Chapter 1

A Dynamic Model of Organizational Planning

Where Do the Firms Discover Emerging Technological Know-how?

Abstract: The direction of organizational planning has shifted over the years from operating efficiency to financial returns, integrated with a strategic responsiveness to the dominant stakeholder groups. The focus on operating efficiency matured by the 1950s, with a near-universal adoption of scientific management principles. Since mid-1950s, the firms pursued a variety of techniques for improving their financial effectiveness. The targeted financial criteria evolved over time from simple return on equity in 1960s, to a more comprehensive return on total assets in 1970s, and then to growth in stock market valuation in 1980s, and present value of cash flows generated in 1990s. The relevant stakeholder group moved from the principal entrepreneurial owners of the 1950s, mass shareholder groups of the 1960s, conglomerate holding companies of the 1970s, and employee stockholders of the 1980s, to the loyal customer groups and risk-averse institutional funds of the 1990s. It is proposed that the firms fulfil the demands of their stakeholders more proficiently through strategic alliances with various localized vendors, who offer their distinctive services at costs that sustain the cash flows perpetually.

Introduction

Over the recent years, there has been a great deal of academic interest in the strategic value of firm-specific resources. In one of the most influential article on the resource-based view of the firm, Dierickx and Cool (1989) note the essential rent-generating properties of the resources to be firm-specificity, tacitness, and stickiness, together constituting credible and enforceable barriers for the competitive market access to these resources. From the perspective of organizational planning, if the firms seek to derive rents from resources that are non-tradable, then the vendors of tradable resources suffer entropy in their competitive advantage. Consequently, there are

diminished incentives for the market to offer tradable resources, and thus the productivity of the rent-generating marketing initiatives of the firm is significantly hindered. Under these conditions, the firms are forced to acquire alternative resources not as profitable.

Rumelt (1982) analyzed data on the revenues derived by the Fortune 500 firms in the US under varying organizational conditions, over time between 1949 and 1974. These conditions included the reliance on firm-specific capability, evaluated as the percentage of firms deriving at least 70% of the revenues from one business unit, with at least half of those revenues from the same common core skill, strength, or resource. The firms using firm-specific capability, including those in the single, dominant constrained, related constrained or related linked, businesses were profitable. Others, including those in the dominant vertical, dominant unrelated link, and unrelated businesses, were not. As is evident from Table 1.1, still diversification outside the domain of firm-specific capability increasingly dominated the ability to sustain large sales volumes, even though such diversification had a detrimental impact on the asset profitability.

Table 1.1: Profitability and Development of Corporate Organization in the US

Organization Category #	Impact on Profitability	Year	Percentage of Fortune 500 Industrials in Categories	
1.Single Business	0.48		# 1 only	# 1 to 4 only
2.Dominant Constrained	0.86	1949	42.0%	81.9%
3.Related Constrained	1.39	1954	34.1%	80.7%
4.Related Linked	0.74	1959	22.8%	75.8%
5.Dominant Vertical	-1.70	1964	21.5%	72.5%
6.Dominant Link-Unrelated	-1.05	1969	14.8%	65.4%
7.Unrelated Business	-1.94	1974	14.4%	62.9%

On account of their diminishing profitability, the US firms experienced escalating pressures to keep up their growth. Brush, Bromiley and Hendrickx (1997) analyzed 686 business unit level observations of the US corporations that operated in exactly three business units at least for three successive years over the period 1986-95. The three business units, on average, accounted for 51%, 29%, and 20% of the total corporate assets. Marketing power explained 2.2% of the total variation in business unit performance, while the manufacturing power just 0.5% of

the total variation. Table 1.2 highlights that the largest business unit focused on an integrative marketing of the corporate resources to the targeted industry. The middle business unit exploited the firm-specific rents to develop innovative applications for totally new industrial segment. The smallest one linked the creative technological know-how from an industry outside the dominant corporate domain, for an overall growth in the firm-specific capability.

Table 1.2: Sources of Business Unit Performance Variations in the US

	Corporate-effect	Industry-effect
Business Unit 1	17.5%	2.3%
Business Unit 2	17.9%	0.2%
Business Unit 3	6.2%	3.0%
Average	13.8%	1.8%

Asch (1951: 177-180) studied "the social and personal conditions that induce individuals to resist or to yield to group pressures when the latter are perceived to be *contrary to fact*... The group in question had, with the exception of one member, previously met with the experimenter and received instructions to respond at certain times with wrong – and unanimous – judgments… Both the members of the majority and the critical subjects were male college students. We shall report the results for a total of fifty critical subjects in this experiment… There was a marked movement toward the majority. One third of all the estimates in the critical group were errors identical with or in the direction of the distorted estimates of the majority. The significance of this finding becomes clear in the light of the virtual absence of errors in control groups the members of which recorded their estimates in writing." Kanter (1983) in the work The Change Master elaborates, "The new practices implied by an innovation need to produce results and a success experience for the people using them… A number of integrative actions can help weave the innovation into the fabric of the organization's expected operations. Changes in training and communication are important. People need to learn how to use or incorporate the new structure or method or opportunity… Leaders or prime movers have to demonstrate that they want the changes and continue to push for them even when it looks as if things might slide back."

Chemers (1997: 114-115) inquired "whether the general principles or specific characteristics of leadership processes are affected by cultural or subcultural differences," and highlighted, "An initial question concerns whether there is sufficient variation across groups to warrant a concern with the generalizability of our theories…. Punnett and Ronen (1984) reviewed 25 studies that assessed national differences in work-related attitudes and values. They reported that 17 of the studies revealed significant national or cultural differences explaining between 15 and 63% of the variance in individual responses… For most of world history,… technologies based on hierarchical authority systems requiring reliable and obedient workers tended to develop religious and political systems consistent with the values that would support those demands. Over time, the adaptive patterns became traditions passed from one generation to another, stabilizing the institutions, norms, and values that maintain the system."

