

ENTREPRENEURIAL CHOICES OF STRATEGIC OPTIONS IN JAPAN'S RPG DEVELOPMENT

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ABSTRACT

This paper highlights a subjective aspect of the entrepreneurial decisions through a case study of the development race of Japanese RPGs in the 1980s. There can be different modes of 'management' based on 'rationalist' and 'semi-rationalist' assumptions. Real-life industries always have both aspects of 'management', but depending on the developmental stage, one of them tends to predominate, as is well illustrated by 'life cycle' models of industrial development processes. To approach the video game industry in its infancy, which was characterized by a high level of uncertainty, this paper considers that the 'semi-rationalist' assumption is appropriate and that the strategic behaviour of entrepreneurs is most strongly determined by how they view their complex and dynamic environment. The real option approach can provide an effective perspective from which to approach the trade-off relationship that may constrain the entrepreneurs, who are required to pursue both perceived profitability and experiential learning while facing a high level of uncertainty.

Keyword: Video Game Software, R&D, Real Option

INTRODUCTION

This paper highlights a subjective aspect of the entrepreneurial decisions in the course of competitive processes through a case study of the development race in Japanese role-playing games (RPGs) that were targeted at the video game users of the 1980s. It has long been said that in the video game industry, Japan has continually sustained its strategically good position amongst global economies. But is this actually true? Any participant in the annual developers' conference organized by the Computer Entertainment Supplier's Association (CESA)—a Japanese trade organization for video game producers—will find this difficult to believe. No presentation or roundtable discussion would uphold such an optimistic view, since foreign software houses have encroached upon the market share of their Japanese counterparts.

In reality, raising the question 'Why is Japan strong?' has lost its meaning. This will pose a serious question that management researchers should consider. This industry has attracted so much public attention that it has become possible to access a vast amount of published information. Many management thinkers have conducted industry analyses based on the rich data and attempted to generalize the 'best practices' from the analyses (Aoyama and Izushi, 2003; Baba, 1998; Fujita, 1998, 1999a, 1999b; Fukushima, 1999; Kohashi, 1993a, 1993b, 1998, 1999; Shintaku et al., 2003; Sunagawa, 1998). At the risk of oversimplification, 'management' is, in part, what managers intend to do for better outcomes by referring to generalized knowledge that theoretical thinkers can contribute to. However, we eventually realized that Japan has gradually lost its strategic position and, therefore, management researchers may have lost their credentials for their past works. It is necessary to reconsider the manner in which management researchers should approach real-life industries.

At this point, it may be useful to start with reflecting the concept of ‘management’ since it is the basis of all our research efforts. To exemplify, let us reflect on the 1980s in Japan. Video game systems had become popular among a certain segment in the Japanese market; however, few people believed that the industry would claim a market size as large as ¥2 trillion, as it does today.

There was a reason for such a passive response. It was common knowledge that entertainment companies, typically toy producers, needed to survive in small markets where consumers’ demands were volatile and unpredictable. Managers were like maverick charlatans, which implies that an industry like toy production comprised speculative small and medium-sized enterprises. Nintendo was famous as one of the founders of Japan’s video game industry and a platform holder ever since it sold the Family Computer or ‘Famicom’ (Nintendo Entertainment System); however, it was originally a small-sized company established in the Meiji era to sell *hana-fuda*, authentic Japanese playing cards. Large establishments had only been marginally interested in entering this industry since they have regarded home video consoles as low-end PCs with low profitability.

Given the uncertain future of the industry, a trial-and-error method is necessary at the corporate level in order to create more adaptive business systems and sustainable industrial structures. An intentional design and control of such structures would be possible only by predicting the future trends in targeted markets and the ongoing progress of technology; otherwise, trial-and-error methods are essential.

Based on the above, this paper considers that there can be different modes of ‘management’. At one extreme, managers can be ‘rationalists’ in the sense that they strive to objectively analyze the pros and cons of any strategic option, given a limited number of contingency variables. Lessons from the ‘best practices’ can be applied here. At the other extreme, managers rely on the entrepreneurs’ personal intuitions and numerous experiments. These managers are ‘semi-rationalists’. This is because they intend to be rational in their daily decisions, but such decisions are inevitably subjective, given the high level of exogenous contingencies.

