The Diffusion of ISO 9000 and Economic Crisis in Korea adoption

Ki Tae Park

(Department of Sociology, Korea University)

Abstract

This research explores the adoption mechanisms of ISO 9000 series and change of its patterns by using panel data from 1992 to 2006. Previous research stress that firms may adopt Quality Management System due to the economic benefits like an increasing market share through enhancing of reliability of last products. I follow earlier analysis frame; I add the new-institutional factors and time specific effects to test other diffusion mechanisms. New-institutionalism emphasizes an external pressure, firm's conformity to norms and getting legitimacy. Firm is exposed to norm more than others; it is more likely to adopt a taken-for-granted standard to improve its survival chance through taking legitimacy. Korean economic crisis is one another important factor that affects change of diffusion dynamic. It often symbolizes Korean specialty and be regarded as a great change source of Korean society. Hypotheses concern internal logic of firms to increase their economic performances, external environmental factors like a number of academic articles and effects of economic crisis. Results provide support for hypotheses partly. Korean large firms adopt certification to enhance their economic performances and to conform to norm for gaining legitimacy at the same time. I find a logic shift that diffusing factors changed from pursuing legitimacy to intend to the economic rationality after economic crisis.

Keywords

ISO 9000, New-Institutionalism, Economic rationality, Diffusion, Logic shift, Economic Crisis

INTRODUCTION

This society esteems diversity. At the same time, it diffuses a number of same rules all over the world and all the people keep it on. For instance, the conflict between labor and firm settles a dispute by arbitration through convention of ILO (International Labor Organization); almost consumer in super-market takes goods that be certified by many bodies. These phenomenon are not regulated by coercion, but be obeyed by actors who believe and followed it voluntarily (Brunsson and Jacobsson, 2000). Due to the firm also be embedded in and affected from society like a people, the firm is not be free from a source of resources, society (Granovetter, 1985). As a one case, increasing pressure that firm should adopt a standard system which is be enacted by IGO and INGO, many organizations have been put into standard system of their free will (Drori et al, 2003).

Although there are various standards, the most popular certification is ISO 9000 series which have been given to 776,608 organizations until 2005. When firm gets ISO 9000 certification, it may takes some benefits (Martinez-Costa and Martinez-Lorente, 2003). At the same time, however, firm encounters disadvantages that be determined their rise and fall by re-inspection report of 3rd party per every 3 year. It shows ironical condition of adopting for enhancing their survival chance (Guler, Guillen & Macpherson, 2002). As well as, too many certification marks from main gate of pickled radish factory in rural area to sign of restaurant beside road make a suspicious to the rationality and efficiency of certifications (Martinez-Costa & Martinez-Lorente 2003; Rao, Ragu-Nathan & Solis 1997). Generally, as firm focuses on quality controls, product cost of firm will rise up naturally. It means that managerial efficiency fall down due to the side effect of quality management system, and makes doubt that certifications really diffused based on the economic rationality. Even though a certifying body notifies that 'The ISO system wastes time and money' on its web board. All these conditions show ironic of standard system and certifications wouldn't diffuse just according to the economic rationality. This research, therefore, explore diffusion mechanism of certification in spite of various irrational phenomenon are existed. In other words, I will test why firm adopt ISO 9000 series that is taken-for-granted institution based on the firm's conformity to the norms and economical benefits at the same time.

In 1997, the Korea encountered economic crisis unconsciously. It must have considered our national developing strategy which have been called 'miracle of Han river' since 1970s. Neoliberalism which was instructed by IMF (International Monetary Fund) demanded that change of Korean society to be more rational and throwing away traditional Korean values. Especially, on the economic section, intervention of state was regarded as the poison of liberal market, so logic of 'market should controls itself' passed into Korean society. In the words, as Neoliberalism occupied all over the Korea, market is the most valuable worth, and let it turned operating guideline of firms. It means that capitalism of Anglo-American style came into and external environmental change led to internal change. Economic crisis as a Korean specialty made us to reconsider routines of our firms and shift it more rational. So, I will enquire logic shift which is based on the Korean economic crisis. Rapid change of business conditions and macro changes of market increased uncertainty, and they made logic shift from chasing legitimacy to the economic benefits. It takes opposite site to argue of Tolbert and Zucker (1983).

