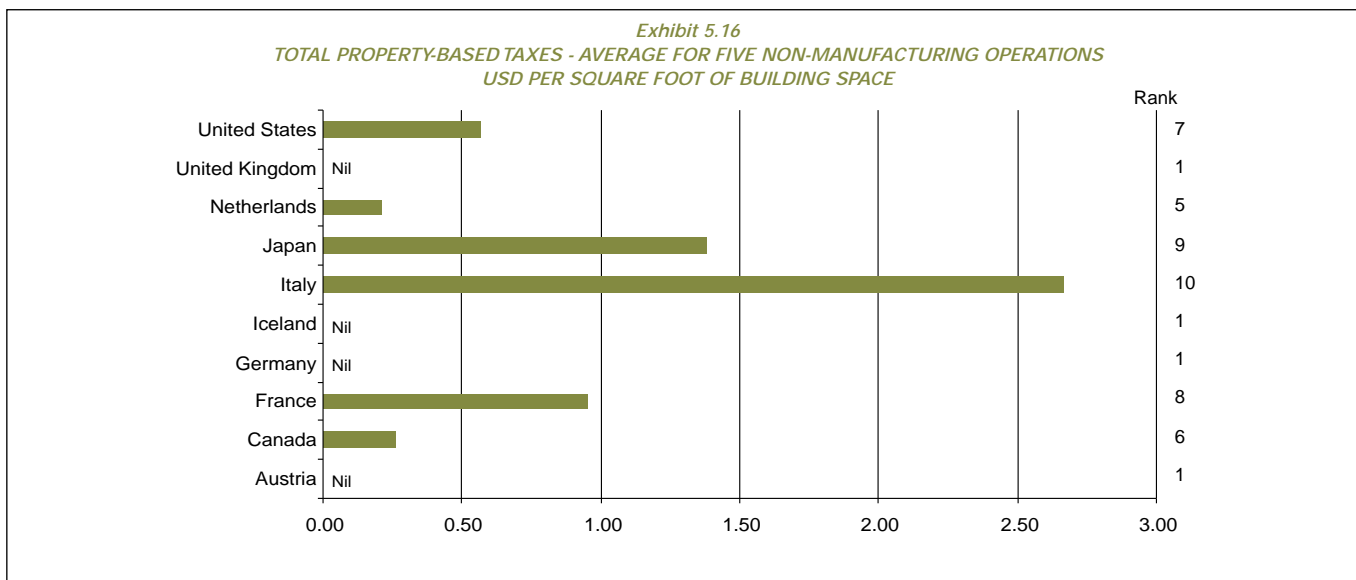
2. Capital taxes

Capital taxes apply, in at least some locations, in five of the countries examined in this study: Austria, Canada, Japan, the Netherlands, and the United States.

- In Austria and the Netherlands, capital tax applies primarily on capital contributions to a corporation, not on an annual basis.
- In Canada, a national capital tax applies to larger corporations, regardless of location. In addition, provincial capital taxes apply in five of the six Canadian locations selected for the international comparison.
- In Japan, prefectural and municipal capital taxes apply in all three locations considered in this study.
- In the United States, there is no national capital tax. However, many states, including five of the nine locations selected for the international comparison in this report, levy capital taxes in various forms.

Based on the average of the standard 14 operations examined, the typical tax burden where capital taxes apply is as follows:

- In Austria and the Netherlands, where capital tax is not applied annually, the costs for capital tax are very low, averaging USD 6,000 in Austria and USD 3,000 in the Netherlands (10-year average, 0.08 and 0.04 percent of location-sensitive costs, respectively).
- In Canada, average capital tax costs are approximately USD 42,000 per annum in three of the six locations, or about 0.6 percent of location-sensitive costs for those locations. Average annual costs for the other two locations are approximately USD 1,000 (due to phase-out of capital tax) and USD 52,000 (0.8 percent of location-sensitive costs).
- In Japan, average capital tax costs are approximately USD 8,000 per annum, or 0.07 percent of location-sensitive costs.
- In those US locations where capital taxes apply, the average tax costs range from USD 2,000 to USD 12,000 per annum (0.02 to 0.14 percent of location-sensitive costs for the relevant locations).