As a first step, two fundamental forces in the rent-generating value of the firm-specific resources might be highlighted: (1) Trading complementary technological resources, demonstrating flexible applicability in diverse industrial applications, from the outside vendors. (2) Developing innovative linkages between the traded resources and the firm-specific know-how, for opening up further industrial applications. This work appraises the alternative techniques for trading technology, and recommends further analysis of the second force.

Strategic Value of Trading Technology

The US has been enjoying unusual growth in the value-added over the recent years, even as Japan is suffering an equally unusual recession. The overseas institutions are currently committing more than $200 billion a year of portfolio assets to the US market, compared to just $70 billion committed to the Japanese market. In exchange, the US mutual funds, pension, insurance and banking institutions are seeking to promote substantial worldwide growth. They managed 45% of the total $22,000 billion of global funds in 1995, compared to just 34.1% managed by the European, 17.8% by the Japanese, and 3.1% by the Asian institutions (Financial Times, April 24,

1997: 1). For instance, Travelers Group, scheduled to merge with Citibank, acquired 26% equity, valued at $1.6 billion, in Japan's third largest stockbroker, Nikko Securities over June 1998. As such, several Japanese firms recorded tremendous profitability over the recent years. Supported with the substantial US networks, Honda added CR-V to its multipurpose recreational portfolio. Toyota introduced a new minisport-utility, RAV4. RAV4, made only in Japan, was designed to target the popular US demand. With the upgraded 4Runner and luxurious Lexus vehicles, Toyota's exports to the US surged 232% to 56,952 vehicles in January 1997 from a year earlier. This was the "first time in which January exports had risen year-to-year since 1990." (The Wall Street Journal, 1997: A 2) On the whole, Japan's motor vehicle exports to the US rose by 75% in January 1997 compared to January 1996.

The growing fundamentals help the workforce generate super-normal rents: after falling from a base of 100 in 1985 to 96.0 in 1989, the Japanese unit-yen wage-index jumped sharply to 118.3 in 1993 and was at 115.8 in 1995. In contrast, the unit $ wage index in the US, after edging up to 107.3 in 1991, fell to 105.6 by 1995 (Financial Times, 1996: 7). Further, the firms can also improve their global competitiveness, and the consumers can enjoy cheaper products. Japan's producer's price index fell from 100 in 1985 to 92.0 in 1995, while that in the US went up to 122.2 in 1995. While the $ consumer price index in the US surged from a base 100 in 1985 to 141.7 in 1995, the yen consumer price index in Japan edged only to 115.9 in 1995. The overall gains were only accelerated by the wealth-effect of near tripling of the $ value of yen between 1985 and 1995. In this regard, Schumpeter (1911: 133-134) illustrated the catalyst value for innovative rents, "As an example... the choice of a new and cheaper source of supply for a means of production, perhaps a raw material may be cited. This source of supply did not exist previously for the economic system. No direct and regular connection existed with its country of origin... But if someone establishes a business having regard to this source of supply, and

everything goes well, then he can produce a unit of product more cheaply... he is an entrepreneur, his profit entrepreneur profit."

As an another illustration, one might highlight the experiences with the network software R/3 designed by a German firm, SAP AG. SAP AG, the world's fourth largest software firm, had a sales of $2.4 billion growing @38% in 1996. SAP had a leading 26% share in the global enterprise software market, far ahead of the second placed Oracle Corp.'s 8%. In 1996, global consulting revenues relating to the enterprise software were a strong $5.6 billion. SAP was being used by more than 7,000 corporate clients in the US alone. The global software leader, Microsoft Corp., invested $25 million over a period of 10 months, for replacing 33 different accounting systems in 26 subsidiaries with a single standardized SAP package. Microsoft called the transition an "incredible success story" that generated $18 million worth of annual savings. Similarly, Owens-Corning Fiberglass Corp. had disparate computer systems, whose maintenance cost stood at $30 million annually, and which impeded the firm's ability to "offer one-call shopping for all the exterior siding, insulation, pipes and roofing material that builders need." It invested $15-20 million in the SAP software, and another $80-85 million in the external consulting, employee training, and installation costs. Its Chief Executive noted "We have no savings as of yet," but emphasized the value of long-term commitment. The oil big-weight Chevron Corp. was expecting to generate $50 million of annual cost savings on its $100 million of SAP investment. Coca-Cola Co. had also formulated a "Project Infinity" with a worldwide SAP installation investment outlay of $300 million. The project heralded benefits such as allowing "a manager in Atlanta to be able to look at a table on a PC or laptop and know up-to-minute how sales of 20-ounce bottles of Coke Classic are doing in India." In another major market breakthrough, General Motors decided to invest $1 billion over a period of two-to-four years on SAP, after a successful test installation on twenty corporate sites. General Motors also

committed to motivating the whole range of its global vendors to make complementary investments, for real time networking (The Wall Street Journal, 1997: A1, A12).

The resources traded from the vendors usually generate super-normal spillovers. After rapidly growing through the assembly of intermediate inputs, IBM initiated an integrated System 360 mainframe in the early 1960s. Using additional human capital from the market, IBM sought to internalize an increasing proportion of components, keeping its design programs proprietary. By the late 1970s, several new personal computer firms emerged, all assembling inputs traded from various known and unknown vendors, and contested a growing share of the computer market. As a result, after reaching a peak of $175.875 in August 1987, the value of IBM's stock tumbled to $40 by 1993. Since then, under a new top management team hired from the mature consumer products industry, IBM worked with the second-hand dealers to phase out maintenance-intensive, old and bulky, mainframes of its prime customers. It then helped these customers to make a transition to smaller, cheaper, and more functional personal computers. Table 1.3 highlights that the technical services became the fastest growing revenue segment of IBM, with sales rising by 115.9% over 1993-97. The sales growth of 100.3% in the personal computers segment was close behind. Though the sales of core mainframe and maintenance operations took a beating, the losses were more than compensated by the emergent demand for software catering to the transitional functions. By January 1997, IBM's per employee revenue had surged 58% since 1993, and the value of IBM stock had recovered to more than $170.