Real-life industries always have both aspects of ‘management’, but depending on the developmental stage, one of them tends to predominate, as is well illustrated by ‘life cycle’ models of industrial development processes, although it is not always the case. As shown in the following case analysis, when the video game industry was in its infancy, its future was so uncertain that nothing determined the strategic behaviour of entrepreneurs as strongly as how they viewed their complex and dynamic environment.

In addition to the existing empirical research efforts to explicate ex post rationales for the ‘best practices’ in that industry, this paper emphasizes ex ante rationales for strategic choices undertaken by entrepreneurs facing dynamic and complex realities. This theoretical standpoint has long been regarded as important, but one question remains unanswered: How can a perception of a man or a world view alone be an effective means to survive in a real-life industrial competition especially in the process of trial and error? Such a world view is neither visible nor tangible and there is no guarantee that it should serve as a barrier to competitive threats. This paper aims at bridging this theoretical gap.

The next section presents the purpose of the paper and constructs a hypothetical understanding of how entrepreneurs’ world views can protect themselves from competitors’ challenges by applying the ‘real option’ approach. The third section reviews the experience of Japan’s video game industry in its infancy and focuses on the strategic interaction between the two largest RPG producers in Japan—Square

Corporation and Enix Corporation —that gave birth to a new trend of computer entertainment in the Japanese market. The final section analyses the case and presents a new approach focusing on a trade-off relationship between perceived profitability and experiential learning through a trial-and-error process.

LITERATURE REVIEW

To approach a developmental process of an industry of complex and dynamic nature, the concept of a 'life cycle' may have long formed a rigid perceptual basis for management researchers. Here, we review the 'life cycle' models of the development process of an industry.

A 'life cycle' image of industrial development

'Life cycle' models take root in a biological evolutionist theory based on the following well-known 'variation-selection-retention' assumption.

No creature is aware of the exact nature of its physical environment nor can it predict precisely what kind of changes will take place in the environment. It is unaware of the physical properties that are adaptively appropriate to any given surrounding. Further, it is unaware of the physical configuration that can help it to obtain any preferred capability. This ex ante uncertain fit between the living species and their environment will become more problematic if the pooled resources in the environment are extremely scarce and insufficient to accommodate many species with various characteristics.

Under the assumption of 'blindness' of the living organisms to the present and the future, random mutation and crossbreeding between genetically close species, either expected or unexpected, are the main sources of the new physical features that may create potentially adaptive capabilities. Some of the created capabilities will become stable characteristics of a species if living organisms possessing these capabilities survive over generations despite the selective pressures from the environment.

Although there is always the risk of analogical application of natural scientific theories to the field of social sciences, the idea that the superior amongst various human actors will create a better world under healthy rivalry has always appealed to prominent social theorists. Inspired by this analogy, Utterback (1994) put empirical flesh on the theoretical bones to provide an image of industrial realities within a cyclic framework.

He suggested that an industry and the technologies employed in it should be akin to the twin wheels of a chariot and termed the advancement of the two as 'co-evolution'. In the early days of industrial development, technical knowledge is limited and consumers' needs and wants are vague and fluctuate frequently. Companies on the supply side need to undertake a trial-and-error method based on their projected image of the future, which creates various options for product specification. These companies also prompt consumer demands and broaden technical knowledge by re-investing revenues from the earlier versions of the products. Under fair rivalry and technical and market uncertainties, there are always risks that must be taken; however, this co-evolutionary process of industry and technology will broaden the scale and scope of the value added to the products. In this process, accumulated wealth will be paid back to those who undertook the risks. Thus, those who undertake trial and error may play an important role until producers and consumers in the market interact and arrive at a certain level of consensus with regard to standard product specifications, which is deemed as a milestone for industrial maturity.

‘Rationalist’ vs. ‘semi-rationalist’ assumptions

Within this theoretical framework, there are different types of economic actors. This paper suggests that such actors should be categorized into ‘rationalists’ and ‘semi-rationalists’.

The ‘rationalists’ assume a certain level of rationality in their daily management actions. At the risk of over-simplification, rationality is achieved by treating objective realities as ‘determinate systems’ (Thompson, 1967). This determinate system can be controlled by a limited number of interrelated variables, given a limited number of contingency variables. Therefore, it is easier for economic actors to foresee the future behaviour of the system and to make a ‘rational’ choice of strategic actions for intended outcomes.