International Organization for Standardization and Certification

ISO (International Organization for Standardization) was established in Geneva, Switzerland in 1947 and the biggest international organization to develop and enact diverse standards. According to statute chapter 2 of ISO, it was founded to fertilize trade of goods and services between states through remove technical obstacles and unite industrial standards of each country. ISO submits just one body per the one county and it commands 146 states as a member in 2003.

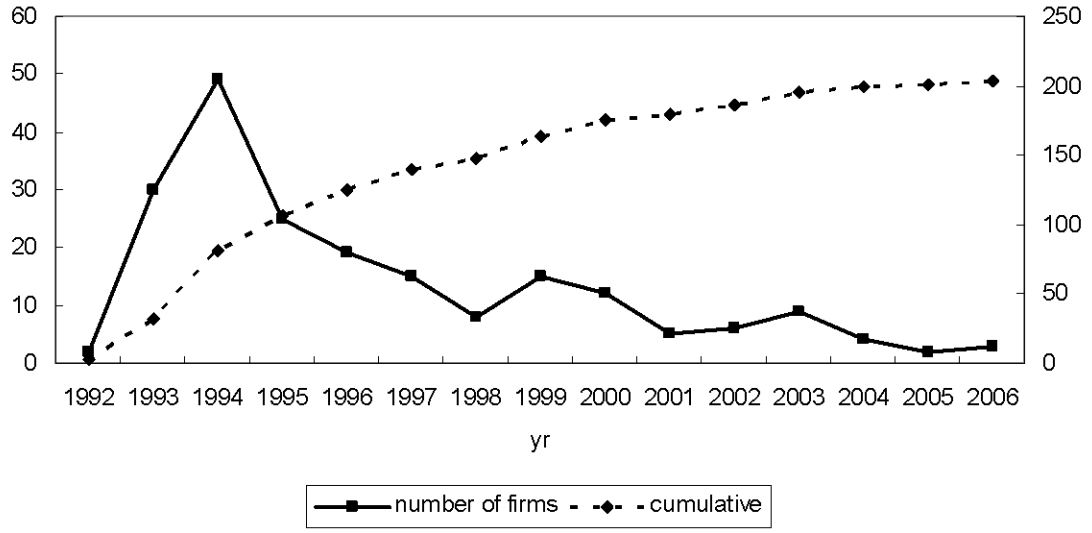
In 1951, ISO developed the first standard that 「Standard Reference Temperature for Industrial Measurement」 and it has enacted 16,445 standards that cover from agricultural industry to medical and information technology. Although ISO keeps various standards, 9000 series, 14000 series and 26000 series are regarded as representative certification. 9000 series is called Quality Management System and enacted in 1987, ISO 14001 which is called Environment Management System. Not yet be conformed, ISO 26000 series is the standard which is used as a norm of corporation social responsibility. The most representative certification, ISO 9000 series was adopted by 776,608 organizations in 161 states in 2005. Even though North Korea as thought the most exclusive state has 939 organizations and organizations in many peripheral states adopt it. These conditions mean ISO standards is used as an international rule on a trade.

National industrial standard as KS (Korean Industrial Standards) and JIS (Japanese Industrial Standards) guarantees quality of last product and limits its coverage to just manufacturing industries, but ISO certification approves standardization of producing process from design to after-sales service by 3rd party, certification authority (Guler, Guillen & Macpherson, 2002). Applied fields of ISO standard are wider than national standard, therefore, because of all goods and services in a same process can be taken equal marks.

The Adoption of Korean Firms

In 1992, Samsung Electronics Co., Ltd and Daewoo Shipbuilding & Marine Engineering Co., Ltd adopted ISO 9000 series for the first time in Korean large firms. Cheju province was also certified the first as a local autonomous entity in 1997. After that, QMS has diffused rapidly between organizations in diverse industries like transportation and education beyond manufacturing and service sector. A number of adopting firms has increased about 22 times from 619 in 1995 to 14,033 in 2005. Among Korean 300 large firms, 204 firms (68%) adopt ISO 9000 series, and as categorizing by industries, 90.2% of manufacturing and 100% construction are certified. It show that some industries as be known easier to standardize adopt ISO 9000 series and financial and insurance are relatively low owing to feature of service industries that each process is separated to individual stage.

