

## An Analysis of IS Projects with Risk Assessment Approach: the case of Taurus in LSE and Jasdec in TSE

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# An Analysis of IS Projects with Risk Assessment Approach

: the case of Taurus in the LSE and Jasdec in the TSE

Yoko OGUSHI

There were two big Information System(IS) projects aimed to implement a new, efficient settlement system in order to treat with increasing equity trading in late 80s : One was called Taurus in the London Stock Exchange(LSE), the other was called Jasdec in the Tokyo Stock Exchange(TSE). The Taurus project, however, was halted in 1993 after long years of struggling. On the contrary, Jasdec was successfully implemented in 1992. Careful analysis using risk assessment approach shows us there is no doubt that Taurus was a far more risky project than Jasdec. Especially in making a contextual link each factor referred to the projects gives us a comprehensive explanation how the former project was going to be risky in its developing process. It is also argued that there is an influence on projects due to stocks as not being a pure commodity.

## 1.0 Introduction

In the last two decades, Advanced Information System has been regarded as a strategic resource to obtain a competitive advantage. In other words, it has become seriously important for organisations to provide a solution to the business challenge which is posed by intense global competition by using advanced technology. It can be said that a useful computerised Information System is one of the major keys to success to survive in world-wide competition. Indeed, computer technology plays a very important role in many aspects of improving services to customers in most areas.

However, in many cases, organisations fail to introduce new information systems. Especially in the case of a large system, it often takes so much extra time and expenditure to implement, or have crucial defaults which lead that business can not pay off their

investment. Therefore, it is very important to minimize risks in all processes of IS projects.

In retrospect, however, Taurus was a highly complex, ambiguous project, and then, it was seemed a obviously risky project comparing with Jasdec.

Here there is a question why the LSE had become involved in such a risky project and finally gave up Taurus though the TSE could implement Jasdec successfully in early 90s.

The purpose of the current paper is to answer the above question by demonstrating an analysis of these two IS projects where complex IS and many participants were involved, with risk assessment approach. Especially, this analysis highlights which kind of factors influenced both projects and how these factors referred to the causes of projects' success or failure.

## 2.0 Theoretical framework

### 2.1 Definition of risk

There are so many definitions which determine the boundaries of what should be called risk. Laudon and Laudon (1994) argue that risk is a possibility which leads to a negative outcomes of varying degree and could be estimated on the basis of experience or some theories. In this paper, risk will be taken on the definition. These risk factors refer to the following consequences : failure to obtain some or all expected benefit due to implementation difficulties ; implementation time much longer and/or costs much higher than estimated ; performance lower than expected.

### 2.2 Choosing the theoretical framework

Generally, the more risk factors existing, the more likely project failure is to happen. In addition, when the level of complexity and uncertainty of a project is high, it is assumed that a project has potentially high risk. In fact, there are a lot of factors we should consider as risk. However, how should we assess risk factors which are included in a project?

Although there is much existing literatures on risk assessment for introducing IS into an organisation, it seems that most of them fail to provide a sufficient explanation for the causes of failure. Because some of them only focus on a technical aspect of a project, on the other hand, others merely argue the problems from an organisational point of

view. Of course IS is put under strong impacts from organisational structure, culture, political process and management because these factors are potential resources which lead a peculiar feature to IS. At the same time, however, the introduction or renewal of IS also put a strong behavioural impact on an organisation. In short, A system failure is caused by management side as much as by technical side. As Willcocks and Margetts (1994) suggest, risk as a factor of failure should be treated as mutually interacting phenomena rather than independent factors.

Moreover, recent studies show that the major risks and reasons for failure are more attributable to organisational, social and political aspects than to technical factors (e. g., Scott and Morton(Ed.), 1991 ; Willcocks and Margetts, 1994). A framework presented by Pettigrew *et al.*(1994) seems to succeed in involving historical, processual and contextual characters as mutually interacting phenomena between management and technical side in IS project. According to them, incorporating the outer and inner context of an organisation into an analysis will bring a number of important benefits. They argue that describing the process to answer the question about what, why, when and how of an organisation response to change will be helpful to explain the outcomes of projects. In addition, they emphasise the importance of making a linkage between these two contexts with the process and the content of change. In other words, there is obviously needs to

explore context, content and process linkages through time in order to obtain more persuasive explanation of the result of an IS project. Furthermore, to assess risks, Pettigrew *et al.*, go on to discuss that it is important to adopt an “eclectic and processual” viewpoint, namely a conceptual approach, rather than to substitute rational linear viewpoint with political process theories (Pettigrew *et al.*, 1994, p8)

Under their frame work, there are four conceptual, interacting categories each of which makes a linkage to explain outcomes of a project;

- Outer context

Factors of outer context derive from outside of an organisation. The organisation and its members need to respond to and accommodate these factors. Economical condition, political issues such as government policy or regulation, competition in a market are factors which are considered in this category.

- Inner context

These factors refer to characteristics of an organisation itself, such as current management strategy, organisational culture, structure, politics, reward or promotion system and human resources.

- Content

Content covers a substance of a concrete project and proposed changes which arise from a project. For example, type of technology, size and expenditure. It can be said that the nature of the organisational response

may be shaped by factors of content that is ongoing. Some change will be caused radically, others incrementally. In other words, the nature of the organisational response may be shaped by the characteristics of the project that is being processed and its nature may reflect content again through project development process.