Table 1.3: Business Unit Level IBM Sales 1992 and 1996, in US$ billion

Product	*1992*	*1996*	*Change*
PCs	6.27	12.56	100.3%
Services	7.35	15.87	115.9%
Maintenance	7.64	6.98	-8.6%
Mainframes	10.13	5.61	-44.6%
Software	11.11	13.05	17.5%
Others	22.35	21.88	-2.1%
Total	64.85	75.95	17.1%

Source: The Wall Street Journal (March 25, 1997: B1)

Hypothesis Formulation

For a sustainable competitive advantage, several Japanese firms are seeking services of the leading American firms. In the auto assembly, four Japanese firms have equity stakes from the Big-3 US assemblers: Isuzu Motors, Mazda Motors, Mitsubishi Motors, and Suzuki Motors. Toyota, and its core affiliates, Daihatsu, Toyota Auto Body, and Nippondenso, have focused more on their independent initiatives for organizational learning.

Sample and Data Source: The data on the four American affiliates, and four Toyota group members, are taken from the NIKKEI NEEDS database, with the assistance of Takahiro Fujimoto at the University of Tokyo. The data are for the main operations of the firm, excluding all affiliates or subsidiaries. The data for each firm are for 7 years, from 1987 to 1993. The data were converted from the varying accounting years, to a common calendar year basis. The data were translated into the US$ from yen, for the appraisal of international-level performance.

Two aspects of performance are evaluated: (1) Firm-specific services, or **human-effect**, measured as value-added/employee. (2) Networked services, or **trading-effect**, measured as gross profits/employee. Table 1.4(a) shows that the human-effect of Toyota group reached a peak of $185,923 in 1988, and fell sharply over the next three years, before picking up again. The human-effect of American affiliates peaked at $142,849 in 1988, but the subsequent decline was contained. In 1992, American affiliates gained an edge over the Toyota group, even though their human-effect was just $117,390 in 1987, compared to Toyota group's $153,443. American affiliates realized rapid growth in trading-effect over the period. Toyota group, in contrast, lost its pre-eminent position by 1991, as its trading-effect rapidly fell after 1989. In 1993, Toyota group diminished the gap in trading-effect, and again took an edge in human-effect.

Table 1.4(a): Performance of American Auto Affiliates in Japan and Toyota Group

	Human- Effect		**Trading- Effect**	
	American Affiliates	Toyota Group	American Affiliates	Toyota Group
1987	117,390	153,443	49,637	60,654
1988	142,849	185,923	62,316	77,207
1989	138,520	171,687	67,655	79,902

1990	141,413	160,831	73,259	76,445
1991	154,708	160,383	74,744	66,918
1992	167,373	162,673	76,792	61,223
1993	174,054	175,723	76,927	64,985

To evaluate the sources of improved trading-effect, two aspects of intermediate assembly are studied: (1) external **material power**, measured as the (purchased input cost including subcontractor's fee)/sales, and (2) internal **kaizen power**, measured as (cost of goods sold – manufacturing labor cost – purchased input cost)/sales. Table 1.4(b) shows the percentage data. A strong material power supported the revenues of American affiliates until 1991. Toyota group rapidly caught up, especially beginning 1989, and acquired an edge in the material power after 1992. American affiliates relied on a lower, and diminishing, level of kaizen power until 1990. The kaizen power of Toyota group fell at a faster rate, and by 1993 was slightly less than that of the American affiliates. The kaizen power of the American affiliates rapidly increased after 1990, and the material power gradually diminished after 1991.

Table 1.4(b): Intermediate Assembly by American Auto Affiliates in Japan and Toyota Group

	Material Power		Kaizen Power	
	American Affiliates	Toyota Group	American Affiliates	Toyota Group
1987	73.37%	67.67%	9.39%	13.06%
1988	73.46%	67.90%	9.07%	12.31%
1989	74.16%	70.09%	7.31%	9.65%
1990	74.71%	72.46%	6.14%	8.03%
1991	75.27%	74.84%	6.61%	8.28%
1992	74.57%	76.27%	7.72%	8.34%
1993	74.47%	76.45%	8.21%	8.11%

To evaluate the growing competitive advantage of the Toyota group, two forces are analyzed: (1) **transaction cost**, measured as (general and administrative overheads)/sales, and (2) **reputation cost**, measured as (selling, advertising, and distribution costs)/sales. Table 1.4(c) presents the percentage data. As is evident, in general, American affiliates had a significantly higher transaction as well as reputation cost than the Toyota group.

Table 1.4(c): Cost-effectiveness of American Auto Affiliates in Japan and Toyota Group

	Transaction Cost		Reputation Cost	
	American Affiliates	Toyota Group	American Affiliates	Toyota Group
1987	3.71%	3.61%	7.24%	5.27%
1988	3.76%	3.44%	6.96%	5.28%
1989	4.17%	3.57%	7.46%	5.37%
1990	4.27%	3.52%	7.92%	5.31%
1991	4.18%	3.19%	7.76%	5.27%
1992	4.16%	3.10%	7.28%	4.91%
1993	4.42%	3.22%	7.25%	4.81%

Thus, a greater reliance on the competitive market resources could significantly improve the innovative product offerings of the firm. Therefore it is proposed that:

Hypothesis: Organizational Planning and Manufacturing Parity

The greater the resources freed to the (real) market for corporate control, the better the quality of technological servicing.

Operational Measures

The competitive innovative know-how of the vendors boosts the quality of a firm's technological services. Table 1.5(a) presents the regression of Material power, Kaizen power, Transaction cost, and Reputation cost, of the American affiliates on their human-effect and trading-effect. The data are at the firm level for seven years. The intercepts yield the **quality-effect** of American servicing. The t-values are in brackets. As is evident, the high quality of American services helped conserve the material power and reputation cost, while adding to the kaizen power and transaction cost [compare quality-effect with Tables 1.4(b) and 1.4(c)]. Trading-effect obviated the kaizen power, and promoted reputation and transaction costs. Human-effect conserved the material power and reputation cost, and boosted kaizen power.