Figure 1 shows a number of adoptions of Korean large firms by year. The first half of 90s, from 1992 to 1995, ISO 9000 has diffused very rapidly. This condition causes by rational choice of firms to increase their sales, coercive roles of Korean government by quality management act, mimetic process based on imitates other firm's adopting and myth that getting legitimacy affects to enhance efficiency at the same time (DiMaggio & Powell 1983).



[Figure 1] a number of adoptions of Korean large firms by year

On the other hands, the second half of the decade of 90s, we find another diffusing pattern. Although speed of adoption is reduced, firm is certified constantly. It means logic of adoption is changed. In other words, economic crisis and depression affects mechanism of diffusion. Decrease of domestic demands and difficulty of export were occurred, nevertheless firms try to adopt standards that may be paid between $50,000 and several million dollars (Guler et al, 2002).

Theories and Hypotheses

There are many previous researches why some institutions are diffused inter-organization level on the organizational sociology and organizational theory session in management. First, you can find a series of research streams that organization adopts new institutions which are based on its rational choice to enhance its efficiency. This perspective concerns organizations as an economic actors should perform effective. Second, however, new-institutionalism emphasizes another mechanism that organization should conform to external norms to survive through gaining legitimacy (Meyer & Rowan 1977; DiMaggio & Powell 1983; Zucker, 1987). Guler et al. (2002) and Mendel (2006) assert that possessing a certification of other firms operates to non--certified firm as a norm which is existed out of organization, and non-certified firm would try to obey an external norm to retain resources for a long term survival through gaining legitimacy.

1. Hypotheses based on economical rationality

Generally speaking, firm exists to earn much higher profits (Swedberg, 2003). When corporation makes lower performance and disappoint investors, however, stockholders sell their stock and appeal change of the board of directors. Even we can

find mortality of firm. In this dangerous conditions, firm should decide to special measures for keeping on amount invested and survival. In other words, possibility of adoption will run high to solve managerial problems. As stated earlier, merits of ISO certification are known as the best shortcut of enhancing liability and branching out of market share. Based on above statements, thus, I hypothesize:

Hypothesis 1. The poorer economic performance, firm will be more likely to take ISO 9000 series

Almost Korean firms ignore debt ratio and focus the expansion of business. In data, for example, just 15.3% of spells have a lower level than one's capital and mean is 2616.44%. It means that stock markets of Korea do not develop and they do not gather capitals through stock market, but prefer indirect way like a loan of financial and support of developmental state.

In resource dependency theory, organization should be more dependent by resources which affect its survival definitely (Pfeffer & Salansik, 1978). To keep on the investment and survive, it responds to demands of market value that firm which relies on external funds. Therefore, corporation under the higher financial dependency and keep on its life through debt may respond to creditors' claim which is stood as adopt ISO series. This leads to the following predictions:

Hypothesis 2. Firms which have higher debt ratio will be more likely to adopt ISO 9000 series.

Guler et al. (2002) assert that trade with foreign countries is an entry way of external norm. As many firms compete to make higher performance in the same market intensively, they imitate behavior of having higher sales firms. And certifications make a good use of overcoming tools to trade barriers of developed countries. In course of inspection, products gain quality liability naturally, and it may extend possibility of market entry. In real, Federal Communications Commission regulates level of EMI (Electro Magnetic Interference) to control for radio resources on the major electronic devices effectively. When firm disobeys its policy, FCC should restrict import, selling, display and advertisement. It means that low quality products of undeveloped countries which have just price competitiveness cannot be exported to United States. Based on above statements, thus, I hypothesize:

Hypothesis 3-1. Exporting firm will be more likely to be certified.
Hypothesis 3-2. Firms which have lower exporting ratio will be more likely to adopt ISO 9000 series