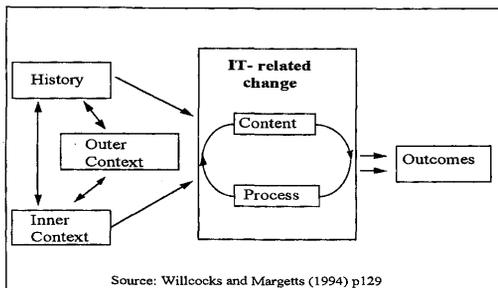
- Process

Process covers a stream of a project in terms of how things are done and the issues recognised from the start to the end of a project. In process, factors mentioned above may influence a project and cause many changes to a project itself.

In developing Pettigrew and his co-workers’ framework, Willcock and Margetts (1994) add two categories ; one is history and the other is outcomes. They present a figure on a framework for risk analysis (See Figure 2-1). Since this contextual approach as a way of risk assessments seems to be most appropriate to analyse IS projects, it will be applied to the two contrasting projects, namely Taurus and Jasdec, in the following sections.

(Figure 2-1)

Framework for risk analysis



### 3.0 Projects Analysis

#### 3.1 Common Background in Stock Exchanges

##### World-wide competition and Systemic risk

There are two big driving forces which lead stock exchanges in the world to implement an efficient settlement system : one is world-wide competition among markets, and the other is settlement risk, especially systemic risk.

Since the 1970s, as the movement of international capital had been steadily liberalised, globalisation and deregulation became a watchword in financial fields in many countries. Share trading had been growing rapidly both domestically and internationally. As a result, a competition among stock exchanges in the world has been promoted and threatened its positions even they had

already established a long history as a leading financial market. Therefore, each stock exchange had to produce efficient, convenient trading facilities to survive.

In addition with the competition, globalisation of financial markets led to another big issue for markets : settlement risk<sup>1)</sup>. Although the volume of stock transactions has been increasing both domestically and internationally, settlement systems still remained diverse between countries. However, after the Crash in 1987, it was clear of the need to uniform trading procedures in each market by introducing efficient settlement systems in order to overcome settlement risk, especially systemic risk<sup>2)</sup>. Importantly, exchanges in the world has become influenced each other and tightened their linkage in last two decades.

The G30's recommendations<sup>3)</sup> were accepted as an important framework for enhancing the efficiency and reducing risks in international clearance and settlement procedure by nations that held major capital markets. It insisted that shortening the settlement period in all financial markets could have a substantial positive impact in terms of risk management. Reflecting the G30's recommendations, interests in the markets had to devote much more attention to the international aspect of financial markets. There-

1) Settlement risk arises when there is a time gap between delivery of goods and services and required payment.  
 2) Systemic risk refers to a disturbance impairing the working of the system that is composed of market participants, trading mechanisms, clearing and settlement arrangement.  
 3) The G30, the group of 30, is constituted by 30 financial specialists from 10 advanced countries and announced 9 recommendations to overcome settlement risks by 1992.

fore, in addition with competitive pressure with other stock exchanges, there was strong international pressure for every market to reform or renew their settlement system by 1992.

### 3.2 Taurus Project in the LSE

For the LSE, the answer for the above pressure was the Taurus (which stands for Transfer and Automated Registration of Uncertified Stock) project. So far settling share transactions in the LSE took up to three weeks<sup>4)</sup>, they needed to introduce a far more efficient settlement system. Taurus was recognised as a paperless share ownership register where an investor's right to a share was to exist only in computer data recorded by book entry transfer of their market purchases and sales. Taking paper out of the system by book entry transfers dematerialisation was granted as driving down settlement costs and risks and to enable London to reach a rolling three-day settlement<sup>5)</sup> of trades and a delivery versus payment. These changes would have promised LSE to be a more attractive and efficient place to transact stock shares. Moreover, Taurus would have led to a fully competitive advantage against other leading international stock markets.

#### 3.2.1 Organisational factors

##### History

The LSE has the longest history in the world stock exchange markets. The origins of it can be found 17th century in London.

By the end of the 17th century, the market had received a official acknowledgement because of their fund raising capabilities after the government raised capital by issuing their own one. Since then, it was created a close but long distance relationship between the government and the stock exchange. It meant that the City obtained a freedom from political issues. In this historical stream, the City built up their stance and became a magnet for funds and financial investments.

By the end of 19th century, the LSE became a well established formal market place, which had its own building and facilities to support the transaction of securities and to finance the capital investment in Great Britain. Until now, it has still kept position as one of the leading stock exchanges in the world.

##### Culture and politics

The stock exchange has historically played a role as the central organisation responsible for communicating with its members -not exactly as leader of them (Murphy, 1988, 74). Especially, the exchange has been regarded consensus with member firms as important

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4) Anonymous (1993) What is a stock exchange for. The Economist March 13 p.119.

5) Rolling settlement means that a continuous settlement schedule so that all traded settle within the same time frame -whether any specific number of days after trade date, settlements occur on all business days.

from its managerial aspect<sup>6)</sup>. In addition, as aforementioned, the Exchange itself has preferred a free-wheeling culture with lowest administration by the government or the Treasury.

#### Turnover value and its feature

The turnover value of equities in the LSE in 1995 was about £700 billion and the 3rd biggest stock exchange in the world in this sense (See Figure 3-1). The most important feature of the LSE is a quite high percentage of cross-border transactions in comparison with another main stock exchanges. After the introduction of SEAQ International in the Big Bang, London has been increasing its share of cross border transactions rapidly. Only the LSE shows a rate over 50% (See Figure 3-2)

(Figure 3-1)

Turnover Value of equities (m.£)

	1990		1995	
	Domestic	Foreign	Domestic	Foreign
LSE	157,812.5	147,024.8	332,166	395,392
NYSE	N.A	N.A	1,820,232	168,747
TSE	729,880.0	7,881.1	521,775	6,100

Source : Fact Book : London Stock Exchange

(Figure 3-2)

Cross-border equities transactions  
As a percentage of GNP

Equities	US	Japan	UK
1975	1.8	0.9	N/A.
1980	3.4	2.2	N/A.
1985	5.1	6.7	15.2
1990	11.2	14.1	75.8

#### Participants

The number of listed domestic companies was 2,303 in comparison with the number of listed foreign companies of 536 in 1995. Since 1985, the number of listed foreign companies has kept over 500. The total number of its member firms was 306 in 1995. The important point to be mentioned is that about 40 percent of member firms are owned by foreign securities companies (Cohen, 1995, 7).