Table 1.5(a): Reengineering Initiatives of the American Auto Affiliates

	Material Power	Kaizen Power	Reputation cost	Transaction cost
Quality-effect	0.7349 (159.312)	0.0850 (24.502)	0.0718 (37.541)	0.0429 (39.053)
Trading-effect	-2.3×10^{-7} (-0.806)	-6.8×10^{-7} (-3.173)	8.43×10^{-7} (7.087)	3.73×10^{-7} (5.466)
Human-effect	-7.1×10^{-7} (-3.865)	7.22×10^{-7} (5.203)	-4.4×10^{-7} (-5.774)	0.86×10^{-7} (1.960)
R sq.	0.611	0.524	0.673	0.793

Table 1.5(b) is analysis for the Toyota group. High quality of freely available resources helped Toyota group conserve the material power and transaction cost, while fostering kaizen power and reputation cost. Trading-effect conserved material power, and boosted kaizen power, reputation cost as well as transaction cost. Human-effect had an opposite balancing-effect.

Table 1.5(b): Resource Spillovers of American Auto Affiliates to the Toyota Group

	Material Power	Kaizen Power	Reputation cost	Transaction cost
Quality-effect	0.6984 (43.545)	0.1032 (13.333)	0.0641 (13.582)	0.0389 (14.476)
Trading-effect	-33×10^{-7} (-2.612)	12.9×10^{-7} (2.091)	22.3×10^{-7} (5.940)	9.45×10^{-7} (4.417)
Human-effect	24.6×10^{-7} (2.923)	-8.7×10^{-7} (-2.150)	-11×10^{-7} (-4.438)	-5.8×10^{-7} (-4.144)
R sq.	0.264	0.156	0.679	0.439

Thus, there is a need to correct for the **entropy-effect** in the realized service quality.

Test of the Hypothesis

The diminishing free-market compensation from the lead firms motivates the vendors to service competing groups. The overall **kaizen-effect** of the American affiliates is measured as "residuals of a dependent factor for a year aggregated over the four affiliates." The group-specific **reputation-effect** of the American affiliates is measured as "residuals of a dependent factor for a year aggregated over the four affiliates – residuals for a year aggregated over the four affiliates and over the four dependent factors." The incremental value of the Toyota group's services is measured as "aggregate million $ value of sales for the four Toyota members in a year – aggregate million $ value of all four residuals for all the four Toyota members in a year." The incremental **quality** of the Toyota group's services is measured as "(aggregate $ value of sales for the four Toyota members in a year – aggregate $ value of all four residuals for all the four Toyota members in a year)/ aggregate $ value of sales for the four members in a year." Table 1.6(a) is the regression of the incremental value and quality of the Toyota group's services on the kaizen-effect and reputation-effect of American affiliates. A comparative analysis is also conducted for the incremental value and quality of American affiliates on the kaizen-effect and reputation-effect of Toyota group. The intercepts yield the unique **group-effect**. The t-values are in brackets.

Group-level control over the vendors was highly volatile, and generated at best negative effects on the technological services. American affiliates tended to enjoy beneficent kaizen power, even as the Toyota group had to eschew the rent-appropriating kaizen power. Reputation-effect yielded super-normal value and quality benefits to the Toyota group, though American affiliates also enjoyed improved technological servicing.

Table 1.6(a): Vendor Services Cross-over for the Toyota Group and American Affiliates

	Toyota Group Value	Toyota Group Quality	American Affiliates Value	American Affiliates Quality
Group-effect	-95.1 (-0.633)	-0.0021 (-0.960)	-28.8 (-0.627)	-0.0001 (-1.056)
Kaizen-effect	-36,804.6 (-1.421)	-0.4091 (-1.095)	1,387.1 (0.700)	0.0503 (1.279)
Reputation-effect	170,219.2 (6.184)	2.2855 (5.756)	18,622.5 (7.676)	0.404 (8.382)
R sq.	0.815	0.805	0.817	0.852

Quality-effect is measured as the "residual of the quality equation." **Value-effect** is measured as the "residual of the value equation." Table 1.6(b) presents the correlation among the quality- and value- effects of the American affiliates and Toyota group. The improved quality of the US affiliate services cut the value of Toyota group's services, but enhanced the overall value of the US affiliate services. The improved quality of the Toyota group's services imparted a premium to the group's services, which in turn limited the quality of the US affiliate services.

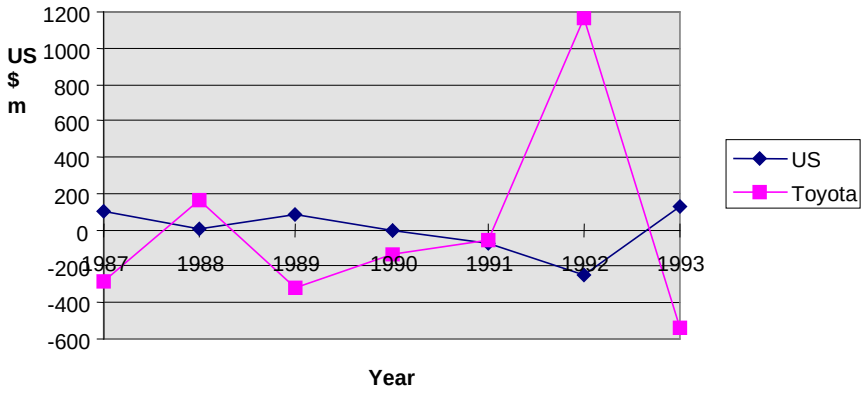
Table 1.6(b): Technological Servicing Correlation of Toyota Group and American Affiliates

	American quality-effect	American Value-effect	Toyota Value-effect
American quality-effect	1.000	0.9262	-0.8145
Toyota quality-effect	-0.7871	-0.8437	0.9057
Toyota value-effect	-0.8145	-0.7183	1.000

The value-effect of the American affiliates and Toyota group is illustrated in Figure 1.1. In general the American affiliates enjoyed a stronger value-effect. Toyota group was led to discover the new emerging options, the benefits of which reached a strong $1162 million in 1992. This corresponded to a year when the imports of Toyota alone from the US vendors jumped to a

peak of $2 billion, soon after the commissioning of a second assembly line in the Kentucky transplant. However, the value accrued by the Toyota group rapidly diminished in 1993.