2. Hypotheses based on conformity to norm

The young company may be sensitive to norm. In a young company case, it tries to conform to external norms to gain resources because its experiences and resources are relatively inferior to old firms. And the young should encounter competition with pre-existing company for a customer and shareholders. Thus, organization which solves many problems to develop and survive depends on take-for-

granted external institutions thought legitimized. In other words, it relies on easier solution that is to conform to standards, rather than depends on unlimited effort. In conclusion, the young which do not be support by market will imitate other legitimized actors to take legitimacy through adopting ISO series. This leads to the following predictions:

Hypothesis 4. The young Firm will be more likely to adopt ISO 9000 series

We can guess that the old don't be certified. In general, almost older firm has a various treating capability to crisis which is originated from former critical conditions, occupied market share before getting certify. It means that the old is able to keep its survival without ISO 9000 series.

Moreover, structural inertia in population ecology explains constancy of the old organization despite external factor makes change (Hannan and Freeman, 1984; Young, 1998; Carroll and Hannan, 2000). They assert that structural inertia is caused by cumulative history and tradition of organization and legitimacy which is haven it. In other words, success may be a main factor to make structural inertia. Based on above statements, thus, I hypothesize:

Hypothesis 5. The old firm is less likely to adopt Quality Management System

The firm lies under various norms that "corporation should do and have something." It may conform to norms, and those have related to survival of organization closely. Especially, Managerial Association provides isomorphic mechanisms through offer a field of learning and a network effects about dominant rule. As the firm in association internalized behavior patterns of other firms in same field, it imitates except doubt to liability. And if corporation resists to general rules, it may encounter decrease of reputation, and it follows. Thus, we can guess that firm in association and the longer duration of membership having corporation may conform to norm due to pressure of rules are increasing in proportion to duration. In sample of this research, 53.3% of firm possess have FKI (the Federation of Korean Industries) membership. This leads to the following predictions:

Hypothesis 6. Duration of FKI membership affects adoption of ISO 9000 positively.

Hypothesis 7 will test mimetic isomorphism between Korean large firms. Generally speaking, degree of diffusion is relative to legitimacy of specific institution. In this condition, a number of ISO 9000 adoption firms symbolize intensity of pressure and it forces adoption to non-adopts. Therefore, firm follows others behavior to get legitimacy and certification will be diffused as the easiest way, nevertheless institution interrupt performance of organization (DiMaggio & Powell 1983). In other words, despite economic benefits may decrease by adoption; firm will take a certification for survive through getting resources. Based on above statements, thus, I hypothesize:

Hypothesis 7. A number of ISO 9000 series adoption of other firms until last year may be high, remain firm is more likely to adopt.

Professions have important roles to establishment of roles (Strang and Meyer, 1993). When professional groups approve legitimacy of specific institutions, it affects to diffusion. Also, ISO 9000 series is founded by researchers and managers who have technical background like other standards. These features of ISO 9000 are affected to adoption of remained firms through a number of professional articles which are written by professions and do a normative symbol. Therefore, we can predict follows:

Hypothesis 8. A number of academic articles is may be high until last year, remain firms will be more likely to adopt ISO 9000 series.

Chaebol has a great influence like conquering 12-16% of GNP from 1985 to 2000 in Korea. Thus, Korea government to limit economic power and concentration to Chaebol assigns and controls various institutions. It means economic authority of Chaebol is extremely powerful, and that increase visibility of external actors and let it make an enquiring object.
Second, still Chaebol is ruled just a one person, owner and has pyramid structure which shows existing of powerful controls. The owner participates on processing of decision making like a CEO. After all, adoption is determined by owner's favor and interest to maintain his/her permutation as a method of self-defense (Abrahamson, 1991). Based on above statements, thus, I hypothesize:

Hypothesis 9. Firm in Chaebol will be more likely to adopt ISO

3. Hypotheses based on time specific effects: Changing Trends over Time

Previous many researches explain logic shift on diffusion of institutions. We can find out change of norms when specific event occurs, and it affects all over the society by periods. For instance, Tolbert and Zucker (1983) assert that organization takes institutions due to the real demands in early stage and it adopts institution to be legitimized. However, this paper predicts reverse patterns like Strang & Macy (2001). In the first half of 1990, Quality Management System appeared as a fashion. After economic crisis, however, diffusion mechanism changed forward to economic rationality because of logic of societal operating changed forward to Neoliberalism. Therefore, we can predict follows:

Hypothesis 10. The positive effects of economic rational factors on the adopting of ISO 9000 will decrease relative to the effects of external sources (new-institutional effects) over time.