#### 3.2.2 Background of the Taurus project After the Big Bang -Great paper backlog

The aim behind the Big Bang was the government's desire to ensure the position of the LSE as a leader of the global efficient financial market by making it more competitive and effective than any other financial market.

Thanks to the Big Bang, the volume of trading had been expanded extremely. For instance, before the Big Bang, the daily average number of transactions was about 20,000 valued at \$700 million, and then, after the

6) Anonymous (1993) London's crumbling pillars. The Economist May 29 p.95-96.

LSE's transformation, the average jumped to about 60,000 valued at \$1,100 million (Galletly and Richie, 1988, 109). In addition, trading volume of foreign investors had prompted sharp growth in turnover in non-UK company shares in the LSE. It had also increased cross-border transactions dramatically. Since then, the City of London has become the global centre for international share trading.

However, this increasing volume of transaction of share certificate caused a big problem. Because very little investment was spent for an efficient settlement system, the volume of backlog of unsettled share certificates was increasing tremendously. The back office capacity could no longer meet the trading capacity.

In addition, there was the other serious problem for the LSE. Unlike rolling settlements, a year was divided into 26 fortnight account periods. Because all trades that took place within an account period were settled on a particular day, the opening Monday of accounts usually saw turnover 14 per cent higher than the second Monday, and in the first Friday 16 per cent fewer bargains than the closing Friday (Gandy, 1993, 59-62)

To improve settlement speed and to iron the existing peaks in office work became of importance to get efficiency. Obviously, the LSE needed far more efficient settlement system.

### 3.2.3 Taurus Development

#### Taurus as a successor of Talisman system

The idea for Taurus derived from the existing batch-processing Talisman system. Although Taurus was being designed to replace the existing share ownership and transfer processes by electronic means, it would have been integrated with the existing Talisman system, rather than replacing it. Talisman would continue to be used for the reporting of share certifications (Dunham, 1991, 107). Unlike the depository trust company system in other major exchanges such as New York or Tokyo, which continue to store physical share certificates, Taurus aimed to do away with paper altogether and shareholder data would be stored solely in electronic form.

Initially, Taurus project was simply intended to dematerialise share certificate by an automated book entry transfer in 1980. However, by 1981, the intention of the LSE altered to automate the entire market settlement processes with one central system. In short, the new concept meant that a central computer maintained all records of shareholders. This changed idea, in the end, resulted in abandonment. Registrars who were working for maintaining share registers for listed companies rejected the concept simply because they feared unemployment by the advent of Taurus. Unable to dictate to them, the stock exchange was given up the concept.

### Repeated compromises

The 1987 Crash forced the LSE and its member firms to face the Taurus project seriously. However, it had a problem again because the exchange rekindled the concept of a central computer system. Of course it led to the resistance of registrars again. In addition, this time, a number of participants in the markets such as security firms, custodial banks and investing institutions objected to the design of the system which the task force proposed. This opposition was mainly caused by technical and financial reasons. In particular, it became obvious that the cost of the proposed system was about £60 millions only for hardware of the central data base which meant a third times as much cost as information databases.

Consequently, the Bank of England established the SISCOT (which stands for Securities Industry Committee on Taurus) to intend to avoid a conflict and to formulate requests between the interest groups. However, against the Bank's intention, a battle started on SISCOT committee among rival interest groups. Especially the listed companies objected to a proposition by the SISCOT that to extend SEPON (which is an acronym of Stock Exchange Pool Nominee) system to manage database on shareholders<sup>7)</sup>. Because of a fear of hostile merger and acquisition, the companies desperately requested to be enabled to access the on-line

database in order to know the real beneficial shareholder's names not nominee's one<sup>8)</sup>. However, Taurus was not designed to be enabled to be accessed by multiple objectives. Therefore, the SISCOT finally decided to give up the concept of holding a central computer database.

Instead, the committee decided on building a series of distributed databases linked together by the communications network. In this system, the exchange expected to act as a 'Hub'(Waters and Cane, 1993, 11) market intermediates and service providers would become Taurus Account Controllers(TACs). The problem with distributed databases lay in their complexity. Without experience, it was clear that the proposed system involved some trouble. In fact, to build up the system, they needed 400 different sites with various combinations of hardware and software at each site(Ibid.). Thus, this decision made Taurus more complicate system.

In addition, stockbrokers of private clients insisted that the beneficial share holders' names should be continuously held on the companies register not simply held in a nominee account. According to them, shareholders might miss chances to get a benefit from the companies if the real name of the shareholder was only available in a nominee account. Therefore, this resulted in a concession again. Investors would still have their names on a company's share register

7) SEPON is the LSE's nominee account and all market-makers' equities are hold in the account.

8) Under the this proposal, only nominees' names come up in SEPON not a name of a actual shareholder.

rather than simply being pooled together with others in a nominee account.

Furthermore, DTI interrupted system development from the viewpoint of investor protections. In addition with a £100 millions compensation fund, full encryption (security coding) was added with the cost and complexity of construction to protect investors from hackers(Ibid.).