3. Transaction taxes

Transaction taxes include:

- non-refundable sales taxes
- gross receipts taxes
- refundable value-added style taxes (VAT or GST).

For the purposes of this analysis, value-added style 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 such taxes do impose a cost on companies in terms of cash flow timing and administration, these costs are not material to this study. The universal use of refundable value-added taxes in Europe and Japan creates a transaction tax advantage for these regions as compared to North America.

Non-refundable sales taxes apply commonly at the state level throughout the United States. All nine states included in this international comparison levy sales taxes. Non-refundable sales taxes also apply in one-half of all Canadian provinces and in three of the six Canadian locations included in this international comparison. Where non-refundable sales taxes apply, exemptions are generally available for a large number of costs incurred by a manufacturer, to avoid the compounding of taxes into the price of goods at each stage of the production process. Where sales taxes apply, the typical tax burden is between USD 65,000 and USD 150,000 per annum, or approximately 0.7 to 1.8 percent of location-sensitive costs. This creates a distinct advantage for locations without these taxes.

Gross receipt taxes apply in a small number of jurisdictions in the United States, either instead of, or in addition to, state or local income taxes. Only one of the nine cities included in this international comparison levies a tax on gross receipts.

4. Local business taxes

Sundry local business taxes also apply in many jurisdictions and are included in the total cost calculations for this study.

J. Income Taxes

In this study, income taxes have been calculated on a "tax payable" basis. Deferred income tax balances (both positive and negative) are not included since these accounting entries are generally not relevant to site selection decisions.

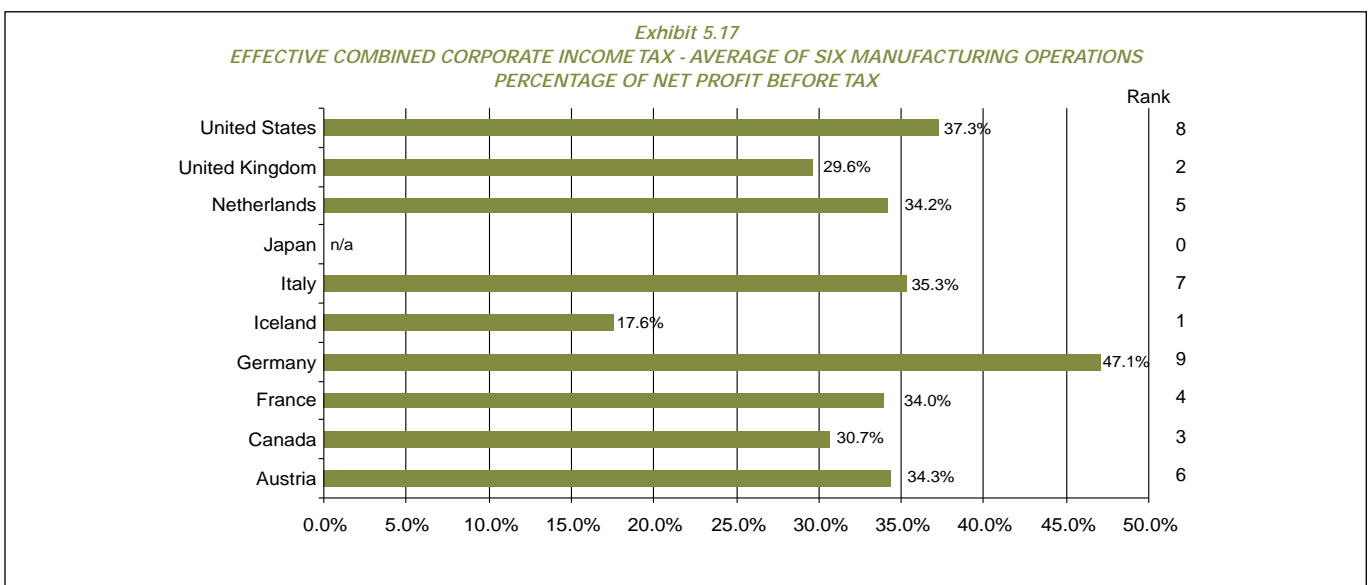
In Iceland, the taxable base is the net income; i.e., income after deduction of business expenses. Business expenses are expenses incurred in obtaining and maintaining the income, including interest, discount on securities, exchange rate losses, provision for doubtful accounts receivable and depreciation, and certain allowances provided by law.