Data and Measures

Data and its sources To test hypothesis, I gather data from some resources about Korean large 300 firms. First, all financial data is sampled through KISVALUE. It contains diverse financial information of about 18,000 Korean firms. Second, from KORCHAMBIZ web site, I extract dummy variables that exporting company and involving in Chaebol. Third, FKI web site gives me dummy variables that membership of KFI and duration.

Dependent Variable I code "1", when firm adopts ISO 9000 and either code "0", when corporation do not be certified. Observing era is 15 year, from 1992 to 2006. I choose starting point as 1992 because first adoption occurs at that time.

Independent Variables In this research, I operate and use diverse index to measure adoption mechanisms which are that economic rationality and conformity to norm. Ahead, to test concepts that firm intends to grow its performance, I use the rate of operating profits, debt ratio, rate of exporting and dummy variable which is whether or not an exporting company. Also, new-institutional variables are whether or not young company under 5 years after founded and old firm over36 year are based on age, duration of FKI membership, a number of other firms' adoption and academic articles and whether or not of involving Chaebol.

Control Variables. I pick up some operated index as control variables which are whether or not of manufacturing, age, firm size which is constructed by number of employees.

Method of analysis. After coding secondary data, I test hypotheses through event history analysis. On data set of this paper, contents of variables change by time and rate of variances do not follow normal distribution. And I find serious deviation in data set. Thus, I choose survival analysis, and it can treat data of quantitative and qualitative at the same time, censoring problem, time-varing explanatory variables.

Results and Discussion

1. Longitudinal results

<Table 2> shows longitudinal results which contain diverse information, 1992-2006.

<Table 2> results of longitudinal analysis, 1992-2006

Measuring concept	Measuring index	Model 1	Model 2	Model 3
Control Variables	Manufacturing dummy	1.18**** (.146)	.471**** (.179)	.486**** (.183)
	Age	-.068 (.08)	-.024 (.097)	.173 (.212)
	Size	.100* (.055)	.134** (.058)	.085 (.063)
Economic rationality	Rate of operating profits		.00002 (.00002)	.00001 (.00002)
	Debt ratio		-.00007 (.00005)	-.00008 (.00006)
	Export dummy		1.42**** (.248)	1.32**** (.248)
	Rate of export		-.007**** (.002)	-.007**** (.003)
Conformity to norms and culture	Young company dummy			.279 (.358)
	Old company dummy			-.417* (.236)
	Period of FKI membership			.005 (.008)
	Adoption of other firms			.024**** (.005)
	Academic discourse			.004 (.009)
	Chaebol dummy			.472**** (.164)
Constant		-3.47*** (.403)		-5.26**** (.807)
Number of Observations		2042	2042	2042
Log likelihood		-334.5	-283.4	-263.2