Theoretically, this type of manager often dominates the last stage of the cyclic developmental process of an industry, where various technical and market factors are relatively well known to the actors. This image of industrial realities corresponds to the hypothetical examples that the tradition of economics often refers to. Economic actors interact under competitive pressures to produce well-defined goods and services of better quality in a more efficient manner than before and at the fair sacrifice of less efficient producers of lower quality goods. Consequently, the producers’ wilful efforts to be more efficient and effective will immediately become the benchmarks for rival firms. The lessons from the ‘best practices’ lead to the standardization of various business practices, *ceteris paribus*.

On the other hand, the ‘blindness’ of economic actors is also negligible. In particular, during the initial developmental stage where too many exogenous contingencies outweigh the actors’ cognitive capacities, early entrants or entrepreneurial ventures will not act confidently and the trial-and-error method tends to be actively employed in their daily management. Such actors can be called ‘semi-rationalists’.

The ‘semi-rationalists’ intend, but are only partially able, to achieve rationality due to their cognitive limits. Hypothetically, individual actors implicitly have their unique sets of structural and contingency variables in mind. A classical literature focusing on this idiosyncrasy displayed by organizations within an industry is Miles and Snow (1978). They show that different strategies, which have been articulated through competitive interactions in an industry, can exhibit different modes of rationality. In other words, each has developed its unique and exclusive set of market segments, organizational capabilities and management control systems. This system complexity can be referred to as ‘embeddedness’ where a wide range of social and organizational as well as technical and market factors are intertwined (Henderson and Clark, 1990).

Further, this system complexity can be more effectively elucidated by showing how diverse meanings or functions can be attributed to a single strategic action, depending on how individual actors perceive their surroundings. Consider an example of drastic change management in organizations.

Every firm possesses a certain business experience that becomes a source of uniqueness (Nelson and Winter, 1982). Experiential learning will be gradually accompanied by routinised or institutionalized organizational procedures in order to make obvious to the employees the knowledge that is learnt, such as what is required for individual workers, the manner in which it is to be achieved and why it contributes to the competitiveness of the entire company.

This obviousness of operational capabilities to organization members may sometimes blind them to unwanted facts and become a fetter of the past (Leonard = Barton,

1995). Management textbooks often state that it is necessary to eliminate such fetters in order to promote innovativeness. In order to achieve this, the establishment of a small experimental laboratory located at a distance from the company's headquarters, which is often infected with a notorious conservativeness, is often recommended. A good example is the birth of the PC division of IBM (Sakakibara et al., 1989).

Occasionally, this may work to promote something new for the company; however, it may not necessarily be new for the entire industry. The obviousness of operational capabilities to organization members also becomes a counter-power to easy mutual imitations of business practices amongst competing firms. Do you think that the IBM PC was truly a creative product? Was the experimental project a real success in order to establish its sustainable competitive advantage afterward? There is no simple answer to these questions, because either positive or negative evaluation is possible depending on the historical contexts on which the evaluation is based.

Given such an indeterminate nature of project evaluations, it becomes necessary to focus on what an individual manager sees and thinks is real, in order to understand what he has done, the manner in which he did it and his reasons for doing it. Managers intend to be rational in their daily decisions; however, when their cognitive capacities are overwhelmed by a high level of exogenous contingencies, subjectivity inevitably creeps in.

How can a world view serve as a means of survival?

Recent research seems to have shown more interest in 'semi-rationalistic' behaviours of economic actors; however, we believe that the competitive strategy of 'semi-rationalistic' firms has not been a subject of focus.

Under the 'rationalist' assumption, there is hypothetically a single strategic choice that best suits a given goal under a given circumstance, because the determinate systems encountered by the economic actors are composed of a limited number of variables of high foreseeability and, therefore, controllability, based on the good knowledge of outside contingencies. This strong assumption is one of the essential bases of retrospective industry analyses. For example, Porter (1980)'s classical 'five force analysis' specifically determines which key variables are the source of competitive advantage of a given firm within a given industry, through a careful retrospective analysis.

