

**Technology Strategy  
in Korean Leading Edge Companies  
- Survey & Interview**

**2002. 11**

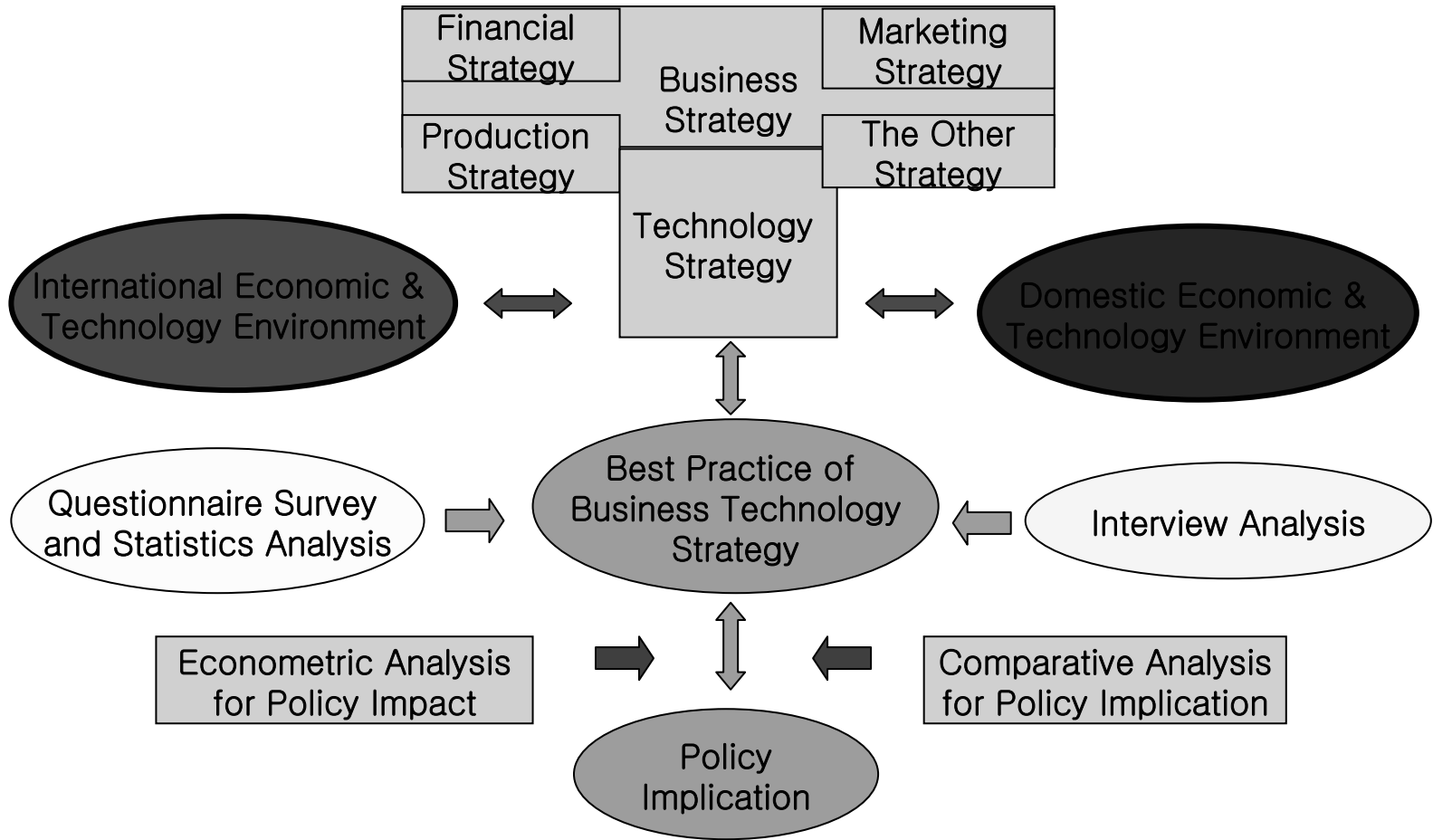
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**Science and Technology Policy Institute (STEPI)**

