

The Pennsylvania State University

The Graduate School

College of Communications

THE POLITICAL ECONOMY OF THE DIGITAL DIVIDE IN TAIWAN

A Thesis in

Mass Communications

by

Chen-Ling Hung

© 2004 Chen-Ling Hung

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

May 2004

The thesis of Chen-Ling Hung was reviewed and approved* by the following:

Ronald V. Bettig
Associate Professor of Communications
Thesis Advisor
Chair of Committee

Dennis Davis
Professor of Communications

Richard Taylor
Professor of Communications

Chris Benner
Assistant Professor of Geography

John Nichols
Professor of Communications
Associate Dean for Research and Graduate Programs
in Mass Communications

*Signatures are on file in the Graduate School

ABSTRACT

This study utilizes a political-economic perspective to analyze the digital divide. This approach corrects the ideological bias of neo-liberal research on the digital divide and its insufficiency of theoretical foundation and provides a framework for political-economic scholars to systematically explore this issue.

Political-economic theory is useful for examining the digital divide for it provides a holistic analysis of existing relationships among wealth, power and knowledge. This theory provides a critical perspective on the operation of capitalism, arguing that the nature and development of capitalism is signified by the concentration of wealth and power in the hands of a few people who dominate policymaking and the distribution of resources, including new technology and information, thus strengthening existing disparities.

The study employs four entry points including history, ownership, access and policy to analyze the digital divide from a global perspective while focusing on the case of Taiwan. Its findings suggest that Internet development in Taiwan is following similar patterns and exhibiting many of the same characteristics found at the global level, including the role of the state and corporation sector in commercializing the Internet. The commercialization of the Internet has inspired a trend toward concentration of ownership in Internet-related industries which include media, telecommunications and information technology. This study also finds disparities in Internet use a reflection of existing social inequality in terms of income, education and location. The divide is further strengthened by information policy that tends to favor the interests of big corporations and ignore the needs of the poor. In a word, this inequality of resource allocation is inherent in the nature of capitalism and is further deepened with the global expansion of capital and technology. The development of the Internet and its application shows that the Internet itself is not an autonomic domain. To the contrary, it is molded by the political-economic context in which it emerged.

For a further look at how the state and the corporation work to strengthen social and economic inequality, this study utilizes critical theories of the capitalist state to analyze

information and industrial policies in Taiwan. It finds the role of the Taiwanese state has been transformed, from a developmental state which led the nation's progress before the 1990s, to a capitalist state which tends to yield to the interests of the capitalist class. This transformation signifies the decline of the state's autonomy, constrained by both internal and external factors. Internally, the Taiwanese capitalist class went from being nestled under the state's protection to a contending force against the state. Internationally, Taiwan's further incorporation into the global economy, especially its entry into the World Trade Organization, set constraints on the state's autonomy. The analysis of the liberalization of Taiwan's telecommunications market and the lifting of the ban on chipmakers' move to China both demonstrate limits on state autonomy. Consequently, the state gradually acts as a capitalist state which spontaneously protects the interests of the (global) capitalist class as a whole while ignoring or even deepening social inequality.

In conclusion, based on the political-economic analysis of the digital divide, globalization definitely does not benefit everyone. Rather, it strengthens Taiwan's reliance on western countries especially the United States and worsens the nation's industrial crisis. As WTO requirements forced Taiwan to give up more of its autonomy, they also increased social inequality in many ways, which in turn deepen the digital divide. Therefore, this study provides some cautious thoughts on bridging the digital divide in the context of Taiwan's changing status in the international division of labor and its social inequality and discontent. This study proposes the principle of "inclusive politics" by which representatives from civil society can participate in policymaking and make inclusive policy highlighting the needs of the poor. It argues that the solution to the digital divide is based on a society of justice and equality where civil rights are valued and promoted. Only in such a world, can technology be distributed equally and used for human development.

TABLE OF CONTENTS

LIST OF FIGURES	viii
LIST OF TABLES	ix
ACKNOWLEDGEMENTS	xi
Chapter 1 THE DIGITAL DIVIDE—GLOBAL CAPITALISM AND ITS DISCONTENT	1
1.1 Introduction: The Rationale for Studying the Digital Divide through the Political-Economic Approach	3
1.2 Taiwan in Brief	12
1.2.1 Why Taiwan?.....	12
1.2.2 Development of the Internet in Taiwan.....	16
1.3 Methodological Approach: Case Study	17
1.3.1 Data Collection.....	19
1.3.2 Data Analysis.....	20
1.4 Research Questions and the Outline	21
1.4.1 Research Questions	21
1.4.2 Outline	22
Chapter 2 THEORETICAL APPROACHES	24
2.1 Theoretical Approach	24
2.1.1 The Political Economy of Communications.....	24
2.1.2 The Political Economy of the Internet.....	27
2.1.2.1 Ownership of Cyberspace	27
2.1.2.2 Commodification of Cyberspace.....	29
2.1.2.3 Class Struggle.....	31
2.1.3 The Theories of the Capitalist State	33
2.2 Key Concepts behind the Digital Divide	35
2.2.1 The “Information Society”	35
2.2.1.1 Post-industrial Society: Daniel Bell	36
2.2.1.2 Informational Capitalism: Manuel Castells.....	39
2.2.1.3 Cultural Imperialism: Herbert Schiller.....	45
2.2.1.4 Summarizing Bell, Castells and Schiller.....	49
2.2.2 The Theories of Development	50
2.2.2.1 Modernization Theory	50
2.2.2.2 Diffusion of Innovations	54
2.2.2.3 Dependency Theory	57
2.2.3 Globalization	63
2.2.3.1 A review	64
2.2.3.2 Globalization and Inequality	72

Chapter 3 GLOBALIZATION AND THE DIGITAL DIVIDE	76
3.1 A History of the Internet.....	76
3.1.1 Two stages of Internet Development.....	76
3.1.1.1 Computer Networks and National Defense.....	77
3.1.1.2 ARPANET to Internet.....	77
3.1.2 State/Corporate Dominance.....	78
3.1.3 Resistance in Cyberspace	80
3.1.4 Global Governance.....	82
3.2 Internet-Related Industries.....	83
3.2.1 Concentration	83
3.2.2 AOL-Time Warner Merger	87
3.2.3 US Dominance of the Global Market.....	90
3.3 The Global Disparity in Internet Access	94
3.3.1 Mapping the Global Digital Divide.....	95
3.3.2 Trends in the Global Digital Divide	99
3.3.3 Explanations for the Global Digital Divide.....	102
3.4 Internet Policy: Toward a Global Information Society?.....	104
3.4.1 The Global Information Infrastructure	104
3.4.2 Dealing with the Digital Divide	106
3.4.2.1 The Group of Eight	107
3.4.2.2 The United Nations Development Program	108
3.4.2.3 The International Telecommunications Union.....	109
3.4.2.4 The World Bank	112
3.4.3 International Regime Change	115
3.4.3.1 The Decay of the International Telecommunications Union	115
3.4.3.2 The Dominance of the World Trade Organization.....	117
Chapter 4 THE COMMERCIALIZATION OF THE INTERNET IN TAIWAN	119
4.1 Taiwan's Profile.....	119
4.1.1 Brief History of Taiwan.....	119
4.1.2 Current Economy.....	125
4.2 The Development of the Internet.....	129
4.2.1 Three Phases	129
4.2.2 Political-Economic Forces behind the Development of the Internet....	134
4.3 Internet-Related Industries.....	138
4.3.1 Concentration	138
4.3.1.1 Media.....	138
4.3.1.2 Telecommunications	141
4.3.1.3 Information Technology.....	145
4.3.2 The Expansion of the Eastern Multimedia Team: A Brief Case Study.....	148
4.3.3 Foreign Investment.....	153

Chapter 5 THE DIGITAL DIVIDE IN TAIWAN: POLICY IMPLICATIONS	158
5.1 The Digital Divide of Taiwan.....	158
5.1.1 The Penetration of Information and Communications Technologies...	158
5.1.2 Unequal Access to the Internet.....	163
5.1.2.1 Growth of Internet Users.....	163
5.1.2.2 Demographic Characteristics of Internet Users.....	165
5.1.3 The Digital Divide as a Reflection of the Social Divide	174
5.2 Information and Internet Policy.....	182
5.2.1 National Projects in Promoting Internet Use.....	182
5.2.1.1 National Information Infrastructure	183
5.2.1.2 E-Taiwan	184
5.2.2 Dealing with the Digital Divide	191
Chapter 6 GLOBAL CAPITALISM AND THE TAIWANESE STATE	196
6.1 The Liberalization of the Fixed-Network Telecommunications Market.....	196
6.1.1 The World Trade Organization and Telecommunications Liberalization	196
6.1.2 Main Players.....	198
6.1.3 Corporate Power Influences Policymaking.....	201
6.1.4 US Pressure	206
6.1.5 The Analysis of the Triple Alliance	209
6.2 Globalization and Information Technology in Taiwan	215
6.2.1 Taiwan's Science and Technology Development	216
6.2.2 China's Technology Development and Market Openness	223
6.2.3 Taiwan's Entry into China's Computer Chip Market: The Debate.....	229
Chapter 7 SUMMARY AND CONCLUSION.....	236
7.1 The Political-Economic Analysis of the Internet.....	237
7.2 The Role of the State	242
7.3 Concluding Remarks	250
7.3.1 Through Regional Integration to the Global Market.....	251
7.3.2 Building an Inclusive and Just Society.....	255
Bibliography	261
Appendix 1: Chronology of Taiwan's History from 1544 to 2002	286
Appendix 2: Taiwan's Top 40 Conglomerates in 2002 and 2003.....	288
VITA.....	290

LIST OF FIGURES

Figure 3-1: The World's Best-Performing ICT Companies, 1998	91
Figure 3-2: Diffusion Rate of Different Technologies	95
Figure 3-3: Growth of Global Online Population from 1997 to 2002	100
Figure 4-1: Global Market Share of Taiwanese Information Products in 2001	127
Figure 5-1: Growth of Internet Use in Taiwan from 1997 to 2003	164
Figure 5-2: Lin's Executive Sequences for Bridging the Digital Divide.....	193
Figure 6-1: The Taiwanese Information Technology Hardware Industry's Production Locations by Production Value in 2001 and 2002	230

LIST OF TABLES

Table 3-1 : Concentration of Media Industry Revenue by Number of Companies	84
Table 3-2 : Search Engine Global Usage Share of January 2003	92
Table 3-3 : Top Global Properties of June 2003	93
Table 3-4 : Global Internet Users (% of Population) in 1998 and 2000	96
Table 3-5 : Internet Hosts per 1000 Inhabitants between 1997 and 2000	102
Table 4-1 : Major Economic Indicators of Taiwan from 1999 to 2003	126
Table 4-2 : World Ranking of the Production Value of Information Hardware between 1999 and 2002	128
Table 4-3 : Shareholders of Taiwanese Cellular Phone Corporations in 1997	142
Table 4-4 : Cellular Phone Subscribers by Operator between 1999 and 2001	143
Table 4-5 : Subsidiary Companies of the Rebar Group	152
Table 4-6 : Operational Revenue of Top Four Taiwanese Portals in 2002 and 2003..	155
Table 5-1 : Statistics of the Diffusion of Information and Communications Technologies in Taiwan between 1997 and 2003	161
Table 5-2 : Demographic Characteristics of Taiwanese Internet Users between 1998 and 2003*	167
Table 5-3 : Internet Use Behavior between 1998 and 2003	173
Table 5-4 : Income Distribution by Education 2001	175
Table 5-5 : Income Distribution by Degree of Urbanization in 2001	175
Table 5-6 : Education Opportunity by Household Income in selected years from 1979 to 1999	176
Table 5-7 : Disposable Income, Consumption and Savings between 1997 and 2001	178

Table 5-8: Income Allocation Ratio and Income Gap in Selective Years between 1980 and 2001.....	179
Table 5-9: Average Savings per Household by Disposable Income Quintile in Selective Years between 1980 and 2001	180
Table 5-10: Regulatory Reforms Adapted to Promote the National Information Infrastructure Initiatives.....	185
Table 5-11: Members of the Civil Advisory Committee of the National Information and Communications Initiative in 2003.....	189
Table 5-12: Budget for Bridging the Digital Divide from 2004 to 2005.....	195
Table 6-1: Partners of Private Fixed-Network Companies by 2001	199
Table 6-2: Operational Revenue of the Private Fixed-Network Operators between 2001 and 2004.....	201
Table 6-3: Established Enterprises in the Hsinchu Science Park in December 2003	220
Table 6-4: China's Commitment in Telecommunications Services for Entry into the World Trade Organization	228

ACKNOWLEDGEMENTS

This dissertation would have been impossible without the help and support from the following people and institutes.

First and foremost, my gratitude goes to Dr. Ronald V. Bettig, my thesis advisor. Dr. Bettig accompanied me all the way through my doctoral study. It is through his guidance and assistance, my study at the Pennsylvania State University and the dissertation writing followed the schedule. Dr. Bettig sets a significant model to my future academic career for his passion in teaching and critical research.

I can never appreciate the instruction of my committee members: Dr. Dennis Davis, Dr. Richard Taylor and Dr. Chris Benner. It is in their classes I explored the issue of the digital divide which later became the topic of this dissertation. Their feedback in my term papers and comments in this dissertation helped to fulfill my aspects in the critical study of the digital divide.

In addition, I owe the accomplishment of this dissertation to the assistance of my friends in various fields including governmental branches, media, private institutes and academia. Huang Yu-Hua, Huang Shu-Hsuan, Chang Wei-Lun, Chen Jen-Hao, Wang Wei-Ching, Tien Hsi-Ju, Dr. Feng Jian-San and Dr. Lee Cheng-Chung helped in gathering research data. Chuck Brown helped editing the draft of this dissertation. He was always the first reader of each chapter in spite of his heavy load of work. Lu Ching-Chih helped to edit tables and make the electronic file of this dissertation. His carefulness and deliberation make this dissertation in a good shape. Chen Yun-Chi and Tsai Hsin-Chun provided their timely assistance in correcting errors of this dissertation.

I also appreciate two institutes for their financial support of my Ph.D. study. The Rotary Foundation granted me a one-year Ambassadorial Scholarship with the recommendation of legislator Chiu Tai-San. The Ministry of Education in Taiwan granted me public scholarship with three-year tuition and living expenses. Their support enabled me to concentrate on my study without worrying about financial issues.

Last but not least, my deep gratitude goes to my families, my respectable mother Hung Chou Feng-Mei, my sisters Hung Chen-Yi and Hung Chen-Chen and my brother Hung Ying-Chieh, for their endless love and tolerance. My father Hung Wan-Chu, who passed away in late 2002, did not make it to witness my academic achievement. I know that he keeps watching and protecting me in heaven.

Chapter 1

THE DIGITAL DIVIDE—GLOBAL CAPITALISM AND ITS DISCONTENT

Under the current social and institutional conditions prevailing in our world, the new techno-economic system seems to induce uneven development, simultaneously increasing wealth and poverty, productivity and social exclusion, with its effects being differentially distributed in various areas of the world and in various social groups. And because the Internet is at the heart of the new socio-technical pattern of organization, this global process of uneven development is perhaps the most dramatic expression of the digital divide. (Castells, 2001, p. 265)

We are ... fully aware that the benefits of the information technology revolution are today unevenly distributed between the developed and developing countries and within societies. We are fully committed to turning this digital divide into a digital opportunity for all, particularly for those who risk being left behind and being further marginalized. (World Summit of the Information Society, 2003, Section 10 of the *Declaration of Principles*)

The mainstream version of neo-liberalism claims that we are experiencing an era of globalization in which more and more people are benefiting from the free flow of capital, information and technology. However, the “people” does not include everyone living in some new “global village”. As the reality of globalization unfolds, it is marked by polarization of the distribution of resources and the marginalization of disadvantaged people (Castells, 1998; Golding, 1998a). One of the symbols of global and social inequality is the phenomenon of the digital divide.

The digital divide, initially defined as unequal access to the Internet, has caused extensive attention in public discussion. The latest example is the first stage of the World Summit of the Information Society held in Geneva in December 2003, in which representatives from all over the world made bridging the digital divide a core agenda. Why does the digital divide matter? Why do stakeholders from the governmental sector and private sector take it serious? On the one hand, the divide is a part of broader

economic and political inequalities. On the other hand, it represents a new form of social exclusion. In a world, the digital divide is not only the *result* of social inequalities; it also may serve to *enlarge* existing inequalities. If the existing digital divide cannot be effectively reduced, the poor countries and poor people will keep being excluded from the benefits of new technology such as the Internet.

Being aware of the significant influence of the digital divide, researchers have taken efforts to explain the situation, identify the factors causing the divide, and propose solutions. Most research on the digital divide tends to take a neo-liberal perspective on social formation and a deterministic view of technology. Research assumes that the market can remedy the digital divide for it promises a trickle-down effect of Internet diffusion from the rich to the poor. It also assumes that technology is neutral and autonomous from the socioeconomic system and power structure and predicts that technology leads society in a positively progressive direction. Ideological biases have led previous research in the documentation of specific inequalities in access to technology but this research fails to address fundamental causes. That is, it fails to make a holistic and historical analysis of capitalism and to question the overall role of this system in the formation and reproduction of the digital divide.

The aforementioned limitations of mainstream research on the digital divide call for an urgency of proposing an alternative perspective to examine the inequality of Internet diffusion. Radical political economy, a critical approach which deals with the interrelationship among power, wealth and knowledge, serves as a useful means for examining the digital divide. Instead of viewing technology as a neutral phenomenon, the political-economic approach highlights the analysis of power structures and the logic of capital which influences how technology is created and used and how technology in turn maintains existing power structure and social inequality. This approach hence challenges the dominant neo-liberal ideology by raising questions about the just allocation of resources in capitalist society. Therefore, this dissertation utilizes the political-economic approach to look into the unequal distribution of Internet access from a holistic view of the operation of capitalism.

This chapter begins with a basic introduction to the concept of the digital divide and the theoretical approach of critical political economy as one approach to explaining the inequality of technology distribution under global capitalism. Next, it gives a brief introduction to the case of Taiwan and the development of the Internet in this country to show why it is significant. This chapter further explains the methodology of using case studies in critical research. Finally, this chapter proposes research questions and the outline of this dissertation.

1.1 Introduction: The Rationale for Studying the Digital Divide through the Political-Economic Approach

The concept of the digital divide originated with the US government in 1995, to indicate the gap between those haves and the have-nots in terms of access to digital technology and facilities. When the US government first employed this concept and began a series of national surveys on Internet use¹, the digital divide was defined as the inequality of Internet use between different groups within a country. Since then, the notion of the digital divide has been applied more broadly to measure Internet use within countries or among countries. At the global level, the digital divide reflects the inequality between digitally rich countries and digitally poor countries, which, in turn, reflects the disparity in the distribution of wealth between the industrialized North and the developing or underdeveloped South (Castells, 1996; Mody, 1999; Rogers, 2000).

Why does the digital divide matter? From the perspective of social equality, the divide is a part of broader economic and political inequalities. Therefore, it allows us to address the matter of developing a more humane society. Furthermore, the digital divide represents a new form of social exclusion. The digital divide is not only the *result* of social inequalities; it also may end up serving to *enlarge* existing inequalities. Obviously,

¹ The series of surveys conducted by the US Department of Commerce are as follows: *Falling through the Net: A Survey of the "Have Nots" in Rural and Urban American* (1995), *Falling through the Net II: New Data on the Digital Divide* (1998), *Falling through the Net: Defining the Digital Divide* (1999), *Falling through the Net: Toward Digital Inclusion* (2000), and *A nation Online: How Americans are Expanding their Use of the Internet* (2002).

the Internet is not the sole answer for solving social inequalities, but it may be a crucial resource that the poor might use to participate in the knowledge economy, to get a job and to improve their quality of life. As Lisa Servon (2002) argues, there are two orders of resources which can meet people's need. The first-order resources are those that can be thought of as satisfying basic physiological needs and safety needs, which include food, clothing, shelter, housing, basic education, healthcare and childcare that enable people to survive in the short term. Besides these resources, the poor need more tools that enable them to make long-range plans for a better life beyond the struggles of day-to-day existence. These second-order resources, including post-secondary education, economic literacy and information technology, serve to enhance people's ability to accumulate assets and skills that can help them to exit poverty. Obviously, technology is not the answer for solving social inequality, but it is a critical resource that people can use to participate in the information age.

At the global level, the digital divide between developed and developing countries represents the unequal distribution of global wealth, power and knowledge, which further enlarges this disparity of distribution. To avoid exclusion from the global economic system, governments in the developing world such as Taiwan and China and international organizations such as the United Nations and the Group of Eight have started many initiatives to bridge the divide. These initiatives have been implemented on the ground that the disparity of Internet diffusion between developed and developing countries deepens the disadvantages faced by developing countries (Mahizhnan, 2001; Rodriguez and Wilson, 2000; UNDP, 2001).

In the past few years, a great quantity of literature dealing with the digital divide has been generated, mainly from three sources: official reports of individual national governments or international organizations; surveys and reports conducted by the private sector; and academic research from different fields such as political science, sociology, communications, education, geography, and so on. The way they address the digital divide issue can be organized into three categories: studies describing the situation, those identifying the factors that are causing the divide, and those searching for solutions.

The 2001 report of the United Nations Development Program (UNDP) serves as a good example of literature addressing casual factors of and solutions to the digital divide. This report reveals that, in 2000, rich countries had the highest rate of Internet use while only a few people in poor countries were connected to the network. Although the number of Internet users in every region increased between 1998 and 2000, more than three-quarters of Internet users were living in Organization for Economic Cooperation and Development (OECD) countries, which contain only 14 percent of the world's population (UNDP, 2001, p.41). In addition to the distribution of wealth, telecommunications infrastructure, development of human capital, and levels on democratization are among main factors explaining the global digital divide (Hargittai, 1999; Mody, 1999; Norris, 2001).

The UNDP report also revealed that Internet diffusion was uneven within countries. The data in 2000 in the report shows that users tended to be concentrated in urban areas, among young men and among people with higher incomes and more education. First of all, location is a crucial factor determining Internet use. For example, 80 percent of Internet users in the Dominican Republic lived in the capital Santo Domingo. And in Thailand 90 percent lived in urban areas, which contained only 21 percent of the country's population. In many countries, younger people are more apt to be online. For example, 74 percent of Chilean users were under 35. Income also relates to the inequality of Internet use. In Bulgaria the poorest 65 percent of the population accounted for only 29 percent of Internet users. When considering education as a factor, the UNDP found that in Chile 89 percent of Internet users had some higher education and in Sri Lanka 65 percent. Finally, Internet use was found to be unequal among genders. For example, men made up 86 percent of users in Ethiopia, 83 percent in Senegal, and 62 percent in Latin America (p. 40). Examining trends defining the digital divide, the report concluded that while disparities of location, income, education and age have continued over time, gender disparities were easing in some cases.

The UNDP as well as many other international organizations and governments see the market as the primary factor for closing the digital divide while recognizing that the operation of market forces alone may not be sufficient to achieve the goal of universal

service and meet the needs of all people. Therefore, the UNDP urged that, in addition to relying upon market forces, more purposeful efforts involving public investment and international cooperation should be undertaken to make the new technology accessible to all and to transform the Internet into a tool for human development.

Research on the digital divide tends to be grounded in a deterministic and optimistic view of technology, which assumes that technology is autonomous from the social system and that it propels social change in a positive direction. Furthermore, this view fits well with the “development paradigm” in which technology was seen as central to modernization and national development. In the field of international communications, the development paradigm arose in the historical context of the Cold War after World War II, when the world was divided into three groups: the First World which was composed of Western capitalist countries, the Second World composed of the communist countries in Asia and Eastern Europe, and the Third World made up of newly independent countries. The Western countries, led by the US, were enthusiastic exporters of their media products to the Third World in the name of development.

Development theory, or modernization theory, faced challenges from Latin American scholars who argued that the media messages and development projects promoted by the Western countries were Western-centered and elitist, thus shaping development in a way that fitted the needs of Western capitalism, rather than the needs of people in the Third World. Therefore, they contended that the media could not help improve living quality or social equality of the Third World but would leave it in a situation of underdevelopment and dependence on the First World. This oppositional argument came to be known as dependency theory.

Facing the critique from dependency theory, development theory has been transformed into a neo-development approach. In 1995, Everett Rogers argued that, in contrast to its elite orientation in the early years, development is now defined as a widely participatory process of social change in a society intended to bring about both social and material advancement (including greater equality, freedom, and other valued qualities) for the majority of people through their gaining greater control over their environment. Although this neo-developmental view did acknowledge the local social structures and

cultural practices needed to carry out the diffusion of new technology, it has been criticized for merely expanding the development perspective without changing it in any fundamental way. Its epistemology is still Western-centered and technology-biased (Sussman, 1984). Most crucially, it views the market as the means to promote technology for the goal of development. Vincent Mosco (1996) pointed out that the crucial elements of modernization in the neo-developmental view emphasize that “modernization requires advanced telecommunications and computer infrastructure, preferably through the ‘efficient’ private corporations, thus integrating the South into a globalized information economy” (Mosco, 1996; Quoted from Thussu, 2000, p.60).

This orientation fails to consider inherent problems in relying on capitalism to ensure an equitable distribution of Internet access. It views Internet diffusion solely as a trickle-down process from the rich nations and classes to the poor. The contention is that in the long term, the new technology will become evenly distributed among people as a result of natural market forces. Some have recognized that the frequency of market failure inherent in capitalism calls for more public intervention to ensure no interruption in the trickle-down process, thus ultimately resulting in greater equality of distribution of new technologies. However, both groups – those who favor a more laissez-faire approach and those who favor some intervention – fail to make a holistic and historical analysis of capitalism and the state.

Because they fail to question the overall role of capitalism in shaping the use of new technologies, a number of basic and crucial questions have been left unanswered. These questions include the following: How does the logic of capitalism generate the digital divide? In what ways does the resulting structure of capitalism shape and determine the digital divide? What are the power structures among and within nations that reproduce and reinforce information disparities? What role do governments play in the development of new technologies? And who holds the power to influence policy making and resource allocation and to determine who is granted and who is denied access?

Failure to adequately address these types of questions – and thus the underlying role of capitalism in the formation and reproduction of the digital divide – has resulted in

the body of previous research on this issue dealing primarily with the documentation of specific inequalities in access to technology. For example, the previously mentioned UNDP report, while valuable in pointing out the magnitude of the problem, does nothing to address its fundamental cause. These types of reports have led policy makers to tend to address the problem only through the creation of policies aimed at reducing these inequalities instead of considering the mechanisms in which they have their genesis.

To better understand the world we live in and the way we live, political economists have sought to relate the ways in which the capitalist system shapes or structures the phenomena we attempt to observe and interpret, making this approach a meaningful and useful means for examining the digital divide from a qualitative and holistic perspective. As Vincent Norris (1990) proposes, the political-economic approach examines the social totality among the polity, the economy and the communications system, aiming to interpret how they operate within capitalist society. Standing firmly on Marxist criticism of capitalist society, radical political economy hence contributes to our understanding the world with its ability to challenge the conventional ideology and influence the construction of reality.

The political-economic approach highlights the ways in which the logic of capital as the primary determining factor shapes the communications system. Here, determinism, from Raymond Williams' (1977) definition, does not operate in one direction; in practice it is a process involving not only "the setting of limits" but also "the exertion of pressures" (p.87). Ronald Bettig (1996) further applies Williams' definition to political economic research, claiming that one purpose of the political economy of communications is to examine communications history to discover "those instances or domains in which technology or economics are determining" (p.11). Following this tradition, this dissertation looks at capitalism and the Internet in creating and maintaining the digital divide. In this dissertation, the basic argument of the relationship between capitalism and the digital divide is centered at the inequality of resource allocation. Political-economists argue that the logic of capital results in concentration of ownership by which a handful of capitalists that control the means of production and have dominant influence on the state. State policies hence tend to favor the capitalist class while at the

expense of the needs of the poor, thus maintaining and enlarging the existing unequal allocation of resources including new technology. The diffusion of the Internet, following the lines of social inequality, in turn has an influence on strengthening the social divide in terms of access to wealth and power.

A key emphasis of political-economic research is on demonstrating how the logic of capital results in concentration of ownership. Samuel Bowles and Richard Edwards (1985) explicated the basic (re)production rule of capitalism by distinguishing it from that of feudalism. The maintenance of feudal society relied on the consumption of surplus while the operation of capitalist society relies on its reinvestment. In feudal society the lords strengthened their positions by consuming the surplus product by maintaining a large retinue, building castles and other activities in exchange for the people's loyalty. The lords felt no need to invest their surplus to enhance productive capacities, resulting in a stagnant economy. In capitalist society the capitalist use of the surplus is quite different. Competition between capitalists inspires the reinvestment of capital and the enhancement of production. Bowles and Edwards explained, "Competition for profits forces individual capitalists to reinvest much of one period's profits in order to keep up with their competitors in the next period", which leads to the overall result in which "the capitalist surplus product is largely invested in and continually changes the production process" (p.89). In this way, capitalism emerges as the first system to have a class that has to invest its surplus in order to survive and reproduce itself as members of the dominant class.

In order to accumulate as much capital as they can, capitalists have to figure out ways to reduce the cost of production and increase prices of products and expand the market for their products while preventing competitors from entry. Therefore, although the accumulation of capital is originally inspired by competition, its logic leads to concentration in the market structure. Thus, Daniel Fusfeld (1972) argued that the dominant trend in the market structure of capitalism is toward concentration. Fusfeld examined the American economy in the 1970s, finding that it was dominated by large firms with a considerable degree of market power, after several phases of expansion and mergers. The urge to merge was based on the companies' need for large amounts of

capital to build expensive equipment for enhancing productivity and to engage in long-range planning, and the incentive of gaining financial profits and monopolistic profits. In monopolistic or oligopolistic markets, dominant companies are price makers that can gain higher-than-normal profits based on their market power. In addition to influencing prices, monopolistic or oligopolistic status enables corporations to exclude competitors, influence public policy, and affect the flow of capital. Finally, it leads to a tendency to shift income and wealth to monopoly firms and those who own and control them. According to Fusfeld's analysis, monopoly is rare in the real world, but oligopoly, which appeared in important American industries in the early 1970s including motor vehicles, petroleum refining, iron and steel, copper, aircraft engine, drugs, industrial chemicals, and daily products is now common in most industries (pp. 395-421).

This trend is also reflected in the media industry. Media concentration benefits media owners with direct economic gains by setting high entry barriers against competitors and indirectly through the acquisition of political power by influencing the state in shaping policy that furthers the interests of their owners and the capitalist class as a whole. Consequently, inequality in the distribution of resources such as the media becomes directly relevant to the unequal distribution of power, which in turn, enforces the existing unequal distribution of knowledge and information.

Contrary to the argument of political economy, post-Fordists propose a different view of the market structure and organization form of modern corporations in a world of globalization and technological innovation. Different from the thesis of Fordism by which mass production and market concentration signify industrial operation in the World War II phase, post-Fordism argues that since the 1970s, the accelerated globalization of the market and communications has resulted in changes in industrial production and organizing. The features of post-Fordism are associated with flexible production and vertical disintegration of corporate organization. This thesis suggests that corporations have begun increasingly to vertically disintegrate instead of producing as much as is possible within an individual firm. The strategy of outsourcing exemplifies a new form of corporate cooperation. This kind of vertical disintegration is workable thanks to an adequate infrastructure of communications and technology which facilitates

the co-ordination and control of dispersed activities (Webster, 2002, pp. 76-77). Manuel Castells (1996, p.194) named the new organizational form “the network enterprise” by which corporations cooperate with each other based on the networks they participate. Castells argues that, in their global operation, transnational corporations (TNCs) participate in a variety of networks depending on products, processors, and countries; therefore, the new economy cannot be characterized as being centered any longer on TNCs.

Castells and post-Fordists contribute to the discussion of global capitalism with suggestions for a new form of production and corporate organization. Their argument provides the possibility of the emergence of small-and-medium-size enterprises in the global division of labor and prepares the stage for class struggle either at the national level or the global level. But this argument should be carefully addressed because it ignores the fact that TNCs are still the power-holders of wealth and technology in the global economy, since most networks are structured around such corporations. Dieter Ernst’s (1994) research on the formation of global interfirm networks found that networks were either centered on a major multinational enterprise or were formed on the basis of alliances and cooperation between such enterprises. This also can be found in the oligopolistic market structure of global information technology (IT) industries and also in the supplier networks between Taiwan’s IT companies and leading TNCs such as IBM and Compaq.

The argument that industrial markets and corporate organization are critical for understanding the digital divide is because it is related to not only the concentration of wealth but also the concentration of power which in turn conditions the diffusion of the Internet. From neo-Marxist perspectives, in a capitalist system, the capitalist class that controls the means of production is able to influence state officials and relevant forces in society to support its favored policies. The state functions as a “capitalist state” to protect the interests of the dominant class or leading faction thereof. Theories of the capitalist class can be organized into three categories: instrumentalism, structuralism and class struggle. Instrumentalist theories of the capitalist state argue that the state functions to directly serve the interests of the ruling class. This approach focuses on the conscious

behaviors of the ruling class and its implication for state policies. Structuralist approaches argue that the state tends to actively perform its role as a protector and promoter of capital. This approach emphasizes the state's dependence on the accumulation of capital as its source of revenue and the structural constraints that force the state to promote the interests of the capitalist class. Either from the perspective of human agency or structural constraints, instrumentalism and structuralism view the capitalist class as a uniform group with mutual interests. Their viewpoint is questioned by the theory of class struggle. For the theory of class struggle, the capitalist class includes various class factions or industry coalitions organized to promote their interests through state action. This theory sees the state as a site of interclass and intraclass struggle. Hence, the capitalist state functions as a relatively autonomous mediator of class struggle inherent in the capitalist accumulation process and thus maintains the dynamics of capitalist development. Drawing on these critical approaches to the state, this dissertation provides an analysis of how the market and the state work to influence the unequal distribution of new technology and telecommunications infrastructure, taking Taiwan as the object of research in the context of its integration into global capitalism.

1.2 Taiwan in Brief

1.2.1 Why Taiwan?

In January 2002, Taiwan officially became a member of the World Trade Organization (WTO) after a long period of negotiations. The Taiwanese government was cheered by its entry and expressed its willingness to open markets in trade, finance and telecommunications, as the organization required. In what context and with what motivation was Taiwan so eager to participate in the global trade regime? What are the influences of WTO entry for Taiwan? Among many predictions of the influences, one thing that can be sure is the degree of the openness of markets will have an impact on the way the Internet develops, whether positive or negative. Since entry into the WTO

symbolizes Taiwan's further integration into the global economic system and will influence the Internet's development, it is crucial to examine the issue of the digital divide in both a global as well as national context.

Taiwan is significant in digital divide research for it shows a rare case of a developing country "catching-up" to the technology development and diffusion of advanced industrialized countries in the digital age. According to official statistics released by Taiwan's telecommunications ministry, Internet users of Taiwan reached 8.76 million in June 2003, accounting for 39% of the total population of 22.4 million (MOTC, 2003). In the same period, the global Internet penetration rate per capita was about 10%. Two indexes proposed by international organizations show Taiwan's outstanding performance in terms of the information infrastructure and digital access. According to the Global Information Technology Report 2002-2003 published by the World Economic Forum, Taiwan's Networked Readiness Index ranked ninth among 84 countries, up from 15th in 2001-2002, and only behind Singapore in Asia (third). According to the International Telecommunications Union (2003), Taiwan ranked world ninth based on the Digital Access Index in 2002. Among various indicators in 2002, Taiwan's Internet user penetration was 39%, ranking 18th in the world. Taiwan was ranked fourth globally in its broadband Internet penetration 9.4%. Taiwan's fixed telephone subscribers per capita was 57.45%, ranking world fifth and its cellular subscribers per capita was 106.5%, ranking top one. As Pippa Norris (2001, p. 56) pointed out, Taiwan's global ranking of Internet penetration rate exceeded its GDP ranking, which stands as an interesting example for digital divide researchers to further examining how a developing country can catch up with developed nations in the digital age.

Taiwan, a small island country located off the southeastern coast of China with a high population density of 622 people per square kilometer, has attracted worldwide attention for its economic growth and political democratization. Both contributed to the development of the country's information industry and Internet diffusion. Since the Republic of China (ROC) government moved to the island after losing the civil war with the Chinese Communist Party, Taiwan has been striving for its economical and political survival in the past five decades. Despite being ruled by colonial regimes in the 17th and

20th centuries and martial law for 40 years after World War II, Taiwan's peaceful democratization has been acclaimed as a "quiet revolution" (GIO, 2003). From a dictatorship led by Chiang Kai-shek that began in 1949, Taiwan's political system has experienced several stages of reform since the end of the 1980s. In 1996, the Taiwanese people voted for their president and vice president for the first time. In 2000, the Democratic Progressive Party won the presidential election, replacing the long-term ruling party, the Kuomintang. Although Taiwan's economic growth started under the dictatorship period, its economic prosperity led to the emergence of a middle class which became the major force for political democratization.

Taiwan's economy was transformed from a self-sufficient agrarian system in the 1950s into an industrial and service economy in the 1980s. The statistics of the Directorate-General of Budget, Accounting, and Statistics (DGBAS) showed that, in 2003, Taiwan's gross national product (GNP) was US\$295.9 billion, and per capita GNP was US\$13,157. Its gross domestic product (GDP) was US\$281.2 billion, ranking Taiwan among the top 20 economies in the world. Taiwan's economic performance is highly related to its foreign trade. According to the *World Investment Report 2002* published by the United Nations Conference on Trade and Development (UNCTAD), by the end of 2001, Taiwan had accumulated a total foreign investment of approximately US\$32 billion. This was about 0.47 percent of all global foreign investment, ranking Taiwan 31st in the world. Taiwan's accumulated outward investment was approximately US\$54.7 billion, accounting for 0.83 percent of the global total and ranking the country 18th in the world. With its membership in the WTO, Taiwan will be further integrated into global economy.

Taiwan's economic growth became a hot topic of development research as scholars sought to explore the secret to the prosperity of East Asia's newly industrial countries. However, the prosperity was found to have come at the expense of people's political freedom, labor rights and sustainable development of the environment (Mosco, 1996, p.129). The role of Taiwan's government was also noticeable because it exemplified the features of the developmental state in East Asian countries that were different from those of western industrialized countries (Palan and Abbot, 1996). The Taiwanese government

has played a leading role in the formation of Taiwan's economy and information technology development, as did the governments of some Asian developing countries such as Korea and Singapore. With a series of major national projects and emphasis on information industry in its development, Taiwan is well integrated into the global knowledge economy.

The government's policy focus on the information industry since the 1980s contributed to Taiwan's high economic growth and status in the global information market. "Made in Taiwan" information products dominated more than half of the global market share in products such as notebook PCs, mother boards, and monitors. The high market share of information products made Taiwan one of the major countries in the production of information hardware, with the global ranking of the fourth place in 2002. Taiwan was also notable for its global share of semiconductor products due to government support since the 1980s. By 2001, the production value of Taiwan's contract chip-making industry accounted for 73 percent of the world's total output, and its IC packaging industry accounted for 30 percent of the world's output. Taiwan was also the world's second largest supplier of IC designs, next only to Silicon Valley (GIO, 2003).

The abovementioned development in politics, economy and information technology all prepared Taiwan, giving it an advantageous status in enhancing its Internet diffusion. Nevertheless, IT penetration in Taiwan was unequal among different groups in terms of income, education and location. For example, according to a 2002 Taiwan family income survey conducted by the DGBAS, Taiwan's household Internet penetration rate was 45.94%, in which the 20% highest income group had a penetration rate of 76.76% while the 20% lowest income group only 10.52%. Household cellular phone penetration was 83.62% at that time, in which the 20% highest income group had a penetration rate of 98.60% while the 20% lowest income group only 47.49%. This dissertation seeks to explain the conditions under and context in which Taiwan reached such high penetration levels in Internet service and other related information infrastructure. Most important of all, this dissertation examines how these political and socioeconomic conditions, internally or externally, influence the unequal diffusion of this new technology.

1.2.2 Development of the Internet in Taiwan

There were three stages in the development of the Internet in Taiwan. The Internet was first used for education and research, which began with the BITNET Project under the Ministry of Education. In July 1987, Taiwan began its international Internet connection through the help of Tokyo University of Science. In 1990, the Taiwan Academic Net (TANet) connected major universities and research institutes and started to operate in mid 1991, which encouraged Internet use in academia by supplying free access.

The second stage was the commercialization of the Internet. In early 1994, the Directorate General of Communications, an institute taking responsibility of supervising telecommunications under the Ministry of Transportation and Communications, established the first commercial Internet Hinet and began to charge for business use in mid 1995. After that, the Internet was no longer a nonprofit research tool; it became a new type of consumer good. The large number of TANet users cultivated since the early 1990s formed the market for commercial Internet service providers (Hwang, 1999).

In 1994, Taiwan followed the path of the US by launching a ten-year National Information Infrastructure (NII) project aimed at strengthening its position as the Asia-Pacific regional telecommunications hub (Wang, 1999; Panol and Rao, 2002). The National Information and Communications Initiative (NICI) was established under the lead of the Executive Yuan (the highest administrative organ of Taiwan's executive branch) for promoting technological and economic development with information and telecommunications network as the core. The major achievement of the NII project was to get 3 million people online, which occurred in early 1999, accounting for 13 percent of the Taiwanese population. Furthermore, the E-Taiwan Project, proposed by the Science and Technology Advisory Group (STAG) under the Executive Yuan in May 2002, aimed at enhancing Taiwan's competitive capacity and economic growth. With the emphasis on E-life, E-government, E-business and E-transportation, this six-year-long project sought to make Taiwan a high-tech and service-based island (STAG, 2002). The promotion and application of the Internet became one of the core strategies for national development.

The above brief introduction of Internet development in Taiwan signifies a process of commercialization of the Internet, in which the state, the market, civil society and the international environment all play a role. Through a political-economic analysis, this study will examine the influence of these forces on Internet diffusion through four entry points including the history of the Internet, Internet-related industries, Internet access and Internet policy.

1.3 Methodological Approach: Case Study

Janet Wasko (1999) mentions that political economy draws upon several disciplines such as history, economics, sociology and political science. This approach draws on a wide range of techniques and methods from the aforementioned disciplines, especially including Marxist economics, power-structure research and institutional analysis. In order to conduct a political-economic analysis of the digital divide in Taiwan, this dissertation uses a case study based methodology, frequently used in these disciplines.

A case study can be used for comparisons with cases and theoretical applications. The case-oriented approach is quite different from a variable-oriented method often applied to cross-national data with its focus on hypothesis-testing and subsequent confirmation or rejection of general theories represented in selected variables (Bradshaw & Wallace, 1991). The case-oriented discourse speaks directly to the events and experiences of cases, abstracting from their histories and their special characteristics and circumstances to draw out their theoretical significance (Ragin, 1991).

Accordingly, the case study highlights the importance of history and context (Burgess, 2001; Tenue, 1990). A primary purpose of a case study is to specify and elaborate the historical process that impact social phenomena. A society is influenced by different historical circumstances that provide insight into its current condition. Even relatively similar societies have very different histories, a fact that should not be ignored or deemphasized in the rush to explain similarity across cases. Therefore, a case study is to understand a case or different cases, and to tell a story about a case (Huberman & Miles, 1998; Stake, 1998; Tenue, 1990) rather than to generalize the phenomenon observed.

Since every case tells a story, case-oriented discourse responds to the experiences of cases as singular entities and is capable of contributing both to the discussion of issues and problems faced by individual cases and to the development of theory. York Bradshaw and Michael Wallace (1991) insist that the key to the case study is to understand the relation between case and theory. Good case studies respond to theory, by refuting and extending it or by illuminating important phenomena that are outside the scope of existing theory. When case-study researchers pay sufficient attention to theory, interpretations of the case are presented in a definite theoretical light, which usually strengthens their discourse on the phenomenon observed.

Because the case study helps inform general theory and explain conditions that deviate from conventional theoretical explanation, it is especially meaningful and useful in the study of the Third World. Because many theories have been formulated in advanced Western societies, they reflect an (often unintended) ethnocentric bias against underdeveloped and other less studied regions of the world. Thus, case-study research is indispensable when investigating the Third World with appropriate sensitivity and accuracy (Bradshaw & Wallace, 1991, p.154). Since my dissertation is focused on Taiwan, which is generally categorized in the group of developing countries, applying the case-study method can help to better understand the significance of this case, avoiding a quick generalization of theories originating from western countries or other developing countries.

However, case studies have their weaknesses. Case studies seek to be historically contextualized and theoretically formulated, leading to the problem of the case research that when discourse is too case-oriented, every case may seem too different to be compared with any other. This causes a further problem: scholarly authority may derive exclusively from in-depth knowledge of cases, not from explication of their theoretical relevance. As Charles Ragin (1991) points out, the danger of the case study is that, "In the extreme, discourse that is too slanted toward cases can atomize comparative social science, with each scholar attached to a seemingly unique case or small set of related cases and deriving authority from knowledge that cannot be socialized or pooled in some way" (p.3). However, with its strong roots in the political-economic approach, this

dissertation seeks connections between empirical observation and theoretical demonstration and aims to provide a case study of Taiwan that can be used for comparison.

1.3.1 Data Collection

The study is based on collection and analysis of some primary but mostly secondary sources. The empirical data was collected from a range of secondary sources, primarily including government documents and business and annual reports as well as other important sources such as academic journals and books, survey results, trade and popular magazine articles, daily newspapers, electronic newspapers, and websites. Through the above sources, data were gathered on the history of Internet development, the market structure of Internet industry, the phenomenon of Internet use and the Internet policy in Taiwan.

For example, to get a basic understanding of the digital divide in Taiwan, reports of survey results regarding Internet use were my first target. In Taiwan, there are several organizations conducting surveys of Internet use. The Department of Transportation and Communications (DOTC) takes charge of the official surveys and has had published four reports of its survey results since 1998. The Department of Industry Technology (DOIT) estimates the number of Internet users on a quarterly base. One of the biggest Chinese portals Yam has conducted an annual online survey since 1995, which is based on individual Internet users. Additionally, the DOIT occasionally conducts a family online survey. I studied several sources of data to see if they reached some common descriptions of the digital divide in Taiwan and compared them with research results conducted focusing on the global and national levels.

In addition, the study of information policy in Taiwan relies on official documents as the basic source of data. Additionally, analysis and comment on these reports or policies were also consulted for a better understanding of the context in which they were received. Data from international resources regarding information policies of western

countries and international organizations were also collected for the purpose of comparison.

1.3.2 Data Analysis

My theoretical approach is based on the political economy of communications, which can be situated in the broader methodological paradigm of critical qualitative research. Any critical approach provides rules for interpreting the data. According to Joe Kincheloe and Peter McLaren (1998), the project of critical research is not simply the empirical re-presentation of the world but the “transgressive” task of posing the research itself as a set of ideological practices. Empirical analysis needs to be interrogated in order to uncover the contradictions and negations embodied in any objective description. Critical researchers maintain that the meaning of an experience or an observation is not self-evident. The meaning of any experience will depend on the struggle over the interpretation and definition of that experience. In summary, Kincheloe and McLaren emphasize, “The way we analyze and interpret empirical data is conditioned by the way it is theoretically framed. It is also dependent upon the researcher’s own ideological assumptions. The empirical data derived from any study cannot be treated as simple irrefutable facts. They represent hidden assumptions – assumptions the critical researcher must dig out and expose” (p. 273).

Corresponding to the principle of interpretation in critical research, the methodology of political economy is strictly theoretically framed. Researchers from this school conduct and organize empirical data and test it according to an interpretive framework grounded in political-economic theory. In its procedures, doing political-economic research is not very different from those of empirical research. However, as Graham Murdock (1989, p.227) argued, it is “the way available research materials are contextualized theoretically and the way that explanations are constructed” that distinguishes this approach. In sum, as Bettig (1996, p.6) explains, the political economist “moves from the realm of theory and the abstract to the realm of the specific and

empirical and back again. Evidence gathered at the empirical level is seen as a surface manifestation of the structural forces that lie below” in this case within global capitalism.

1.4 Research Questions and the Outline

1.4.1 Research Questions

My research questions are framed according to the assumptions of political-economic theory, to examine the digital divide within the existing relationships among wealth, power and knowledge. With these concerns, I develop four categories of questions in the analysis of the digital divide, focusing on both global perspectives and the case of Taiwan.

1. The history of the Internet

What is the history of the Internet? What is the political-economic context in which the Internet developed? What are the roles of corporations and the state in this development? How are processes of commercialization affecting this medium?

2. Internet-related industries

How have Internet-related industries developed? What is the market structure within Internet-related industries? Who are the main players?

3. Unequal Internet access

What are the patterns of Internet diffusion globally and domestically? Is there a phenomenon of the digital divide between nations or within nations? What is Taiwan’s status in terms of the global digital divide? Does inequality exist between different groups in Taiwan? What are the demographic characteristics of Internet users and non-users? How can this be explained?

4. Internet policy

What are the content of and principles guiding Internet policies? Who are the key actors influencing policymaking and the distribution of resources? What are the implications of these policies and strategies? Who benefits and who suffers?

1.4.2 Outline

After recognizing the importance of applying the political-economic approach to analyze the unequal distribution of the Internet under global capitalism in the first chapter, the second chapter will be followed by a literature review of theories that are relevant to the research of the digital divide in Taiwan. The approach of the political economy of communications is highlighted because it grounds the critical perspective of this research. Theoretical arguments related to the information society, development/dependency and globalization are introduced for they help to clarify the basic structural factors of the digital divide, namely the interaction between technology, capitalism, inequality, and developed and developing countries.

Since this study puts the case study of Taiwan in the context of the development of global capitalism, a comprehensive description of the global digital divide is necessary before embarking upon the case study. Therefore, Chapter Three will draw a picture of the inequality that has come with the development of the Internet at the global level. Due to the emphasis of political economy on a historical and holistic view of communication and culture, the analysis of the global digital divide will begin with a history of the Internet, and then turn to the development of Internet-related industries. Next, I describe the unequal access to the Internet at the global level and further examine Internet policy promoted by US-led western countries and international organizations. The framework of analyzing the global digital divide including history, economic and political power aims to construct an understanding of the relationship among control over wealth, power, knowledge and inequality.

Chapter Four to Chapter Six will detail a case study of the digital divide as it has evolved in Taiwan. Chapter Four will begin with a historical review of the Internet's development and follow with an analysis of the structure of Internet-related industries. Chapter Five will examine Internet access and Internet policy in Taiwan. The analytic framework used in Chapter Four and Chapter Five together parallels that of the global digital divide in Chapter Three. However, as opposed to the global analysis in Chapter Three, the case study of Taiwan will pay attention to how various forces influence

industrial development and policymaking and in turn how this shapes the distribution of Internet use in Taiwan. These forces examined include internal forces such as the local government and local capitalists and external forces such as transnational corporations and their home countries as well as international organizations and institutions. Chapter Six provides two case studies, the liberalization of the fixed-network telecommunications service market and the move by Taiwan's integrated circuit foundry manufacturers to China, for analyzing the dynamic interaction of internal forces and external forces and its implication for the digital divide across borders. The last chapter of this dissertation will summarize the key findings of the study and conclude with policy suggestions.

Chapter 2

THEORETICAL APPROACHES

Chapter two introduces the theoretical approaches of this study. It begins with a review of the critical political-economic approach and focuses especially on three entry points of this approach – media ownership, commodification and class struggle – as a fundamental framework for this study of the digital divide. Additionally, this chapter further introduces three key concepts – the information society, development and globalization – for they provide relevant arguments on technology, capitalism and the world order that are relevant to the digital divide.

2.1 Theoretical Approach

2.1.1 The Political Economy of Communications

Vincent Norris (1990) describes the political economic approach to the study of communications as a systemic approach, examining the interrelationship among the political, economic and communication systems and the institutions and organizations that constitute them. In addition, the political economy of communications highlights normative questions about the above relationships.

Norris proposes that the political economy of communications “is concerned with the polity, the economy and the communications system, with the existing relationships among wealth, power and knowledge” (p.10). The relationships among wealth, power and knowledge are complementary. It means that the political economic approach insists on a holistic and historical examination of the social totality among the polity, the economy and the communications system aiming to interpret how they operate within capitalist society.

Additionally, political economy is concerned with normative questions regarding the relationships among the economic, political and information systems as well as the distribution of wealth, power and knowledge respectively. It concerns “not only how power and wealth affect the production and distribution of knowledge and how knowledge affects the production and distribution of wealth and power, but how, in the Good Society, such matters ought to be handled” (Norris, 1990, p.10).

Standing firmly on Marxist criticism of the capitalist society, radical political economy contributes to our understanding the world with its ability to influence the construction of reality. According to Oscar Gandy (1992), when the political economic approach works is “not when it produces agreement and consent, but when it disturbs consensus; when it challenges the conventional, and generates uncertainty, debate, and the search for more information” (p.37). Beyond that, it is rooted in a Marxist materialism which holds that the role of scholarship is not to merely interpret the world, but to change it and for critical political economists, to change it radically. This dissertation aims to challenge the mainstream approach of neo-liberalism, seeking to find a different way of examining and solving the digital divide.

Sut Jhally (1989) proposes two approaches of political economy of culture in capitalist society: one sees media as a “consciousness industry” and the other focuses on “industrialization of culture”. The consciousness industry approach emphasizes the role of the media as a set of ideological institutions, while the industrialization of culture approach stresses the expansion of the commodity form into the superstructure. These approaches ought to be seen as complementary.

According to Jhally, capitalism is characterized by power and rewards being increasingly concentrated in the hands of those who own the means of production at the expense of the much larger group of people who own only their own labor power which they sell in exchange for wages. The system reproduces itself to survive through gaining the consent of the dominated through ideology circulated by the media. In a word, the media function as an instrument for the manufacture and circulation of a dominant ideology and consciousness which reflect the class interests of their capitalist owners.

Therefore, media ownership becomes a central focus of critical political-economic research.

The industrialization of culture approach highlights the commodification of culture under capitalism and its transformation into something to be bought and sold in the marketplace. Therefore, culture is no longer an ideological means that serves to strengthen dominant ideas, rather, it becomes “a part of material production, a part of the base itself, and is subject to the same laws of economic production as other industrial spheres” (Jhally, 1989, p.73). From this approach, culture is seen as a commodity in which its exchange-value subordinates its use-value, and audiences become a commodity to be sold to the advertisers.

Ronald Bettig (1996) broadens the categories of the political-economic approach to three fields: the economic structure of communications industries; the effects of the logic of capital on the production, distribution, and consumption of culture and information; and the contradictions and forms of resistance within the capitalist communications system (p. 33). Vincent Mosco (1996) identifies three “entry points” (p. 139) of political economy of communications as commodification, spatialization and structuration. First, commodification refers to “the process of transforming use values into exchange values, and the manifold ways this process is extended into the social field of communication products, of audiences, and of labor” (p.139). Second, spatialization is the process referred to as “the transformation of space with time”, which comprises “globalization, or the worldwide agglomeration of the communication industries, and industrial restructuring, or their manifold integration” (p.139). Mosco suggests that the processes of nation-building or nationality and citizenship are sources of division and opposition to spatialization. Third, structuration describes the process “whereby structures are mutually constituted with human agency, or to put it more specifically, structures are constituted out of agency even as they serve as the very medium for that constitution. The outcome of structuration is a set of social relational and power processes organized around class, gender, race, and social movements that both correspond to and oppose one another” (p. 139).

2.1.2 The Political Economy of the Internet

Political-economic research on the Internet can be divided into the analytical categories defined by Bettig or the “entry points” defined by Mosco: ownership of cyberspace, commodification of cyberspace and class struggle over cyberspace. These three categories are used to reveal the development of the Internet within the capitalist system which is characterized by unequal distribution of resources and power, thus serving as the crucial dimensions in my research on the digital divide both in the global level and within the nation frontier of Taiwan. The following is an introduction of the three categories utilized by political-economic scholars in Internet research and provides early evidence (by 2000) of the concentration of ownership, inequality of access to the Internet and corporate influence on policymaking. More updated data will be provided in the third chapter for the discussion of globalization and the digital divide.

2.1.2.1 Ownership of Cyberspace

The ownership/concentration of information and media has been a central concern of political economy. Radical political economists such as Robert McChesney (1999) and Dan Schiller (1999) find that Internet ownership and market structure follow the path of old media, namely, a predominant tendency toward concentration instead of sustained competition.

Examining the National Information Infrastructure (NII) project proposed by the Clinton administration in 1993, McChesney (1999) argues that the information marketplace in reality is anti-competitive due to the logic of capital, even though the administration promised to promote the Internet through a competitive market institution. The core characteristic of capitalism is the accumulation of capital, through which the capitalist class invest the surplus in order to survive and reproduce themselves as members of the dominant class (Bowles and Edwards, 1985). In order to accumulate as much capital as they can, capitalists have to figure out ways to reduce the cost of production and increase the price of products. Among many ways, expanding the market

for products and preventing competitors from participating in the market are usually found. Therefore, the logic of capital leads to concentration in the market structure. The trend of concentration has been found in some important American industries including motor vehicles, petroleum refining, iron and steel, copper, aircraft engine, drugs, industrial chemicals, and daily products (Fusfeld, 1972). This trend is also reflected in the media industry (Bagdikian, 2000).

This trend of concentration in the information marketplace is no different from that of the traditional media marketplace. Radical political economists have seen the media as a being highly concentrated one, in which fewer and fewer media owners dominate the market. Ben Bagdikian (2000) has calculated that, in 1983, fifty corporations dominated most of the media industry in the US; by 1990, the fifty companies had shrunk to twenty three; by 1997, only ten companies were left (p. xxi). By 1999, only six corporations controlled the bulk of US media output; they were GE, Viacom, Disney, Bertelsmann, Time Warner, and Murdock's News Corp, which were all listed in the 1999 Fortune Global 500 of the largest corporations in the world (p.x).

According to McChesney (1999) and D. Schiller (1999), three existing industries, telecommunications, computer, and media, have eagerly sought to extend their market to the Internet realm. Following their observation, I define the Internet-related industries as including the media industry, information technology sector and telecommunications sector². In the Internet-related industry sectors, the trend tends to be concentration due to fiscal and technological convergence of the new media. Peter Golding (1998b) pointed out two features of major corporations in the telecommunications and information sectors that stood out in the late 1990s. One was the rash of mergers and acquisitions that took place. The other was the diversification of activity. Both were designed to place the big corporations in the leading position in the race to commercialize the Internet.

² There is not a specific industry category for the Internet industry in existing data sets. The Internet-related industries I refer to in this dissertation include the media industry in the consumer discretionary sector, the information technology sector which includes software and services industry, technology hardware and equipment, semiconductors and semiconductor equipment, and the telecommunication services sector. These classifications are selected from the Global Industry Classification Standard that is adopted by the Standard & Poor's Industry Report.

McChesney (1999) and D. Schiller (1999) find that three existing industries, telecommunications, computer, and media, have eagerly sought to transform the Internet from a potential threat to a profitable channel under their control. With a succession of mergers, US companies have come to successfully dominate the global information technology market. D. Schiller (1999) points out that as of 1999 companies headquartered in the US already took in an estimated 62 percent of global information technology business, and that share was rising. US companies held fully 75 percent of global software markets and in this estimate claimed roughly the same share of the worldwide Internet economy. The computer software giant Microsoft targeted the global market, generating more than half of its annual software sales from its subsidiaries in nearly sixty countries (pp. 82-83).

There is much evidence therefore suggesting that emerging Internet market tends to be concentrated with a few big companies. As Saul Hansell (1998) argued in the *New York Times*, the lesson of the Internet was that “the big get bigger and the small fade away” (Quoted from McChesney, 1999, p.182). McChesney (1999) predicted that the Internet, rather than having a competitive bias, may in fact stimulate monopoly and oligopoly (p. 183). More updated data are provided in the third chapter.

2.1.2.2 Commodification of Cyberspace

The political economic approach stresses that the logic of capital influences the production, distribution and consumption of culture and information, and therefore shapes access to cultural / informational production and consumption. More precisely, in the case of production, distribution and consumption of the Internet, the logic of capital, namely making profit, makes the Internet accessible to those who can afford it while untouchable to those cannot, both at the global and the national levels.

Golding (1998a) argued, neo-liberal globalization, nominally pushed by the market forces, has produced massive inequalities in access to and ownership of communication facilities such as telephones, computers and the Internet. For example, in 1997, countries in the Organization for Economic Cooperation and Development (OECD) contained only

15 percent of the world's population, while accounting for 71 percent of all telephone lines. Half the world's population had never made a phone call, while only a fraction are on line and in touch to any effect and benefit (p.79).

A recent United Nations (UN) report in 2001 serves to facilitate understanding of the extremes of the digital divide. As of 1994 not a single less developed country had a computer network directly connected to the Internet. That same year, "dot.com" replaced "dot.edu" as the most common domain name. Commercialization of cyberspace saw private corporations rapidly swarm to the Internet in the developed world while most people in the Third World had no knowledge of its existence. The United Nations Development Program (UNDP) (2001) estimated that, in 1997, 84 percent of mobile telephone subscribers, 91 percent of all facsimile machines, and fully 97 percent of all Internet host computers were in developed countries. The Internet's predominant language, English, was spoken by a mere 15 percent of the world's people. In 2000, although Internet users in every region saw an increase, the distribution was still very unequal. More than three-quarters of Internet users lived in OECD countries. While the US had 54 percent of its national population online, the Arab States, Sub-Saharan Africa and South Asia each had less than 1 percent of their respective population online. Only 6.7 percent of the world population was online in 2000 (UNDP, 2001, P.40).

Thus, the US has the largest online population (by individual) in the world in 2000, which accounts for its 54 percent of population as mentioned above. In its beginning to promote Internet access in the early 1990s, the US government promised to make everyone benefit from the new technology within a market driven framework. However, critical scholars such as Herbert Schiller (1996) and McChesney (1999) questioned the promise by arguing that market principles operate in contradiction to universal service. McChesney insists that, under the logic of capital, the most money is made by pitching high "quality" service to the affluent who can afford it, and who are most attractive to advertisers. As John Malone, then chairman and CEO of TCI, admitted in a 1995 interview, "the best way to conduct the Internet access business is to offer 'tiered' service, with high-speed access for the affluent and for business, on down to low clunker Internet access for those who cannot afford better service" (Quoted from McChesney,

1999, pp.161-162). Therefore, the poor have always been excluded from access to advanced technologies because of their lack of affordability.

Bettig's (1997) critical review of the Internet's development through the political-economic approach foresaw the enclosure of cyberspace with the dominance of private corporations posing a threat to democracy. Bettig predicted that the Internet market would tend to become concentrated rather than decentralized given the enclosure process. Additionally, the US-based transnational corporations would not only dominate the domestic market but also the global market. Although the Internet is distributed to more and more users, there are still a great amount of people excluded from access to this technology. With the conflict between market principles and universal service, the promise of the Internet for all by 2003 remained rhetorical rather than realistic.

