

C. Research and Development

1. Biotechnology

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

a) Representative Operation – Biomedical R&D

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

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

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

b) International Results

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

c) Selected Cities

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

EXHIBIT 3.58 – BIOTECHNOLOGY		
Biomedical R&D – Summary of Operating Parameters		
Facilities Requirements		
Class A office space leased	45,000 ft2	(4,181 m2)
Other Initial Investment Requirements		
Machinery and equipment – US \$'000	\$500	
Office equipment – US \$'000	\$500	
R&D equipment – US \$'000	\$4,000	
Inventory – US \$'000	–	
Equity financing – % of project costs	100%	
Workforce		
Management	6	
Sales and administration	11	
Dedicated product development	47	
Other	2	
Total employees	66	
Energy Requirements		
Electricity monthly consumption/peak demand	112,600 kWh	and 280 kW
Other Annual Operating Characteristics		
Sales at full production – US \$'000	– ¹	
Operating costs – US \$'000	\$2,000	
Investment in tax-eligible R&D – % of sales	20%	

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

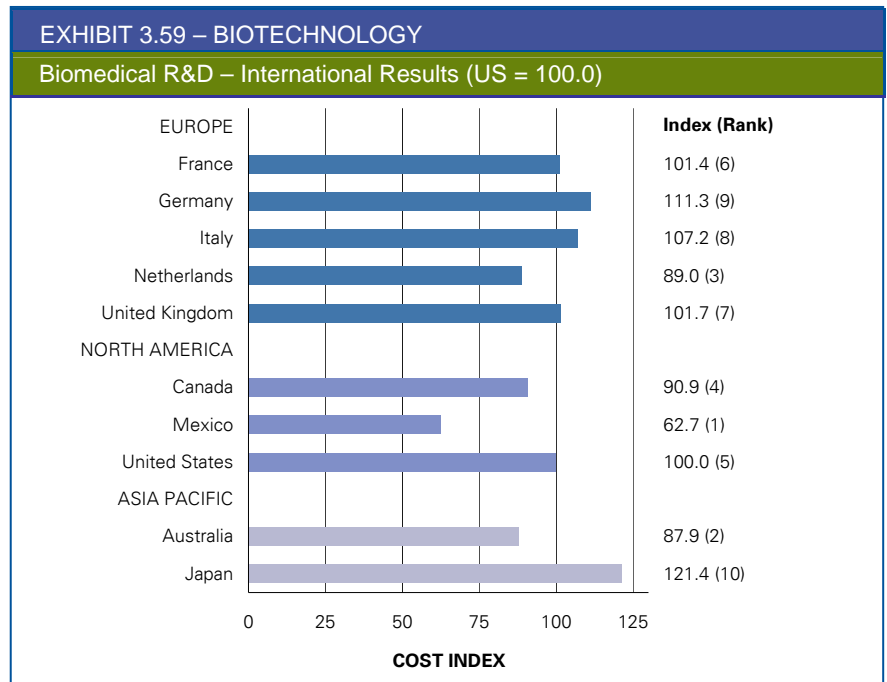


EXHIBIT 3.60 – BIOTECHNOLOGY

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

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

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

EXHIBIT 3.61 – BIOTECHNOLOGY

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

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

1 Rank among 95 cities.