**Korea**

# Research Framework



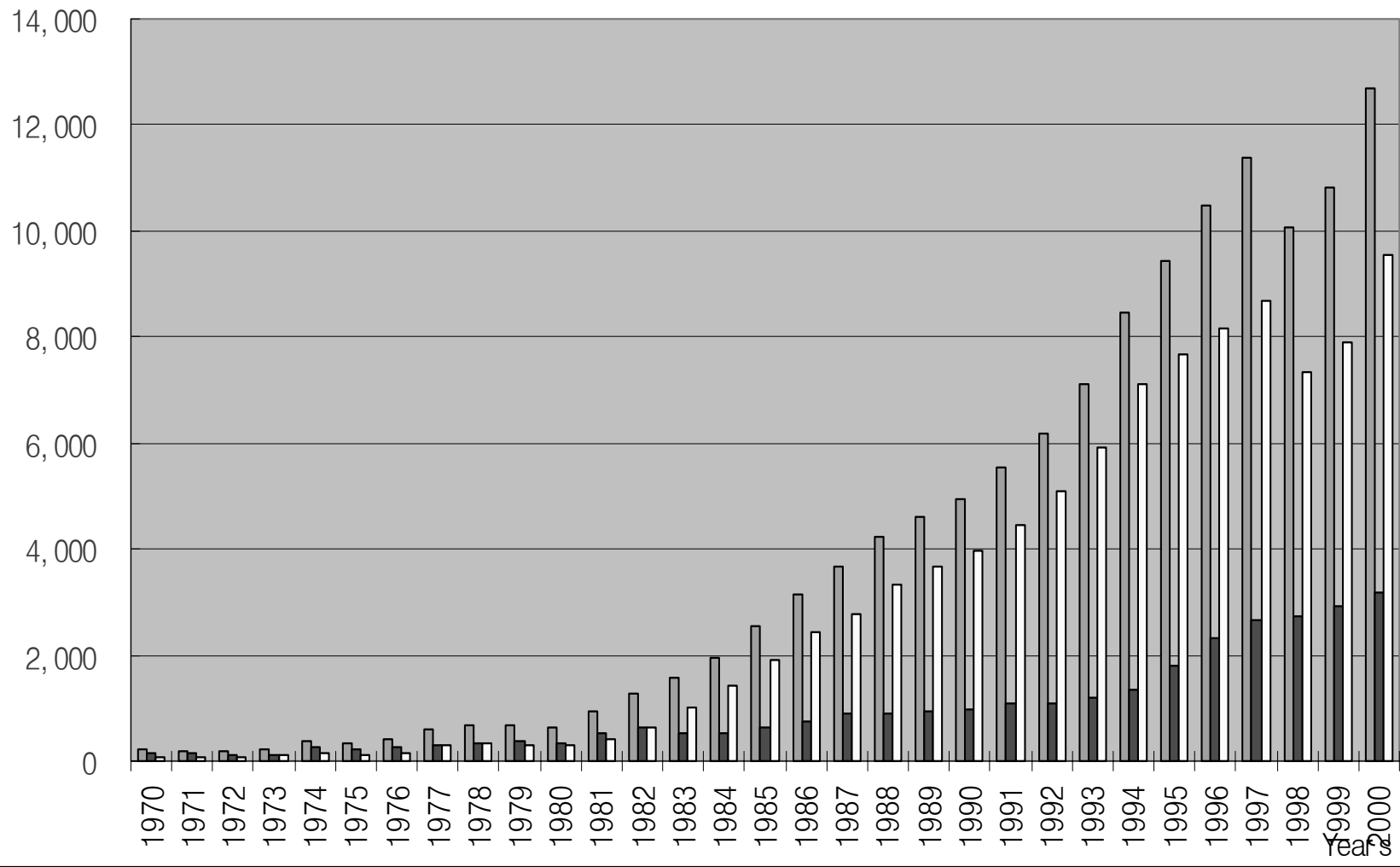
# Changes in Business Environment

- ❑ **International environments**
  - **Acceleration of globalization**
  - **Rapid development of new technologies(IT, BT, NT etc.)**
  - **Rapid growing of business R&D expenditure**
  - **Rising of R&D outsourcing**
  - **Shortening time to market**
  
- ❑ **Domestic environments**
  - **Foreign financial crisis in 1997**
  - **Changes in the direction of economic policy**
  - **Antitrust, unfair trade, etc.**
  - **Changes in corporate governance**
  - **Changes in industrial structure**

billion won  
(const. Won in  
1995)

# The Trend of R&D Expenditures in Korea

■ Total ■ Gov't □ Private



# Survey on technology strategy of Korean Firms

## ❑ Survey objectives:

- Identify the changing technology strategy of Korean firms in response to changing business/technology environment such as undergone foreign exchange crisis, globalisation, emerging technologies

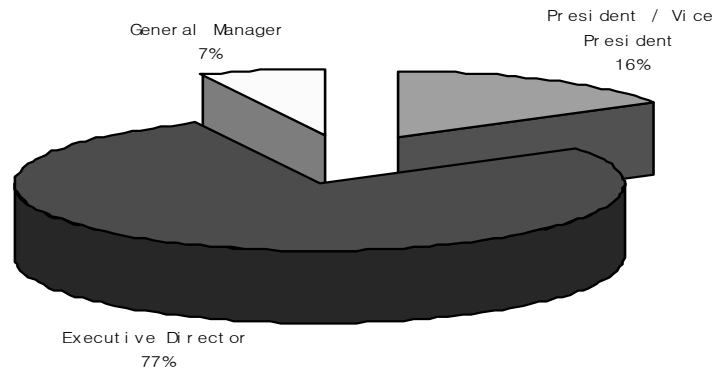
## ❑ Sample size of Survey firms:

- Pick 828 firms (450 large firms, 205 SMEs, 173 venture firms) based on a set of selection criteria (R&D institutes/units, sales volume, R&D manpower)

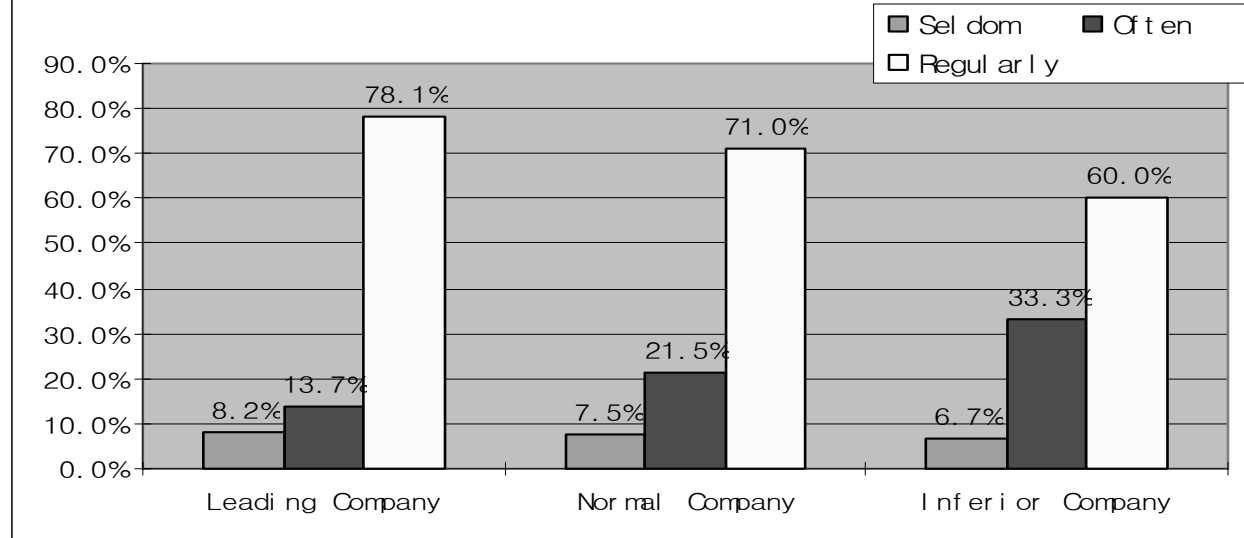
## ❑ Questionnaire retrieval rate:

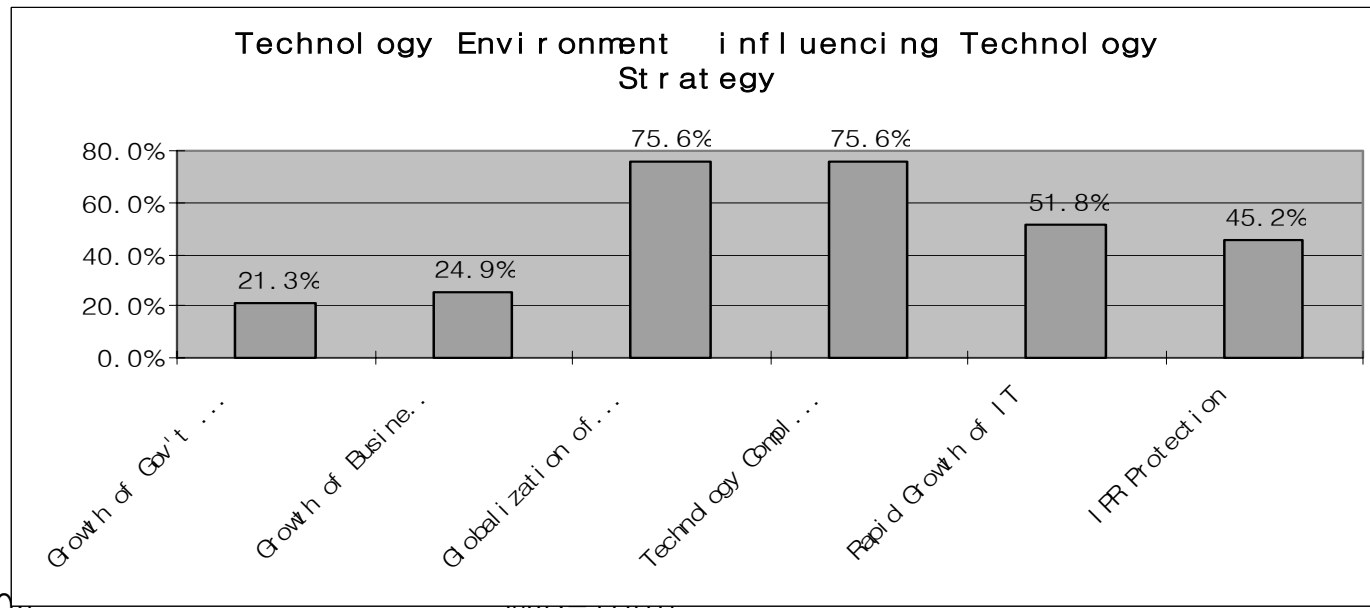
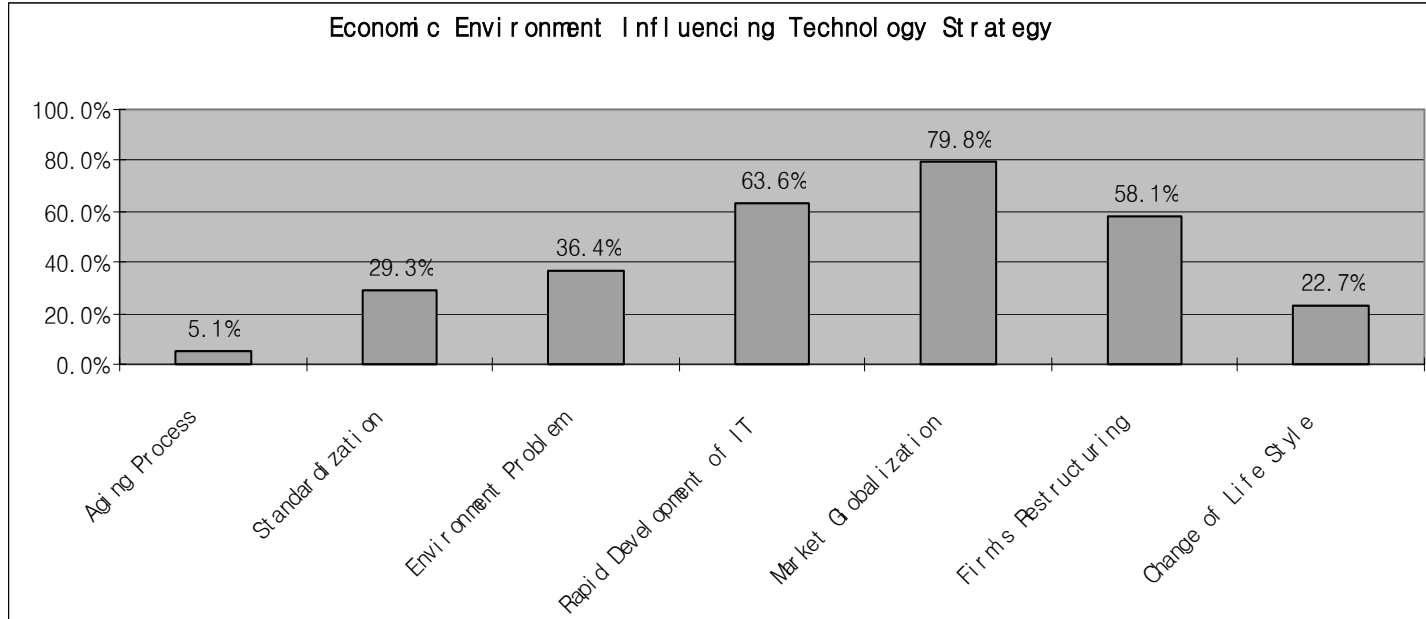
- Total 199 firms(24.0%) : LF 127(28.2%), SMEs 42(20.5%), start-ups 30(17.3%)

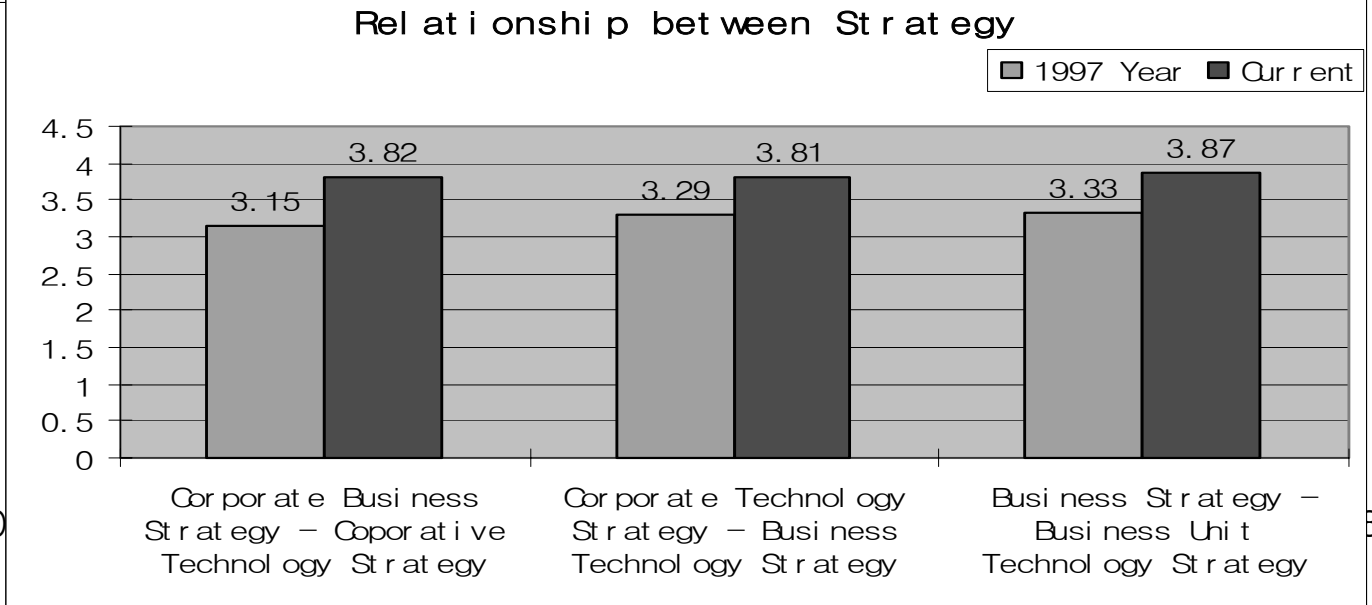
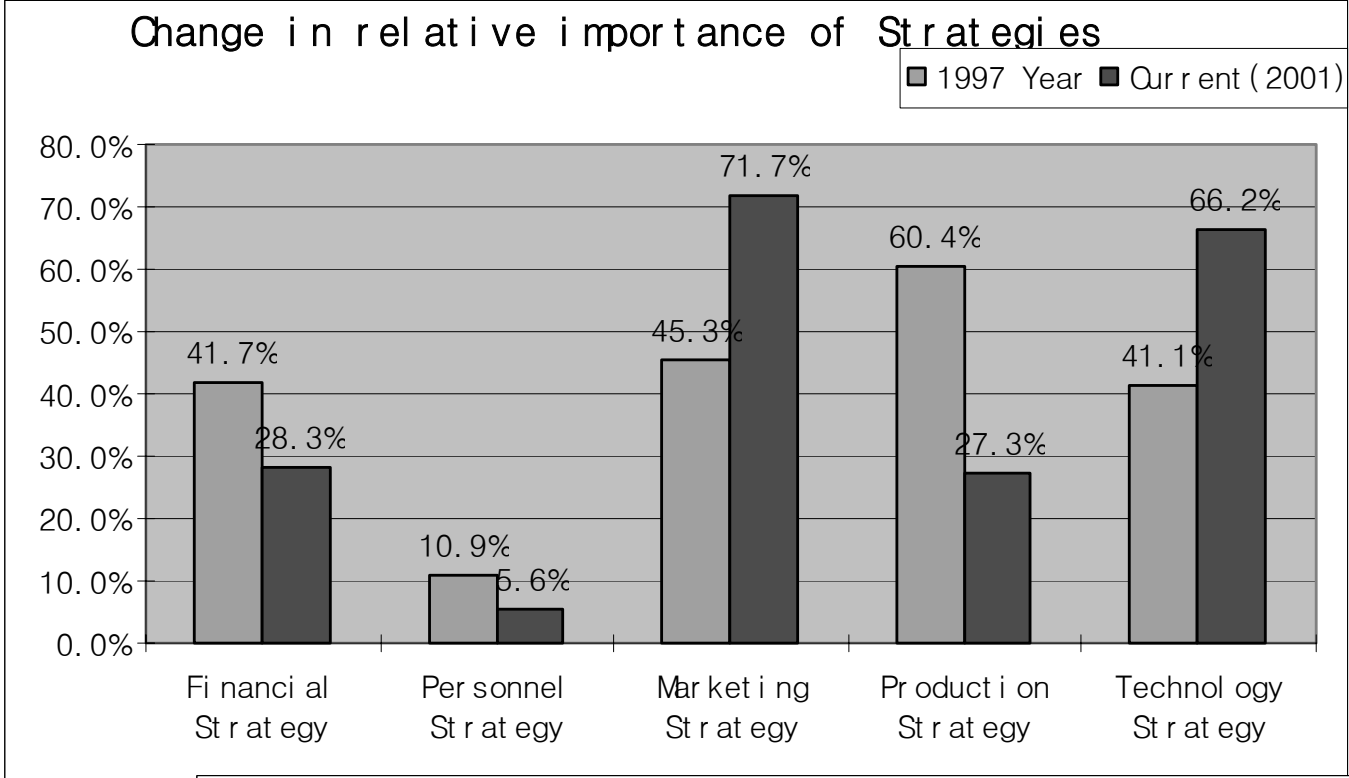
### Position of CTO