The corporate income tax rate for assessment year 2003 (income year 2002) is 18 percent for companies and 26 percent for partnerships registered as taxable entities.

1. Manufacturing operations

The effective combined corporate income tax rates (federal, regional, and local), based on the average of six manufacturing operations, are shown in Exhibit 5.17.

Based on this calculation, Iceland (1) has by far the lowest effective combined corporate income tax rate, at 17.6 percent; it is followed by the United Kingdom (2), at 29.6 percent; and Canada (3), at 30.7 percent.



The next four countries are closely ranked: France (4), at 34.0 percent; the Netherlands (5), at 34.2 percent; Austria (6), at 34.3 percent; and Italy (7), at 35.3 percent.

The United States (8) has a calculated effective rate of 37.3 percent, while the effective rate for Germany (9) is 47.1 percent, down from the 64.4 percent rate in 1999 due to significant federal tax cuts in Germany over the last three years.

For Japan, the calculation of effective income tax rates is not meaningful because of the marginal profitability in Japan of the seven manufacturing operations modelled. For profitable entities, the nominal and effective tax rates in Japan are generally in the range of 40 to 44 percent, which would put Japan behind the United States but ahead of Germany.

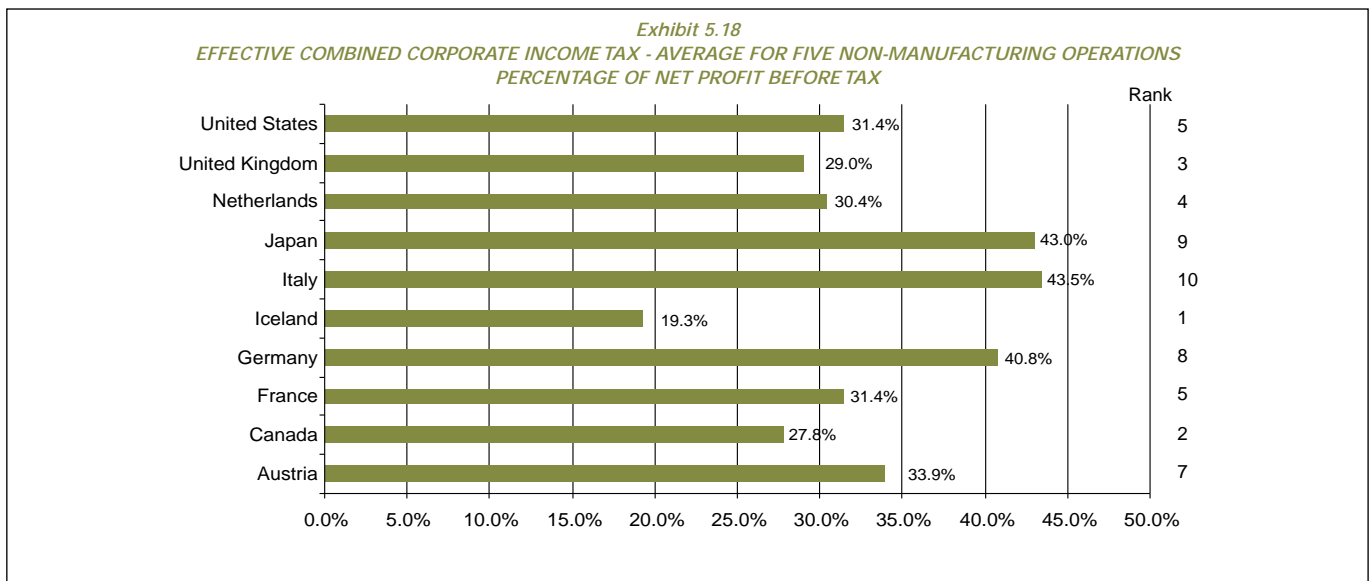
2. Non-manufacturing operations

The effective combined corporate income tax rates for the five non-manufacturing operations are shown in Exhibit 5.18.