His recent work also seems to share this assumption (Porter, 1998); it points out that trade-off relationships amongst strategic options can serve as barriers to competitive threats from rivals. For instance, the nascent PC inkjet printer technology commercialized in Japan used to be characterized by the trade-off relationship between monochrome and full-colour printing (Fujiwara, 2002). This was because 'viscosity' of inks and 'permeability' of papers that suit monochrome printing were never suitable to full-colour printing and vice versa. Whether monochrome or full-colour printing should be pursued was a strategically critical choice for individual firms. Unless there had been any change in the trade-off constraints on the key variables, the PC printer market would have been safely divided into two completely different segments, namely, the business segment that preferred clear monochrome characters printed on pure white paper and the hobbyist segment that began to enjoy Internet surfing and digital photography. As far as Japanese PC inkjet printer producers were concerned, Cannon and Epson enjoyed considerable sales in the respective segments.

This type of reasoning has strong applicability as long as technical and market conditions are relatively simple and static. Paradoxically, the PC printing technology was so nascent that the choice was very limited due to the trade-off that was stable in the short run. However, Cannon and Epson engaged in fierce battles after a short period of co-prosperity, because heavy R&D investments on both sides pushed the technical frontier outward and loosened the trade-off constraint between the two printing styles. The battlefield became so complex and uncertain since the constraints were removed that the two companies adopted the trial-and-error method to determine which products were in greater demand in the developing market. This strategic behaviour appears to be characteristic of 'semi-rationalists'.

In such a scenario, how can firms be competitive in the process of trial and error? During this important phase of experiential learning, how can such companies defend themselves from their rivals? To the best of the author's knowledge, these questions have not been accorded a high priority. Under the 'rationalist' assumption, it is possible to assume the quality of decisions undertaken by managers. Given a determinate system of high foreseeability and controllability, good choices must be made as long as managers are always expected to be rational. This paper believes that this reasoning underlies every effort to explicate ex post rationales for the 'best practices'. However, as long as one assumes a high level of uncertainty, it is impossible to evaluate the quality of ex ante rationales that individual actors presume for their subsequent attempts before the selective pressure in a competition eventually decides who wins or loses the race.

This paper considers that during the phase of technical and market exploration, the economic actors are necessarily armed against competitive threats in order to conduct meaningful experiential learning; therefore, the manner in which they defend themselves needs to be questioned. This gives rise to a difficulty. Under the 'semi-rationalist' assumption, theoretically nothing influences managers' behaviours as strongly as their world views. Such world views are neither visible nor tangible. Thus, how can only a perception of a man function as an effective barrier to his rivals' challenges? In order to construct a hypothetical answer to the question, the next section applies the real option approach that has been developed in the area of financial engineering and recently applied as a project evaluation technique.

AN APPLICATION OF THE REAL OPTION APPROACH

This new approach may well be in contrast to, or advanced from, the traditional 'Discounted Cash Flow' (DCF) or the 'Net Present Value' approach (Amram and Kulatilaka, 2000; Katou, 2000; Luehrman, 1999a, 1999b). The traditional approach displays its weakest point when it ignores the economic values of strategic options that are created only after capital commitments are made.

We regard a capital commitment to a project merely as a first step, similar to purchasing an option in a financial market. The initial capital commitment creates two strategic alternatives—the project can be pursued if it is promising and abandoned if not. This abandonment is expected to save overall expenditure. The opportunity for such a choice in the initial capital commitment is not what the DCF approach had originally assumed. The limitation of this viewpoint is that the pursuit of the project is deemed to incur costs throughout its execution. This decreases the total expected economic value of all the projects in comparison to those assessed by the real option approach.

Further, as the environment of a project becomes increasingly uncertain, the new information that is created gradually through capital commitments will become

increasingly valuable. Under the assumption of the DCF approach, risks are prescribed based on the present limited knowledge of the distant future. If the environment is perceived as uncertain, the likelihood of its success future will be very low, and vice versa. Projects are often regarded to be more risky or less promising, particularly under bureaucratic organizational climates, which may greatly reduce their total value. These two factors, i.e., the assumption of project abandonment and the uncertain environment, make the real option approach more attractive to project evaluators than the traditional approach.

By applying the real option approach, we can formalize the manner in which two different project evaluators perceive uncertainty. Since either the traditional DCF approach or the new real option approach assesses the future value of present projects, subjectivity cannot be completely eliminated from the assessment. This subjective nature beneath the formal arithmetic presentation represents the contrasting attitudes of two different project evaluators towards uncertainty.