### CEO's Involvement in Technology Strategy

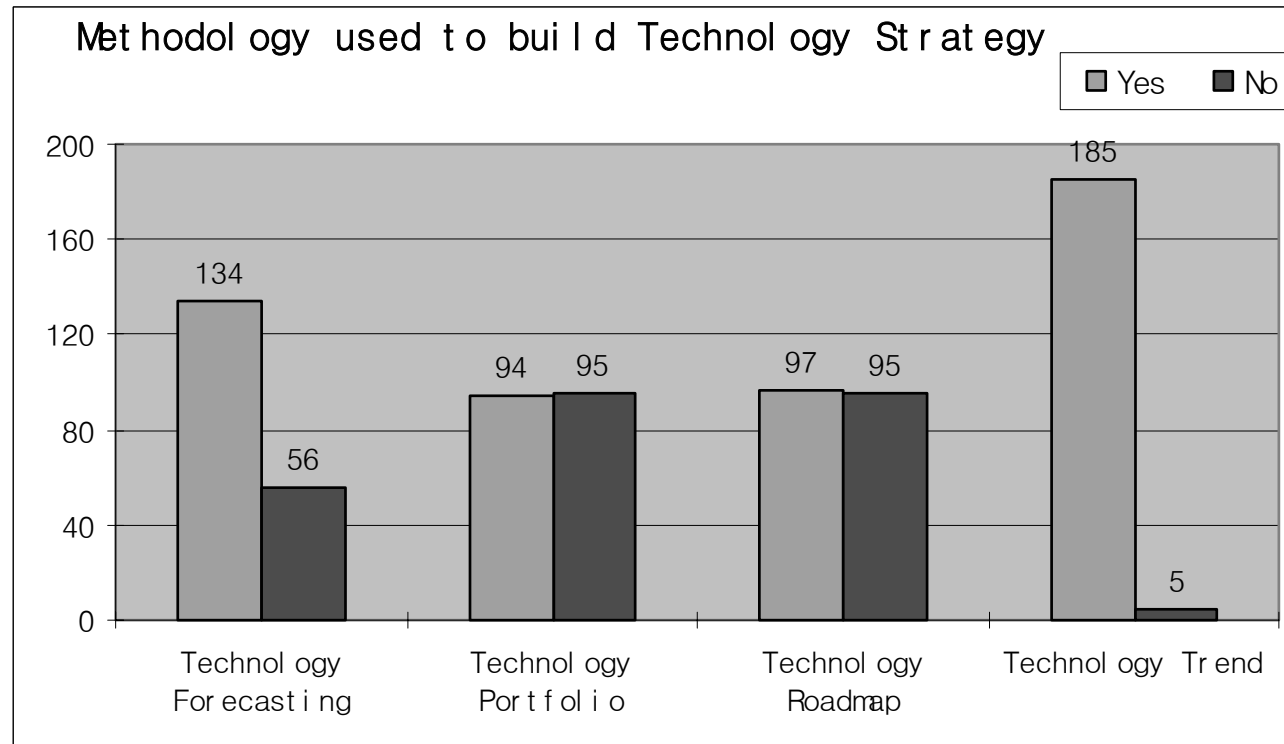
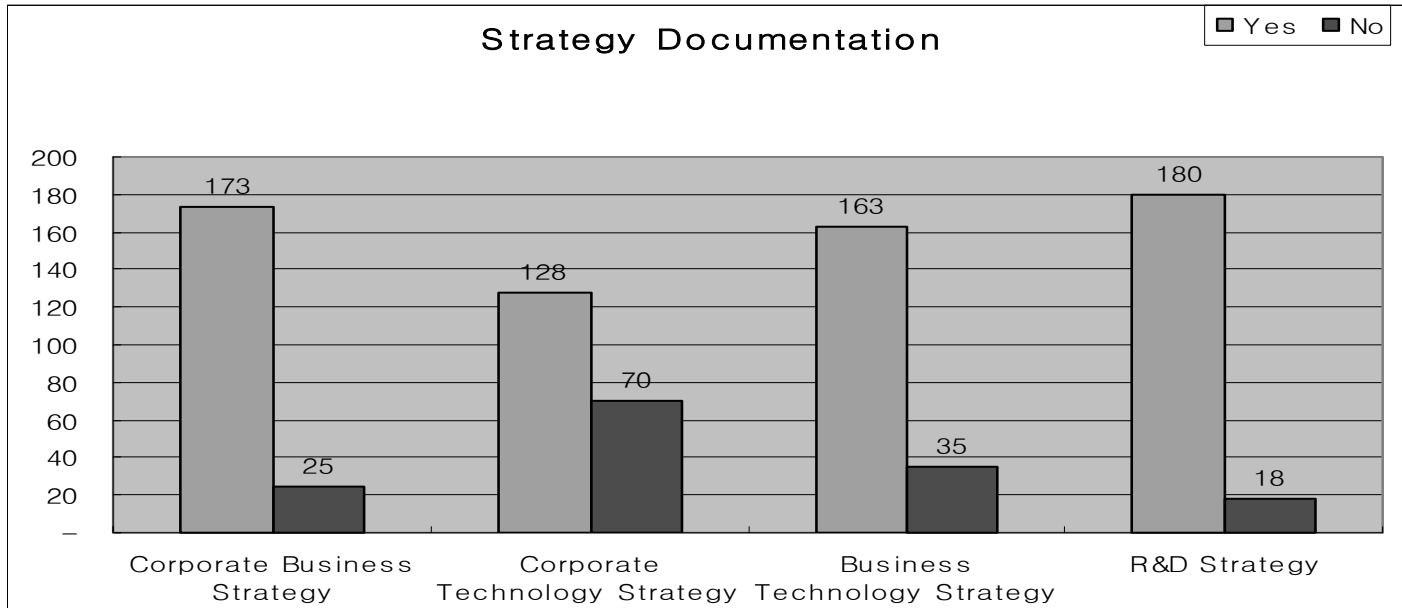