Figure 1.1:
Super-normal Gains of Toyota Group



Correction Factor for the Entropy-effect

The firms might limit the entropy in the value of their technological services by trading additional resources from the local markets, and marketing higher quality products globally at lower costs.

Sample and Data Source: The industry segment-level data for the US are published in the Annual Survey of Manufacturers. The National Bureau of Economic Research has classified the data for the period 1961-90 on a comparable basis. The data were taken for the auto-assembly and auto-parts segments. The cost-effectiveness of technological services is evaluated on two parameters: (1) **Trading power**, measured as trade/sales, and (2) **Servicing power**, measured as trade balance/sales. Two sources of cost-effectiveness are evaluated: (1) **Corporate-effect**, measured as (fixed investments during a year – gross profits during the year), (2) **Vendor-effect**, measured as (material costs during a year – gross profits during the year). For both auto assembly as well as parts, Table 1.7(a) presents the regression of trading power and servicing power on the corporate-effect and market-effect, over the period 1961-90. The intercepts yield the **globalization-effect** of the American work system. The t-values are in brackets.

Globalization-effect had a negative impact on the trading power, and a positive impact on the servicing power, of the auto assembly. Vendor-effect exerted a balancing opposite effect, while the corporate-effect supported the globalization. Sustained globalization-effect improved the trading power of the auto parts, while the vendor-effect exerted a balancing opposite effect.

Table 1.7(a): Globalization of the American Auto Industry

	Automotive Assembly		Automotive Parts	
	Trading Power	Servicing Power	Trading Power	Servicing Power
Globalization-effect	-1.927 (-2.684)	1.596 (2.532)	0.693 (3.161)	0.124 (1.290)
Vendor-effect	2.909 (3.477)	-2.268 (-3.088)	-1.069 (-4.821)	-0.021 (-0.219)
Corporate-effect	-4.000 (-2.401)	3.293 (2.251)	0.556 (0.751)	0.436 (1.340)
R sq.	0.424	0.341	0.533	0.080

The newly discovered vendor know-how offers opportunities for upgrading the network-wide services. **Development** of firm-specific resources is measured as the "number of technical personnel/ number of production personnel." **Cost** of development is measured as the "wages of technical personnel/ wages of production personnel." Table 1.7(b) presents the regression of the development and cost of firm-specific resources on the corporate-effect and vendor-effect.

Globalization-effect boosted the development of auto assembly, compared to the auto parts, but the costs of this development were quite inflationary. Vendor-effect reduced the development as well as costs of the auto assembly, at rates far exceeding that of the auto parts. Corporate-effect promoted a super-normal development of the auto assembly, at costs that were quite competitive with the global developmental costs of the auto parts operations.

Table 1.7(b): Organizational Development of the American Auto Industry

	Automotive Assembly		Automotive Parts	
	Development	Cost	Development	Cost
Globalization-effect	0.569 (6.179)	0.747 (5.979)	0.313 (4.925)	0.397 (5.957)
Vendor-effect	-0.414 (-3.857)	-0.570 (-3.918)	-0.143 (-2.228)	-0.152 (-2.253)
Corporate-effect	0.849 (3.976)	1.076 (3.714)	0.155 (0.722)	0.232 (1.031)
R sq.	0.370	0.362	0.172	0.163

The initial **learning-effect** on the development of auto assembly is measured as "residuals of the development equation for the auto assembly segment," and its cost as "residuals

of the compensation equation for the auto assembly segment." The subsequent **learning-effect** on the trading power of the auto parts is measured as "residuals of the trading power equation for the auto parts segment," and its servicing power as "residuals of the servicing power equation for the auto parts segment." The impact of knowledge **spillovers-effect** over time is measured as the "learning-effect * Dummy = 1 if year > 1975." The impact of spillovers on the trading power of the auto assembly is termed as **trading-effect**, and measured as the "residuals of the trading power equation for the auto assembly segment." The related servicing power is termed as **servicing-effect**, and measured as the "residuals of the servicing power equation for the auto assembly segment." The impact of spillovers on the development of auto parts operations, **development-effect**, is measured as the "residuals of the quality equation for the auto parts segment." The related costs, **cost-effect**, are measured as the "residuals of the compensation equation for the auto parts segment." Table 1.7(c) presents the regression of auto assembly's trading-effect and servicing-effect on the diffusion- and spillovers- effects of the auto parts. It also shows the regression of auto parts development- and cost- effects on the diffusion-effect and spillovers-effect of the auto assembly. The intercepts yield the **localization-effect** of American services. Cum R sq. reflects the overall technological growth. The t-values are in brackets.

There was no significant long-term local-effect of the American technological services. The learning from the auto parts know-how added to the trading as well as servicing effectiveness of the auto assembly. The spillovers to the auto parts partially neutralized this effectiveness.

Table 1.7(c): Competitive Advantage of the American Auto Industry

	Automotive Assembly		Automotive Parts	
	Trading-effect	Servicing-effect	Development-effect	Cost-effect
Localization-effect	0.010 (0.616)	-0.023 (-1.322)	0.000 (0.018)	-0.001 (-0.184)
Leaning-effect	1.548 (3.984)	4.700 (3.497)	0.706 (1.745)	0.447 (1.366)
Spillovers-effect	-0.487 (-1.029)	-3.184 (-2.152)	0.044 (0.082)	-0.210 (-0.437)
R sq.	0.660	0.515	0.228	0.089
Cum. R sq.	0.804	0.680	0.361	0.237

Where Do the Firms Discover Emerging Technological Know-how?