In general, results are similar to those for the manufacturing operations, with the following exceptions:

- The effective tax rate for Iceland is somewhat higher, although predominantly lowest compared to the other nine countries.
- The effective tax rates for France, Canada, and the United States are somewhat lower due to the significance of R&D activities for these operations and the availability of R&D tax credits in these locations.
- The effective tax rates for Germany are lower. These types of operations achieve greater average profitability in Germany than do manufacturing operations, resulting in effective tax rates more closely aligned to nominal tax rates.
- The effective tax rates for the United States are reduced, due mainly to the relatively low taxable incomes of the cost-centre operations. (The US has a sliding scale tax structure, and these "cost plus" operations fall into a lower tax bracket than their more profitable manufacturing counterparts).

Effective corporate tax rates are sensitive to many operation-specific factors. Rates for specific operations can be obtained online at www.CompetitiveAlternatives.com.



6. Other Site Selection Considerations

Exhibit 6.1
KEY SITE LOCATION FACTORS

	COST FACTORS	OTHER KEY FACTORS
BUSINESS	<p>Business costs</p> <ul style="list-style-type: none"> ■ Land/building/office costs ■ Labour wage/salary/benefits costs ■ Transportation and distribution costs ■ Utilities costs ■ Financing costs ■ Federal/state/local taxes <p style="text-align: center; border: 1px solid black; padding: 2px;">FOCUS OF THIS STUDY</p>	<p>Business environment</p> <ul style="list-style-type: none"> ■ Labour availability and skills ■ Access to markets, customers, and suppliers ■ Road, rail, port, and airport infrastructure ■ Utilities and telecom service reliability ■ Suitable land sites ■ Regulatory environment ■ Inflation ■ Stability
PERSONAL	<p>Cost of living</p> <ul style="list-style-type: none"> ■ Personal taxes ■ Cost of housing ■ Cost of consumer products ■ Health care costs ■ Education costs 	<p>Quality of life</p> <ul style="list-style-type: none"> ■ Crime rates ■ Health care facilities ■ Schools and universities ■ Climate ■ Culture and recreation

The primary objective of this study has been to compare business costs (top left quadrant, Exhibit 6.1) among 87 cities in ten countries. Identifying a cost-competitive location is a key step in the site selection process.

However, business costs must also be considered in the context of the business environment in promising cities (top right quadrant). For some types of business, cost of living and quality of life (bottom two quadrants) may also be significant factors. The relative importance of each factor will vary by firm. Opportunity-specific analysis is required to evaluate and weight them appropriately in any particular situation. The following pages provide a brief overview of some of these other key considerations, as well as identifying sources of more detailed information.

Exhibit 6.2 lists the site selection factors most frequently cited as important by "Area Development" magazine's December 2001 US Corporate Survey. Exhibit 6.2 also identifies the location in this report where the major site selection factors are discussed or incorporated into the results of this study.

Exhibit 6.2
SITE SELECTION FACTORS, BY INDICATED FREQUENCY OF IMPORTANCE¹

	Percentage of respondents citing as important	Report reference
Availability of skilled labour	91.6	Exhibit 6.3
Labour costs	91.5	Exhibit 5.2
Highway accessibility	87.9	Exhibit 6.3
Energy availability and costs	86.4	Exhibits 6.3 & 5.11, 5.12
Availability of telecommunications services	83.3	
Tax exemptions	82.7	Exhibits 5.16 - 5.18 ²
Occupancy or construction costs	82.3	Exhibits 5.6 - 5.7
State and local incentives	81.4	Exhibits 5.16 - 5.18 ²
Proximity to major markets	80.2	
Availability of land	79.7	Exhibit 5.6 ³
Corporate tax rate	79.0	Exhibits 5.15 - 5.18
Environmental regulations	78.8	
Low union profile	78.0	
Cost of land	77.3	Exhibit 5.6 ³

1. Area Development, December 2001. Percentage of total respondents who consider a factor to be either "very important" or "important."