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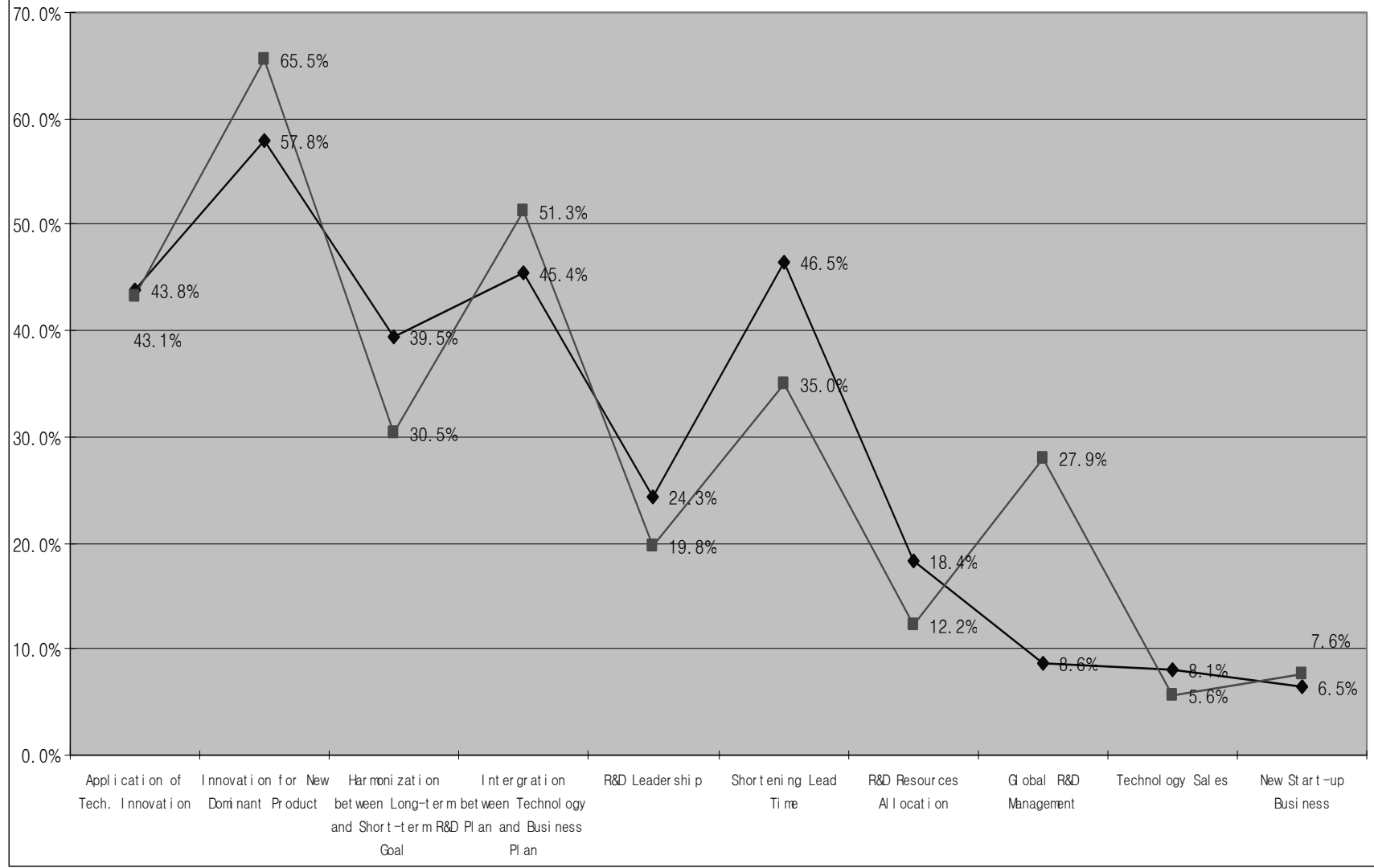




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# Changes in Strategic Focus of CTOs