This conception leads to the following working hypothesis: every time managers make project evaluations, they will consider it more profitable to make as small a capital commitment as possible when they perceive their business environments to be highly uncertain.

Imagine a hypothetical emerging market where consumer needs and wants are opaque and the demand volatility is high. Also imagine two competing firms in this industry with the same amount of capital resources.

If a manager facing uncertainty in this industry intends to be rational, he will ensure scope for withdrawal from unpromising projects by undertaking gradual financial commitments. As the real option approach assumes, a small financial commitment will create information about the uncertain future and make the estimates of project success more reliable. Ensuring scope for withdrawal saves sunk costs too. A good example is test marketing by a prototype product and/or in a limited area with a standard demographic structure of a wider target area. Such effects of gradual financial commitments will appear to become more valuable when he perceives his environment to be more uncertain.

If a manager evaluates present project values in the remote future, he will attribute lower probabilities to the future success. This tendency will become obvious under any bureaucratic organizational climate and, consequently, larger financial commitments will become difficult to validate unless accompanied by any means of risk diversification. One of such means is to split the projects into phases and decide whether or not to continue with the projects depending on the phase reviews; this is exactly what the real option approach assumes.

This rationale will explain an attitude towards uncertainty. If a manager thinks his business environment is uncertain, his capital commitment will remain small, and vice versa. Further, it is usually true that the fewer the resources one can prepare, the smaller is the project one can conduct. This is why test marketing is conducted by using prototype products instead of standard products and/or in a limited area with the demographic characteristics similar to those of a wider target area. If a manager endeavours to save capital commitments at a lower level, the information he can get will decrease in value. If one is to learn anything from experience, one would need to pay for it; therefore, a manager with larger capital commitments may explore a wider and deeper range of technical and market opportunities, and vice versa.

Thus, under a high level of uncertainty, a manager will limit his domain of activities because this arrangement appears to realize a higher rate of returns to capital investments, at least at the perceptual level. Smaller capital commitments will

become observable as vertical and lateral fractionation within and between organizations and functional specialization. This structural characteristics is similar to what Chesbrough (2003) called 'network organization'. Since the manager thinks larger commitments are less profitable, he will avoid these as long as he intends to be rational. He could, however, have fewer opportunities for experiential learning.

On the other hand, a manager with larger capital commitments will bring a larger domain of activities under his control, thereby increasing experiential learning. This can be profitable, at least in his perception, as long as he diversifies his business risks somehow. Further, because his domain of activities is vast, he can behave like his counterpart whose domain is relatively limited but will never reach the same level of profitability due to intensive capital commitments; this may dissuade him from sympathizing with his rival.

Recalling Porter's (1998) idea, if two different strategic options display a trade-off relationship, the incompatibility between the two is not negligible. By applying this idea, this paper indicates a trade-off relationship between perceived profitability and experiential learning. This conclusion appears to echo March's (2000) conception of 'exploration' and 'exploitation'.

It has scope for confusion that Porter's theories appear to assume 'rationalistic' actors. The purpose of this section has been to construct a 'semi-rationalistic' theory to explain how firms can defend themselves in the process of experiential learning. This paper assumes that the concept of a trade-off relationship between the two key factors should be so difficult to overcome—given a limited knowledge in the short term in the process of technical and market exploration—that it tightly constrains even 'semi-rationalistic' behaviours of the firms. In the language of organizational learning, the process of trial and error in the daily explorative activities can be called single-loop learning, while overcoming the constraint may be a goal to pursue at the double-loop learning level (Watkins and Marsic, 1993).

CASE

Through an overview of Japan's video game industry in its infancy, we will further elaborate how the world views of managers can contribute to the competitive differentiation of the firms. We will particularly focus on the RPG development race, which was one of the new categories of computer entertainment and experienced market expansion through the prosperous coexistence of Square and Enix.

Industry overview

Let us recall our introduction to computer games. It is suggested below that around 1980, Japan's video game industry was grounded on uncertain market demands and, therefore, entrepreneurs behaved like maverick charlatans and there was a passive attitude towards the long-term development of the industry.