The assembly operations attract high skilled low cost vendors, whose services have been hitherto localized. Nakamura (1983: 189) explains that over the early 20th century, the introduction of electricity in Japan "so transformed manufacturing processes that consumer goods production for the masses could no longer be adequately handled by cottage industries. The major locus of production shifted to real factories. Based on the supply of cheap electricity and the spread of electric motors, machinery that had been invented earlier was introduced from abroad. The industrial revolution in advanced nations was caused by the very invention of machinery to produce consumer goods, but in Japan it was the dissemination of electricity that brought industrial transformation of consumer goods production… Very often problems of excess power arose where hydroelectric power plants were built. So it was desirable to relieve the excess by attracting industries that consume much electricity. Moreover, owing to stoppage of imports of chemical industry products during the war, one after another new firms were established in [electro-chemical, electric-based refining, soda, carbide, and ammonium sulfate] fields."

Sample and Data Source: The raw annual data relating to the investments in Japan over the period 1901-1930 were taken from Nakamura (1983). During this period, which corresponded to the investments based on the donations received from China and subsequent spillovers during the World War I, the value of yen remained essentially stable at US$0.5. Earlier, between 1871 and 1900, the value of yen had fallen sharply from $1.0 to $0.5. After 1930, with the exhaustion of discovered resources, the value of yen again began a rapid fall, reaching $0.234 in 1940 and $0.003 in 1950. Table 1.8 presents summary data for the gross capital formation of the government and private sector, loan-generating power of the largest five national and other smaller local banks, manufacturing wage growth of the male and female workforce (measured as wage index, base = 1930), and the machinery investment. After falling to a record low during the World War I period, the capital forming services of the government rose to record heights

over the 1920s, and limited the private capital formation. The largest national banks accumulated large deposits, amidst limited demand for loan capital. The smaller local banks had been more active in discovering new loan options, but faced depressed conditions during the World War I and subsequently over the late 1920s. Under these conditions, the investments into machinery rapidly fell after the boom of the World War I period.

Table 1.8: Planning Parameters in the Pre-war Japan (1 Yen ~ 0.5 US$)

	Gross Capital Formation in million Yen		(Loans – Deposits) /Paid up capital		Manufacturing wage Index 1930=100		Investments in million yen
	Government	Private	Big-5	Others	Male	Female	Machinery
1901-05	84.5	207.0	-1.51	0.71	18.76	24.77	116.0
1906-10	149.0	389.6	-1.07	0.51	22.92	31.27	213.2
1911-15	200.0	531.2	-0.45	0.55	26.31	36.59	331.0
1916-20	375.6	1436.4	-1.39	-0.09	57.72	78.88	1095.8
1921-25	820.5	1766.9	-1.52	0.40	102.13	131.30	831.0
1926-30	940.8	1524.7	-3.23	-0.45	104.26	117.21	732.8

By 1920, Japan had made foreign investments worth Yen 2200 million, up from just Yen 460 million in 1914 (Nakamura, 1983: 153). After the World War I, Japan enjoyed unusual reduction in the costs. General wholesale cost index fell 41% during 1920, while the cost of cotton yarn and imported steel by 73% and 63% respectively. The US also enjoyed similar effects: from spring 1920 to summer 1921, the general wholesale costs in the US dropped by 44% and the raw material costs by 51%. Thence, when Kanto region of Japan suffered a devastating earthquake in 1923, Japanese government participated actively in the capital formation, and put moratorium on debt repayments. The sustained capital shortages led to a deflationary policy in 1925, serving to create a major financial panic in 1927. By late 1930, Japan gave up the gold standard parity, and sought direct merger and acquisition of the Chinese market.

The impact of common global knowledge on the collective community initiatives, **government-effect**, is measured as the annual gross capital formation of the government. The impact of locally generated knowledge on the private initiatives, **corporate-effect**, is measured as

the annual gross capital formation of the private sector. The following presents the regression of the annual investments into machinery (machine power) on the government-effect and corporate-effect. The t-values are in brackets. As is evident, common knowledge significantly depressed the machinery power, but the localized know-how sustained the corporate factories.

Machine Power = 39.070 – 0.681 Government-effect + 0.826 Corporate-effect R sq.: 0.908
(1.00) (-5.25) (12.15)

The impact of localized know-how on the loan-generating power of the small local banks is termed as **local-effect**. The impact of the diverse localized services on the loan-generating power of the Big-5 national banks is termed as **global-effect**. The following is the regression of the machine power on the local-effect and global-effect. The t-values are in brackets. As is evident, the loans for supporting the localized know-how obviated the machine power. The global efforts to boost the power through a mass assembly of local resources were not fruitful.

Machine Power = 875.668 – 679.706 Local-effect + 95.536 Global-effect R sq.: 0.502
(6.25) (-4.66) (1.45)

Under these conditions, banks increasingly invested their deposit funds for equity financing of new steel and chemical initiatives, with a special focus on the construction, warehousing, insurance, and trading services relating to the material resources imported from the overseas. These new industries relied on the male workforce, compared to the earlier textile sector where the manufacturing was a domain of the female workforce. Therefore modernization is evaluated as **male-effect**, measured as the manufacturing wage index for male workers. The mass consumer demand for the traditional products is evaluated as **female-effect**, measured as the manufacturing wage index for female workers. The following presents the regression of machine power on the male-effect and female-effect. The t-values are in brackets. As is evident, female-effect significantly boosted the machine power, while the male-effect tended to lock the demand.

Machine Power = 78.885 –11.602 Male-effect + 15.950 Female-effect R sq.: 0.629
(0.96) (-1.65) (2.71)

The catalyst force of the new overseas demand on the machine power is termed as **marketing-effect**, measured as the residual of the government-corporate machine power equation. The catalyst force of the new imported machinery is termed as **manufacturing-effect**, measured as the residual of the local-global machine power equation. The catalyst force of the newly discovered local services internationally is termed as **trading-effect**, measured as the residual of male-female machine power equation. The following presents the regression of marketing-effect on the manufacturing-effect and trading-effect. The t-values are in brackets. As is evident, manufacturing-effect had a significant negative impact on the global marketing. The discovery of localized trading options helped to generate innovative consumer products.