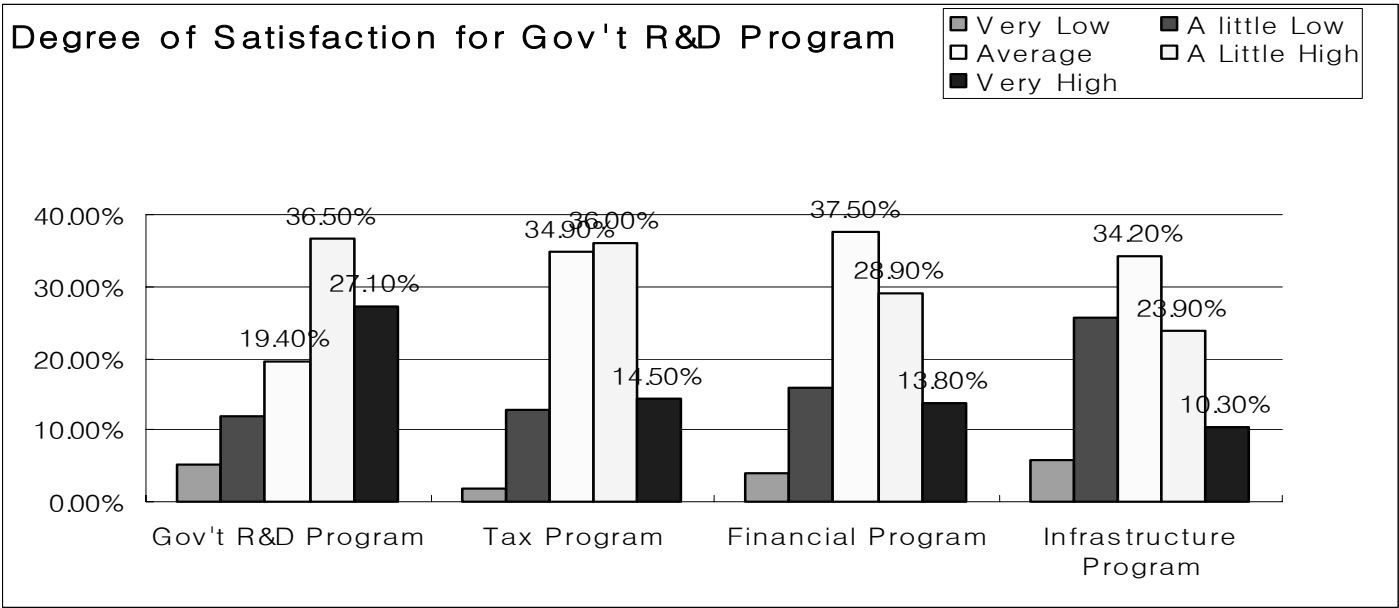
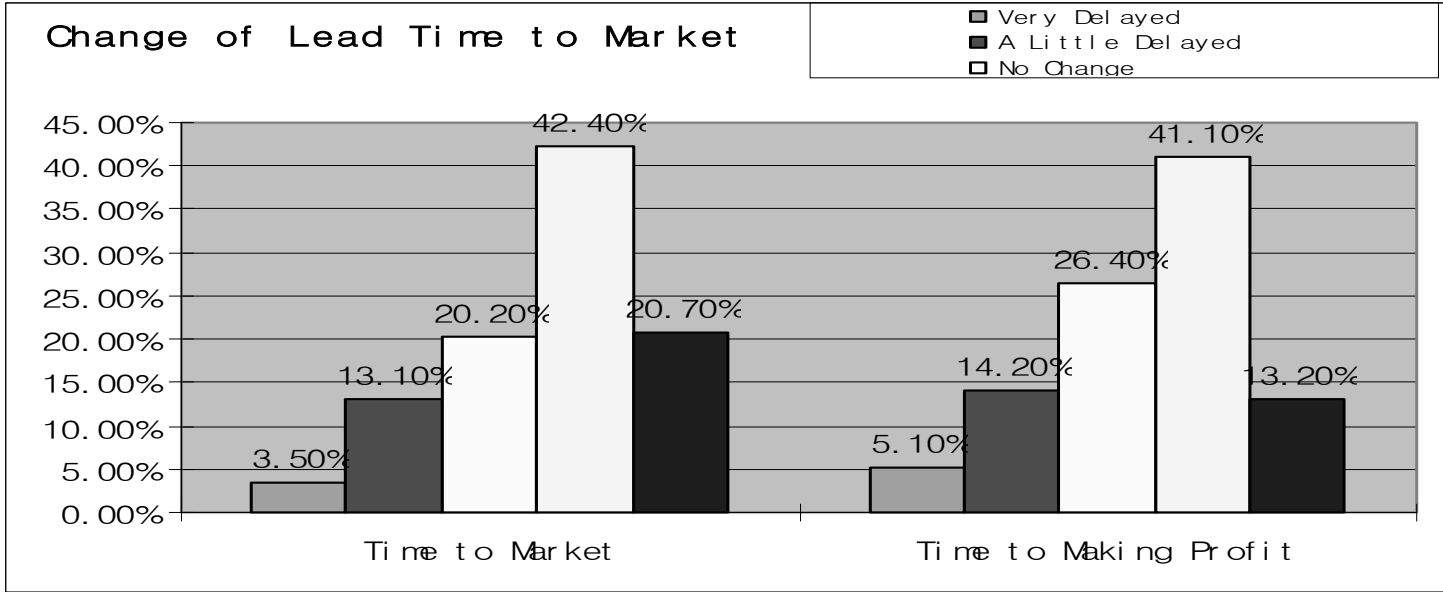
◆ 97 Year ■ Current