2.1.2.3 Class Struggle

Bettig's (1996) research on the history of copyright examines the intraclass struggle among the broadcast television, cable television and film industry, whenever new technology emerges and arouses conflict among them (pp. 117-187). His analysis demonstrates how media owners exercise their power to influence policymaking in order to protect their private interests. Like the history of copyright, history repeats itself with the development of the Internet. In the 1990s, private interests dominated the direction of US Internet policy. H. Schiller (1996) and McChesney (1999) argue that the emphasis on the private sector's role in the Internet's development was first introduced with the NII project³ and reiterated in *the Telecommunications Act* of 1996, which allowed the private sector to have a primary role in determining the future of US electronic media and digital

³ The NII project proposed by then Vice President Al Gore in 1993 was guided by the following principles: (1) encouraging private investment in the NII; (2) promoting and protecting competition; (3) providing open access to the NII by consumers and service providers; (4) Preserving and advancing universal service to avoid creating a society of information "haves" and "have-nots"; (5) ensuring flexibility so that the newly-adopted regulatory framework can keep pace with the rapid technological and market changes that pervade the telecommunications and information industries. See Administration White Paper on Communication Act Reform for related information.

communication. Although universal service still stands as the core concept in the policy, critical scholars have been skeptical of the capability of the market to achieve the goal to serve all.

McChesney further points out that private corporations have directly influenced US policy making in different cases. The leading media, telecommunications, and computer firms have had lobbying groups specifically commissioned to advance their interests in Internet related businesses. Additionally, after his inauguration as US Vice President in 1992, Al Gore actively cultivated relations with CEOs of computer firms, forming a “cyber-cabinet” that met monthly keeping him on top of Internet policy developments. McChesney further argues that privatization of the Internet was largely shaped at a meeting at Harvard University in 1990 of representatives from the government and the largest telecommunications and computer firms. At this meeting, corporate representatives argued that it would be unfair to private providers of network services to have to compete with the government, so the government should get out of the Internet business. The government began to privatize its portion of the Internet backbone in 1993.

The above description does not mean that the public was totally silent on Internet policy. For example, the American Libraries Association called for establishing a Corporation for Public Networking because otherwise the Internet would become “owned, controlled and dominated by unregulated media giants that are driven by profits, not the hope for cultural understanding, greater democracy, the decrease of poverty, or educational enhancement” (Quoted from Golding, 1998b, p.147). However, this opposition voice has had little influence due to its exclusion from policymaking process. This case shows how the state functions as the arena for political class struggle in which the capitalist class sought to use the state as an instrument of domination and the state holds a bias in favor of the interests of the capitalist class.

2.1.3 The Theories of the Capitalist State

The political-economic approach of communications examines the relationship of power, wealth and knowledge. One of the crucial dimensions of the political-economic analysis is the function of the state in capitalist society. The class struggle approach introduced in the former section explicates the mediated role of the state for interclass or intraclass struggle, but it cannot explain the structural relationship between the state and the capitalist class and the tendency of policymaking in favor of the interests of the capitalist class as a whole. Therefore, this section extends the discussion of the class struggle and other two main theses of the neo-Marxist capitalist state: instrumentalism and structuralism (Bettig, 1996; Hamilton, 1982). These theories are used to analyze the making of information and Internet policy of Taiwan.

Instrumentalism argues that the state in capitalist society functions as an instrument of the ruling class. This thesis tends to emphasize the constitution of the ruling class and the means this class exercise in public or private institutions in order to protect its interests. As Ralph Miliband (1969) pointed out, the dominant class is able to manipulate a capitalist state through a variety of direct and indirect means such as recruitment into positions in the government, membership in advisory committees, lobbying, campaign financing and control of the media and the education system. In a word, this thesis focuses on the conscious behaviors of human agency (the capitalist class) and its effects on state policies.

Structuralism considers the capitalist state an objective guarantor of production relations or economic accumulation. It highlights the relationship between the logic of capital and state policies. In capitalist society, the state does not control capital; it relies on the capitalists for accumulating capital from which revenues are extracted to run the state. Based on the structural dependence, the state has to ensure the smooth accumulation of capital for its own survival. Consequently, the state is relatively to intervene in the economy for solving the continuing economic crises produced by contradictions inherent to the capitalist mode of production. For the structuralists such as Nicos Poulantzas (1969), the state is constrained by its position within a given social

formation and granted a certain degree of autonomy from the dominant class and society in order to preserve or reproduce that social formation. In a capitalist society, the state accordingly becomes a guarantor for the capitalist mode of production and the related class structure.

Either from the perspective of human agency or structural constraints, instrumentalism and structuralism view the capitalist class a largely uniform group with mutual interests and the autonomy of the state is consequently constrained by the interests of the capitalist class. For the theory of class struggle, the capitalist class is not seen as an entirely uniform group with a common interest. Instead, it includes various class factions or industry coalitions organized to promote their interests through state action. Bob Jessop (1990) introduced the concept of “hegemonic project” to describe how the hegemonic class faction seeks to reach its interests through influencing state officials and relevant forces in society to support its favored policy. This theory of class struggle sees the state as a site of interclass and intraclass struggle. According to Claus Offe (1974), this thesis argues that in order to cope with the inherent general crises of capitalism and the expansion of socialism, the capitalist state must intervene increasingly in the economy. The capitalist state does this as a relatively autonomous mediator of the class struggle inherent in the capitalist accumulation process and thus maintains the dynamics of capitalist development. Contradictions arising from the various mediating roles of the state itself make the state the principal arena of crisis.

The abovementioned discussion is limited to the interaction of the state and the capitalist class within the nation, especially the state in North America and Western Europe where the capitalist class is in place. It is not enough to explain how the state functions within global capitalism, especially for my research focus on a developing country. Therefore, the analysis of the role of the state needs a further review of comparative perspectives of development and globalization. For example, the state in Latin America was conceptualized by early dependency theorists as fundamentally different from states in North America and Western Europe: autonomous with respect to weak state capital but completely dependent on multinational capital (Baran, 1957). The argument of a later version of dependency theory saw the state could take initiatives and

form alliances with domestic and multinational capitals for a nation's own development (Cardoso & Faletto, 1979). The world system theory emphasized the role of the state in carving out a space for indigenous economic and political forces to move the nation to an intermediate semi-peripheral position within the world economy (Wallerstein, 1979). These arguments will be detailed in the second section of this chapter.

2.2 Key Concepts behind the Digital Divide

The abovementioned approach of political economy provides a theoretical perspective and guiding framework for this study of the digital divide in Taiwan. For a better understanding of theoretical arguments around the digital divide, this section further reviews three key concepts including the information society, development, and globalization. Debates on the meanings of these concepts are explored to deepen the analysis of the digital divide from the political-economic approach. These debates provide key arguments related to technology, capitalism, inequality and the world order that the political economy of communications views as crucial for examining the development of the Internet.

2.2.1 The “Information Society”

The “information society” is a popular term that generally underscores the significance of information in modern society. This term originated in Japan (Ito, 1981) but received its strongest intellectual support in the US. It was further highlighted by many governments in their information policy rhetoric as a primary means of enhancing national development. The typical tendencies of the information society include a growing numbers of information workers, increased interconnectedness, high personal consumption of information, and the proliferation of information technologies that represent responses to demand for information (Schement and Curtis, 1995, p.10). This section selects three key thinkers on the concept of the information society. Through a

review and comparison of their theses, I attempt to clarify the relationship between information/information technology and the development of capitalism.

2.2.1.1 Post-industrial Society: Daniel Bell

In his book, *The Coming of Post-Industrial Society*, Daniel Bell (1973) contended that the US was entering a new social-economic system after World War II which was characterized by a heightened significance of information and information-related industries. For Bell, in the post-industrial society, information is crucial both quantitatively and qualitatively. On the one hand, features of post-industrialism lead to greater amounts of information being put into use. On the other hand, there is a qualitative shift of information that he calls “theoretical knowledge”, meaning that, in post-industrial society, there is not just more information; there is also a different kind of information / knowledge in play. By putting information at the core of the new system, Bell asserted that “the post-industrial society is an information society” (p.467).

For analytical purpose, Bell divided societies into pre-industrial, industrial and post-industrial, each with different “design”. The design of pre-industrial society is a “game against nature”: its resources are drawn from extractive industries and it is subject to the laws of diminishing returns and low productivity; the design of industrial society is a “game fabricated nature” which is centered on man-machine relationship and uses energy to transform the natural environment into a technical environment; the design of a post-industrial society is a “game between persons” in which an intellectual technology, based on information, rises alongside of machine technology (p. 116).

Because of these different designs, there are vast differences in the character of economic sector distribution and the slopes of occupations. By early 1980s, pre-industrial societies existed in Asia, Africa and Latin America where agriculture, mining, fishing and timber constituted economic sectors and farmers, miners, fishermen and unskilled workers were main occupational distribution. Industrial societies existed in Western Europe, Soviet Union and Japan where secondary goods producing including manufacturing and processing constituted major economic sectors and semi-skilled

workers and engineers are the major occupational slope. The post-industrial society existed in the US where service was the main economic sector and professional and technical scientists were in the most important occupational category.

With the differences shown, Bell claimed the post-industrial society was a new type of social formation which signifies a shift of manufacturing to services. This shift begins with a decline of workers employed in manufacturing and an increase in industrial output because of rationalization and technological innovation. Increasing industrial output brings about increasing wealth with which people can spend on for their new needs. Therefore, occupations in services are created to fulfill people's new needs in which information is crucially important. Consequently, a continuous release of people from employment in manufacturing occupations leads to the creation of a never-ending supply of new job opportunities in services aimed at fulfilling new needs that more wealth generates. Therefore, the decline of manufacturing occupations and the emergence and prosperity of service occupations form a continuous circle that symbolizes the transformation of a society from its industrial period to a post-industrial stage. However, Bell celebrated the prosperity of service economy while ignoring the structural employment happening in the process of industrial transformation in many countries. And he could not foresee the bursting bubble of the so called "new economy" around 2000 which broke the myth of endless economic growth and endless job opportunities in the knowledge- based economy.

In addition, for Bell, the post-industrial society adds a new criterion to the definitions of base and access: technical skill becomes a condition of operative power, and higher education the means of obtaining technical skill. As a result, there has been a shift in the slope of power as, in key institutions, technical competence becomes the overriding consideration. For example, in industry, family capitalism is replaced by managerial capitalism; in government, patronage is replaced by civil service and bureaucratization; in the universities, the exclusiveness of the old social elites, particularly a White Anglo-Saxon Protestant domination of the Ivy League colleges, breaks up with the inclusion of ethnic groups, particularly Jews. Increasingly, the newer professional occupations, particularly engineering and economics, become central to the

technical decisions of the society. The post-industrial society, “in this dimension of status and power, is the logical extension of the meritocracy; it is the codification of a new social order based, in principle, on the priority of education talent” (p. 426). In this way, Bell denied wealth as the fundamental element of class; instead, knowledge and education became the determinate condition of social stratification.

Many like-minded scholars agreed with Bell when he pointed out the significance of information and a new type of occupational structure. His research was an extension of Fritz Machlup’s (1962) work which first introduced the theory of a “knowledge economy” from the analysis of the contribution of information activities to the US Gross National Product (GNP). And in turn Bell’s idea of an information-dominated society inspired many influential studies. For example, Marc Porat (1977) further identified a new “information sector” in addition to the traditional sectors of agriculture, industry, and service, finding that this sector was the largest of the four in the US economy in the late 1960s. Based on this research in the late 1970s, Porat proclaimed the US an “information economy”. In the early 1980s, Wilson Dizard (1982) titled his book *The Coming Information Age* in which he asserted that the US had become the first nation to complete the three-stage shift from an agricultural society (equal to what Bell called “the pre-industrial society) to an industrial society and then to a new era of the “information age”.

However, Bell’s observations and assertions of the coming of a new socioeconomic system were questionable in the following ways. First, Frank Webster (2002) argues that Bell holds an anti-holistic view of society (p.33). Bell (1973) claimed that societies are not “organic or so integrated as to be analyzable as a single system” (p.114). He argued that society can be separated into three different realms: social structure, polity and culture, with each having autonomy and not necessarily influencing one another. And he further asserted that the post-industrial society emerges through changes in social structure, rather than in politics or culture, although its development most certainly “poses questions” (p.13) for the polity and cultural domain. Due to a lack of a more holistic view of advanced societies, Bell failed to address how the social sphere, the political sphere and the cultural sphere are intertwined with each other and shape the use and distribution of information throughout the whole society.

Furthermore, what draws his attention is how information occupies the core of the social formation which leads to his belief in information and information technology as the primary determinant of social change. In a word, Bell is a technological determinist. Krishan Kumar (1995) opposed to Bell's perspective by saying, "the acceptance of the growing importance of information technology, even an information revolution, is one thing; the acceptance of the idea of a new industrial revolution, a new kind of society, a new age, is quite another" (p.17). Kumar argued the "information society" theorists including Bell can be attacked for their short-sighted historical perspective. What they see new about the social system is in fact the culmination of trends deep in the past. The prominence of information and communications technologies is a consequential development of the control revolution (Beniger, 1985) inherent in the crisis of production and control of capitalism. Furthermore, Kumar (1995) argued the new technology is being applied within a political and economic framework that confirms and accentuates existing patterns such mechanization, routinization and rationalization. Besides, existing social inequalities are maintained and magnified. Therefore, the instruments and techniques may change, but the basic operation and structure of capitalist industrial societies remain the same as before (p.32). To be brief, Bell's "information society" represented the continuity of capitalism.

2.2.1.2 Informational Capitalism: Manual Castells

Manual Castells' three volume work *The Information Age: Economy, Society and Culture* (1996, 1997, 1998) established his notable status in the discourses about the information society. His work aimed to provide a comprehensive examination of information and communication technologies (ICTs) in the context of global patterns of social, political, economic and technological change. To begin with, Castells traced the roots of the information society to the 1980s in which an information economy emerged within the era of the collapse of Soviet statism, the demise of international communism and the profound restructuring of capitalism. According to Castells, the crucial characteristic of the information age is the spread of networks linking people, institutions

and countries. This network influences the social structure in two divergent directions: it increases integration into international affairs on the one hand, and increases social division and fragmentation on the other. This argument corresponds to Denis McQuail's (2000) two dimensions of media's influences on social order: centripetal and centrifugal. The former refers to effects in the form of more social unity, order, cohesion and integration. The latter refers to effects the stimulus towards social change, freedom, individualism and fragmentation. No matter what influences the network bring about, Castells argued that inclusion in the network is a requisite for people's full participation in socioeconomic activities. This is an argument for extending access to ICTs, especially to the Internet, as a right of citizenship in the information age (Webster, 2002, p. 106), which is relevant to the concerns of this dissertation.

In his effort to describe the significance of information/information technology and its influence on contemporary society, Castells took a more holistic perspective that make him distinct from Bell. Concerned about the relationship between information and capitalism, Castells carefully picked the term "information capitalism" to reveal the unresolved tension of the information age in serving as both continuity and change within the capitalist system. On the one hand, information capitalism presents continuity because it maintains that capitalism, in terms of its governing logic of capital and social stratification, is still the fundamental social principle of the world. On the other hand, it claims a change since "informationalism" is highlighted as primary motor of late twentieth century capitalist society. For him, the information age heralded the coming of a new society which has been brought into being by the development of networks and which gives priority to information flows. According to Castells (1996), capitalism still exists, but "in new, profoundly modified forms", at the core of which is this "spirit of informationalism" (p.198).

However, Castells' emphasis on informationalism unavoidably led him to the position of technological determinism that many proponents of the information society hold. He asserted that we are actually in a period of informational capitalism, in which the real motor of change is a "technological revolution, centered around information technologies, which is reshaping, at an accelerated pace, the material basis of society"

(p.1). Castells endorsed throughout the principle that it is the “information technology revolution” which is the base on which all else of the network society is built. As Weber commented (2002), unavoidably, it means that Castells is committed to a technocratic view of development, just as much as is Bell and other theorists of the information age.

Castells tried to reveal various new forms of what he called informational capitalism through data from different fields such as culture, economy, society and polity and from different areas around the world. I find some of his arguments concerning the organization of Transnational Corporations (TNCs), global capitalists and social stratification in the network society relevant to my study and worthy of further discussion.

Castells (1996) believed that the network society had profoundly changed organizational forms of TNCs from being vertically integrated to being so disintegrated as to be transformed into the “horizontal corporation” (p.166). For Castells, the network society is about speed, efficiency and adaptability in a global market, in which the traditionally vertically integrated form of the large corporation is too rigid to respond to rapid change. Therefore, TNCs have to devolve power to those with access to the network of “self-programmed, self-directed units based on decentralization, participation, and co-ordination” (p.166). In this way the “globalization of competition dissolves the large corporation in a web of multidirectional networks” (p.193).

Castells named the new organizational form “the network enterprise”. By definition, the network enterprise is the specific form of enterprise whose system of means is constituted by the intersection of segments of autonomous systems of goals. Thus, the components of the network are both autonomous and dependent vis-à-vis the network, and may be a part of other networks, and therefore of other systems of means aimed at other goals. Since some TNCs participate in a variety of networks depending on products, processors, and countries, the new economy cannot be characterized as being centered any longer on TNCs, even if they continue to exercise jointly oligopolistic control over most markets. This is because corporations have transformed themselves into a web of multiple networks embedded in a multiplicity of institutional environments. Power still exists, but it is randomly exercised. Markets still trade, but purely economic

calculations are hampered by their dependency on unsolvable equations overdetermined by too many variables (pp.194-195).

Castells thus aligned his position with post-Fordists and the flexibility of production. However, Castells ignored the fact that TNCs are still the power-holders of wealth and technology in the global economy, since most networks are structured around such corporations. Dieter Ernst's (1994) research on the formation of global interfirm networks found that networks were either centered on a major multinational enterprise or were formed on the basis of alliances and cooperation between such enterprises. Oligopolistic concentration has been maintained or increased in most sectors of major industries, not only in spite of but because of the networked form of organization. This is because entry into the strategic networks requires either considerable resources of capital and technology or an alliance with a major player in the network. Ernst's argument can be confirmed by the oligopolistic market structure of global IT industry and also in the supplier networks between Taiwan's IT companies and leading TNCs such as IBM and Compaq.

Castells argued that the network society brings about new forms of social stratification. Because the network society is information oriented, information labor emerged as the main labor force in "knowledge-intensive" business, making the working class disposable. The information laborers constitute a new class based on their education and expertise, not the property they owned. Therefore, he maintained that the traditional class stratification between the capitalist class and the working class had become outdated. In the network society a new social stratification emerges between informational labor and unskilled labor.

In this way Castells echoed Bell's argument that a new social order in the post-industrial society is principally based on the priority of educational credentials, not on wealth. The problem of both Bell and Castells's argument is they separate the education of information laborer from its class roots and fail to question who has access to educational resources. Are educational resources being equally distributed to any one who wants access to them? Or are most of them reserved for the privileged classes? Webster (2002) answered the above questions by reminding us of the association of high

reputation universities with disproportionately students of privileged origins (p. 117), showing that education is still highly related to income and wealth. The high tuition in Ivy League universities filters students with their capability to pay. It is the same with Oxford and Cambridge, the most exclusive universities in Britain. Half of students in both universities are from private schools only 7 percent of the relevant age group can enter (Adonis and Pollard, 1997).

Furthermore, John Scott (1997) revealed that the propertied class not only control ownership of corporations but also the educational system. Scott commented, the “propertied capitalist class has interests throughout the corporate system, and is able to ensure its continuity over time through its monopolization of the educational system as well as its monopolization of wealth” (p.20). Consequently, by controlling major means of reproduction : capital and education, the capitalist class keeps standing at the top of the stratification system, enjoying superior life chances to those in the subordinate service class that fill the rungs of the corporate hierarchies.

Based on his expertise in geography, Castells drew attention to issues of space, especially urban space. Castells maintained that megacities had become development engines that are at once “globally connected and locally disconnected, physically and socially” (p.404). In the megacities live the dominant managerial elites who have global links and lifestyles and separate themselves within the cities they inhabit. Although the dominant elites share similar cultural taste at the global level, nevertheless, Castells rejected identifying this privileged group as a global capitalist class that a thesis of global capitalism would suggest. Castells argued informational capitalism has two distinctive features in the capital accumulation process: it is global and it is structured around an information network of financial flow. In the process, the legal owners of capital do not really control the flow of capital; it is people who carry on the flow who can make a decision. Therefore, “there is not, sociologically and economically, such a thing as a global capitalist class. But there is an integrated, global capital network, whose movements and variable logic ultimately determine economies and influence societies” (pp.473-474). Castells maintained, the real class seizing control of information capitalism

is “a faceless collective capitalist, made up of financial flows operated by electronic networks” (p.474).

In fact, Castells argument is nothing new. His argument reminds us the “managerial class” proposed by Adolf Berle and Gardiner Mean’s (1932) research on control and ownership of US corporations in the 1930s. They argued ownership of corporate stock had become widely diffused to numerous stakeholders so that no single individual or group of stakeholders can exercise control over the modern corporation. Only the managerial class, constituted of chief executive or upper-level managers, is capable of running the corporation on behalf of vast shareholders. But the managerial class hypotheses had been challenged by radical scholars who argued the capitalist class did exist in US society. William Domhoff (1983) argued that the ruling class was 5 percent of US families who owned half of wealth in this country. Members of this class shared mutual interests by sitting at corporate board meetings and shared a distinctive life style by entering exclusive private schools and social clubs. They controlled major corporations and social resources and used these sources to maintain their social cohesion. When the corporations and capital went global, the global capitalist class consequently formed.

Leslie Sklair (2002) views the transnational capitalist class as a crucial element of global capitalism. In her definition, direct ownership of the means of production is not the only criterion of the transnational capitalists. This transnational class formed due to the members share the following characteristics: they share global and local economic interests; they seek to exert control in economical, political and cultural domains; they have global rather than local perspectives on a variety of issues; they tend to consider themselves citizens of the world as well as of their home country; and they share similar lifestyles. Based on these criteria, the transnational capitalist class includes TNC executives and their local affiliates, globalizing state and inter-state bureaucrats and politicians, globalizing professional, and merchants and media. Most important of all, this class seeks to organize the conditions under which its interests can be fulfilled within the global, national and local levels. Therefore, according to Sklair, the concept of the transnational capitalist class implies “there is one central transnational capitalist class that

make system-wide decisions, and that it connects with the transnational capitalist class in each community, region and country” (p.99).

2.2.1.3 Cultural Imperialism: Herbert Schiller

Herbert Schiller, a prominent scholar among neo-Marxist-oriented critical theorists, insisted on analyzing the current cultural and social phenomenon from a political-economic approach. With the political-economic approach, Schiller looked behind information to the structural features and the operation of the capitalist system with an emphasis on a holistic historical analysis.

Schiller saw the relationship between information and capitalism as a dialectic interaction. For him, the information society reflected capitalist imperatives: on the one hand, the history of capitalist development affects the information domain; on the other hand, the information domain becomes an essential foundation of capitalism.

Furthermore, Schiller’s concern with the significance of capitalism’s imperatives for the information domain is the role of *power, control and interest*. In his observation of capitalist culture, Schiller (1973) argued that “the central questions concerning the character of, and prospects for, the new information technology are our familiar criteria: for whose benefit and under whose control will it be implemented?” (p.175)

Therefore, Schiller defined the information society as one the powerful dominant and benefit from the information domain. For Schiller,

What is called the “information society” is, in fact, the production, processing and transmission of a very large amount of data about all sorts of matters – individual and national, social and commercial, economic and military. Most of the data are produced to meet very specific needs of supercorporations, national government bureaucracies, and the military establishment of the advanced industrial state (Schiller, 1981, p.25).

In his influential book, *Mass Communications and American Empire* (1969/1992), Schiller examined the role and influence of US government and US-based TNCs, in league with the military interests, in their promotion of new technology to the developing world. Schiller argued that the West, especially the US, dominated the global

communications which caused unequal flows of information and undermined the cultural autonomy of the developing countries. His argument on the global communications order was marked as the approach of cultural imperialism. According to Schiller (1976), cultural imperialism was defined as “the sum of the processes by which a society is brought into the modern society and how its dominating stratum is attracted, pressured, forced, and sometimes bribed into shaping social instructions to correspond to, or even to promote, the values and structures of the dominate centre of the system” (p.9). Therefore, he termed the US’s exportation of telecommunications technology and cultural products to the developing countries as an “electronic invasion” that threatened traditional culture and enforces dependency of the developing world on industrial countries.

With the end of the Cold World in the beginning of the 1990s and the US standing as the lone superpower in the world, Schiller saw the TNCs increasingly acquired a more important role in international relations which transformed US cultural imperialism into “transnational corporate cultural domination” (1992, p.39). The discussion of such corporate power will be detailed later.

Webster (2002, pp. 124-160) identified three key elements of Schiller’s argument on the information society which are worth a further elaboration:

(1) Market Criteria

Schiller argued that market criteria, namely the maximization of profit, leads to commodification of information. In capitalist society, market principles determine the production and distribution of material and cultural products. Information, as the core of the cultural product, is therefore produced and made available where it has the prospect of being sold at a profit. This corresponds to what Vincent Mosco (1989) described as a “pay-per society” in which the ability to pay on the consumption side of the market equation and the anticipation of making profit on the production side function is the determinant force in the generation of and access to information.

In a word, the capitalist logic determinates the type of information for smoothing the operation of capitalism and for serving those who can afford it. In his analysis of the use of databases, Schiller questioned:

What kind of information today is being produced at incredible levels of sophistication? Stock market prices, commodity prices, currency information. You have big private data producers, all kinds of brokers ... who have their video monitors and are plugged into information systems which give them incredible arrays of highly specific information, but this is all related to how you can make more money in the stock market ... how you can shift funds in and out of the country ... that's where more of this information is going and who is receiving it. (Schiller, 1990, p.3)

(2) Class Inequalities

For Schiller, class inequalities exercise a central pull in the information age that influences distribution of access to information. The centrality of “ability to pay” criteria, and the close linkage these have with class inequalities, leads Schiller (1996) to emphasize “information inequality” as one crucial symbol and consequence of advanced capitalism. He further distinguished the “information rich” and “information poor”, both within and between nations. Thus:

Access to information becomes a factor of wealth and income. The general public and the State itself are progressively excluded...The division inside the society between information “haves” and “have nots” deepens just as it does between nations, making the less-developed ones – which in the information age means the overwhelming majority – still more dependent on the few information generators, processors and transmitters. (Schiller, 1983, p. 88)

Consequently, as Webster (2002, p.149) extended Schiller, the “information revolution” being born into a class society is marked by existing inequalities and may indeed exacerbate them. Thus what has been called the “information gap” may be continuously widened, with those economically and educationally privileged able to extend their advantages by access to sophisticated information resources such as online databases and advanced computer communications facilities, while those at the bottom of the class system are increasingly swamped by what Schiller has termed “garbage information” which diverts, amuses and gossips, but offers little information of value. Schiller’s insight is inspiring for his early grasp of the disparity of Internet access and its influence on class society.

(3) Corporate Capitalism

Schiller viewed the corporate sector as the major beneficiary of the “information revolution”. The information revolution symbolizes the innovation and prevalence of advanced ICTs which serve corporate needs both in their internal management and external services. Modern corporations have a built-in need for developed information networks and advanced systems of management control. Up-to-the-minute computerized technologies are a prerequisite for coordinating, integrating and administering the information flow of organizations which typically have disparate locations. Furthermore, ICT allows corporations to conduct business globally with minimal concern for restrictions imposed by nation states. Corporations can operate telecommunications networks that offer them instantaneous economic transactions and real-time computer linkages along private lines which are removed from the scrutiny of supposedly sovereign states.

Finally, the information revolution is not just being targeted at the corporate sector; it is also being managed and developed by corporate capital itself. In fact the information industry is among the most oligopolistic, gigantic and global of corporate businesses. It is a business in ferment, mergers and takeovers having been the order since the 1990s. For example, AT&T merged with NCR in 1991; AT&T purchased Telecoms Inc. with \$48 billion in 1997; and AOL and Time Warner merged with a historical price of \$106 billion in 2000. The trend is mergers among different business involving increasingly larger amounts of money.

Schiller’s arguments have been questioned for their capacity for suggesting practical strategies and alternative policies. Additionally, his emphasis on class that traditional Marxist view as fundamental is said to lead to a failure to take account of other factors such as education (cultural capital) in the analysis of social and informational stratification. However, Webster (2002) defends Schiller by arguing that his holistic approach is helpful in understanding and explaining the information age and at the same time the possibility of radical ways of reorganizing society.

2.2.1.4 Summarizing Bell, Castells and Schiller

The above discussion on the “information society” was intended to clarify different perspectives on the concept due to its frequent use in discourses about global information policy (e.g. the European Union’s policy toward the information society, the International Telecommunications Union hosted meeting “The World Summit on the Information Society”). While different perspectives exist, the common feature of the arguments connecting the three thinkers under this concept is that they all recognized the important role of information in society. Bell seems strongly technology determinist, in that he argued the knowledge-based post-industrial society was a new social system that emerged in 1970 America and would soon appear in advanced industrial countries in Europe and Japan. He predicted a prosperous knowledge-based economy based on its endless needs of services and employment. His argument ignored the continuity of the mode and relation of production inherent in capitalism, which led to his failure to foresee the crisis of the knowledge economy due to overexpansion of capital and sustained inequality within capitalist society. Castells claimed to take a holistic view of the dialectic interaction between technology development and global capitalism. However, in his efforts to unfold the new political, economic and cultural phenomenon in what he called network society, he tended to emphasize the determining influence of technology over society and overlooked the analysis of power and control in the established social system. His approach of analysis unavoidably made him aligned with Bell. Therefore, his arguments on the formation of TNCs, social stratification and global capitalist class came under attack by critics. Castells argued that TNCs have transformed from vertically to horizontally structured corporations due to the emergence of communications networks. In contrast, Schiller saw the dominant tendency of corporate development in modern capitalism to be forward concentration and conglomeration. While Castells insisted that education and knowledge is replacing income and wealth as the new indicator of social stratification due to the nature of informational capitalism, Schiller stressed that a traditional class analysis is still valid and useful. Schiller emphasized power, control and interest in analyzing the information society, helping to understand various forms of

inequality in capitalist society. Standing on the side of the political-economic approach, this dissertation focuses on the trend toward corporate concentration in Internet-related industries in Taiwan. The dissertation also examines the interwoven relationship between wealth, education and other social resources that determine social stratification and in turn access to the Internet.

2.2.2 The Theories of Development

2.2.2.1 Modernization Theory

The modernization approach constituted the dominant paradigm of development theories during the 1950s and the 1960s. Having its roots from the Industrial Revolution which brought about economic and political advancement in eighteenth-century Europe, modernization has come to mean the process by which developing countries could attain the standard of living of the West in this post-World War II period.

Modernization theory can be clarified by the basic definition of two key notions: one is modernization and another is development. According to Rogers and Svenning (1969), modernization meant “the process by which individuals change from a traditional way of life to a more complex, technologically advanced, and rapidly changing style of life”. Development referred to “a type of social change in which new ideas are introduced into a social system in order to produce higher per capita incomes and levels of living through more modern production methods and improved social organization” (p.8). By this definition, modernization theory referred to a kind of social adjustment from a traditional style to a modern one in which ideological change and material innovation play an important role.

Furthermore, Rogers (1976, p.49) pointed out four elements in this dominant paradigm of development, which were:

(1) Economic growth through industrialization and accompanying urbanization was the key to development.

- (2) The choice of technology was to be capital-intensive, and labor-saving, mainly transferred from industrialized nations.
- (3) Centralized planning should be controlled by government economists and bankers in order to speed up the process of development.
- (4) The causes of underdevelopment were believed to lie mainly with the developing nations rather than in their trade or other external relationships with industrialized countries.

From the above list, the assumption of “the West leads and the Third World follows” in this process of development is uncovered. The modernization approach assumes that the economic growth that the West was proud of stands as the desirable goal that developing countries should pursue. In order to achieve advancement, developing countries were to rely on the help of industrial countries, especially on the importation of advanced technologies. In this process, the governments of developing countries were to take responsibility to actively making plans for their development. While the external forces from industrial countries and the internal forces within the developing countries both play their roles, the theory assumes that the responsibility of the outcome of development is internal.

However, historical evidence shows that the development model that the West set for developing countries caused problems due to its lack of consideration for the real needs of developing countries. In 1971 Wilber Schramm, a key figure of development theory, led the way by admitting, “The Western model did not work as its proponents had expected” (p. 14). In 1976, Rogers announced “the passing of the dominant paradigm” and attempted to redefine development as:

A widely participatory process of social change in a society, intended to bring about social and material advancement including greater equality, freedom, and other value qualities for the majority of the people through their gaining greater control over their own environment. (Rogers, 1976, p. 225)

It is worthy of addressing the role of media in the modernization approach. Modernization theory arose from the notion that international mass communication could be used to spread the message of modernity and transfer economic and political models

of the West to the newly independent countries of the South. Therefore communications research on modernization theory was based on the belief that the mass media would help transform traditional societies. This pro-media attitude was very influential and received support from international organizations such as the United Nations Education, Science and Culture Organization (UNESCO) and by the governments in developing countries that made this modernization approach prevalent.

In academia, Daniel Lerner, Schramm and Rogers became notable scholars for their research on communications for development. Lerner's work *The Passing of Traditional Society* (1958) was an examination of media use in the Middle East in which he proposed that mass media function as a "mobility multiplier" which enables people to raise literacy and makes them aspire to a modern way of life. Schramm's work *Mass Media and National Development* (1964) is a further extension of Lerner's concept. He emphasized the mass media could serve as the vehicle for transferring new ideas from the North to the South and, within the South, from urban to rural areas for speeding up development. He noted that:

The task of the mass media of information and the "new media" of education is to speed and ease the long, slow social transformation required for economic development, and, in particular, to speed and smooth the task of modernizing human resources behind the national effort. (Schramm, 1964, p. 27)

Rogers's work *Diffusion of Innovation* (1962) is another influential work on modernization theory which uses the level of media development as an indicator of general societal development.

The timing of the above research was significant. The United Nations (UN) had proclaimed the 1960s as "the Decade of Development" and UN agencies and Western governments, led by the US, were generously funding research, often in conjunction with private companies, through universities and the development bureaucracy, notably the newly established United States Agency for International Development (USAID), the United States Information Agency (USIA), and the Peace Corps, to harness the power of the mass media to "modernize" the newly independent countries of the South (Thussu, 2000, p.57).

Meanwhile, with the institutional promotion of the ideology of modernization from the West, governments across the developing world became engaged in the process of modernizing their media system, especially restructuring their telecommunications sectors with the aim strengthening their national development. Accompanied with the provision and expansion of telecommunications services was an increased emphasis on market principles and decreased intervention of the state in regulating telecommunications. Thus from the early 1980s on the global trends of privatization and deregulation unfolded.

Due to its emphasis on diffusing information and communications technologies and a Western and market-oriented perspective, the modernization approach came to be criticized as ethnocentric, media-biased, overly dependent on measurements of economic growth, and inadequate for the political and structural constraints, and complex communications needs of developing societies (Bian, 2000, p. 50; Thussu, 2000, pp.58-60).

First, modernization theory was predicated on a definition of development that followed the model of Western industrialization, measured primarily by the rate of economic growth of output or GNP. It failed to recognize that the creation of wealth on its own was insufficient: the improvement of life for the majority of the populations depended on the equitable distribution of that wealth and its use for the public good. It also failed to ask questions such as Development for whom? and Who would gain or lose from it? This theory privileged the economic while generally ignored any discussion of the political, social, or cultural dimensions of development.

Second, the mass media were assumed to be a neutral force in the process of development. This approach ignored how the media are themselves products of social, political, economic and cultural conditions. Therefore, it failed to examine what the benefit of ICTs really were and for whom.

Third, as mentioned by many critical scholars, it is important to understand the Cold War context in which development theory emerged, a time when it was politically expedient for the West to use the notion of modernization to bring the newly independent nations of Asia, the Middle East and Africa into the sphere of capitalism. Therefore, the

modernization approach is often equated with “Westernization,” “Industrialization,” or even “Americanization”, for this approach was developed by scholars in US-led Western countries (Mowlana & Wilson, 1990). As W. Sachs (1992) points out, “from the start, development’s hidden agenda was nothing else than the Westernization of the world” (p.1).

Finally, southern scholars, especially those from Latin America, argued that the chief beneficiaries of modernization programs were not the rural poor in the South but Western media and communication companies. These TNCs had expanded into the Third World in the name of modernization and development, but in fact in search of new market and customers for their products. Therefore, they argued that modernization programs were exacerbating the already deep social and economic inequalities in the developing countries and making them dependent on Western models of development.

2.2.2.2 Diffusion of Innovations

Diffusion of innovations, proposed by Rogers, is among the most popular model of the modernization theory. This model is relevant to the concern of this dissertation because it deals with research on the distribution of Internet use in both advanced countries and the developing world. As of the 1990s, this model had been applied by many disciplines and produced around 4000 research articles (Rogers, 1995, p.xv).

According to Rogers (1995), diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system (p. 5). In a word, the research of diffusion of innovations is about how a new innovation is diffused among a society and the key elements of this model include innovation, communication channel, time and social system.

Diffusion does not only refer to the *process*, it also indicates a *change*. As Rogers mentions, “diffusion is a kind of social change, defined as the process by which alteration occurs in the structure and function of a social system. When new ideas are invented, diffused, and are adopted or rejected, leading to certain consequences, social change occurs” (p.6).

The diffusion model has experienced different periods of development. The 1940s saw the original formulation of the diffusion paradigm. Diffusion studies were proliferated in the US in the 1950s and were expanded in developing countries in the 1960s. The classical diffusion model fits this dominant paradigm of development, namely modernization theory, quite well since it implied that the transfer of technological innovations from development agencies to their clients lay at the heart of the development process. So diffusion studies began to proliferate in Latin America, Africa, and Asia, especially after about 1960. Today, about 16 percent of all diffusion studies have been conducted in Third World nations (p. 126).

The 1970s saw the beginnings of introspective criticism for diffusion research. This criticism focuses on why some biases exist in this model and how to overcome them. The biases and problems this model had were fourfold (Rogers, 1995, pp. 100-129):

(1) The pro-innovation bias

This bias is assumed and implied in the diffusion model that an innovation should be diffused and adopted by all members of a social system and it should be diffused rapidly without any re-invention and rejection. This bias existed due to the fact that much diffusion research is funded by change agencies who have a pro-innovation bias.

This bias reveals the failure of this approach to explain the unexpected result of technological diffusion. Rogers acknowledged this bias by adding that “even in the case of an overwhelmingly advantageous innovation, individuals in the potential audience for the innovation may perceive it in light of many possible values. If the researcher is to understand their behavior in adopting or rejecting the innovation, the researcher must be capable of taking their various points of view” (Rogers, 1995, p.111).

(2) The individual-blame bias

In diffusion research, individual-blame refers to the tendency to hold an individual responsible for his or her problems, rather than the system of which the individual is a part (Caplan and Nelson, 1973). To focus on the individual as a major factor causing resistance or delay of diffusion of innovation lead to researchers’ ignorance of the system factor that usually put much weight on success and failure of the result of diffusion. As Rogers (1995) mentions, “Some factors underlying a particular social problem might

indeed be individual in nature, and any effective solution to the problem may have to change these individual factors. But in many cases the causes of the social problem lie in the larger system of which the individual interventions will no be very effective in solving system-level problems” (p. 115).

(3) The recall problem

By definition, an innovation diffuses through time. This causes a methodological problem of gathering data from correspondents as time passes. Because diffusion research relies on recall data from respondents as to their date of adoption of a new innovation, the accuracy of their recall is questionable (Menzel, 1957; Coughenour, 1965). The levels of accuracy vary on the basis of the innovation’s salience to the individual, the length of time over which recall is requested, and on the basis of individual differences in education, memory, and the like.

(4) The issue of equality

Generally speaking, diffusion researchers fail to pay much attention to the consequences of innovation. They have been especially inattentive to the issue of how the socioeconomic benefits of innovation are distributed within a society. Rogers (1995) admits that “when the issue of equality has been investigated, we often find that the diffusion of innovations widens the socioeconomic gap between the higher and the lower status segments of a system” (p.125).

This tendency of the diffusion of innovations in enlarging socioeconomic inequality has specially been noted in Third World countries. In this way, the appropriateness of the diffusion paradigm to Third World nations was criticized as problematic. Bordenave (1976) argues that the diffusion research questions asked by Latin American researchers do not get to the main issues affecting development.

The typical research issues in past diffusion studies were:

- (1) How are technological innovations diffused in a social system?
- (2) What are the characteristics of innovators, early adopters, and other adopter categories?
- (3) What is the role of opinion leaders in the interpersonal networks through which a new idea diffuses in a system like a peasant village?

Bordenave suggests that the following research questions are more appropriate, if one is planning for a just social structure as the result of a development program:

- (1) What criteria guide the choice of innovations that are to be disused: (a) the public welfare, (b) increased production of goods for export, (c) maintaining low prices for urban consumers, or (d) increase profits for society's elites like large landowners and industrialists?
- (2) What influence does society's social structure have over individual innovation-decisions?
- (3) Are the technological innovations being diffused appropriate, well-proven, and adequate for the stage of socioeconomic development of the nation?
- (4) What are the likely consequences of technological innovation in terms of employment and unemployment, migration of rural people to already overcrowded cities, and to a more equitable distribution of individual incomes? Will the innovation widen or narrow socioeconomic gaps?

The diffusion model has been broadly applied to the penetration of the Internet since the late 1990s. However, the problems of a lack of the broader social-economic concern still exist within this model which causes its failure to relate social and power structures influencing the digital divide.

2.2.2.3 Dependency Theory

Dependency theory emerged in Latin America in the late 1960s and 1970s as a response to the failures of modernization theory put into practice. Deriving its theoretical tradition from two major intellectual trends, Marxism and Latin American Structuralism (Hettne, 1995), the dependency school aimed to provide an alternative framework for analyzing international communication and the status of the Third World in the global system.

Dependency, defined by Dos Santos as

a conditioning situation in which the economies of one group of countries are conditioned by the development and expansion of others. A

relationship of interdependence between two or more economies or between such economies and the world trading system becomes a dependent relationship when some countries can expand only as reflection of the expansion of the dominant countries, which may have positive or negative effects on their immediate development. (Santos, 1970, p.231)

The dependency thesis rejects the notion of interdependence that implies an equal relationship between the West and the Third World. Instead it views the process of development under the modernization perspective as a continuation of the old colonial type of domination. That is, development for these Third World countries was shaped in a way to strengthen the dominance of the industrialized countries and to maintain the Third World in a position of dependency. Thus, they called for developing countries to invent their own processes of development, while maintaining economic development as their goal (Servaes, 1989).

Generally speaking, dependency theory is highly heterogeneous since its members come from different disciplines, from different ideological orientations and deal with development issues of different regions and countries. However, this school has been identified as a theory by communications scholars such Mosco (1996) and Thussu (2000) since dependency theorists shared some basic assumptions as a response to the failure of development projects enforced by the West. The assumptions including (Larrain, 1989):

- (1) They argued that underdevelopment was directly caused by dependency on central economies (or industrialized nations); capitalism in the peripheral nations was unable to bring about a process of development;
- (2) They emphasized that obstacles to national development stemmed from external conditions; and
- (3) They stressed that the role of internal forces or class struggle necessarily mediated the influence of external forces.

To be more specific, the dependency school can be understood from its two theoretical divisions: the traditional dependency theory and the dependent development theory.

Proponents of the dependency school felt that there was a need to revise the meaning of “development” that is defined by the dominant paradigm. For dependency scholars, the

term should mean more than just increased economic growth. Instead, development should be defined from the perspectives of equality, that is, its ability to improve the living standard for all the people in the periphery (So, 1990, p.105). For their real development, the traditional dependency scholars suggested the developing countries should adopt a strategy of self-reliance and cut their link with the Western countries.

For example, Andre Gunder Frank (1967, 1969) argued that development was impossible under the imbalanced relationship between industrial countries and developing countries; therefore, developing countries should cut their link with the West and strengthen their internal participation. Frank viewed the world as a global capitalist system in which two groups of countries, metropolises and satellites, are linked to each other in an unequal situation. The metropolises are the industrialized countries and the satellites are the developing countries. He observed that the consequences of external linking of satellites with metropolises are twofold. First, capitalist expansion generated the continuous development of the metropolises and the continuing underdevelopment of the satellites. Second, the development of the metropolises necessitated the underdevelopment of the satellites. In his view, development is impossible under a world capitalist system because Western countries are opposed to the development efforts of the Third World. Therefore, the key to Third World self-reliance lay in severing links with the West and taking revolutionary measures to transfer power to the people.

Standing with Frank, Santos (1971) also argued that the economic backwardness of developing countries was not due to lack of integration with capitalism. Instead, monopolistic control of foreign capital, foreign aid and loan, and foreign technology at national and international levels prevented these countries from reaching an advantageous position.

Therefore, both Frank and Santos suggested that peripheral countries should sever their ties with core countries. Instead of relying on foreign aid and foreign technology, peripheral countries should adopt a self-reliance model—relying upon their own resources and planning their own paths of development so as to achieve independence and autonomous national development. In terms of development strategies, the classic

dependency approach emphasized industrialization through import substitution and subsequent regional integration (Hettne, 1995, p. 92).

Despite their forcefulness, the following aspects of the classic dependency scholars have been criticized. First, this theory takes a reductive approach of treating all developing countries the same. It results in a failure to predict the rapid industrialization experience of some newly industrializing countries, especially in East Asia (Gunnarsson, 1985). Second, this theory embraces a simple conception of dependency by which the governments and local capitalists of the Third World countries are too weak to have bargaining vis-a-vis Western countries and international monopoly capital. Overemphasis of external conditions and neglect of internal dynamics leads to the failure of a proper explanation for the development process of some Third World countries (Kim, 1994, pp. 153-154).

Later developments in the dependency perspective were built on correcting the above shortcomings of the classic dependency theory, aiming to provide a comprehensive framework for explaining and predicting the development dynamics of the Third World. Fernando Cardoso and Enzo Faletto (1979) created the “associated-dependent development” model which combined two formerly contradictory notions — dependency and development. On the one hand, they recognized the possibility of economic development in developing countries but rejected the Western-oriented notion of “interdependence” in describing the relationship between the core and the periphery since their relationship is not equally and mutually beneficiary. On the other hand, they criticized dependency scholars for separating external factors and internal factors in their analysis of development in the Third World and thus failing to examine the social or ideological processes that occur within these countries.

Cardoso and Faletto applied a dialectical, structural-historical method for the analysis of dependent development in which the interaction between external determinants and internal determinants and suggests the ways through which external factors are interwoven with internal ones (p.ix). This model includes three types of political actors — the military-bureaucratic-technocratic state, the multinational corporation, and the local bourgeoisie to study both foreign and domestic political forces

in the process of development. It helps to show “how the historically specific interaction between these actors has managed to produce some dynamic development within the structural confines of dependency” (So, 1990, p.142). With this methodology, the dependent development approach is able to specify each new situation in the search for differences and the diversity of many Third World development experiences, and relate these to older forms of dependency, stressing the contradictory aspects and effects of dependent development in diverse contexts (Cardoso and Faletto, 1979, p.xiii).

Building upon Cardoso and Faletto’s concept of associated dependent development, Peter Evans (1979) further extended the dependent development model for analyzing the mechanisms and outcomes of “dependent development” in the Third World. Based on his case study of Brazil, Evans noted that “dependent development is not the negation of dependence, it is rather dependence combined with development” (p.32).

Evans argued that dependent development is governed by a triple alliance among the state, TNCs, and local capitalists. The relationships among these three actors are characterized by both cooperation and conflicts, as each holds different interests, objectives, and leverage. Therefore, “the concept of dependency means ... that the historical process of capitalist development occurs in a dependent country in accordance with the interaction of its international political and economic alliance with international capitalism” (p.27). The interests and status of the three actors in the alliance are detailed as follows.

(1) The Transnational Corporations

The interests of the transnational corporations (TNCs) lie in the penetration of new markets for fulfilling their needs of capital accumulation. By exercising “allocative control”, the TNCs operate for the overall maximization of global profits. By utilizing technology and capital, the TNCs make the peripheral economy as permeable as possible for their products and are anxious to market their existing ideas and technology regardless of their appropriateness to the local environment.

(2) The State

The state is recognized as a key agent in supporting capital accumulation and social control mostly by employing repression and promoting nationalism. In fostering

dependent development, the state has a paradoxical nature: for national development, it relies on the cooperation of the TNCs to utilize their technology and capital for the country's economic prosperity while it represses humanistic needs of its working-class populations by exploiting them to maximize their labor (e.g., cheap wages, extraordinary working hours, degraded working environments and low standards of living).

(3) Local Capitalists

Local capitalists hold an inferior and disadvantageous position vis-a-vis the TNCs. The position and privileges of local capitalists are contingent on their ability to make alliances with other elite groups, which generally are the TNCs and the state. Once allied with international capital, however, local capitalists are transformed into a subordinate and internationalized bourgeoisie.

Through the mechanisms of the triple alliance, dependent development yields not only economic growth but also structural changes in the social, economic, and political realms. Evans further notes several contradictory consequences of dependent development. First, Western technology is not necessarily beneficial for the social structure of developing countries since capital-intensive technology is not always suited to the productive structure of a dependent country that needs to absorb a large unemployed labor force. Second, since TNCs rely on their home countries for capital goods and technology, their investments in a dependent country do not generate profitable outcomes in the peripheral economy in the same way that they would in the core economy. Third, national integration is threatened in the process of dependent development due to consumption patterns of the dominant, upper-class elites for luxury products in a dependent country, which broadens the gap between haves and have-nots, and thus economically and socially marginalize the "masses" (i.e., the working classes and the peasantry). Besides the economic exclusion of the masses, in order to maintain the stability required for continuing large-scale foreign investment and economic growth, the dominant ruling class excludes the masses politically from participating in politics by making abrupt constitutional changes and by repressing their demands for democratic reforms. Accordingly, most dependent development effectively proceeds under bureaucratic-authoritarian regimes. Unlike the assumptions of modernization theory, this

perspective argues that capitalism, development, and democracy do not automatically go together in developing countries.

Evans' model provides a broader frame for looking into the development process of developing countries. However, there is still lack of some crucial actors in his dependent development approach. By including TNCs, local governments and local capitalists as the key actors in the dynamic interaction of internal forces and external forces of developing countries, this model neglects the importance of core governments which usually support the TNCs in their process of expanding into foreign markets (Kim, 1994, p.160). Furthermore, from a Marxist methodological viewpoint, domestic class struggle between the dominant classes and the oppressed mass population is missing from this framework (Bian, 2000, p.68). Finally, the international organizations are also missing here. Since international institutions are recognized as being more and more important and deeply involved in internal affairs in the global capitalist system, a comprehensive analysis of development in the developing countries cannot ignore them as a key agent.

Despite its shortcomings, the dependency paradigm provides a broad framework and gives detailed historical analysis of how developmental processes operate in specific contexts. The approach is also useful in inspiring Third World scholars to perform their own empirical studies and to rethink historical development of their own countries (Gunnarsson, 1985, p. 185). In my case study of Taiwan, I will borrow the assumptions of dependency development and the framework of Evans' triple-alliance model for it helps us to understand the internal and external forces influencing the Internet policy and diffusion in Taiwan.

2.2.3 Globalization

As a collective and general description of the contemporary political, economic and cultural phenomena, globalization has become a focus of debate in the academia from various disciplines such as sociology, political science, economics, geography, communications, and ecology, etc. It has been argued that "globalization may be the concept of the 1990s, a key idea by which we understand the transition of human society

into the third millennium” (Waters, 1995, p.1). The term has also been used more generally to describe contemporary developments in communication and culture (Thussu, 2000, p. 76). Therefore, this section reviews the arguments about globalization and then focuses on the inequality of distribution of resources that serves as a key theme in my study of the digital divide.

2.2.3.1 A review

There are various ways to approach and categorize globalization. For example, Thussu (2000, pp.76-81) distinguishes the discourses of globalization into two camps: the liberal and the critical.

In its most liberal interpretation, globalization is seen as fostering international economic integration and as a mechanism for promoting global liberal capitalism. For those who see capitalism as “the end of history” (Fukuyama, 1992), globalization is to be welcomed for the effect that it has in promoting global markets and liberal democracy. The triumph of democracy is celebrated through increasing emphasis on global governance (UN, 1995), “cosmopolitan democracy” (Archibugi and Held, 1995) and even “cosmopolitics” (Cheah and Robbins, 1998). In this dominant view of globalization, the expansion of information and communication technologies coupled with market-led liberal democracies are contributing to the creation of a global civil society (Clark, 1997).

Both Marxists and world-system theorists stress the importance of the rise of global dominance of a capitalist market economy that is penetrating the entire world (Tehranian, 1999). For these critical scholars, several shifts happened to contribute to the acceptance of capitalism as the global system such as the collapse of communism, the disintegration of the Soviet Union and the Eastern bloc, the shift within Western democracies from a public to a private sector capitalism, and the international trend towards liberalization and privatization. However, questions remain about the extent of globalization (Ferguson, 1992).

Held et al. (1999, pp. 2-10) categorize the debate of globalization into three groups: the hyperglobalist thesis, the skeptical thesis and the transformationalist thesis,

depending on their attitude toward globalization. For the hyperglobalizers, globalization is a new epoch of human history in which the impersonal global market are more powerful than the nation-state. This thesis is further divided between the neoliberals who welcome the coming of globalization as the triumph of individual freedom and the market principles over state authority, and the radical Marxists who interpret and criticize contemporary world order as an oppressive global capitalism (Ohmae, 1995; Greider, 1997). The skeptical thesis questions so-called globalization as a myth and its having been exaggerated (Hirst, 1997). Drawing on statistical evidence of global flows of investment, trade and labor, this thesis argues that the levels global economic interaction are not historically unprecedented and the state still plays the primary role in the process of global integration. The transformationalist thesis views globalization as a powerful transformational force in which the government and societies have to adjust to a new world where the boundary between international and domestic, external and internal is no longer clear (Giddens, 1996; Rosenau, 1990).

Waters (2001) sees the global transformation occurring in three regions of social life that are fundamental in many theoretical analyses:

(1) The economy: social arrangements for the production, exchange, distribution and consumption of land, capital, goods and labor services.

(2) The polity: social arrangements for the concentration and application of power that can establish control over populations, territories and other assets, especially in so far as it is manifested as the organized exchange of coercion and surveillance (military, police, bureaucracy etc.); such institutionalized transformations of these practices as authority, regulation, administration and diplomacy; and such resources as electoral support, political donations, capacities for redistribution, citizenship rights, taxation support, lobbying, and obedience.

(3) Culture: social arrangements for the production, exchange and expression of symbols (signs) that represent facts, affects, meanings, beliefs, commitments, preferences, tastes and values (p.10).

For Waters these three regions are structurally autonomous and the relative affectivity of the regions can vary across history and geography. In this way he opposes

the Marxist position that the economy determines the polity and culture and to the Parsonsian position that culture determines the other two arenas (p.10).

Since globalization can be observed from different sites and be interpreted from various approaches, this term causes doubt of its usefulness. Marcuse (2000) urges a cautious review of the language of globalization. He argues,

To begin with, the word globalization itself is a nonconcept in most uses: a simple catalogue of everything that seems different since, say, 1970, whether advances in information technology, widespread use of air freight, speculation in currencies, increased capital flows across borders, Disneyfication of culture, mass marketing, global warming, genetic engineering, multinational corporate power, new international division of labor, international mobility of labor, reduced power of nation-states, postmodernism, or post-Fordism. The issue is more than one of careless use of words: intellectually, such muddy use of the term fogs any effort to separate cause from effect, to analyze what is being done, by whom, to whom, for what, and with what effect. (Marcuse, 2000, p.23)

Marcuse's criticism is valid since this concept of globalization can refer to anything and at the same time it can be nothing at all. The ambiguity of the concept of globalization explains why there is a large stock of research and work conducted and published under this concept by its proponents and even opponents. In order to have a general understanding about the discourse of globalization, the following section will describe Leslie Sklair's (2002) categories of globalization research in which the theoretical sources and key points of different approaches are provided.

Sklair identifies four categories of globalization research (pp. 39-47):

(1) Global polity and society

This approach maintains that global polity and society can be achieved only in the modern age with the advancement of science, technology, industry, and universal values. This body of literature is filled with discussions of the decreasing power and significance of the nation-state and the increasing significance or actually power of super-national and global institutions and systems of belief and value. For those theorists, the most desirable future is the formation of a global civil society through the global governance of international institutions and organizations.

Some scholars of the global polity and society claim that globalization becomes possible only with modernity. Anthony Giddens (1990) sees globalization as the spread of modernity, which he defines as the extension of the nation-state system, the world capitalist economy, the world military order and the international division of labor. He explains globalization as a consequence of modernity itself and which represents the global political and social transformation of humanity. This transformation is inevitable and efforts at institutional adjustment should be made for smoothing out processes of global transformation.

In this way the concept of international regime theory emerges for proponents of global transformation, who are eagerly searching for “new ways to organize intellectually and understand international activity...in an increasingly complex, interdependent and dangerous world” (Puchala and Hopkins, 1983, p.61). Defined as “principles, norms, rules, and decision-making procedures around which actor expectations converge in a given area of international relationship” (Gilpin, 2001, p.83), international regime theory has been at the core of research on international institutions. The recently developed international regime addresses key two dimensions: inclusion of private authority and the importance of soft law. The main component of international regimes does not necessarily have to be the nation-state. In the process of international conflict and negotiation, issue areas can be organized and institutionalized as private regimes or as mixed public/private ones, where the private actors can be either corporations or non-governmental organizations (NGOs). In the era of globalization, international regimes are increasingly the product of negotiations between public sectors and private sectors in which soft law is formed to govern a regime’s activities and behaviors. Soft law includes “statements of principles, guidelines, understandings, model laws and codes, and declarations that...are neither strictly binding norms of law, nor completely irrelevant political maxims, operating in a grey authority and soft law and politics” (Franda, 2001, p.4).

It is important to note that the philosophical assumption of this approach is essentially neoliberalism. This dominant ideology has been prevailed globally since the 1980s when conservative parties were elected in both the US and the UK. These parties

led neoliberal capitalism movement (including privatization, liberalization, deregulation, etc.) toward the expansion and integration of international trade and finance. The collapse of the communist system in the Soviet Union and Eastern Europe was further celebrated by neoliberalist theorists as the end of ideology. In the early 1990s, Fukuyama (1992) maintained that the passing of “Marxism-Leninism” signals “the end point of mankind’s ideological evolution”. He argued that this was the evidence of “the total exhaustion of viable systematic alternatives to Western liberalism”. Liberal democracy may constitute the “final form of human government” and as such constitute the “end of history” (p. xi). This thesis is very clear from Polly Toynbee’s (2000) comments on globalization: “Deeply flawed maybe, but the best so far” (p. 196).

Steger (2002) summarizes five central claims of globalization that help understand this concept from the neoliberal perspectives:

- 1) Globalization is about the liberation and global integration of markets;

According to this argument, free market with its rationality and efficiency can only be achieved in a democratic society in which property rights and individual freedom are protected and valued.

- 2) Globalization is inevitable and irreversible;

This perspective can be found in former British Minister Margaret Thatcher’s interpretation of the phenomenon. She gives globalization a nickname TINA, which means “There is no alternative” (Korten, 1995, p. 71; quoted from Harris & Seid, 2000, p.16). In this way, neoliberals have come to hold the view of historical determinism. This determinist language in fact helps present the evolution of the market as the natural course of history.

- 3) Nobody is in charge of globalization;

Friedman (1992) argued, “globalization isn’t a choice. It’s reality... And the most basic truth about globalization is this: No one is in charge” (p. 112). What he implied with this claim is that, it is the market, guided by the invisible hand, rather than human actions, that pushes globalization forward. This claim helps to relieve the dominant power of any responsibility for any negative consequences in the process of

expanding their global interests and influence such as the Asian finance crisis happened in the late 1990s.

4) Globalization benefits everyone;

Liberalist scholars tend to cite statistics on the volume of international trade and Gross Domestic Production or GNP to show the positive correlation between economic globalization and people's income and wealth. China's economic growth has been explained this way and celebrated for opening its markets (Wolf, 2000). However, by focusing on global or national economic growth as a whole, this claim obscures the increasing gap between the rich and poor caused by globalization.

5) Globalization spreads democracy in the world;

Friedman (1992) proposes the notion of "democratization from above", maintaining that the global market requires transparency, unified standards, and a free press. With the pressure from outside, or above in Friedman's words, countries like China that would not democratize from the top or the grass roots, would have to reform to suit the conditions necessary for a free market. In this way, the free market also takes up a missionary role. The expansion of free market is given a moral face in this discourse.

Neoliberal globalization creates and reinforces the above myths for people all over the world. It confuses people's well-being and development with economic growth that is achieved at the expense of the environment, workers, and the poor. It obscures the detrimental consequences of the market, such as a tendency toward the formation of monopolies. This view also disguises the corporate forces behind globalization as historical inevitability. Furthermore, it conceals the fact that rather than benefiting everyone, transnational corporations enlarge the gap between the rich and poor by extracting local wealth and driving local businesses out of the market (Yin, 2003, p.15)

(2) The world system perspective

This thesis on globalization was formulated in the 1970s by Immanuel Wallerstein (1979). He opposed the bimodal system view of dependency theory, instead proposed a trimodal system consisting of core (industrialized countries), semiperiphery (developing countries with industrial capacities), and periphery (developing countries) to

explain the division of labor in the capitalist world system (Wallerstein, 1979, pp.69-70). This idea has been picked up by many scholars as a useful tool in analyzing newly industrializing countries.

The world system theory closely resembles dependency theory. They both assume the systematic bias of capitalist globalization leads only to further dependency of developing countries on the developed ones. No genuine development in underdeveloped countries can be brought about by capitalist globalization. But the world system approach is different from the dependency approach for it treats the whole world as its unit of analysis, adopts a historical methodology, develops a trimodal theoretical structure, and abandons the deterministic viewpoint to the direction of development. Critics of the approach have argued that because this model uses the world system as an analytical unit, it overlooks state structures and class relations inherent in national development processes (Huang, 1986). Also, Wallerstein's trimodal structure is built on the economics of the international division of labor, which tends to ignore cultural issues.

An implicit attempt to make connections between dependency theory and world-system theory was formulated on the basis of an influential conceptual innovation, the new international division of labor (NIDL) theory. This theory draws attention to the consequences of changes in global production strategies of the TNCs since the 1960s. In common with Wallerstein and the world-system theorists, the proponents of the NIDL share a general conception of the capitalist world-system divided into core, semi-periphery, and periphery in which a division of labor has evolved to maximize the profits of transnational corporations and to solve the problems of the major capitalist societies. In common with the dependency perspective the NIDL theorists see little prospect for any genuine Third World development in these changes in global capitalist strategies.

The theory of NIDL draws attention to the activities of TNCs, maintaining that these activities are increasingly being brought into global processes of supply, production and marketing. This theory has been criticized for concentrating too much on the TNCs' search for cheap labor and thus fails to connect economic with political and cultural transnational practices (Sklair, 2002, p. 41).

(3) The global capitalism approach

For scholars of the global capitalism approach, the main driving force of globalization is the structure of the ever-more globalizing capitalism (e.g. Ross & Trachte, 1990; Robinson, 1996; Sklair, 2002). Unlike the world system approach that focuses on nation-state centered economics, the global capitalism approach strives toward “a concept of the global that involves more than the relations between nation-states and explanation of national economics competing against each other” (Sklair, 2002, p. 46).