It was in 1983 that Nintendo sold its first generation of Famicoms. Rather unexpectedly, few industry magazines reported seriously on the new electronic console that would dominate the global computer entertainment market. This was because the Famicom was not the only computer targeted at general households. Many similar products sold by various toy producers in a broad price range repeatedly appeared and disappeared before and after the 1980s and, unfortunately, the Famicom was one of the latecomers.

Large electronics establishments also entered this market; however, their interests were rather marginal. They placed game consoles at the lowest end of the wide spectrum of computer products. Since the 1970s, computer technologies have been

rapidly downsized and electronics companies began selling ‘office automation’ (OA) products in addition to their traditional super computers. The idea was that computers could increase office productivity just as machines increased factory productivity. This OA campaign was the primary battlefield for the electronics giants. Game consoles for general households played the role of training machines for neophiliacs and began to consume a bulk of the silicon chips pumped out of heavily capitalized, state-of-art factories. However, the game consoles were regarded as hobbyist machines with low profitability and therefore received relatively less attention.

On the other hand, toy producers were happier that the electronics giants were offering new technologies at low prices. These manufacturers released a wide variety of products ranging from small electronic toys to large programmable consoles similar to desktop PCs.

The difference between the large electronics establishments and the toy producers could be traced back to the behind-the-scenes business systems that are adaptively appropriate for selling entertainment services. Faced with capricious customers, the toy producers, mainly small and medium-sized firms, built flexible producer-distributor networks. These networks absorbed the frequent fluctuations of market demands by risk diversification and mutual accommodations of inventories.

In other words, new entrants into the video game market would easily withdraw unless they had speculative motives and adaptive business networks. Soon after Nintendo released the Famicom, the cumulative units of sales reached 10 million; however, this was an absolute outlier. Prior to the launch of Nintendo, it was considered satisfactory if sales reached 100 thousand units. Thus, there was little optimism about the industry’s future and few predicted the upsurge in demand following the introduction of the Famicom.

Thereafter, the importance of behind-the-scene adaptive structures was demonstrated again when a number of speculative small and medium-sized firms appeared in the sphere of software development.

The USP of the Famicom was its action games, which used Nintendo’s knowledge of a new image processing technique—sprite animation—designed through the experience gained in arcade game development. The technique delivered two-dimensional animation on limited computational capability, and Nintendo demonstrated its technical potentiality by the successful in-house development of Super Mario Bros., the perfect successor to the popular arcade game Donkey Kong.

Nintendo enjoyed constant success in software development. However, it gradually licensed development activities to its loyal third parties, including Square and Enix, under strict agreements with regard to game contents and the production and distribution of software cartridges. However, as the number of third parties increased, problematic software began to appear in the midst of the Nintendo boom. The quality of entertainment software was threatened as an increasing number of small-scale speculative software houses entered the market and easily recycled the most popular game designs. Nintendo began to lose control of its third parties due to strong consumer appetites; this was the beginning of the end of the first Nintendo boom. Only a few of the speculative entrants survived, and they emerged as the main players of the second video game boom.

Thus, the expectation that video games would establish as large a market as they have today and grow into a product category that Japan could be proud of in the global economy was not dominant at all. Faced with uncertain consumer demands, small

and medium-sized firms with myopic attitudes crowded a tiny segment of a larger electronic computing sector.

Gradually, it was accepted that the larger computer industry, which the video game industry was part of, would be one of the pillars supporting Japan's economy. The following section will discuss how two motley players envisioning a prosperous future undertook the trial-and-error method and ultimately chanced upon a great achievement. In order to study this process, we will concentrate on how RPGs eventually gained their current status.

The origin of Square

Final Fantasy (FF) was one of the million-selling series of RPGs. Square, a Japanese software developer known as Square Soft abroad, released volumes of this series approximately every year. Square enjoyed large annual turnovers from the series and diversified its businesses to include movie production using its state-of-art CG technologies. This software factory became a member of the 'winners club' in Japan's economy during the severe recession in the 1990s.

In November 2002, this entrepreneurial company announced a merger with its biggest rival, Enix, the publisher of the Dragon Quest (DQ) series (Dragon Warrior in North America), the other extremely popular Japanese RPG title. According to a CESA report, the top 30 titles in terms of the total shipment between 1983 and 2002 included 13 RPG titles released by both Square and Enix, second to Nintendo's 14 titles in various genres. The news of the merger caused a national controversy, because the video game was expected to be the last remedy to the trade imbalance in Japan's software industry.