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

3. Availability of land is captured in the costs of industrial land presented in this report.

A. Business Environment

Exhibit 6.3 provides some initial information designed to assist in understanding differences in some aspects of the business environment for each of the countries studied.

- Highway accessibility: Based on an international survey of corporate executives, the 2001 "World Competitiveness Yearbook" ranks Germany's overall product distribution infrastructure first among the ten countries examined, followed by Austria and France.
- Availability of skilled labour: The same survey finds skilled labour to be most readily available in Iceland, Austria, Japan, and the United States. Availability is poorest in the United Kingdom, Italy, and the Netherlands.
- Overall labour availability: The unemployment rate in each country is an indicator of the overall availability of labour. During the first quarter of 2001, the highest rates of unemployment were in Italy, France, and Germany, while the lowest rates of unemployment were in Iceland, the Netherlands, Austria, and the United States.
- Energy self-sufficiency: a 2001 study by the International Energy Agency shows Canada and the United Kingdom to be significantly more energy self-sufficient than the other countries examined, as both of these countries are net exporters of energy. Austria, Italy, and Japan have the lowest self-sufficiency ratings and, in percentage terms, are the largest energy importers among the countries examined. Iceland has electric and geothermal energy in abundance but imports both oil and gas.
- Growth in real GDP per capita: in 2000, the United States, Canada, and the Netherlands had the highest per capita GDP growth rates among the countries examined. Growth rates were lowest in Iceland, Austria, and Japan. In recent years, the economy of Iceland has experienced, on average, one of the highest growth rates of GDP among OECD countries. Growth over the period 1996-2000 averaged 4.8%.

B. Personal Costs

Exhibit 6.4 identifies some personal cost of living measures for the ten countries examined.

- Increases in consumer prices: According to the 2001 "World Competitiveness Yearbook", Consumer Price Inflation was lowest in Japan and France and highest in Iceland and the United States.
- Cost of living: According to the "World Competitiveness Yearbook", the cost of living is lowest in Canada and the Netherlands and highest in Japan and Iceland.
- There are significant differences in the cost of living among participating countries. For example, while business costs in Canada, Iceland, and the United Kingdom are closely ranked, Canada's personal cost of living index is more than 20 percent lower than that in the UK, and more than 60 percent lower than that in Iceland. It should be noted that the index does not take housing costs into account; these, if included, would strengthen Iceland's comparative position.

Exhibit 6.4
COST OF LIVING COMPARATIVE FACTORS

Country	Consumer Price Inflation % ¹ (and ranking)	Cost of living index ^{1,2} (and ranking)
Austria	2.29 (4)	101.28 (5)
France	1.63 (2)	107.43 (7)
Germany	2.00 (3)	99.05 (4)
Iceland	5.00 (10)	155.55 (9)
Italy	2.55 (5)	102.25 (6)
Netherlands	2.58 (6)	96.59 (2)
United Kingdom	2.88 (8)	114.78 (8)
Canada	2.73 (7)	92.67 (1)
United States	3.39 (9)	96.87 (3)
Japan	-0.68 (1)	158.48 (10)