Ross and Trachte (1990) argue that capitalism can be best analyzed on three levels: the level of internal logic of the system, the structural level of historical development, and the level of specific social formation or society. They use this analysis to explain deindustrialization in advanced capitalist countries and regions and the incorporations of the Third World into the capitalist system.

Sklair (2000) proposes an analytical frame to approach the global system through its key agents: the TNCs, the transnational capitalist class and the culture-ideology of consumerism. For the smooth operation of the global system, these agents have to produce something in their specific realms. TNCs produce commodities and the services necessary to manufacture and sell them. The transnational capitalist class produces the political environment within which the products of one country can be successfully marketed in another. The culture-ideology of consumerism produces the values and attitudes that create and sustain the need for the products. Furthermore, in order to work properly these agents have to monopolize the key resources for which there is great competition. Therefore, “the TNCs strive to control global capital and material resources, the transnational capitalist classes strive to control global power, and the transnational agents and institutions of the cultural-ideology of consumerism strive to control the realm of ideas” (pp. 68-69). Their capacity to control resources and produce things needed determines the growth of the global capitalism.

(4) The global culture approach

Global culture emerges as a new phenomenon accompanies the globalization of politics and economy. Appadurai (1990) specifies five ‘scapes’ –ethnoscapes (flows of people), technoscapes (flows of machinery), finanscapes (flows of money), mediascapes

(flows of images) and ideoscapes (flows of ideas) – to describe the dynamics of contemporary global diversity, which provide a comprehensive framework for following scholars to analyze the various aspects of global culture.

Global culture scholars have divergent opinions on the prevalence and implication of cultural globalization. For development communication theorists, strategic use of international media can bring about social benefits and promote development (e.g. Rogers, 1994; Winkins & Mody, 2001). However, for critical scholars, globalization is driven by a mass media based culture, and this culture is homogenizing national or local cultures and threatening local autonomy and cultural identities (e.g. Herman & McChesney, 1997; Schiller, 1969; Tomlinson, 1999).

In addition, there is always the centered question about whether globalization increases cultural homogeneity or leads to greater diversity and heterogeneity. From the approach of cultural hybridity, culture tends to be heterogeneous due to the interaction of external culture and domestic culture. In contrast, scholars of cultural imperialism view globalization as Americanization, McDonalozation (Ritzer, 1993) or making of a McWorld (Barber, 1996), which means culture diversity yields to the dominant powers and cultures.

Although scholars of this approach have different viewpoints of global culture, they share some common concerns. First, they are all interested in the question of how specific identities can survive in the face of an emerging global culture. Second, they tend to prioritize the cultural over the political and the economic.

The fundamental problem with the cultural approach to globalization is precisely that it is cultural, and always risks losing sight of the material realities that lie behind the cultural and symbolic phenomena that are being researched (Sklair, 2002, p.43).

2.2.3.2 Globalization and Inequality

While the dominant neoliberal paradigm claims that globalization benefits everyone, much current evidence shows that more and more people suffer from poverty and exploitation. For example, the poorest people in the world suffer on many counts

such as lack of clean water, sanitation and rampant unemployment. Industrialized countries are experiencing rising unemployment especially in the manufacturing sector. There is much evidence that the neoliberal vision of global governance and development cannot provide human security and satisfaction of basic needs (Thomas, 2001). The deepening poverty and inequality represents a crisis for the system and the focus of radical critiques of capitalist globalization (Singer, 1999; Sklair, 2002).

The facts of a growing global disparity are shown in many reports from international institutions. According to the World Bank, between 1970 and 2000 the distribution of income on a per capita basis between the richest and the poorest countries and between groups within most countries became more unequal (Korzeniewicz and Moran, 1997). The United Nations Development Programme (UNDP) presented a sobering historical perspective in its 2000 Report: Global inequalities in income increased in the 20th century by orders of magnitude out of proportion to anything experienced before. The distance between the incomes of the richest and poorest country was about 3 to 1 in 1820, 35 to 1 in 1950, 44 to 1 in 1973 and 72 to 1 in 1992 (UNDP, 2000, p. 6). UNDP comments that, "Economic growth cannot be accelerated enough to overcome the handicap of too much income directed to the rich. Income does not trickle down; it only circulates among elite groups" (p. 43).

The UN Research Institute for Social Development (UNRISD, 2000) indicated poverty has increased in the past few years by estimating that the numbers of people living on less than \$1 per day had increased from 1,196 million in 1987 to 1,214 million in 1998. Poverty reduction had been recorded in East Asia and the Pacific, the Middle East and North Africa, while increases were reported in postcommunist Europe and Central Asia, Latin America, Caribbean, South Asia and sub-Saharan Africa. Why has poverty increased in the era of global economic growth? The institute answers by saying that, "The incidence of poverty has increased in the past few years not because the world as a whole is getting poorer, but because the benefits of growth have been unevenly spread" (UNRISD, 2000, p. 11).

Sklair (2002) views this striking increase in inequality as a *polarization crisis* and a *class crisis* in the global system. But why is this a class crisis? She argues that it is the

lack of economic resources that is the main reason why so many of the poor are getting poorer while access to economic resources explains why the rich are getting richer. Therefore the polarization crisis is by nature a class crisis.

While there are more poor women than men, more poor members of some ethnic minorities than of the majority groups, and more poor people in rural than urban areas, their relative poverty is not due to their gender, their ethnicity, or their location but to their lack of access to education, well-paying jobs, land, fair prices for their crops, and to their poor health, malnutrition, and hunger. That the children of the very poor generally find it very difficult to escape from poverty themselves goes a long way towards explaining why these cycles of deprivation are so difficult to break down. It is their relationship to the means of production, to capital in its various forms, that locks most of the poor into poverty, thus it is at its base a class crisis (pp.52-53).

Sklair attributes global inequality a class crisis to access to economic resources. The question following is what causes the exclusion of the poor to access to economic resources? James Petras and Henry Veltmeyer (2001) argue that these social inequalities are the result of two structural factors: the growing concentration and centralization of ownership through mergers, buyouts or joint ventures and the tight integration of the state with the globalist corporate elite. The centralization of political decision making is an essential element using state resources to strengthen the profits and growth of concentrated capital (p. 51).

Petras and Veltmeyer's argument reminds us of the perspectives of critical scholarship on cultural imperialism, dependent development, the world system and the global capitalism which all highlight the crucial role of a capitalist class either at the national level or global level in dominating social resources and deepening class stratification.

The current concern of this dissertation, the digital divide, highlights polarization between richer and poorer in terms of access to electronic technologies, particularly the Internet (Mansell and When, 1998, Main, 2001). Therefore, in order to determine the political-economic forces in play in the disparity on Internet access, this study will draw attention to the corporate structure of Internet-related industries and policymaking of Taiwan to see how the internal forces (the state, the local capitalists) and the external

forces (the core government, the TNCs and the international institutions) interact to enforce the interests of the global capitalist class at the expense of social equality.

The review of three key concepts behind the digital divide reveals the bias and limits of technological-determinist perspectives on the information society, development-oriented modernization theory and neo-liberal globalization. These mainstream assumptions have been inherent in describing the process of Internet diffusion in the global level as well as in Taiwan. They are reflected in the policy content and strategies of international organizations and the Taiwanese government in promoting this new technology. To look through the problems of these mainstream assumptions and their limits in exploring the structural factors and proposing effective measures for the unequal access to the Internet, this dissertation builds upon the radical political-economic approach to make a dialectical connection between the development of capitalism and disparities of Internet access and use.

Chapter 3

GLOBALIZATION AND THE DIGITAL DIVIDE

This chapter aims to provide a political-economic analysis of the global digital divide. This analysis includes different aspects regarding the global network: the history of the Internet, dynamic development of Internet-related industries, disparity of Internet access, and global Internet policy.

3.1 A History of the Internet

This section provides a brief history of the Internet. In fact, the birth, growth and diffusion of the Internet were led by efforts in the US. There is no question the US played a critical role in the establishment of what has evolved into the global network that we know today (Klopfenstein, 2002, p. 18). Besides, the history of the Internet is not only about the innovation of technology, it is more about various forces involved in the development of this technology.

3.1.1 Two stages of Internet Development

Brian Winston (1998) divided the history of the Internet into two stages. The first stage is prototypes and ideation of the Internet, in which US national defense agencies and scientific academia are highly involved. The second stage is diffusion of the Internet in which commercialization constructs the main theme.

3.1.1.1 Computer Networks and National Defense

The prototypes of the Internet include several basic technological elements such as the existence of computers and telecommunications networks. The prototype activity leading to the Internet was remote access to computers via telephone links which was done in 1940. In 1945, the emerging idea of associate databanks, the handling of electronic data within networks marked the transformation from prototypes to the ideation stage. Another crucial idea is from Paul Baran, a researcher working for the US Air Force, who proposed in 1964 the measures to break up any digital message into “message blocks” within military communication systems to solve the problem of the systems being destroyed in case of nuclear attack. Baran’s idea lead to the establishment of ARPANET, which is generally considered to be the precursor of the Internet.

ARPANET was a computer network set up by the Advanced Research Projects Agency (ARPA) in September 1969. ARPA was formed in 1958 by the Defense Department of the US with the task of mobilizing research resources, particularly from universities in order to meet the challenge of keeping up with the technology of the Soviet Union in the wake of the launching of the first Sputnik in 1957. Although the scheme of ARPANET was focused on academic sites, for Winston, it is without doubt that the project was highly tied to US national defense for all these machines were founded by defense agencies and closely bound to defense work, and all involved scientists who were working for the Pentagon or for firms contracted by the Pentagon. By 1979, only sixteen ARPANET sites were on campuses while the remaining forty-six were used in the military-industrial complex. Finally, ARPANET itself was closed down in 1989, the year the Soviet Union and thus the Cold War dissolved (Winston, 1998, pp.325-327, p.332).

3.1.1.2 ARPANET to Internet

After ARPANET was constructed, the power of network communication was further explored by the computing community. For example, a new form of international

communication became possible by the invention of e-mail in 1973. Use groups grew with the network. Between 1973 and 1975 a node was added every month and there were some 2000 users at that time. However, the Internet still was just an academic novelty (Hafer and Lyon, 1996, p. 247), except for its main use in US national defense, because only a handful of universities were allowed access to the network.

The broadening of network use in academia became possible with funding from the National Science Foundation (NSF), which took charge of management of the national computing network NSFNET. In May 1979, a group of non-ARPANET computer departments met in Madison, Wisconsin and decided to build a cheaper, slower and less redundant network to provide academia-wide use. Under request, the NSF agreed to fund \$5 million for start-up costs and the Computer Science Research Network (CSNET) was thus established. For the first time, the advantages of computer networking were made available to academics beyond computer science departments. By 1983, with more than seventy sites on-line, this network was financially stable.

Another crucial decision made by the NSF that influenced network diffusion use commercialization of the Internet. Following the trend of deregulation and privatization in the 1970s and the 1980s, the NSF agreed to commercial exploitation of the Internet, which opened the door to on-line services. CompuServe, the first of these, started in 1979 and fifteen years later claimed 3.2 million users in 120 countries and was partly-owned by Time Warner. Its biggest rival, America Online, claimed 3.5 million users and had commercial relationships with the German group Bertelsmann and the French group Hachette. Prodigy belonged to IBM and Sears and claimed 1.4 million users (Dufour, 1995, pp. 32-33). In 1995, the NSF handed the backbone and its management over to the private telecommunications giants Sprint, Ameritech and Pacific Bell which became the gatekeepers of the principal access points.

3.1.2 State/Corporate Dominance

The NSF's decision to open the public network for commercial use signifies the government and corporations having reached their common interest in developing the

Internet. As Brian Murphy (2002) argues, it is indeed the institutionally powerful, state and the corporations, which has since dominated the development of new technology.

In the state domain, the commercialization and privatization of cyberspace came through a series of bureaucratic and legislative operations in which former Vice President Al Gore had a crucial role. Gore created the governmental structures that would ease public networking into the hands of large-scale corporations. He worked through the White House-based Information Infrastructure Task Force (IITF) to craft a wide-ranging policy for a National Information Infrastructure (NII) in which private corporations were to take the “lead role” as managers and operators. Gore’s privatization strategy was executed through a series of congressional acts: *the Information and Infrastructure Technology Act* of 1993, *the National Information Infrastructure Act* of 1993 and *the Telecommunication Act* of 1996. This legislation affirmed that the market would drive the information highway.

Commercial enterprises’ taking over public networking can be seen in their successes in cultivating ideology and political lobbying. According to Murphy (2002), the corporate prehistory of the Internet may be sketched along three “trajectories”: (1) huge corporate enrichment via government research and manufacturing contracts; (2) internal knowledge network development fostering transnationalization; and (3) consumer product development creating a platform for the commercialization of the Internet. These three trajectories had the ideological impact to create a “commonsense attitude” among policymakers that networking “progress” is best left to the large-scale transnational commercial sector (p.31).

In addition, private corporations directly influence policy making in different cases. The leading media, telecommunications, and computer firms have lobbying groups specifically commissioned to advance their interests on the Internet. Gore actively cultivated the input of computer firm CEOs, forming a “cyber-cabinet” to meet monthly so he could stay on top of industry policy concerns. The key moment in the privatization of the Internet is said to be a meeting in 1990 at Harvard University. Government officials and representatives of the largest telecommunications and computer firms attended the meeting in which corporate officials argued that it would be unfair to private

providers of network services to have to compete with the government, so the government should get out of the Internet business. The government began to privatize its portion of the Internet backbone soon thereafter in 1993 (McChesney, 1999).

Privatization and commercialization have transformed the Internet into a virtual shopping mall. In 1994, around the time the Internet backbone was privatized, dot.com hosts replaced dot.edu as the most common domain name. In January 2003, dot.com amounted to 40,555,072, second only to dot.net with 61,945,611. At the same time, dot.edu hosts numbered 7,459,219 and dot.org 1,116,311 (Internet Software Consortium, 2003). E-commerce continued to post gains. eMarketer predicts that worldwide B2B e-commerce revenues would surpass US 1.4 trillion by the end of 2003 and reach 2.7 trillion by 2004, while the US would account for over one-half of the revenues (NUA, 2003). Jupiter Research predicted that B2C online retail revenue in the US will be \$51.7 billion and reach \$105 billion by 2007 (CyberAtlas, April 1, 2003).

3.1.3 Resistance in Cyberspace

While detailing how state and corporate domains dominate the development of the Internet with the commercial imperative, Murphy also stresses the grassroots forces of civil society and social movement that exist as opposition to corporate “enclosure” (Bettig, 1997; Dyer-Witford, 2002) of cyberspace.

In civil society, fascination with computer-communication grew with public availability of microcomputers and cheap telecommunication devices (modems). In 1983 a microcomputer-based bulletin board system (BBS) (given the name of Fidonet) was opened by computer programmer Tom Jennings. It was capable of exchanging files with other microcomputers. The existence of Fidonet made the system the first popular alternative to public and corporate computer networking. Relying on PCs and calls over standard telephone lines, Fidonet was the cheapest and most accessible computer communication network. It became the platform for communication amongst activists, development workers, and nongovernmental organizations around the world.

Paralleling the worldwide Fidonet explosion, civil-society groups in North America developed Free Nets. This network was initiated in 1986 by computer scientist Tom Grundner in his efforts to link the far-flung clinics of Cleveland's Case Western Reserve University. The Cleveland FreeNet was the first self-described community network mirroring a local civil society on a computer system and was soon emulated throughout communities in many countries.

The Internet also provides a robust channel for social movement groups in their daily communication and mobilization. One of the worldwide alternative networks for social movement is the Association for Progressive Communications (APC) which was initiated from a meeting in Amsterdam, in which representatives from NGOs, campaigning organizations, resource workers and researchers recognized the need and worked together to give birth to the new network. According to its mission statement, "the APC arose in response to the need for a more efficient and effective tool to promote international communications among non-profit organizations, NGOs and individuals working in the peace, environmental conflict resolution, health, and public interest communities" (APC, 2003). This network serves to educate and meet the organizational needs of international users, providing users with the tools and services for communication, collaboration and information sharing. By 2000 the APC had affiliates in more than fifty countries.

The practice of these democratic networks thus has two implications. They break the enclosure of expert knowledge on the one hand, and challenge a government/ corporate monopoly over the development of the Internet on the other hand (Murphy, 2001, p.35).

In sum, the Internet has diverse institutional histories, as Murphy (2001) emphasizes. These social formations cooperated with or opposed each other in forming the operation and application of the Internet. "The public/corporate forces attempt to dominate with the commercial imperative. But the structures of civil society and social movement computer networking exist and can operate support for a resistant form of online communitarian communication" (p. 41).

3.1.4 Global Governance

The final point in the history of the Internet is regarding the governance of the Internet. In the early 1990s, the US government saw it necessary to release its control of the network since the Internet was expanding on a global scale and the NSF was planning its privatization. So, in January 1992, the Internet Society was formed, a nonprofit organization which was given oversight of two Internet-related agencies: the Internet Activities Board and the Internet Engineering Task Force. The Information Society attracted wide international participation since this organization was under the authority of Vinton Cerf and Robert Kahn who were widely trusted by the Internet community for their technical knowledge and their record of commitment to openness and consensus-building.

Another organization, the Internet Corporation for Assigned Names and Numbers (ICANN) was established in 2000 with the approval of the US government. It is a non-profit, private corporation that assumes the management of IP address space allocation, protocol parameter assignment, domain name system management, and root server system management. ICANN has four components: one at-large membership and three supporting organizations which deal with major issues of Internet coordination including address, domain name and protocol. It was designed as an open system in which any individual with technical knowledge could apply for membership and was a democratic organization with members voting for the board of 18 directors, the governing body of ICANN. However, ICANN has been criticized for its lack of true democracy. For example, in its 2000 election, only 35,000 of the total 158,000 members participated in the vote. The decision making was dominated by some powerful groups, among them the US corporate and government agents.

Governments around the world, and particularly European governments, are extremely critical of what they see as American dominance of ICANN (Castells, 2001, pp.31-33). First of all, the links between ICANN and the US Commerce Department have not really been severed; therefore, US interests tend to overwhelmingly affect the decisions of ICANN in its Internet management. For instance, ICANN refused

recognition of the “dot.eu” domain address, applicable to all companies and institutions from the European Union. For European Union representatives this was an important trademark to denote European companies working within the institutional rules established in the European Union. This case exacerbated the conflict between the US and Europe over the use and allocation of Internet resources. Thus, the recent development of the Internet saw the increasing contradiction between the historical roots of the technology in the US and its increasingly global character reflected in the construction of global governance of the Internet.

3.2 Internet-Related Industries

The development of Internet-related industries shows two characteristics: concentration in ownership and US dominance in the global market.

3.2.1 Concentration

In 1994, the Clinton administration proposed building the National Information Infrastructure (NII) based on the principle of free markets and competition. The assumption behind these principles is that through competition in the market place, fairness and justness can be achieved and consumers’ needs can be served and satisfied. Opposed to the neo-liberalist rhetoric of the US government, Robert McChesney (1999) argued that the reality of the market place is anti-competitive tendencies rooted in the logic of capital, namely, profit maximization. The media market is a good example of increasing concentration under the regulatory principle of competition, in which fewer and fewer media owners dominate the market. In 1983 there were 50 corporations within the media market in the US; in 1990 there were less than 10. With the expansion of international corporations, the global media market was also dominated by a few corporations. By 2001, seven multinational corporations dominated the global media market: Disney, AOL-Time Warner, Sony, News Corporation, Viacom, Vivendi, and

Bertelsmann. These companies owned the major US film studios, all but one of the US TV networks; the few companies that control 80-85 percent of the global music market; the preponderance of satellite broadcasting worldwide; a significant percentage of book and magazine publishing; and all or part of most of the commercial cable TV channels in the US and worldwide (McChesney, 2001).

Benjamin Compaine and Douglas Gomery's research (2000) on media ownership also found the media market to be a highly consolidated one. From a comparison of industry revenue in 1986 and 1997, the trend shows that the leading media companies absorbed more and more revenue in the media industry. In 1997, the top six companies' revenues accounted for 30.73 percent of the whole industry, a 5 percent increase from 1986. The top-four accounted for 24.13 percent of industry revenues, with an increase of 5.44 percent from 1986. The most astonishing phenomenon is that the top two companies shared 16.44 percent of industry revenues, a doubling of their revenue share in 1986 (See Table 3-1).

Table 3-1: Concentration of Media Industry Revenue by Number of Companies

	% of industry revenue 1997	% of industry revenue 1986
Top 50	81.81	78.67
Top 20	59.16	56.79
Top 10	40.57	37.66
Top 8	35.97	32.35
Top 6	30.73	25.81
Top 4	24.13	18.79
Top 2	16.44	8.84

Source: Compaine and Gomery, 2000, p. 562.

In the Internet-related industries, the trend tends to be concentration due to fiscal and technological convergence of the new media. As Peter Golding (1998) points out, two features of major corporations in the telecommunications and information sectors stand out in the late 1990s. One is the rash of mergers and incorporation that has taken place.

The other is the diversification of activity. Both are designed to place the conglomerates in priority position as Internet commercialization becomes mature and profitable.

Therefore, what Dan Schiller (1999) called the “merger fever” occurred both domestically and globally. According to a 1995 survey by Broadview Associates, merger and acquisition transactions in the information technology (IT) industry jumped 57 percent in 1995, with a transaction value of \$134 million. McChesney’s (2001) updated data shows that in the first half of 2000, the volume of merger deals in global media, Internet, and telecommunications totaled \$300 billion, triple the figure for the same period in 1999, and exponentially higher than the figure from ten years earlier.

The major players in the big merger trend since the emergence of the Internet include three industries: telecommunications industry, computer industry and media giants. They are eager to transform the Internet from a potential threat to a channel under their control (McChesney, 1999; D. Schiller, 1999). These three industries form what referred as Internet-related industries in this dissertation.

As McChesney (1999, pp. 160-161) points out, telecommunications firms have many incentives to join the new market as well as advantages: 1. existing firms have wires to people’s business and homes; 2. big firms, such as WorldCom-MCI, AT&T, GTE/Bell Atlantic, and Sprint, own the backbones which makes them suited to become Internet Service Providers (ISPs); 3. these firms enjoy a great deal of cash and cash flow. In the US, telecommunications companies entered the Internet market as ISPs (e.g., AT&T’s WorldNet) and backbone providers (e.g., WorldCom took over MCI with 37,000 million). A representative global merger case in telecommunications was between AT&T’s international operations and British Telecommunications in 1998, in which AT&T aimed to better “focus on serving multinational corporations” (Schiesel, 1998, p.A3).

The computer industry is also actively involved in the Internet buseness. Take Microsoft for example; it is a partner with TCI in its digital cable TV operation. It also has its own WebTV. Microsoft has a role in each of the two routes that are competing to establish high-speed Internet access to the consumer personal computer market. Through its 11 percent stake in Comcast, Microsoft has a piece of @Home, the cable modem ISP

run by the major cable companies. It also is a partner with Intel, GTE, and the Baby Bell regional phone companies in the venture to offer high-speed Internet access via telephone lines. Microsoft also has a 10 percent stake in Time Warner's Road Runner cable modem service. In 1998 Microsoft purchased major stakes in Qwest, the fourth-largest U.S. long-distance carrier, and Thomson, the biggest maker of television sets in the US.

The media giants own content and they see the Internet providing them with new synergy. Therefore, they are active in seeking to capture two "killer applications": e-commerce and portals. According to McChesney (1999), the giants have turned to e-commerce in two ways. First, as major producers of the content being sold online, they are in a superior position to sell it themselves at a profit (e.g., Time Warner launched a major push to be a Web retailer in 1998). The second way is to link it to the advertising and commerce they are conducting on their traditional media (e.g., NBC established "Giftseeker", an online shopping website in 1998). Portals are places where Internet users tend to congregate. Media giants see it as strategically important to acquire portals because a big audience means big money for these companies. In 1998, GE's NBC led the media array into portals with its purchase of Snap. AOL's acquisition of Time Warner in 2000 stood as a milestone in the wave of big mergers. This case will be detailed in the next section.

The above evidence suggests that the emerging Internet markets are tending to become concentrated and controlled by a few big companies. As Heather Menzies points out,

beneath the rhetoric of the information society, and the cowboy frontierism of Internet enthusiasts, the ideology of monopoly capitalism is being consolidated (and hegemonized) in forms that are more total and totalizing for being invisible and ubiquitous. ... The global corporate communities, especially in the information, financial-information, and communication business, with their control of capital and monopolies of information, can use the information highway as a unified system of production, marketing, distribution, and consumption. (Menzies, 1998, pp.87-89)

3.2.2 AOL-Time Warner Merger

The case of AOL-Time Warner represents a peak moment in the consolidation of Internet-related industries. Therefore, this section discusses this case in detail. On January 10, 2000, America on Line (AOL) and Time Warner announced a merger agreement. After a year, on January 11, 2001, the Federal Communications Commission (FCC) adopted conditional approval of this merger. By acquiring Time Warner, AOL-Time Warner became the largest media conglomerate in the world.

On the eve of the announcement of this historical merger, AOL was the largest Internet Service Provider (ISP) in the US, with approximately 26 million paying subscribers to whom it provided Internet access, online content (including e-commerce services), e-mail and Instant Messaging (IM). AOL owned the two largest IM services, AIM and ICQ, which were free and available to non-AOL subscribers. By all market measures, AOL was by far the largest IM service. In addition, AOL had begun to provide interactive television services (ITV) that combined traditional video programming features with web-based and other interactive features, viewed and used by consumers through their TV sets.

Time Warner has long been among the handful of media conglomerates that dominate the US as well as the global market. Before the finalization of the merger, Time Warner was the nation's second largest cable operator, with approximately 12.6 million cable customers, and its cable systems served approximately 20 million households. Time Warner offered residential high-speed Internet access over upgraded cable facilities to its customers through Road Runner, which it owns. No other ISPs were available to Time Warner cable subscribers over the cable platform. At the time of the merger, Time Warner owned and operated some of the most popular video programming networks, multiple sports franchises, magazines, music recording labels, a broadcast TV network, and companies that produce and distribute films and TV programming. As a result of the merger between AT&T and MediaOne, AT&T owned a 25 percent stake in Time Warner Entertainment (TWE), a Time Warner Inc. subsidiary. Time Warner owned the remaining 75 percent of TWE. TWE operated Time Warner's cable systems as well as much of Time Warner's content library (FCC, 2000a).

Due to the significant market status of these two companies in the online market and media market, this merger proposal aroused considerable debate. In a public hearing held by the FCC (2000b) on July 27, 2000, AOL and Time Warner emphasized the benefit of the merger on the promotion of media convergence and consumer's interest (e.g., the deployment of a wide range of broadband technologies to all consumers; direct stimulation of the cable broadband market and the probable indirect stimulation of alternative broadband technologies; acceleration of the transformation of traditional media products to digital platforms, aiding the development of advanced services). Some interest groups supported AOL and Time Warner's argument. For example, the National Association of Telecommunications Officers and Advisors (NATOA) pointed out that cable still remained a bottleneck of high-speed Internet access, and there was no DSL or satellite as an alternative that was widely available and accessible to the consumer, especially for providing interactive television technology. They argued that consumers want universal, timely, and quality service accessible with cable network. Therefore, they agreed the AOL and Time Warner merger should be approved if the combined powerful company provided quality content and high-speed Internet access to their customers, which, they argue, was in the public interest.

The greatest opposition from the corporate sector was independent ISPs and other media and IT companies, including Yahoo, Microsoft, and Disney. They believed that the merger would enhance the new company's power to dominate both the Internet and cable market and prevent competition from other companies. The conditions of the rival ISPs, cable companies, and media content corporations for approving the merger were: opening Time Warner's broadband cable network access for unaffiliated ISPs, not discriminating in favor of the affiliated company's content, interoperation with AOL's Instant Messenger, and that the relationship between Time Warner content and AOL packaged distribution should be based on generally available and acceptable market terms and conditions.

Several consumer groups articulated their concerns with the merger. The Consumer Union, the Consumer Federation of America, American Civil Liberties Union, and the Center for Media Education petitioned the FCC to deny the transaction for various

reasons. The major reason was given the great control in media content market by Time Warner (1/2 of the 20 most popular cable networks, 33 magazines, 10% of the nations books, 1/6 of the domestic record market, 1/5 of domestic movie products)(FCC, 2000b), the pending new company, combined with AOL, would control a significant share of both the Internet service market and the media content market. In addition, they criticized the inconsistent and self-serving position that both AOL and Time Warner had taken on the issue of open access. They warned that the AOL acquisition of Time Warner had the most ominous implications for increased free access to information that was once the principal promise of the Internet.

The FCC examined the merger's potential effects on (1) high speed Internet services, (2) services based on instant messaging, (3) interactive television services, (4) electronic programming guides, (5) carriage of television broadcast signals, (6) increased concentration among multichannel video programming distributors (MVPDs), and (7) competition among MVPDs. In analyzing the potential public interest benefits, the FCC determined that the applicants had demonstrated that the merger would result in benefits, but the nature and degree of these benefits are not sufficient to outweigh the potential harms that would result from the merger absent conditions. Therefore, the FCC created conditions for the approval of the merger. It ordered that AOL-Time Warner must open its cable systems to competitor ISPs and allow customers to select a participating ISP by a method that does not discriminate in favor of AOL (FCC, 2000a).

In spite of this conditional approval, AOL-Time Warner soon abused its market superiority to suppress its peers. As Ronald Bettig and Jeanne Hall (2003, p.28) point out, the newly combined company dropped its promise of open access to other competitors. Until the merger, AOL supported an open system, since it required access to phone and cable lines to provide its Internet service, reaching 54 percent of US households at the time. By acquiring Time Warner's cable system, with 22 percent of the nation's cable subscribers, the combined companies created a natural incentive to bundle their services and restrict access to its cable system. AOL promptly dropped its commitment to open access after announcing the merger. So "although the combination of the Internet and broadband cable services has the potential to deliver content from millions of sources, it

makes more sense for a media monolith to deliver that which it already owns” (p. 28). The result is the leading status of the “AOL-Time Warner Network” among web portals. Media Metrix (2001) reported that, in March 2001, AOL-Time Warner had the greatest number of unique visitors of any web portal with Microsoft and Yahoo next in line.

Interestingly, the leading status of AOL-Time Warner did not necessarily bring about growing shares. In contrast, in January 2001 AOL and Time Warner shares had fallen 35% and 23% since the merger was announced in early 2000 (Lieberman, January 12, 2001). The continuous decreasing earnings at AOL made the owner of the merged company officially cut “AOL” from its name in October 2003. However, Affiliated Computer Services CEO Jeff Rich commented that the problem of the merger was a clash of totally different managing cultures and “on the top of that was an inflated price funded by overinflated AOL stock” (Jones, May 9, 2003). Rich and other finance analysts insisted that companies stand on the right side of a merger can mean a quick profit. Merger and acquisition keeps being the major means for corporations to expand their markets and make profits, which was showed in the merger case that Cingular Wireless bid \$41 billion for AT&T Wireless in early 2004.

3.2.3 US Dominance of the Global Market

With the prevalence of neo-liberalism and mergers and acquisitions, US companies have been able to successfully expand their market globally, achieving a dominant position. By 1999, companies headquartered in the US already took in an estimated 62 percent of global information technology business, and that share was rising. US companies held fully 75 percent of global software markets and in this estimate claimed roughly the same share of the worldwide Internet economy. Microsoft gained more than half of its annual software sales from its subsidiaries in nearly sixty countries (D. Schiller, 1999, p.82-83). Among various sectors of the ICT industry, a group of US companies led the list: for example, AT&T and Bell Atlantic in telecommunications, IBM and HP in computers and electronic office equipment, IBM, Intel and Texas Instruments in electronics semiconductors, GE in electronic equipment, and Electronic

Data System, Microsoft and Oracle in computer services and software. In total, As Figure 3-1 shows, among the world's ten best-performing ICT companies in 1998, US companies accounted for six. They were America Online, Dell Computer, Ingram Micro, EMC, Compuware and Microsoft (Hamelink, 1999/2000, p.27).

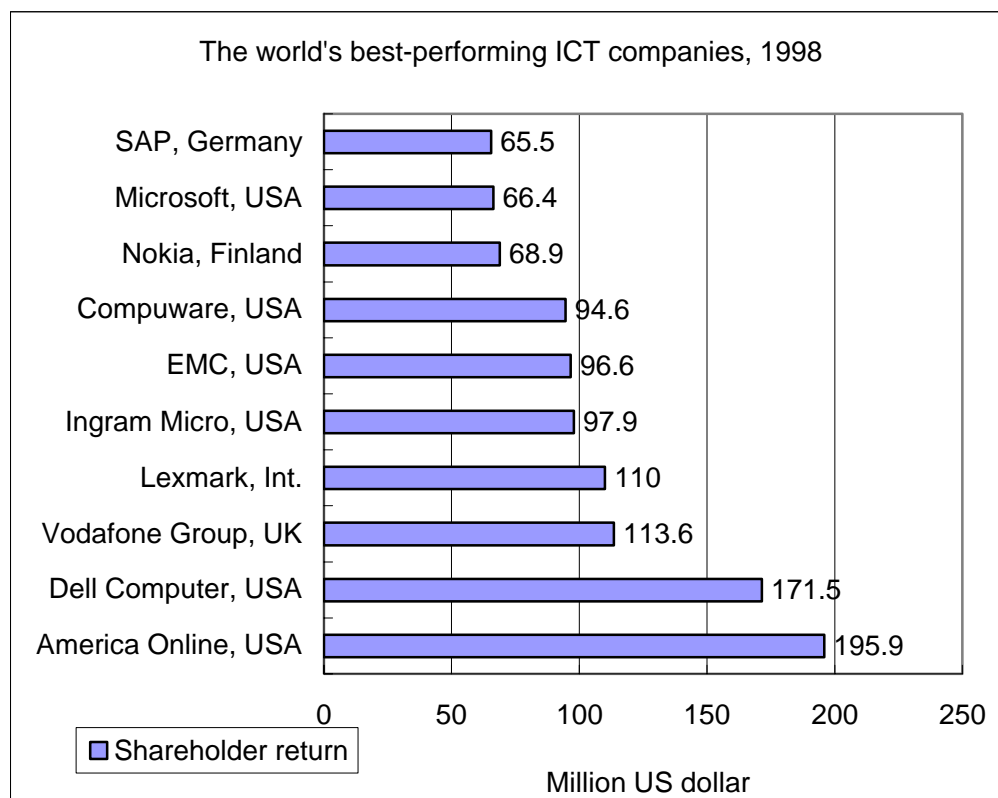


Figure 3-1: The World's Best-Performing ICT Companies, 1998

Source: Business Week, November 2, 1998; cited from Hamelink, 1999/2000, p.27.

More updated data show the US maintains its dominance. In the field of Internet service, a few companies dominate the market and most of which are US based (except for Terra Lycos, ranking top 5, launched in Spain). According to a January 2003 OneStat report, Google accounted for more than half of global usage share, while Yahoo was second with a 22% share and MSN followed with about 10% (See Table 3-2).

 Table 3-2: Search Engine Global Usage Share of January 2003

<i>Search Engine</i>	<i>Usage Share</i>
Google	54.7%
Yahoo	22.1%
MSN Search	9.5%
AOL Search	3.7%
Terra Lycos	2.8%
Altavista	2.5%
Askjeeves	1.5%

Source: OneStat, January 2003; quoted from CyberAtlas, July 28, 2003

Nielsen//NetRatings provided updated information on top global properties as of June 2003. In the list of top ten properties, eight are US-based except for Lycos Network based in Spain and Sony based in Japan. Yahoo topped this list with an audience of about 88 million, MSN was second with an audience of 78 million and AOL-Time Warner followed with an audience of 68 million (See Table 3-3).

Internet content providers (ICPs) are seen as a competitive market in which thousands of players located in various regions target their niche market. However, the phenomenon of US dominance exists in this market. Matthew Zook (2000) constructed a database locating Internet domains on the basis of their registration postal address, which helps to map Internet content providers and their spatial patterns. According to his data in July 2000, the US accounted for about 50 percent of the total Internet domains, followed by Germany with 8.6 percent and the UK with 8.5 percent. Canada (3.6 percent), South Korea (2.5 percent) and France (2.1 percent) were in the middle while all other countries' shares were below 2 percent. These data show that Internet domains are highly concentrated by country, with substantial dominance by the US. This concentration is much higher than the concentration of Internet users. At the same time, Internet users in North America (including the US and Canada) accounted for 42.6 percent, followed by

Table 3-3: Top Global Properties of June 2003

Property Name	Unique Audience	Active Reach %	Time Per Person
Yahoo	87,894,668	35.25	01:39:37
MSN	77,995,869	31.28	00:57:33
AOL Time Warner	67,928,168	27.24	00:38:17
Microsoft	51,634,159	20.71	00:09:30
Google	37,525,846	15.05	00:16:53
eBay	30,423,917	12.20	01:26:03
Amazon	30,229,547	12.12	00:14:42
About-Primedia	24,116,323	09.67	00:10:32
Lycos Network	23,582,378	09.46	00:13:18
Sony	17,463,803	07.00	00:14:45

Source: Nielsen//NetRatings; quoted from CyberAtlas, July 28, 2003

Europe with 23.8 percent and Asia with 20.6 percent (Castells, 2001, p. 261). The US dominance is even greater when measured in terms of top sites and pageviews (measured by the number of hits from users). Again using Zook's data, in 2000, the US accounted for 65 percent of the top thousand websites, and 83 percent of the total pageviews of Internet users. South Korea was second to the US with 5.6 percent, followed by the UK with 2.9 percent and Germany with 1.1 percent.

Zook's analysis of the location of Internet domains by city, with a database of 2,500 cities worldwide, further shows that Internet content provision is increasingly a metropolitan phenomenon. In January 2000, the top five cities, accounting for 1 percent of the world's population, accounted for 20.4 percent of Internet domains. The top fifty cities, with only 4 percent of world's population, contained 48.2 percent of Internet domains, and the top 500 cities, with 12.4 percent of the population, represented 70 percent of Internet domains. Moreover, the concentration of Internet domains between 1998 and 2000 increased for the top five cities by 2.7 percent, and for the top ten cities by 1.3 percent. Most of these Internet domain concentrations were located in the US.

According to Zook's data, in January 2000, seventeen out of the top twenty cities in the ranking of Internet domains were in the US. The largest concentration was in the Greater New York area, followed by Greater Los Angeles, and San Francisco- Oakland-San Jose.

Thus, research shows that Internet content provision, as measured by domain addresses, follows a pattern of high spatial concentration. According to Castells (2001, p. 222), it is concentrated in a few countries, lead by the US; it is overwhelmingly located in metropolitan areas, and particularly in some of the wealthiest metropolitan areas; it is concentrated in a few leading metropolitan locations in each country commercialization of the Internet began.

3.3 The Global Disparity in Internet Access

In order to draw a general map of the global digital divide (GDD), empirical data of Internet access are indispensable. While there are lots of data available from international organizations such as the United Nations, the Organization for Economic Cooperation and Development (OECD) and the International Telecommunications Union (ITU) or corporation-funded organizations such as NUA and Netsizer, it is the researcher's task to find a general trend of the global digital divide from different sources of data. As Pippa Norris (2000) suggests, "the most effective research strategy is to triangulate among diverse sources of evidence, attempting to understand the Internet by piecing together a range of independent studies to see if the evidence points in a consistent direction across different countries" (p. 36).

In general, data from different sources all indicate evidence that a great gap exists between the developed world and the developing world. And the disparity is related to various kinds of factors such as economic development, information indicators and education level.

3.3.1 Mapping the Global Digital Divide

The characteristics of the global diffusion of the Internet are twofold: it grows at such a rapid speed that no other traditional media can compete; and it is very unequally diffused between rich countries and poor countries.

According to time-series data of Internet diffusion, there is a dramatic rise in popularity of the Internet in recent years. Norris (2001) uses data of the NUA, indicating that between 1995 and 2000 the total worldwide number of Internet users surged from about 26 to over 400 million worldwide, an explosive jump within the period of five years. As of September 2002, global Internet users reached 605 million, accounting for 10 percent of total worldwide population (NUA, 2002).

The ITU collects data from various websites, reporting that the number of Internet hosts grew from forty thousand in 1990 to 43.5 million in 1998, a thousandfold increase within less than one decade. Within this same period, countries that were connected to the Internet grew from only 22 to 217, a nearly tenfold increase (ITU, 1999, p.21).

The diffusion of the Internet shows astonishingly explosive power that distinguishes it from that of former media. The same report of the ITU notes that it took only four years for the world wide web (WWW) to reach 50 million users while the telephone took 74 years, radio took 38 years, the PC took 16 years and TV took 13 years to reach an equal number of users (ITU, 1999, P.18) (See Figure 3-2).

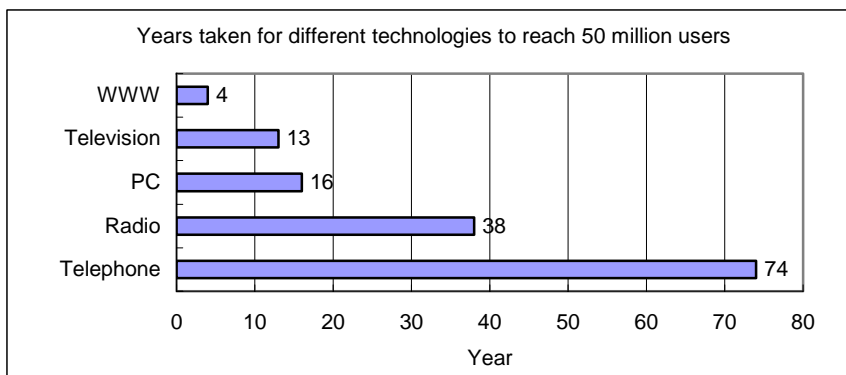


Figure 3-2: Diffusion Rate of Different Technologies

Source: ITU, 1999, P. 18

However, despite this remarkable expansion, today about one in ten of the world's population is online, with highly uneven diffusion worldwide. The following is a brief review of the phenomenon of the global digital divide, based on the report of the United Nations Development Program (UNDP). Table 3-4 shows rich countries had a high rate of Internet use while only a few people in poor countries were connected to the network. For example, among different areas in the world, OECD countries had a penetration rate of 6.9% in 1998 and the penetration increased to 28.2% in 2000. The US alone has had the highest penetration rates, 26.3% in 1998 and 54.3% in 2000. While more than half of Americans were found to be Internet users, the US government claimed that it is really “a

Table 3-4: Global Internet Users (% of Population) in 1998 and 2000

	1998	2000
The US	26.3	54.3
OECD	6.9	28.2
Latin America and the Caribbean	0.8	3.2
East Asia and the Pacific	0.5	2.3
Eastern Europe and CIS	0.8	3.9
Arab States	0.2	0.6
Sub-Saharan Africa	0.1	0.4
South Asia	0.04	0.4
World	2.4	6.7

Source: UNDP, 2001

nation online” (NTIA, 2002). The rest of the world averages low penetration rates, less than 1% in 1998 and between 0.4% and 4% in 2000. Although Internet users in every region saw an increase between 1998 and 2000, more than three-quarters of Internet users were living in OECD countries, which contained only 14 percent of the world's population (UNDP, 2001, p.41).

Other studies show similar results. According to Norris (2001, p.45), in 2000, most of the world's online community (84%) lived in highly developed nations. In comparison,

the thirty-five societies classified by the UNDP with low levels of human development contained only about 1 percent of the online population, although home to half a billion people. A 2003 report of World Institute for Development Economics Research, United Nations University, confirmed the global disparity in Internet use. According to the report, by 2003, over 90 percent of Internet users came from the richest 20 percent of the world's population, while the poorest 20 percent contained only 0.2 percent of the world's Internet users. On average, the number of personal computers and Internet users per capita was ten times higher in rich countries than in developing countries. Technology inequality not only follows income inequality, it even exceeds income inequality. Low-income countries accounted for 40 percent of the world's population and 11 percent of the world's gross national income, yet only 2 percent of the world's Internet users.

Another indicator showing the unequal distribution of Internet use is interregional Internet bandwidth. Internet bandwidth connected across international borders shows that most bandwidth is used by the developed countries. North America stands as the center of international connection (TeleGeography, 2002). Among various connections from North America to other areas, bandwidth between North America and Europe, 207,918 Mbps, was the highest. Internet bandwidth between North America and Asia was 55,983 Mbps. Internet bandwidth between North America and Latin America was 23,620 Mbps. Internet bandwidth between Europe and Asia was 1,655 Mbps. Internet bandwidth between North America and Africa was 1,247 Mbps. Internet bandwidth between Europe and Africa was only 821 Mbps.

More precisely speaking, most of the Internet bandwidth is used by the US. A close look at the list of top 50 interregional Internet routers supports this viewpoint. In 2002, all top 50 interregional Internet routers were used for connecting one specific city in the US with a city outside the US. For example, the top interregional Internet router was between London and New York with bandwidth of 96,599 Mbps, followed by the router between New York and Paris (bandwidth 25,502), the router between Amsterdam and New York (bandwidth 22,489), the router between London and Washington, DC (bandwidth 18,037), and the router between Copenhagen and New York (bandwidth 11,819). The top

six to top ten interregional Internet routers were between San Francisco and Tokyo (bandwidth 9,707), between Frankfurt and New York (bandwidth 7,970), between Miami and Sao Paulo (bandwidth 5,523), between San Francisco and Taipei (bandwidth 5,474), and between Seattle and Toyko (bandwidth 4,815).

According to the UNDP's *Human Development Report 2001*, the diffusion of the Internet has also been uneven within countries, concentrated in urban areas, among young men and among people with higher incomes and more education. In most countries Internet users are predominantly:

- Urban and located in certain regions. In China the 15 least connected provinces, with 600 million people, have only 4 million Internet users—while Shanghai and Beijing, with 27 million people, have 5 million users. In the Dominican Republic 80% of Internet users live in the capital, Santo Domingo. And in Thailand 90% live in urban areas, which contain only 21% of the country's population. Among India's 1.4 million Internet connections, more than 1.3 million are in the five states of Delhi, Karnataka, Maharashtra, Tamil Nadu and Mumbai.
- Better educated and wealthier. In Bulgaria the poorest 65% of the population accounts for only 29% of Internet users. In Chile 89% of Internet users have had tertiary education, in Sri Lanka 65%, and in China 70%.
- Young. Everywhere, younger people are more apt to be online. In Australia 18–24-year-olds are five times more likely to be Internet users than those above 55. In Chile 74% of users are under 35; in China that share is 84%. Other countries follow the same pattern.
- Male. Men make up 86% of users in Ethiopia, 83% in Senegal, 70% in China, 67% in France and 62% in Latin America. Some of these disparities are easing. For example, the gender gap seems to be narrowing rapidly— as in Thailand, where the share of female users jumped from 35% in 1999 to 49% in 2000, or in the United States, where women made up 38% of users in 1996 but 51% in 2000. In Brazil, where Internet use has increased rapidly, women account for 47% of users.

Given the great digital divide between and within countries, and recognizing the market is not enough to achieve the goal of universal service and to meet the needs of

people, the UNDP suggested that turning the technology into a tool for human development will require more efforts including public investment and international cooperation.

3.3.2 Trends in the Global Digital Divide

Another concern raised by the digital divide is whether or not the gap will be maintained over time. Since the Internet is a new technology with a short period of diffusion (since the late 1990s), a long-term trend for its distribution cannot yet be determined. Instead, Norris (2001) examines the diffusion pattern of traditional media such as radio and TV from 1970 to 2000. The result shows that the gap in access to these media between industrialized countries and developing countries has not diminished in this period because use of TV and radio grew more sharply in the industrialized group than in the developing group, which resulted in the enlarging inequalities of media access between rich and poor nations. Applying this observation of media use to the Internet, Norris believes that the disparity of Internet access between rich countries and poor countries that we see today will not necessarily close as more and more people go online because “early-adopter countries seem likely to maintain their relative lead, leading in digital technologies, even while laggard societies attempt to catch up” (p.64).

Rodriguez and Wilson’s (2000) report for the World Bank also showed the same evidence. Their research on information and communication technology (ICT) indicates that the average growth rate in the diffusion of developed countries was 23% between 1994 and 1996; that of poor countries averaged only 18% over the same period. The result is a widening gap in the distribution of ICT globally. Examining the GDP growth, they also find, on average, that poor countries are not catching up with rich countries. The gap continues to grow for most countries, despite the introduction of ICT. Both studies conclude by finding that the availability of the new technology reinforces existing inequalities, rather than overcoming or transforming them.

The data of NUA Internet surveys between 1997 and 2002 show some characteristics of the growth trend of the global online population. In general, Internet

users by region can be divided into two groups: the first group includes North America, Europe and Asia/Pacific, each of which had more than 10 million users in 1997 and grew to 180-190 million in 2002; the second group includes Africa, Middle East and Latin America, each with less than 1 million users in 1997 with the amount of users growing slowly. The gap between these two groups is still huge. A further look at the first group shows that North America continued to dominate Internet access into the late 1990s. It accounted for 62.5 percent of global online population in 1997 and 57 percent in 1998. Europe followed with 20 percent and 22 percent, and Asia/Pacific having 15 percent and 17 percent in these two years. Europe and the Asia/Pacific region began to catch up with North America in the growth rate of Internet users in 2001 and even to exceed it in 2002. The trend shows that, from 2001 on, the growth of Internet users in North America stagnated while Europe and the Pacific Rim experienced rapid increase in the number of Internet users (See Figure 3-3).

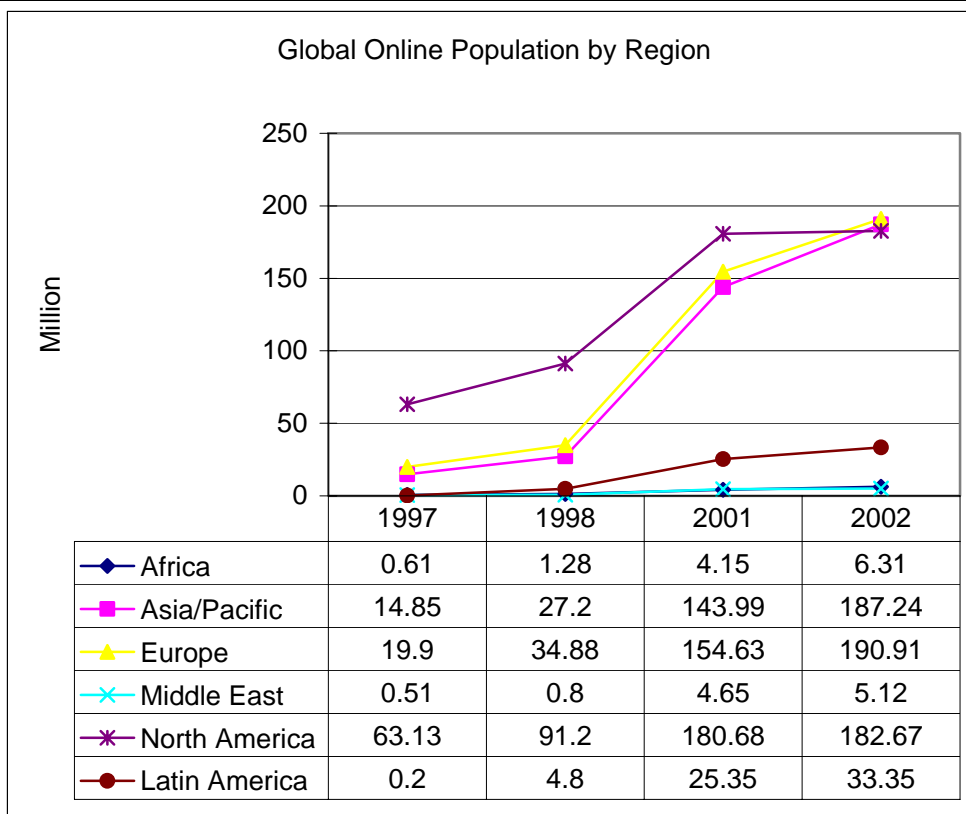


Figure 3-3: Growth of Global Online Population from 1997 to 2002

Source: NUA Internet Survey (2003)

As Manuel Castells (2001) predicts, the bulk of new users will certainly come from developing countries, simply because it is where over 80 percent of the population of the world lives. It is obvious that Asia is the fastest growing area in the world. By the end of 2000, South Korea was the leading Asian country in Internet penetration, with 42 percent of the population online, including 25 percent of users with high-speed Internet connection from home. Taiwan's penetration rate was over 36 percent, and almost 30 percent for Hong Kong. Beijing accounted for one-third of Internet users in China. However, poor countries in Africa, Middle East and Latin America show no sign of catching up.

Another indicator, number of Internet hosts, also supports the model of the enlarging global digital divide between rich countries and poor countries. Based on the OECD's report (2001), in October 2000, there were just over 94 million Internet hosts in the world, with 95.6% in OECD countries and 4.4% outside the OECD. Growth in non-member countries, mostly those with relatively high GDP per capita, had matched growth rates in the OECD area. Taiwan, Singapore, Hong Kong and Israel accounted for 52% of all Internet hosts outside the OECD and Argentina, Brazil, Malaysia and South Africa accounted for a further 24%.

On a regional basis, North America and Europe account for 89% of all Internet hosts. The regional share of Internet hosts is very low in Central and South America and in Africa. Africa has only 0.25% of all Internet hosts and its share has been decreasing (See Table 3-5). The overwhelming majority of these Internet hosts are in South Africa, where the growth rate is slow. The shares of Central and South America-based hosts have grown, owing to much higher growth rates in Argentina, Brazil and Chile.

In October 2000, there were 81.5 Internet hosts for every 1000 inhabitants in OECD countries but only 0.85 per 1000 inhabitants outside the OECD area. In 2001, the OECD area was expected to surpass 100 Internet hosts per 1000 inhabitants; non-OECD countries were expected to achieve just one Internet host per 1000 inhabitants. As measured by Internet hosts, the global digital divide is growing rapidly. In October 1997, the divide between Africa and North America was a multiple of 267. By October 2000, this had grown to a multiple of 540.

Table 3-5: Internet Hosts per 1000 Inhabitants between 1997 and 2000

	October 1997	October 1998	October 1999	October 2000
North America	46.28	69.74	116.41	168.68
Oceania	26.81	34.76	43.84	59.16
Europe	6.13	9.45	13.41	20.22
Central and South America	0.48	0.91	1.67	2.53
Asia	0.53	0.87	1.28	1.96
Africa	0.17	0.21	0.28	0.31
OECD	23	34	55	82
Non-OECD	0.21	0.38	0.59	0.85

Source: Netsizer (www.netsizer.com); cited from OECD, 2001, p. 8 & p. 13.

3.3.3 Explanations for the Global Digital Divide

Recognizing the great uneven access to the Internet around the world, determining the factors behind the digital divide becomes a crucial task for researchers. Many researchers, including Mody, Norris, Rodriguez and Wilson and the ITU study, connect economic development to Internet use and access. That is, the higher level of a country's economic development, the higher percentage of internet use it has. Interestingly, there are some exceptions to the trend. For example, Hargittai's (1999) research on Internet access in OECD countries finds that even within developing countries, differences in Internet connectivity exist. That means, economic development is a significant predictor of Internet use, but not the only one. There are still other factors influencing the GDD.

Internet use is found to be related to levels of establishment of the information society. Mody (1999) and Norris (2000) compare Internet use and uses of other media such as radio, TV and telephone, showing that use of all forms of communication media is highly intercorrelated. Rodriguez and Wilson (2000) have created the Index of

Technological Progress showing the same results. All these findings mean that countries at the forefront of the Information Society on one indicator are likely to lead on many others as well.

In general, economic development and information society indicators can explain GDD well. However, more factors are worthy of examination. Norris (2000) points out human capital and democratic development as two supplemental factors for GDD. The ITU (1999) compares the number of Internet hosts and the UN Human Development Index like adult literacy, education and life expectancy. Mody (1999) pays attention to the living conditions in different countries with indicators that are similar to the UN Human Development Index. Rodriguez and Wilson (2000) find that advances in ICTs like the Internet are associated with a climate of democratic rights and civil liberties that is conducive to innovation and adaptation of ICTs, respect for the rule of law and security of property rights, investment in human capital, and low levels of government intervention into markets.

Castells (1996, 2001) argues that the digital divide exemplifies social inequality that is rooted in global capitalism. Coinciding with the explosion of the information-technology revolution, the rise of the new economy, and the diffusion of the Internet, in the 1990s, the world experienced a substantial increase in income inequality, polarization, poverty, and social exclusion. At the turn of the millennium, close to 50 percent of the world's population was trying to get by on less than 2 dollars a day, in a sharp increase in the proportion of people in a similar condition one decade earlier. On the other hand, 20 percent of the people disposed of 86 percent of the wealth. Consequently, under the social and institutional conditions prevailing in our world, the new techno-economic system seems to induce uneven development, instead of decreasing inequality. The digital divide, from Castells' point of view, exemplifies the extreme disparities of this global process of uneven development.

3.4 Internet Policy: Toward a Global Information Society?

The above analysis of the history, industry, and penetration of the Internet shows that the US dominates the production, distribution and consumption of the new technology. This section focuses on the policy dimension, beginning with the Global Information Infrastructure, to see how the dominance of the US and neo-liberal ideology put into action to influence the global regime as well as the digital divide.

3.4.1 The Global Information Infrastructure

In 1993, the Clinton Administration announced the National Information Infrastructure (NII) project as a crucial information policy for the US to win in world markets. In the following year, US Vice President Al Gore proposed the Global Information Infrastructure (GII) in the annual meeting of the International Telecommunications Union (ITU) to connect the world through the telecommunications network. With the promotion of the US and the international organizations, building the information infrastructure took on a worldwide feverish pitch. Governments around the world have been eager to propose measures to strengthen their information and technological capacity and welcoming the emergence of a global information society⁴.

Addressing on the topic of “Telecommunication and Development”, Gore (1994) outlined five principles as the foundation of the GII, which included encouraging private sector investment; promoting competition; providing open access to the network for all information providers and users; creating a flexible regulatory environment that can keep

⁴ For example, the Canadian government issued “The Canadian Information Highway” in 1994. The same year, the European Commission proposed “Europe’s Way to the Information Society: An Action Plan”. In 1999, the EU issued an E-Europe project to promote Internet use in its member countries. Many European countries have been on their way toward an information society. In Asia, Japan promoted the NII in 1995. The newly industrial countries, such as Taiwan and South Korea, soon followed the path of the industrialized countries to informatize and digitalize their countries. China also sees information crucial on its transformation to a modern and open society. In 1996, informatization was integrated into China’s national project of economic and social development.

pace with rapid technological and market changes; and ensuring universal service. Leaders from the world telecommunications community incorporated these five principles into the ITU's "Buenos Aires Declaration on Global Telecommunication Development for the 21st Century".

In 1995, the GII was further endorsed at a meeting of ministers from the G7 group (the predecessor of the G8). The G7 conference outlined common principles for the worldwide information society and common guidelines for cooperation. These principles were listed as follows: promote dynamic competition; encourage private investment; define a regulatory framework that can change with the times; ensure open access to networks; guarantee universal supply of and access to services; promote equal opportunity for all citizens; promote diversity of content (including cultural and linguistic diversity); and recognize the need for global cooperation by paying particular attention to the least-developed countries. At its meeting in July 2000 in Japan, the G8 agreed to a Charter on the Global Information Society. The world's richest countries worked together to build the information super highway. International organizations such as the ITU, the United Nations Development Program, and the World Bank successively put lots of resources to promote the GII.

Meanwhile, information technology was mystified as a powerful engine for economic growth and international competitiveness. Strategically, a market-oriented approach of promoting the new information technology became the central principle. To its end, the information infrastructure seeks to enhance welfare and social justice of all human beings. In a word, the engine for globalization of the information society was to be private investment fueled by competition and liberalization, with promises of universal access and equality of opportunity for citizens.

The dominant ideology of IT for development follows the tone of modernization theory, implying that information technology is a crucial tool for the developed countries to keep leading the world and for the developing countries to catch up and become integrated into the global market place. But from the approach of dependency theory, globalization is nothing but the representation of imperialism and market-orientated promotion of information technology will only deepen social and international inequality.

In US support for the promotion of telecommunications hardware and software in the new information age, Herbert Schiller (1998) found “historical continuities in its quest for systemic power and control” of global communication (p.23). What made it different was “the changed economic basis of US dominance, with TNCs acquiring an increasingly important role in international relations, transforming US cultural imperialism into ‘transnational corporate cultural domination’” (Schiller, 1992, p.39).

Critical scholars further question the principles of the GII that private creation and ownership of the information highway will be in the general public good. As Schiller (1995) and Golding (1998) critically argued, the GII can only benefit those haves and marginalize those have-nots because the logic of profit making leads the private sector to build the infrastructure for those who can afford it while leaving the rest behind. So far, the consequence of the GII has been to produce massive global inequalities in access to and ownership of communication and information facilities.

Cees Hamelink (1997) argues that GII is definitely going to fail in its goal to move toward a democratic global communication order. Comparing the New World Information and Communication Order movement in the 1970s and the GII project in the 1990s, a common lack of crucial elements is found in terms of control, access, quality and people’s participation. Without people’s voices being heard in the policymaking process, the GII cannot claim to stand for the promotion of technology for all.

3.4.2 Dealing with the Digital Divide

As mentioned, many international organizations have taken efforts to make information technology work for development. Here is an introduction of their policy and projects addressing the issue of the digital divide, based on information gathered from the official websites of these organizations. Organizations include representatives of the rich, the Group of Eight (G8), those in the UN system such as the United Nation Development Program and the International Telecommunications Union, and trade and finance-related organizations such as the World Bank.

3.4.2.1 The Group of Eight

The G8 agreed to a *Charter on the Global Information Society* at its annual meeting in 2000, acknowledging the growing digital divide between wealthy and poor countries. According to the Charter, to ensure that information technology (IT) serves the goals of economic growth and the public welfare, G8 countries claimed they would exercise their leadership “in advancing government efforts to foster an appropriate policy and regulatory environment to stimulate competition and innovation, ensure economic and financial stability, advance stakeholder collaboration to optimize global networks, fight abuses that undermine the integrity of the network, bridge the digital divide, invest in people, and promote global access and participation” (<http://www.dotforce.org/reports/it1.html>, 2000).

The G8’s key strategies to drive toward universal and affordable access, namely bridging the digital divide, include: fostering market conditions conducive to the provision of affordable communications services; exploring other complementary means, including access through publicly available facilities; giving priority to improving network access, especially in underserved urban, rural and remote areas; paying particular attention to the needs and constraints of the socially under-privileged, people with disabilities, and older persons and actively pursuing measures to facilitate their access and use; encouraging further development of “user-friendly”, “barrier-free” technologies, including mobile access to the Internet, as well as greater utilization of free and publicly available contents in a way which respects intellectual property rights.

To achieve the goal of the information society, a Digital Opportunity Task Force (DOT Force) was established with a view to integrating the G8’s efforts into a broader international approach. The DOT Force’s membership comprised governments, international organizations, and one each from the three business groups: World Economic Forum, Global Business Dialogue, and the Global Information Infrastructure Commission. The major tasks of the DOT Force include: (1) actively facilitating discussions with developing countries, international organizations and other stakeholders to promote international cooperation with a view to fostering policy, regulatory and

network readiness; improving connectivity, increasing access and lowering cost; building human capacity; and encouraging participation in global e-commerce networks; (2) encouraging the G8's own efforts to co-operate on IT-related pilot programs and projects; (3) promoting closer policy dialogue among partners and work to raise global public awareness of the challenges and opportunities; (4) examining inputs from the private sector and other interested groups such as the Global Digital Divide Initiative's contributions.