Square originated in a company owned by the father of its founder. The company, Den-Yu-Sha ('Den' and 'Yu' are the Chinese words for electricity and friend respectively), was located in Tokushima Prefecture, Shikoku Island, in the west of Osaka Bay. As an affiliate of a local power company, Den-Yu-Sha built power lines under regular contracts. However, the owner's son, Masafumi Miyamoto, had ambitions different from his father's. After graduating from Waseda University, one of the best private universities in Tokyo, he began developing computer game software in a division of Den-Yu-Sha in Yokohama in October 1983. This was the inception of Square.

At that time, electronic computers were in their infancy and were becoming popular in a small niche market in Japan. Miyamoto was a layman in this field and he set up his business with purely financial motivations. He thought, 'I don't understand how computers work but I do understand what a good computer game should be like.' Miyamoto retreated from the battlefield in the video game industry and assumed the position of President of the Miyamoto family's conglomerate established in 1988.

An RPG was originally called a table-talk role playing game. Players rolled a die and created a fantasy in imagery worlds such as underground dungeons and lost ancient continents. Most importantly, the players themselves assumed the roles of their fantasy characters. The RPG was quickly introduced to the world of PC gaming. Since the production of the Apple PC, electronic computers became popularized, which made computer gaming available to general consumers. Independent software houses appeared to supply original gaming programs. Since Apple's PCs had floppy disk drives with enormous memory capacities by contemporary standards, adventure games and RPGs requiring voluminous data and uncomplicated computing capabilities were suitable applications.

Hisashi Suzuki, ex CEO of Square, states that his colleagues and himself were already familiar with adventure games on Apple PCs when they were hired by the company as part-time workers. Hironobu Sakaguchi, the creative director of the current volume of FF, claimed that they should create and commercialize an RPG because it was unfamiliar to Japanese consumers.

Playing RPGs was enjoyable, but it sometimes took a few months to complete a single game. Those games were very different from arcade games such as Space Invaders, which required less time but greater responsiveness and alertness. Weaving detailed stories and plots into environments that they called ‘universes’ required a lot of time and energy.

Square’s approach to this was the division of labour and the employment of professionals. Game programming in those days was usually conducted by one programmer. He (or she at times) designed the look of the game, composed sound effects, wrote scenarios and programmed everything in computer languages. This was not inconceivable because the functions that computers could perform were limited and the computer gaming market was the almost exclusive domain of ‘computer freaks’. To Miyamoto, however, it seemed strategically wrong for Square to merely copy what the early entrants were doing.

Miyamoto believed that computers would evolve more rapidly, become cheaper and faster and handle more colours and sounds. It would be difficult for one person to control all areas of the creation of the games. In order to differentiate his start up from competitors, Miyamoto employed trained graphic designers, skilled programmers and professional story writers well before such expertise became the norm.

To create more attractive pictures, students from art universities began creating drawings by using dots (or pixels). This was termed as the full-graphics (or bit-map) approach and required that every dot should be defined by coordinates with RGB data for colour definition. This could greatly improve the quality of pictures but could deteriorate the quality of the game, since the calculations of vast graphic data required a long time. To solve this problem programmatically, the team employed a postgraduate student from Keio University—one of the best private universities, located in Tokyo and Yokohama—and Japan’s first animated PC game, Will, was released in 1985. One hundred thousand copies of Will were sold, which was a major commercial success at the time.

Square released its first Famicom-compatible software Thexder immediately after the introduction of Will for PCs in 1985. Unfortunately, this happened towards the end of the Famicom boom, during which other software houses easily earned a fortune.

According to the Leisure White Paper, based on annual surveys, the video game industry enjoyed two peak periods, in 1986 and 1993. Of the respondents, 28.9% said they had played video games in their leisure time or as a pastime at least once in 1986. This figure could well be underestimated because the survey excluded people in their early teens and below. The demand dropped thereafter, but 29.8% of the respondents returned to video games in 1993.

Square’s hesitant entry into the business was due to the misfit of its self identity. The developers in Square considered themselves to be creators of computer software. They opined that Famicom was a toy and considered manufacturing Famicom-compatible software to be a waste. As Suzuki recollects, ‘We began this business with NEC’s PC-8800 series and we thought ourselves to be at the cutting edge of computer technologies.’