### Software

The LSE chose a global system developed by the Vista Concepts of New York, as the heart of the new software for Taurus. The Vista Concepts is one of the market leaders in its field and its product has an excellent reputation in the United States. In addition, this company created a multi-currency system for Midland and replaced two earlier systems successfully<sup>9)</sup>. However, the software would need more alternation than it was estimated (Drummond, 1996, 350). In the end, to customise its package for Taurus project, up to 70 percent of the package had to be rewritten and its complicated work was done at two places by two parties based in London and in New York (Waters and Cane, 1993, 11). Thus, it was pointed out that there might be happened communication poor between them.

### Legal framework

In order to abolish real share certificates indicating ownership, it was clear to change

regulatory framework before introduction of Taurus. Under the amended Company Act, shareholders would receive a new right, 'entitlement' instead of a share certificate. However, it was more complex and took much more time than the project team had envisaged in the first place. Especially because Taurus might be used to settle for foreign securities, there was a need to supplement regulations for this purpose (Hill, 1991, 22).

### Tight Schedule

It was pointed out many times that the test schedule of Taurus was very tight, although a test was very important. In fact, in comparing with the bank of England's Central Money Market Office (CMO) where they were 30 people connected, or Central Gilt Office (CGO) which had only 20 users, Taurus project had to involve several hundred. It seems to be tight even if everything went smoothly. In addition, this project should have led a quite huge environmental change to the market. However, the LSE planned only six weeks testing period with such a wide population and a dramatic environmental change (Whybrow, 1991, 19).

By 1991, the project was no longer well controlled. The first delay was announced in February. Every time interests of the projects loudly argued their demerits, the project was influenced and changed its

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9) Anonymous (1991) Gearing up for Taurus *Banking World* October 1991, p.29.

design. It meant “the exchange was trying to build its core computer system on sand” (Ibid.). Years of change and modification in order to meet all interests groups caused a huge cost to development of the Taurus system. Thus, as new compromises were exercised, the system became more complicated.

At any rate, a test for Taurus to implement started in 1992 and the second stage of testing began in January 1993. In that stage, participants tried to link to the LSE and the project seemed to be finally going well. By the middle of February, about 128 companies were involved in the project and a total of 285 already applied to become participants and the opening date of Taurus was to have been April 1994 (Ibid., 20-21). However, elements of the software were not completed yet. Indeed, some of the programme was still under consideration. Worse, it was gradually clear a jam and difficulties in interpreting data. Then, the hope for a smooth start of the test changed to a doubt for a viability of the project.

#### 3.2.4 Taurus fiasco

According to the original timetable of the stock exchange, paperless stock exchange by book entry transfer should have started in October 1991 and rolling settlement should have started October 1992. However the Taurus project was canceled at last in 1993.

As a result, interests of the project spent much money and made a effort to meet the request of a phantom settlement system,

Taurus. Indeed total £400 million expenses and more that 10 years was consumed for this project.

#### 3.3 Jasdec Project in the TSE

In the TSE, most settlements in terms of share trade were already exercised within T+3 when the G30's recommendations were announced in 1989. For the TSE, one which they would answer by Jasdec (which is an abbreviation of Japan Securities Depository Center) project was the third recommendation, namely establishment of a central securities depository.

A principal function of a central securities depository is to immobilise or dematerialise securities in safekeeping by using a book entry method. This book entry method means that a transfer of a given equity from one account to another account is able to be exercised by a debit or credit on the book of the central depository. If computerised systems are applied to a book entry method, it might be a great step to enable the market participants to settle their share trading in delivery versus payment(DVP). Ideally, using a DVP makes settlement done instantly. In addition, it leads to a reduction of settlement risks and costs incurred in share trading. Thus, to fulfil the recommendation above, the TSE needed to set up a central security depository system, namely Jasdec by 1992.

### 3.3.1 Organisational factors

#### History

A history of stock exchanges in Japan started in May 1898 in Tokyo and Osaka to deal with public bonds issued by feudal lords and their retainers. After World War II, the Securities and Exchange law, which was similar to the American Securities Act of 1933 and the Securities Act of 1934, was set up in 1948 and the TSE had reopened in 1949. Since then, this law and related regulations of securities trading have been worked as a regulatory framework in terms of stock exchange. In addition, there has been administrative guidance given by the Ministry of Finance (MOF). From the protecting monetary viewpoint, the MOF has often encouraged or arranged this process officially and unofficially to prevent bankruptcies of financial institutions. When the securities panic happened in 1965, the Bank of Japan (BOJ, Central bank in Japan) intervened in the stock market to save it from a severe crash. After the panic, the Securities and Exchange Law was amended in 1965 in order to prevent future panic. Securities firms were required to be licensed by the MOF rather than registered since then. In addition, a variety of rules and regulations were introduced from the viewpoint of investors protection. Therefore, it has been established a system that the TSE and its member

firms are greatly influenced by the MOF. By the end of 1980s, substantial growth in the national economy pushed parallel growth in trading volume and stock price on the TSE. Then, it has been one of the top three stock exchanges in the world.

#### Culture and politics

In comparison with the BOJ which has a small role in stock exchange markets, MOF plays an important role as a regulator for all financial institutions in Japan. In fact, its comprehensive authority is regarded as the most powerful and prestigious among Ministries of the Japanese government. Because the MOF is central to the functioning of financial systems and establishes financial policy in Japan, all financial institutions have to obtain proper licences in order to engage in business, which are regulated by the MOF. This Ministry also monitors and controls activities of all financial institutions. Regular audits on all banks, securities firms and insurance companies both domestic and foreign are exercised in conformity with statutory Laws. In addition, there has been unofficial “administrative guidance”<sup>10)</sup>, so called Gyosei shidou, by MOF in the financial system. Many researchers argue that its power extends beyond the status and financial industries have to accept a solution suggested by MOF (e.g., Tatewaki, 1991, 175 Rosebluth, 1989, 210). Thus, although

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10) Administrative Guidance : It means that unwritten regulations which are established and enforced by Ministries. In financial area, it is exercised by Ministry of Finance.

there has been voluntary restraint by The TSE and the Securities Dealers Association of Japan, MOF has exercised a leading role in the stock exchange. Actually, 'nothing may happen without approval, either implicit or explicit, from the MOF' (Tatewaki, 1991, 175) in the financial field in Japan.