3.4.2.2 The United Nations Development Program

The United Nations Development Program (UNDP) serves as the UN's global development network. It claimed to be an advocate for change and to connect countries to knowledge, experience and resources to help people build a better life. On the ground in 166 countries, the UNDP says it works with countries on their own solutions to global and national development challenges. The UNDP's new mission is to link and coordinate global and national efforts to reach its Millennium Development Goals⁵, including the overarching goal of cutting poverty in half by 2015. The focus is helping countries build and share solutions to the challenges of democratic governance, poverty reduction, crisis prevention and recovery, energy and environment, HIV/AIDS, and ICT (<http://www.undp.org/>, 2003).

With regard to ICT, the Sustainable Development Networking Program (SDNP) is part of the UNDP's effort to address the issues of the increasing information gap between industrialized countries and developing countries. The SDNP operates at the national level, launching and supporting local Internet sites, and building national information capacity and knowledge resources. Launched with 12 initial country pilot projects in

⁵ The Millennium Development Goals are an ambitious agenda for reducing poverty and improving lives that world leaders agreed on at the *Millennium Summit* in September 2000. These goals include: 1. Eradicate extreme poverty and hunger; 2. Achieve universal primary education; 3. Promote gender equality and empower women; 4. Reduce child mortality; 5. Improve maternal health; 6. Combat HIV/AIDS, malaria and other diseases; 7. Ensure environmental sustainability; 8. Develop a global partnership for development.

1993, the SDNP operated in 40 developing countries until 2003. The program's stated aims are to make information technology more accessible, more usable, and more understandable to civil society, tailored to each country's situation and needs (<http://www.sdnf.undp.org/stories/intro.html>, 2004).

3.4.2.3 The International Telecommunications Union

The International Telecommunications Union (ITU) is responsible on a global level for telecommunications infrastructure standards, coordination of radio frequencies, satellite orbits, and the settlements system for telephone calls between countries. The ITU is dependent for effectiveness on building consensual solutions to problems and is powerless to impose decisions on any country.

The Telecommunication Development Bureau of ITU (ITU-D) claims to encourage and enable ITU member states, especially emerging markets, to draw maximum benefit from technical, financial, and regulatory changes in the telecommunications environment. It seeks to provide infrastructural support for a comprehensive and collaborative development program for the enhancement of telecommunication systems and services. ITU-D initiated e-strategies (<http://www.itu.int/ITU-D/e-strategy/index.html>, 2003) with the stated goal of assisting developing countries in harnessing the potential of IT to contribute towards reducing the social divide, improving the quality life, promoting universal access and facilitating entry into the information society. The strategies include:

- Fostering the development of Internet Protocol (IP) networks and services of all types of telecommunication networks.
- Integrating the development of IP with the rollout of societal applications to enhance governmental, medical/health, educational, agricultural, business and community services.
- Enhancing security and building confidence in the use of public networks.
- Continuing the development of Multi-purpose Community Telecenters (MCTs) and multipurpose platforms as a mechanism to provide wider and affordable access to ICTs.

- Enhancing ICT literacy and increasing public awareness on the potentials of ICTs for socio-economic development.
- Promoting the establishment of a favorable legal environment for e-applications.
- In all actions, taking into account the needs of rural, isolated and poorly served areas and people with special needs (e.g., gender, youths and indigenous people).

In addition, many experiments were established to promote ICT diffusion. Electronic Commerce for Developing Countries aimed to allow “emerging markets” to use their current infrastructures and services to take part in electronic commerce, to transfer the know-how of e-commerce technology and to motivate the planning and deployment of the telecommunication infrastructure. It also claimed to be stimulating Internet penetration, boosting businesses for local content and connection services providers, and encouraging better regional and multinational cooperation through easier communications. Promotion of Universal Access to ICTs is another ongoing activity aimed at bringing Internet connectivity to developing countries, particularly in underserved or rural areas. These include providing training through regional seminars and workshops, and implementing Community Telecenter Pilot Projects.

To hold a global discussion on ICT and its implication on societies, the ITU was designated to host two-phased World Summit on the Information Society (WSIS). The first-phase meeting took place in Geneva in December 2003. It addressed the broad range of themes concerning the Information Society and adopted a *Declaration of Principles* and *Plan of Action*, addressing the whole range of issues related to the Information Society. The documents highlighted three objectives: to make ICTs accessible to all, to make ICTs a tool for economic and social development, and to insure confidence and security in the use of ICT. To fulfill these objectives, the documents dealt with issues such as the promotion of information and communication infrastructure; the role of governments, the business sectors and civil society in the promotion of ICTs for development; capacity building including human resources development and education; the promotion of development-oriented ICT applications for all; and the efforts to overcome barriers to the achievement of the information society through employment of a human perspective (WSIS, 2004).

However, in its process of collecting opinions from different sectors – the state, the market and the non-governmental organizations, ITU has been criticized for its bias of doubling corporations' voice. The primary criterion used in UN organizations to define “non-governmental organizations”, includes not only non-profit organizations, but also trade and corporate organizations such as the International Chamber of Commerce, the Association of Information Industries, the World Federation of Advertisers and the International Advertising Association. Private-sector interests are therefore being given double representation: first by the organizations created to protect corporate interests and secondly by the leading firms in the computer and telecommunication industries. Armand Mattelart (2003) argues that the strategy of UN agencies is increasingly to encourage these corporations to “make their voice heard” whenever the fate of the “global information society” is being debated, and to get them involved in programs designed to reduce the “digital divide”. This is one of the reasons why the latter notion is starting to become commonplace, thereby avoiding the larger questions concerning social, political and economic divisions (pp.150-151).

The WSIS meeting ended with passage of the *Declaration of Principles and Plan of Action* and establishment of the Digital Solidarity Fund. However, no new mechanisms for bridging the digital divide were created. Communication Rights in the Information Society (2004), an alliance of NGOs which had been actively participating in the summit, pointed out the fundamental reason for the WSIS's failure to set up mechanisms to help poor countries in access to ICTs is the opposition from powerful governments. Because the powerful governments had applied the market model which serves their corporations well, they refused to deviate and consider alternative paradigms for development. Consequently, the WSIS became a “talking shop”, borrowing the word from Glory Mushingi (2004), a member of OneWorld Net from Africa. For Mushingi, the Geneva meeting was just like those before, because as “a lot of money is being wasted on big conferences and no concrete results [generated] from them” (<http://www.oneworld.net/article/view/80144/1/>).

3.4.2.4 The World Bank

Founded in 1944, the World Bank Group is one of the world's largest sources of development assistance. The Bank, which provided US\$19.5 billion in loans to its client countries in fiscal year 2002, worked in more than 100 developing economies, claiming to bring a mix of finance and ideas to improve living standards and eliminate the worst forms of poverty. For each of its clients, the Bank works with government agencies, nongovernmental organizations, and the private sector to formulate assistance strategies. Owned by more than 184 member countries, the Bank claims it uses its financial resources to individually help each developing country onto a path of stable, sustainable, and equitable growth which includes:

- Investing in people, particularly through basic health and education;
- Focusing on social development, inclusion, governance, and institution-building as key elements of poverty reduction;
- Strengthening the ability of the governments to deliver quality services, efficiently and transparently;
- Protecting the environment;
- Supporting and encouraging private business development;
- Promoting reforms to create a stable macroeconomic environment, conducive to investment and long-term planning.

The World Bank initiated a global grant program Information for Development Program (infoDev) in September 1995 with the stated objective of addressing the obstacles facing developing countries in an increasingly information-driven world economy. It sought to promote innovative projects on the use of ICTs for economic and social development, with a special emphasis on the needs of the poor in developing countries. The infoDev's key method of intervention is through specific activities in areas such as consensus building, information infrastructure development strategies, and telecommunications reform and market access. All activities are designed to support workable strategies and can include workshops, assessments, demonstration projects,

feasibility studies, or other approaches. They can cover one or many countries; and address one or many sectors (<http://www.infodev.org/>, 2000).

Based on the above introduction of several international organizations and their efforts, some common characteristics of their policy and initiatives addressing the information society and the digital divide can be outlined as follows.

(1) The development of the information society is market-led. The role of the government is to build a regulatory and investment environment for the private sector to expand the telecommunications infrastructure and e-commerce.

(2) IT plays an important role for development. It is especially urgent for developing countries to strengthen their IT industry and applications for them to catch up with industrialized countries and for their people to benefit from it. Competition and liberalization are keys to telecommunications development. Exploring new means of IT is also a key measures to make IT accessible to people.

(3) To build the information society and bridge the digital divide requires the cooperation among different stakeholders such as international organizations, governments, corporations, NGOs and local agents. Finally, the local situation and people's needs should be addressed.

Although so many projects have been initiated in the hope of bridging the digital divide, it shows little sign of decrease as outlined in the former section. Since the digital divide is rooted in social inequality, solely focusing on promoting IT in poor areas cannot solve the problem of sustained poverty and exclusion. At its worst, strategies highlighting market approaches just reproduce inequality caused by the unequal distributive system of global capitalism. It is no surprise that in contrast to neo-liberal claims that globalization benefits everyone, UNESCO has warned that the process of economic globalization could just as well be culturally impoverishing, unfair and unjust (UNESCO, 2001).

Practically, some weaknesses the information projects have been revealed. The Village Knowledge Centres in Chennai, India illustrates the problems facing development in the poorest areas:

The vast majority of Web sites are in English, a language that more than 95 percent of Indians do not speak. Nonetheless, the project has, since its inception, challenged this by translating and producing local contents in

Tamil. Poverty itself is a huge limitation. Only 12 public telephones exist in the project area, which covers 19 villages, with a population of 22,000. Routine power failures and overloaded telephone lines make connection to the Internet a frustrating proposition. There are serious questions about whether countries like India, weighed down by high rates of illiteracy and illness, should spend heavily to provide villages that desperately need schools and health clinics, with what most would consider a luxury (Dagron, 2001, p.30).

Theoretically speaking, a neo-liberal market orientation exacerbates inequality in the three following three ways:

(1) A free market implies a full competition among corporations. However, the reality of the market in the field of new technology continually tends forward concentration. The merger of media corporations and computer and telecommunications corporations has been feverish all over the world (McChesney, 1999; Mosco, 1996; Schiller, 1999), epitomized by the AOL-Time Warner merger.

(2) Liberalization and privatization of telecommunications is seen as necessary for TNCs to operate efficiently in the global age. For Western-based big telecommunications corporations, it is a good opportunity to expand into the developing world. It is evident that when the developing countries open their telecommunications markets, foreign corporations soon enter and come to dominate (D. Schiller, 1999). For example, four of the six mobile telephone licenses awarded by Taiwan in 1996 went to U.S. firms partnered with domestic companies; the other two went to Hong Kong and German-based consortia.

(3) The global flow of capital and diffusion of technology is unequal. The distribution of wealth in the past two decades (which saw economic growth globally) shows an increasing disparity in both the developed world and the developing world. With the investment and output of telecommunications increasingly making up an increasing ratio of overall investment and output, the disparity of technology access between the rich and the poor maintains (Castells, 1998; Hamelink, 1999).

3.4.3 International Regime Change

As introduced in the second chapter, the development of international regimes can be characterized along two dimensions: the inclusion of private authority and the importance of soft law. That means, in the era of globalization, international regimes are increasingly the product of negotiations between public sectors and private sectors in which soft law is formed to govern regimes activities and behaviors. With regard to the Internet, international regimes seem to follow the above two trends. However, while the private sector dominates in international regimes, the influences of corporations always outweigh the non-governmental organizations (NGOs). And soft law directed at the development of the information society is more about trade and economics than technology or culture. These changes can be traced back to from the decay of the ITU and the rise of the WTO to dominant status.

3.4.3.1 The Decay of the International Telecommunications Union

William Drake (2000) explores the ITU's historical development and transformation, and its decay in the contemporary global order. Since 1865, governments have cooperated in the ITU and its predecessor, the International Telegraph Union, to maintain a regime based on the overarching principles of national sovereignty network interconnection and joint service provisioning. This framework allowed national carriers to slowly evolve a global network of national networks while protecting themselves from competitive market forces.

However, regulatory ideology changed from supporting national monopolies to mandating the necessity of liberalization and commercialization. Since 1988, Western governments renegotiated the regime's major instruments to facilitate a shift towards a market-based and more privately controlled global order, while many developing countries and state monopolies resisted this change. But even with this relaxation of old regulatory approaches and accommodation of market demands, the regime had come under further pressure since 1998. Recognizing the challenge from developing countries

against rapid change toward the market approach, the US-led western ally sought another strategy to recreate regime norms and institutions.

The GATT provided the best possibility. The GATT had slowly enlarged its mandates from goods to services. Trade-related services were introduced into its negotiations in the Tokyo Round in the 1970s. By the 1980s, trade in services, including telecommunications services, was on the agenda. In 1997, the *Agreement of Basic Telecommunication* (ABT) was reached with a total of sixty-nine countries signing up. The regulatory principles of the agreement (in a Reference Paper) include: opening markets to foreign investment in all areas of telecommunications, including voice telephony, leased lines, mobile, and satellite; ensuring that discrimination by dominant players is prohibited to ease market entry; ensuring fair, transparent, and nondiscriminatory interconnection with dominant suppliers; requiring a regulator independent of any telecommunications supplier; allocating frequencies, numbers, and other resources in a transparent and nondiscriminatory manner (Senunas, 1997) .

Jonathan Aronson (2000) argues that the GATT had two great advantages. First, it provided a venue that was controlled by pro-competitive trade ministers, not monopoly-bound telecommunications regulators. Moreover, trade ministers almost always outrank telecommunications ministers. Second, it infuriated the barons of the ITU and their rules and provoked them to reenergize their own institutions. The only way for the ITU to retain its influence was to adapt and change.

Along with the growing influence of the new trade in services regime negotiated in the WTO, Drake (2000) further points out, the rise of the Internet, the spread of so-called “new modes of operation” that de-couple market behavior from multilateral disciplines, and the declining compliance of key members states – especially the US – have thrown the world’s oldest regime into a state of creeping decay. In a privatized and liberalized global telecommunications market, the ITU is increasingly irrelevant and ignored by the major players. Drake asserts that, to the extent that multilateral telecommunications rules will be needed in the new global information economy, they will be provided by the WTO and other trade institutions and a diverse range of private sector-led standards bodies and not by the ITU (p.125).

So far, the ITU still plays very important roles in other aspects of global communications such as radio frequency spectrum regulation and technical assistance to developing countries. But today, for Drake, it is the WTO that sets the multilateral rules of the game on the economic organization of global communications, and private standards bodies – especially in the Internet environment – are increasingly driving the interconnection of technologies into a seamless global information fabric.

3.4.3.2 The Dominance of the World Trade Organization

The WTO is the main global international organization dealing with the rules of trade between nations. At its heart are WTO agreements, negotiated and signed by the bulk of the world's trading nations and ratified in their parliaments. The intended goal is to help producers of goods and services, exporters, and importers conduct their business. The WTO is powerful since its members have given it enormous clout in delivering sanctions should they breach its rules, sanctions strong enough to hurt even the richest national. Its functions include administering all GATT and WTO agreements, negotiating and implementing new trade agreements, handling trade disputes, monitoring national trade policies, and providing technical assistance and training for developing countries.

As mentioned above, the WTO now plays a major role in the global governance of telecommunications equipment, infrastructure, and services. Combined with its decisive influence in intellectual property rights, the WTO can reasonably claim to be the single most powerful player in media and communications governance globally (Siochru & Girard, 2002).

Although the WTO acts to provide a forum for trade negotiations between governments, usually they are based on an equal status between countries. In recent years, critics have argued that the more powerful countries reap the benefits of the growing world trade, while many poorer countries are actually worse off. The reason for Sean Siochru and Bruce Girard (2002) is that, although less industrialized countries comprise a majority of WTO members, almost all are in one way or another already greatly dependent on the more powerful nations, such as on the US, those of the EU, or

Japan, in terms of imports, exports, aid, and security. Justified by experience, poorer countries fear that failure to comply with the wishes of these powerful countries in the WTO may result in wider threats to their overall well being and security. Therefore, developing countries have no other option but yield to the rules that western countries have initiated.

Another criticism of the WTO is of the huge influence of TNCs with this organization. As Siochru and Girard (2002) point out, TNCs pursue their interests in the WTO through highly organized, well-resourced lobbying groups. Corporations, more usually competing with each other, come together in long-term cooperation to influence the agenda and outcomes of trade rounds. Their influence on governments is enormous, with most governments equating their interests with those of their corporations and industries. There are also close personal and personnel links between the WTO and corporations—the normal route for retiring director-generals is into top-level management positions in industry, and many industry directors are on key WTO dispute panels. No other nongovernment sector has a significant say.

The above analysis of the dynamic interaction between major stakeholders in the international regimes reveals the dominance of US-led western governments and TNCs, backed up by neo-liberal ideology. The political power of the western governments complements the market power of TNCs to maximize their interests through domination of the global regime in trade and information technology. By doing this, they exclude the voices and interests of developing countries and their people and thus deepen the global disparities in the distribution of wealth, power and knowledge.

Chapter 4

THE COMMERCIALIZATION OF THE INTERNET IN TAIWAN

This chapter provides the analysis of the commercialization of the Internet in Taiwan. It begins with a brief introduction of this island country. The second section is a description of the development of the Internet in Taiwan, focusing on the role of the state and the corporate sector in leading the drive toward commercialization of the Internet. The commercialization of the Internet in turn inspired businesses in media, telecommunications and information technology to seek new opportunities through this new channel. The last section then examines the changing market structure of abovementioned Internet-related industries, examining how Taiwanese corporations are following the global trend of mergers and acquisitions and aiming to prepare themselves for competition in the new Internet market.

4.1 Taiwan's Profile

4.1.1 Brief History of Taiwan

Taiwan is formally known as the Republic of China (ROC), Asia's first constitutional republic which was founded in 1912. The ROC government, led by the Kuomintang (KMT), relocated to Taiwan in 1949 when the Chinese Communist Party established the People's Republic of China (PRC) on the mainland. The ROC has since exercised jurisdiction over Taiwan, Penghu, Kinmen, Matsu, and numerous other islets. The two sides of the Taiwan Strait have since been governed as separate territories despite the Chinese government's continuing claims that Taiwan is a part of China.

With a total area of nearly 36,000 sq. km, Taiwan is separated from China by the Taiwan Strait, which is about 220 km at its widest point and 130 km at its narrowest. The island is almost equidistant from Shanghai and Hong Kong. In December 2002, Taiwan's population density was 622 persons per square kilometer, making it the second highest in the world after Bangladesh.

Despite the sustained tension with its neighbor, China, Taiwan has been striving for its survival and independence and is well known for its economic growth and political democratization in the past decades. Taiwan's economy was transformed from a self-sufficient agrarian economy into an industrial and service oriented one, with per capita gross national product (GNP) reaching US\$13,157 in 2003 (MOEA, 2004). Despite being ruled by colonial regimes in the 17th and 20th centuries and martial law for 40 years after World War II, Taiwan's peaceful democratization has been acclaimed as a "quiet revolution" (GIO, 2003).

Taiwan's political and economic developments were conditioned by many forces, including the US which worked as the major external force with the KMT government serving the most crucial internal force. In the 1950s, America strengthened its tie with Taiwan due to its military alliance with Chiang Kai-Shek's government during World War II. After Chiang's retreated to Taiwan governing, from 1951 to 1965, large amounts of economic and military aid came from the US as part of its cold war efforts to preserve this valuable ally in Asia. US aid contributed to Taiwan's economic recovery from heavy allied bombing during the Second World War. Much of the aid was used to improve Taiwan's infrastructure and the agricultural sector. Advisors stationed in Taiwan and Taiwanese sent abroad for education were all directed to rebuild the economy.

Internally, Chiang began his dictatorship and directed Taiwan's economic development with central-planning projects. The land reform program, which was completed in 1953, reduced land rents, distributed public land, and purchased and resold land from large landlords. Farmers were supplied with fertilizer, seeds, pesticides, expert advice, and credit. By 1959, 90 percent of exports were agriculture or food related. Increased production and higher income resulted in low inflation and steady capital accumulation, as importing food was unnecessary. The other effect of land reform was

eliminating the power of rich landowners from contesting the authority of the KMT government, a foreign ruler for native Taiwanese.

After land reform policies and economic assistance had formed a solid foundation for the economy, two policies of the 1950s and 60s led to the economy's remarkable takeoff of the 1970s. The first was an "import substitution policy" aimed at making Taiwan self-sufficient by producing inexpensive consumer goods, processing imported raw materials, and restricting other imports. When government planners realized that economic development was limited by Taiwan's small domestic economy, a second policy of "export promotion" was adopted in the late 1950s and continued throughout the 1960s. Using Japan as a model and employing US advice, the resource-poor, labor-abundant island began to expand light industries. Export-processing zones were set up with special tax incentives to attract overseas investment. Soon, Taiwan had secured an international reputation as a world exporter. The status of a world exporter, in fact, deepened Taiwan's dependency on advanced industrial countries (Gupu, 1995).

Between 1962 and 1985, Taiwan's economy experienced the most rapid growth in its history: an average annual growth rate of nearly 10 percent, or more than twice the average economic growth rate of industrialized countries during the same period (GIO, 2003). Equitable distribution of income was a major objective in the government's economic planning. In 1953, the average income of the top 20 percent of the population was estimated at 20 times that of the bottom 20 percent. From the 1960s on, this ratio was reduced to a range of between 1:5 and 1:4, indicating a highly equitable distribution of income. However, in 1990 this ratio grew to 1:5.18 and kept growing to 1:6.16 in 2002 (DGBAS, 2002). Income inequality increased with Taiwan's further incorporation into knowledge-intensive global capitalism.

The economic structure of the nation shifted from reliance on agricultural exports in the 1950s to light manufacturing in the 1960s and 70s; and to high technology and chemical product exports in the 1980s and 90s. By 1995, technology-intensive products constituted 46.7 percent of exports, and by 2001, 54.4 percent.

It is worthy of notice that much of the credit for Taiwan's steady economic growth must go to the spread of universal education throughout the island. After 1949, the

government expanded education and raised literacy rates. From 1950 to 2001, the number of university students, including those at private colleges and universities, increased by more than 100 times to 677,171⁶. The number of high school students also increased from around 34,000 in the early 1950s to more than 370,980 in 2001. Most noticeable has been the change in the literacy rate. In 1951, 34.6 percent of the population of six years and older were illiterate. This figure had dropped to 15.3 percent by 1969. In 2003, only about 5.3 percent of the population is illiterate, mostly the elderly (GIO, 2003).

Although the greatest change in post-1949 Taiwan has been the island's economic revolution and rapid rise in income and living standards, the social transformation brought about following the lifting of martial law in 1987 cannot be overlooked. The legalization of labor strikes, demonstrations, and the formation of new political parties have given more power to the people, while the lifting of restrictions on newspapers and publishing has produced significant media growth and broadened the perspectives of the people.

Social transformation accompanied political transformation. Before the lifting of martial law, Taiwan was under Chiang Kai-Shek's dictatorship since 1949. Directed election only allowed in the local government level. Beginning in 1950, all the chief executive and representative bodies below the provincial level were directly elected by the people, and in 1951, 16 county and five city governments and councils were established.

The full democratization has been begun under Chiang Ching-Kuo's rule since 1978⁷, starting with the lifting of martial law in 1987 shortly before Chiang's death in 1988. The first major opposition party, the Democratic Progressive Party (DPP), was formally established in 1986, marking the beginning of multiparty democracy in Taiwan. Chiang Ching-Kuo's successor, Lee Teng-Hui, continued to reform the rigid political system that

⁶ Although there were only five M.A. candidates in 1950 and Taiwan did not have its first Ph.D. student until 1956, by 2001 there were 87,251 students in 3,250 master's degree programs and 15,962 students studying in 960 Ph.D. programs. Thousands of others were enrolled in graduate programs abroad in the US, Japan, Canada, Australia, Britain, and other European countries.

⁷ Chiang Ching-Kuo is Chiang Kai-shek's eldest son, who became president in 1978, three years after Chiang Kai-shek's death.

had experienced decades of civil war and martial law. Under his administration, press freedoms were guaranteed, opposition political parties developed, visits to the mainland continued, and revisions to the constitution completed.

Representatives of the National Assembly, the Legislative Yuan, and the Control Yuan, who had been frozen in office since 1947, were also asked to step down during Lee's administration. Elections for all seats in the National Assembly and the Legislative Yuan were first held in 1991 and 1992, respectively. The Control Yuan was transformed into a semi-judicial institution following the 1992 constitutional amendment. On March 23, 1996, the democratization process peaked with the first direct election of the ROC president, who was before elected by representatives of the National Assembly. Lee Teng-hui, the first native Taiwanese president, was elected as president despite the missile tests off the coast of Taiwan and military exercises conducted by China in the period of the election. On March 18, 2000, Chen Shui-Bian of the DPP won the second direct presidential election, which not only brought a record 82 percent voter turnout, but also ended the KMT's five-decade hold on the presidency. Formal Taipei Mayor Chen, at the age of 49, was the youngest president of the ROC while Vice President Annette Lu is the highest-ranking woman in the ROC's political history. The efforts and accomplishment of its democratization are well recognized and it is ranked as a free country by the Freedom House⁸.

Above domestic political changes were closely related to Taiwan's international experiences. The ROC was a founding member of the United Nations (UN) in 1945. However, after the withdrawal of the government to Taiwan and the establishment of the PRC, diplomatic competition increased between the two rivals. In 1971, the PRC succeeded in gaining admission to the UN General Assembly, forcing the ROC to walk out. Since then, most of the remaining UN members have switched their ties from Taipei to Beijing. A low point was reached at the end of the 1970s, when the US became one of the last major powers to sever diplomatic ties and the 1954 *Mutual Defense Treaty*. Since

⁸ According to the Freedom House, the range of freedom rating is from 1 to 7. The smaller the number is, the higher level of freedom a country is. There are three levels of freedom: free, not free and partly free. Taiwan was ranked partly free before 1996 and free since 1996.

then, the US has continued economic ties and sold defensive military equipment to Taiwan in accordance with the *Taiwan Relations Act* of 1979. With the beginning of democratization, the people's dissatisfaction with the state of Taiwan's affairs led to a new effort to increase international participation. Collectively known as "pragmatic diplomacy," this policy included a revived effort to expand and consolidate formal diplomatic ties, a new campaign to re-enter international organizations, and increased emphasis on substantive ties with the US, Japan, and Europe. During the 1990s, these efforts resulted in some progress, although the ultimate goal of UN membership still faced many obstacles.

Two recent developments that will strongly affect Taiwan's future are its entry into the World Trade Organization (WTO) and its increasing economic involvement with China. After more than 12 years of negotiations and waiting, Taiwan signed its WTO accession accord in November 2001, with official entry on January 1, 2002. Membership in the WTO has enabled Taiwan's industrial and business sector to fully participate in the world economy on a more equal basis. However, opening the domestic economy to the world has also exposed the island to increased competition, which caused a negative impact on some industries, most notably agriculture. The government's inability to protect the farmers' interests caused the largest demonstration on record in late 2002. One hundred and twenty thousand farmers and fishermen marched through the streets of Taipei, Taiwan's capital, to raise government awareness of their growing economic plight (*Taipei Times*, November 24, 2002).

The second major development has been the substantial increase of Taiwanese investment and business activity in China since the 1980s. After the *Emergency Decree* was lifted in 1987, civilian contacts between Taiwan and China were allowed. In 1992, investment in the mainland by Taiwan businesses was legalized, quickly pushing China to the top of the list of Taiwan's outward investment. By 2001, China had become Taiwan's third largest trading partner, and Taiwan had become the fifth largest source of foreign investment in China. By 2001, Taiwan's business sector had invested over

US\$19.9 billion on the mainland⁹. The sharp increase of Taiwan exports to China beginning in 1990 decreased Taiwan's dependence on the US market, but raised new concerns of growing economic reliance on the ROC's long-time foe. Although politically divided, investment and trade by the business community have brought the two sides closer economically. While many businesses have sought cheap labor and potential markets on the mainland, the government has been working toward normalizing relations across the Taiwan Strait by establishing a new, expanded review mechanism for China-bound investments. For instance, in March 2002, the government lifted its ban on investment in 8-inch wafer fabrication plants in China to raise Taiwan's competitive edge in the international semiconductor market. The impact of this new development will probably affect not only Taiwan's economy, but its political relations with Beijing as well. This case will be discussed in Chapter Six.

4.1.2 Current Economy

As mentioned above, the emphasis of Taiwan's economic development shifted from labor-intensive exports of the 1950s and 1960s, to heavy and chemical industries in the 1970s, and then to high-tech industries in the 1980s and 1990s (Wang, 1999). With major government-led projects such as establishment of export areas in the 1960s, Ten Projects in the 1970s, science-based industrial parks in the 1980s and 1990s, Taiwan sought to actively participate in the global knowledge economy and thus gained its fame as an "economic miracle".

According to the statistics of the Directorate-General of Budget, Accounting, and Statistics (DGBAS), Taiwan's GNP was US\$295.9 billion, and per capita GNP was US\$13,157 in 2003. Its gross domestic product (GDP) was US\$281.2 billion, of which 30.38 percent was contributed by the industrial sector and only 1.82 percent by agriculture. The service sector, which has been particularly robust and responsible for

⁹ This number is based on Taiwan's official statistics. Beijing's statistics indicated a much higher figure of US\$29.1 billion.

generating more than 50 percent of Taiwan's GDP since 1988, accounted for 67.79 percent of the GDP in 2003. With the global economic recession, Taiwan saw a decline of GNP and GDP and a sharp increase of unemployment of 4.6% although the foreign exchange reserves continued growing in 2001 and began to slightly grow from 2002 on (see Table 4-1).

Table 4-1: Major Economic Indicators of Taiwan from 1999 to 2003

<i>Item</i>	<i>Unit</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>
Economic growth rate (real GDP increase)	%	5.42	5.86	2.18	3.59	5.24
Gross national product (GNP)	US\$ billion	290.5	313.9	286.8	2,893	2,959
Per capita GNP	US\$	13,235	14,188	12,876	12,916	
Changes in consumer prices (CPI)	%	0.18	1.26	-0.01	-0.20	-0.30
Exchange rate (average)	NT\$ per US\$	32.27	31.23	33.80	34.80	34.00
Unemployment rate	%	2.9	3.0	4.6	5.17	4.99
Foreign exchange reserves (end of the year)	US\$ billion	106.2	106.7	122.2	1,617	2,066

Source: Directorate-General of Budget, Accounting, and Statistics (DGBAS)

Two indicators further underscore Taiwan's integrated status in the global economy: investment and production of information technology (IT). According to the *World Investment Report 2002* published by the United Nations Conference on Trade and Development (UNCTAD), by the end of 2001, Taiwan had accumulated a total foreign investment of approximately US\$32 billion. This was about 0.47 percent of all global foreign investment, ranking Taiwan 31st in the world. The same report listed Taiwan's accumulated outward investment at approximately US\$54.7 billion, accounting for 0.83 percent of the global total and ranking the island 18th in the world. The report also ranked Taiwan 15th in the world in terms of potential to attract foreign investment. With its commitment as a member of the WTO, Taiwan has already opened its finance,

insurance, transportation, telecommunications, and real estate sectors to foreign investment. At present, with the exception of a small number of ratio restrictions on foreign investment, such as in telecommunications services, foreign investors enjoy the same equal treatment as local investors. Manufacturing is also completely open to foreign investment, except for a small number of items that affect national security, health, and environmental protection. The degree of liberalization had reached 99 percent in the manufacturing sector and 95 percent in the service sector as of 2001.

The policy focus on information industry since the 1980s contributed to Taiwan's high economic growth and its crucial status in the global information market (See Figure 4-1). Taiwan's 1,000 computer hardware manufacturers provide jobs for approximately 130,000 employees. Made in Taiwan information products dominated more than half of the market share in products such as notebook PCs, mother boards, CDT monitors and LCD monitors. The high market share of information products made Taiwan one of the major countries in the production of information hardware. Until 1999, Taiwan ranked in third place in production value of information hardware, behind only the US and Japan. As more and more factories and corporations moved to China, Taiwan

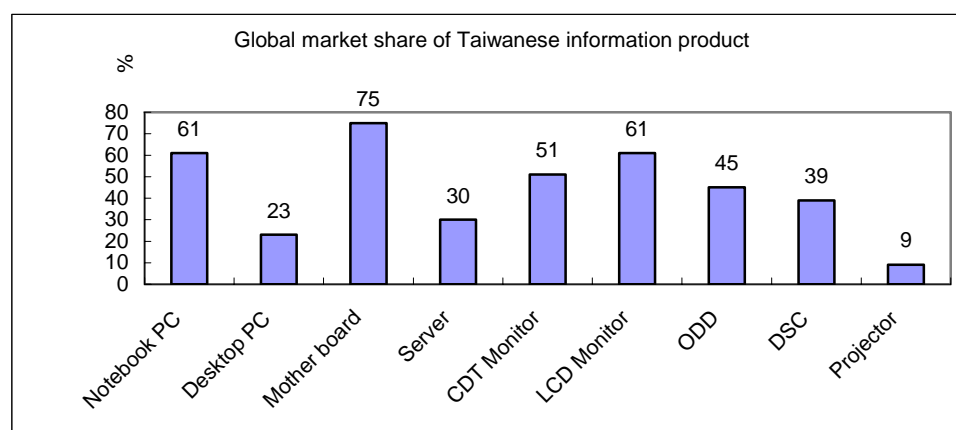


Figure 4-1: Global Market Share of Taiwanese Information Products in 2001

Source: MIC ITIS project, III, November 2002.

dropped behind China and ranked the fourth place between 2000 and 2002 (See Table 4-2). Taiwan's information industry is facing the challenge of globalization and the need of technical upgrades for its survival.

Table 4-2: World Ranking of the Production Value of Information Hardware between 1999 and 2002

<i>Year</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>
US	89,055	85,523	70,995	70,296
China	18,455	25,535	28,174	35,225
Japan	48,279	52,153	39,204	31,488
Taiwan	21,023	23,081	20,124	17,348
Singapore	16,765	16,395	13,898	14,414
UK	13,710	12,121	12,045	12,316
South Korea	7,427	11,856	9,837	12,180
Germany	7,512	8,815	8,149	8,270
Mexico	7,500	9,400	8,211	8,246
Malaysia	6,105	7,395	6,619	6,856

Source: DOIT, MOEA, 2003

Unit: US\$ million

Taiwan is also notable for its global share of semiconductor products due to government support since the 1980s. After more than two decades of development, Taiwan's semiconductor industry has distinguished itself by its complete industry supply chain, significant clustering effect, and strong capabilities in original equipment manufacturing (OEM) wafer manufacturing. By 2001, the production value of Taiwan's contract chip-making industry accounted for 73 percent of the world's total output, and its IC packaging industry accounted for 30 percent of the world's output. Taiwan was also the world's second largest supplier of IC designs, next only to Silicon Valley, accounting for 26 percent of the world's output (GIO, 2003). Leading players of the

sector include Taiwan Semiconductor Manufacturing Company Limited (TSMC) and United Microelectronics Corporation (UMC).

Due to the success of information hardware and IC foundries which dominate the manufacturing industry, Taiwan has prepared itself to build an Asia-Pacific technology production manufacturing center and technology island. However, the growth of the IT industry cannot mask the reality of increasing financial deficits and the expanding income gap (Tseng, 1999). This socio-economic disparity will be detailed in the next chapter.

4.2 The Development of the Internet

4.2.1 Three Phases

The development of the Internet in Taiwan experienced similar phases with that in the US except for its original use for national defense. That means, the Internet in Taiwan was used for academic purpose in the beginning (in the 1980s) and was later promoted for commercial use after 1995. Following the institutional analysis suggested by Brian Murphy (2002), the review of The Internet's history in Taiwan also confirms its experience in the US, finding that state and corporate domination of the Internet and its development.

To be more detailed, I identify three stages in the development of the Internet in Taiwan. In the initial stage the Ministry of Education (MOE) played an important role. Due to a lack of domestic computer resources for teaching and research, the MOE tried to develop a means for universities to share limited resources. In order to improve information education through developing a network among schools, the MOE used an IBM host IBM341-M02 and built working stations in main universities of Taiwan. In 1984 fourteen universities were connected through the leased line and X.25 Packet Switched Data Network to share software for their research and teaching. This is the beginning of the school network.

The MOE further signed a cooperation contract with IBM to strengthen research resources by using the computer related technology. Following IBM's suggestion, the ministry targeted at BINET (Because It's Time NETwork), an international academic network used for transmitting files and mail, as its connection channel to the world. In July 1987, the MOE connected to international BINET through the node of Tokyo University of Science. The completion of this international connection satisfied the need of exchanging international academic information and further promoted the development of domestic university network.

The popularity of BINET soon resulted in problems of overload with junk mail and inefficient regulation, which forced the MOE to initiate the construction of a new network to take the place of BINET. With a budget of NT\$220 million over three years, in 1990 the new network Taiwan Academic Net (TANet) successfully connected major universities and research institutes. The backbone of TANet T1 started operating in June 1991 and connected with JvNCNet of Princeton University and NSFNET in December that year. This is identified as the formal initiation of the Internet era of Taiwan (MOE, 1994). The backbone was later upgraded to T3 due to increased congestion.

In the initial period of the Internet diffusion, Taiwan was experiencing the critical transformation toward political democratization. Soon after the lifting of martial law, the government was cautious about its measures of political control even when it acknowledged that the new technology might be a danger to national security since it makes communication with foreign countries easier. The government wanted to station police officials in the MOE and on university campuses but this plan resulted in opposition from universities. The government finally abandoned the idea of stationing police after requiring a signed security guarantee with the computer center of each university in which the computer center promised the network would not be used for illegal goals (Hwang, 1999, p.35). The struggle for controlling the Internet between the government and the academia reveals the multiple nature of the Internet. According to Sut Jhally (1989), in capitalist society, the media function both as an instrument for circulating the dominant ideology and as a commodity subordinate to the market rule. The Internet, a new form of media, should theoretically serve both roles. In the first phase

of Internet development, the government at one time tried to strengthen the ideological role of the Internet by controlling speech over this medium. The social opposition accompanying Taiwan's democratization forced the government to give up the direct suppression that it used to exercise over traditional media such as broadcasting and publishing. However, the ideological and commodity role of the Internet was later sophisticatedly developed with the commercialization of the Internet.

At the least, the successful resistance against the government control brought about freedom of using the Internet in the academia. Nonprofit TANet soon became the core of academic research and students' lives. National Chiao Tung University began to build the network in student dorms and led the trend of connecting student dorms and clubs with the Internet all over the university campuses. Besides the prevalence of network infrastructure, the creation of the Chinese Bulletin Board System (BBS) in 1992 further promoted Internet use on campus. BBS became a new channel of information sharing and news diffusion among the group of high-education elites. The BBS, with its anonymous and interactive function, also provided a good channel for the minority, such as Taiwanese aboriginal people and feminist and lesbian groups, to communicate and mobilize (Hwang, 1998; Wang & Tsi, 1998).

The TANet backbone is a three-layer structure: the first layer is the National Backbone, the second layer is a Regional Network Center and the third layer is the County/City Network Center. The MOE Computer Center is in charge of the operation of the National Backbone, the Regional Network Centers are located at nine national universities, and are run by the Computer Centers of the Universities. Around the mid-1990s, all universities and colleges and 80% of junior colleges were connected to the Regional Network Centers. To extend the TANet down to K-12 schools, the MOE began helping the county/city government to setup Education Network Centers and assist K-12 schools to connect to local Network Centers (Chen, 1996).

The establishment of TANet was for research and teaching, therefore, it was totally sponsored by public funding. Once the network was built, it offered equal use for people in academia without any subscription fee. The privilege of those in academia to have access to this resource was questioned by telecommunications operators and private

corporations, who argued that the existence of the academic network would hinder the telecommunications companies from making a profit (Tseng, 1994, p.38). With the stable growth of Internet users, the telecommunications regulator and operator Directorate General of Telecommunications (DGT)¹⁰ saw an opportunity to intervene into the service. In the end of 1993, the DGT decided to expand its service to the Internet. Under the request of the Ministry of Transportation and Communications (MOTC), the authority under which the DGT operates, the DGT established a network to serve business needs. In March 1994, run by the Data Communication Institute of the DGT, HiNet was established and opened for commercial use. The HiNet backbone was mainly a T3 link, and it had a 6 Mbps international link connecting to the US. After a year of its experimental period, HiNet ended its free-use stage and began to charge a subscription fee on April 1, 1995. Three months later, another network SEEDNet followed suit by beginning to charge their users a subscription fee as well (Guo, 1996). SEEDNet was run by the Institute of Information Industry (III), with part of its funds coming from the Ministry of Economy Affairs (MOEA). The mid-1990s saw the commercialization of the Internet in which the Internet in Taiwan has been no longer a nonprofit research tool; it has become a new type of consumer good. The large number of users TANet cultivated since the early 1990s formed a solid market base for commercial Internet service providers (ISPs) (Hwang, 1999, p.50).

In August 1996, the number of TANet users was estimated at about 600,000. HiNet had 150,000 users and SEEDNet had 50,000 users, according to the account users applying for access to these two networks (Chen, 1996). The above numbers show that after two years of promotion, users of commercial networks grew rapidly, accounting for one third of TANet users. In November 1997, business users of the Internet amounted to 760 thousand, surpassing TANet users (Dai & Chen, 1997).

¹⁰ The DGT was a regulator and only operator of telecommunications service in Taiwan before 1996. The *1996 Telecommunications Act* forced the DGT to give up its operation on telecommunications service. A state-owned enterprise Chunghwa Telecom was created in the same year to take over as telecommunications operator.

As far as domain name registration is concerned, more than 118,925 English domain names with attribute suffixes (gov.tw, edu.tw, mil.tw, com.tw, org.tw, net.tw, idv.tw, game.tw, club.tw, ebiz.tw), 81,454 Chinese domain names with attribute suffixes [shanyei (com).tw, chuchi (org).tw, wanglu (net).tw], and 26,121 general purpose Chinese domain names (xxxx.tw) had been issued by the end of 2002. While no big change appeared in the number of .tw English domain names issued in 2002, there was significant growth in the number of Chinese domain names with the shanyei.tw suffix in December 2002 (MOEA, 2002, p.320).

The third phase of Taiwan's Internet history, accompanying the commercialization of the Internet, involved its strategic importance for national development. Under the proposal of the Science and Technology Advisory Committee (STAG), in 1994, the KMT government launched a ten-year National Information Infrastructure (NII) project aiming at strengthening its position as the Asia-Pacific regional telecommunications hub (Wang, 1999; Panol and Rao, 2002). The government attempted to use the NII as an engine of growth to keep Taiwan's information industry moving forward despite significant migration of its manufacturing base to lower-cost offshore countries. The NII also sparked domestic software development, helping to build an information infrastructure which would not only support Taiwan's economic growth but also help Taiwan realize its goal as the regional operations center (Zarit, 1996, p.67).

A high level Task Force headed by a cabinet-level minister was established to oversee the NII project. The Task Force was originally divided into five working groups, organized by function and responsibility: Resource Planning, Network Construction, Application Technology & Promotion, Human Resources Education & Basic Application, and the Coordination and Integrating. Group members were all drawn from the vice minister-level and other key decision makers came from the relevant ministries, think-tanks, and research institutes. The Task Force was later reorganized into the National Information and Communications Initiative (NICI), continually promoting technological and economic development with information and telecommunications network as the core. The major achievement of the NII project was to reach a goal of

having 3 million people online, which was realized in early 1999, accounting for 13 percent of Taiwan's total population.

In 2002, the DPP government made the E-Taiwan Project, which again was proposed by the Science and Technology Advisor Group, aiming at enhancing Taiwan's competitive capacity and economic growth. With the emphasis on E-life, E-government, E-business and E-transportation, this six-year-long project envisioned making Taiwan a high-tech and service-based island (STAG, 2002). In November 2003, the government initiated the "M-Taiwan" project in a package of NT\$ 500 billion to finance the "Ten New Projects". President Chen Shui-Bian's goal, with the M-Taiwan project, was to connect mobile phone, wireless Internet and Internet phone to promote various wireless broadband applications and services (Jiang, 2003 November 25, p.38). Under this government project, the promotion and application of the Internet became one of the core strategies for national development.

4.2.2 Political-Economic Forces behind the Development of the Internet

The abovementioned history shows that the government and the private sector are two major internal forces influencing the development of the Internet. The government funded the major backbones in the initial stage of the Internet and actively promoted commercialization of the Internet. The telecom regulator Directorate General of Telecommunications foresaw the Internet as a tool for making profit and began to open its backbone for business use. The government further created a business-favored digital environment in which corporate operation via the Internet became more smoothly.

Through the NII project, the government made progress in strengthening the Internet infrastructure. By July 1999 all middle and primary schools had computer classrooms connected to the Internet through ADSL facilities. Through NII efforts all teachers were trained with basic skills of information technology and forty-six teaching material centers established for education via the Internet. Furthermore, through the Government Service Network, established in July 1997, six hundred government agencies were linked. An electronic gateway project is under way to facilitate ease of

application procedure of government services (Panol & Rao, 2002: 190-191). As the commercial application of the Internet is concerned, through low corporate taxes and a minimum of government “red tape,” Taiwan has nourished thousands of new e-company start-ups since 1998. Private sector participation raised about \$3 billion in venture capital from more than one hundred private funds by 2000 (Rohwer et al., 2000). Consequently, Taiwan’s Networked Readiness Index ranked ninth among 84 countries, up from 15th in 2001-2002, and only behind Singapore in Asia (third), according to the Global Information Technology Report 2002-2003 published by the World Economic Forum. According to the report of the Ministry of Economic Affairs (2002, p.299), this ranking reflects Taiwan’s favorable E-commerce environment which results from the government’s promotion policies.

The government’s efforts to promote E-commerce are a continuation of its valuation of economic growth and development of the IT industry. From the industry’s side, using the Internet helped speed up the process of production, distribution and service. More specifically, the drive behind Taiwan’s business to business (B2B) E-commerce program stemmed from the short product life cycles of the IT industry in the late 1990s. At the time, foreign corporations were imposing strict requirements for product delivery and Taiwanese manufacturers had to respond rapidly to their international customers’ needs by implementing computerized business management methods to fasten the process of delivery¹¹. Digitalization of companies throughout the supply chain became an essential trend.

Thus Taiwan’s IT and electronics manufacturers began to expand the scope of information sharing from internal data sharing inter-company access to information. The most representative example of this is in the domestic original equipment manufacture (OEM) semiconductor industry. Taiwan’s two largest OEM semiconductor manufacturers – TSMC and UMC – have implemented supply chain management as well

¹¹ The delivery requirements foreign manufacturers imposed included “995” and “983” materials requirements (95% of products delivered within 5 days of order and 98% of products delivered within 3 days). To fulfill the requirements, Taiwan manufacturers responded by implementing computerized business management methods such as Enterprise Resource Planning (ERP), Material Requirement Planning (MRPI), Manufacturing Resource Planning (MRPII), and Supply Chain Management (SCM).

as corroborative design applications. Their digitalization moves were seen as major achievements both among domestic suppliers and internationally. As central links in the domestic supply chains gradually digitized their processes, digitalization of companies throughout the supply chain became an essential trend. Thereafter, the trend toward enterprise digitization in Taiwan spread from the IT and electronics industries to other industries. By 2003, the level of digitization remained highest in IT and electronics; in traditional industries, B2B E-commerce still had considerable room for growth (MOEA, 2002, p.301).

In view of B2B E-commerce's importance in driving domestic competitiveness, in 1998 and 1999 Taiwan began the promotion of the "E-government" plan, and in 1999 expanded promotion of the Industry Automation and E-business Promotion Program which selected a number of important industries to focus on the E-supply and E-demand chain processes. Thereafter, the government launched the Knowledge Economy Development Program, the Global Logistics Development Plan and the National Information and Communication Initiative (NICI) Program to strengthen Taiwan's international competitiveness and global logistics capabilities. In 2002, Taiwan announced an integrated national focus policy, the Challenge 2008: National Development Plan. Its aim was to strengthen Taiwan's software and hardware infrastructure through high value-added industry digitization promotion, and to establish Taiwan as one of Asia's leaders in the digital field through E-commerce promotion. This policy includes 10 major plans, two of which – the E-Taiwan Construction Plan and the Operations Headquarters Development Plan – are most closely linked to E-commerce (MOEA, 2002, p.306).

According to the Market Information Center (MIC) of Information Industry Institute estimates, the scale of the domestic B2B market reached NT\$3.318 trillion, a 54% increase over 2001. The MIC also predicts that from 2000 to 2006, the scale of the domestic B2B market will achieve a Compound Annual Growth Rate (CAGR) of 34.81% (MOEA, 2002:302). The ECRC's estimates of Taiwan's B2C E-commerce market in 2002 reached NT\$15.75 billion, a 77% increase over NT\$8.89 billion in 2001. Additionally, according to an MOEA business development survey, national retail sales

reached NT3.2177 trillion in 2002. And according to ECRC, E-commerce represented 0.29% of the total domestic traditional retail market in 2001 and 0.5% of the total in 2002. Compared with the US, whose 2002 online purchasing constituted 2.3% of the total, Taiwan still has some distance to go (MOEA, 2002, pp.303-304). According to the MOEA, Taiwanese B2C E-commerce market scale reached 22 billion, with an annual growth rate of 40.3%. Travel business accounted for 48.5% of B2C market (Tsai, 2003).

Again, we see the state and the private corporate sector reach common interests in developing the Internet in Taiwan. As Marxist theories of the capitalist state point out, the reason the state and the capitalist class cooperate with each other is not only because the corporate sector is powerful enough to influence state officials in the policymaking process, but also, more fundamentally, because the state structurally relies on capital accumulation from which the state generates its revenue to keep operating,. Therefore, from the NII under the KMT administration to the E-Taiwan project under the DPP administration, no matter what political party is in power, government officials hold the same structural attitude toward the development of the Internet by encouraging the commercial use of the technology as an economic priority and political necessity (i.e. economic growth).

From a deeper structural view, the commercialization of the Internet in Taiwan is rooted in the expansion and reorganization of global capitalism. It is not only domestic forces that direct the molding of the Internet. Indeed, external forces play an even more fundamental structural role in conditioning what this technology will become. According to Guo Liang-Wen's (1999) political-economic analysis of the development of the Internet in Taiwan there was an interaction between internal and external influences all set within the context of the structural expansion of global capitalism. To make a global information market a reality in which the US-based TNCs can earn more profit, the US government led the promotion of the global information infrastructure (GII) in 1994. The US government saw the GII as a measure to ensure that US companies would keep their leadership in the world market. Other IT-rich countries in Europe plus Japan soon followed the proposal of the US to promote the business-favored information policy to the whole world with the assistance of international organizations such as the G8 and the

WTO. Guo's analysis of the GII corresponds to the argument of political-economic scholars such as H. Schiller and McChesney. Guo further argued the Taiwanese government has actively followed the steps of these advanced countries, making the information infrastructure a national priority. For a developing country like Taiwan, which has deeply incorporated into the global network of IT production and distribution, through the promotion of information infrastructure, its goal has become to support private corporations and enhance their competitive advantage in the global economy. Thus the commercialization of the Internet has become a primary trend since it meets the interests of the state and capitalists.

4.3 Internet-Related Industries

The commercialization of the Internet did not only inspire new e-company start-ups, it also led to structural change in many business markets. As McChesney (1999) and D. Schiller (1999) observed, the emergence of the Internet caused changes in several industries including media, telecommunications and information, both in the US and around the world. Corporations in these industries were engaged in the game of mergers, acquisitions and strategic alliances with the goal to strengthen their capability to intervene and compete in the digital market by becoming bigger and able to influence markets. The trend toward concentration also appears in Taiwan.

4.3.1 Concentration

4.3.1.1 Media

Unlike the supposed "invisible hand" upon which the U.S. market is based, the "visible hand" of the KMT government controlled Taiwan's media after World War II. The KMT government hindered freedom of speech and diversity of media content through regulation and control of ownership. Under martial law, this government ceased

to issue new licenses for private individuals to operate newspaper, radio stations and TV stations, leaving only 65 newspapers, 31 radio stations and 3 terrestrial TV stations in operation until the late 1980s. The media under operation at that time were closely tied to the KMT. They were either owned by the KMT, the government or by core members of the ruling party. For example, the two major newspapers, the *China Times* and the *United Daily*, dominated more than half of Taiwan's newspaper market and their owners were long-term members of KMT's highest decision-making organ. The only three terrestrial TV stations –Taiwan Television Enterprise (TTV), China Television Company (CTV) and Chinese Television System (CTS) were either directed owned by the government or the ruling party. Through strict control of ownership, the government could manufacture and circulate its dominant ideology via the media.

Not until the 38-year-old martial law was lifted in July 1987, due to strong social demand for political democratization and media liberalization, did Taiwan's media environment experience tremendous changes. In 1988, the government lifted its ban preventing the start up of new newspapers. In late 1988, it legalized satellite reception, giving Taiwanese subscribers direct access to foreign programs. In 1993, the government started proceedings for new applications for radio stations, opening up 28 FM and AM frequencies to private operators. In the same year, cable TV was legalized and began competing with terrestrial TV stations. To meet growing demands for the liberalization of the electronic media, the fourth terrestrial TV station Formosa Television (FTV) was inaugurated in 1997 and the Public Television Service channel was established in mid-1998, breaking the long-term oligopoly of the three KMT government-controlled TV stations. Technological advances have also brought important changes, including digital broadcasting, which began on a trial basis in June 2000 (GIO, 2003, pp. 274-276). The repeal of long-term restrictions on media brought about new prosperity for industry. The media industries soon experienced reconsolidation, especially the cable TV business in which two conglomerates came to control 60-70 percent of subscribers (Hung, 1998).

An illegal cable TV industry emerged in 1969, and was finally legalized in 1993. Operators were obliged to register with the sector regulator, the Government Information Office (GIO). The *Cable Television Law* in 1993 divided the business into two major

sectors: system operators and channel suppliers. The law divided Taiwan into 51 cable districts with a maximum of five operators in each district. Most districts can support only one or two operators due to the limited scale of the market. Therefore, many independent system operators were unable to compete with the two conglomerate-backed groups Eastern Multimedia Team (EMT) and United Communications Groups (UCG). They ended up by quitting the market or were bought out by these two conglomerates. According to Chung Ming-Fei's (1998) research, in 1996, the government issued licenses to 151 system operators. After two years, 97 systems were left in the market. As of September 2002, only 73 cable systems were in operation around Taiwan, while another two were in the preparatory stages of launching service (GIO, 2002). Among these systems, these two multi system operators (MSOs) together owned 45 systems, accounting for a combined 3.2 million subscribers. The World Market Research Center (WMRC) (2002) predicted that this total number of systems will shrink as the market consolidates into a handful of major groups.

Taiwan's cable penetration rate by household was about 85 percent in 2003. The cable systems usually offered subscribers a fixed package of over 70 channels at a fixed monthly rate of approximately US\$20. These channels include news and information, movies, cartoons, religious programs, sports, music, entertainment, talk shows, and home-shopping services. In September 2002, a total of 54 domestic and 17 foreign companies were offering 86 and 32 satellite channels, respectively, including such foreign channels as NHK from Japan; Home Box Office (HBO), Disney, and Discovery from the US; and groups of specialized, satellite-based channels operated by local media conglomerates, such as TVBS, CTI, Videoland, Sanlih Entertainment Television, and Gala Television (GIO, 2003, pp.274-276). EMT and UCG also produced several channels of programs, which made them both system operators and channels suppliers.

According to the WMRC (2002), EMT held minority interests in 20 operators corresponding to 1.2 million subscribers in 2002. Crucially, it held a 70% share of the Taipei market. In July 1997, it invested US\$70 million in an island-wide hybrid coaxial (HFC) network. In November 1999, two international investors, the US-based Capital International and Asian fund management firm AIDEC, decided to invest NT\$2.7 billion

(US\$85 million), buying over 100 million shares. UCG is owned by Taiwan's major conglomerate Koo's Group. It had ownership in 25 cable operators accounting for two million subscribers in 1998. Like Eastern, UCG was investing in an island-wide Hybrid fiber/coaxial (HFC) network into which it plans to integrate satellite and telecommunication services in 2002.

Technology convergence and policy encouragement situated the two MSOs in advantageous status to intervene into the Internet market. By 2005, the Taiwanese government plans to build a broadband information superhighway across the island consisting of coaxial cable, optical fiber and satellites for interactive voice, data and video. It is estimated that 90% of the country's existing infrastructure will need to be upgraded to integrate this highway. Both EMT and UCG were laying hybrid fiber-optic networks around the island in the early 2000s. And at the same time both began offering Internet package in the Taipei area (WMRC, 2002). In addition, due to the rapid development of the network business in Taiwan, several large-scale international software and hardware firms began taking an increasing interest in the sector. Cable network operators will be able to rent out their super-broadband networks to local private fixed-network telecommunications firms. In addition, the firms will be placed to capitalize on the rapidly developing E-commerce sector.

4.3.1.2 Telecommunications

Before the amendment of the *Telecommunications Act* in 1996, the telecommunications industry was a national monopoly under the regulation and operation of the Directorate General of Telecommunications (DGT), a subordinate agency of the cabinet-level Ministry of Transportation and Communications (MOTC). In its efforts to join the WTO, the government ordered the DGT to propose a timetable of liberalizing telecommunications services. In January 1997 the government opened wireless service to private competition and in 2000 it opened the fixed-network service market. The telecommunications sector had been the target of corporate investment since 1996, accompanying the liberalization process. According to a business survey in 1996 of the

top ten business conglomerates in Taiwan, nine were cooperating with other firms through joint ventures in telecommunications (all but the eighth biggest company Hwalung Group) (Chou, 1996).

In January 1997 Taiwan liberalized wireless telecom services. Six private operators were granted licenses to join incumbent Chunghwa Telecom Co. (CHT), commencing services in December 1997. These six private companies represented six operating groups formed by big business conglomerates, KMT holding companies, state-operated corporations and foreign telecommunications giants (See Table 4-3). The consortium of

Table 4-3: Shareholders of Taiwanese Cellular Phone Corporations in 1997

	Lead company	Major domestic partner	Foreign partner
Taiwan Cellular Corporation	Pacific Electric Wire & Cable (27.5%)	Evergreen Marine (10%) Fubon Insurance (8%) Acer Inc. (8%) Continental Engineering Corp. (7.5%) Yageo Corp. (5%)	Verizon (12%)
Far EastTone	Far East Group (62%)	Chiao Tung Bank* (4%) China Development Corp.** (8%) Systex (7.5%)	AT&T Wireless (18%)
KG Telecom	Koo's Group (50%)	China Life Insurance** (5%) Taiwan Power* (5%) Teco Electric & Machinery Co. (8%) Cathay Life Insurance (5%) Shinkong Life Insurance (2.5%)	Bell Canada & Sprint (20%)
Tuntex Telecom	Tuntex Group (44%)	Chien Tai Cement (20%) China Development Corp.** (8%)	First Pacific (HK) (17%)
Mo Bi Tai	Teco Electric & Machinery (38%)	China Steel *(25%) Tecm Co. (5%)	T-Mobil (Germany) (4%)
Trans Asia Telecom	Formosa Plastic Group (50%)	Goldsun Group (3%)	Southwest Bell (20%)

* State-owned enterprise

** KMT invested company

Source: Reorganized from Bian, 1999, pp.300-305.

the private operators saw the state, the domestic capitalists and transnational corporations form a triple alliance, as Evans (1985) suggested, to seek their profits Taiwan's newly opened cellular phone market.

The development of Taiwan's cellular phone market had two features: the expansion of users and the concentration of ownership. The participation of private competitors soon led to a price war, contributing to a decrease in subscription fees and the expansion of cellular phone users (See Table 4-4). In June 2001, Taiwan had 20.29 million mobile subscribers, which made for a stunningly high penetration rate of 93%, the world's highest since 2001 (WMRC, 2002).

Table 4-4: Cellular Phone Subscribers by Operator between 1999 and 2001

	Standards	June 1999	September 2000	September 2001
Chunghwa Telecom	AMPS	2.7	4.19	5.9
	GSM900			
	GSM1800			
Taiwan Cellular	GSM1800	1.7	4.77	5.5
KG Telecom	GSM1800	-	3.05	-
Far EasTone	GSM900/1800	1.4	2.95	3.8 (June 2001)

Source: WMRC, 2002, p.12.

Unit: Million

The cellular phone operators began a series of mergers soon after launching operations in early 1998. The first case of acquisition occurred in 1999: a 23% share of Tuntex Telecommunications was acquired by KG Telecom (Fei, 1999). In early 2000, Far EasTone bought into the operation of Mo Bi Tai with an acquisition of 4.25% share by Far East Textile, a company in the Far East Group (Chang, 2000, November 14). In

May 2001, Taiwan Cellular announced its acquisition of a 97% share of TransAsia with NT\$13.5 billion. Taiwan Cellular actively accomplished the then biggest merger in the Taiwanese telecommunications market as a preparation for the 3G cellular phone operation (Guo, 2001, May 10). Taiwan Cellular had subscribers of 5.5 million and TransAsia had 680,000. Following the acquisition, the company's subscriber base and market share exceeded incumbent CHT's. The company, which planned to keep the unit separate from its main operations, beat off competition from a formidable consortium of Far EasTone, AT&T and SingTel to gain control of TransAsia (WMRC, 2002).

In October 2003 a record merger worth NT\$29.6 billion (about US\$ 1 billion) occurred between Far EasTone and KGT transforming the competitive landscape of Taiwan's telecommunications market. At the time of the merger, Far EasTone and KGT had a combined subscriber base of approximately 7.75 million mobile users, which positioned the merged entity as one of the top three players in Taiwan. Combined operating revenue in the first half of 2003 exceeded NT\$ 29.3 billion (KGT: NT\$11.6 billion + Far EasTone NT\$ 17.7 billion), representing approximately 32% of the total market revenue. In addition, the combined company had the largest mobile service distribution platform in Taiwan through 460 sales outlets, representing 37% of the market, substantially ahead of its peers (KGT, October 7, 2003). Far EasTone chairman Douglas Hsu asserted confidently that the merged company would lead the cellular market (Lee, 2003). After the merger between Far EasTone and KG Telecom in 2003, only four cellular phone operators were left in the market, compared to seven in 1997.

