

B. Research & 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 and, according to the Biotechnology Industry Organization (BIO), the US biotech industry alone spent \$19.8 billion on R&D in 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 3.46, 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 3.47. These results reflect the combined impact of 27 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.48.

c) Selected Cities

Exhibit 3.49 profiles results for selected cities, by country, from among the 102 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.10.

EXHIBIT 3.46 – BIOTECHNOLOGY	
Biomedical R&D – Summary of Operating Parameters	
Facilities Requirements	
Class A office space leased	45,000 ft ² (4,181 m ²)
Other Initial Investment Requirements	
Machinery and equipment – US \$'000	\$175
Office equipment – US \$'000	\$850
R&D equipment – US \$'000	\$2,500
Inventory – US \$'000	–
Equity financing - % of project costs	100%
Workforce	
Management	6
Sales and administration	11
Dedicated product development	46
Unskilled laborers	2
Other	1
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	23%

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.

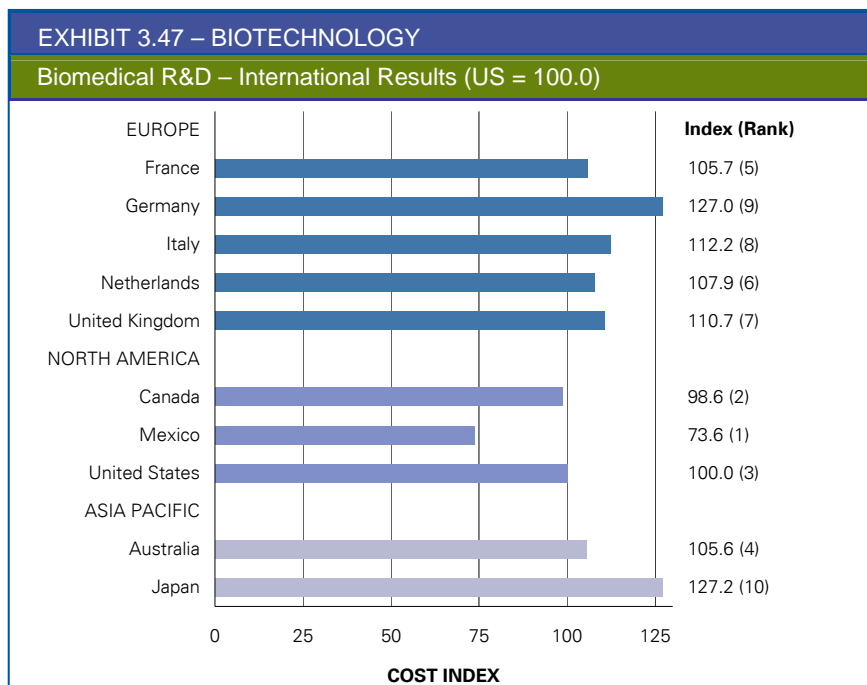


EXHIBIT 3.48 – BIOTECHNOLOGY

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	10,890	12,348	10,751	10,569	11,252	9,940	7,165	9,694	10,484	12,315
Costs										
- Salaries & Wages	3,936	5,929	4,117	5,066	4,756	4,388	2,606	4,158	4,336	5,003
- Statutory Plans	1,673	859	1,308	543	562	269	320	341	550	472
- Other Benefits	777	1,272	1,199	1,699	1,414	834	538	931	1,010	1,397
- Total Labor & Benefits	6,385	8,060	6,623	7,308	6,733	5,491	3,464	5,429	5,897	6,873
- Facility Lease	1,271	873	529	861	1,425	1,267	693	993	1,534	1,682
- Transportation	-	-	-	-	-	-	-	-	-	-
- Utilities	152	203	299	184	172	126	313	104	163	284
- Interest & Depreciation	148	190	227	196	-	141	114	228	36	398
- Non-income Taxes	44	-	194	14	-	112	29	166	-	62
- 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	990	1,122	978	961	1,023	904	652	881	954	1,117
- Income Taxes ¹	(246)	377	476	(610)	(122)	(34)	210	316	115	420
Effective Rate	(24.8%)	33.5%	48.7%	25.5%	(12.0%)	(3.7%)	32.1%	36.5%	12.1%	37.7%
After-tax Profit	1,235	746	502	716	1,145	938	443	560	839	696
Total Annual Costs	9,654	11,603	10,249	9,853	10,107	9,003	6,722	9,134	9,646	11,619
Index (US=100.0)	105.7	127.0	112.2	107.9	110.7	98.6	73.6	100.0	105.6	127.2
Rank	5	9	8	6	7	2	1	3	4	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 3.49 – BIOTECHNOLOGY

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

Country	City	Index	Rank Among 102 Cities	Country	City	Index	Rank Among 102 Cities
France	Paris	117.5	92	Canada	Montreal	94.9	31
	Toulouse	101.2	54		Quebec City	90.5	16
Germany	Erlangen	123.9	98	Saskatoon	92.0	19	
	Frankfurt	137.7	101	Toronto	104.0	66	
Italy	Livorno	112.1	85	Vancouver	107.5	73	
	Vicenza	112.4	88	Mexico	Guadalajara	79.0	4
Netherlands	Utrecht	107.9	74	Monterrey	83.8	7	
United Kingdom	London	151.8	102	United States	Atlanta	97.9	41
	Plymouth	108.4	78		Baltimore	100.2	50
Australia	Brisbane	108.1	76		Boston	113.2	90
	Melbourne	103.8	65		Chicago	113.1	89
Japan	Fukuoka	129.2	99		Hartford	106.7	70
					Indianapolis	102.2	60
					Minneapolis	106.8	71
					Raleigh	97.0	35
			San Diego		110.8	82	