#### Turnover value and its feature

Although there are seven other stock exchanges in Japan, the TSE has represented over eighty per cent of national total equity trading volume since 1975<sup>11)</sup>. During late 1980s, the TSE had been kept as the top stock exchange in the world in value terms, although it was in fourth position in 1995. Unlike the London Stock Exchange, one of the features of the TSE is its huge trading volume of domestic share certificates in comparison with small volume of foreign share transactions (See Figure 3-1). Cross border transaction volume is also small. (see Figure 3-2).

#### Participants

There were 124 securities firms which were listed as a member of the TSE in April 1994. Numbers listed on the exchange was 1,234 companies in the first section and 433 companies in the second section. 110 foreign companies are listed on the TSE Foreign Stock Market.

### 3.2.3 Background of the Jasdec project Bubble economy and stock investment boom

It is said that bubble economy started in the late 1980s in Japan. The price of lands and of stocks in Japan achieved sky high level within a short period in late 1980s. Although during a short period after the crash 1987 prices of stocks decreased sharply, a good business condition pushed stock prices up strongly again. These circumstances would be provided by mainly two policies: one is low interest rates and the other is privatisation of public sectors.

#### i) Interest rate

There was a strong attempt by the government to ensure domestic demand to decrease a huge amount of trade surplus, specially against the United States, by encouraging imports in mid-1980s as an answer to international pressure for their surplus. Therefore, among 1986 and 1987, the Bank of Japan had continuously decreased the official discount rate from 5 to 2.5 per cent, which was assumed to be a quite low level in comparison with historical discount rate in a similar economical condition (Pratten, 1993, 56). Along with the low discount rate, interest rates for depositors were set at a quite low level. At the same time, as profit making from active fund management has been increasing in importance to overall corporate business, a tremendous volume of excess

11) Fact book : Tokyo Stock Exchange 1994 p.95.

money, which lost opportunities to deposit in good conditions, flew into stock markets as well as real estate markets. It caused stock prices to rise quickly and enormously.

ii) Privatisation of public Sectors

In addition to the low interest rate, there was another reason assumed to be caused by the stock investment boom in Japan in late 1980s. There were several plans to privatise public sectors. Nippon Telephone and Telegraph (NTT), which was a telephone monopoly and its shares were wholly owned by the MOF, was decided to be the first privatised company in April 1985 and the government began to sell its shares in late 1986. A lot of new investors became participants in the stock exchange at that time.

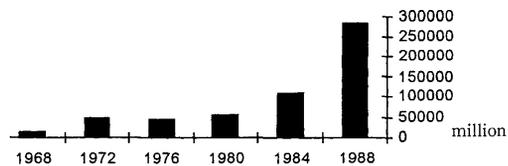
Settlement problem

Since 1972, all listed stocks on the TSE had been settled by the Japan Securities Clearing Corporation(JSCC) which was set up as a subsidiary of the TSE to handle clearing and to move towards a book entry environment. JSCC handled trades of members efficiently and played an important role for the operation of depository and delivery of a large number of stock certificates. However, as JSCC should have been running under the framework of the existing Commercial Code, stocks deposited by the participants (the TSE member securities firms and the Japan Securities Finance company) still had to return to real share holders through its member firms every time share holders exer-

cised their rights such as receiving dividends and exercising voting. Therefore, as a trading volume of the TSE has been increasing in early 1980s, settlement had become conceived as a tremendously heavy burden for people working for the securities industry and JSCC. In parallel with rapidly increasing share prices, trading volume of stocks in the TSE had been expanding rapidly (See Figure 3-3). It faced an ever-growing mountain of paper (Lake, 1990, 78). As a result, under the existing settlement system, settlement backlog gradually became a serious problem and system called for more efficiency.

(Figure 3-3)

Turnover value of equity (domestic) in TSE



Source : Year Fact Book (1993) Tokyo stock Exchange

3.3.3 Jasdec Development

JASDEC includes two meanings, one is a public sector which run a new settlement system and the other is a new system itself. Thus, in order not to confuse, we will use “the Center” to refer to the public sector and “Jasdec” to refer to a new settlement system.

The origin of the idea of Jasdec, which was to immobilise share certificates through book entry transfer, was made in early 1970s. However, without amending the existing law at that time, “it was too big to be done by

consensus” (Ibid., 79). in the word of manager of JSCC clearing administration. As JSCC was based on members’ agreements, not law, there was a limit on its mandate. In the end, although JSCC aimed for immobilisation, it was only half a book entry system not a complete one. As already mentioned, under the limitation of law, share certificates had to back real shareholders each time they exercise rights.

Therefore, when the TSE tried building a complete book entry system, they consulted a clearing system experts group to be sure of the project and discussed the need of a new law in order to introduce a new complete settlement system with advisory bodies for Ministries of Justice and Finance. The Securities Exchange Council started a study of the central depository and clearing system in 1979. In 1984, to integrate opinions for a new system from listed companies, *Keizai Dantai Rengokai*, which is a pressure organisation gathered by Japanese major companies, established a working group. Their opinion was reflected in the discussion in the Council. In 1984, “The Law Concerning Central Depository and Book Entry Delivery of Share Certificate and Other Securities” was enacted and put into effect<sup>12)</sup>. Under the new law, investors do not need to surrender real share certificates to a counterparty in order to transfer ownership. Then, the Center was established in 1985 and designated as a securities depository organisation by MOF.