A crucial point to review concerning the rapid concentration of cellular phone market in Taiwan is what caused concentration. The press helped the corporations justify their merger action. The business media said the reasons for the merger trend of telecommunications were twofold: the government issued too many licenses which led to too many competitors in a limited market, and since this industry is by nature capital-intensive, therefore, there is a need for continual mergers (Shen, 2003, p.36). In this analysis, a report from stock analysts of the Swiss Bank Bill Sohn and Shirley Tse was quoted. The analysts sought to predict the future development of the telecommunications industry in Taiwan, saying that cellular phone market had achieved maturity and more

efficient mergers among companies would bring about greater prosperity (Shen, 2003, p. 37). The “necessity” excuse disguised the corporations as passive reactors to market forces and their unavoidable merger behavior was conditioned by the scale of the market and the nature of telecommunications industry. But the corporations were not only passive reactors, rather, they were active grabbers of market shares. Due to the logic of capital, the corporations sought to expand their market by driving or buying out their competitors. The logic of capital is the real motivation behind the mergers. It explains why US telecommunications companies keep merging and acquiring their competitors. The hope is that mergers will bring about prosperity. But, unfortunately, prosperity is about business profits, often at the expense of consumer choices among various service suppliers.

4.3.1.3 Information Technology

The structure of Taiwan’s information technology industry resembles a pyramid. A handful of companies at the top of the pyramid commit themselves to product innovation through costly and time-consuming Research and Development (R&D), while small and medium enterprises (SMEs) at the base of the pyramid produce the vast majority (85 percent) of the actual output. As in other manufacturing sectors, SMEs generally produce goods on an OEM (original equipment manufacturer) and ODM (original design manufacturer) basis, and therefore spend a negligible percentage of their revenue on R&D. This has led to the inability of these companies to make in-depth assessments for investment, production, and marketing of new and innovative products. Moreover, heavy reliance on the importation of key components and advanced technology from the US and Japan has tied Taiwan’s information technology industry to the economic strength of these two countries, thereby offsetting a good portion of Taiwan’s trade surplus each year (GIO, 2003, pp.144-145).

As mentioned above, at the top of the pyramid are a handful of big companies, almost entirely clustered in Hsinchu Science Park (HSP), which are the group most capable in being able to play the merger game and engaging international competition.

Therefore, big mergers were planned and accomplished by this group of IT giants. As part of a global strategy to penetrate foreign markets, 60 of the companies in HSP have established branch offices overseas. Through international cooperation and strategic alliances, they are exploring international R&D resources to create an integrated technological production network. They have also used joint ventures and mergers to “overcome growth limitations” and globalize their operations (GIO, 2003).

The top two IC foundry corporations TSMC and UMC had continually acquired other small companies in the same line of business. On August 31, 1999, the Taiwan Stock Exchange approved UMC’s plan to merge four units including Utek Semiconductor Corp., United Integrated Circuit Corp., United Semiconductor Corp and United Silicon Inc. These companies had been units of UMC before the merger. However, UMC decided to buy out interests in these companies to reduce costs and boost efficiency. UMC CEO John Hsuan predicted the merger would boost earnings to NT\$2 a share in the following year from a 1999 forecast of NT\$1 per share. Sales were expected to rise to NT\$ 70 billion from a forecast NT\$25 billion in the year of the merger (Bloomberg, September 1, 1999).

TSMC merged Acer Semiconductor Manufacturing Co. in December 1999 and the third chipmaker Worldwide Semiconductor Manufacturing Co. (NT\$199 billion) in January 2000. An analyst at Grand Cathay Securities Corp. Rick Hsu said, these purchases are “the quickest way for TSMC to ramp up capacity” because they increased annual production capacity of 8-inch equivalent wafers from 2.8 million in 1999 to 3.4 million in the following year (Bloomberg, January 8, 2000). The acquisition secured TSMC’s leading position in IC foundry.

The top PC manufacturing company Hon Hai Precision Co. successively merged five companies within 2003, which resulted in the company replacing Flextronic as the biggest electronic manufacturing (EMS) company in the world. The merged companies included the graphic card company Hanhsun (NT\$95 million), Eimo Oyj. (NT\$2.4 billion), Motorola Inc. in Mexico (US\$18 million), Ambit Microsystems Corp. (US\$1billion) and its offspring Hon Chun. The merger of companies in various areas of ICT industries obviously showed Hon Hai’s ambition to expand and diversify its

business. Among these companies, Eimo Oyj and Motorola Inc. in Mexico are handset makers that sped up Hon Hai's entry into the mobile phone market. Ambit is Taiwan's largest networking equipment maker and a spin-off unit of local leading computer-maker Acer Inc. This merger represents Hon Hai's victory of intervention into the network business (Wang, December 2003). The analysis of the press showed that Taiwan's entry into the WTO made the corporations choose to enhance their global competitiveness by conducting the strategy of merger. Other factors included the liberalization of state-owned corporations and regulations (Pai, 2003, November 23, p.3).

The above companies in the media, telecommunications and IT industries did not seek targets of mergers and strategic alliances only in their individual businesses; they also tried to expand their profit by intervening into Internet businesses such as ISPs and ICPs. The following introduction of major ISP mergers and acquisitions shows the "convergence" of businesses interests.

In mid-2001, the country had 165 ISPs, according to the Taiwan Chapter of the Internet Society. Chunghwa Telecom's Hinet (www.hinet.net) was the leading ISP of Taiwan and the fifth largest ISP in the world in 2001. Of the three million Internet subscribers in 1998, two million were with private ISPs – Hinet accounted for 0.9 million. CHT ended 2002 with one million subscribers and began 2002 with price cuts to help boost growth. Its goal was boosted by its April 2002 strategic alliance with Yahoo! Kimo. Other operators were forced to offer similar price concessions as CHT in order to compete for and retain ADSL users.

Other leading private ISPs are as follows. Seednet (www.seed.net.tw) was originally part of the Institute of Information Industry, and was spun off as Digital United in 1998. In June 2003, it was purchased by Far EasTone, one of the major cellular phone operators (Business Next, p.36). Yahoo!/Kimo (tw.yahoo.com) became a merged company after Kimo was acquired by Yahoo! in November 2000. As abovementioned, in April 2002, it tied up with Chunghwa Telecom to promote and market the incumbent's broadband service. GigaMedia (www.giga.net.tw) was a subsidiary of Koo's Group which operated cable TV and mobile phone service. Gigamedia began providing Internet access in late 1998. In November 1999, Microsoft took a 10% stake in the company. GigaMedia was

the largest broadband Internet service provider as of November 1999. In February 2001, this company announced to launch a premium multimedia ADSL product to complement existing cable modem services.

Among many IT and telecom companies entering the Internet market, Taiwan's leading computer manufacturer Acer was undoubtedly among the most ambitious. Acer launched an application service and Internet portal targeting Chinese-language family users in April 2000 with its Acer Internet Service (www.acer.com.tw). By 2002 the company already had more than 300,000 registered members. The development was part of Acer's strategy to become a major ISP, both in the domestic market and in the greater Chinese community. A new investment unit of Taiwan's Acer Group, Acer Digital Services was a holding company with investments in more than 100 Internet companies, and was to be the conduit for the Acer Group's plan to plough a total of US\$3 billion into about 200 Internet firms in mainland China within the next five years (WMCR, 2002). Just like software giant Microsoft which has aggressively acquired or formed alliance with telecommunications companies and ISPs to compete in the English market, Acer followed similar strategies with the aim of dominating the Chinese language market. With the intervention of powerful corporations into the Internet market, small ISPs and Internet companies will soon disappear or be acquired by big companies.

4.3.2 The Expansion of the Eastern Multimedia Team: A Brief Case Study

While the abovementioned section shows the larger picture of the concentration of ownership in media, telecommunications and IT industries due to the emergence of the Internet, this section provides a case of a Taiwanese media company, focusing on its expansion from the cable TV sector to telecommunications and then Internet. The expansion of the Eastern Media Group (EMT) represents an embryo of media conglomerate in Taiwan which aggressively gained cross-ownership of various media, situating itself in a similar status of AOL-Time Warner in the US.

EMT entered Taiwan's cable television business in 1991 by starting a cable television programming company Union All Communications. In 1995, with an

investment of NT \$2 billion (US\$71 million), EMT formed United Multimedia Inc. as its flagship unit and expected to build a cable TV conglomerate based upon it. Following a series of strategic acquisitions in late 1996 and early 1997, EMT acquired at least one system in each of the five cable TV franchise districts of Taipei, Taiwan's most populous and affluent region. With an investment of NT\$ 6 billion, by 1997, EMT controlled around 80 percent (about 450,000 subscribers) of Taipei's total cable TV households, compared with its competitor UCG's 110,000 subscribers in Taipei. Moreover, EMT had also spent NT\$3 billion in acquiring cable TV systems island-wide up to mid-1997 (Chen, 1998, pp.140-141).

EMT formed Eastern Broadcasting Company responsible for producing eight cable TV channels including news, movie, drama, entertainment, kids, and shopping. These channels together, under the name of the ETTV family, constituted Taiwan's largest domestic channel group. In 2002, the ETTV family secured a 16.7 percent market share of viewer ratings and a 17 percent market share of advertising revenue, with sales of NT\$2.6 billion-both first rankings in the industry (EBC, 2003). EMT also owned a satellite TV channel.

Through varied strategies, EMT strived for leadership in the existing cable market. In 1997, EMT combined with medium size popular cable channel operators such as Sanli and GTV to establish a cable channel coalition to compete with another coalition led by UCG. The two coalitions, which owned approximately 20 and 40 channels respectively in that year, one-third of Taiwan's 180 cable channels, began to market their channels to system operators in a bundled package (Chen, 1998, p.178). The coalitions signify another form of concentration of the cable TV industry. According to a survey conducted by *Business Weekly* of Taiwan, in 1996 EMT became the first cable TV company, ranked 435, to join Taiwan's top 500 services list in 1996. With a 74 percent annual growth rate in 1996, EMT total assets that year stood at NT\$1.6 billion with revenues of NT\$ 868 million (Chang, June 2, 1997).

The expansion of EMT continued with the deregulation of media ownership. When the *Cable Television Law* was enacted in 1993, it prohibited a single individual or company to hold more than 20% of a system operator's shares, based on the principle of

ownership separation. It also excluded other media owners in newspaper, broadcasting and terrestrial TV to own any cable TV stations. In May 2001, this law was revised in which the principle of ownership separation was abandoned. That means any corporation can own a 100% stake in a cable TV station. The revision of related laws such as the *Cable Television Law* and *Broadcasting Law* also lifted the ban on cross-media ownership which allowed a media conglomerate such as EMT more room to expand. EMT soon acquired a Kaohsiung-based newspaper *Minchung Daily* in 2002.

Furthermore, the liberalization of Taiwan's telecommunications service market gave EMT one more opportunity to expand. In the mid-1990s, it had been searching for business opportunities in the telecommunications market by integrating its broadband network to serve more customers in various industries such as the fixed-network service market and access to the Internet. EMT's parent company China Rebar formed an operation team in 2000, gaining a fixed-network telecommunications license among three. For its entry into the Internet market, EMT established a new Internet company ETWebs, Inc. and began to operate a news website in February 2000, which became the first case of combination between the Internet and TV (Chang, Feb 26, 2000).

In February 2001, EMT took over Internet service provider Asia Pacific Online (APO), ShipnTrack.com (SNT) and had a strategic alliance with Digital Island. By merging with and investing in ISPs, EMT's goal was to integrate telecommunications, dial-up, cable modem and ADSL, broadband and Internet data service, etc. to expand its fixed-network market. APO had about 350 thousand dial-up subscribers, 2500 ADSL subscribers, and 1200 leased line business customers before the acquisition. This acquisition helped EMT to double its profit by combining the value-added service of APO and the internet infrastructure of EMT. In addition, Eastern announced that it would match up the plan of the Kaoshiung government and Tainan Science Park to digitalize the great Kaohsiung area by investing NT\$10 billion in three years (Tsai, February 2001).

Baldwin, McVoy and Steinfield (1996, p.4) described, the convergence of integrated broadband systems, from cable, telecommunications, to satellite services, has connected elements of all the media industries. The expansion of EMT represented the convergence of media ownership along the line of technology convergence. By a series of mergers and

expansions, EMT owned businesses in cable TV, TV shopping, broadcasting, satellite TV, the Internet, data service, fixed-network service and broadband service by the end of 2003. However, although this company had multiple channels to provide services, its targeted customers were not of variety. Take the telecommunications service as an example, based on the logic of capital, EMT only invested in those services with a promising reward of profit. EMT's strategy was to target business customers and the data market, including international service, domestic long-distance, leased line and broadband Internet service. The household market was its lowest priority at the time (Tsai, February 2001). In this case, media concentration under the principle of profit maximization meant that, the corporation would only serve those who could afford their products and services and exclude the poor.

Besides the deregulation of ownership and the convergence of technologies, the economic success of EMT is also due to the significant political power of its parent conglomerate, Rebar Group. Established in 1959, Rebar Group has sought to maintain good political relationships with the ruling party which has helped it benefit by expanding its business from traditional manufacturing and food industry to the media and telecommunications industries. The success of its expansion in turn has rewarded it with more power, both political and economic. Consequently, Rebar Group had been entering four major sectors by 2003, including (1) finance, banking and insurance, (2) manufacturing, (3) service and realty, and (4) telecommunications, cable TV and broadband information network, according to the Group's homepage (See Table 4-5). Directly controlling more than twenty companies, the group held a total asset of NT\$478.7 billion at the end of 2003. The conglomerate was estimated a total market value of NT\$32.9 billion, based on the market value of its five subsidiary companies listed on Taiwanese Stock Exchange, ranking 32 among 42 conglomerates. The average market value of the 42 conglomerates was NT\$194.3 billion at the end of 2003 (Yang, January 2004).

Table 4-5: Subsidiary Companies of the Rebar Group

<i>Industry sector</i>	<i>Main company</i>
Finance, banking and insurance	Great Chinese Bills Finance Corporation, The Chinese Bank, Union Insurance, Far Eastern V.C. Investment Corp.
Manufacturing	China Rebar, China Hsin Food and Synthetic Fiber
Service and realty	Rebar Construction, Rebar Rehouse, Far Eastern Silo and Shipping, Crown Plaza Hotels and Resorts, Taipei Sea World, Eastern Home Shopping Company, IDEE Department Store
Telecommunications, cable TV and broadband information network	Eastern Media Team, Eastern Television Inc, Eastern Media and Technology, Eastern Broadband Telecom, Eastern broadcasting, Asia Pacific Online, Eastern Advertising, Taipei Multiple System Operation Communications, United Network Technologies

Source: Rebar Group (<http://www.chinarebar.com.tw/intro.htm>)

When the KMT ruled Taiwan, the Rebar Group maintained political relations with the KMT or its top officials. The chairman of the group, Wang You-Tsang was the member of the KMT's Central Standing Committee and head of the China General Chamber of Commerce, one of Taiwan's biggest three business organizations. Wang Ling-Lin, the chairman of EMT, is a legislator of Taiwan as well as the head of the Taiwan CATV Industry Development Association (Chen, 1998, p.181). Even when the DPP seized the reins of the government after 2000, the KMT bigwigs continued to enjoy special privileges. This was reflected in the attitude of the ruling government toward the

media giant. As Wei Ti (2003) points out, the tendency of the development of media industry in Taiwan shows the deepening of the cooperation between the state and media capitalists. The state holds the attitude of either positively cooperating with a corporation or passively letting it alone in exchange for the consent and support from business as a whole. This can explain EMT's path of expansion. The continuous looseness of operating limits is basically a response of the lobbying pressure from Eastern. In 2003, the Government Information Office, the primary media regulating agency, has approved EMT's application to provide digital value-added service and prepared to concentrate the central government's investigative power of cable TV subscription fees due to EMT's request. The same year, EMT also secured a loan from the state-operated First Bank based on its good relationship with Chen Hsui-Bian's administration (Wei, 2003, p.27).

4.3.3 Foreign Investment

Foreign corporations have played a crucial role in the development of Taiwan's Internet-related industries. Since terrestrial TV stations were launched in the 1960s in Taiwan, foreign capital has been entering the Taiwanese TV market. Japanese Corporation had a partial interest in Taiwan Television Enterprise. The legalization of cable TV and the liberalization of the telecommunications market attracted a group of foreign companies to the Taiwanese market.

In the cable TV industry, all major MSOs have foreign capital investors. Rupert Murdoch's StarSky has a 20% share in UCG. EMT has investment from American, Singapore, Japanese and European companies. Two other small but competing companies, Pacific Network and Taiwan Broadband are by nature foreign operations (Wei, 2003). In 2003, the operation of Eastern Media and Technology, a major unit for EMT to enter the Internet market, was taken by representative of foreign capital Singapore Fund Liang Jia-Chian. On the surface, the reason for the power transfer is a deficit of this company. But some doubt the power transfer is just a business strategy to involve more foreign participation (Huang, 2003). No matter what the reason is, it shows foreign capital has the power to control the domestic company under some situations.

When cellular phone service was privatized, many international corporations intervened to share the market (Chen, 1999) by joint ventures. Among the six winners of cellular services, each has at least one foreign company as its stake holder (Chen, 2001, p.53). Since launching their operations in early 1998, the consortium of private cellular phone operators have changed considerably. In 1999, Japan Telecom owned 5% interest of Mo Bi Tai. Bell Canada increased its share in KGT from 10% to 20% (Fei, 1999). In 2003, AT&T Wireless gave up its share in Far EasTone. Japan's NTT DoCoMo was said to be willing to acquire the shares and support Far EasTone with 3G techniques (Lee, 2003).

International corporations showed high interest in the fixed-network market by discussing cooperation with domestic corporations after the Taiwanese government decided to open this market. However, international corporations such as AT&T, MCI WorldCom, British Telecom, CSL Hong Kong and Bell South finally gave up due to the uncertainty of the nation's fixed-network policy. At that time, foreign investment was limited to 20% by the *Telecommunications Law*. Although the Taiwanese government has considered lifting the limit to 60%, these foreign corporations found the rule to be a barrier (WMRC, 2002, pp.85-86). Some companies left to form joint ventures with domestic operators: Singapore Telecom, German Telecom and Verizon were partners of three bidders of fixed-network license in 2000.

Foreign corporations saw the newly opened telecommunications market as an opportunity to make money. After their predicted profit had been achieved or they had bettered investment targets, they soon withdrew from the Taiwanese market. In highly noted cases, Bell Canada withdrew from KG Telecom as well as other Asian companies in 2000; Bell South withdrew from TransAsia in 2000; and AT&T Wireless withdrew from Far EasTone in 2003 (Chang, November 14, 2000).

For some TNCs, to intervention into Taiwan's market was a good stepping stone for reaching the much larger Chinese market. They saw the Taiwanese market as a means, not an end. The merger between US-based Yahoo! and the Taiwanese portal Kimo is an example. In November 2000, Yahoo! announced its acquisition of Kimo, shocking those in the business of Chinese portals. Yahoo! had been leading the ISP market in Western

countries and in many Asian countries such as Japan and Korea, but was not performing well in Taiwan. Therefore, it sought to acquire Taiwan's biggest portal Kimo (Lin, 2000, November 10). When Yahoo! Director Jerry Yang announced the merger with an amount of US\$ 150 million (about NT\$4.8 billion), he mentioned that this merger aimed to establish the company's status and influence in the greater Chinese area and that the Taiwanese market represented a crucial strategic position. Obviously, Yahoo!'s short-term goal was to build its leading status in Taiwan and the next step then to expand into the Chinese market (Liao & Peng, November, 2000).

In October 2003, two years after the merger, Yahoo! Kimo grew to become the top Taiwanese portal. Internet advertising is its main income (see Table 4-6). The general Manager of Yahoo! Kimo Chou Kailian mentioned that this company was interested in online entertainment and had been planning digital business content such as music downloading and online games (He, October 10, 2003). Such business participants eagerly transformed this academic-oriented tool into an amusement park.

Table 4-6: Operational Revenue of Top Four Taiwanese Portals in 2002 and 2003

Portal	2002 Operational Revenue	2003 Operational Revenue	Note
Yahoo! Kimo	0.55 billion	1 billion	Advertising as main income
PChome Online	0.57 billion	1.2 billion	E-commerce as main income, accounting for 70%
Yam	0.4-0.5 billion	0.6 billion	Both E-commerce and advertising as income
Sina	N/A	N/A	One of the world top Chinese portals

Source: He, 2003, p.12.

Unit: NT\$

Although not every case of international mergers has been successful (e.g. the merger between China-based portal Sina and Taiwan-based portal PCHome ended as a failure in 1999), the mergers between ISPs remained a top business strategy. In 2000, rumors about AOL and e-Bay's merging its Taiwanese portals were heard (Lin, 2000,

November 10). No matter who initiates mergers or is the target of acquisition, Taiwan's corporations have been in a whirlpool of mergers and strategy alliances, leading to the concentration of ownership in the Internet-related industries. This development corresponded to the global trend mentioned in the third chapter.

For Taiwanese companies, to join the merger game is either a passive reaction to the external competitive pressure or an active strategy to gain more profit. In their analysis of "the borderless merger war among international telecom operators", Fei Chia-Chi and Lu Yu-Ching (2000) argued that in the trend of international merger and strategic alliances, if Taiwanese operators fail to join the game, they will fall into an inferior competitive position, either in the international market or the local market, especially after China promised to open its market in exchange for its entry into the WTO, foreign operators will consider Taiwanese operators as cooperation partners to intervene into the Chinese market. In this context of global competition, Taiwanese operators have begun to cooperate with foreign companies. For example, in 2000 Far EasTone cooperated with AT&T, British Telecom and Hong Kong Digital Telecom with the goal to connect a global 3G communications network to offer broadband mobile phone service (Fei & Lu, 2000). In fact, neo-liberal ideology has rooted in the mind of corporate owners and managers that they take unlimited flow of capital and growing trend of mergers for granted. Pacific Communications Services (PCS) general manager Sun Dau-Chun pointed out, the telecommunications business is not an exclusive market of Taiwanese operators. In stead, "it is a business without borders". PCS's son company, Taiwan Cellular, does not exclude the possibility of being acquired by foreign operators, and it will also strive for operation of foreign business (Lin, November 10, 2000).

The above analysis of the development of the Internet and its related industries shows that Taiwan has been following global trends, seeing the commercialization of the Internet and the concentration of Internet-related businesses. Concentration in Internet-related industries has strengthened the economic and political power of the leading corporations, giving them more leverage over the state in negotiating and promoting their interests. The following two chapters will examine the interaction between the corporate

sector and the Taiwanese government in major information policymaking and their influence on the distribution of ICTs such as telephones and the Internet.

Chapter 5

THE DIGITAL DIVIDE IN TAIWAN: POLICY IMPLICATIONS

This chapter touches the core issue of this dissertation: the digital divide. The first section describes the unequal diffusion of the Internet in Taiwan, a reflection of the socioeconomic divisions found there. The second section reviews Taiwan's information and Internet policy, examining how the government took economic growth and industrial competitiveness as its main concerns and did not even propose a measure for bridging the digital divide until late 2003.

5.1 The Digital Divide of Taiwan

5.1.1 The Penetration of Information and Communications Technologies

The history of Taiwan in the preceding chapter showed that in the past decade this country has caught up with advanced industrialized countries in terms of economic indicators and information technology production. With regard to ICT diffusion, Taiwan is also notable for its Internet user penetration, which performed better than its GDP per capita in 2000 global ranking (Norris, 2001, p.56). Although the growth of Taiwan's Internet user penetration was slowing between 2001 and 2003 after an explosive increase since the mid-1990, its global ranking stayed among the top twenty in 2003. Before the eve of the World Summit of the Information Society held in Geneva in late 2003, the International Telecommunications Union (ITU) released a Digital Access Index for global ICT rankings, placing Taiwan ninth in the world based on its information

infrastructure and usage¹². This section introduces Taiwan's record in ICTs diffusion with a cautious note that a comparatively high diffusion does not guarantee equal use of technologies.

According to statistics from the Ministry of Transportation and Communications (MOTC), Internet users in Taiwan reached 8.76 million in June 2003, accounting for 39% of the total population. Internet penetration in Taiwan was high compared to the global average penetration rate of 10% in 2003 (NUA, 2003). According to the International Telecommunications Union (ITU) (2003a), at the end of 2002, Internet users in Taiwan were 8.6 million, accounting for 38.14%. Taiwan's Internet per capita penetration was ranked 18th in the world and fifth in Asia, following South Korea, Singapore, Japan and Hong Kong. At the same time, its per capita penetration was 39.46% and household penetration was 72%, second only to Sweden (75%) (Lu, December 4, 2003).

Taiwan's broadband¹³ Internet penetration rate by 2002 was also notable. According to the ITU (2003a), in 2002 Taiwan ranked fourth globally in its broadband Internet per capita penetration at 9.4%, following South Korea (21%), Hong Kong (14.9%) and Canada (11.2%). In June 2003, the number of broadband users in Taiwan reached 2.47 million, representing 28.18% of total Internet users, and 35.4% of the household already had the broadband access to the Internet. This penetration rate made Taiwan number two in the world, behind only Korea. In Internet access, ADSL service coverage had reached 98.8% of nationwide, while cable TV home-pass reached 84.6% by June 2003 (DGT, 2003, pp.5-6).

After three months, according to Focus on Internet News and Data (FIND) of the Institute of Information Industry (2003), the number of broadband subscribers had reached 2.7 million in the third quarter of 2003, with an increase of 240,000 compared to the second quarter. The drop in the price of subscription fees by fixed-network operators

¹² The Digital Access Index includes five categories of criteria: infrastructure, affordability, knowledge, quality and usage, to evaluate the digital environment of a country.

¹³ Defined by the OECD, the broadband service refers to an uploading speed of 64kbps and a downloading speed of 256kbps. The technologies that can achieve these speeds include digital subscriber line (DSL), cable modem, fiber to the building (FTTB), leased line, wireless local area network (WLAN), and third-generation (3G) mobile communications. The technology used for Taiwan's broadband access services is mainly ADSL and cable modem (DGT, 2002).

and ISPs contributed to the rapid growth of the broadband market. ADSL subscribers dominated with the number of 2.4 million. The growth of ADSL users had shown the trend of stable growth. In 2003, eMarketer predicted a continuous high growth of broadband subscribers of Taiwan: 3,250,000 in 2003, 4,520,000 in 2004 and 5,090,000 in 2005 (Pan, November 2003).

As far as bandwidth is concerned, by the end of September 2003, the outward bandwidth reached 24,803Mbps. Taiwan was directly connected via broadband with 15 countries. The bandwidth to the US is 12,162 Mbps, standing as the top country that Taiwan was connected to. The other major countries included Japan (5,167 Mbps), Hong Kong (3,823 Mbps), China (2,352 Mbps), Korea (611 Mbps), Singapore (321 Mbps) and the UK (200 Mbps) (Li, 2003).

Two other indicators, mobile phone penetration and fixed-network penetration, also help to show the prevalence of information and communications technologies (ICTs). Since its opening to private competition in 1996, the cellular phone market began expanding rapidly. Mobile phone subscribers numbered 1.5 million by 1997, 4.7 million by 1998 and 11.5 million by 1999 (DGT, 2003). In 2000, the number of mobile phone subscribers reached 17.9 million, overtaking the number of local phone subscribers at 12.6 million (See Table 5-1).

Through 2003, penetration of cellular phones in Taiwan had been ranked number one in the world since 2001, according to the *2003 World Telecom Report* of the ITU (2003b). In 2002, Taiwan topped the world in its cellular phone penetration rate of 106.15% per capita and second only to Luxemburg (185.74%) in its telephone penetration of 164%. In 2002, Taiwan had a total population of around 23 million with 37 million telephone lines. Among these telephones counted, the number of mobile phones accounted for 65% (22.8 million), exceeding that of fixed-line telephones. The ITU predicted that the number of mobile phones in Taiwan will increase to 26.2 million, increasing its penetration rate to 114.28% per capita in 2003. In the same period, the number of fixed-line telephones will increase to 13.8 million, accounting for 60.36% (Lu, December 4, 2003).

Table 5-1: Statistics of the Diffusion of Information and Communications Technologies in Taiwan between 1997 and 2003

	1997	1998	1999	2000	2001	2002	2003 (June)
Local Phone (1,000 Subscribers)	10,862	11,500	12,044	12,642	12,847	13,099	13,220
% (Pop Based)	49.96	52.44	54.52	56.75	57.34	58.17	58.61
Mobile Phone (1,000 Subscribers)	1,492	4,727	11,541	17,874	21,633	23,905	25,110
% (Pop Based)	6.86	21.56	52.24	80.24	96.55	106.15	111.33
Cable TV (Home Pass Penetration)	78.50	79	80.3	80.6	82.2	84.6	
Internet (10,000 Users)	166	301	402	626	782	859	876
% (Pop Based)	7.63	13.73	18.20	28.10	34.90	38.14	38.84
Broadband Internet (10,000 Users)			2.5	26.28	11.64	21.16	24.69
% (Internet Based)			0.62	4.20	12.88	24.63	28.18
Population (1,000)	21,743	21,929	22,092	22,277	22,406	22,521	22,554
Household (1,000)	6,204	6,370	6,532	6,682	6,802	6,925	6,983

Source: DGT, 2003.

The Ministry of Transportation and Communications (MOTC) suggested that such a high penetration showed Taiwan's "superiority" of digitalization and the fruits of telecommunications liberalization. The MOTC's opinion is just partly right. Taiwan's cellular phone users saw a rapid increase after the opening of this market to private competition in 1996. In 1996 only 970,000 people subscribed to cellular service, accounting for 4.51% of its total population. By the end of October 2003, subscribers amounted to 25,141,000, accounting for 110% (DGT, 2003). Private competitors were allowed entering the market when the penetration rate was low and demand was high, therefore their strategies of lowering the price soon led to rapid expansion of cellular phone users as well as a increase of operating revenues. Revenue changes between fixed-network service and mobile phone service shows the trend of a market expansion of the latter. In 1997, revenue for fixed-network services accounted for 74% of total revenues of telecommunications service; revenue for mobile phone service accounted for 22% (including pager service); and 4% was for data business. In 2002, revenue for fixed-network services decreased to 27% of total revenues of telecommunications service, while revenue for mobile phone service increased from 22% to 56% in five years. As for data business, the revenue grew from 4% to 17%. The total scale of telecommunications service market almost doubled in the five years between with the cellular phone service contributing over half of total revenues of telecommunications business in Taiwan in the end of 2002 (DGT, 2003).

However, liberalization did not necessarily bring about the expansion of networks. In 2000 the fixed-network telecom services market was opened to allow three private operators competing with Chunghwa Telecom. This market (which includes local telephone, domestic long-distance and international services) saw little growth especially in local phone service in the last four years. In 2001, the eve private competitor entered the market, local phone subscribers were 12,827 thousand, accounting for 55% of the national population. In October 2003, subscribers slightly increased to 13,310 thousand, accounting for 58.9%. At the same time, the three private operators only shared 1.4% of the local phone service market. As MOTC vice Minister Tsai Duei admitted, the effect of opening this market to private competition is "not as good as expected" (Jiang, December

11, 2003). Taiwan's local phone penetration had been high in the period of national monopoly due to the principle of universal service. When the private companies entered the market, they had less incentive to invest in local phone service due to the high cost of building infrastructure and the low reward of profit. Instead, they only invested where profits were promising such as international phone and domestic long-distance phone services. The market rules the corporations followed made the maintenance of universal service questionable. The same rule is also created barrier to equal access to the Internet.

5.1.2 Unequal Access to the Internet

The description of the digital divide in this section is based on an interpretation of various sources such as the results of surveys of Internet use conducted by Focus on Internet News and Data (FIND) of the Institute of Information Industry (III) under the support of the Department of Industrial Technology (DOIT), Ministry of Economic Affairs (MOEA) and the official survey of the Ministry of Transportation and Communications (MOTC). The demographic data on Taiwan is mainly from the statistics of the Directorate General of Budget Accounting and Statistics (DGBAS) and the Department of Statistics of the Ministry of the Interior. Other sources from survey results conducted by the private sector or researchers are also used here to support or challenge the findings of official surveys.

5.1.2.1 Growth of Internet Users

FIND conducted a quarterly survey of Taiwanese Internet users. According to the results of its September 2003 survey, there were 8.77 million people online, accounting for 39 percent of the whole Taiwanese population of 23 million. The number of Internet users showed a trend of dramatic growth before 2001. In 1996, there were only 600,000 people online, when 6 percent of Taiwanese were Internet users. After five years, by

2001, the percentage had grown 5.8 times. After 2001, Internet use showed a steady and slow growth (See Figure 5-1).

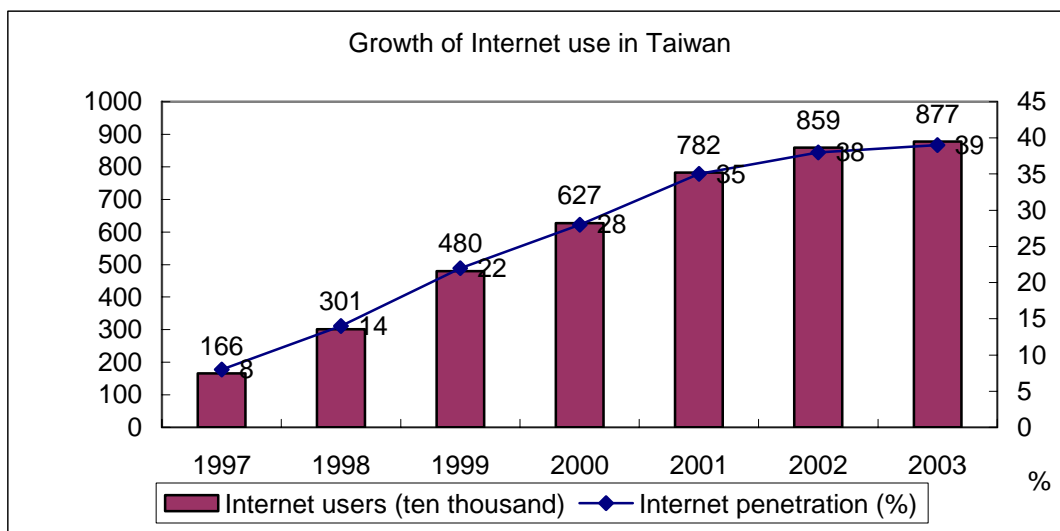


Figure 5-1: Growth of Internet Use in Taiwan from 1997 to 2003

Source: DOIT, MOEA

MOTC's survey confirmed the decline of growth rate of Internet penetration although it indicated a higher Internet user penetration than the FIND survey¹⁴. The 2003 MOTC survey showed 10.92 million Taiwanese had ever been online by March 2003, accounting for 48.6% of the total Taiwanese population. 9.22 million people had been online within a month before the survey, making the penetration rate at 41.1%. The number of Internet users increased 30.9% between 2001 and 2003, showing a decline of the growth rate within the period of this series of surveys. The number of Internet users in the first three surveys was 2.65 million, 4.4 million and 8.34 million. The growth rate was 66% from 1998 to 1999 and 89.5% from 1999 to 2001.

The results of these two surveys seemed to suggest that Internet diffusion in Taiwan has experienced a substantial surge and reached the peak of the S-shape pattern in 2001,

¹⁴ The explanation for the differences between the estimates of Internet users in these two surveys is that they had different definitions of "Internet user". The FIND survey defined Internet users as people with active accounts for access to the Internet from home, work places or schools. The MOTC survey defined Internet users as "those who had ever used the Internet".

based on the expectation of the diffusion model of communications technology. It sent an alarming message that Internet user penetration in Taiwan was in the latter stage of diffusion: growing slowly or even stagnating. It also implied that the diffusion of the Internet does not naturally trickle down. If the socioeconomic conditions in the early stage of Internet diffusion show no change, it is difficult to expect that the poor and ill-educated who were excluded from using the Internet before will have any better chance of accessing to the Internet in the future.

5.1.2.2 Demographic Characteristics of Internet Users

In addition to the total number and rate of Internet users, the demographic characteristics of Internet users are crucial for understanding the digital divide. In this section, the surveys conducted by the MOTC (1998, 1999, 2001, 2003) are introduced as the main source for a further look at demographic characteristics of Taiwanese Internet users. The ministry conducted four nationwide surveys on Internet use from 1998 to 2003, trace the changes of the demographic composition of Internet users. The series of surveys used telephone inquiries with a strict process of sampling. However, MOTC surveys have a major shortcoming for they failed to include income as an indicator for measuring the digital divide. Income has proven to be the crucial factor in creating the digital divide according to surveys of individual countries such as the US and China and of the international organizations such as the ITU and UNDP. Here data from the Directorate General of Budget Accounting and Statistics (DGBAS) and the Department of Industrial Technology (DOIT) under the Ministry of Economic Affairs (MOEA) are used for revealing the connection between income and Internet use.

As the composition of Internet users is concerned, the MOTC surveys have highlighted some demographic categories as determining factors of Internet use: gender, age, education, location and occupation (See Table 5-2). The results of the 2003 survey showed that more males used the Internet than females. Male users accounted for 53% while female users 47%. The majority of Internet users were under the age of forty which

accounted for 77.3% of all users. Among users of all ages, youths from 20 to 29 constituted the highest proportion at 28.7%, followed by those aged from 30 to 39 (25.1%) and those aged from 15 to 19 (23.5%). People beyond the age of 40 accounted for only 22.7% of Internet users. Sixteen percent users were between 40 and 49, 5.9% users were between 50 and 59. Only 0.8% of Internet users were over 60 years of age. The results showed that young people still composed the main body of Internet users.

In addition, the results showed that education was a determining factor of Internet use. Taiwan's formal education system includes three levels: elementary education, intermediate education and higher education. Elementary education is a six-year school program for students aging from 6 to 12. Intermediate education includes the three-year junior high school for students aging from 13 to 15 and the three-year senior high school for students in the age of 16 to 18. Higher education includes colleges, universities and graduate schools. Colleges refer to either five-year education for students graduating from junior high school or four-year education for senior high school graduates. The features of universities and graduate schools are the same with those in the US. Based on abovementioned categories, the survey results showed people with a high school diploma, or college or university degree composed the majority of Internet users. Internet users with senior high school education accounted for 28.9%, followed by college 25.3%, university 23.5%, junior high school 8.9%, and graduate school 5.2%. Internet users with elementary education and under only accounted for 0.6%. People with a high education tend to be Internet users, according to Table 5-2. More than 80% of people with higher education were Internet users (college 80%, university 88.5%, and graduate school 97.2%). The rate went down with the education level: senior high school 58.7% and junior high school 38.4%. In the group of people with elementary school education, only 18.7% of them were Internet users. Although Internet users in each education category saw an increase in the four surveys, the gap between high education groups and less education groups maintains.

Table 5-2: Demographic Characteristics of Taiwanese Internet Users between 1998 and 2003*

MOTC report	March 1998	January 1999	March 2001	March 2003
Online User				
ever use (%)	2.65million (12.2%)	4.4million (20.1%)	8.34million (37.5%)	10.92million (48.6%)
Frequent user**	1.46million	2.5million	7.21million	9.22million (41.1%)
Gender				
Male	13.0%	21%	39.6%	50.5%
Female	11.4%	19.2%	35.4%	46.7%
Age				
Under 6			2.7%	5.6%
6-11		5.9% (under 12)	29.5%	43.7%
12-19	20.9%	36.1%	75.8%	82.8%
20-29	31.0%	42.0%	66.2%	90.1%
30-39	12.3%	23.9%	46.7%	63.1%
40-49		13.4%	27.9%	43.0%
50-59		6.9%	15.8%	23.8%
over 60		1.1%	2.7%	3.3%
Education				
Elementary and under	4.1%	3.0%	12.2%	18.1%
Junior high school	11.2%	17.0%	30.0%	38.4%
Senior high school	22.0%	31.0%	41.0%	58.7%
College	45.6%	64.2%	73.0%	80.0%
University	64.5%	78.8%	84.2%	88.5%
Graduate school	85.7%	91.9%	91.5%	97.2%
Region				
Taipei	17.7%	33.8%	56.4%	62.6%
Kaohsiung	12.4%	22.6%	41.8%	51.5%
Northern TW	13.0%	21.9%	38.1%	51.1%
Central TW	11.3%	16.0%	33.7%	44.6%
Southern TW	9.4%	15.1%	30.7%	41.7%
Eastern TW		13.9%	28.0%	41.9%

*Numbers showed in the table indicate the ratio of Internet users in each demographic group.

**Frequent users are defined as those who use the Internet at least two hours in a week in 1998 report and 1999 report, and as those who once use the Internet in a month.

Source: MOTC, 1998, 1999, 2001 and 2003

There are several reasons to explain education as a crucial factor for unequal access to the Internet. Different from using traditional media such as radio and television, using the Internet requires basic literacy and skills that education is supposed to provide. Therefore, people with higher education tend to be prepared better for using this technology. Another explanation is the Taiwanese government's policy to promote the Internet in schools. The history of the Internet introduced in the fourth chapter shows that Taiwan's education ministry began to connect universities with the networks in 1992 and further connected the networks to high schools and elementary schools. With a better equipped network infrastructure on campus, highly educated elites tend to have more opportunities going online. This policy also can explain the phenomenon that students composed the largest number of Internet users (29.5%) among various occupation categories. The rate was followed by people in the service sector (15.1%) and manufacturing (13.6%) and military civil service (12.3%) (including soldiers, teachers and public officials). Those in the agriculture sector accounted for only 0.4% and others accounted for 4.0% (including unemployed, retired and volunteer). However, education cannot be isolated as a single factor for explaining the digital divide because it tends to associate with other demographic features such as income and region.

Taiwan is divided into four regions: the northern, the central, the southern and the eastern area. In addition, there two special municipalities: Taipei City, the capital and business center of the country located in northern Taiwan, and Kaohsiung City, a business and industrial center in southern Taiwan. In 2003, these two municipalities had a population of 4 million, accounting for 18% of Taiwan's total population. Between both municipalities is a long western coast clustered with a few populous cities and townships. The eastern area and some islets such as Penhu and Lanyu are less populous rural areas. Based on the regional division, the MOTC survey results showed that, among Internet users in different regions, Taipei residents accounted for 16.29% and Kaohsiung residents 7.17%. Internet users in the other four areas accounted for about three fourths of total online population. The northern area was 33.63%, followed by the central area of 22.54%, and the southern area of 17.96. The eastern area was far behind with 2.42%. The statistics in Table 5-2 reveal obviously the unequal distribution of Internet among

different areas. In Taipei, about 62.2% were Internet users while in Kaohsiung 51.5%. 51.1% of residents in the northern area were Internet users, trailed by 44.6% in the central area, 41.7% in the southern area, and 41.9% in the eastern area.

This survey also gathered data of household computer penetration and Internet penetration, which confirmed the unequal distribution of both among different areas. Survey results showed that 71% of households owned the computer in Taiwan. Taipei had the highest penetration of 80.9%, followed by Kaohsiung at 75.5%, and the northern area of 75.1%. The eastern area only had 56.0% of households with computers. Online households accounted for 65% of total households in Taiwan. Taipei topped the penetration rate with 75.9%, followed by the northern area with 69.6%, the southern area with 56.8% and the eastern area with 52.8%.

Region became a determining factor for the digital divide, in fact, depending on the level of urbanization of different areas. Chang Ying-Hwa and Lin Ji-Ping's (2001) research examined the correlation between urbanization and informatization, finding a positive relation. Taipei was defined as an information rich city because of its high level of urbanization and informatization (using Internet penetration as a proxy). Hsinchu City was also an information rich city although its urbanization level was not as high as Kaohsiung or Taichung. Hsinchu's high level of informatization was due to the establishment of Hsinchu Science and Industrial Park and two national universities which attract information elites residing in the city.

Theoretically, in the urban area the major business sectors are industrial and service sectors which generate value-added production. In the rural area agriculture is the main sector in which the extraction of raw material are major activities. Because of the division of labor between the urban and the rural, urban residents tend to gain higher incomes and therefore can more likely afford the Internet. In contrast, rural residents tend to have lower incomes and cannot afford such a luxury. This argument is confirmed by the DGBAS's report in 2001. It showed that the urban area had high income and high Internet penetration while the rural area had low income and low Internet penetration. For example, Taiwan's most prosperous metropolis Taipei City ranked first in household income and household Internet penetration. Penghu County, the poor island in

southwestern Taiwan ranked as the last in both. Household annual income in Taipei was 2.06 times of that in Penghu while Internet penetration of Taipei was 3.78 times (DGBAS, 2001).

The DGBAS's statistics helped to explicate why region served as a crucial factor for the digital divide. More important, it revealed wealth as the fundamental factor responsible for the digital divide in Taiwan, a point that the MOTC survey failed to indicate. The agency's 2002 Family Income and Expenditure Survey Report (2002) further pointed out the direct influence of income on Internet distribution. It showed that higher income led to a higher percentage of households online. Based on five equal divisions of households according to disposable income, 67.82% of households in the 20% highest income group had Internet facility, followed by the second group (61.51%), the third group (47.39%) and the fourth group (33.52). Only 10.52% of households in the 20% lowest income group had Internet facility. The distribution pattern of computer ownership among these five groups followed that of Internet facility. 85.15% of households in the highest income group owned the computer, followed by 74.3% in the second group, 61.09% in the third, 46.56% in the fourth and only 16.91% of households in the lowest income group had the computer.

A survey conducted by FIND in 2001 supported the abovementioned DGBAS's statistics. This survey collected data of Internet use in Taiwanese households and demographic characteristics of the main income earner of the online household. The majority of the main income earners are males with high education and income. Among online households, 64% were in the high income group, 32.4% in the middle income group and only 3.6% in the low income group (FIND, 2001, p.III-31). Income represents a household's affordability of technological equipment and education; therefore, is undoubtedly a determining factor of the digital divide.

From the results of interviewing 531 household heads in 2000, Tseng Hsu-Feng (2001) found that Internet use was related to education and location. People with higher education obviously had easier access to information. Residences in Taipei had higher level of access to information compared to other areas. Tseng also found that education, information access, and information skills had effects on occupational reputation and

income. Tseng's research confirmed the MOTC's survey results, viewing education and location as important factors in shaping the digital divide. It also emphasized education and information access as a means of the accumulation of wealth. However, it failed to examine income as a determinant of education, not only a result of education.

The MOTC survey report is worthy of addressing for it not only described the demographic characteristics of Internet users, it also explored the features of those who never go online. In 2003, people who never used the Internet accounted for 51.4% of the Taiwanese population. Among those who never used the Internet, females (53.3%) numbered more than males (49.5%). Most children (94.4%) and elderly people (96.7%) never used the Internet. 81.9% of people with only elementary education answered that they never used the Internet, contrary to only 2.8% of people with graduate school education gave the answer. More than half of residents in the central, southern and eastern areas never used the Internet.

In addition, this survey conducted in 2003 added a new question to explore the reasons why people never used the Internet. Since non-users of the Internet constituted of children and the elderly and ill-educated rural residents, they saw the factor of age (36.2%), the lack of online skills (16.9), no need to be online (14.9%) and the lack of online equipment (11.8) as major reasons for not using the Internet. Similar concerns were reflected in workers' opinions on computer use. The statistics reported in 2003 by the Council of Labor Affairs showed that among those workers¹⁵ who did not have a computer at home, 47% did not think they needed to use one there. 36% responded that they were not capable of using a computer and 10% responded that they could not afford computer equipment. Therefore, about forty percent of workers prefer an information policy of decreasing online fee and 37% hope the government can offer vocational computer training (Hsu, August 18, 2003). Both sources of data indicated necessity, affordability and skills as important issues for the exclusive group that did not access to the Internet.

¹⁵ According to the *Labor Standards Law* of Taiwan, the worker is defined as a person who is hired by an employer to do a job for which wages are paid.

A further comparison between Internet users and people who were never online showed that these two groups (haves and have-nots) had different concerns regarding access to the Internet. While the digital have-nots were concerned about their skills and affordability to use the technology, the haves were concerned more about the efficiency of the technology. According to the MOTC survey results, Internet users saw a decrease of online expenditure (35.8%) and an increase of bandwidth (22.4%) and accessibility (23.6%) as the primary issues when making policy suggestions to the government (See Table 5-3).

Most of surveys of Internet use focused on behaviors of Internet users and thus failed to address the situation of non-users. Correspondingly, information policy was made to meet the needs of Internet users, not non-users. For example, the Taiwanese government's policy of opening the fixed-network service to private competition and promoting broadband technology and its application was based on the concern of enhancing technology efficiency so that Internet users could no longer experience online jam-ups and unstable network connections (These were main problems Internet users encountered. See Table 5-3). In a word, the abovementioned policy will only serve the needs of the haves (Internet users and the privileged urbanites), not those of the have-nots. Therefore, the information policy focusing on the market-led expansion and upgrading of infrastructure has done little for bridging the digital divide because the infrastructure for the have-nots' first concern for access to the Internet (compared to skill training and basic online equipment). For the worst, to maximize their profit, the private corporations seek only to take care of the rich urban residents as they continually expand their markets, thus enlarging the existing gap between the haves and have-nots.

Table 5-3: Internet Use Behavior between 1998 and 2003

MOTC report	March 1998	January 1999	March 2001	March 2003
Online Location				
Home	55.5%	63%	77%	86.2%
School	33.9%	35.8%	34.9%	22.2%
Office	27.1%	31.7%	30.4%	36.2%
Internet cafe	10.0%	3.9%	12.9%	18.9%
ISP				
Hinet	53.4%	64.8%	67.5%	78.7%
TANet	23%	25.7%	19.7%	2.1%
SeedNet	10%	10%	12.4%	5.0%
EBT/APOL			3.5%	7.1%
Others	10%	10%		
Online Activity				
Search info	85%	80.8%	81.3%	79.7%
Entertainment	23.9%	26.2%	28.1%	18.7%
Database & software	18.5%	27.6%	24.1%	5.9%
Communication	17.1%	21.7%	40.9%	36.9%
Trouble Encountered				
Online jam	79%	75%	72%	33.3%
Content insufficiency	34%	14.6%	16.6%	12.7%
Online Instability	29%	27.8%	27.2%	12.7%
Garbage info	65%	17%	21.1%	9.4%
High expense	57.8%	15.2%	13.6%	2.1%
Privacy invasion	47.1%		5.1%	1.8%
Virus	31.5%		10.0%	7.2%
Policy Suggestion				
Increase bandwidth	50.8%	59%	47.6%	22.4%
Decrease expense	28.1%	53%	48.7%	35.8%
Training & education	12.8%	30.6%	27.6%	16.3%
Enhance quality		20%	18.1%	18.1%
Preclude porn		16.7%	17.8%	15.4%
Enhance accessibility	N/A	N/A	N/A	23.6%

Source: MOTC 1998, 1999, 2001 and 2003

5.1.3 The Digital Divide as a Reflection of the Social Divide

The above review of major Internet survey results in Taiwan shows Internet use is related to a person's demographic characteristics and social status. As Wu Chi-Yin (1998) commented on the results of a 1998 Internet survey conducted by the commercial portal Yam, the phenomenon of Internet use in Taiwan was "a mirror of the social structure" for it reflected the social inequality in which the privileged class benefited from the new technology and excluded the poor from access to it. For Wu, the unequal distribution of the Internet revealed that Internet use had nothing to do with the utopia of grassroots democracy and social equality that this technology was once expected to serve. It is true that, although the Internet was being diffused to the general population in Taiwan to a user penetration rate of 38% in 2003, the privileged urban residents with high income and high education were still the main users of the new technology as they were in 1998.

The digital divide in Taiwan is a reflection of the complex of social disparities based upon education, income and region. High income owners tend to be high-education urban residents whereas low income owners low-education rural residents. The statistics between region, income and education conducted by the Directorate General of Budget, Accounting and Statistics (DGBAS) reveals the correlation. Table 5-4 shows the correlation of higher education with higher income. In 2001, while people with a university and college education had an average yearly income of NT\$ 782 thousand and people with graduate school education had that of nearly NT\$ 1 million, people with elementary school education and below had average yearly income less than NT\$ 300 thousand. Table 5-5 shows the correlation between income and urbanization. City residents had average annual income of NT\$ 539 thousand whereas village residents had that of NT\$305 thousand. The ratio of average annual income between farm and non-farm was 1: 1.5.

The data confirmed the argument of the "information society" that in a knowledge-intensive capitalist society, education appears as a factor of wealth and income. But if we

further examine what causes the difference of education opportunities, we will find income as the critical factor definitely.

Table 5-4: Income Distribution by Education 2001

Education	Percentage of Population	Average Annual Income
Illiteracy And Supplementary School	4.5%	116,297
Elementary School	18.2%	291,879
Junior High School	15.7%	416,526
Senior High School	9.5%	510,056
Senior Vocational School*	22.8%	471,043
Junior College**	15.7%	596,995
University And College	11.2%	781,902
Graduate School	2.4%	988,927

*Senior vocational schools are preparing students aging 15 to 18 with vocational skills.

**Junior Colleges are two –year programs for senior high school graduates.

Source: DGBAS, 2001

Table 5-5: Income Distribution by Degree of Urbanization in 2001

Category of Urbanization	Percentage of Population	Average Annual Income
City	69.8%	539,079
Town	20.5%	384,340
Village	9.8%	304,974
Farm	12%	329,695
Non-farm	88%	505,730

Source: DGBAS, 2001

Based on the data of DGBAS, Luoh Ming-Ching (2003) found household income was a determinant factor for people to study in universities. In the period of 1979 to 1981, the rate Taiwan's households with university students aging between 19 and 22 were 9.0%. After twenty years, in the period of 1997 to 1999, this rate grew to 25.2%. In the twenty years, income kept determining people's education even the total education opportunities expanded a lot. Based on disposable income quintile, in 1979-81, 3.9% of the lowest income group had family members enrolled as university students while 15.3% in the highest group. In 1997-99, the rate in the lowest income group was 19.8 while the highest group was 36.6% (Table 5-6). Louh's study showed the higher income a household gained, the higher opportunity its family member had to be a university student.

Table 5-6: Education Opportunity by Household Income in selected years from 1979 to 1999

Year	Total Households (%)	Disposable Income Quintile				
		Lowest 20% Households	Second 20% Households	Third 20% Households	Fourth 20% Households	Highest 20% Households
1979-81	9.0	3.9	6.8	8.7	10.2	15.3
1982-86	9.7	4.4	7.4	9.0	10.7	16.6
1987-91	12.1	8.5	10.2	11.8	12.2	17.1
1992-96	17.7	14.7	15.1	15.7	17.6	25.2
1997-99	25.2	19.8	21.6	24.3	23.3	36.6

Source: Louh, 2003, p.20

The income disparity between cities and villages originated from a growth of rural-urban specification. As E. K. Hunt and Howard Sherman (1986, pp.13-17) pointed out in their review of the economic history of Europe, the emergence and growth of towns and cities was a significant feature of its transition from medieval feudalism to the beginnings of capitalism. Advancement in agriculture techniques led to increase output which support growing city population with sufficient food. The growth of cities led to a growth of rural-urban specification. Rural farmers tied to the land in producing and extracting raw material. Urban workers severed all ties to the soil, focusing on goods manufacturing

and trading from which more profits were generated. Rural-urban specification thus caused disparity of wealth and resource allocation between cities and villages.

Urbanization in Taiwan has caused migration from the rural to the urban, leading to 70% of the country's population concentrating in cities, 20% in towns and only less than 10% remaining in villages. In the cities reside rich and well-educated elites engaging in affluent urban lives while in the villages old farmers survive on their cheap farm products. Concerning regional disparity and the digital divide in Taiwan, the Director of Institute of Information Industry Wu Guo-Chun (2003) pointed out, the social problem is not only about the wealth gap as traditionally defined, the information gap is a more serious problem. He maintained that a new class conflict is represented by the unbalanced distribution of resources between different areas. Disparity of resource allocation between the urban and the rural brings about the digital divide. Therefore, Wu suggested, to bridge the digital divide between the rural and the urban, the basic solution depends on the redistribution of mental resources instead of material resources. The core difficulty for bridging the digital divide is the lack of informational talent in the rural area.

In Taiwan, unbalanced regional development and resource allocation resulted in deepening social disparity that is obviously represented by the increasing income gap. According to the statistics agency's survey results of household income in Taiwan, average disposable income dropped a record percentage of 2.56 from 2000 to 2001. In 2001, the income gap between the highest 20% families and the lowest 20% families was 6.39 and the gap between the highest 10% families and the lowest 10% families reached 61.33, making the record income gap since 1960 (DGBAS, 2002).

Reviewing the statistics released by DGBAS, Tseng Chi-Chao and You Yun-Kue (2003) pointed out some characteristics of the trend of income allocation. First, 2000 saw the negative growth of income. From 1964 to 2000, national and individual household disposable income continuously increased. In 2001, the growth became negative. Income decrease unavoidably caused the decline of consumption and savings (See Table 5-7).

Second, the trend of wealth allocation has been from the poor to the rich, causing an expansion of the income gap. According to DGBAS statistics, between 1980 and 2001,

the richest 20% households had 35-40% of total household income while the poorest 20% households had only less than 10%. In 2001, the lowest 20% household incomes dropped

Table 5-7: Disposable Income, Consumption and Savings between 1997 and 2001

Year	National (NT\$ hundred million)			Household (NT\$)		
	Disposable income	Consumption	Savings	Disposable income	Consumption	Savings
1997	52,706	38,730	13,976	863,427	634,477	228,951
1998	54,775	40,545	14,229	873,175	646,343	226,831
1999	57,176	42,142	15,034	889,053	655,282	233,770
2000	58,734	43,664	15,070	891,445	662,722	228,723
2001	58,468	44,281	14,187	868,651	657,872	210,779
2001AGR*	-0.45	1.41	-5.86	-2.56	-0.73	-7.58

*Annual Growth Rate

Source: DGBAS

11.35% while the highest 20% household incomes increased 2.11%. The gap between the rich and the poor was enlarging (see Table 5-8).

In addition, the rich families tended to have more savings. From 1980 to 2000, the savings ratio between richest 20% households and poorest 20% households kept growing: from 14.69 in 1980, 25.58 in 1990 to 44.38 in 2000. Most astonishingly, between 2000 and 2001, the richest 20% households kept accumulating more savings, but the poorest 20% households showed negative growth in their savings. (see Table 5-9) This means that these poorest families had no extra money to save. Rather, they depended on loans for living. The difference of savings between highest income families and low income families indeed exemplifies the operation of capitalism in which the poor suffer the burdens and the rich reap the benefits of this economic system (Bowles and Edwards, 1985, p.22).

Table 5-8: Income Allocation Ratio and Income Gap in Selective Years between 1980 and 2001

Year	Disposable income (NT\$, %)					Ratio*	Gini
	Lowest 20% households	Second 20% households	Third 20% households	Fourth 20% households	Highest 20% households		
1980	102,272 (8.82%)	161,965 (13.90%)	206,358 (17.70%)	265,552 (22.78%)	428,910 (36.80%)	4.17	0.277
1990	193,685 (7.45%)	343,785 (13.22%)	455,427 (17.51%)	603,914 (23.22%)	1,003,925 (38.60%)	5.18	0.312
1997	312,458 (7.24%)	557,429 (12.91%)	753,919 (17.46%)	1,003,815 (23.25%)	1,689,517 (39.14%)	5.14	0.320
1998	310,865 (7.12%)	560,766 (12.84%)	765,375 (17.53%)	1,014,770 (23.24%)	1,714,097 (39.26%)	5.51	0.324
1999	317,001 (7.13%)	573,853 (12.91%)	778,496 (17.51%)	1,031,669 (23.21%)	1,744,245 (39.24%)	5.50	0.325
2000	315,172 (7.07%)	571,355 (12.82%)	778,556 (17.47%)	1,043,508 (23.41%)	1,748,633 (39.23%)	5.55	0.326
2001	279,404 (6.43%)	524,766 (12.08%)	740,054 (17.04%)	1,013,478 (23.33%)	1,785,550 (41.11%)	6.39	0.350

* It indicates the ratio between the highest 20% households and the lowest 20% households.

Source: DGBAS, 2002

Table 5-9: Average Savings per Household by Disposable Income Quintile in Selective Years between 1980 and 2001

Year	Disposable Income Quintile					Ratio*
	Lowest 20% households	Second 20% households	Third 20% households	Fourth 20% households	Highest 20% households	
1980	9,793	21,848	35,686	59,861	143,831	14.69
1990	15,750	56,825	100,817	172,862	402,868	25.58
1997	19,994	70,245	141,247	256,068	657,199	32.87
1998	21,976	64,267	132,630	250,840	664,443	30.23
1999	26,735	76,305	139,931	254,371	671,511	25.12
2000	14,733	68,572	143,820	262,601	653,888	44.38
2001	-4,516	44,315	110,623	220,922	682,548	-

* It refers to the ratio of the highest group over the lowest group Unit: NT\$

Source: DGBAS, 2001

At a conference discussing social justice in late 2003, the National Policy Advisor to the President Chai Sung-Lin pointed out the change of income allocation and the continuous increase of the numbers of the poor as the most severe social problems in Taiwan. Among 6.8 million of households in Taiwan, the ratio of the average income between the top one-tenth highest-income households and the one-tenth lowest-income households was about 15:1. This ratio held steady for about 20 years during the 1970s and 1980s. The 1990s saw an expansion of the income gap. The gap was 61:1 in 2001 and increased to 93:1 in 2002. He predicted that the gap in 2003 would be larger because of higher unemployment. He urged the government to take effective measures to help the poor and bridge the income gap; otherwise, the whole society will suffer from instability and disorder caused by sustaining injustice (Hsiou, 2003).

Taiwan's efforts to pursue industrial transformation and to participate in the global economy deepened its social disparities. Besides an increasing income gap, Taiwan experienced the trend of structural unemployment in from agriculture to industry and service. According to official statistics, the unemployment rate was 1.45 in 1993, stood at

2.6 in 1996 and grew to 4.57 in 2001. The unemployed constituted the majority of the growing poor. Unemployment thus became a main issue at an annual labor demonstration held in Taipei in late 2002.

In the transformation of Taiwan's economic structure, the agriculture sector was undoubtedly the victim. Policies based on emphasizing the information technology sector and neglect of the agriculture sector forced farm areas into a continuing crisis of decay. Farmers further suffered from Taiwan's entry into the World Trade Organization in January 2002 because of tariff free and unlimited importation of foreign agricultural products. The government estimated that, in the first year of WTO membership, the total production value of Taiwan's farming, animal husbandry, and fishery sectors was expected to fall by about 6.8 percent. In 2004, agricultural output was expected to fall by 10.6 percent. Given these anticipated decreases in domestic agricultural output, the amount of land used by the agricultural sector was expected to diminish by 86,000 hectares between 2000 and 2004, affecting an estimated 20,000 to 46,000 agricultural workers (GIO, 2003).

On November 23, some 120,000 farmers and fishermen marched through the streets of the capital to raise government awareness of their growing economic plight, which they claimed had been adversely affected by Taiwan's entry into the WTO. Organized by Taiwan Farmers Union in consultation with numerous labor groups and minority groups, the number of demonstrators reached a record for a street protest in Taiwan. In the demonstration, farmers showed their discontent with the government's inability to solve the distress of the agriculture sector. As a senior official of a farmers' association from southern Taiwan revealed to the press, "After Taiwan's entrance to the WTO, prices of more than 200 kinds of vegetables and fruits in the market have decreased at least 50 percent. The government is not helping us solve the problems, but is instead implementing inappropriate financial reforms" (*Taipei Times*, November 24, 2002). On the eve of this demonstration, the government announced the implementation of its tough control mechanism to regulate lending by credit units of farmers' and fishermen's associations which, those associations said, would destroy them. The protests raised

awareness of the difficulty farmers faced and the challenge the government met on Taiwan's way toward a further integrated global economic order.