Marketing-effect = 0.000 –0.162 Manufacturing-effect + 0.419 Trading-effect R sq.: 0.711
(0.000) (-3.57) (7.94)

Conclusions and the Recommendations for Further Research

Recently several attempts have been made to research a systematic organizational approach to development. Some of the prominent international level efforts include the 1992 Rio de Janeiro United Nations Conference on Environment and Development, 1994 Cairo International Conference on Population and Development, 1995 Copenhagen World Conference for Social Development, and 1995 Beijing World Conference on Women: Action for Equality, Development and Peace. The development has been discovered to encompass "all aspects of human existence," of which economics is only a part, and in which family – in particular "motherhood" – plays a fundamental role as the "basic unit of society." (United Nations Organization for Education, Science and Culture, 1994: 34-35) For material growth in the standards of living, it is essential to harness the cultural resources from the diverse developmental domains, including personal, private, psychological, physiological, public, professional and political. Poor nourishment, bordering on impoverishment, can severely hinder the infant survival and life expectancies, as is particularly evident from the Sub-Saharan African experiences. Even the families in the more prosperous South Asia can afford any health staff,

traditional or modern, for less than half of the births, and therefore suffer high maternal mortality during pregnancies (United Nations Development Program, 1995: 36).

Despite the severe resource base constraints, the economically impoverished nations have considerable local know-how for developing highly productive commercial services. In India and China, for instance, the high yielding variety seeds engineered by the local scientists have received whole-hearted endorsement of the farmers, and boosted the overall farm production to sustain the growing population base despite limited machinery purchasing power. The feasibility of multiple cropping under new system innovative ideas from the women workforce, such as conversion of the household waste material into manure and fuel, for enriching the land fertility. Such innovations generated savings in both initial capital outlays and subsequent operating costs.

The experiences of both the fast growing economies such as Indonesia and Thailand, as well as of the shrinking economies such as Peru and Slovenia, show that the school education motivates the workforce to offer creative insights for boosting the productivity of normal technological investments. In Peru, the development value of the creative ideas of workforce with full secondary schooling in Peru is 52% higher, of workforce with some secondary schooling is 25% higher, than of workforce with no secondary schooling. Creative development helps the firms offer distinctive services to the worldwide customers. Such Taiwanese chemical firms as market their products internationally, invest three times in the development of creative workforce ideas, than those targeting just the small domestic market. (World Bank, 1995: 36-39)

A major constraint in the further development of cultural creativity is the shortage of skilled trainers. The formal training programs worldwide graduate only a small proportion of youth, selected based on a variety of talent criteria originally deriving from the initial base education and family income class (International Labor Organization, 1991: 39). Therefore the potentially creative workforces are charged super-normal interest rates, thereby limiting their ability to make productivity-enhancing contributions. Under these conditions, the markets suffer

from a severe inflationary climate, and near-permanent declines in real wages of a vast majority of the workforce. These effects have been visible not only in the poorer nations such as Bolivia, Ghana, and Mexico, but also in the affluent communities such as the US (World Bank, 1995: 99).

The diminishing cost-effectiveness of secondary sector worldwide has been pushing nearly 43 million new workers annually to primarily tertiary servicing activities (International Labor Organization, 1994: 1). The vast majority of the global workforce makes creative contributions at a very grassroots level, in the form of informal domestic services, involving small-scale trade and micro enterprises. These are typically single person initiatives, which consume very limited capital base, without any credit or technology services, and operate on a negligible profit margin. Such tertiary employment has grown to more than 60% of the urban workforce in Sub-Saharan Africa, with similar cases existing in Latin America and Asia, and to a lesser extent, even in Eastern Europe and the developed Western nations (International Labor Organization, 1994: 1). The workforces in nations such as Slovenia and Poland are offering significant innovative services for mitigating the unemployment problem of the Western European community. In Vietnam and Mongolia, the skilled local workers are seeking employment with the Japanese transplants, and help reengineer costly machinery and designs expatriated from the mature regions. Where the foreign language is not an impediment, the experienced workers move to flexibly extend their services across the global landscape, as is common for the workers from the Philippines migrating to the US.

Despite the super-normal growth enjoyed by the US, in general over the 1990s, world's average per capita income suffered significant shrinkage. World trade slowed down, regional differences in growth rates of output surged, and the rate of growth of unemployment in developed nations surpassed even the secular trend to reach 7.7% in 1993. Unemployment in developing nations grew from an already large initial base, and part time employment rose worldwide generating substantial disguised under-employment (United Nations, 1994: 1-2). The

increasing expenditure gap, in both developing and developed nations, burdened an expanding number of nations with a notional servicing of debt, without any development in manufacturing power or real output per capita in material terms. There was a short-term over-valuation of initially in-demand currencies giving way to the long-term depreciation. The sharp deterioration in the terms of trade amounted, in the case of Sub-Saharan African nations, to a net annual loss of 2.8% of Gross Domestic Product in 1990 using an early 1980s base, and generated a highly volatile (sometimes negative) growth in the real per capita Gross Domestic Product. Given the escalating bad debts, Japan – with the largest trade surplus in the world – has been offering financial support to the vulnerable communities at an increasingly liberal concessional terms (United Nations Conference on Trade and Development, 1995: 24-26). Without any competitive international demand for the services of the workforce supported by these loans, the destabilizing economics of rural-to-urban migration (9 million workers annually in Asia-Pacific alone, accounting for 45% of the urban workforce) has only worsened. There is a growing evidence of the demanding politics for infrastructure services, and bewildering societies full of intrinsic splits in the family unit (Asian Development Bank, 1992: 15-18).