The two top people at the Center came from the MOF and the third in command came from the TSE (Ibid., 79)

#### Function of Jasdec

The next task was to decide which kind of settlement system they needed. The Center had a meeting with the TSE to discuss the issue. As a result, not only efficiency but also economic viewpoint was considered as important in the meeting. Therefore, the Center divided the function of a new system into two parts, one was for data which had to process immediately and the other was for data which could be transferred later.

#### Main points of Jasdec

- 1) Batch file system.
- 2) Jasdec includes two kinds of system : a system for book entry transfer processing data immediately (Duplex system) and a system for data change within a couple of days (Single system).

They proposed their blueprint to interests such as securities firms and banks. Many requirements were presented. In particular, with increasing volume of international share transactions, comparison of instruction between domestic securities firms and foreign securities firms has become a serious problem. Because of delay, incompatibility or backlog of instruction, there was a strong need to solve this problem. Thus, there was

12) Fact Book : Tokyo Stock Exchange 1994.

an enthusiastic opinion to equip a function of the international instruction comparison system into Jasdec and to enable book entry transfer between securities firm accounts and bank accounts. However, the Center rejected these requirements. The reasons were as follows (Japan Securities Depository Center, 1994) :

- 1) These requirements would make the computer system complex and expensive.
- 2) These requirements would cause a delay of system development.

Many requirements were rejected mainly because of the above reasons. However, the Center agreed to supply shareholder lists to issuers on recording date, which no other depository in the world has agreed to (Ibid., 80).

In 1987, the Center chose HITACHI Electronic Corporation, one of the biggest Japanese electronic companies in the world, in order to build hardware. In the case of software, Tosho Computer System(TCS) was chosen. Because there was a strong relationship between TCS and the Center, it was appreciated as easy to communicate with each other. In addition, they had an experience to build up a depository system.

The original time schedule was following;

- 1) The content of Jasdec would be decided by 1987.
- 2) The design of Jasdec would be finished between January August in 1988.

- 3) The programming of Jasdec would be finished between December 1988 and November 1989.

- 4) Connection with users and overall testing would be finished by September 1990.

As a user of Jasdec, in total 269 companies applied. Although there was a need to set up a backup system, the Center decided to use a backup system which belonged to TCS. However, finally, they rented a backup system from HITACHI. In terms of terminals, the Center decided to use a lease. The Center borrowed all terminals from HITACHI Lease Co, Ltd. and lent them to its participants.

In September 1990, TSC finished building software for Jasdec. To be ready for the system, from July to September, a Pilot test with 22 co-operated securities industries and banks was exercised. Although the Center finished everything in the Jasdec project by September 1990, they decided to postpone putting it into full operation in order to train users, especially end users to use the system efficiently. As a result, September 1991, Jasdec was completed and was fully put into operation in October 1992.

### 3.4 Applying the theory

#### 3.4.1 Categorising factors in two projects

Here, factors which we have seen already in previous chapters are going to be categorised to analyse each project.

## London

### (a) History

-Globalisation and deregulation for the financial world became mainstream in the world-wide financial markets in the 1980s. As a result, a volume of cross border financial transactions has been expanding rapidly and stock exchanges in the world have been influenced from other markets' trends.

-As a historical feature, it can be pointed out that the City has kept relative freedom from the government and political issue. In other words, authorities for financial matters such as the Bank of England or the Treasury have merely intervened in the matters of the City.

### (b) Outer Context

-To ensure the position of the LSE as a leader stock exchange in the world, a reform of the LSE, the Big Bang, was exercised in 1986. As one of the most important changes, foreign securities firms could be a member firm of the LSE.

-G30's report after the Crash in 1987 was published in 1989 and encouraged every stock exchange to cover all of their recommendations by 1992.

### (c) Inner Context

-As a important feature of the LSE, it should be pointed out the overwhelming transaction volume of foreign share certificate in comparison with other major stock exchanges.

-The LSE has a culture to regard a consensus with member firms as important rather than to behave as the leader of them.

### (d) Content-Process

Firstly, the content of Taurus was to dematerialise share certificates by maintaining all records of shareholders through a central computer system. However, as the project was going to be processed, many compromises had been made to satisfy every stakeholder such as registrars who were paid to maintain share registers for listed companies and other City interests. Every compromise had influenced the content of Taurus. The content of Taurus was changed to a series of distributing databases linked together by a communication network. A distributing database is said to be a complex task for even experienced systems engineers (Waters and Cane, 1993, 11). In addition, the LSE intended to settle foreign share trading through Taurus. As a result, the project became a more complex and expensive system in comparison with its original plan.

### (e) Outcomes

The LSE announced to halt the project on 11th March 1993. After that, the Bank of England assembled the new task force to build a new settlement system into the LSE as soon as possible.

## Tokyo

### (a) History

-The TSE has been also involved in a big wave of Globalisation and deregulation and increasing cross border transactions.

-Traditionally, the TSE and financial institutions have been under the strong control from authorities, especially MOF.

## (b) Outer Context

-There were competitions with other Asian financial markets. However, strong domestic economy and high saving rate have supported the TSE's steady position as a world top three stock market.

-There was no Central Depository Center, the G30's recommendations became one of the driving forces for the TSE to introduce new systems.