The social stratification as well as the digital divide exemplifies the unequal nature of capitalist society. A capitalist society is built upon class differentiation and concentration of wealth and power in the hand of a few people, in which the capitalist state consciously or structurally protects the interests of capitalists through policymaking and execution, thus helps maintain inequality. This explains the state's inability to enhance the wellbeing of Taiwan's poor. Therefore, after reviewing the social disparity of Taiwan, a further examination of information policy and its implications for Internet access is necessary to better understand the political and economic factors behind the unequal distribution of Internet access.

5.2 Information and Internet Policy

5.2.1 National Projects in Promoting Internet Use

As mentioned in the preceding chapter on Taiwan's history, the government's policy focus on the development of information and communications technology since the 1980s contributed to Taiwan's high economic growth and its crucial status in the global information market. For meeting corporate needs and maintaining its international competitiveness, the Taiwanese government followed the US-led western IT-rich countries to initiate the National Information Infrastructure project in the mid-1990s. Then Premier Lian Chan (1997) addressed the influence of US information policy on Taiwan in the opening ceremony of the TANet' 97 Conference, saying that the "Clinton Administration proposed the NII in 1993. It shows America's ambition in leading the world in information network, and many countries follow the appeal. Therefore, I began to promote the NII project in my term of office". Lian's ambition was to strengthen Taiwan's position as an Asia-Pacific regional telecommunications hub by launching a ten-year NII project in 1994. The NII project was later transformed and integrated into an

E-Taiwan project in 2002 after the Democratic Progress Party took over the Kuomintang to rule the country in 2000.

5.2.1.1 National Information Infrastructure

The National Information Infrastructure (NII) was viewed as the ideal model for Taiwan's economic and technological development. This was revealed by the addresses of key members of the NII Task Force. The first NII Task Force convener Hsia Han-Min (1994) announced, "We are poised to leap to an industrialized country from a developing one, the NII has become our stepping –stone". NII Task Force Executive Secretary Guo Yun (1995) urged, "If we can seize the opportunity to promote the NII, Taiwan will become a smart island with economic prosperity and civil progress in the twenty-first century. Otherwise, we will lose competitiveness and fall into poverty and underdevelopment". For the Taiwanese government, building the NII became a choice between success and failure, development and poverty.

Following the path of the US, "government motivation with private-sector leadership" was the agent to carry out the NII project. In order to include many representatives from the information and communications industries, a Civil Advisory Committee was set in 1994, made up of many leading media and technology corporations in the policy-making process. Ten broad guidelines for developing the NII were laid out by Premier Lian, including (Zarit, 1995, p.67):

- Form the NII Task Force;
- Increase the use of data communication services;
- Develop domestic multimedia industry;
- Manage wireless frequency spectrum application planning;
- Publicly announce telecommunications equipment and services procurement projects;
- Propagate the NII and educate end-users;
- Advocate legislation to facilitate the NII;
- Implement and expand broadband experimental networks;

- Integrate networks; and
- Ensure conformance with international standards.

To accomplish these goals, many laws and regulations have been initiated or revised (see Table 5-10). For example, the amendments of the *Telecommunications Law* provide a basis for regulatory reform and market liberalization in telecommunications services. The amendments of the *Cable Television Law* and the initiation of *Communications Basic Law* lifted the ban on cross-ownership, which helped for integrating networks. The initiation of the *Electronic Signatures Law*, and the amendments of laws such as the *Trademark Act*, the *Banking Act*, the *Arbitration Act* and the *Copyright Act* all dealt with online commercial activities.

The ruling political party since 2000, the DPP, continued the tone of highlighting the importance of information technology. At the first meeting of the Private-sector Knowledge-based Economy Promotion Committee at the end of 2000, newly elected President Chen remarked in his address that both the government and private sector must expedite establishing a knowledge-based society to raise national competitiveness. Chen designated 2001 as the first year of his plan to promote a knowledge-based economy and society (GIO, 2003).

5.2.1.2 E-Taiwan

To advance technology innovation and application, the E-Taiwan Project was proposed by the Science and Technology Advisor Group (STAG) in May 2002, as part of the “Challenge 2008” six-year national development plan¹⁶. Aiming at shaping the island

¹⁶ In May 2002, the Executive Yuan passed the “Challenge 2008 – National Development Plan”, also called the “Six Year National Development Plan”, expecting to boost economic growth, employment and raise living standards. The national development plan included ten key individual plans and had a total budget of NT\$2.65 trillion, among which e-Taiwan costs NT\$402 billion, only second to the budget of Island-wide Trunk Transportation Construction Plan of NT\$ 1.26 trillion (MOEA, 2003).

Table 5-10: Regulatory Reforms Adapted to Promote the National Information Infrastructure Initiatives

Regulation	Objectives	Legislation Progress
<i>Electronic Signatures Law</i>	To insure secure transactions for growing e-commerce	Formally enacted in April 2002
<i>Freedom of Government Information Law</i>	Release of suitable government information to the public	The draft is under review by the Legislature
<i>Criminal Law</i>	To deal with crimes happening on the Internet such as unauthorized entry into a computer system	Amendments passed by the Legislature in August 1997
<i>Telecommunications Law</i>	To increase the foreign investment ratio for Type I services up to 60% and to further liberalize the telecom sector	Amendments passed by the Legislature in 2002
<i>Cable Television Law</i>	To allow the cross-ownership of cable TV operators and telecommunications companies	Amendments passed by the Legislature in January 1999
<i>Trademark Act</i>	To clarify lawful use of a trademark on the Internet	
<i>Banking Act</i>	To ensure the security of the use of e-wallet (electronic cash)	
<i>Copyright Act</i>	To deal with the issues relating to reproduction and use of content on the Internet	Amendments passed by the Legislature in June 2003
<i>Arbitration Act</i>	To allow contracts to be arbitrated over the Internet	
<i>Computer-processed Personal Data Protection Act</i>	To regulate the use of personal data collected over the Internet	Formally enacted in 1996
<i>Income Tax Law</i> <i>Business Law</i>	To allow the public to file the income tax return over the Internet	Amendments passed in 2000
<i>Communications Basic Law</i>	To allow cross-ownership of cable TV operators and fixed-network operators	Draft passed by the Executive Yuan in September 2003

Source: Wang, 1999: 242; MOEA, 2003; Lin, 2003. Compiled and updated by the author.

into the most E-oriented country in Asia, the government proposed a budget of over US\$1 billion and more than US\$3 billion in business opportunities. With the emphasis on E-life, E-government, E-business and E-transportation, this six-year-long project was to make Taiwan a high-tech and service-based island (STAG, 2002). The promotion and application of the Internet became one of the core strategies for national development. Major outlines for the projects are as follows,

- Simplification of trade convenience;
- Digitalization of government service;
- Digitalization of government operation;
- Smart transportation system;
- Digitalization of business operation and management;
- E-society related projects;
- Infrastructure related projects

Because of their diversified utilization, broadband networks play an extremely important role in the information society, and for this reason the construction of broadband networks has become a major policy of the government for advancement toward the information society as well as an important index of the upgrading of national competitiveness in Taiwan.

In view of this situation, Taiwan is using the promotional principle of “government motivation with private-sector leadership” and is working with private industry to continue implementing the broadband network construction plan within the “Knowledge Economy Program” and the “National Information and Communications Development Program” (DGT, 2002). At the beginning of 2002 the broadband network construction plan was revised and renamed the “Six Million Broadband Subscribers” plan and was incorporated into the “E-Taiwan” plan, molding Taiwan into one of the most E-savvy countries in the Asia-Pacific region. Taiwan’s government was eager to promote broadband network to serve information-rich people for their needs of speedy transmission of information online. As the 2003 survey results of the Ministry of Transportation and Communications (2003) revealed in the first section of this chapter,

Internet users indicated online speed was their major concerns of using the Internet and they suggested the government to make an effective policy.

A brief introduction of major projects of the NII and E-Taiwan shows different emphases of each. The NII was initiated in 1994 with a focus on a sound environment for promoting information infrastructure. The E-Taiwan, proposed in 2002 when the Internet penetration rate in Taiwan had reached 35 percent, shifted its focus to overall applications of digital technology. Both projects highlighted the role of technology and industry as promoting economic development by strengthening competitiveness of the information industry, promoting Internet application of trade and business operation and management. The issue of the digital divide gained a little attention in these two projects. In the NII project, a network of life-long learning was established and service for the handicapped was supplied. In E-Taiwan project, to bridge the digital divide was a sub-item of building an E-society. In order to build an E-society of equality and efficiency, according the proposal of the E-Taiwan project, the government would make efforts to facilitate the minority with information education and information application.

The emphasis of corporate interests in the NII project is due to the government's concern for economic growth through which the budget for running the government can be generated from the businesses and the legitimacy of this government can be strengthened. In its process of policymaking, the NII was advised by the Civil Advisory Committee which invited representatives from related business. In order to practice the principle of "leadership by the civil society", the Civil Advisory Committee was set in 1994 to assist the NII project. The committee provided input from the business sector, including information on privatization, frequency spectrum management, network construction, and intellectual property rights. The committee also made recommendations on topics as broad as research and development strategies, and as specific as pilot experimental projects, as well as playing an active role in establishing personnel training policy (Zarit, 1996, p.67).

In its first and second term in 1994 and 1995, the committee proposed many major suggestions which were accepted by the government, therefore from the third term on, many telecommunications companies competed to participate in the committee's

membership (*Commercial Times*, December 26, 1995, p.4; cited from Hwang, 1999, p.63). The conveners of the committee included representatives from IT giants such as the general manager of United Fiber-Optic Jing Shih-Tian, chairman of Acer Stan Shih and chairman of MiTAC-SYNNEX Group Matthew Miao. Miao has been the convener since 1997. No wonder it was satirized as the “Capitalist Advisory Committee” by Hwang Hui-Ying (1999, p.63) in her analysis of the development of the Internet in Taiwan before 1999.

By the end of 2003 the Civil Advisory Committee was constituted of 46 members, all members were from the business sector except for five from academia (see Table 5-11). Representatives from business included one from the media sector, six from traditional industries, five from finance and banking. The remaining 29 seats belonged to the telecommunications operators and IT industry (including six members represented the business associations and 23 represented their own businesses). These members represented domestic heavyweights such as IT companies Acer and VIA Technologies, telecommunications companies Chunghwa Telecom and Eastern Broadband Telecommunications (a unit of EMT) and leading ISPs SEEDNet and Yam, and branches of international corporations such as IBM Taiwan, HP Taiwan, Texas Instrument Asia and Microsoft Taiwan. While representatives from the business sector dominated the committee, there was no representative from the real “civil society” representatives such as the NGOs or local organizations and community groups. In fact, at the time the organization of the committee was proposed in 1994, it was said that the purpose of the organization was precisely to “respond to the needs of business” (*Commercial Times*, June 7, 1994, p.21). The advisory committee, in fact, disguised business interests as public interests by misapplying the term of “civil”.

Many business leaders have abused their power to force the government to yield to their interests. For example, in 1996, the then convener Stan Shih threatened the government to pass the *Telecommunications Law*, saying that otherwise Acer would withdraw its global telecommunications center from Taiwan (*China Times*, January 11, 1996, p.1 & 4). Chairman of Taipei Computer Association Frank Huang proposed that

Table 5-11: Members of the Civil Advisory Committee of the National Information and Communications Initiative in 2003

Name	Title	Company
Matthew F. C. Miao	Chairman	MiTAC-SYNNEX Group
Frank Haung	Chairman	Taipei Computer Association
Chien-Ming Ker	President	The Association of Technology Promotion
Sheng-Hsiung Hsu	Chairman	Taiwan Electrical and Electronic Manufacturers' Association
Chen-chia Lee	Chairman	Taiwan Federation of Industries
James Wang	Chairman	Information Service Industry Association of R.O.C.
Ming-Jen Hsu	Chairman	Taipei Hsien Computer Association
WenChi Chen	President& CEO	VIA Technologies, Inc.
Kang-Chi Chou	Vice President	Gretai Securities Market (a.k.a. TAISDAQ)
Chen-Chen Chang-Lin	Chairman	Financial Information Service Co., Ltd.
Cheng-Cheng Tung	President	Cathay United Bank
Chi-Chu Chen	Chairman	International Investment Trust Co., Ltd.
Stan Shih	Chairman	Acer
Jason Hsu	General Manager	IBM Taiwan
Rosemary W. Ho	Managing Director	HP Taiwan
Terry Cheng	President	Texas Instrument Asia
Theodore Huang	Chairman	TECO Corp.
Raymond Soong	Chairman	Lite-On Technology Corp.
ArthurYu-Cheng Chiao	Chairman	Winbond Electronics Corp.
Kelly Wu	Country Manager	Intel Microelectronics Asia Ltd., Taiwan Branch

Chuan-His Wang	President	Fubon Bank
Eric TS Wu	Chairman	Taiwan Securities Co., Ltd.
Lance Wu	President	Vista Incubation Technology Corp.
Ren C. Luo	President	National Chung Cheng University
Eunice Chiou	President	Microsoft Taiwan
Shyue-Ching Lu	President	Chunghwa Telecom Co., Ltd.
Ling-tai Wang	Vice Chairman	Eastern Broadband Telecom Co., Ltd.
Andrew Sun	Chairman	Data Systems Consulting Co., Ltd.
George Chou	Vice Chairman	Taiwan Telecommunication Network Services Co., Ltd.
Donald Weng	President	SaveCom International Inc.
Chia-Jiun	President	Digital United Inc.
Ming Ouhyoung	Professor	National Taiwan University, Department of Computer Science and Information Engineering
Chi-Ming Chuang	President	The Open University of Kaohsiung
An-Chieh Huang	Chairman	Accton Technology Corp.
Jen-ran Chen	CEO	Yam.com
Hsien-hsiung Tseng	Chairman	Taiwan Network Information Center
Cheng-Kang Chou	President	Kaosha Textile Co., Ltd.
Eric Lin	Chairman	Les Enphants Co., Ltd.
Danny Chiu	President& CEO	Morrison Express Co., Ltd.
Diane Ying	Publisher	Commonwealth Publishing Group
Evan Tu	President	Synnex Technology International Corp.
Chung-jen Hsu	President	President Chain Store Corp.
Earle J.S. Ho	Chairman& CEO	Tung Ho Steel Enterprise Corp.
Mark Han	President	DaChen Great Wall Group
Kuang-Chih Huang	Professor	Cheng Shiu University
Shrane Koung Chou	President	CSIM

Source: NICI Civil Advisory Committee, 2003 (<http://www.nici.org.tw/>)

the government should open the domestic integrated circuit (IC) foundry factories to investment and build factories in China. Huang's proposal was supported by Hsu Sheng-Hsiung, Chairman of Taiwan Electrical and Electronic Manufactures' Association. They said they would urge the government to speed more openness (Chen, March 6, 2002). Pressure from IT corporations forced the government to lift its ban on Taiwanese companies' investment in China's IC manufacturing.

The cooperation between the state and the corporations in making information policy in Taiwan led to business-favored policy such as the NII project and E-Taiwan project. On the one hand, IT capitalists successfully used the state in promoting their interests by sitting on the crucial advisory committees to influence policymaking or directly threaten the state with its economic power. In this way, the state served as an instrument for protecting the capitalist class, as instrumentalism of the capitalist state theories argued. On the other hand, the state actively took business interests into consideration and equated it to public interests. Following the argument of structuralism, the emphasis of corporate interests in these digitalization projects is due to the state's structural dependency on capital accumulating of the capitalist class, using another popular term economic growth, through which the budget for running the government can be generated and the legitimacy of this government can be maintained. The cooperation of the state and capitalists consequently excluded the poor's interests. It explains why the two key information strategies emphasized overall infrastructure establishment and various applications of digital technology aiming at strengthening ICT industry and international competitiveness, but paid little attention on the inequality of ICT access, namely the digital divide.

5.2.2 Dealing with the Digital Divide

The Taiwanese government did not formally address the issue of the digital divide in its policy until 2003. In a paper titled "Bridging the digital divide: The government's duty

and strategy”, the Institute of Information Industry (III)¹⁷ Chairman Lin Feng-Ching (2003) suggested two directions the government could take to bridge the digital divide: to strengthen the infrastructure and provide universal access. Lin proposed policy suggestions of building the necessary infrastructure to bridge the digital divide, which included the establishment of a single planning and regulatory unit, measurement of the digital divide and evaluation of the effects of related plans, and supplying ICT infrastructure. Suggestions of the universal application of digital technology included E-government service and promotion, measurements of education and training, ICT access for individuals and families and ICT applications in businesses.

Lin suggested a phased strategy due to limited government resources. He insisted that policy regarding building infrastructure should be put in place first. The second proposed phase was to strengthen E-government service and measurements of education and training. The last phase was universal application of ICT among individuals and businesses. He suggested in the last phase the government should plan to equip public buildings with ICT so that minorities would have the opportunity to access the technology despite the limitation of their personal resources (see Figure 5-2). However, although the digital divide was the major concern on Lin’s mind according to the topic of his paper, the needs of minorities is situated in the last stage of planning and execution.

Lin’s suggestions were followed by the government with the establishment of a single unit to plan and manage matters regarding the digital divide. This unit was named the “Guiding Group of Bridging the Digital Divide,” subordinated to the National Information and Communication Initiative (NICI) Committee, a successor to the NII Task Force. This guiding group began its operation on August 1, 2003, proposing the initiative program of bridging the digital divide. According to the proposed program, the prospective of bridging the digital divide was to create a fair environment and opportunity for ICT use and application, to help people improve their living quality in spite of the differences of their education, wealth and residence, and to promote the equal

¹⁷ The III made a “eliminating the digital divide between the urban and the rural” plan in June 2001. it planed to invest NT\$30 million in a year to enhance information application in the rural area (Wu, 2002)

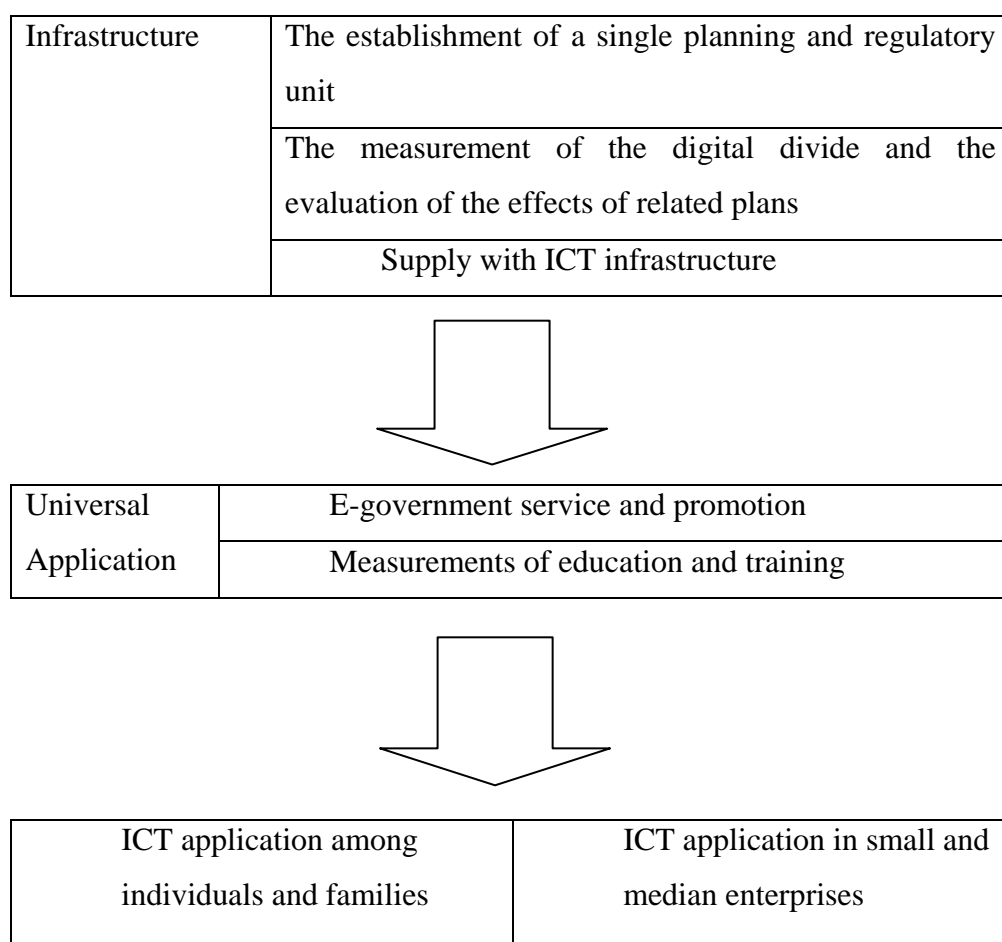


Figure 5-2: Lin's Executive Sequences for Bridging the Digital Divide

Source: Lin, 2003, p.50.

development among regions in Taiwan. The objectives of this program were threefold: first, to create an environment where the public and the minority have easy access to the Internet, secondly, to provide people who are willing to enhance their digital ability with learning opportunities and equipment, and finally to increase the rate of Internet use among the minorities so as to eliminate the digital divide.

The guiding group also detailed a schedule for achieving the abovementioned objectives. The schedule of creating a digital environment included: broadband system coverage reaching 90% in 2004 and 99% in 2005, television penetration reaching 90% in 2004 and 99% in 2005 in aboriginal areas, the percentage of setting online equipment in

the local public library reaching 100% in 2004, the coverage of public information service centers reaching 40% in 2004 and 60% in 2005 with the goal of building 500 centers. The schedule of providing people with online equipment and learning opportunity includes: to subsidize 3000 schools in the remote area with online fees and to train 3000 teachers to teach online skills, to provide the minority with used computers amounting to 10,000 until 2006, and to subsidize the minority (including the low-income, the handicapped, the elders and women) for skill training, 13,000 people each year. The schedule of increasing the online rate of the minority includes: to increase the household Internet penetration by 3% each year among the aborigine and to decrease the difference of Internet penetration rate between the richest three counties and the poorest three countries (NICI, 2003).

Initiative strategies to achieve the objectives are as follows: (1) to incorporate the task of bridging the digital divide into a weight-bearing point of government administration and to incorporate information literacy of the minority into a part of social work; (2) to integrate current administration and public resources: to make full use of public buildings such as schools and public libraries to enhance people's information literacy; (3) to make good use of private resources: to encourage businesses and organizations to help bridge the digital divide by the incentive of tax reduction; and (4) to initiate strategies phase by phase in order to make use of limited resources: to improve information skills of the minority and assist digitalization of small corporations are the top priority because it can uphold social justice and enhance industrial competitiveness.

The whole program demands a total budget of NT\$ 1,987 million in three years (see Table 5-12) to achieve the above goals and requires cooperation among different cabinet-level agencies such as the Ministry of Education, the Ministry of Transportation and Communications, the Ministry of the Interior, the Council of Agriculture, the Council of Indigenous Peoples, the Council for Cultural Affairs, the Government Information Office, the Environmental Protection Administration and the Research, Development, and Evaluation Commission. Since it is a brand new program approved by Premier Yu Shyi- Kun on September 10, 2003 and not many measures have been adopted and

executed by abovementioned agencies, the effects of these plans need a further examination.

Table 5-12: Budget for Bridging the Digital Divide from 2004 to 2005

Plans	2004	2005	2006	Total
Strengthening Online Infrastructure and Service	424	361	223	1,008
Enhancing Information Literacy of the Minority	207	207	217	631
Associating with Social Resources to Encourage ICT Equipment	49	64	127	240
Understanding the Digital Divide and Proposing Strategies	36	36	36	108
Total Amount of Budget	716	668	603	1,987

Source: NICI, 2003.

Unit: NT\$ million

This chapter has analyzed the digital divide in Taiwan, finding the divide to be a reflection of social disparities and government failure to address the needs of the poor. The capability of the government in dealing with technology development and inequality is conditioned by its relationship with the domestic and international forces operating within the context of global capitalism. For a further examination of the interaction among the state, domestic capitalists, civil society and foreign forces such as TNCs and their governments, and international organizations, I will provide two case studies regarding telecommunications and IT policy in Taiwan in the next chapter.

Chapter 6

GLOBAL CAPITALISM AND THE TAIWANESE STATE

This chapter includes two case studies. The first case examines the liberalization of the fixed-network telecommunications service market in line with Taiwan's entry into the World Trade Organization (WTO). The second case reviews the debate of Taiwanese chipmakers' move to China. Both aim to analyze the role the state and the market in action within the context of global capitalism.

6.1 The Liberalization of the Fixed-Network Telecommunications Market

6.1.1 The World Trade Organization and Telecommunications Liberalization

A review of the development of the Internet and information policy in Taiwan in previous chapters shows that the Taiwanese government viewed the establishment of a sound information infrastructure as a critical prerequisite for the prevalence of the Internet. Facing pressure from internal and external forces, the government has been proceeding telecommunications liberalization with the goal to strengthen the information infrastructure.

From Taiwan's experience, telecommunications liberalization was initiated under pressure by many sectors: 1) by domestic consumers demanding lower prices and better service; 2) by the US government and the American Institute in Taiwan which are advocating lower trade barriers to foreign telecommunications equipment and service providers; 3) by Taiwan's strong desire to enter the WTO as soon as possible; 4) by the government's goal to become a regional operations center; and 5) by the plan to establishing a National Information Infrastructure (Zarit, 1996:62). Among the above factors, the commitment Taiwan made to participate in the WTO was a determinant for

liberalization schedules and regulatory reform. As a result, the Directorate General of Telecommunications (DGT) has been forced to start giving up its monopoly to provide competition.

The DGT had been the regulator and the only operator of telecommunications services in Taiwan since 1958. For fulfilling the requirement of entering the WTO, the Taiwanese government enacted the 1996 *Telecommunications Law* which provided the regulatory framework for a new competition-oriented telecommunications sector. The Law ordered the GDT to split off its operating body, which was taken over by a new state-owned enterprise Chunghwa Telecom. The GDT kept playing the role of a telecommunications regulator.

The Law divides telecommunications services into two categories, Type I and Type II. Type I covers all basic telecommunications services including fixed-network, wireless and satellite whilst Type II incorporates all value-added services (VAS) such as data transaction services and fax services. Because Type I telecom businesses involve the use of limited resources (e.g. radio frequency) and right-of-way (for the establishment of fixed-network), a special approval by the regulator DGT is required to operate such businesses.

Type II services were opened to competition in concert with the government's NII in the mid-1990s. 100% foreign capital stakes was allowed in these services. In Type I services, competition began in 1997 with the licensing of four kinds of mobile businesses including cellular phone, paging, trunking radio and mobile data to private operators. In 2000, the fixed-network market was opened to three private operating teams competing with Chunghwa Telecom. The 1996 Law capped direct foreign capital at 20% in Type I services. The revised law in 2001 increased the cap to 49%. Direct and indirect foreign investments together in a single telecommunications carrier were capped at 60%.

By December 2002 Taiwan had a total of 73 companies engaged in Type I telecommunications businesses and 380 operating Type II businesses. Operating revenues in the domestic telecommunications market reached NT\$ 327.1 billion, accounting for 3.36% of total GDP (DGT, 2002, p.11).

6.1.2 Main Players

On March 19, 2000, three companies won the bid for the fixed-network license, including Eastern Broadband Telecom (EBT), Taiwan Fixed Network Telecom (TFN), and New Century Infocomm (NCI). The inclusive license with which these fixed-network companies were rewarded included international, domestic long-distance and local telephone service. The DGT estimated that these companies would invest NT\$93.7 billion in three years after their launching and invest a total of NT\$381.6 billion in ten years, which would make up 13% of GDP in terms of related output value (Feng, March 19, 2000). Based on the reason that the fixed-network service needed a large investment in the establishment of infrastructure, the MOTC required a high threshold of capital sum NT\$ 40 billion (US\$1.25 billion) for the bidders to start operation. This requisite hindered small business from participation, leaving only big conglomerates to enter in this capital-intense market (See Table 6-1).

Among the three private operators, EBT (www.ebtelco.com) was the first to initiate operation of fixed-network service in January 2001. The operating team was led by China Rebar, the parent company of the cable TV giant Eastern Multimedia Team. The consortium of EBT comprised state-run Taiwan Railway Administration (TRA), and 35 domestic enterprises, including the former ruling party Kuomintang Business Management Committee, Teco Electric and Machinery Co., Hung Tai Group and Shin Kong Group. The foreign shareholder was German Telecom.

NCI became the second private firm in operation in March 2001. This company was headed by Far Eastern Group which owned the major cellular phone operator Far EasTone, and constituted by the KMT-controlled China Development Bank and China TV, the Cathay Life Group and the influential Koo's group. Singapore Telecommunications was the foreign investor, owning 18% of shares.

TFN (www.tfn.net.tw) was formed by Pacific Communications Services (now known as Taiwan Cellular), the island's second largest cellular phone provider. Other investors included the Fubon Group, the Acer Group, the Evergreen Group and the KMT-controlled China Development Bank. State-owned enterprises Taiwan Power and TRA

Table 6-1: Partners of Private Fixed-Network Companies by 2001

Company	Eastern Broadband Telecom	New Century Infocomm	Taiwan Fixed Network Telecom
Main Shareholder	China Rebar (30%)	Far Eastern Group (21%)	Pacific Communications Services (20%)
Other Domestic Shareholder	Kuomintang Business Management Committee (10%), Teco Electric and Machinery Co., Hung Tai Group and Shin Kong Group, etc.	China Development Bank, the United Group, Koo's group, China TV and the Cathay Life Group, etc	Fubon Group, Acer Group, Evergreen Group, Taiwan Cellular, China Development Bank, etc.
State-Owned Enterprise	Taiwan Railway Administration (20%)	Taiwan Power (10%)	Taiwan Power, and Taiwan Railway Administration (10%)
Foreign Shareholder	German Telecom	Singapore Telecom (18%)	Verizon (15%)
Equipment Supplier	Arctel, Cisco, Nortel and Bellcore	Lucent, Nortel, Arctel and Cisco	Siemens, Cisco, Nortel and Lucent
Related License Held by Shareholder	Satellite fixed network (Rebar) Route leasing (Eastern)	Cellular (KGT, Far EasTone) Route leasing (KGT) Satellite fixed network (KGT)	Cellular (Taiwan Cellular) Route leasing (Taiwan Cellular)
Customer Base	Cable TV: 1.5 million	Cellular: 3.6 million Cable TV: 1.65million	Cellular: 3.3 million

Source: *China Times*, 2000; Lin, February 2001, pp.23-24

each had 10% of the company's shares. Verizon of the US was the main foreign investor, with 15% of shares.

The participation of the above three companies in the fixed-network service market was predicted as a challenge to the monopolistic status of Chunghwa Telecom (CHT), which had been the state-run monopoly fixed-network service provider. In 2002, CHT (www.cht.com.tw) had assets of US\$ 13billion-14billion, and employed around 35,000 people. Its annual gross revenue reached US\$5.72 billion (WMRC, 2002: 7). In 2000, CHT made its domestic initial public offering. Until early 2002, the cabinet-level communications agency MOTC held 95.4% of CHT's stock, with the remaining 4.6% in the hands of private investors including 3% owned by its employees. A further public sale of its shares proceeded in the end of 2002, 13% of CHT went to Fubon Group and Cathay Life group which had invested in CHT's competitor TFN (Business Next, p.36).

In their first year of operation, the three private companies made a small amount of revenue, amounting to NT\$ 3.2 billion together. In the following year, their revenue increased to NT\$16.6 billion, more than 5 times the 2001 revenue. But their revenue only accounted for 8.6% of the total revenue of this market, meaning that CHT shared more than 90% of the total revenue. In the first three quarters of 2003, the four fixed-network companies had total operating revenue of NT\$83.5billion. Growth rate was 4.6% compared to the same period in 2002. CHT's market share was 87%, lower than the preceding period of 91.4%. Three private companies together had 13% of the market share, higher than 8.6% of the last year. In terms of their revenue (including international service, domestic long distance and local service), the three private companies together had total operational revenue of NT\$10.8 billion, higher than that of the last year NT\$6.9 billion (growth rate is 57%). CHT's revenue was NT\$72.7 billion, slightly lower than that of the last year NT\$73 billion (He, November 1, 2003).

The private operators predicted total operational revenue of NT\$21 billion in 2003 and NT\$25 billion in 2004, accounting for 13.8% of CHT's income of NT\$182 billion (see Table 6-2). The private companies' strategy was to continue strengthen their international Internet service in which they have the best profit and target at expanding the data broadband application service in 2004 (He, December 1, 2003).

Table 6-2: Operational Revenue of the Private Fixed-Network Operators between 2001 and 2004

<i>Company</i>	<i>Eastern Broadband Telecom</i>	<i>New Century Infocomm</i>	<i>Taiwan Fixed Network Telecom</i>
2001	0.7	1.4	1.1
2002	5.1	7.2	4.3
2003	7	7-7.5	7
2004 (Prediction)	7.5-8	9	7.5-8

Source: He, 2003, p.13

Unit: NT\$ billion

6.1.3 Corporate Power Influences Policymaking

The private fixed-network companies were constituted by domestic conglomerates, KMT-controlled companies, state-owned enterprises, and foreign telecommunications heavyweights. Their corporate power made it easy for them to lobby and influence policy in their favor. The so-called “Rebar Clause” is a significant case of the intervention of corporate power into policymaking, as Chen Ping-Hung (2001) revealed in his case study of fixed-network liberalization.

This controversial clause concerns the capital requirement of a fixed-network business such as the minimum capital sum and the phases of raising funds. The Rebar Group complained that the minimum capital sum of NT\$400 billion was too high and the two-phase process of raising funds was too difficult to achieve on time. They lobbied the government to loosen the rule. At a meeting, representatives of the Rebar Group, including its vice chairman and then legislator Wang Ling-Lin and his congressional colleagues, visited the officials of the MOTC which took charge of the fixed-network licensing to oppose the rule. After the meeting, the agency in charge agreed to extend the

two-phase process of fund raising to a three-phase one. Although the minimum of the capital sum has not been changed, the agency agreed with the Rebar Group's suggestion that the company's established network (in the cable TV business) could be counted as part of its capital sum. The MOTC's compromise helped to lessen the company's pressure to raise fund.

Furthermore, in 2003 the three private fixed-network operators joined together to lobby for their interests of expanding shares in the fixed-network market. The inclusive license these fixed-network companies were rewarded includes international, domestic long-distance and local telephone service. But, after launching their operations, the private operators have only put their resources into expanding international telephone market, domestic long-distance services, and broadband subscription services, but not local telephone service (Liu, 2001, March 24). Due to the logic of capital, the private companies were not willing to invest in local telephone service since it cost too much to build the local loop and rewarded too little in terms of profit. However, these companies did not want to give up the market totally so they asked for government assistance.

As the DGT (2002, p.11) pointed out in its annual report, because the cost of constructing international telephone networks was low and the reward of profit margins was large, all of these new entrants initially focused on the international telephone business. By December 2002 these private operators had taken over 32.16% share of that market. At the same time, they occupied 5.49% of the long-distance market and 1.26% of the local market. With the entry of new firms, the fixed-network telecommunications business no longer offered basic voice communication services alone; in addition to providing a diversity of value-added services, the operators were gradually shifting the focus of their business promotion to broadband and multimedia services.

The thinking of these companies was clearly revealed at a round table meeting held by *Taiwan Telecom Magazine* (Lin, August 2002), in which representatives from these companies expressed their strategies. EBT's strategy was to expand broadband market based on its cable TV network, according to its Vice Executive Manager Cheng Jiyun-Ching. EBT had 160,000 cable modem users based on its cable TV subscribers and 60,000 ADSL users. By acquiring its foe company Giga Multimedia and adding 60,000

users to its consumer base, EBT had a total of 30,000 subscribers for its broadband network service by 2002. TFN made urban areas their priority for network construction including three metropolitan areas in northern, central and southern Taiwan and 12 other cities. The representative of NCI recognized that the state-owned telecommunications operator CHT had long focused its service on the general public. Therefore, NCI tried to maximize its profit by acquiring business customers that CHT ignored. In addition, this company proceeded with resource integration by using the outlets of the cellular phone company Far Eastone, NCI's main shareholder, to promote its fixed-network service.

However, these companies did not want to give up the market if they could figure out a way to reduce the cost. The private companies argued that two major obstacles hindered them from sharing the local telephone market. The first was the problems of acquiring right-of-way from different local governments (such as city or county government) which made it difficult for the private companies to deploy their network. The DGT was asked to help solve the problem by amending related laws. Since the establishment of network infrastructure is a high cost venture and faces the practical difficulties of getting right-of-way, the private companies were urged to rent the local loop from CHT which had sound deployment of the infrastructure due to its long-term national monopoly and its duty of carrying out the principle of universal service. However, private competitors complained that CHT rejected leasing out its local loops at a low price, which caused the second obstacle for private companies to expand their market (DGT, 2002; Lin, August 2002). The Directorate General of Telecommunications, which is responsible for implementing a fair-competition mechanism among telecommunications competitors started to intervene into the conflict between CHT and private operators. To remove the obstacles, on August 20, 2002 the DGT sent letters to the four fixed-network carriers requesting them to start negotiation on general leasing terms and conditions for local loops. On September 26 that year, CHT and the three private carriers began holding weekly meetings for the negotiation of local leasing conditions, procedures, linking methods, leasing prices, and other matters. However, negotiation between CHT and three private carriers saw no significant progress.

Therefore, the three private companies kept lobbying the government in order to force CHT to reduce the rent of its infrastructure.

In a meeting with President Chen Shui-Bian in July 2002, heavyweights from the private fixed-network companies including EBT chairman Wang You-Theng, executive vice chairman Wang Ling-Tai, TFN chairman Douglas Tong Hsu, and NCI vice chairman Lee Tai-Cheng and Tsi Ming-Hsing, stated and pled for a “fair and reasonable” environment in which the private sector could compete in the fixed-network market. They asked for the government’s assistance in obtaining the right-of-way to build the network and lease the last-mile local loop from CHT. President Chen showed his understanding and responded that he would ask the telecommunications ministry MOTC to help the private companies to solve related problems they faced in expanding their business. If the MOTC could not solve the problem, the Executive Yuan would be asked to reconcile the dispute. Chen emphasized that he saw telecommunications liberalization is essential to building an environment for competition (He, July 24, 2002).

Although President Chen, also chairman of the ruling Democratic Progressive Party (DPP), showed consideration for the private sector, not all DPP politicians agreed with sharing CHT’s established infrastructure. DDP legislator Tang Jing-Chyuan held a hearing on October 18, 2002 discussing the policy to release CHT’s local loops to the private sector (Feng, 2002). Tang argued that the policy violated the goal of liberalizing fixed-network service and was in fact a policy yielding to and benefiting private operators. Some legislators also suggested the government should be very cautious about this policy. The MOTC official stated that leasing CHT’s local loop to the private sector would solve the problem of private companies in acquiring the right-of-way for building their networks. The government could force the private companies to build their own network by increasing rents year by year.

CHT staff offered major resistance to the attempt of private competitors to gain access to their loop, criticizing the government for unfairly favoring the private companies by forcing CHT to release its local loop. Representatives argued that to release CHT’s local loops would favor the private fixed-network companies at the expense of the interest of CHT shareholders and the public. According to the *Rule of Managing Fixed-*

Network Telecom Service, the private companies were asked to build 1 million telephone numbers in the six years after their bidding. However, the private companies raised more than NT\$ 200 billion in total but only invested in the fiber optic network without connecting their network to the last mile of their customers. Tang criticized that it is very “opportunistic” of the private companies (Feng, 2002).

Government policy has been made or revised to meet the needs of the private sector first. Yielding to the pressure from the private sector, the DGT at one time planned to lessen its rules on bidding for fixed-network telecom service in mid 2002. The plan was that new bidders had to be able to serve a minimum to serve 0.4 million customers and raise NT\$16 billion of capital amount. The current operators’ obligation would be reduced to connect their network to threshold of 0.7 million customers and raise NT\$16 billion of capital amount. Among these 0.7 million users, 75% could be fulfilled by renting the local loop from other operators. But this plan was objected to by the Minister of the MOTC Lin Lin-Shan. Lin decided that the current operators should keep their promise to fulfill the requirement of their bidding. Therefore, the MOTC reversed the DGT, its subordinate agency’s plan on fixed-network bid. It maintained that fixed-network operators should fulfill the requirement of 1 million users and NT\$40 billion capital amount. This reversal showed the administration’s willingness to strengthen broadband infrastructure by severing the threshold of the bidding for fixed-network telecom service. The administration stated that this reversal was made to fulfill the plans for an E-Taiwan, which sought to build broadband network to reach six million households by 2008 (Jiang, December 3, 2002).

Nevertheless, after less than a year, the government promised the private sector a better offer. In September 2003, the government planned to invest NT\$ 60 billion in three years to build the second common channel for the fixed-network operators. This plan was criticized, according to a news analysis of the *Commercial Times*, as a favor to the private sector at the expense of the public interest and basic social justice (Jiang, September 15, 2003). The *Times* argued that once the government takes over the responsibility of the private sector to build the infrastructure, it becomes the burden of taxpayers as a whole. And it also violates the open-market principle of liberalization. This plan, named “the

Deployment Plan of Connecting Fiber Optic to Nationwide Households” is said to be a concession as a result of the efforts of the private companies which have been lobbying the MOTC and other responsible agencies, even the President. The government was criticized and told that it should make efforts to reconcile the dispute between local governments and the private companies in the process of building the infrastructure, better way than just reducing the cost of the private at the expense of public interests (Jiang, September 15, 2003).

Examining the historical context of the policy of opening fixed-network service, Cheng Chun-Ming (2000) finds a complicated interaction among capitalists, the government and citizens; a process in which the government and capitalists play the dominant role. First of all, the requirement for a minimum capital sum (NT\$400 billion) prevents small business and local groups from applying for licenses. Instead, only large conglomerates and foreign corporations can enter the market. In this way, licensing fixed-network operations became a powerful tool for the government to gain support from big business (Winseck, 1998, p.190, Cheng, 2000, p.63). Furthermore, the government revised rules to meet the needs of private competitors thanks to the lobbying efforts from these competitors. The case of the “Rebar Clause” and the DGT’s intervention into the negotiation between private companies and CHT in leasing local loops all showed the government’s bias in favor of the private sector. The 2003 government policy of investing NT\$ 60 billion in three years to build the second common channel was to solve private carriers’ problems by building local loops with public funding. It obviously benefits the private carriers by exempting their duty of building local loops. Instead, CHT has to suffer from an unfair competitive environment and the public has to give away part of its national tax revenue to private interests.

6.1.4 US Pressure

While private companies strived against the CHT monopoly for their own survival, the government had been in the process of re-opening the fixed-network market since late 2001, just one year after the first bidding took place. The decision of opening the fixed-

network market again was no doubt due to the pressure of the US in Taiwan's process of gaining entry into the WTO (Jiang, December 3, 2002). Based on the promise of Taiwan's accession to the WTO, the telecommunications sector was to be totally opened. Until the end of 2003, all telecommunications services had been open to private competition. However, the US blamed the Taiwanese government for not fully opening its fixed-network telecom market since it only allowed three private operators to enter after the first bidding in 2000. Accordingly, the US strongly pushed the Taiwanese government to re-open the market (Fei, November 12, 2003).

In 2001 the US continued accusing Taiwan of not keeping its promises on telecommunications liberalization in exchange for its entry into the WTO. In March 2001, US representatives requested Taiwan to re-open markets for fixed-network telecommunications and submarine cable services. In the following month, the US Trade Representative (USTR) announced a review of world telecommunications markets, in which it blamed Taiwan for failing to complete liberalization (Guo, April 4, 2001). In May 2001, The USTR listed Taiwan in the observation category of *Super 301* for Taiwan's telecommunications regulations being an obstacle to American corporations' entry into the markets of this island (Hsu, May 1, 2001). In the view of the US, the major obstacles including the threshold of raising NT\$40 billion of capital sum and serving 1 million of customers required just for applying the fixed-network license and the prohibition against submarine cable operators (that the US companies had invested in) on building terrestrial loops and serving terminal users. The US government further used the opportunity of bilateral conversations at the Asia Pacific Economic Cooperation (APEC) minister meeting in June 2001, in which US representatives urged Taiwan to re-open the fixed-network market and lift restrictions on foreign investment and application requirements (Chen, June 6, 2001).

In response to the critique and pressure from the US, the Ministry of Transportation and Communications (MOTC) argued that Taiwan had been following the timetable of liberalization, even exceeding the schedule of opening its fixed-network market in 2000, one year before the promised time. Therefore, Taiwan should not be the target of trade sanctions by the US. Arguing that the US attempted to help its own telecommunications

corporations to operate international service in Taiwan through pressure in trade negotiations, the MOTC refuted that it was impossible to follow US request because the Taiwanese government had to protect the interests of domestic companies as well as the development of its telecommunications industry. The MOTC saw no benefit for Taiwan's telecommunications industry if foreign competitors were allowed to enter its market because, based on the content of negotiation, US companies did not want to take responsibility for those services needing the establishment of infrastructure such as local telephone service. In contrast, the categories the US asked for to have opened were those in which its corporations could easily make profits. Therefore, the MOTC argued "if the government let the US get whatever it requested, Taiwan's telecommunications industry would be severely ruined by the entry of foreign telecom giants (Guo, April 4, 2001).

Despite its extreme discontent with the US, the MOTC finally promised to open fixed-network service again at the eve of Taiwan's formal entry into the WTO, the priority in Taiwan's agenda to return to the international community (Chen, November 27, 2001). In December 2001 the telecommunications regulator DGT, subsidiary unit of the MOTC, called together experts, scholars, and operators to organize a committee for "Coordination with Planning for a Regulatory Mechanism for the Re-opening of Fixed Communication Services". At the end of July 2002, after holding six meetings, the task force reached a preliminary resolution on the re-opening of fixed communications. The main points of the resolution included the reduction of operating restrictions on the integrated fixed-network service, and the opening up of individual licenses for international long-distance, and local network services. The DGT announced consultation documents twice, in August and December 2002, to solicit the opinions of the public (DGT, 2002, p.17).

In its consultative documents, the DGT planned to open the all-inclusive license and single license for local, long-distance and international telephone services. There are two versions of the rule for securing an all-inclusive license: to acquire the capital sum of NT\$40 billion and serve 1 million customers, and to acquire the capital sum of NT\$16 billion and serve 0.4 million customers. If the new bidders' capital requirement is reduced according to the second version, the incumbents' (including EBT, NCI and TFN)

capital threshold will also be reduced to NT\$16 billion. The DGT finally decided to re-open fixed-network service in September 2003 with a slight reduction of the capital sum requirement while maintaining the threshold of being able to serve 1 million customers for all-inclusive licensing (Fei, February 11, 2003).

The incumbent private companies had been operating for more than three years by the end of 2003 and still faced with operating difficulties. To prevent competition from foreign corporations, these companies had been actively opposed to the open policy (Fei, November 12, 2003). In their meeting with President Chen in late 2003, officials from the three largest private companies expressed their opposition against the further liberalization of fixed-network licenses that the government had promised for accession to the WTO. They argued if the government insisted on opening the bidding, it had to be based on a “sound competitive environment”, by which they meant the removal of the threshold of capital sums and customer minimums once the re-opening of fixed-network service could no longer be suspended. This was reported in a joint signed letter sent to the MOTC by leaders of these three private operators (Chen, November 27, 2001). The Taiwanese government’s final decision to re-open the fixed-network market was a victory for US-based transnational corporations (TNCs) the US government. The domestic telecommunications companies, although they had more bargaining power over Chunhwa Telecom than in the first phase of fixed-network liberalization, finally fell to an inferior position when facing TNCs.

6.1.5 The Analysis of the Triple Alliance

According to Peter Evan’s triple-alliance concept, the relationship among the state, TNCs, and local capitalists are characterized by both cooperation and conflicts, as each holds different interests, objectives, and leverage. This alliance began with cooperation in the first stage of Taiwan’s liberalization of the fixed-network telecom market and changed to conflict in the stage of re-opening the market. In the first stage, this alliance reached its mutual interests by forming a joint venture to enter the market. In the stage of conflicts, the state’s autonomy is constrained by its relationship with the international

forces including TNCs, their home countries and international organizations and internal forces led by domestic capitalists. However, Taiwan's government and corporations have less bargaining power against external forces due to its subordinate status in the world system.

Due to its commitment to the WTO, the Taiwanese government lost its overall control of telecommunications through a forced liberalization schedule. However, it still held the control of who was able to enter the market by setting the capital thresholds for entrants and a capital cap for foreign companies. When opening the fixed-network to competition in 2000, the telecommunications agency MOTC required a high threshold of capital sum NT\$ 40 billion for the bidders to start operation, which became a powerful tool for the government to gain support from Taiwan's big business. The three operating teams individually led by conglomerates China Rebar, Far Eastern Group and Pacific Communications Services. These conglomerates already had businesses in media or telecommunications services. China Rebar owned EMT, the country's top cable TV operator. Far Eastern Group and Pacific Communications Services each owned Far EasTone and Taiwan Cellular, two winners among six of wireless service licenses in 1996.

At that time, direct foreign capital was capped at 20% in a domestic telecommunications company and indirect foreign investment at 60%. Therefore, foreign companies had to cooperate with domestic conglomerates with a joint venture to enter Taiwan's fixed-network service market. Under these conditions, German Telecom joined EBT, Singapore Telecom joined TFN, and Verizon of the US joined NCI, carefully kept their shares below 20% of each operator.

The state also actively intervened into the operation of the fixed-network service market with joint ventures with three teams through the state-owned enterprises (SOEs) and the then ruling party KMT-controlled companies. The state-owned enterprise Taiwan Railway Administration had a 20% stake in EBT, Taiwan Power had 10% in TFN, and both SOEs together owned a 20% stake in NCI. The Kuomintang Business Management Committee had a 10% stake in EBT, and the KMT-controlled China Development Bank had shares in both TFN and NCI.

Therefore, all of the three operating teams were constituted by domestic conglomerates, KMT-controlled companies, state-owned enterprises, and foreign telecommunications heavyweights. The triple alliance, TNCs, the domestic state, and domestic capitalists, reached their common interests by jointly investing in Taiwan's fixed-network service operators, the same way as they did in intervening into the country's wireless service market described in Chapter Four.

The interaction and cooperation between the state and capitalists continually occurred on issues as the corporate sector tried to force the government to change regulations in their favor. The so-called "Rebar Clause", a result of the Rebar Group's execution of its power to change the rule meeting their needs, is an example. Utilizing an instrumental theory of the capitalist state, Ralph Miliband (1969) pointed out that the state can be manipulated by the dominant class through a variety of direct and indirect means such as recruitment into positions in the government, membership in advisory committees, lobbying, campaign financing and control of the media and the education system. In the case of Rebar Clause, Rebar Group owned Taiwan's top cable TV MSOs and other media channels with which it could influence the public opinion and government policy. The Group's chairman Wang You-Tsang had a seat in KMT's Central Standing Committee which was the highest decision-making body of the then ruling party which ran the state apparatus. More directly, its vice chairman Wang Ling-Lin was a member of the legislature's Information and Technology Committee which overseeing the administration's telecommunications affairs. The multiple relationships this conglomerate had with the government explain why the government yielded to its request.

Furthermore, in 2003 the three private fixed-network operators succeeded in joining together to lobby for expanding their shares in the fixed-network telecommunications market. Profit goal meant that the private companies were not willing to invest in local phone service since it costs too much to build the local loop. Instead, they requested that the state-owned enterprise CHT should lease its established local loops so that they could easily operate in the local telephone market without spending to build the infrastructure.

This caused direct conflicts between the interests of the state-run CHT and private operators and led to the intervention of the government into the dispute.

For understanding the role of the state in intervening into the conflict between different representatives from the capitalist class, I find the theory of class struggle useful to explain the process in this case. This theory sees the state as a site of interclass and intraclass struggle since the capitalist class does not always act a uniform group with a common interest. Instead, it includes various class factions or industry coalitions organized to promote their interests through state action. In this current case, government policy has been made or revised depending on the strength of mobilization power of each side. Yielding to the pressure from the private sector, the telecom agency DGT at one time planned to lessen its rules of bidding so that the private companies could be exempted from the obligation of building the local loops itself. But the Minister of the MOTC Lin Ling-Shan objected to this plan for insisting that the operators keep their promise to fulfill the requirements of their biddings. Nevertheless, after less than a year, the government promised the private companies a better offer, announcing a plan to invest NT\$ 60 billion in three years to build the second common channel for the fixed-network operators. Consequently, CHT won by resisting the private companies' intention to lease its local loops but would finally face competition from private companies in the local telephone market. The three private operators gained a bigger win by gaining the promised channel without any spending. The cost was transferred to taxpayers since the government planned to use its budget to build the channel. This outcome shows again how the state acts to protect the interests of big business at the expense of the public.

The relationship among the three actors of the triple alliance entered the phase of conflict when the US, on the behalf of US-based TNCs, forced the Taiwanese government to re-open the fixed-network telecom market. The TNCs were not satisfied with just 20% in Taiwan's telecommunications operators and they wanted to have more control and hopefully more profits. US companies urged the US government to negotiate further opening of Taiwan's telecommunications by allowing more competitors and lowering the capital threshold for entry. The US government utilized a variety of means to force the Taiwanese government to re-open its markets such as trade sanctions and

bilateral “negotiations” both at the APEC and the WTO. Backed up by internal pressure from domestic companies, the Taiwanese government at one time resisted demands to re-open its markets. But in the end, Taiwan promised to open fixed-network service, again on the eve of its formal entry into the WTO.

As Sean Siochru and Bruce Girard (2002) argued, the WTO plays a major role in the global governance of telecommunications equipment, infrastructure, and services. This organization acts to provide a forum for trade negotiations between governments, but usually the negotiations are not based on an equal status between countries. Due to unbalanced power between industrialized countries and developing countries, the WTO negotiation became a site the powerful countries expand their interests by forcing the powerless countries to yield to their request. For developing countries, being in one way or another already greatly dependent on the more powerful nations, they have no other option but yield to the rules that western countries initiate due to the fear that failure to comply with the wishes of these powerful countries in the WTO may result in wider threats to their overall well being and security. This explains why the Taiwanese government yielded to the US’s demand for opening the telecom market even the government knew that it would harm domestic interests.

In addition, the liberalization of telecommunications and the execution of broadband policy in Taiwan demonstrated their influence on the unequal diffusion of the Internet. As Poong Hui-Luan (2001, p.39) points out, telecommunications liberalization and the digital divide are two faces of a coin since the digital divide is the phenomenon and result of market failure and economic externalities inherent in telecommunications liberalization. This comment fits the results of the liberalization of fixed-network service in Taiwan very well.

Due to the market rule, the private companies were not willing to invest in high-cost and low-profit areas such as the establishment of local loops and broadband service in rural areas. Before 1996, during the period of national monopoly of telecommunications, the DGT, the regulator and state-owned enterprise at that time, built local loops to fulfill the goal of universal service. In contrast, private operators only invested in those services with low entry barriers such as international and long-distance telephone service. The

practice of private entry into the fixed-network market led to “cream-skimming”, resulting in the competing firms only investing in profitable areas and services. As N. Sinha (1995) argues, the market rule will lead to uneven development, undermining the economies of scale in an integrated system, and will prevent growth of a nationwide structure.

The private operators had been spending their efforts on the establishment of the network community to serve the rich, which caused a new form of social exclusion in terms of geography and technology. Since the consortium of fixed-network operators includes the real estate industry, they have tried to combine their realty business with telecommunications business by building the network community in affluent areas. In 2000, Pacific Communications Service, the main shareholder of TFN, signed a contract with Minghwui Community, Taipei, to build a broadband network community. Rebar Group, the main shareholder of EBT, built a broadband network community in Chingmei, Taipei, and an experimented network in Hsinchu Science and Industry Park. This kind of network communities, providing community space with technological infrastructure and other convenient facilities such as schools, shopping centers and community parks, have influenced the development of communities and urban planning. It is argued that this kind of development will lead to the direction of public policy toward the establishment of the specific information suburbs instead of a more inclusive information society (Winseck, 1998, p.306). In his analysis of the new media district in New York, Vincent Mosco (1999) found a significance of transformation of community outlook and governance. In the district where high-tech workers and their families reside, the private service companies have been put in charge of community security including policing the streets, managing the parks, hauling away trash and removing the homeless. Surrounded by advanced technology, the wealthy protect themselves in safe and exclusive neighborhoods, while moving away the poor from their community and the concern of public policy (Mosco, 1999).

The government relies on the entry of private competitors to promote broadband service, which has been viewed as a critical technological advancement for building Taiwan into a digital island. The concept and application of the above proved to be a

cause of the enlarging digital divide. Furthermore, the basic concern that has never been raised is whether broadband service is a necessary technology that people really need. It has been argued that the industry in discussion creates and promotes the need for a fixed-network at the expense of real social needs and alternative options (Cheng, 2000, p.62). The MOTC survey results discussed in Chapter Five show that Internet users and people who are never online have different concerns about Internet policy. Internet users see a decrease of expenditure (35.8%) and an increase of bandwidth (22.4%) as the primary issues. Those who do not use the Internet confront with the difficulty of skills developing and training instead of the problem of bandwidth and online speed. Given the people's real concerns, the broadband policy that the Taiwanese government highlights, to its best, can only satisfy the privileged group who already have been included in the digital world. Therefore, telecommunications liberalization and broadband policy, in theory and in practice, has provided little for bridging the digital divide because it neglects the needs of the excluded people.

6.2 Globalization and Information Technology in Taiwan

As many digital divide researchers point out, the information technology (IT) capacity of individual country can serve as an indicator of the global digital divide and one crucial factor and dimension for some newly industrial countries such as Taiwan and South Korea to catch up with advanced industrialized countries. However, Taiwan's IT development, under strong state intervention, is dependent on the US and the global division of labor which makes it vulnerable to threats from other developing countries especially China. This case study of integrated circuit (IC) manufacturers' move to China tells part of the history of dependent development, focusing on how the state and corporations act to solve the production crisis of Taiwan's industries.

6.2.1 Taiwan's Science and Technology Development

Taiwan has been recognized as one of the East Asian development models for its aggressive efforts in strengthening indigenous science and technology to boost economic growth (Wang, 2003, p.196). The Taiwanese government has played a key role in promoting IT production and IT use as an “initiating mechanism” (Simon, 1993) with a close interaction with the private sector.

According to Wang Hsiao-Hui (2003), the Taiwanese government adopted dual IT promotion plans starting in the 1980s as part of its aggressive attempts to sustain Taiwan's competitive advantage. On the one hand, it designated the information technology industry, telecommunications, and semiconductors as strategic industries. The Taiwanese government initiated incentives to encourage these key industries to develop their roots locally and establish competitiveness globally. The government provided tax incentives and full-facility science parks to encourage entrepreneurs to develop those key industries locally and exporting final products globally.

On the other hand, the government has recognized the benefits of IT adoption to the entire economy. The government formulated national information plans to expedite IT adoption in both public agencies and the private sector. The Institute for Information Industry was established as the agency in charge in 1980, under the direction of the Executive Yuan, with two major missions. First, the primary purpose of IT development was to develop the technology industry as a major export sector in the economy. Second, it was expected that applying information technology in government agencies and all other industry sectors would enhance government efficiency and improve labor productivity.

While the government's efforts in promoting IT applications has been introduced in Chapter Five, this section focuses on how the government created a beneficial environment for the growth of domestic technology companies. The story began in the 1970s while Taiwan was facing the global oil crisis and domestic poverty. Even worse, the formal diplomatic relationship between Taiwan and the US was damaged in 1979, which isolated the island from the world political arena. The removal of the US security

umbrella forced Taiwan to begin a strategy of industrial transformation, with a focus on technology-led development for achieving self-reliance (Lin, 1998).

However, US relations continued with its promise of protecting Taiwan under the *Taiwan Relations Act* and its influence on the formation and development of Taiwan's technology policy and industry. To promote comprehensive development of national science and technology (S&T), the Executive Yuan promulgated the "Science and Technology Development Program" in May 1979 as guidelines for its ministries, councils, and agencies. This program also established the Advisory Board of Science and Technology in the Office of the Premier which advised the premier and relevant cabinet members either collectively, or individually, on the government's science and technology future development options. To ensure the effective operation of the advisory board, a mission-oriented Science and Technology Advisory Group (STAG) was established in December 1979, which later worked as the driving force of the NII project in 1994 and E-Taiwan project in 2002. The primary missions of the STAG include: providing recommendations on national development policy and important S&T programs or projects, sponsoring and organizing board meetings and various strategic review board meetings, steering S&T development programs or projects designated by the cabinet, collecting important S&T development information, consulting, and other relevant matters assigned by the premier.

In its first term, the STAG constituted of five internationally prestigious leaders from various S&T fields and most of them were from the US. For example, the first-term chief advisor Patrick Haggerty was ex-chairman of US-based Texas Instruments. He helped build the first US electronic manufacturing factory in Taiwan and promote the interaction of IT companies between America and Taiwan. He also recommended his colleague in Texas Instruments, Morris Chang, to return home to start his business, Taiwan Semiconductor Manufacturing Company (TSMC). TSMC later became the world's IC founding leader, and that Chang gained himself the honorary title as "Father of Taiwan's semiconductor". The second-term chief advisor Frederick Seitz served as Chair of US National Science Foundation. His contributions to Taiwan's technology development were the initiations of the Committee of Science and technology

Cooperation between Taiwan and the US to facilitate the interaction of technology experts between the two countries. The third-term chief chairman, Ian Ross, served as the Honorary President of the Bell Research Institute. Ross was influential in Taiwan's IT policymaking and telecommunications (NSC, 2003, pp.1-6).

After 1998, the STAG enlarged its board members to invite a number of eminent local and overseas S&T advisors. Local advisors attended all of the science and technology meetings held by the Executive Yuan and jointly formed a consultative board for the entire cabinet. Until 2003, the STAG consisted of 20 members, among which nine were foreign advisors, including eight from the US and one from Belgium. Among eleven local advisors, TSMC Chairman Chang and Acer Chairman Stan Shih sat along with other representatives from national universities and research institutions. In this way, the government opened the door for IT entrepreneurs to directly and deeply influence its policymaking.

Besides the STAG of the Executive Yuan, there are several agencies responsible for the development of science and technology in Taiwan. The National Science Council (NSC) has been playing the key role as a ministry of science or technology in facilitating policies for technology-led development at the national level since the 1970s. In order to upgrade Taiwan's research capabilities, the Industrial Technology Research Institute (ITRI) was established in 1973 under the Ministry of Economic Affairs (MOEA) as the R&D incubator to promote technological leverage as well as a development fund to promote financial or capital leverage. The NSC has provided an institutional framework through which the country's technical talents and specialists are encouraged to devote themselves to technology upgrading and R&D. One of the most acclaimed decisions of the NSC has been its launching of the Hsinchu Science Park (HSP).

Since its establishment in 1980, the HSP has strived to develop a favorable environment for investment, to attract high-tech talent, to introduce advanced technologies, and thus to promote domestic industry. By 2003, the government had invested approximately US\$1,006 million in the Park's infrastructure. Following decades of efforts, the HSP, claiming itself "the Silicon Valley of Taiwan", has become a symbol of Taiwan's success in technological development and economic growth. Therefore, the

Taiwanese government is actively developing the bases of the Park at Chunan, Tungluo and Duhsin, together with the development of the Southern Taiwan Science Park, Luchu Base, and the Central Taiwan Science Park, hoping to duplicate the success of the HSP. These science parks will be served by high-speed railways, estimated to launch their operations in 2005, thus to form the island's corridor of the hi-tech industry (GIO, 2003, p.179).