*p<.1, **p<.05, ***p<.01, ( ) S.E

2. Time Specific Results

<Table 3> shows results of time specific analysis, 1992-1997 and 1998-2006

<table 2> results of time specific analysis

Measuring concept	Measuring index	1992-1997	1998-2006	1992-2006
Control Variables	Manufacturing dummy	.206 (.213)	1.15**** (.364)	.486**** (.183)
	Age	.451 (.321)	.111 (.298)	.173 (.212)
	Size	.098 (.076)	.016 (.124)	.085 (.063)
Economic rationality	Rate of operating profits	00002 (.00001)	-.0001 (.0001)	.00001 (.00002)
	Debt ratio	-.00003 (.00004)	-.0008*** (.0004)	-.00008 (.00006)
	Export dummy	1.35**** (.318)	.865*** (.419)	1.32**** (.248)
	Rate of export	-.004 (.003)	-.012*** (.005)	-.007**** (.003)
Conformity to norms and culture	Young company dummy	.496 (.467)	.352 (.599)	.279 (.358)
	Old company dummy	-.496* (.293)	-.500 (.445)	-.417* (.236)
	Period of FKI membership	.007 (.009)	-.005 (.015)	.005 (.008)
	Adoption of other firms	.045**** (.011)	.050 (.037)	.024**** (.005)
	Academic discourse	-.044*** (.023)	.028* (.014)	.004 (.009)
	Chaebol dummy	.500**** (.193)	.408 (.339)	.472**** (.164)
Constant		-6.12**** (1.14)	-4.79**** (1.34)	-5.26**** (.807)
Number of Observations		1092	950	2042
Log likelihood		-198.4	-106.3	-263.2

*p<.1, **p<.05, ***p<.01, ( ) S.E.

REFERENCE

Abrahamson, Eric. 1991. "Managerial Fads and Fashions: the Diffusion and rejection of Innovations." *Academy of Management of Review*, 16: 586-612

Brusson, Nils and Bengt Jacobsson. 2000. A World of Standard. Oxford University Press.

Carroll, Glenn R. and Michael T. Hannan. 2000. The Demography of Corporations and Industries. Princeton University Press.

DiMaggio, Paul and Walter Powell. 1983. "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields." *American Sociological Review*, 48, 1983: 147-60.

Drori, Gili S., John Meyer, Francisco O. Ramirez & Evan Schofer. 2003. Science in the Modern World Polity. Stanford University Press.

Granovetter, Mark. 1985. "Economic Action and Social Structure: The problem of Embeddedness." *American Journal of Sociology*, 91: 481-510.

Guler, Isin, Mauro F. Guillen & John Muir Macpherson. 2002. "Global Competition, Institutions, and the Diffusion of Organizational Practices: The International Spread of ISO 9000 Quality Certificates." *Administrative Science Quarterly*, 47(2):207-232

Hannan, Michael T. and John Freeman. 1984. "Structural Inertia and Organizational Change" *American Sociological Review*, 49: 149 ~ 164

Martinez-Costa, Micaela & Angel Rafael Martinez-Lorente. 2003. "Effects of ISO 9000 certification on firms' performance: a vision from the market." *TQM & Business Excellence* 14(10), 1179-1191

Meyer, John & Brian Rowan. 1977. "Institutionalized Organizations: Formal Structure as Myth and Ceremony." *American Journal of Sociology*, 83: 340-363

Pfeffer, Jeffrey and Gerald R. Salancik. 2003. "Introduction to the Classic Edition." Pp. xi-xxix in The External Control of Organization: A Resource Dependence Perspective. Stanford, CA: Stanford Business Books. [1978. New York: Harper and Row]

Rao, S. Subba, T. S. Ragu-Nathan & Luis E. Solis. 1997. "Does ISO 9000 have an effect on quality management practice? An international Empirical Study." *Total Quality Management*, 8(6): 335-346

Strang, David and Michael W. Macy. 2001. "In Search of Excellence: Fads, Success Stories, and Adaptive Emulation." *American Journal of Sociology*, 107(1): 147-182

Strang, David and John Meyer. 1993. "Institutional conditions for Diffusion." *Theory and Society*, 22: 487 ~ 511.

Swedberg, R. 2003. "Firms" Principles of Economic Sociology, pp. 74-103.

Tolbert, S. Pamela & Lynne G. Zucker. 1983. "Institutional Sources of Change in the Formal Structure of Organizations: The Diffusion of Civil Service Reform, 1880-1935." *Administrative Science Quarterly*, 28(1): 22 ~ 39

Young, Ruth C. 1988. "Is Population Ecology a Useful Paradigm for the study of Organization?" *American Journal of Sociology*, 94(1): 1 ~ 24

Zucker, Lynne G. 1987. "Institutional Theories of Organization." *Annual Review of Sociology*, 13: 443 ~ 464