-From the late 1980s to the early 1990s, it had been a bubble economy because of low levels of interest rates in order to reduce a huge trade surplus. In addition, a trend of privatisation of public sectors in Japan, especially NTT stock boom, widely prevailed in late 1980. It expanded a number of investors and the transaction volume of the TSE.

## (c) Inner Context

-Trading volume of domestic share trading overwhelms the volume of foreign share trading.

-Not only the TSE but also whole industries in Japan are rigidly regulated by the authorities. On

-The TSE already exercised most settlements within T+3-day before implementing Jasdec.

## (d) Content-Process

The aim of Jasdec project was to immobilise domestic share certificates through a book entry system by creating a central depository center. Although, there were many requirements from interests for a new

system, many of them were rejected as pushing up costs and making the system complex.

## (e) Outcomes

Jasdec was built into the TSE in October 1992 and enable to have a complete book entry settlement system. Except three companies which disagree to treat their share certificate through JASDEC, the system settles share certificates listed on the TSE and OTC stocks.

### 3.4.2 Interactive relationships between each category

## (a) History and outer context

## London

The stream of liberalisation in world financial markets caused fundamental deregulation in the City, namely 'Big Bang'. After the Big Bang, turnover of the LSE jumped up, especially turnover of foreign share trading which expanded quickly. Turnover value of foreign equipment trading became about twice as much as that in 1991<sup>13)</sup>.

## Tokyo

In addition to a trend of liberalisation in stock exchanges, there is another reason why equity transaction volume had increased in the TSE quickly in the mid-late 1980s.

Around after Bretton Woods system, some of the important financial policies in governments were decided in the framework of

13) Fact Book : London Stock Exchange 1996.

world economy. It is said that it was caused the bubble economy in Japan. Because in order to support the price of US dollars, major nations had to keep relatively low interest rates in the mid-late 1980s. Although the economy was in a good condition in Japan, low interest rate prevented investors or depositors from keeping their money in banks. As a result, much money was invested in equity. In addition, privatisation of NTT expanded a population of investors. As prices of equities had been increasing, the trading volume of equities had been increased rapidly and tremendously in the TSE. It had increased foreign share trading but mainly domestic share transactions still dominated share transaction volume in the TSE.

#### (b) History and inner context

##### London

London has enjoyed a relative freedom from authorities. The LSE has a long history and kept its position as a leading stock exchange in the world from the beginning. It regarded that consensus with member firms was important rather than playing as a leader of them.

##### Tokyo

The government had to set up stock markets again after the World War II. As the securities firms were weak and stock trading thin at that time, there was a need of strong supervision from its authority, namely Minis-

try of Finance. This authority has played a role as a buffer between rival companies and controlled financial matters in Japan officially and unofficially.

#### (c) Outer context and inner context

##### London

As already mentioned, the Big Bang was a trigger to rapidly increasing share trading. Especially, as a number of foreign securities firms became a member firm, foreign share transaction volume has been expanded rapidly. Nevertheless liberalisation and globalisation in financial markets encouraged competition and threatened its position. Thus, the LSE was involved in competition and put under strong pressure to introduce a new efficient settlement system as soon as possible.

##### Tokyo

Although trading volume of share transaction has been increased, most of the volume was occupied by domestic share transaction. In addition, the TSE has already exercised settlement within T+3, so a pressure to implement an advanced system seems not so strong.

#### (d) History and content-process

##### London

The LSE has been relatively free from its authorities. Many members of Taurus projector even top manager were not from

authorities but from private sectors such as consulting companies<sup>14)</sup>. It was true that the Bank of England assembled SISCOT committee but the committee was involved in a war among interests in the market. There was no visible leadership from outside of the LSE. Finally, they allowed many compromises to satisfy interest parties of the project in system development process. The committee could not take leadership to integrate its opinion.

### Tokyo

At first, the TSE set up the Center to start the Jasdec project. Two top people came from the MOF became top commanders and third commander was from the TSE itself in the Center. Then, from a past lesson of failure, the TSE moved to amend a related law in order to have strong support. Furthermore, they consulted with many experts before the project was launched and prevailed the need of settlement system for the interests.

### (e) Inner context and content-process

#### London

As observed in figure 3-1, the proportion of foreign equity turnover shows quite a high rate in comparison with domestic one. International settlements are more complicated than domestic settlements, because there are

many differences between nations such as time zone, currency and regulations. However, it is natural that the LSE had a strategy to build up a settlement system working for international share settlement as well as domestic. This inner context might have influenced when the LSE chose VISTA's software and, in the end, it caused a problem. In addition, it is pointed out poor communication occurred. As VISTA is an US based company, the London team did not know what was going on in the project until the New York team arrived (Water and Cane, 1993, 11) in London. Moreover, there was a need to have supplemental regulations in order to settle foreign shares (Hill, 1991, 22).

Besides, because the LSE regarded consensus important, they could not stop changing the content of the project. In other words, nobody took leadership to stop a compromising project. Whenever a compromise was repeated, the system was going to be demanding.

#### Tokyo

On the contrary, Jasdec was a project to settle only domestic share certificates. Although there was a need to settle foreign share transitions, it was too small a population of the foreign share trading to consider it.

The TSE chose Tosho Computer System Co., Ltd as a software provider. The rea-

14) According to Waters and Cane (1993), Coopers & Lybrand supplied 18 staffs for the project, led by Watson, who was the third and final project director of Taurus.

sons why the TSE chose the company was : one was a subsidiary of the TSE, thus, they could communicate with each other quite well, the other was the company was judged as being good at making software for share transaction.