Many factors have contributed to the success of the HSP including research environment, governmental support, and the reverse brain drain. The HSP is located near both National Tsing Hua University and National Chiao Tung University. National Tsing Hua University is a multidisciplinary research university, with seven colleges, 9,017 students and 504 professors. National Chiao Tung University has five colleges, 11,251 students and 562 professors. Both institutions support professional training and provide the Park's companies with excellent human resources. Located five kilometers east of the Park, the ITRI, a national, government-sponsored non-profit organization for applied research, has seven laboratories, which focus on electronics, optoelectronics, computing and communications, materials, mechanics, chemical engineering, and energy and resources. It also has five research centers, covering aviation and space, measurement standards, nano technology, biomedical engineering, and industrial safety and health technology, with a total of over 6,000 researchers. The Park also includes three national laboratories, namely the National Center for High-performance Computing, the Synchrotron Radiation Research Center, and the National Space Program Office. Supporting research organizations include the Precision Instrument Development Center, the Chip Implementation Center and the National Nano Device Laboratories in National Chiao Tung University. These organizations collaborate closely with the Park's companies in research and development (HSP, 2003).

Technological assistance offered by industrial research institutes and academic circles contributed to the development of IT companies. Since its establishment in 1973, the ITRI has developed numerous technologies and transferred lots of technologies to private companies. Over 40 companies in the Park are ITRI spin-offs, including UMC (1980), TSMC (1987), MIRLE Automation (1988), the Taiwan Mask Co. (1989) and

VSIC (1994). About fifty percent of the companies in the Park have established technical relationships such as joint R&D, technology transfer, and technical services, with the ITRI (Lin, 1998).

At the end of December 2003, the HSP has accommodated 369 companies, including 320 domestic and 49 foreign ones. Among the domestic companies, 101 were established by returned overseas Taiwanese (See Table 6-3). These firms contributed to the total revenue of US\$ 20,453 million, representing an annual growth of 4.2%. The total paid-in capital of the park was US\$ 27,854 million, 93% of which came from domestic sources while the remaining 7% came from overseas. According to statistics published by Industrial Technology Intelligence Services (ITIS, MOEA), the production of IC industries in Taiwan in 2002 grew by 23% over the previous year. The 136 IC firms in the HSP also performed well, creating sales revenue of US\$ 13,265 million, representing a growth rate of 19%.

Table 6-3: Established Enterprises in the Hsinchu Science Park in December 2003

Category		No. of Enterprises	Registered Capital	%	Paid-in Capital	%
Domestic Company		320	1,321,973.54	96.63	959,117.85	96.63
	Overseas Taiwanese	101	378,232.24	27.65	260,359.41	26.23
	Other	219	943,741.29	68.98	698,758.44	70.40
Foreign Company		49	46,082.16	3.37	33,472.64	3.37
	Overseas Taiwanese	18	14,827.10	1.08	9,941.54	1.00
	Other	31	31,255.06	2.28	23,531.10	2.37
Total		369	1,368,055.69	100	992,590.50	100

Source: HSP, 2003

The quality of human resources appeared to be the foundation of the development of the HSP. The total number of employees was 97,435 in 2003, and approximately 66% had at least a bachelor degree. Furthermore, the average age of the employees was 32,

and the ratio of male to female workers was 50-50. Returned overseas Taiwanese (most from the US) numbered 4,318 people, who are believed to play a crucial role in the Park's activities because the technologies and business concepts they have brought back during the past two decades have taken roots and been developed to promote high-tech industries in Taiwan (HSP, 2003).

Annalee Saxenian (2002) conducted a research on HSP enterprisers from the perspective of transnational communities and global production networks. She observed that Taiwan's policymakers created an environment that attracted US-educated engineers to return home, and that these technology experts accelerated the pace of industrial upgrading of Taiwan's personal computer and semiconductor industries beyond the expectations of the policymakers. For example, Morris Chang returned to Taiwan to start TSMC in 1987 after getting his Ph.D. in the US and working for Texas Instruments for a period. From a spin-off of the ITRI, TSMC grew to be the world's top chipmaker. Wu Miin, a Ph.D. from Stanford University, returned to Taiwan in the late 1980s after working for Silicon Valley-based semiconductor companies including Siliconix and Intel. Brought back 30 senior Silicon Valley engineers with him, Wu established his own semiconductor company, Macronix, which became the first Taiwanese company to be listed on NASDAQ in 1996.

Saxenian found that Taiwan-born and US-educated engineers have the professional contacts and language skills to function fluently in both the Silicon Valley and Taiwanese business cultures and simultaneously to draw on the complementary strengths of the two regional economies. As engineers travel between the two regions, they transmit technical knowledge as well as contacts, capital, and information about new opportunities and new markets. Saxenian (2002, p.10) saw the growing integration of the technological communities between Silicon Valley and Hsinchu offers benefits to both economies. Silicon Valley remains the center of new product definition and the development of leading edge technologies, while Taiwan offers world-class manufacturing, flexible integration and access to key markets in China and Southeast Asia. The development of Taiwan's IT industry confirmed the theory of new international division of labor: the development of the core does not necessarily lead to underdevelopment of the periphery.

In fact, Taiwan's IT industry and gross economy benefited from the global division of labor.

However, the relationship between Taiwan and the US is not interdependent as described by development scholars; it is more dependent upon the offshoring strategy and needs of US-based IT companies. Lack of core knowledge and skill in defining new products, Taiwan's IT companies can only share benefits by smoothing out the manufacturing and delivery process which in turn led to a lack of R&D sector in the industry.

In 2001, the companies in Hsinchu Science Park spent US\$ 1,429 million on research and development, representing 7.29% of the total sale revenues, above the average R&D investment of 1.3% of revenue by Taiwan's manufacturing industry. Of the R&D spending of US\$ 1,429 million, the IC industry invested the largest sum, US\$ 1,017 million, and the biotechnology industry invested most, 20%, as a proportion of revenue. The companies in the Park employed 9,023 R&D related professionals, representing 9.4% of all employees, in which the IC industry employed 4,915 of these researchers.

Although IC companies invested more in research and development compared to other manufacturing businesses, the sums and rates of R&D investment of Taiwan's IC companies lag behind those of world leading IT companies. Most Taiwanese companies invested in the improvement of production process to keep their advantage in the foundry area instead of the innovation of new standards and skills. Therefore, they could not upgrade skills. The data of MIC shows that the total research budget of Taiwan's top 12 information hardware companies lag far behind of that of international IT companies such as IBM and Microsoft. These 12 companies include Hong Hai and Acer and their production value in total amount for 60% of the industry. In 2002, Taiwan's top 12 companies invested only US\$ 408 million in research and development, while Microsoft invested US\$4,307 million and IBM US\$4,787 million. Japanese companies Fujitsu invested US\$2,302, Hitachi invested US\$3,195 million, and Sony invested US\$3437 (MOEA, 2003, p.15-9). As described in previous chapters, IT industry is a highly concentrated one in which transnational corporations based in western countries dominate global market (e.g. Microsoft in the software sector, IBM in the computer sector). In

Taiwan, the IT market is also dominated by a few companies such as TSMC and UMC in IC foundry and Acer in computer manufacturing. However, the big multinationals are capable of investing in R&D and facilitate it to dominate markets. Through the protection of the intellectual property such as patents, TNCs can keep leading the market by keeping core knowledge in their possession.

For IT companies in developing countries such as Taiwan, without controlling core knowledge, they can only integrate into the production chain by offering quality foundry and timely delivery. However, it cannot be denied that foundry production is just a low-level skill and is easily to be replaced. With the opening of the Chinese market which offers lower production cost, Taiwan's IT industry is facing the challenge of upgrading its workers' skills as it has lost its advantage of lower production costs.

6.2.2 China's Technology Development and Market Openness

China, the long-term political foe of Taiwan, has gradually become the main partner and competitor of Taiwan's IT companies due to its IT development and open-market policy. This section gives a basic introduction of China's economic transformation and information policy, serving as a background for further understanding how the China factor influences Taiwan's IT industry and policy that will be further illustrated in the next section.

China has been experiencing an economic reform from a communist system to a socialist market economy. In the first 30 years after the founding of the PRC, the Chinese government carried out planned economy, with targets and quotas for various spheres of economic development set by the special "planning committees" of the state. At the end of the 1970s, the gap in economic growth between China and other countries forced its leaders to begin reforming the country's economic system. Under Deng Xiao-Ping's leadership, reforms began initially in rural areas in 1978 when the household contract responsibility system was introduced there. In 1984, the economic restructuring shifted from the rural areas to the cities. In 1992, after years of reform and liberalization, the Chinese government formalized its policy to establish a market economy. In 1997, the

Chinese government stressed that the non-public sectors of the economy are an important component part of the socialist economy, in which private capital was encouraged to invest in strategic industries such as information and technology industry (China Internet Information Center, 2003).

The development of the high-tech sector was accelerated by the economic reforms of the late 1970s, which created a sense of national urgency because China needed to catch up with the West in key areas such as information technology so as to boost its economic growth. According to Xin Fan (2001), domestic and international pressure forced China to invest in technology development. Domestically, China suffered from poverty and faced an urgent need for economic growth. Internationally, the global capitalistic expansion and technology innovation led by western countries and TNCs inspired China to view information technology as an engine for China's further progress.

In October 1982, the State Council established a Computer and IC Leading Committee to steer the development of fundamental high technology. Inspired by the western concept of the "information society", Chinese leaders recognized the importance of IT and its application. Therefore, the Computer and IC Leading Committee was reorganized and renamed as the Electronic Development Leading Committee which proposed a strategy for the development of electronics and IT industries. According to the strategy, the IT industry had to be transformed to serve the needs of national development and social life, and that the electronic industry had to be based on the development of key fields in IC, computer, telecommunications and software. The Ministry of Science and Technology (MOST) has been the highest-ranking governmental agency in charge of the research and development of high-tech products, many of which require intensive investment and know-how. The Ministry of Information Industry is engaged in the marketing and production of high-tech goods.

Several initiatives were designed and proposed for developing China's high-tech sector. The Torch Program was approved by the Chinese government in 1984. Its original objective was to promote the development of science and education and to transform laboratory projects into commercial products, thus improving China's competitiveness in the international market. In March 1986, the influential National High-tech Research and

Development Plan (863 Plan) was initiated. The government invested in RMB\$ 10 billion (US\$1.21 billion) of which IT-related investment accounted for two thirds (Lu, 2002, pp.51-53). The 863 plan aims at promoting excellence in scientific research and building a national capacity in high technologies that can compete with western industrialized countries. Under its umbrella, state research funds have been allocated to leading universities and institutions such as the Chinese Academy of Sciences, which are engaged in strategic R&D activities. Its projects embrace telecommunications, optical-electronics, artificial intelligence and information processing, as well as space technologies and biotechnologies (Dai, 2003, p. 9).

One of the key tasks of abovementioned programs was to establish new high-tech development zones. From the experience of Silicon Valley in the US and HSP in Taiwan, the Chinese government thought of it as an inevitable step in facing the challenge of competing in world markets, which also coincided with China's "open-door" policy in general. By 2000, there were fifty-three high-tech parks in China, housing 16,000 companies and employing 1.84 million workers. These parks included companies in different industries such as electronics, IT, communications, bioengineering, energy and new materials. In 2000, revenues from these parks reached RMB\$650 billion (US\$78.3 billion) and generated exports worth US\$12 billion (Lin, 2003, p.25).

To attract companies and talents to the park, high-tech parks shared common policies such as offering tax exemptions for start-up business and providing housing and convenient facilities for employees there. The Chinese government also adopted flexible measures to attract overseas Chinese to return home. Official statistics show that about one-third of government-sponsored student/scholars have returned to China, and a substantial number of them are working in high-tech parks (Lin, 2003, pp.27-28).

The development of high-tech and information technology was united under the label of "informatization" in 1993 when a series of Golden Projects¹⁸ were initiated, which

¹⁸ To name a few, these projects include: nationwide economic information backbone network, electronic monetary and modern payment system, foreign trade information sources network, electronic taxation system, industrial production and circulation information network, comprehensive agricultural management and service information system, education and scientific research computer network and human resource project, and health care network system.

highlighted the development of three nationwide information networks. The Golden Bridge, Golden Card, and Golden Customs intended to facilitate the development of many sectors, such as taxation, agriculture, health care, education, commerce, and business management.

In January 1996, the National Leading Group on Informatization under the State Council was established as the highest instructing and coordinating institution for information policy. In the same year, the State Planning Commission formally approved the first stage of Golden Bridge Project and listed it as one of the major projects for the 9th Five-Year Plan. The informatization program was further highlighted in the 10th Five-Year Plan in 2000. In Premier Zhu Rong-Ji's report on Outline of the 10th Five-Year Plan at the Fourth Session of the Ninth National People's Congress March 5, 2001, informatization program included the following issues,

Developing new and high-tech industries, and using information technology to stimulate industrialization. In accordance with actual situations, we need to selectively stimulate development of new and high-tech industries such as information technology, bioengineering and materials science. We need to lend support to important high-tech projects, such as high-speed, wide-band information networks, key integrated circuits and new-type carrier rockets in order to strengthen China's new and high-tech industries on an overall as well as individual basis. We need to expand the manufacturing of information technology products, develop the ability to manufacture all components of integrated systems, and enhance our capability for independent development. We also need to develop the software industry, strengthen the development of the information infrastructure, and apply digital and network technologies extensively in the technical development, production and marketing activities of enterprises, and in public services and government administration, so that industrialization and the information revolution go hand in hand.

China's leaders recognized the impeccable significance of informatization in the national overall development. In the first meeting of the national leading group on informatization¹⁹ in December 2001, several principles were confirmed to promote information infrastructure which highlighted market orientation and competition as the

¹⁹ In August 2001, the group was formed in accordance with a decision by the CPC Central Committee to strengthen leadership over the development of the country's information technology.

major rule. The government's role has been the forerunner to trigger the informatization development. From these principles, Chinese information policy echoed the principle of the US, insisting on the dominance of the market in establishing and promoting the information infrastructure.

China's entry into the World Trade Organization in 2002 signified the major step toward marketization and globalization. On 27 September 2001, almost 15 years after negotiations on its admission began, China finally accepted the terms of its entry into the WTO with the 142 member governments and legally became a member of the WTO at the end of 2001. China has opened its market to the world by eliminating import tariffs on IT products and allowing more foreign capital investment in its telecommunications industry.

With regard to the IT sector, China followed the *Information Technology Agreement* signed in 1997 after its entry into the WTO. According to the agreement, any participatory country has to reduce tariffs to zero on 200 kinds of IT products, divided among computer, telecommunications equipment, IC components, IC manufacturing equipment, software and scientific research equipment. Since 1999, China has levied an average tariff between 39% and 53% on these imported products. By eliminating the tariffs, China's tax revenue will decrease since IT importation tariffs had accounted for a major part of its national income. Additionally, the elimination of importation tariffs means the removal of one crucial measure to protect domestic products. Foreign products will gain competitive advantage and threaten the market share of domestic products (Lu, 2002, p.438).

For a long time, China's telecommunications sector was the least liberalized in Asia and relatively closed to foreign investment (WMRC, 2002). But this is expected to change after China's accession to the WTO. China has processed institutional and industrial reform for its acceptance by the WTO in the 1990s. The Chinese government made efforts to separate regulatory and operational agency and divide state-owned telecommunications company, China Telecom, into four units. China's commitment to open its telecommunications service market to foreign capital addressed the last crucial step to conform to the WTO requirements. In preliminary agreements reached with the

US, the Chinese government pledged to permit foreign investors to hold up to a 49% stake in value-added services after two years of its accession, 49% in basic mobile voice and data services after three years of its accession, and 49% in domestic and international services after six years of its accession (See Table 6-4).

Table 6-4: China's Commitment in Telecommunications Services for Entry into the World Trade Organization

Types of Service	Maximum FDI Threshold
Value-Added Services	30% on accession, 49% one year post accession, 50% two years post accession
Basic Mobile Voice/Data Services	25% on accession, 35% one year post accession, 49% three years post accession
Domestic and International Services (Voice, Packet and Circuit Switched Data Service, Fax and International Closed User Group Voice and Data Services)	25% three years post accession, 35% five year post accession, and 49% six years post accession

Source: WMRC, 2002 , p.56

After several years of heavy investment in IT development, China has emerged as a substantial player in the global digital market place. Its advantage of low cost of production attracted foreign companies, transforming China “the factory to the world”. Take the information hardware as an example, China's production value was US\$18,455 million in 1999, ranking the fourth in the world, after the US, Japan and Taiwan. In 2000, China surpassed Taiwan with a hardware production value of US\$25,535 million. In 2002, China surpassed Japan with its production value of US\$35,225 million and ranked second in the world. While most leading countries, including the US, faced a decline in their production value since 2000, only China kept growing in its production value of information hardware.

Although the penetration of IT in China is still low compared to that of advanced countries, China's huge population base (1.2 billion) makes its IT market one of the biggest in the world. China has the world's second largest fixed-line telephone network, largest mobile phone network and largest cable TV network. The number of Internet users only ranked second to the US in 2003. China's accession to the WTO and the liberalization of IT and telecommunications markets will no doubt attract more foreign companies to compete in this potential market.

6.2.3 Taiwan's Entry into China's Computer Chip Market: The Debate

In 1992, investment in the mainland by Taiwan businesses was legalized, which quickly pushed China to the top of the list of Taiwan's outward foreign investment. By 2001, China had become Taiwan's third largest trading partner, and Taiwan had become the fifth largest foreign investor in China. By 2001, Taiwan's business sector had invested over US\$19.9 billion on the mainland. IT companies have actively shifted their production to China. By 2001, Taiwan's IT hardware industry made production value of US\$42.750 billion, in which 36.9% was made in China, while 47.1% in Taiwan and 16% in other countries. In 2002, Taiwan's IT hardware industry shifted more production to China, while 46.9% of its production value (US\$47.845 billion) was made in China, leaving only 36.3% in Taiwan (See Figure 6-1). Until 2001, the semiconductor industry was prohibited from investing in China due to considerations on economy and national security of the Taiwanese government.

In early 2002, Taiwan's semiconductor industry was at the heart of a heated political debate for its intention to move into the Chinese market. Morris Chang, Chairman of TSMC, had showed his eagerness to invest in China since late 2001, for China has made up one of the world's biggest markets that TSMC could not ignore. Chang's opinion generated high attention and high tension in the government and the society at large because TSMC was the world's leading semiconductor manufacturer which has great impact on Taiwan's economic growth. But TSMC's willingness to invest in China,

Taiwan's long-term foe, was too politically sensitive to be recognized and accepted by the government and some civil groups.

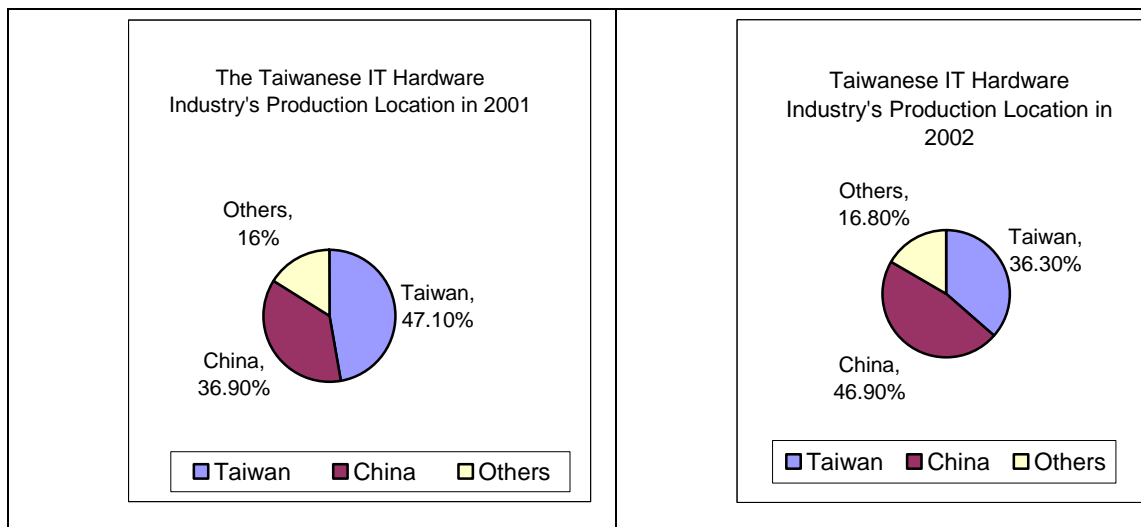


Figure 6-1: The Taiwanese Information Technology Hardware Industry's Production Locations by Production Value in 2001 and 2002

Source: ITIS Project, MIC, November 2002.

Some said that greater freedom of industry activities was necessary if Taiwan's chipmakers are able to compete with foreign rivals in the world's third-largest semiconductor market. Many had voiced their concerns over national security and feared that Taiwan's industries will be hollowed out if the government allows local companies to relocate themselves to China. Some even said that Taiwan's blind push for investment across the Strait may not only enhance Chinese power but also send a signal to the US that Taiwan is slowly moving from economic to political integration with China. The unique political relationship between Taiwan and China, nevertheless, had complicated the issue (Ko, March 30, 2002).

A report published earlier in 2001 by the National Security Bureau (NSB), Taiwan's equivalent of the US' Central Intelligence Agency, said that the government should use "all means at its disposal to stem the flow of high-tech investment to China" (Nystedt, January 1, 2002: 17) because local investors would become the political pawns of Beijing. The NSB found the chip industry particularly sensitive. Besides its widespread

application in IT industry, sophisticated computer chips are used in a wide range of military hardware - most importantly missile guidance systems. This is a major reason the US government bans the sale of the latest chipmaking equipment to China. This is also one of the major concerns of Taiwanese government in dealing with this issue.

The main opposition to allowing chipmakers to invest in China came from the Mainland Affairs Council, the highest administrative agency responsible for cross-straits relationship. The chairwoman Tsai Ying-Wen described the lifting of the ban on the two leading chipmakers TSMC and UMC as “two tigers” who would bite “the little rabbits” represented by Taiwan’s small IT companies. Tsai shared similar concerns on national security and economic development as a whole with other high level political officials such as Vice President Lu Hsui-Lian and Secretary-in-General of the Presidential House Chen Shih-Meng. In addition, the Labor Council worried about the rising layoffs and unemployment rates if semiconductor companies actually move to China.

Nevertheless, some cabinet-level agencies supported the chipmakers that the movement of semiconductor production from Taiwan to China was urgent since other international manufacturers had begun to build factories in China. Once these factories became operational, orders for Taiwan manufacturers were likely to be reduced. Lifting the ban would help the business expand to China and strengthen its international competitiveness and, finally, benefit Taiwan’s economy. The Ministry of Economy Affairs and the National Science Council also held this viewpoint.

Many IT companies applauded Chang for challenging the government’s ban, for they expressed the necessity of a more flexible policy on cross-straits trade. However, not every company shared the same interest with TSMC. UMC and Powerchip Semiconductor Corp. (PSC), the competitors and followers of TSMC in semiconductor manufacturing industry voiced their opposition in the beginning when Chang proposed his plan to invest in China. UMC Chairman Robert Tsao responded to Chang’s views by pointing out the invalidity in the statement that the semiconductor company would lose its competitiveness without its investment in China. PSC Chairman Frank Hwang argued too that it was too early for Taiwanese chipmakers to move to other countries since there was still room for upgrading processing technology of the companies. However, the

disagreements among the companies were soon resolved since they shared the long-term interest of forcing the government to remove its hand from the market, both domestic market and international. Chang also strived for support from other IT companies (e.g. Acer) and traditional manufacture (e.g. Formosa Plastics). In early 2002, Acer chairman Stan Shih joined Chang in urging the government to lift the ban, which put greater pressure on the cabinet. Shih and Chiang were leaders in Taiwan's computer industry and IC industry, and they all served as members of the Science and Technology Advisory Group which directly advised the cabinet on science and technology affairs.

In fact, the outflow of Taiwan's capital to China is not something that started in 2002. It happened long before the government started to consider adjustments to its cross-strait trade policies. The government has been under constant and intense pressure to loosen or even eliminate barriers to direct economic exchanges with China. In light of this pressure, under the leadership of the DPP's Chen Hsui-Bain, the Economic Development Advisory Conference was convened in August 2001 which proposed replacing former president Lee Teng-Hui's "no haste, be patient" policy with one of "active opening and effective management" for increased economic relations with China (Ko, March 30, 2002).

China's vast and rapidly expanding market potential, cheap land and labor, in juxtaposition with the fear of losing out to competitors who are already there, prompted Taiwanese capitalists to pressure the government to liberalize investment restrictions. As a result, the government shifted its target consideration --from the indecisiveness to lift the ban to the management of process and effects of chipmaker's moving to China. The government speculated a plan that would limit chipmaking investments in China to less up-to-date technology, such as chip etching on eight-inch wafers using 0.25 micron processes and other less-advanced technology (Nystedt, January 1, 2002) to reduce the risk of jeopardizing national security.

The civil groups finally voiced its opposition. On March 9, 2002, approximately 1,000 people protested in the streets of Taipei to oppose the government's decision to conditionally lift the ban for leading semiconductor manufacturers to build eight-inch wafer foundries in China. Organizers of the demonstration, the Taiwan Association of

University Professors and the Taiwanese Engineers' Association, appealed to the government to postpone the decision until the production of 12-inch wafers became more widespread. They said changes of policy would harm the nation's industrial and economic development and exacerbate the rising unemployment rates. Around 1,000 protesters – mostly supporters of the Taiwan Solidarity Union, the Friends of Lee Teng-Hui Association and the Taiwan Independence Party – participated in the march. Some DPP members also joined the event (Lin, March 10, 2002). The demonstrators feared that allowing chipmakers to invest in China will cause a hollowing out of the industry as chipmakers moved their foundries across the Strait. They also feared that China would gain a technological advantage in this sector over Taiwan, one of the few remaining political bargaining chips Taiwan has against China's huge market, army and growing international political clout.

Finally, on March 30 of 2002, Premier Yu Shyi-Kun announced that the government would allow local chipmakers to transfer depreciated eight-inch wafer fabrication machinery to China on the condition of certain requirements to be met. The government would also review the possibility of whether to allow new machinery of such foundries to be set up in China in two years. To reduce the negative effect of allowing local chipmakers to set up wafer foundries in China to the minimum level, the government will institute a comprehensive and effective management mechanism. Yu promised that the government will “make sure that the key technology, talent and capital do not flow to China in a bid to maintain Taiwan's high-technology competitive edge” (Ko & Hsu, March 30, 2002). After three months, TSMC proposed the first application for its investment in Shanghai and was approved by the government in 2003. Before the official approval, TSMC factories had been under construction by the full aid of Shanghai municipal government.

The success of the IC manufacturing company's move to China tells the story about the decline of state power in the global capitalist system. The comment from a professor in International Relations reveals the mainstream ideology of globalization that prevailed nationwide and pointed out the dilemma faced by the government. Lee Kuo-Hsiung, deputy director of the Institute of International Relations at National Chengchi

University, commented that it was impossible for a democratic country to ignore the free-market system in an era of globalization and of the lure in China. “How do you expect to persuade your people to ignore a market which is so big and so close to you geographically?” he asked. “Besides, as the world economy becomes more globalized, the governments’ power gradually decreases while market forces grow” (Ko, March 30, 2002).

The Taiwanese government has transformed from a “leader” of IT development in the 1980s to a “partner” of IT companies since the 1990s. With the growing scale and competitiveness of the private IT sector, the government gradually lost its bargaining power when facing the pressure from the business and only yield to the interests of the business. Situated in semi-periphery in the world system, Taiwan’s IT corporations face the crisis as China emerging as “the factory to the world”, at the same time figuring out ways to invest in China and diminish the capability of Taiwan’s state to regulate and control businesses activities.

Furthermore, the development of the IT industry in Taiwan again supports the arguments of dependent development theory. The growth of Taiwan’s economy and IT industry is based on technological dependence on advanced countries, especially the US. The government’s reliance on US advisors for policymaking in science and technology and the enlisting of US-educated engineers in IT industry established a strong tie between Taiwan and the US. In the 1990s, US information technology companies invested in Taiwanese IT industry and sought for cooperative partners in technology-related components. Taiwan’s leaders considered it a great opportunity to become participants in the global division of labor while TNCs viewed Taiwan a main original equipment manufacture (OEM) center. While US companies control know-how and core knowledge, Taiwanese companies smooth out the production process by building and strengthening its foundry capability. Consequently, its long-term dependence on technology transfer from IT advanced countries led to the lack of the capability in research and development.

In the past, the competitive advantage of IT industry in Taiwan was based on the low cost of land, labor, and production. With the increase of production cost in Taiwan, IT companies chose to move their factories to China where production costs are low so as

to keep their competitive advantage. China has become the target of Taiwanese companies to reduplicate the “Taiwanese OEM” experience (Chen, Lee & Chen, 2000, p.64). The development of Taiwan’s IT companies is hence conditioned by their status in the global division of labor. On the one hand, since core knowledge is controlled by big multinationals with their R&D capability and the protection of patents, Taiwan has difficulty to upgrade in the system of division of labor. On the other hand, Taiwan faces challenges from other developing countries in terms of low production cost and efficiency. Taiwan’s IT companies’ moving out speaks for their crisis of losing competitive advantage in this system.

Chapter 7

SUMMARY AND CONCLUSION

This dissertation utilizes the political-economic approach to analyze the digital divide, which on the one hand corrects the bias of neo-liberalist research of the digital divide, and on the other hand provides a framework for political-economic scholars to systematically look into this new issue.

A review of the digital divide research reveals not only its ideological bias but also a weakness in theory building. Therefore, this dissertation also attempts to fill in the missing parts by applying various concepts to help explicate unequal access to the Internet. Based on the analytical framework of political economy, I have reviewed three concepts including first, information society, second, development/dependency and third, globalization, for they deal with the dynamic relationships among technology, power, wealth, knowledge and finding equality, either at the global level or the national level. These concepts are not exhaustive, but they are robust for explaining the digital divide of Taiwan from a critical and holistic perspective.

In this chapter, I begin to summarize my political-economic analysis of the digital divide in Taiwan, which is framed by four entry points including history, ownership, access and policy. Its findings suggest that Internet development in Taiwan reflects similar patterns and characteristics of that in the global level. It finds a trend of concentration of wealth and power in the hands of a few people, and this trend in turn strengthens social disparities as well as the digital divide. Furthermore, I highlight the role of the state in Taiwan with its transformation from the developmental state to the capitalist state between the late 1980s and early 1990s. The two case studies of the liberalization of Taiwan's fixed-network telecommunications service market and the relocation of Taiwan's semiconductor manufacturers to China show how the capitalist state works within global capitalism. Finally, I conclude this chapter with cautious

thoughts on bridging the digital divide in the context of Taiwan's changing status in the international division of labor and the country's internal social inequality and discontent.

7.1 The Political-Economic Analysis of the Internet

In Chapter Three, I conducted a political-economic analysis of the global digital divide, finding that the US has dominated the development of the Internet at the global level. The US government first invented the Internet for its national defense and promoted this technology for commercial use, closely cooperating with the private sector. For smoothing the flow of capital and US-based transnational corporations' global operation, the prevalence of the Internet became necessary and urgent. With the initiation of the global information infrastructure, the US actively promoted the Internet to the rest of the world, in which US-based TNCs head the global market and the US government sets the principles of information policy for other governments to follow. The international organizations, especially the WTO, served well to strengthen the interests of the US and allied western countries. Under the extreme disparity of political, economic and technological power among countries, the unequal access to the Internet corresponds to the globally uneven distribution of power, wealth and knowledge.

Taiwan, with an Internet user penetration rate of 38% by 2003, has been identified by researchers and international organizations as a country which is capable of catching-up among few cases in the global disparity of Internet diffusion. Taiwan's economic success, high penetration of information and communications technologies, excellent human resources, active government promotion and stable political environment all have a role contributing to its Internet diffusion. However, from the political-economic perspective, the development of the Internet in Taiwan shows no different trend compared with that in the global level, for it reveals the dominance of the state and capitalists behind the (unequal) development of the Internet.

In Chapter Four, I provided an examination of the commercialization of the Internet in Taiwan, finding the Taiwanese government and the private sector were two major internal forces influencing the trend. The government funded major backbones in the

initial stage of Internet development since 1990 and actively opened the Internet for business use, aiming at generating more revenue from the businesses. Businesses had full motivation to commercialize the Internet due to the advantage that this technology helped enhance their efficiency in the global production and supply chain, and offered a new channel for corporations to make profits. Since the state and corporations reached their mutual interests in commercializing the Internet, US-initiated national information infrastructure provided a business-favored orientation in policies for Taiwan to follow, aiming to enhance the corporations' competitive advantage in the global economy.

The commercialization of the Internet provides a good opportunity for businesses to make profit via the new channel and causes changes of several industries including media, telecommunications and information technology, both in the US and around the world. Corporations in these industries were engaged in the game of merger, acquisition and strategic alliance with the goal to strengthen their capability to intervene and compete in the digital market. The trend of concentration also appears in Taiwan.

Taiwan's media were owned or controlled by the KMT government until the lifting of martial law in 1987. The industry reached prosperity soon after but experienced reconsolidation especially in the cable TV business. Until 2002, through a series of mergers, two major players Eastern Media Team (EMT) and United Communications Group (UCG) bought out many independent local systems, together having about two thirds of cable TV subscribers. They also laid hybrid fiber-optic networks around the island in line with the government's plan to build a broadband information superhighway. In the telecommunications sector, private competition began in the late 1990s with the Taiwanese government's commitment to join the WTO. The most astonishing phenomenon was the rapid shrink of competitors in the wireless service market. Since launching its operations in early 1998, the consortium of private cellular phone operators has changed considerably after four waves of mergers. By October 2003 only four companies, instead of 7 in the beginning, remained in Taiwan's cellular phone market. The information technology industry, clustering in Hsinchu Science Park, also indicated a tendency to concentration. The top two IC foundry corporations Taiwan Semiconductor Manufacturing Corporation (TSMC) and United Manufacturing Corporations (UMC)

continually acquired other small companies in the same business in 2000, ensuring their leading status.

The abovementioned companies in the media, telecommunications and IT industries not only sought targets of merger and strategic alliance in their individual businesses but also tried to expand their profits by intervening into the Internet business such as Internet service providers and Internet content providers. EMT is an example of corporate expansion, which began its business with cable TV in 1991 and soon intervened into telecommunications and the Internet by acquiring many small competitors. The logic behind the mergers was the same with AOL and Time Warner in 2000, Cingular Wireless and AT&T Wireless in early 2004, and many others, basically aiming to dominate the market and to make profits in the era of technological convergence.

The state and corporate sector cooperated to develop the Internet into a commercial channel. On the one hand this orientation has enhanced Internet penetration rate that propelled Taiwan among the countries of highest Internet diffusion. On the other hand it still excludes the poor from access to the technology because their welfare is not of the government's main concern. The core issue of the digital divide and its policy implication constitutes of the theme of Chapter Five. According to the ITU (2003), Taiwan ranked world ninth based on the Digital Access Index in 2002. Among various indicators in 2002, Taiwan's Internet user penetration was 39%, ranking 18th in the world. Taiwan was ranked fourth globally in its broadband Internet penetration 9.4%. Taiwan's fixed telephone subscribers per capita was 57.45%, ranking world fifth and its cellular subscribers per capita was 106.5%, ranking top one. However, ICT penetration in Taiwan was unequal in terms of household income, according to a 2002 Taiwan family income survey conducted by the Directorate General of Budget, Accounting and Statistics. This survey showed in 2002, household Internet penetration was 45.94%, in which the 20% highest income group had a penetration rate of 76.76% while the 20% lowest income group only 10.52%. Household cellular phone penetration was 83.62% at that time, in which the 20% highest income group had a penetration rate of 98.60% while the 20% lowest income group only 47.49%.

In addition to income, the results of the 2003 survey conducted by the Ministry of Transportation and Communications indicated that gender, age, education, occupation and region are major factors influencing the digital divide in Taiwan. In a word, the characteristics of Internet users in Taiwan tend to be young, rich, well-educated urbanites. Survey results show that the pattern of the digital divide corresponds to that of other countries found in reports of many international organizations such as the ITU, the UNDP and the OECD.

My analysis of official statistics of Taiwanese households find the digital divide in Taiwan a reflection of the complex of social disparity based on education, income and region. And income inequality has been the most critical factor for the digital divide. From a long-term observation, Taiwan's income inequality illustrated the enlarging tendency. Taiwan's efforts to pursue industrial transformation and to participate in the global economy were believed to be the major reasons of the deepening social disparity (Yu, August 31, 2003). Since 2000, the increasing income gap and structural unemployment have forced the suffered to hold demonstrations to raise government attention to their growing economic plight, which had been adversely affected by Taiwan's WTO entry.

The unequal access to the Internet in Taiwan roots in the unequal distribution of resources in capitalist society. As Herbert Schiller (1983, p.88) argued, class inequalities exercise a central pull in the information age that influences distribution of access to information and technology. In turn, access to information and technology becomes a factor of wealth and income. Frank Webster (2002, p.149) also argued that the information technology was born into a class society. The use of information technology was marked by existing inequalities and may indeed exacerbate them.

The digital divide based on the inherent social stratification was not bridged by policy; instead, the divide was worsened by it. A review of the content of the National Information Infrastructure project and E-Taiwan project showed that the government made favored policy for business opportunities and private participation, following the principles the US and other western countries promoted. The reason the government took the principles for granted is due to its long-term belief in neo-liberal ideology of

development and its eagerness to catch up with the western countries in terms of economy and technologic capability. More fundamentally, the government holds the attitude favoring the corporations because of its nature of capitalist state. Therefore, the state, no matter which political party controls the government, actively promotes the interests of the capitalists by initiating national projects and inviting capitalists in the policymaking process.

Under the business-favored environment, the efforts to use the Internet for non-profit goal are constrained. The Internet which works as a resistant tool against state/corporate control in civil society began with the use of the Bulletin Board System (BBS). The BBS, with its semi-anonymous and interactive function, provides a good channel for the minority to communicate with and mobilize. For example, a group of aboriginal people used the BBS to strengthen their identity by sharing opinions and exchanging information (Wang & Tsi, 1998). Feminist and lesbian groups began to establish their own networks, through which a virtual community was formed and further action were called to take against gender discrimination and for gay rights (Hwang, 1998). In Taiwan, an ambitious project to use the Internet for social movement was originated from website Yam in 1994. The establishment of Yam was an effort of several civil groups, with the goal of transmitting their information about themselves to the world and communicating with other civil groups with common concerns. Yam insisted on the non-profit principles and the public interest. It also took efforts to produce Chinese digital content covering different areas such as Taiwanese culture, economics, politics, history and geography (Gwung, 1997). Unfortunately, due to an internal shortage of resources, funding and external competitive pressure from commercial websites, Yam was forced to become a commercial portal in the late 1990s. Yam's transformation signifies the extension of commercial force and the shrink of non-profit space in Taiwan. While the Taiwanese government supported commercial use of the Internet and assisted new IT companies with favors on tax and tariff reduction, it did not subsidize non-profit websites such as Yam.

The difficulty non-profit websites such as Yam faced was similar to that of the working-class press in the late 19th to early 20th century. According to Jon Bekken (1993),

the US labor movement published hundreds of newspapers in various languages and on various issues. These newspapers practiced a journalism different from that of the capitalists newspapers. In addition to news report, they served as forums for readers to debate over socioeconomic issues and a tool to mobilize the people. Most of them relied on subsidies from labor groups or direct subscriptions. However, the working-class newspapers faced financial difficulties within the constraints of a capitalist economy. For example, in 1906, the *Chicago Daily Socialist* launched by drawing financial support from donations and stock purchases. At that time the Chicago newspaper market was dominated by commercial publishers who shared news gathering and distribution facilities. Most crucial of all, they relied on advertising as major revenues which helped them reduce the subscription fee in hope to attract more readers. Due to the shortage of operation fund, the *Chicago Daily Socialist* ended in bankruptcy in 1912.

7.2 The Role of the State

In examining the history of Taiwan in the second half of the 20 century, the state is found to play an important role in directing national economic orientation and technological development. Therefore, it is worthy of addressing the role of the state in Taiwan's development. I argue that the state in Taiwan has been transformed from functioning as the developmental state to the capitalist state. While the former fits to explain Taiwan's development before the late 1980s, the latter fits better to explain the digital divide in Taiwan after 1990.

Ronen Palan and Jason Abbot (1996) applied the concept of the developmental state to examine the development of East Asia, finding five dimensions of definitions including the fusing of "public" and "private", the role of state ideology, the use of developmental legitimacy; plan rationality, and the existence of a relatively autonomous economic technocracy to analyze how East Asian countries could achieve economic growth with high state autonomy. This analytical framework is useful for looking into the relationship between the state and internal forces in Japan and newly-developed industrial countries including Taiwan.

Different from the tradition of the distinction of the public and the private in western political economy, Taiwanese society since 1949 was characterized with the blurring of the public and the private. This blurring, according to Palan and Abbot, is not a natural result of the evolution of East Asian capitalism; it is, to a significant extent, the result of conscious action by the state to increase its autonomy to control the society and thus to achieve its developmental goals. The emphasis of state ideology further strengthens the state's autonomy. These two characteristics of the developmental state have their common origin in Confucian heritage which stresses the collective over the individual (Chowdhury and Islam, 1993). The KMT government had manipulated the cultural tradition to create a "Republic of China" national identity by continuing its resistance against Chinese communist regime, and legitimized and solidified its ruling. This explained why the KMT government controlled the media as the powerful ideological tool.

Because of its weak link with domestic society, the KMT government further strove to legitimize its rule by delivering generating economic success. Economic success was also a powerful approach for the KMT to gain international recognition in competing with the Chinese government. Economic success was achieved by two institutional strategies: plan rationality and autonomous economic technocracy. Since 1949, the KMT government has played a fundamental role in regulating and directing the economy rather than relying on neo-liberal economic beliefs, practices and institutions. National policy and developmental projects were made by government technocrats who enjoyed autonomy from most political and societal pressures. These technocrats took over the KMT leadership after the 1980s. For example, by 1988, twenty one out of twenty four cabinet members had received postgraduate education in the Western countries (Tien, 1989).

Based on its high-level autonomy, the KMT government achieved its goal of economic success, with a rapid growth rate and equitable income distribution compared to those in many other developing countries since the 1960s. This achievement was also contributed by two major external conditions: US support and a favorable international trading environment. However, the success has had its price which including a long-term

dictatorship, weak civil society and environmental degradation. Under the KMT ruling, private capital and commercial activities were encouraged, for the sake of economic growth, while political activities were repressed for strengthening the party's control over the whole society.

Continuing with the concept of the developmental state, Wang Chia-Huang (2000) examined the role of Taiwan's state in the development of IT industry. Wang identified the role of the state as a "planner", "financier" and "promoter". In the 1980s, the KMT government began to view information technology industry as strategic industry and made national projects to promote the development of IT industry. These projects detailed principles, goals and strategies to help build a favorable environment for IT development. As a financier, the government provided private investors with direct assistance and favors such as low-interest loan and subsidy. The indirect assistance included tax reduction or exemption and tariff reduction in importing machines and equipment. As the chief driving force, the government established Hsinchu Science Park and research institutes such as Institute of Information Industry and Industrial Technology Research Institute which supported IT industry with research basis and sound production environment.

The concept of the developmental state helps explain how Taiwan could achieve economic growth and technologic development in the decades after World War II. And it also provides rudimentary understanding of the socioeconomic context in which Taiwan has caught up in Internet diffusion due to strong policy backup and industrial development. This concept highlights the strong autonomy of the state in achieving its developmental goal. From Taiwan's experience, the state gained its autonomy due to the special history of the post-war period in which a capitalist class and civil society were not in shape. However, after four periods of development, the capitalist class grew with the state's support and civil society rose with political democratization in the late 1990s. The capitalist class began to control wealth and participate in policymaking, and hence transformed the role of the state in Taiwan from a developmental one into a capitalist state.

As described in Chapter Two, the neo-Marxist theories of the capitalist state included three theses: instrumentalism, structuralism and class struggle. Instrumentalist theories of the capitalist state argue that the state in capitalist society functions as an instrument of the ruling class by focusing on the conscious behaviors of the ruling class and its implication on state policies. The structuralist approach of state theory argues that the state tends to perform its role as protector and promoter of capital due to its structural dependence on the accumulation of capital from which the revenue to run the state is generated. Either from the perspective of human agency or structural constraints, instrumentalism and structuralism view the capitalist class as a uniform group with mutual interests. The theory of class struggle disagrees with their viewpoints. This theory of class struggle sees the state as a site of interclass and intraclass struggle, emphasizing how the hegemonic class faction seeks to reach its interests through making use of state officials and relevant forces in society to support its favored policy.

The three theoretical approaches are proved helpful to explain Taiwan's policymaking under the constraints of various power structure and social formation. Applying these theories to examine Internet development in Taiwan, I find that the state tends to actively or reactively protect the interests of the capitalist class. But when confronting the conflict between transnational corporations and domestic capitalists, the state tends to yield to the former due to the subsidiary status of Taiwan in the global system.

Taiwan's state acting as the instrument of the ruling class can be found in many cases in the process of policymaking. For example, when the telecommunications agency Ministry of Transportation and Communications (MOTC) opened the fixed-network telecom market to private competition in 2000, it changed the rule regarding capital requirements for the operation of a fixed-network business due to the pressure from an applicant backed up by the Rebar Group. Since the rule was changed to fit only one company's needs, it got the name of the "Rebar Clause" in the public opinions. In the case of the Rebar Clause, the Rebar Group owned Taiwan's top cable TV operator and other media channels with which it can use to direct public opinion and government policy. The Group's chairman Wang You-Tsang had a seat in KMT's Central Standing

Committee which was the highest decision-making body of this ruling party back then which ran the state apparatus. More directly, its Vice Chairman Wang Ling-Lin was a member of the legislature's Information and Technology Committee which overseeing the administration's telecommunications affairs. The multiple relationships this conglomerate had with the government explain why the MOTC yielded to its request.

The corporate representatives have been included in formal and informal consultant institutes to influence policymaking. For example, the crucial change of Taiwan's policy of investing China was made in the Economic Development Advisory Conference which was convened in August 2001 under the leadership of DPP Chen Hsui-Bain. Many business leaders attended the conference and proposed replacing former President Lee Teng-Hui's "no haste, be patient" policy with the policy of "active opening and effective management" for increased economic relations with China. In addition to economic policy, the government relies upon opinions from the business in the development of information technology. The Science and Technology Advisory Group (STAG) under the Executive Yuan was one of the early efforts which aimed mainly to hear advice from IT savvy of US-led western countries. In its early stage, the advisory group had chief advisors from US leading IT firms and government-associated research institutes. From the 1990s on, the group included some domestic IT enterprises. This group advised the administration in every stage of science and technology development and worked as the driving force on the NII project in 1994 and E-Taiwan project in 2001. Furthermore, to respond to the needs of the private sector, the NII is advised by the Civil Advisory Committee to invite representatives from related business without any from civil society. Many telecommunications companies competed to participate in the committee because they found it effective to promote their interests through occupying the committee seats and voicing their opinions there. The committee, disguising the business interests with the name of the "civil", is a significant example indicative of the cooperation of the state and the business at the expense of the public interests in forming the information policy.

In many cases I've seen, the state and the corporation cooperate to mold the Internet in Taiwan. As Marxist theories of the capitalist state point out, the reason the state and the corporation cooperate with each other is not only because the corporate sector is

powerful enough to influence state officials in the policymaking process, but also, more fundamentally, because the state structurally relies on capital accumulation from which the state generates its revenue to keep operating. The structuralist perspective explains, from the NII under the KMT administration to the E-Taiwan project under the DPP administration, no matter what political party is in power, government officials hold the same structural attitude toward the development of the Internet by encouraging the commercial use of the technology as an economic priority and political necessity (i.e. economic growth). From a higher structural level, the commercialization of the Internet in Taiwan is rooted in the expansion and reorganization of global capitalism. For a developing country like Taiwan which has deeply incorporated into the global network of IT production and distribution, through the promotion of information infrastructure, its goal is to support private corporations and enhance their competitive advantage in the global economy. The commercialization of the Internet became a mainstream trend since it meets the interests of the state and capitalists.

The state also functions as the site of class struggle when conflicts appear between different factions of classes. In the case of the liberalization of fixed-network telecommunications service in 2000, the state-owned Chunghwa Telecom (CHT) and three private operators are contenders. Their conflict appears in the expansion of the local telephone market. The CHT owned local loops to connect to the customers based on its long term national monopoly and the fulfillment of universal service. The private operators were not willing to spend construction cost but asked to lease the established local loops from the CHT to enter the market. Being the competitor of these private companies, CHT resisted to follow their request since renting out local loops would definitely harm the company with potential loss of customers. CHT staff allied with ruling party DPP's legislators to fight with the three private companies which had good relationship with the former ruling party KMT. After revising its plan several times, in September 2003, the government gave up to force the CHT to lease its local loops to private competitors. Instead, it pronounced a plan to invest NT\$ 60 billion in three years to build the second common channel for the fixed-network operators. Consequently, CHT won by resisting the private companies' intention to lease its local loops but would finally

face competitions from private companies in the local telephone market. The three private operators gained more by using the promised channel without spending any cost. The cost was transferred to taxpayers since the government planned to use its budget on building the channel. The result tells how the state functions to protect the interests of the capitalists at the expense of the public.

Another controversial issue was the move of Taiwan's semiconductor manufacturers to China. In 2001, Chairman of Taiwan and the world's biggest chipmaker TSMC Morris Chang challenged the Taiwanese government's ban on chipmakers' moving to China, while many industries including IT industry had moved their production line to the mainland. This issue caused disputes between cabinet-level agencies with the mix of political ideology, national security, economic growth and employment concerns. The main actors opposing to rapid lift of investment ban in China including the National Security Bureau, Taiwan's equivalent of the US' Central Intelligence Agency, and the Mainland Affairs Council, the highest administrative agency responsible for cross-straits relationship. Both are concerned about national security and economic development as a whole. Besides, the Labor Council voiced their concerns on employment issues. The main supportive forces in the administration include the Ministry of Economy Affairs and the National Science Council, both agreeing with chipmakers' opinion that the movement of semiconductor production from Taiwan to China was urgent since international manufactures had begun to build factories in China. They agreed that if Taiwan's manufactures lagged behind the international trend, they would lose their competitive advantage.

Outside the administration, Chang's opinion was applauded by IT companies except for TSMC's competitors in IC manufacturing, UMC and Powerlink. They voiced their opposition in the beginning because they viewed TSMC's expansion as a threat to their survival. However, the disagreement within the industry soon was solved since the companies had the same interests to explore China's markets through a more flexible policy on cross-straits trade. The final opposition came from civil society when a demonstration took place in March 2002. Protestors argued changes of policy will harm the nation's industrial and economic development and exacerbate unemployment rates.

Taiwanese companies' move out indeed cause a great amount of layoff since the 1990s. In spite of the internal and external oppositions, the government finally agreed to allow local chipmakers to transfer depreciated eight-inch wafer fabrication machinery to China in early 2002. After three months, TSMC proposed the first application for its investment in Shanghai and was approved in 2003. This case showed that Taiwan's state has transformed from the role of a developmental state which led IT development to the role of a capitalist state which tended to protect the interests of capitalists. With the growing scale and competitiveness of the private IT sector, the government gradually lost its bargaining power when facing the pressure from the business and only yielded to the interests of the business.

According to the abovementioned discussions, state autonomy is constrained by the class structure and the power of the capitalist class in a specific society. However, according to Hamilton (1982, p.23), the limits to state autonomy are not only determined by "the position of the state within class societies", but also by "the position of a given society within the world system. The states in advanced industrialized countries tend to have more bargaining power over developing countries due to the unbalanced dependency relationship between them. This has been proven by many scholars of dependency theory such as Baran (1957), Cardoso and Faletto (1979), and Evans (1979), and confirmed by the practice of bilateral negotiations in the WTO (Siochru & Girard, 2002).

According to Evan's triple-alliance concept, the relationship among the state, TNCs, and local capitalists are characterized by both cooperation and conflicts, as each holds different interests, objectives, and leverage. This alliance was seen in the early stage of the liberalization of Taiwan's telecommunications service market in which the three actors entered both the cellular phone and fixed-network telecom markets by joint ventures led by domestic conglomerates. However, the cooperation of these three actors changed later when the TNCs tried to seek opportunities to compete with domestic operators. In the first bidding of the fixed-network licenses, TNCs joined domestic operating teams due to the 20% cap of direct foreign investment. They were not satisfied with a small share in Taiwan's telecommunications operators; instead, they wanted to

have more control and more profits. US companies urged their government to negotiate further opening of Taiwan's telecommunications market by allowing more competitors and lowering capital threshold. The US government manipulated many means to force the Taiwanese government, including trade sanctions and bilateral negotiations both at the APEC and the WTO. The government at one time resisted US demands. Based on the contents of negotiation, the Taiwanese government knew that US-based transnational corporations only wanted to compete with domestic companies in some telecommunications sectors that can make big profits; they had no interests in investing less profitable area that would help to realize the goal of universal service. Therefore, to open up the telecommunications market for foreign competition would harm domestic companies and the fulfillment of universal service. Nevertheless, in exchange for entering into the WTO, the Taiwanese government has been consequently forced to proceed with the re-opening of the fixed-network market since late 2001. In the stage of conflicts, the state's autonomy is constrained by its relationship with the international forces including TNCs, their home countries and international organizations and internal forces led by domestic capitalists. The result of negotiation showed that Taiwan's government and corporations have less bargaining power against external forces due to its subordinate status in the world system and its eagerness to participate in the global stage.

7.3 Concluding Remarks

Constrained by the internal and external conditions, is it possible for Taiwan to bridge the digital divide between itself and advanced industrialized countries and between different groups within its nation? I propose two critical issues for Taiwan to bridge the digital divide as the concluding remarks.

7.3.1 Through Regional Integration to the Global Market

As described in Chapter Four, Taiwan's history was influenced by two powerful countries: the US and China. US influences on Taiwan are fourfold: military protection since Chiang Kai-Shek's move to Taiwan, financial aid in the 1950s, technology consulting and importation since the 1970s and WTO negotiation since the 1980s. US factor deeply affects Taiwan's integration into US-centered global capitalism. China has been a long-term foe of Taiwan since the end of World War II. Although politically divided, increasingly investment and trade by the business community since the 1990s have brought the two sides closer economically.

For a long time, Taiwan's international trade relied on the markets of the US and Japan. The US was Taiwan's top trade partner by 2002 and was second to Japan in 2003. In 2002, the trade sum between Taiwan and the US was US\$44.86 billion, accounting for 18.45% of Taiwan's total international trade sum. The trade sum between Taiwan and Japan was US\$39.26 billion, accounting for 16.15% of Taiwan's total international trade sum. In 2003, Taiwan-US trade sum decreased to US\$42.76 billion, accounting for a share of 15.76%. Taiwan-Japan trade sum increased to US\$44.55 billion and its share accounted for 16.41%. Among Taiwan's important trade partners, the US share decreased and Japan's share maintained while China's share saw an increase. In 2002, Taiwan-China trade sum was US\$17.89 billion, accounting for 7.36% of Taiwan's total international trade sum. Taiwan-Hong Kong trade sum was US\$32.58 billion, accounting for 13.40% of Taiwan's total international trade sum. In 2003, the trade sum between Taiwan and China increased to US\$32.38 billion, accounting for a share of 11.93%. The trade sum between Taiwan and Hong Kong was US\$30.08 billion, accounting for a share of 11.08% (BFT, 2004). If Hong Kong is included in China in counting the trade sum, in fact, China has been replacing the US as Taiwan's top trade partner since 2002. The sharp increase of Taiwanese trade with China beginning in 1990 decreased Taiwan's dependence on the US market. But it also caused another concern that the island country might be structurally dependent on China.

Taiwanese investment and business activities in China have seen a substantial increase since 1987 when the *Emergency Decree* was lifted and civilian contacts between Taiwan and China were allowed. In 1992, investment in the mainland by Taiwan businesses was legalized, quickly pushing China to the top of the list of Taiwan's outward investment. According to the statistics of the Ministry of Economic Affairs, in 1992, Taiwanese businesses invested US\$247 million in China, accounting for 21.8% of the Taiwan's total outward investment. In the next year, the investment sum in China increased to US\$1.14 billion, accounting for 40.7% of Taiwan's outward investment. In 2002, the investment sum was US\$3.86 billion, accounting for more than half (53.4%) of Taiwan's outward investment (CEPD, 2004). By 2003, Taiwan's business sector had invested over US\$34.31 billion on the mainland.

In the early stage of Taiwan's investment in China, most of the industries were traditional low technology industries and limited added value, such as shoe-making, tailoring, toys and plastic cement. In the early 1990s, the electronic industry gradually shifted the production of some parts and components, such as keyboard, mouse and chassis of low technology, to China. In the late 1990s, the IT products of higher level such as monitor, main-board, desktop computer and notebook computer were shifted to and being produced rapidly in China (*People's Daily Online*, November 2, 2000). For example, Taiwan's desktop computer giant Acer has set 18 branches in China's big cities since 1993. Taiwan's leading laptop computer company Quanta established its factory in Shanghai which was responsible for 70% of company's production by 2003. Consequently, Taiwan's investment in China contributed to its growth in IT production value. In 2000, China surpassed Taiwan as the third top IT hardware producer in the world with a production value of US\$25.5 billion, in which Taiwanese businesses in China contributed to US\$18.5 billion, accounting for 72% (*United Daily*, November 8, 2000). For Taiwan, the hollowing of Taiwan's traditional industries and IT industry due to investment and production shifted to China became an crucial issue in Taiwan's economic development.

According to Yun He-Ling (2004), there are two perspectives regarding cross-strait economic interaction and its political economic influences: neo-liberalism and

nationalism. The neo-liberal perspective argues cross-strait economic interaction should follow market rules. The government should not limit economic activities so that the individuals and corporations can pursue their maximum interests. From this perspective, Taiwanese corporations' move to China is a natural result of the "push and pull effect". On the one hand, Taiwan's businesses were pushed out by the factors such as increasing wages, high cost of land, and an unstable political situation. On the other hand, China pulled Taiwanese businesses in its market with its favored government policy, low cost of labor and land and a vast market.

Another perspective is nationalism which concerns more about national security and Taiwan's autonomy. Economically, nationalists fear that local companies' relocation to China will lead to the hollowing of Taiwan's industries and help to enhance Chinese power. Consequently, Taiwan's competitiveness and its importance in international division of labor will be degraded. Politically, if Taiwan excessively depends upon China's market, the Chinese government will have more power over the Taiwanese government to force Taiwan to step toward further political integration with China, which goes against the wish of the Taiwanese majority. From this perspective, former president Lee Teng-Hui's "no haste, be patient" policy becomes a necessary means to prevent Taiwan's businesses from moving out to China.

However, political prohibition did not effectively cease Taiwanese business's activities to seek cheap labor and potential markets in China. To the contrast, increasing outward investment in China forced the Taiwanese government to work toward normalizing relations across the Taiwan Strait by establishing a new review mechanism for China-bound investments and change its cross-strait trade policy to "active opening and effective management" under Chen Hsui-Bian administration in 2001. In 2002, the Taiwanese government's decision to lift its ban on investment in 8-inch wafer fabrication plants in China exemplifies the increasing economic integration between two sides. The impacts of this new development are twofold. It will affect Taiwan's economic as well as political relations with Beijing, its long-term foe after the civil war. More profound change will be Taiwan's status in global economic integration. The increase of Taiwan-China trade interaction has caused a decrease on its economic dependence on the US,

which might further influence Taiwan's trade relationship with powerful economic nations such as the US and Japan.

Taiwan appears to step forward on the way of regional economic integration by investing in China and then to reach the global market. There are several issues uncertain in the process. Will China grow to be the center and commander of regional economy in East Asia? Or will it be just the factory to the world where western countries exploit its labor and resources? Will Taiwan's increasing investment lead to its dependence on China? Or will Taiwan and China develop a positive cooperative relationship for development of both sides? While these questions are difficult to answer given the complicated global political economic conditions, Taiwan's lesson from industry's move out should be addressed. The growth of Taiwan's economy and IT industry is based on technological dependence on advanced countries, especially the US. In the global chain of production, the US companies control know-how and core knowledge, Taiwanese companies smooth out the production process by building and strengthening its foundry capability. Consequently, its long-term dependence on technology transfer from IT advanced countries led to the lack of the capability in research and development. Since Taiwan's IT industry build its competitive advantage on the low cost of production and low price of products, it is vulnerable by challenge from other developing such as China which can provide lower cost of production. Based on above understanding, to strengthen research and development and develop core knowledge in IT production becomes the key for deciding Taiwan's status in the global division of labor. Therefore, Taiwan should seek to upgrade its technical skills and capability by encouraging research and development and cultivating excellent human resources (Kung and Yang, 2003; Wu, 2000). Only when Taiwan strengthens its core knowledge in information and technology, can it actively create an equal situation for cooperation with other countries so as to break away from dependence in advanced countries. Based on the sound information infrastructure and education environment this country already built, Taiwan has better chance than many other developing countries in strengthening its technology capability. But the government has to keep in mind that technology development and economic growth is not exclusive policy at the expense of social welfare and justice. To construct

“inclusive politics” should be the key issue for the Taiwanese government and civil society to consider bridge the digital divide. I will discuss social inequality and the concept of inclusive politics in the next section.

7.3.2 Building an Inclusive and Just Society

As critique of neo-liberal globalization points out, globalization is marked by polarization of the distribution of resources and the marginalization of disadvantaged people. Globalization comes along with the growing concentration and centralization of wealth and power in the hands of a few people who use state resources to strengthen the profits and growth of concentrated capital (Petras and Veltmeyer, 2001) at the expense of the welfare of the poor. The digital divide discussed in this dissertation exemplifies the global and social inequality in the globalized world.

In Taiwan, social inequality deepens with its further integration into global economy especially after the entry of the WTO. The trend of wealth allocation has been from the poor to the rich, causing an expansion of the income gap. According to DGBAS statistics, between 1980 and 2001, the richest 20% households had 35-40% of total household income while the poorest 20% households had only less than 10%. In 2001, the lowest 20% household incomes dropped 11.35% while the highest 20% household incomes increased 2.11%. The gap between the rich and the poor was enlarging. The worsen inequality pushed National Policy Advisor to the President Chai Sung-Lin and scholars and social activists to urge the government to take effective measures to help the poor and bridge the income gap; otherwise, the whole society will suffer from instability and disorder caused by sustaining injustice (Hsiou, 2003).

It will be unrealistic to anticipate the coming of an “information society” in which people can enjoy the benefit technology brings about, given the context of unequal distribution of social resources. It is the context of social inequality, the nature and characteristic of global capitalism, that conditions the digital divide. Therefore, any efforts built on false acknowledgement of the reality of global capitalism and social

inequality would be in vain to bridge the digital divide. As I have discussed in Chapter Three about many projects initiated by international organizations such as the United Nations and the Group of Eight, the reason their efforts saw no sign to bridge the global digital divide was largely due to their belief and strategies in stressing on trickle down effects in development process through the market model. Therefore, these strategies failed to address a more fundamental social reform for developing countries to conquer the technology inequality and social disparity, both in the global level and national level.