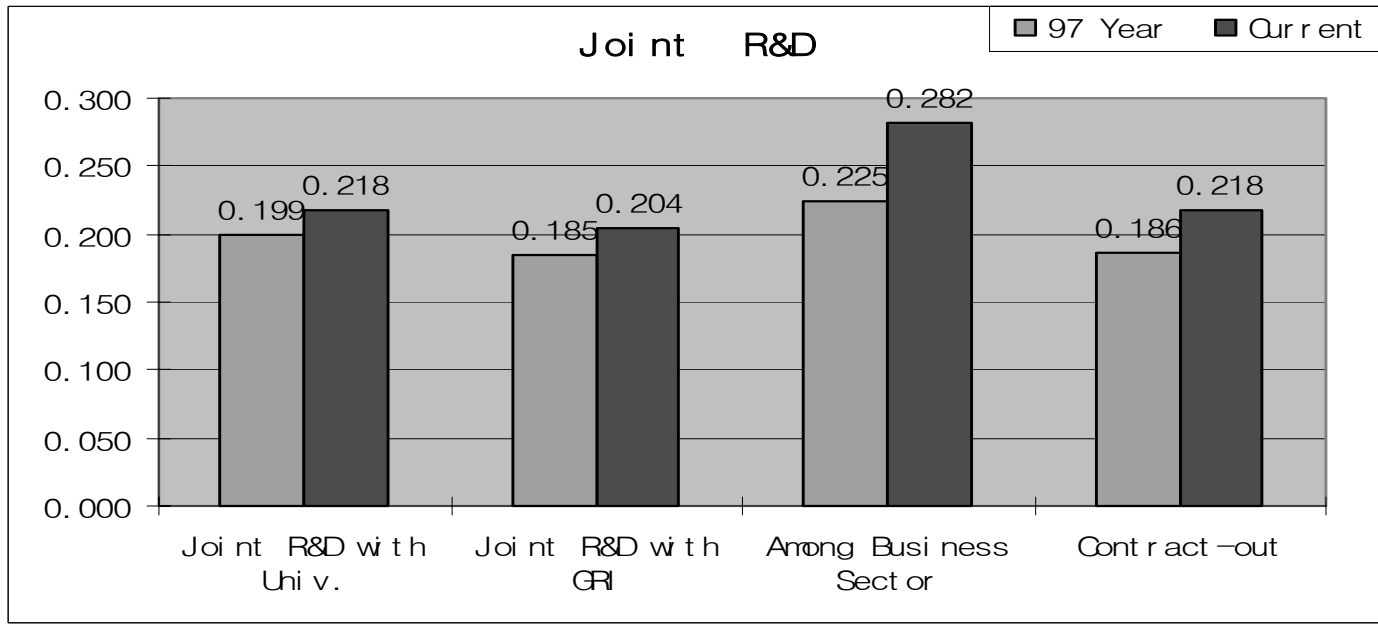
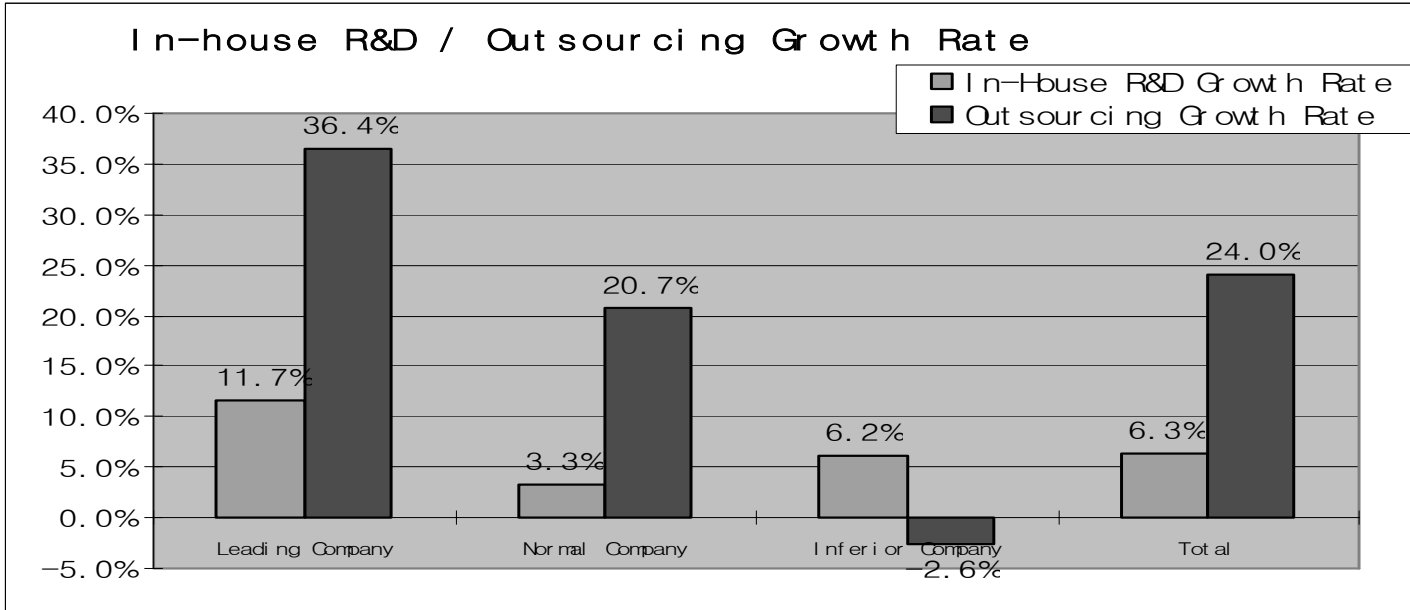


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Mid-Term

10





# Case Study on Technology Strategy of Korean Companies

## 1. Operating Results & R&D(2001년)

Unit: billion Won

contents company	operating results (SV, EX.OP)	R&Dexpenditure & long-term R&D ratio	Remarks
<b>Hyundai Heavy</b>	7404, 6135, 535	R&D: 89 (1.2% of SV), long-term R&D: 10% of total R&D	Fund source: corporately funded
<b>Hyundai Motor</b>	22505, 10400, 2097	R&D: 1020 (4.5% of SV), long- term R&D: 6.2% of total R&D	Fund source: corporately funded
<b>Samsung Electronics</b>	32380, 21870, 2295	R&D&E: 2,400(7.5% of SV), long- term R&D: total R&D	SAIT(Fund source: 50% from corporately funded, 40% contract
<b>LG Chemical</b>	3616, 1508, 269	R&D: 115(3.2% of SV), long-term R&D: 15% of total R&D	Fund source: corporately funded
<b>LG Electronics</b>	16601, 10517, 796	R&D: 759(4.6% of SV), long-term R&D: 3% -4% of total R&D	Fund source: corporately funded
<b>Hyundai Mobis</b>	2965, 1194, 357	R&D: 21 (0.7% of SV), long-term R&D: 20% of total R&D	Fund source: corporately funded
<b>Iljin</b>	221, 122, 1	R&D: 0.6(0.3% of SV) long-term R&D: 20% of total R&D	Fund source: corporately funded

contents \ position	Position & Role of CTO
<b>Hyundai Heavy</b>	President, Member on board of directors, participate executive meeting
<b>Hyundai Motor</b>	Executive of Vice President, No, participate executive meeting
<b>Samsung Electronics</b>	President, Member on board of directors, participate executive meeting
<b>LG Chemical</b>	President, No, participate executive meeting
<b>LG Electronics</b>	President, No, participate executive meeting,
	Authority of R&D personnel management
<b>Hyundai Mobis</b>	President(both R&D and Marketing), Member on board of directors,
<b>Iljin</b>	Executive director, No, participate executive meeting

<b>Hyundai Heavy</b>	To increase Value added of current business sectors and Produce world best products	Acquire core technology in main products. Direction of R&D is more important than speed (regards to industrial characteristics)
<b>Hyundai Motor</b>	Focus on future technology development such as environment related technology	Direction of automobile technology: Auto and Environment, Auto and Human, Auto and Society, Deal with Environmental issues in development of engine and transmission
<b>Samsung Electronics</b>	Take international leadership with own technology, basic technology patents, and international standardization	Advancement of technology management(6 sigma), advance research in strategic technology, accelerate 3P (people, process, product) innovation
<b>LG Chemical</b>	Keep leadership to find new business fields (R&D driven business development)	To find new business, focus on R&D in future competence of information-electronics materials and bioscience fields, Develop high value added products and process
<b>LG Electronics</b>	Innovation for the competence of current business and develop future complex fields products by researching new technology	Strengthen the relationship with business unit, Executing technology leadership 2005 innovation program
<b>Hyundai Mobis</b>	Shift aim from intergrated technology to source technology, accumulate self capability in new business (aerospace)	Leadership create in frontier technology, Focus on mechatronics tecnology, Acquire own technology in current business
<b>Iljin</b>	Focus on new business fields such as optical fibre, ceramics	R&D is creating new future customers