1. The World Competitiveness Yearbook 2001.

2. Cost of living index of goods in major cities, excluding housing, New York City = 100.

Exhibit 6.3
BUSINESS ENVIRONMENT COMPARATIVE FACTORS

Factor	Austria	Canada	France	Germany	Iceland	Italy	Japan	Netherlands	United Kingdom	United States
Distribution infrastructure rating ^{1,2}	8.08 (2)	7.38 (4)	7.94 (3)	8.26 (1)	7.28 (5)	3.14 (10)	6.65 (7)	6.40 (8)	3.55 (8)	7.14 (5)
Skilled labour availability rating ^{1,3}	7.72 (2)	6.85 (5)	6.67 (7)	6.83 (6)	7.83 (1)	5.95 (9)	7.31 (3)	6.36 (8)	5.61 (9)	7.16 (3)
Unemployment rate (%) ¹	4.6 (4)	6.7 (7)	9.7 (9)	7.7 (8)	1.3 (1)	10.8 (10)	4.7 (5)	2.8 (2)	5.2	4.2
Energy self-sufficiency percentage ^{4,5}	33 (7)	152 (1)	50 (5)	39 (6)	n/a	16 (9)	20 (8)	80 (3)	123 (2)	74 (4)
Real GDP per capita growth (%) ¹	2.4 (8)	4.0 (2)	2.9 (6)	3.0 (4)	0.0 (10)	2.9 (5)	1.6 (9)	3.8 (3)	2.5 (7)	4.3 (1)

1. The World Competitiveness Yearbook 2001.

2. On a scale of 0 to 10 indicating the efficiency of the distribution infrastructure for goods and services. High scores indicate efficiency; low scores indicate inefficiency.

3. On a scale of 0 to 10 indicating the availability of skilled labour. High scores indicate easy availability of skilled labour; low scores represent limited availability.

4. International Energy Agency, Key World Energy Statistics for the EIA, 2001.

5. Represents energy production divided by total primary energy supply, where primary energy supply = domestic production + net imports + net stock changes measured in metric tons of oil equivalent.

C. Quality of Life

Personal quality of life factors can also have an impact on site selection decisions. This tends to be particularly true for knowledge-intensive businesses that must attract and retain technical and professional workers in an increasingly global labour market.

The Area Development Corporate Opinion Survey found that most respondents considered quality of life factors to be at least as critical as other factors in the site selection process. Exhibit 6.5 identifies the quality of life factors most frequently identified as important. Exhibit 6.6 illustrates some national-level metrics regarding quality of life factors.

- Recorded crime rates: Rates of recorded violent crime, on a per capita basis, are lowest in Japan, followed by Iceland, Austria, and Italy. Higher violent crime rates are recorded in the Netherlands, the United Kingdom, and the United States. However, caution must be used in making comparisons among countries, as there is little consistency as regards what offences are reported and recorded as violent crimes.
- Overall quality of life: The United Nations Human Development Index represents a broad index that combines a large number of individual quality of life measures, including education, health care, housing, income, and others. In 2001, Canada ranked third on a global basis, the US sixth, Iceland seventh, the Netherlands eighth, and Japan ninth. All of the countries studied were ranked in the top 20.

Exhibit 6.5
QUALITY OF LIFE FACTORS, BY INDICATED FREQUENCY OF IMPORTANCE¹

Site selection factors	Percentage of respondents citing as important
Low crime rate	74.4
Health facilities	65.3
Housing costs	60.6
Housing availability	57.3
Ratings of public schools	57.2
Climate	47.4
Colleges and universities in area	44.8
Cultural opportunities	40.3
Recreational opportunities	39.2

1. Area Development, December 2001. Percentage of total respondents who consider a factor to be either "very important" or "important."

Exhibit 6.6
QUALITY OF LIFE COMPARATIVE FACTORS

Country	Violent crime rate ^{1,2}	Human development index rank ³
Austria	63.8	15
France	294.4	12
Germany	216.5	17
Iceland	38.5	7
Italy	116.4	20
Netherlands	344.7	8
United Kingdom	490.4	13
Canada	242.5	3
United States	574.1	6
Japan	19.2	9

1. The World Competitiveness Yearbook 2001.

2. 1998 number of murders, violent crimes, or armed robberies per 100,000 inhabitants (not comparable across countries).

3. United Nations, Human Development Report, 2001.

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