With regard to Taiwan's efforts to informatize its society, I have pointed out that the two major national projects, the National Information Infrastructure and E-Taiwan, failed to address the unequal use of the Internet because the government and the corporations viewed economic growth and business opportunities as priority. Finally, the program of bridging the digital divide was initiated by the government in 2003, using quantitative indicators as achieving goals to "help people improve their living quality in spite of the differences of their education, wealth and residence" (NICI, 2003). The short-term goals such as subsidizing 3000 schools in the remote area with online fees and training 3000 teachers to teach online skills, providing the minority with used computers amounting to 10,000 until 2006, and subsidizing the minority for skill training with 13,000 people each year, of course, are urgent and helpful for solving the poor's problems of lack of equipment and training if they can be achieved. However, in the long term, the subsidy will be comparatively useless if the social inequality keep worsen and more and more families can not afford basic needs and education.

Therefore, I propose "inclusive politics" initiated by Fernando Henrique Cardoso (1993) for Taiwanese government and society to reverse the unequal distribution of wealth, power and knowledge. Cardoso suggested that an inclusive politics is needed for solving inequality inherent in global capitalism. Reexamining the unequal relationship between the South and the North, Cardoso argued dependency relations will not change and much of the South will not be incorporated into the new world economy unless its problems are incorporated into the "global problem". Politics must be globalized and extended to include the have-nots and the illiterates – those without the new resources required to participate in the information revolution – and this will not occur unless

politics of North and South become “inclusive” at the national and international level (p.12).

Applying Cardoso’s idea to national politics, there are two dimensions to be addressed. First, the process of policymaking should be inclusive to allow participation of representatives from civil society, especially the have-nots. In Taiwan, the Civil Advisory Committee for the National Information Infrastructure was a disguise of public interests by corporate interests because representatives from the business sector dominated the committee while no representative was invited from the real “civil society” such as non-profit organizations, social movement groups and community groups. Consequently, the committee proposed business-favored policy suggestions and ignored the needs of the poor in building the information infrastructure. The committee is only an epitome of the continuous cooperation between the state and the capitalist class which signifies the nature of the capitalist state. However, the state is also a site for class struggle in which different classes compete for their interests. Therefore, representatives from civil society should struggle to voice themselves by intervening into policymaking.

By including representatives from civil society in policymaking process; more inclusive policies are therefore expected. Inclusive policies are not only business concerns that favor the capitalist class and economic growth; they are of more humanitarian concerns with the emphasis on social justice and equality. For example, IT-favored policy has been accused as a crucial factor causing increasing income gap in Taiwan. Yu Kuo-Chin (August 31, 2003) pointed out, the government has been assisting IT corporations with subsidy in production cost and reduction in their taxpaying. The government put most of its resources to IT industry development and edged out resources for social welfare, which consequently enlarged the gap between the rich and the poor. I have proposed to strengthen research and development of Taiwan’s IT industry in previous section, but it does not mean to subsidize the corporations at the expense of the poor’s welfare. To enhance the capability of research and development depends more on the assistance of research institutes and high education that does not only help the IT industry but also the whole society in enhancing its knowledge level and life quality.

Income taxation is another factor of social inequality. The statistics of national income in 2002 (DGBAS, 2003) showed, the income of employers accounted for 16% of national income but they paid only about 5% of total national income tax. Employees earned about 54% of national income and the tax they paid accounted for 70%. This taxation policy enlarges the wealth gap because it generates more government revenues from the poor rather than from the rich. The poor are required to pay comparatively high proportion of tax from their income base than the rich, under the taxation burden, the poor have not much money to save or invest after taxation. In contrast, with a less burden of taxation, the rich can keep most of their income and have more plus wealth to accumulate. Consequently, the rich become richer while the poor become poorer. This is what Bowles and Edwards (1985, p.22) pointed out, the operation of capitalism is exemplified by unequal distribution and redistribution of wealth by which the poor suffer the burdens while the rich reap the benefits of this system.

In the field of education, Taiwan has been successful in providing its people with elementary education. In 1952, about 42 percent of the Taiwanese population could not read and write, and elementary school graduates accounted for 77.5 percent of the total number of all graduates. With the implementation of universal elementary education, in 1967, about 97.52 percent of the students aged six to twelve were enrolled in school. By 2001, the enrollment rate was 99.95 percent, with an average of less than 30.48 students per class, and about 99.15 percent of the graduates continued on to junior high. The same year, the illiteracy rate of Taiwan nationals was 4.21 percent (GIO, 2003). However, higher education is less accessible to the poor due to differential education tuition policy. Luoh Ming-Chin (2003) argued that Taiwan's higher education tuition policy, namely low tuition for public colleges and high tuition for private colleges, subsidizes the rich while exploiting the poor. In Taiwan students enter colleges based on their score of the entrance examination. Public colleges which have better resources tend to require higher examination scores while private colleges require lower scores. Luoh's research found that the probability of obtaining college education is positively correlated with family wealth. Students from rich families have better opportunities to enter public colleges

while students from poor families to the private ones. Therefore, different government subsidies to public and private college are in fact a reverse income distribution.

The abovementioned policies all have an affect on enlarging social inequality in terms of wealth and education, which contributed to the forming of “one Taiwan, two worlds”, highlighted by the *Business Weekly* magazine for the country’s increasing inequality. In its reporter Guo Yi-Ling’s (March 2003) article, the lives in the rich circle are as follows. At Taiwan’s leading IC company TSMC, many female managers chose to spend NT\$ 400,000 to have their babies born in the US. The high-tech elites owned membership in golf clubs which cost at least NT\$ 300,000. The parents had to be interviewed to see if they were qualified to send their children into the bilingual kindergartens in Hsinchu Science Park. The rich people have affluent resources to educate their next generation. For example, the story told that, Dodo, a six-grade student at an exclusive private elementary school, began his day with listening to English radio program and reading newspapers. After school, he had extra lessons for biology, mathematics, English and computer. Dodo lived in high-class residential district in Taipei with his father who was Chairman of an IC design company, getting his Ph.D. at Stanford. In Taiwan, the government applied measures to assist IT corporations such as tax reduction and subsidy. Dodo’s grandfather was ex-general manager of state-owned oil company and his uncle was a transnational corporation ING in Taipei’s senior deputy general manager. Dodo was described as a winner in the beginning of his life with the support from his rich family.

In contrast, a six-year kid Hsio-Ru, living in the rural mountain area Nanto County, was preparing to work on the farm with his father in the morning. Hsio-Ru’s father was a farmer who went bankruptcy after a heavy rain ruined his ginger farm. Without any compensation from the government, he was in debt of NT\$ 6 million with an interest of 40 thousand each month. His farm products earned him less than 200 thousand each year so that he cannot even paid for the interest of his loan. Hsio-Ru’s mother was a Vietnamese, having left away from home for several months. In Taiwan, the poor and ill-educated man tends to spend money to get a wife from Southeastern Asia due to their inability to get a domestic wife and many family and social problems are caused by this

kind of marriage. Hsio-Ru had no idea when she could enter the elementary school since her family could not afford her education. Of course, Hsio-Ru had never seen the computer in her life.

The story of two children circulated in Taiwan soon after its publication in early 2003 not only because it was touching but also because it revealed the reality people sensed in their daily lives. The story confirmed the inequality of Taiwan's society strengthened by biased government policy and the influence of wealth on people's opportunity to access to education and technology. Therefore, to reverse the unequal allocation of social resources, inclusive politics is necessary for Taiwan through which civil society voice its needs and challenge the state-capitalists alliance. The solution to the digital divide is based on a society of justice and equality where civil rights are well valued and promoted. Only in this society technology can be distributed equally and used for human development.

Bibliography

English

- APECTEL (2002). *APEC TEL digital divide blueprint for action*. Retrieved March 8, 2003
- Appadurai, A. (1996). *Modernity at large: Cultural dimensions of globalization*. Minneapolis and London: University of Minneapolis Press.
- Archibugi, D., & Held, D. (1995). *Cosmopolitan democracy*. Cambridge: Polity Press.
- Aronson, J. D. (2000). After Seattle: Trade negotiations and the new economy. In C. T. Marsden (Ed.), *Regulating the global information society* (pp. 178-188). London and New York: Routledge.
- Bagdikian, B. H. (2000). *The media monopoly* (6th ed.). Boston: Beacon Press.
- Baran, P. (1957). *The political economy of growth*. New York: Monthly Review Press.
- Barber, B. R. (1996). *Jihad vs. McWorld*. New York: Ballantine Books.
- Bekken, J. (1993). The working class press at the turn of the century. In R. McChesney & B. Solomon (Eds.), *Ruthless criticism* (pp. 151-175). Minneapolis: University of Minnesota Press.
- Bell, D. (1973). *The coming of post-industrial society: A venture in social forecasting*. Harmondsworth: Penguin.
- Berle, A., & Mean, G. (1932). *The modern corporation and private property*. New York: Macmillan.
- Bettig, R. V. (1996). *Copyrighting culture: The political economy of intellectual property*. Boulder Colorado: Westview Press.
- Bettig, R. V. (1997). The enclosure of cyberspace. *Critical Studies in Mass Communication*(14), 138-157.
- Bettig, R. V., & Hall, J. L. (2003). *Big media, big money: Cultural texts and political economics*. Lanham, MD: Rowman & Littlefield Publishers, Inc.

- Bian, M. (2000). *The political economy of telecommunications in Taiwan*. Unpublished PhD dissertation, Pennsylvania State University, State College, PA.
- Bloomberg (1999, September 1). Regulators approve UMC's plan to merge four main units to cut costs. *Taipei Times*, p. 17.
- Bloomberg (2000, January 8). US\$6.4 bn merger plan keeps TSMC in top spot. *Taipei Times*, p. 1.
- Bordenave, J. D. (1976). Communication of agricultural innovations in Latin America: The need for new models. *Communication Research*, 3(2), 135-154.
- Bowles, S., & Edwards, R. (1985). *Understanding Capitalism*. New York: Harper & Row.
- Burgess, R. G. (2001). Some issues and problems in cross-cultural case study research. In C. J. Pole & R. G. Burgess (Eds.), *Cross-cultural case study* (pp. 43-52). New York: Elsevier Science Inc.
- Caplan, N., & Nelson, S. D. (1973). On being useful: The nature and consequences of psychological research on social problems. *American Psychologist*, 28, 199-211.
- Cardoso, F. H., & Faletto, E. (1979). *Dependency and development in Latin America*. Berkeley and Los Angeles, CA: University of California Press.
- Cardoso, F. H. (1993). North-South relations in the present context: A new dependency? In M. Carnoy, M. Castells, S. S. Cohen & F. H. Cardoso (Eds.), *The new economy in the information age*. State College: PSU.
- Castells, M. (1996). *The rise of the network society* (Vol. 1). Oxford: Blackwell.
- Castells, M. (1997). *The power of identity* (Vol. 3). Oxford: Blackwell.
- Castells, M. (1998). *End of millennium* (Vol. 2). Oxford: Blackwell.
- Castells, M. (2001). *The Internet galaxy: Reflections on the Internet, business, and society*. Oxford: Oxford University Press.
- Cheah, P., & Robbins, B. (1998). *Cosmopolitics: Thinking and feeling beyond the nation*. Minneapolis: University of Minnesota Press.
- Chen, P. (1998). *The political economy of cable television: A case study of Taiwan's electronic media in transition*. Pennsylvania State University, State College.

- Chowdhury, I., & Islam, I. (1993). *The newly industrializing economies of East Asia*. London and New York: Routledge.
- Chu, M. (2002, March 10). Lee calls for sanity over China-investment policy. *Taipei Times*, p. 1.
- Clark, I. (1997). *Globalization and fragmentation: International relations in the twentieth century*. Oxford: Oxford University Press.
- Clarke, M. (2003). *E-development? Development and the new economy*. Helsinki, Finland: United Nations University, World Institute for Development Economics Research.
- Compaine, B. M., & Douglas, G. (2000). *Who owns the media? Competition and concentration in the mass media industry* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Association.
- Coughenour, C. M. (1965). The problem of reliability of adoption data in survey research. *Rural Sociology*, 30, 184-203.
- CRIS (2004). *Failure and Success at the WSIS: Civil Society's next moves*. Retrieved March 3, 2004, from <http://www.crisinfo.org/live/index.php?section=2&subsection=2&id=93>
- Cyber Atlas (2003, May 1). *Google grabs globe, US to Yahoo!* Retrieved October 26, 2003, from http://cyberatlas.internet.com/big_picture/applications/article/0,,1301_2200171,00.html#table3
- Cyber Atlas (2003, July 28). *Global usage and popularity*. Retrieved October 26, 2003, from http://cyberatlas.internet.com/big_picture/traffic_patterns/article/0,,5931_2241181,00.html#table2
- Cyber Atlas (2003, April 1). *Another Banner E-Com Year Expected*. Retrieved October 26, 2003, from http://cyberatlas.internet.com//markets/retailing/article/0,,6061_2196491,00.html#table

- Dai, X. (2003). ICTs in China's development strategy. In C. R. Hughes & G. Wacker (Eds.), *China and the Internet: Politics of the digital leap forward* (pp. 8-29). London & New York: RoutledgeCurzon.
- DGT (2002). *Telecommunications Annual Book 2002*. Taipei: DGT, MOTC.
- DGT (2003). *Subscribers of five mobile telecommunication services*. Retrieved January 9, 2004, from www.dgt.gov.tw/English/Data-statistics/five-mobile-3625.htm
- DGT (2003). *Taiwan telecommunications overview 2003*. Taipei: DGT, MOTC.
- Dizard, W. P. J. (1982). *The coming information age: An overview of technology, economics and politics*. New York: Longman.
- Domhoff, G. W. (1983). *Who rules America now?* Englewood Cliffs, NJ: Prentice Hall.
- DOT Force (2000). *Okinawa Charter on Global Information Society*. Retrieved March 15, 2002, from <http://www.dotforce.org/reports/it1.html>
- DOT Force (2003). *About the DOT Force*. Retrieved March 15, 2003, from <http://www.dotforce.org/about/>
- Drake, W. J. (2000). The rise and decline of the international telecommunications regime. In C. T. Marsden (Ed.), *Regulating the global information society* (pp. 124-177). London and New York: Routledge.
- Dufour, A. (1995). *Internet*. Paris: Presses Universitaires de France.
- Dyer-Witheford, N. (2002). E-capital and the many-headed Hydra. In G. Elmer (Ed.), *Critical perspectives on the Internet* (pp. 129-163). Lanham, MD: Rowman & Littlefield.
- EBC (2003). *EBC is Taiwan's No. 1 Media Content Company*. Retrieved March 1, 2004, from <http://www.ettv.com.tw/ettv2003/01/engindex.htm>
- Ernst, D. (1994). *Inter-firms networks and market structure: Driving forces, barriers and patterns of control* (No. BRIE Research Paper). Berkeley: University of California.
- Evans, P. (1979). *Dependent development: The alliance of multinational, state and local capital in Brazil*. Princeton, NJ: Princeton University Press.
- Fan, X. (2001). *Communication and information in China: Regulatory issues, strategic implications*. Lanham, New York & Oxford: University Press of America.

- FCC (2000a). *Fact sheet: FCC's conditional approval of AOL-Time Warner merger*. Retrieved March 30, 2001, from http://www.fcc.gov/Bureaus/Cable/Public_Notices/2001/fcc01011_fact.doc
- FCC (2000b). *En banc hearing on American Online, Inc., and Time Warner, Inc. applications for transfer of control* (No. CS DOCKET NO. 00-30). Washington DC: Heritage Reporting Corporation.
- Ferguson, M. (1992). The mythology about globalization. 7(1), 69-93.
- Franda, M. (2001). *Governing the Internet: The emergence of an international regime*. Boulder, Colorado: Lynne Rienner Publishers.
- Frank, A. G. (1967). *Capitalism and Underdevelopment in Latin America: Historical studies of Chile and Brazil*. New York: Monthly Review Press.
- Friedman, T. L. (2000). *The lexus and the olive tree*. New York: Anchor Books.
- Fukuyama, F. (1992). *The end of history and the last man*. London: Hamish Hamilton.
- Fusfeld, D. R. (1972). *Economics* (3rd ed.). Lexington, MA: Heath.
- Gandy, O. H. (1992). The political economy approach: A critical challenge. *Journal of Media Economics*(Summer), 23-42.
- Giddens, A. (1990). *The consequences of modernity*. Cambridge: Polity Press.
- Giddens, A. (1996). Globalization: A keynote address. *UNRISD News*, 15.
- Gilpin, R. (2001). *Global political economy: Understanding the international economic order*. Princeton, NJ: Princeton University Press.
- Golding, P. (1998a). Worldwide wedge: Division and contradiction in the global information infrastructure. In D. Thussu (Ed.), *Electronic Empires* (pp. 135-148). London: Arnold.
- Golding, P. (1998b). Global Village or Cultural Pillage? The Unequal Inheritance of the Communications Revolution. In R. W. McChesney, E. M. Wood & J. B. Foster (Eds.), *Capitalism and the Information Age: The political Economy of the Global Communication Revolution* (pp. 69-86). New York: Monthly Review Press.
- Gore, A. (1994). *Telecommunications for development*. Retrieved March 1, 2003, from <http://www.goelzer.net/telecom/al-gore.html>

- Government Information Office (2003). *Taiwan Yearbook 2003*. Taipei: Government Information Office.
- Greider, W. (1997). *One world ready or not: The manic logic of global capitalism*. New York: Simon Schuster.
- Gumucio Dagron, A. (2001). *Making waves: Stories of participatory communication for social change. A reporter to the Rockefeller Foundation*. New York: The Rockefeller Foundation.
- Gunnarsson, C. (1985). Development theory and third world industrialization. *Journal of Contemporary Asia*, 15(2), 183-206.
- Hafner, K., & Lyon, M. (1996). *Where Wizards stay up late: The origins of the Internet*. New York: Simon & Schuster.
- Hamelink, C. (1997). World Communication: Business as Usual? In M. Bailie, R. C. Vincent & D. Winseck (Eds.), *Democratizing Communication? Comparative Perspectives on Information and Power*. Cresskill, NJ: Hampton Press.
- Hamelink, C. J. (1999/2000). Human development. In UNESCO (Ed.), *World communication and information report, 1999-2000* (pp. 23-45). Paris: UNESCO Publishing.
- Hamilton, N. (1982). *The limits of state autonomy: Post-revolutionary Mexico*. Princeton, NJ: Princeton University Press.
- Hargittai. (1999). Weaving the Western web: Explaining differences in Internet connectivity among OECD countries. *Telecommunications Policy*(23), 701-718.
- Harris, R. L., & Seid, M. J. (2000). Critical Perspectives on globalization and neoliberalism in the developing countries. In R. L. Harris & M. J. Seid (Eds.), *Critical Perspectives on globalization and neoliberalism in the developing countries* (pp. 1-26). Leiden, Boston and Koln: Brill.
- Held, D., McGrew, A., Goldblatt, D., & Perraton, J. (1999). *Global transformations: Politics, economics and culture*. Stanford, CA: Stanford University Press.
- Herman, E., & R., M. (1997). *The global media: The new missionary of corporate capitalism*. London: Cassel.
- Hettne, B. (1995). *Development theory and the three worlds*. New York: Longman.

- Hirst, P. (1997). The global economy: Myths and realities. *International affairs*, 73.
- Hsieh, C. (2003). *Chinese foundries*. Taipei: ING Financial Markets.
- HSP (2003). *Introduction (Hsinchu Science Park)*, from <http://www.sipa.gov.tw/guide/2001e/index.html>
- Huang, C. (1986). *The state and foreign capital: A case study of Taiwan*. Unpublished PhD dissertation, Indiana University.
- Huang, H. (1999). *The change of the Internet in Taiwan: an examination from the perspective of political economy (1979-1999)*. Unpublished Master thesis, National Chengchi University, Taipei.
- Huberman, A. M., & Miles, M. B. (1998). Data management and analysis methods. In N. K. Denzin & Y. S. Lincoln (Eds.), *Collecting and interpreting qualitative materials* (pp. 179-210). Thousand Oaks, CA: Sage.
- Hunt, E. K., & Sherman, H. (1986). *Economics: An introduction to traditional and radical views* (5th ed.). New York: Harper & Row.
- Internet Software Consortium (2003). *Distribution of Top-Level Domain Names by Host Count, Jan 2003*. Retrieved October 30, 2003, from <http://www.isc.org/ds/WWW-200301/dist-byinum.html>
- ITU (1999). *Challenges to the network*. Geneva: ITU.
- ITU (2003a). *ITU Digital Access Index: World's first global ICT ranking*. Retrieved January 30, 2004, from http://www.itu.int/newsarchive/press_releases/2003/30.html
- ITU (2003b). *World Telecommunication development report 2003: Executive Summary*. Geneva: ITU.
- ITU-D (2003). *E-strategies*. Retrieved January 5, 2003, from <http://www.itu.int/ITU-D/e-strategy/index.html>
- Jessop, B. (1990). *State theory: Putting the capitalist state in its place*. University Park, PA: Pennsylvania State University Press.
- Jhally, S. (1989). The political economy of culture. In I. Augus & S. Jhally (Eds.), *Cultural politics in contemporary America* (pp. 65-81). New York & London: Routledge.

- Jones, D. (2003, May 9). Get set for more deals, merger meister says. *USA Today*, p. 6B.
- Keller, W. W., & Pauly, L. W. (2003). Crisis and adaptation in Taiwan and South Korea. In W. W. Keller & R. J. Samuels (Eds.), *Crisis and innovation in Asia Technology* (pp. 137-159). Cambridge: Cambridge University Press.
- KGT (2003, Oct 7, January 2, 2004). *Far EasTone and KG Telecom sign merger agreement: Merger creates a new leader in Taiwan's wireless*. Retrieved January 2, 2004, from www.kgt.com.tw/english/20031007.html
- Kim, K. K. (1994). *The globalization of the Korean advertising industry: History of early penetration of TNAAS and their effects on Korean society*. Unpublished PhD dissertation, Pennsylvania State University, State College, PA.
- Kincheloe, J. L., & McLaren, P. L. (1998). Rethinking critical theory and qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The landscape of qualitative research* (pp. 260-299). Thousand Oaks, CA: Sage.
- Klopfenstein, B. C. (2002). The role of the United States in global Internet innovation and diffusion. In S. Rao & B. C. Klopfenstein (Eds.), *Cyberpath to development in Asia: Issues and challenges* (pp. 17-35). Westport, CT: Praeger Publishers.
- Ko, S. (2002, March 30). Cross-strait investments test ruling party's mettle. *Taipei Times*, p. 3.
- Ko, S., & Hsu, C. (2002, March 30). Cabinet will let chip fabs go to China. *Taipei Times*, p. 1.
- Korzeniewicz, R. P., & Moran, T. P. (1997). World-economic trends in the distribution of income, 1965-1992. *American Journal of Sociology*, 102, 1000-1039.
- Kumar, K. (1978). *Prophecy and Progress: The sociology of industrial and post-industrial society*: Allen Lane.
- Kumar, K. (1992). New theories of industrial society. In P. Brown & H. Lauder (Eds.), *Education for economic survival: From Fordism to Post-Fordism?* (pp. 45-75). London: Routledge.
- Kumar, K. (1995). *From post-industrial to post-modern society: New theories of the contemporary world*. Oxford: Blackwell.

- Lerner, D. (1958). *The Passing of Traditional Society: Modernizing the Middle East*. New York: Free Press.
- Lieberman, D. (2001, January 12). Will Time Warner, AOL make a good fit? *USA Today*, p. 1B.
- Lien, C. (1997). *Lien Chan's address in the opening ceremony of TANet's 97 Conference*. Taipei: President Office.
- Lin, O. C. C. (1998). Science and technology policy and its influence on economic development in Taiwan. In H. S. Rowen (Ed.), *Behind East Asian growth: The political and social foundations of prosperity* (pp. 185-206). London & New York: Routledge.
- Lin, M. (2002, March 10). 1000 protest relaxation of wafer rules. *Taipei Times*, p. 3.
- Lin, S. (2003). High-tech park development in China. In M. Jussawalla & R. D. Taylor (Eds.), *Information technology parks of the Asia Pacific: Lessons for the regional digital divide*. New York: M. E. Sharpe, Inc.
- Lu, X. (2002). *Informatization in China*. Beijing: Publishing House of Electronics Industry.
- Machlup, F. (1962). *The production and distribution of knowledge in the United States*. Princeton, NJ: Princeton University Press.
- Mahizhnan, A. (2001). Digital Divide: Will It Deepen or Diminish? *Media Asia*(28), 72-78.
- Main, L. (2001). The global information infrastructure: Empowerment or Imperialism? *Third World Quarterly*, 22(1), 83-97.
- Mansell, R., & Wehn, U. (1998). *Knowledge societies: Information technology for sustainable development*. Oxford: Oxford University Press.
- Marcuse, P. (2000). The language of globalization. *Monthly Review*, 52(3), 23-27.
- Mattelart, A. (2003). *The information society: An introduction*. London, Thousand Oaks and New Delhi: Sage Publications.
- McChesney, R. W. (1993). Conflict, not consensus: The debate over broadcast communication policy, 1930-1935. In W. S. Solomon & R. W. McChesney

- (Eds.), *Ruthless criticism: New perspectives in U.S. communication history* (pp. 222-258). Minneapolis & London: University of Minnesota Press.
- McChesney, R. W. (1997). *Corporate media and the threat to democracy*. New York: Seven Stories Press.
- McChesney, R. W. (1999). *Rich democracy, poor democracy: Communication politics in dubious times*. Urbana and Chicago: University of Illinois Press.
- McChesney, R. W. (2001). Global media, neoliberalism, and imperialism. *Monthly Review*, 52(10).
- Menzel, H. (1957). Public and private conformity under different conditions of acceptance in the group. *Journal of Abnormal and Social Psychology*, 55, 398-402.
- Menzies, H. (1998). Challenging capitalism in cyberspace: The information highway, the postindustrial economy, and people. In R. W. McChesney, E. M. Wood & J. B. Foster (Eds.), *Capitalism and the information age: The political economy of the global communication revolution* (pp. 87-98). New York: Monthly Review Press.
- Miliband, R. (1969). *The state in capitalist society*. New York: Basic Books.
- Mody, B. (1999). The Internet in the Other Three-Quarters of the World. In I. f. I. Studies (Ed.), *The Promise of Global Networks* (pp. 69-94). Queenstown, MD: Institute for Information Studies.
- MOEA (2002). *2002 Taiwan e-commerce Yearbook*. Taipei: MOE.
- MOEA (2003). *2003 Taiwan industrial outlook*. Taipei: ITIS Program Office, DOIT, MOEA.
- Mosco, V. (1989). *The Pay-per society: Computers and communication in the information age*. Norwood, NJ: Ablex.
- Mosco, V. (1996). *The political economy of communication: Rethinking and renewal*. London: Sage.
- Mosco, V. (1998). Myth-ing links: Power and community on the information highway. *The Information Society*(14), 57-62.

- Murdock, G. (1989). Critical inquiry and audience activity. In B. Dervin (Ed.), *Rethinking communication, Volume 2: Paradigm exemplars* (pp. 226-249). Newbury Park, CA: Sage.
- Murphy, B. M. (2002). A Critical history of the Internet. In G. Elmer (Ed.), *Critical perspectives on the Internet* (pp. 27-45). Lanham, MD: Rowman & Littlefield.
- Mushinge, G. (2004). *WSIS Geneva, just a talking shop?* Retrieved March 3, 2004, from <http://www.oneworld.net/article/view/80144/1/?PrintableVersion=enabled>
- Norris, V. P. (1990). *The political economy of communications: An exploration of fundamental concepts* (Working papers). State College: School of Communications, Pennsylvania State University.
- Norris, P. (2001). *Digital divide: Civic engagement, information poverty, and the Internet worldwide*. Cambridge, UK: Cambridge.
- NTIA (2002). *A nation online: How Americans are expanding their use of the Internet*. Washington DC: US Department of Commerce.
- NUA (2002). *How many Online?* Retrieved November 1, 2002, from http://www.nua.ie/surveys/how_many_online/index.html
- NUA (2003, October 25). *eMarketer: Worldwide B2B revenues to pass one trillion*. Retrieved October 28, 2003, from http://www.nua.ie/surveys/?f-VS&art_id=905358753&rel=true
- Nystedt, D. (2002, January 1). Chips and the China syndrome. *Taipei Times*, p. 17.
- Nystedt, D. (2002, March 10). Debate tries to clarify chip issues. *Taipei Times*, p. 3.
- OECD (2001). *Understanding the digital divide*. Paris: OECD Publications.
- Offe, C. (1974). *Structural problems of the capitalist state: Class rule and the political system on the selectiveness of political institution*. Beverly Hill, CA: Sage.
- Ohmae, K. (1995). *The end of the nation state*. New York: Free Press.
- Palan, R., & Abbot, J. (1996). *State strategies in the global political economy*. London and New York: Pinter.
- Panol, Z. S., & Rao, S. (2002). Taiwan: an epicenter in the high-tech world. In S. Rao & B. Klopfenstein (Eds.), *Cyberpath to development in Asia: issues and challenges* (pp. 183-195). Westport, Connecticut & London: Praeger.

- People's Daily Online. (2000). *Taiwan-funded industries see rapid upgrading in Mainland*. Retrieved April 11, 2003, from <http://fpeng.peopledaily.com.cn/200011/02>
- Perkin, H. (1989). *The rise of professional society: Britain since 1880*. London: Routledge.
- Petras, J., & Veltmeyer, H. (2001). *Globalization unmasked: Imperialism in the 21st century*. London and New York: Zed Books.
- Porat, M. U. (1977). *The information economy: Definition and measurement*. Washington DC: US Department of Commerce, Office of Telecommunications.
- Poulantzas, N. (1969). The problem of the capitalist state. *New Left Review*(58), 69-78.
- Ragin, C. G. (1991). Introduction: The problem of balancing discourse on cases and variables in comparative social science. In C. G. Ragin (Ed.), *Issues and alternatives in comparative social research* (pp. 1-8). Leiden, The Netherlands: Brill.
- Ritzer, G. (1993). *The McDonalozation of society*. Thousand Oaks, CA: Pine Forge Press.
- Robinson, W. (1996). *Promoting Polyarchy*. Cambridge: Cambridge University Press.
- Rodriguez, F., & Wilson, E. J. (2000). *Are poor countries losing the Information Revolution?* Retrieved October 1, 2001, from www.infoDev.org/library/wilsonrodriguez.doc
- Rogers, E. M. (1962). *Diffusion of Innovations*. Glencoe, IL: Free Press.
- Rogers, E. M., & Svenning, L. (1969). *Modernization among peasants: The impact of communication*. New York: Hole, Rinehart and Winston.
- Rogers, E. M. (1976). Communication and development: The passing of a dominant paradigm. *Communication Research*, 3(2), 213-240.
- Rogers, E. M. (1995). *Diffusion of innovations* (4th ed.). New York: The Free Press.
- Rogers, E. (2000). Information, globalization, and privatization in the new millennium. *Asian Journal of Communication*(10), 71-92.
- Rohwer, J., Chowdhury, N. K., & Kraar, L. (2000, May 15). The new net tiger. *Fortune*, 310-324.
- Rosenau, J. (1990). *Turbulence in world politics*. Brington: Harvester Wheatsheaf.

- Ross, R., & Trachte, K. (1990). *Global capitalism: The new leviathan*. Albany, NY: SUNY Press.
- Sachs, W. (1992). *The development dictionary: A guide to knowledge as power*. New York: Zeb Books.
- Santos, D. (1970). The structure of dependency. *American Economic Review*, 60(21), 231.
- Schement, J. R., & Curtis, T. (1995). *Tendencies and tensions of the information age: the production and distribution of information in the United States*. New Brunswick and London: Transaction Publishers.
- Schiesel, S. (1998, July 27). AT&T and British Telecom merge overseas operations. *New York Times*, pp. A1, A6.
- Schiller, H. I. (1969). *Mass communications and American empire*. New York: Augustus M. Kelley.
- Schiller, H. I. (1973). *The mind managers*. Boston: Beacon.
- Schiller, H. I. (1976). *Communications and cultural domination*. New York: International Arts and Science Press.
- Schiller, H. I. (1981). *Who knows: Information in the age of the fortune 500*. Norwood, NJ: Ablex.
- Schiller, H. I. (1983). The world crisis and the new information technologies. *Columbia Journal of World Business*, 18(1), 86-90.
- Schiller, H. I. (1990). An interview with Herbert Schiller. *Comnotes*, 4(2), 1-5.
- Schiller, H. I. (1991). Public information goes corporate. *Library Journal*, 1, 42-45.
- Schiller, H. (1992). *Mass Communication and American Empire* (2nd ed.). Boston: Beacon Press.
- Schiller, H. I. (1992). *Mass Communication and American Empire* (2nd ed.). Boston: Beacon Press.
- Schiller, H. (1996). *Information Inequality*. New York: Routledge.
- Schiller, H. I. (1996). *Information inequality*. New York: Routledge.
- Schiller, H. (1998). Striving for communication dominance: A half-century review. In D. Thussu (Ed.), *Electronic empires*. London: Arnold.

- Schiller, D. (1999). *Digital capitalism: Networking the global market system*. Cambridge, MA: MIT Press.
- Schramm, W. (1964). *Mass media and national development: The role of information in the developing countries*. Stanford, CA: Stanford University Press.
- Schramm, W. (1971). The nature of communication between humans. In W. Schramm (Ed.), *The process and effects of mass communication* (pp. 3-35). Urbana, IL: University of Illinois Press.
- Scott, J. (1982). *The upper class*. Macmillan.
- Scott, J. (1986). *Capitalist property and financial power*. Brington: Wheatsheaf.
- Scott, J. (1991). *Who rules Britain?* Cambridge: Polity.
- Scott, J. (1996). *Stratification and power: Structures of class, status, and command*. Cambridge: Polity.
- Scott, J. (1997). *Corporate business and capitalist classes*. Oxford: Oxford University Press.
- SDNP (2004). *SDNP: Success stories*. Retrieved March 1, 2004, from <http://www.sdnf.undp.org/stories/intro.html>
- Senunas, E. (1997). *The 1997 GATS Agreement on Basic Telecommunications: A triumph for multilateralism, or the market?* Retrieved March 10, 2003, from http://www.bc.edu/bc_org/avp/law/st_org/iptf/articles/content/1997111401.html
- Servaes, J. (1989). *Participatory communication research within social movements*. Paper presented at the Participation: A key concept in communication for change and development, Pune, India.
- Servon, L. (2002). *Bridging the digital divide: technology, community, and public policy*. Malden, MA: Blackwell Publishers Ltd.
- Singer, D. (1999). *Whose Millennium? Theirs or ours?* New York: Monthly Review Press.
- Siochru, S. O., & Girard, B. (2002). *Global Media Governance: A Beginner's Guide*. Lanham, Boulder, New York & Oxford: Rowman & Littlefield Publishers.
- Sklair, L. (2000). Sociology of the global system. In F. Lechner & J. Boli (Eds.), *The globalization reader* (pp. 64-69). Malden, MA: Blackwell Publishers.

- Sklair, L. (2002). *Globalization: Capitalism & its alternatives*. New York: Oxford University Press.
- Smythe, D. W. (1954). Some observation on communications theory. *Audio-Visual Communication Review*(2), 24-37.
- So, A. Y. (1990). *Social change and development: Modernization, dependency, and world-system theories*. London: Sage Publications.
- STAG (2002). *E-Taiwan Project* (No. Working Paper Series: STAG-WPS-2002-05). Taipei: STAG.
- Stake, R. E. (1998). Case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *Strategies of qualitative inquiry* (pp. 86-109). Thousand Oaks, CA: Sage.
- Steger, M. B. (2002). *Globalism: The new market ideology*. Lanham, MD: Rowman & Littlefield.
- Sussman, G. (1984). Global Telecommunications in the Third World: Theoretical Considerations. *Media, Culture and Society*(6), 289-300.
- TaipeiTimes. (2002, November 24). Taipei sees biggest demo ever. *Taipei Times*.
- Tehrani, M. (1999). *Global communication and world politics: Domination, development and discourse*. London: Lynne Reiner.
- TeleGeography. (2002). *Global Internet Geography 2003*. Washington DC: TeleGeography, Inc.
- Teune, H. (1990). Comparing countries: Lessons learned. In E. Oyen (Ed.), *Theory and practice in international social research* (pp. 38-62). London: Sage.
- Thomas, C. (2001). Global governance, development and human security: Exploring the links. *Third World Quarterly*, 22(2), 159-175.
- Thussu, D. K. (2000). *International Communication: Continuity and Change*. London: Arnold.
- Tomlinson, J. (1999). *Globalization and culture*. Chicago, IL: Chicago University Press.
- Toynbee, P. (2000). Who's afraid of global culture. In W. Hutton & A. Giddens (Eds.), *On the edge: Living with global capitalism* (pp. 191-212). London: Jonathan Cape.

- UN (1995). *Our global neighborhood: The report of the commission on global governance*. Oxford: Oxford University Press.
- UNCTAD (2002). *World Investment Report*. Geneva: UNCTAD.
- UNDP (2000). *Human development report*. New York: United Nations.
- UNDP (2001). *Human development report 2001: Making new technologies work for human development*. New York & Oxford: Oxford University Press.
- UNDP (2003). *UNDP is the UN's global development network*. Retrieved March 15, 2003, from <http://www.undp.org/>
- UNESCO (2001). *Draft recommendation on the promotion and use of multilingualism and universal access to cyberspace*. Paris: UNESCO.
- UNRISD (2000). *Visible hands: Taking responsibility for social development*. Geneva: United Nations Research Institute for Social Development.
- US Department of Commerce. (1995). *Falling through the Net: A survey of the "have nots" in rural and urban American*. Washington DC: US Department of Commerce.
- US Department of Commerce. (1998). *Falling through the Net II: New Data on the Digital Divide*. Washington DC: US Department of Commerce.
- US Department of Commerce. (1999). *Falling through the net: Defining the digital divide.*, 2000, from <http://www.ntia.doc.gov/ntiahome/fttn99/FTTN.pdf>
- US Department of Commerce. (2000). *Falling through the net: Toward digital inclusion*, 2000, from <http://www.ecommerce.gov/PressRelease/fttn00.pdf>
- US Department of Commerce. (2002). *A nation online: How Americans are expanding their use of the Internet*. Washington DC: US Department of Commerce.
- Useem, M. (1984). *The inner circle: Large corporations and the rise of business political activity in teh US and UK*. New York: Oxford University Press.
- Wallerstein, I. (1979). *The capitalist world-system*. Cambridge: Cambridge University Press.
- Wang, E. (1999). ICT and economic development in Taiwan: analysis of the evidence. *Telecommunications Policy*(23), 235-243.

- Wang, G., & Lo, V. H. (2000). Taiwan. In S. A. Gunaratne (Ed.), *Handbook of the media in Asia* (pp. 660-681). New Delhi: Sage Publications.
- Wang, E. H. (2003). Technopolis development in Taiwan: An information technology capabilities-enhancing approach. In M. Jussawalla & R. D. Taylor (Eds.), *Information technology parks of the Asia Pacific: Lessons for the regional digital divide* (pp. 193-226). New York: M. E. Sharpe, Inc.
- Wang, L. (2003, December 25). Hon Hai bolsters design capability with Ambit deal. *Taipei Times*, p. 10.
- Wasko, J. (1999). The political economy of film. In T. Miller & R. Stan (Eds.), *A companion to film theory*. Malden, MA: Blackwell Publishers.
- Waters, M. (2001). *Globalization* (2nd ed.). London: Routledge.
- Webster, F. (2002). *Theories of the information society* (2nd ed.). London and New York: Routledge.
- Wilkins, K. G., & Mody, B. (2001). Reshaping development communication: development communication and communicating development. *Communication Theory*, 11(4), 385-396.
- Williams, R. (1977). *Marxism and literature*. Oxford: Oxford University Press.
- Winston, B. (1998). *Media Technology and Society: A history from the telegraph to the Internet*. London and New York: Routledge.
- World Markets Research Centre (2002). *Telecoms Country Report: Taiwan*: World Markets Research Centre.
- World Markets Research Centre (2002). *Telecoms Country Report: China*.
- WSIS (2004). *The Summit: Content, themes, and outcome*. Retrieved March 1, 2004, from http://www.itu.int/wsis/newsroom/fact/content_themes_outcome.html
- Yin, J. (2002). *Eris or Erinyes: Comparing news representations of anti-globalization movement*. Unpublished Ph.D. dissertation, Pennsylvania State University, State College.
- Zarit, W. (1996). Taiwan's information industry. In State of the Art Institute (Ed.), *Southeast Asia the information age* (pp. 59-70). Washington DC: Special Libraries Association.

Zook, M. M. (2000). Internet metrics: Using hosts and domain counts to map the Internet globally. *Telecommunications Policy*, 24(6/7).

Chinese

BFT (2004). *List of ROC trade countries*. Retrieved March 10, 2004, from

http://cus.trade.gov.tw/cgi-bin/pbisa60.dll/customs/uo_o_roc/of_o_fsr11_report?

Business Next. (2003, July 1-July 14). 2003 Infotech 100. *Business Next*, 52-177.

CEPD (2004). *Statistics of Taiwanese businesses' investment in China*. Retrieved March 10, 2004, from <http://www.cepd.gov.tw/analysis/china-hongkong/two.doc>

Chang, W. (2000, Feb 26, February 26). Eastern Group enters the Internet market. *Economic Daily*.

Chang, C. (2000, November 14). Cellular operators strive for leading the market by acquisition. *United Daily*, p. 7.

Chang, Y., & Lin, C. (2001). *The correlation among urbanization, stratification and informatization*. Paper presented at the Information Technology and social transformation, Taipei.

Chen, N. (1996). *Internet development*, from <http://apng.edu.tw/taiwan/ERI96>

Chen, C., Lee, Y., & Chen, Y. (2000). Challenges and strategies of promoting knowledge economy in China. *Mainland China Studies*, 43(12), 63-78.

Chen, P. (2001). *Research on communication industry*. Taipei: Wunan Culture Enterprise.

Chen, Y. (2001). International and long-distance telephone licenses open in September next year. *Economic Daily*, p. 4.

Chen, h. (2001, June 6). Taiwan promises US to soon open fixed-network license. *Economic Daily*, p. 3.

Chen, P., & Cheng, L. (2003). The relationship between market structure and performance of Taiwan's television industry. *Journalism Research*(75), 37-71.

Cheng, C. (2000). The conceptual analysis of policy on fixed-line network. In Communication and Law Conference (Ed.), *Fixed-line network vs. the law* (pp. 47-71). Taipei: SanMin Publisher.

- Chou, Y. (2002a, January). The impact of the entry into the WTO on telecom regulations of the two sides of the Taiwan Strait. *Telecommunications Magazine*, 14-21.
- Chou, Y. (2002b, January). The impact of the entry into the WTO on telecom regulations of the two sides of the Taiwan Strait (II). *Telecommunications Magazine*, 104-109.
- Chung, M. (1998). *The formation of Cable TV systems operators: Legalization and concentration*. Unpublished Master thesis, National Chiao Tung University, Hsinchu.
- Dai, K., & Chen, N. (1997). *The data can talk: The updated statistics of Internet in Taiwan*, from <http://www.cis.nctu.edu.tw:8080/~yjhuang/i5-3.html>
- DGBAS (2001). *Survey on ROC household income and expenditure*. Taipei: DGBAS.
- DGBAS (2002). *2002 Taiwan family income and expenditure survey report*. Retrieved March 10, 2003, from <http://www129.tpg.gov.tw/mbas/doc4/income191.htm>
- DGBAS (2002). *National economy dynamics statistics*. Retrieved March 1, 2004, from <http://2k3dmz2.moea.gov.tw/gnweb/statistics/statistics01/reports/A05.xls>
- DGT (2003). *Taiwan telecommunications overview 2003*. Taipei: Directorate General of Telecommunications.
- DOIT (2001). *2001 Yearbook of Internet application and development*. Taipei: DOIT, MOEA.
- DOIT (2002). *2002 Yearbook of Internet application and development*. Taipei: DOIT, MOEA.
- DOIT (2003). *Information industry Yearbook 2003*. Taipei: DOIT, MOEA.
- Fei, J. (1999). The change of shareholders of private cellular phone operators. *United Daily*.
- Fei, J., & Lu, Y. (2000). The borderless merger war among international telecom operators. *Economic Daily*.
- Fei, J., & Lu, Y. (2000, February 17). AT&T plans to increase its share in Far EasTone. *Economic Daily*, p. 31.
- Fei, J. (2000, February 4). AT&T changes its attitude from withdrawing to increasing the share. *Economic Daily*, p. 4.

- Fei, J. (2003).
- Fei, J. (2003, February 11). Unlimited foreign investment planed in telecom service. *Economic Daily*, p. 6.
- Fei, J. (2003, November 12). License for local service will be issued in the next year. *Economic Daily*, p. 6.
- Feng, C. (2000, March 19). The result of fixed-line licensing is finalized, Eastern Broadband Telecom, Taiwan Fixed Network Telecom, and New Century Infocom win the bidding. *Central News Agency*.
- Feng, C. (2002). Congressman opposes to release CHT line to the private sector. *Central News Agency*.
- FIND. (2001). *2001 Yearbook of Internet application and development*. Taipei: DOIT, MOEA.
- FIND. (2003). *Price drop cause the growth of broadband market in the third season*. Retrieved January 10, 2004, from <http://www.find.org.tw>
- Guo, Y. (1995). To know about the NII. *Information and Computer*, 181, 31-36.
- Guo, G. (1996). The situation and prospect of HiNet. *Information and Education*, 12-16.
- Guo, C. (2001, May 10). Taiwan Cellular acquires TransAsia with an eye on the 3G market. *United Daily*, p. 21.
- Guo, C. (2003, April 4). TOMC: we will not follow all US requests. *United Daily*, p. 21.
- Guo, Y. (2003, March). One Taiwan, two worlds. *Business Weekly*.
- Gupu, H. (1995). *The formation of the international export station: Taiwan's Industrialization*. Taipei: Zenchian.
- Gwung, H. (1997). Yam: Internet resource index and local network. In C. Lin (Ed.), *Case studies of Taiwan's information management* (pp. 441-460). Taipei: Hwa Tai.
- He, B., & Jiang, D. (2002, July 24). Private fixed-line network companies visit President Chen urging for a fair market environment of competition. *Commercial Times*.
- He, B. (2003, December 1). Private fixed-line network companies predict a high profit for next year. *Commercial Times*, p. 13.
- He, B. (2003, November 1). Private fixed-line network companies made profit in the first three quarters. *Commercial Times*, p. 12.

- He, Y. (2003, October 10). Yahoo!Kimo tops Taiwanese Internet portals. *Commercial Times*, p. 12.
- Hsia, H. (1994). The record of the NII conference. *Information and Computer*, July, 12-18.
- Hsiou, H. (2003). Sixty percent of households are low-income family. *China Evening News*.
- Hsu, C. (2001). MOEA: US unfair to blame Taiwan set trade barrier. *United Daily*, p. 12.
- Hsu, Y. (2003, August 18). Decrease of computer equipment and online fee expected by forty percent of labors. *Central News Agency*.
- Huang, H. (1998). Dissent BBS. In Academia Sinica (Ed.), *Collection of papers in the conference of information technology and social transformation* (pp. 57-111). Taipei: Academia Sinica.
- Huang, H. (1999). *The change of the Internet in Taiwan: an examination from the perspective of political economy (1979-1999)*. Unpublished Master thesis, National Chengchi University, Taipei.
- Huang, Y. (2003, December 2, December 2). Wang builds the media kingdom by entering the foreign market. *Economic Daily*, p. 31.
- Jiang, J. (2003, November 25). President: Production value of the communications industry will be over one trillion after five years. *Commercial Times*, p. 8.
- Jiang, R. (2002, December 3). Policy reverses for the second stage of fixed-line network bid. *Commercial Times*.
- Jiang, R. (2003, December 11). Taiwanese online penetration ranks the fifth in Asia. *Commercial Times*.
- Jiang, R. (2003, September 15). To transfer the cost to the public is harm to the market institute. *Commercial Times*.
- KGT (2003). Far EasTone and KG Telecom sign merger agreement: Merger creates a new leader in Taiwan's wireless.
- Kung, M., & Yang, C. (2003). *The strategies to enhance global competitiveness of Taiwan's technology industry*. Taipei: Taiwan Think Tank.

- Lee, W. (2003). Hsu: Far EasTone will lead the cellular market after merging GT. *China Times*.
- Lee, H. (2003, August 30). *Taiwanese IT factories in China are making profit*. Retrieved August 30, 2003, from <http://news.chinatimes.com>
- Li, Y. (2003). *Taiwanese outward connection bandwidth reaches 25Gbps in the third season of 2003*. Retrieved January 10, 2004, from <http://www.find.org.tw>
- Liao, M., & Peng, H. (2000). Yahoo! merges Kimo. *United Daily*, p. 1.
- Lin, A. (2000, November 10). Glocalization: The beginning of the war between Internet portals. *United Daily*, p. 15.
- Lin, M. (2001, December 20). *Taiwan's entry into the WTO helps to strengthen its economic power*. Retrieved October 1, 2001, from <http://udnnews.com/news/focusnews/Taiwan-China/504564.shtml>
- Lin, R. (2001, February). Analysis of partners of fixed-line network companies. *Taiwan Telecom*, 23-24.
- Lin, Y. (2002, August). Is fixed-line network liberalization a bubble? *Taiwan Telecom*, 20-28.
- Lin, Y. (2003). The evolution and outlook of digital economy. *National Policy Quarterly*, 2(1), 91-114.
- Lin, F. (2003). Bridging the digital divide: The government's duty and strategy. *National Policy Quarterly*, 2(1), 29-52.
- Lin, H. (2003, September 2). *Telecom market will experience revolutionary competition*. Retrieved September 2, 2003, from <http://news.chinatimes./Chinatimes/newslist/newslist-content/0,3546,110507+112003090200137,00.html>
- Liu, W. (2001, March 24). The price war of fixed-line network. *China Times*.
- Lu, C. (2003, December 4). Taiwan tops the world in its cellular penetration. *Central News Agency*.
- Lu, H. (2003, November 25). M-Taiwan project, a seamless broadband network. *Commercial Times*, p. 38.

- Luoh, M. (2002). Who is the student of National Taiwan University? *Taiwan Economics Review*, 30(1), 113-147.
- Luoh, M. (2003). *Education opportunity and family background*. Retrieved March 03, 2004, from <http://ccms.ntu.edu.tw/~luohm/>
- MingHsing, K., & ChiaYuan, Y. (2003). *The strategies to enhance global competitiveness of Taiwan's technology industry*. Taipei: Taiwan Think Tank.
- MOEA (2002). *The history of Taiwan's application for entry into the WTO*. Retrieved November 7, 2002, from http://www.moeaboft.gov.tw/global_org/wto/WTO-into/into3/into02.htm
- MOEA (2003). *Information Industry Yearbook 2003*. Taipei: DOIT, MOEA.
- MOEA (2004). *National economy statistics*. Retrieved March 3, 2004, from <http://www.moea.gov.tw/>
- MOTC (1998). *Survey report on people's Internet use*. Taipei: MOTC.
- MOTC (1999). *Survey report on Taiwanese Internet use*. Taipei: MOTC.
- MOTC (2001). *Survey report on Taiwanese Internet use*. Taipei: MOTC.
- MOTC (2003). *Survey report on Taiwanese Internet use*. Taipei: MOTC.
- National Science Council (2003). *ROC yearbook of science and technology*. Taipei: National Science Council.
- NICI (2003). *The plan of bridging the digital divide*. Taipei: NICI.
- NICI Civil Advisory Committee (2003). *The introduction of NICI Civil Advisory Committee members*. Retrieved December 30, 2003, from <http://www.nici.org.tw/>
- NSC (2002). *R & D budget in some main countries*. Retrieved March 1, 2004, from <http://2k3dmz2.moea.gov.tw/gnweb/statistics/statistics01/reports/A22.xls>
- Pai, F. (2003, November 23). Jump on the global stage by making good use of merger strategy. *Economic Daily*, p. 3.
- Pan, M. (2003). *Japan, China and Korea dominate Asia Broadband market*. Retrieved January 10, 2004, from <http://www.find.org.tw>
- Poong, H. (2001). The global telecom regime and the digital divide. *Problem and research*, 40(4), 25-40.

- Shen, C. (2003, July1-July14). Why does Far EastTone merge KG Telecom? *Business Next*, 36-37.
- STAG (2002). *E-Taiwan Project* (No. STAG-WPS-2002-05.). Taipei: STAG.
- Tsai, S. (1998, April 16). Wang: Rebar telecom will target at fixed-line network. *Central News Agency*.
- Tsai, F. (2001, Febuary). Eastern actively acquires ISPs. *Taiwan Telecom*, 29-32.
- Tsai, H. (2003). *Taiwanese B2C E-commerce market reaches 22billion in 2003*. Retrieved January 10, 2004, from <http://www.find.org.tw>
- Tseng, L. (1994). An Examination on the management and operation of the TANet. *Newsletter of the Computer Center*, 35-44.
- Tseng, H. (2001). An initial examination of the skill and the social flow of class. *Journal of Cyber Culture and Information Society*(1), 179-200.
- Tseng, H. (2001). *The knowledge economy of Taiwan: Dilemma and myth*. Taipei: Chunhsie Publishing.
- Tseng, C., & You, Y. (2003). Reflection on increasing income gap in Taiwan. *National Policy Forum*(Winter), 213-219.
- United Daily (2000, Novmeber 8). Notice of China's surpassing Taiwan with its production value of IT hardware. *United Daily*, p. 2.
- Wang, S. & Tsi, S. (1998). The research of aboriginal people's online news discussion. In Academia Sinica (Ed.), *Collection of papers in the conference of information technology and social transformation* (pp. 31-56). Taipei: Academia Sinica.
- Wang, C. (2000). *The sociology of information technology*. Taipei: Pro-Ed Publishing Company.
- Wang, H. (2003, August 28, August 28). With over 2.5million users, Taiwan ranks world number 1 in its cellular phone penetration.
- Wei, D. (2003, November). Observation of media industry of Taiwan 2002. *Media Watch*, 22-26.
- Wu, C. (1998). *Comment on the Yam survey result of Internet use 1998, 2002*, from http://survey.yam.com.tw/98/wu_htm

- Wu, M. (2000). Technology development policy in the era of knowledge economy. *National Policy Quarterly*(1), 167-182.
- Wu, C. (2002). Are you the information poor? *Taiwan Economic Research*, 25(6), 104-108.
- Wu, K. (2003). The new social movement of bridging the digital divide. *Infopro Magazine*, 60-61.
- Yang, W. (2004, January). The wealth of 42 conglomerates increased 4.2 trillion. *Wealth Magazine*.
- Yu, K. (2003, August 31). Does Taiwan's income gap see bridging? *Commercial Times*.
- Yun, H. (2004). Power and dependency: Cross-strait relationship in the information technology network. In Y. Sun & K. Kuo (Eds.), *Information technology and politics* (pp. 225-262). Taipei: Yangchi.

 Appendix 1: Chronology of Taiwan's History from 1544 to 2002

1544	The Portuguese sailing to Japan spot Taiwan and refer to it as Ilha Formosa (beautiful island).	1979	The US grants diplomatic recognition to the People's Republic of China and breaks ties with the Republic of China. A demonstration organized by opposition politicians and Formosa Magazine to commemorate Human Rights Day turns into the bloody riot known as the "Kaohsiung Incident" in December.
1662	Jheng Cheng-gong, also known as Koxinga, defeats Dutch forces, ending Dutch rule in Taiwan.	1986	The Democratic Progressive Party (DPP) announces its formation.
1684	Manchus replace the Jheng family as the new rulers of Taiwan. Taiwan becomes a dependency of the Fujian provincial administration.	1987	The Emergency Decree is lifted. The government announces that residents of Taiwan are officially allowed to visit relatives on the mainland.
1885	Taiwan is made a province of China, and Liou Ming-chuan becomes the first governor.	1988	President Chiang Ching-kuo dies on January 13, and Vice President Lee Teng-hui is sworn in as president of the Republic of China.
1895	The Treaty of Shimonoseki concludes Sino-Japanese War; Taiwan is ceded to Japan.	1990	Lee Teng-hui is elected the eighth-term president of the ROC by the National Assembly.
1945	World War II ends with Japan's surrender to the Allies. Taiwan is retroceded to China after 50 years of Japanese occupation.	1991	The Period of National Mobilization for Suppression of the Communist Rebellion is ended in May.
1947	Due to bad administration, ethnic tension, and other factors, an islandwide uprising, known as	1992	The election for the Second Legislative Yuan is held the first popular election of the legislature

	the February 28 Incident, breaks out.		since 1947.
1949	The central government of the Republic of China relocates to Taiwan, after the mainland falls to the Communists.	1996	The first direct presidential election is held, and incumbent president and KMT candidate Lee Teng-hui is elected.
1950	In March, Chiang Kai-shek resumes the presidency of the Republic of China. In June, with the outbreak of the Korean War, US President Truman orders the Seventh Fleet to protect Taiwan from attack by the Chinese Communists.	1998	The Legislative Yuan passes the statute to downgrade the Taiwan Provincial Government.
1953	The Legislative Yuan adopts the Land-to-the-Tiller Act.	1999	On September 21, Taiwan is hit by its deadliest earthquake in more than 60 years. The 7.3 magnitude quake claims more than 2,000 lives and injures over 8,000.
1967	The Executive Yuan extends the period of compulsory education from six to nine years.	2000	Democratic Progressive Party candidate Chen Shui-bian is elected president of the Republic of China, ending the KMT's 50-year hold on the presidency in Taiwan.
1971	The Republic of China withdraws from the United Nations.	2001	The World Trade Organization Ministerial Conference formally approves Taiwan's accession to the WTO on November 11.
1973	The Ten Major Construction Projects begin.	2002	The Executive Yuan approves the Challenge 2008 National Development Plan to foster the talent needed to transform Taiwan into a "green silicon island."
1978	Chiang Ching-kuo is elected president.		

Source: GIO, 2003.

Appendix 2: Taiwan's Top 40 Conglomerates in 2002 and 03

Group	12/31/2002	12/3/2003	Market Value		Business
	Market Value (US\$M)	Market Value (US\$M)	Change (US\$M)	(%)	
Taiwan Semiconductor Manufacturing Co.	23,392.44	40,742.63	17,350.19	74%	Information technology
Formosa Plastics Group	18,230.92	26,402.64	8,171.72	45%	Plastics, Textiles, Information technology,
United Microelectronics Corp	14,496.72	22,485.96	7,989.24	55%	Information technology
Lin-Yuan Group	9,312.14	13,018.38	3,706.24	40%	Finance, Construction
Acer	7,625.37	12,140.34	4,514.97	59%	Information technology
Fuban Group	10,337.13	11,766.23	1,429.10	14%	Finance, Information technology
Foxconn	7,509.06	10,681.24	3,172.18	42%	Information technology
Quanta Computer	5,171.24	9,098.71	3,927.47	76%	Information technology
China Steel Corp	5,739.86	8,375.40	2,635.54	46%	Steel & iron, Electric & machinery, Chemicals
Koo's Group	5,670.32	8,068.72	2,398.40	42%	Cement, Plastics, Rubber, Information technology, Finance
Far Eastern Group	4,980.82	7,216.59	2,235.78	45%	Cement, Textiles, Chemicals, Transportation, Finance, Wholesale & retail, Communication
Compal Electronics	3,277.71	5,858.43	2,580.72	79%	Information technology
Walsin Lihwa Corp.	3,943.83	5,151.07	1,207.24	31%	Electric appliance & cable, Information technology
Shinkong Group	3,248.38	5,120.08	1,871.71	58%	Textiles, Finance, others
Kinpo Electronics Inc	3,213.06	5,038.90	1,825.85	57%	Information technology
Yulon	4,717.34	5,037.67	320.33	7%	Textiles, Electric & Machinery, Automobile, Information technology, others
Uni-President Enterprises Co.	4,149.27	4,632.83	483.57	12%	Cement, Foods, Textiles, Rubber, Information technology, Construction, Finance, Wholesale & retail, others
Lite-On Technology Corp.	1,303.80	4,358.96	3,055.16	234%	Information technology

Pacific Electric Wire & Cable Co. Ltd.	4,021.05	4,046.91	25.85	1%	Electric appliance & cable, Information technology
ASE Group	2,137.94	3,720.96	1,583.03	74%	Information technology, Construction
Tatung	2,503.60	3,645.94	1,142.34	46%	Information technology
Evergreen Group	2,751.16	3,285.34	534.18	19%	Transportation, Steel & iron, Construction
Yuen Foong Yu Paper Manufacturing Co.	1,932.64	2,442.63	509.98	26%	Paper & pulp, Information technology, Finance, others
RITEK Corporation	1,208.28	2,173.26	964.98	80%	Information technology
Delta Electronics Group	1,767.53	2,109.23	341.71	19%	Information technology
MiTAC-SYNNEX group	1,836.32	2,008.33	172.00	9%	Foods, Plastics, Information technology
First International Computer	1,629.65	1,891.18	261.52	16%	Information technology
Yageo Cooperation	1,161.58	1,852.39	690.81	59%	Information technology, Wholesale & retail
Mosel Vitelic Group	1,630.40	1,780.12	149.72	9%	Information technology
UMax Group	853.70	1,700.88	847.18	99%	Information technology, Software
Silicon Integrated Systems Corporation	1,020.22	1,239.02	218.80	21%	Information technology
Rebar Group	947.37	990.03	42.66	5%	Foods, Transportation, Finance, Cement, Wholesale & retail, Tourism, Textiles
Teco Group	904.34	958.31	53.97	6%	Electric & Machinery, Information technology
USI Group	547.28	676.96	129.67	24%	Plastics
Yieh United Steel Corporation	565.75	648.70	82.95	15%	Steel & iron
Goldsun Development & Construction Co.	442.77	553.56	110.80	25%	Construction, others
Ruentex Group	526.57	519.91	-6.67	-1%	Textiles, Wholesale & retail, Construction
Core Pacific Group	326.37	441.48	115.11	35%	Plastics, Construction
Lealea Group	267.62	388.80	121.19	45%	Textiles, Construction
Hualon Corp	36.78	13.93	-22.86	-62%	Textiles

Source: Wealth Magazine, January 2003.

VITA

Chen-Ling Hung

Born on August 15, 1971, in Taichung, Taiwan

Education

- 2004 Ph.D. in Mass Communications, the Pennsylvania State University, USA
- 1996 MA in Journalism, National Chengchi University, Taiwan
- 1993 Bachelor of Laws, National Taiwan University, Taiwan

Employment

- 2000 Reporter, English *Taipei Times*, Taiwan
- 1999-2000 Reporter, *Liberty Times*, Taiwan
- 1997-99 Reporter and Editor, *Wealth Magazine*, Taiwan
- 1996-97 Reporter, *Taiwan Daily*, Taiwan

Scholarship

- 1999 Ambassadorial Scholarship awarded by the Rotary Foundation
- 2000 Public scholarship awarded by the Ministry of Education, Taiwan