## 4. Organizational Structure for Research

Content s Company	Main organizational sub-unit	Role of sub-unit	Globalization of R&D
<b>Hyundai Heavy</b>	R&D Headquarters, Shipbuilding & Ocean Research Institute, Industrial Research Institute, Machine-Electricity Institute, Techno Design Institute	Under the Headquarter 4 institutions are working independently	Local research institute in Hungary & Russia. Employ foreign manpower in drawing unit
<b>Hyundai Motor</b>	Planning & Coordination Office, Automobile development Institute (3 locations), Powertrain Development Institute, Design & Test Institute; in L.A., Detroit, Chiba in Japan, Germany, Sweden.	Manage and Coordinate domestic and abroad institutions, R&D priority setting,	No foreign researcher in domestic institute
<b>Samsung Electronics</b>	Samsung Advanced Institute of Technology(SAIT), Samsung Semiconductor Research Institute, and 41 business unit research Institute, Abroad Institution in Japan, Britain, Germany, and Russia	Operating Technology Group in matrix system and Project team. Process infra team is consist of a special technician group of infra maintenace (reduced R&D cost 20-30%)	Joint Lab abroad. Researchers from Russia and China in domestic research institute. Establish 24 hours cyber research system world wide. Increase R&D outsourcing up to 30%



continued

Contents Company	Main organizational sub-unit	Role of sub-unit	Globalization of R&D
LG Chemical	In LG Chem Research Park, Corporate R&D(New Biz Incubation Unit, Core Technology Platform, Process Innovation) and Business Unit Institute(Information Electronic Materials, Battery Tech Center, Industrial Material, Petrochemicals)	Direction of Business Unit Institute(Cash Cow role): In house R&D and Joint Venture. Coporate R&D Institute: Find New Business Seed, Acquire World Best Core Tech	Local research institute and operation Satellite lab in the USA Liason office in Russia & Europe. 10 foreign researchers in domestic institute
LG Electronics	LG Electronics Institute of Technology as a central Research institute and several Culture Unit(CU) in several business units	Cash cow business(Home appliances): Business related Innovation, LGEIT: Future oriented new business	Local research institute in the USA & India. M&A or estblsh local start-up company. Few foreign researchers
Hyundai Mobis	Technical Research Institute consist of 20 teams	Research activities of 20 teams comprise development of core parts, engineering analyses, and test & evaluation.	Utilize HMC Relationship
Iljin	Optical communication Research Institute and Ceramic Research Institute	To find new business field	Strategic alliance.

## 5. Decision Process of Strategy and Project Management

Content s	Decision Process of Strategy	Project Management
<b>Hyundai Heavy</b>	Make a Long-Term business Forecast in each business unit every later half of the year. Decide corporate level strategy in technology policy meeting(with the review of the council of Technology Development, members are CTO, busuness unit technology executive directors, president of each institute).	20% of projects are from researchers' free idea, by strategic planning is the rest.
<b>Hyundai Motor</b>	Set up corporate strategy for 10 years and revise it each year. After completion of long-term products planning, make a development plan, and make a plan of each research institute's role and function	Select development model through various process including a review of deliberation of products council. Under the authority of project manager prjects of each development stage are managed comprehensively and systematically.
<b>Samsung Electronic s</b>	Long term technology startegy document exists. Select research topic from new technology (or product) map. For the selection of project related to current business, discuss topics with business unit every 3 month. For basic research, researchers hand in self-report and checked by self-control inside of institute.	Apply stage gate method to project management. Invite business unit persons to take design review in each stage.

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<b>Content</b>	<b>Decision Process of Strategy</b>
<b>LG Chemical</b>	Make an alignment process of corporate strategy on corporate level. Reflect technology strategy in Corporate strategy to develop new technology and new market opportunity. Use scenario planning method, technology road map, technology portfolio
<b>LG Electronics</b>	Long term technology strategy and a year plan is decided by business technology strategy meeting every year. Concesus building process by regular meeting with business unit
<b>Hyundai Mobis</b>	Set up target technology by top-down and bottom up process. Focus on building up core technology capability in automobile module business and aerospace business.
<b>Iljin</b>	On the criteria of customer needs and opportunity of future value Strategy is decided by investment council consists of executive directors.

## 6. Methodology of Setting up Technology Strategy

<b>contents</b> <b>company</b>	<b>Methodology</b>
<b>Hyundai Heavy</b>	<b>Technology tree, Technology tree, negative to use TRM</b>
<b>Hyundai Motor</b>	<b>TRM</b>
<b>Samsung Electronics</b>	<b>Technology tree, Technology tree, TRM, and Design for 6 Sigma</b>
<b>LG Chemical</b>	<b>TRM, QFD, Tech tree, TRIZ, DOE etc.</b>
<b>LG Electronics</b>	<b>TRM, AHP</b>
<b>Hyundai Mobis</b>	<b>utilize TRM</b>
<b>Iljin</b>	<b>-</b>

## 7. Human Resource Management

Cont ents Company	Foci of Performance Measurement	Free Research Time	Mobility and Technology Transfer
<b>Hyundai Heavy</b>	Incentive on royalty within a certain amount of revenue. Reports or papers are in difficulty of evaluation as an	Not officially approved free research, give an opportunity to carry out a research project by researcher's idea	Recently pursue co- works between researcher and engineer in production line. Technology development in major business products form
<b>Hyundai Motor</b>	Operate patents management team. Incentive on royalty within a certain amount of revenue.	Give free research opportunity and reward for excellent paper	Operate start-up business plaza inside firm
<b>Samsung Electronics</b>	Operate patent council to manage and evaluate patent. Individual knowledge capability is the most important factor in evaluation. Patent, technology transfer, royalty are important measures.	10% of total R&D is allocated to the free theme research	Researcers often move out to production field case by project and usually return. Establish commercialization architecture for timely technology transfer and shortening time to business.

(Continued)

Contents Company	Foci of Performance Measurement	Free Research Time	Mobility and Technology Transfer
LG Chemical	Evaluate both work ability and individual qualification. Promote researcher's technology transfer to business sector not business incubating.	Operating research informal system. Support research fund for an informal research activities on new technologies(30 research informal is organized now).	2% of mobility(quit) every year. Shortening time from R&D to Business. Strengthening relationship with business sector.
LG Electronics	Measure technological and business wise achievement in consensus meeting with manager. Incentive on royalty	Cash cow business(Home appliances): Business related Innovation, LGEIT: Future oriented new business	Successful technology transfer, Dispatch researcher or research team to business unit
Hyundai Mobis	Consider patent, papers, report, and the other activity in research	not officially approved	Technology research in Aerospace unit directly related to industry, mobility low
Iljin	Focus on team evaluation. Check Research milestone and New products sales volume in 3 years. Stock option when spin off the business	not officially approved. Participatin in out side seminar	Technolgy trnasfer is focusing on new business sectors

## 8. Direction and Evaluation on Government S&T Policy

contents company	Direction and Evaluation on Government S&T Policy
<b>Hyundai Heavy</b>	Tax incentive scheme is effective. Most of Gov't R&D program is not matched with business sector needs. Develop a long term basic technology research. Not participate in Gov't R&D program
<b>Hyundai Motor</b>	Participated G7(Highly Advanced National Prjects) Program. Too extreme air pollution regulation in Diesel automobil engine
<b>Samsung Electronics</b>	Gov't R&D program is not much effective. Participate just for cooperation among GRI, University, and business sector
<b>LG Chemical</b>	Gov't R&D program is not much effective. Support fund for a project consortiumed among busineses sectors or single company. Incremental tax incentive is not much effective in recent business fluctuation environment.
<b>LG Electronics</b>	Participating in Gov't R&D rpogram now. Not directly effective to business sector, only networking effect
<b>Hyundai Mobis</b>	Participate Aerospace launching project.
<b>Iljin</b>	Has been successfully utilize Gov't R&D program. Now participate in Gov't R&D project.