### 3.4.3 Whole factors and outcome

#### London

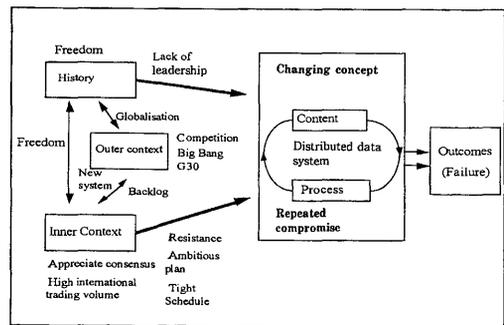
Firstly, it is clear that no leader could be found in the Taurus project to oversee the whole development process of the system. The reason lies partly in history and inner context of the LSE itself. In short, the LSE has kept a position relatively independent from its authority and regarded consensus important as a tradition. Secondly, the high proportion of international transaction imposed some technical and legal problems on the project. It was a logical business strategy for the LSE to have a settlement system which could transact foreign shares as well as domestic shares. This feature was caused especially after the Big Bang. Thirdly, it is noteworthy to point out the increasing international competition. Since the globalisation of the financial markets, on one hand, fund-raiser could have been seeking the most suitable financial market for them, on the other hand, it accelerated world-wide competition among markets. Then, finally, the G30's recommendations put the LSE under pressure strongly. As a leading financial market, the LSE had to improve its settlement system as soon as possible.

These mixed contextual factors made Taurus an ambitious system. As nobody could prevent the project from becoming ambitious, additional risk factors had been increased in the system developing process.

Figure 3-4 enables us to understand which factors interacted directly and indirectly for the IS project.

(Figure 3-4)

Taurus Project



#### Tokyo

In the case of the TSE, it can be pointed out that the three different factors in comparison with the LSE. Firstly, the TSE itself took a leadership to prevail the need of a settlement system. In addition, learning from past lessons, they moved to amend the law in order to obtain strong assistance from the beginning. Then, they built up the Center which worked as a actual executor for the Jasdec project with its authority, namely the MOF. This might have helped them to avoid some resistance. Secondly, it could be noted that due to a tremendously high proportion of domestic share trading there might be some reluctance for them to adopt a system which

could settle foreign share certificates. This factor prevented Jasdec from technical challenge. In other words, the development process of Jasdec was progressed with avoiding risk : adopting relatively low technology and using authority to obtain a support. Furthermore, they had already achieved within T+3-day settlement period, though the previous settlement system was not a complete book entry system.

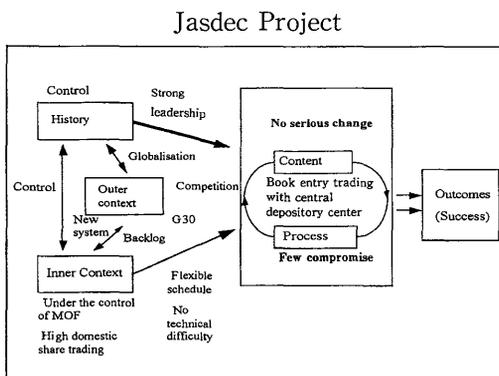
Clearly, the Jasdec project was less risky, not only in technical matters. Before implementing Jasdec, the center trained users, especially end users to use the system efficiently. In addition, In terms of terminals, the Center decided to use a lease. The Center borrowed all terminals from HITACHI Lease Co, Ltd. and lent them to its participants. It might reduce user resistance for Jasdec, because they did not need to invest to have their own terminals.

The above interactive factors help account for its outcome. The approximate pattern of Figure 2-1 also applies to the Jasdec project (see Figure 3-5).

#### 4.0 Conclusion

There are three important things that we should notice for stock related IS projects in stock exchanges. First, importantly, stock owes an inherent feature as not being a pure commodity. The feature put a lot of risks on the projects. Unlike other financial instruments, its most important feature is explained in that holding stock indicates ownership of company. It is extremely important for top managers to always be able to know who are the real main shareholders of their companies. As this is a very sensitive matter, it is easy to assume that the managers are going to demand getting this information. Indeed, when a name of beneficial shareholders is replace, they need to know who is a new shareholder immediately. Thus, if stock exchanges try to satisfy them, a settlement system will clearly be much more complex and expensive. Secondly, although total transaction volume of stock shares has been increasing, there is a limitation of a volume that one company can issue as its shares. Because issuing additional stocks may decrease current shareholders' profits or give opportunities for its rival companies to take over the company, managers must take a prudent attitude for issuing stocks. Thus, settlement systems for stock can not pursue an economical scale. This pushes up transaction costs. Thirdly, it requires skilful labour intensive work to transmit information on shareholders to each

(Figure 3-5)



company. This is because if one company's stock is counted as one sort, there are thousands of sorts of stocks. In addition, most of them are selling and buying smaller units than other financial instruments. In short, if this work in stock trade procedures is replaced by a computerised system, it could be more complex than settlement systems of other financial instruments.

To assess the cases of Taurus and Jasdec projects, it was important to argue which kind of factors played a role as a cause of failure in addition with the above three points. Through a contextual processual approach, it became clear that the interactive relationship of factors could give us comprehensive understanding in the system development process ; all factors are interrelated with one another rather than existing solely. Moreover, we could see how Taurus became a high complex and controversial project, involving novel technology and huge cost through making a linkage between these factors referring to failure.

Because IS projects itself are considered as a risky project, the Taurus and Jasdec projects should be regarded much more risky than usual. This is extremely important fact to stress. Thus, in order to manage this inherently risky projects, a strong leadership was strongly required for both projects. However the LSE too much appreciated a consensus with interest groups in the Taurus project unlike the Jasdec project. It was clearly highlighted with contextual risk assessment approach. A manager of the

bank pointed out that 'when both were put in we ensured that we had the right architecture for when a system like Taurus appeared' (Whybrow, 1991, 18).

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