In this context of fundamentally respecting the rightful human ethics, there is an urgent need for an international initiative to meet the requests from an increasing number of small as well as large enterprises for technical support services (International Monetary Fund, 1994: 3, 1990: 3-4). The relevant international law requires the removal of all direct or indirect measures taken for balance of payment purposes, the assistance for agricultural and rural development as an integral part of growth programs, and the provision of technical assistance regarding the methods by which one's own technical standards can best be met by the producers in other nations (World Trade Organization, 1994: 27, 46, 151-152, 305, 308). The balance of payment surpluses are a strong function of the entirety of methods that allow the simultaneous use of various techniques with a view to favoring the success of a project. The cost-effectiveness of deploying scientific

techniques at the organizational level is impacted not only by the factor inputs, but also the infrastructure services characterized by a substantial direct and indirect support from the governments. Therefore activities of the public sector institutions, in nations with surplus balance of payment positions, seriously infringe upon the verifiable and enforceable international law.

The 1959 United Nations Declaration on the Rights of the Child, taking due account of the gender correction factor highlighted by the United States National Commission (1980: 165-171), noted that the child, by reason of her or his immaturity, shall enjoy special protection, and shall be given opportunities and facilities, by law or by other means, to enable her or him to develop physically, mentally, morally, spiritually, and socially in a healthy and normal manner and in conditions of freedom and dignity. The 1976 Resolution, while declaring an international year of the child, entrusted a goal of programming the decentralization process to the United Nations Children's Fund, in full consideration of the true ground realities of each nation's conditions, needs and priorities. Therefore, it is essential to target 100% nurturing of the enthusiastic energies of each child on the earthly plane, for developing the wonderfully fresh potential into a unified polarized personality on the dynamic metaphysical plane. In this regard, the United Nations Institute for Training and Research (UNITAR, 1995) could help pursue, familiarize, and translate the benefits of the latest scientific managerial knowledge for solving the challenges of the world economy on a wider scale, disseminating the professional skills with a degree of perfection and confidence. A robust, scientific framework will assist policy makers transcend beyond the paradoxical phenomena. Through technological exchange strategies consistent with the global socio-economic milieu, it would be possible to harmonize both time-spectral and spatial differences in development. The innovative and creative linkages among the marvelous spectrum of energies worldwide would help perpetuate a permanent sparkle of light for all children of Mother Nature through eternity.

References

Asch Solomon E.; "Effects of Group Pressure Upon the Modification and Distortion of Judgments," pp. 177-190, in Groups, Leadership, and Men, eds. Harold S. Guetzkow, Pittsburgh: Carnegie Press (1951).

Asian Development Bank (ADB); Annual Report 1992, Manila, Philippines (1992).

Brush Thomas H., Philip Bromiley, and Margaretha Hendrickx; "The Relative Influence of Industry, Corporation, and Business Unit on Performance: An Alternative Estimate," mimeo, Purdue University, March 11 (1997).

Chemers Martin M.; An Integrative Theory of Leadership, NJ: Lawrence Erlbaum (1997).

Dierickx Ingemar, and Karel Cool; "Asset Stock Accumulation and Sustainability of Competitive Advantage," Management Science, 35(12), pp. 1504-1512 (1989).

Financial Times; International Economic Indicators: Prices and Competitiveness, p. 6, February 25 (1997).

Financial Times; "Growth on a Grand Scale," Global Fund Management Survey, by Barry Riley, p. I, April 24 (1997).

International Labor Organization (ILO); The Urban Informal Sector in Africa in Retrospect and Prospect: An Annotated Bibliography, Geneva, International Labor Bibliography No. 10 (1991).

International Labor Organization; World Labor Report, Geneva (1994).

International Monetary Fund (IMF); Annual Report of the Executive Board for the Financial Year Ended April 30, 1994, Washington, D. C. (1994).

Kanter Rosabeth M.; The Change Master, NY: Simon & Schuster (1983).

Nakamura Takafusa; Economic Growth in Prewar Japan, New Haven: Yale University Press (1983).

Punnett, B. J. and Ronen S.; "Operationalizing Cross-cultural Variables," Paper delivered at the forty-fourth annual meeting of the Academy of Management, Boston: MA, August (1984).

Rumelt Richard P.; "Diversification Strategy and Profitability", Strategic Management Journal, vol. 3, pp. 359-369 (1982).

Schumpeter Joseph; The theory of economic development, translated from German in 1934, Cambridge, Mass., Harvard University Press (1911).

The Wall Street Journal; "Gerstner's IBM Revival: Impressive, Incomplete," by Bart Ziegler, p. B 1, B4, March 25 (1997).

The Wall Street Journal; Japan's Vehicle Exports to the US Surge on Soft Yen, Lure of Minisport Models, by Valerie Reitman, P. A 2, February 27 (1997).

The Wall Street Journal; "This German Software is Complex, Expensive – And Wildly Popular," by Joseph B. White, Don Clark and Silvia Ascarelli, p. A1, A12, March 14 (1997).

U.S. Department of Commerce; Annual Survey of Manufacturers, Various Issues.

United Nations (UN); World Economic and Social Survey 1994, Department of Economic and Social Information and Policy Analysis, New York, E/1994/65 ST/ESA/240 (1994).

United Nations Conference on Trade and Development, The Least Developed Countries 1995 Report: Mid-term Review of the Programme of Action, Geneva: UN, TD/B/41/(2)/4 (1995).

United Nations Development Programme (UNDP); Human Development Report 1994, Published for the UNDP by Oxford University Press: New York (1994).

United Nations Institute for Training and Research (UNITAR); Covering Letter and the Questionnaire, MB/mj/95/1623, Geneva, 26 September (1995).

United Nations Organization for Education, Science and Culture (UNESCO); The UNESCO Courier: Religion and Politics Today, December (1994).

United States National Commission on the International Year of the Child; Report to the President, March (1980).

World Bank; World Development Report 1995: Workers in an Integrating World, Published for the World Bank, Oxford University Press: New York (1995).

World Trade Organization (WTO); The Legal Texts: The Results of the Uruguay Round of Multilateral Trade Negotiations, GATT Secretariat, Geneva, June (1994).