Square was swift and alert; they were the seventh third-party company to make an official contract with Nintendo for the development and sale of Famicom software, following Namco (an arcade entertainment manufacturer), Hudson (a PC software house), Bandai (a toy producer) and others. However, Square made no profits for one-and-a-half years after signing the contract.

There were other reasons that kept Square away from Famicom. Square's technical advantage was that it could process full graphics rapidly; this made Will a commercial success. On the other hand, Famicom was never comparable to PCs in terms of versatility and flexibility of configuration but concentrated heavily on processing graphics by custom-made CPUs.

The sprite (or object) approach had already been introduced in one of Namco's best-selling arcade games, Galaxian. Individual characters were broken into small pieces called 'objects'. The movement of characters was processed by combinations of the parts, which could never have realistic and artistic expressions but could reduce required data so that characters could run and jump across the displays. Further, as in the filming of animated cartoons, background movement was programmed independently. There was no need for hundreds of still pictures to be drawn by pixels and processed rapidly.

Nintendo learnt this method and created an arcade shooting game similar to Galaxian. However, such a rehash did not appeal to customers. These advanced technologies were, however, implemented in the arcade game Donkey Kong and also in Famicom. Due to this, consumers preferred Famicom to more versatile and high-power PCs.

Consequently, Suzuki's excuse proved to be unrealistic. Famicom's super graphic processor had such a big impact on consumers that Nintendo had already sold 6.5 million Famicoms by 1986 when there were 38 million households and 14 million youth in their early teens according to Japan's census. Nintendo's competitors, Sega and Epoch, made 370,000 and 90,000 shipments respectively.

Soon after the release of their first Famicom game, Square was officially registered as an independent corporation. Suzuki and Sakaguchi were promoted from part-time to full-time employees. They released numerous Famicom games and their turnover touched ¥3 billion and they rented an *en suite* office in the heart of Ginza, an exclusive area in Tokyo.

On the other hand, at the height of the boom, Nintendo, the third parties and the distributors earned fortunes, which triggered them to churn out a series of low-quality games. Square was no exception; it released 13 titles in 1985, in comparison to only one or two a year before. It split teams and released trivial, indistinct games almost every month. This increased their turnover, but profit margins became low under the Nintendo Model. The rent for the Ginza office became a burden.

Consumers gradually became aware of the trick and the market started to slow down in 1986. In the following year, Square made a critical decision. It relocated to a shabby office in Ueno, the old downtown area of Tokyo, and also laid off half of its staff. It concentrated the efforts of the remaining 30 employees and its limited capital on a 'final fantasy'. If not successful, the company would have to close down.

FF was released on 18 December 1987. The total shipment for this title was 510,000 copies, which retailed for a total of approximately ¥3 billion. Suzuki did not consider this to be a negative result: 'It was not a big success compared to the sales in the past few years. But the Famicom boom was about to end and we thought we did it when we received 400,000 first orders at that time.'

The origin of Enix

In a magazine interview, Miyamoto referred to *Famicom Tsushin* (*Famicom Correspondence*), one of the influential magazines published for Famicom enthusiasts during the boom. Luckily, it featured FF and inspired consumers to purchase it. However, the success of this product was not pure luck. It was time for RPGs to gain popularity.

Since 1976, when computers first appeared, RPGs had been on trial and error. Only 10 years later would commercial successes such as Nintendo's experimental *Zelda* and Enix's masterpiece *DQ* make their appearance.

Yasuhiro Fukushima founded Enix in August 1982. He graduated from Nihon University in 1970 and set up small miscellaneous businesses. After living in America for some time, he decided to set up a PC business because he noticed how popular they were overseas.

Although Fukushima, like Miyamoto of Square, was not a 'computer freak', Enix's tactic of entering this industry was quite ingenious. In a magazine interview, Yuji Horii, the scenario writer of *DQ*, likened Enix to a publishing company: 'They do not have programming capabilities within their organization. They even outsource game concepts and scenarios. Like publishing companies and writers, Enix established the concept of royalties between them and their contractors. This is their most important contribution to this industry.'

Fukushima encountered the same problem as that of Square. He did not know any PC professionals. Square opened a PC salon and advertised for developers, Enix planned a PC game programming contest. Three hundred programs were entered in this contest and Fukushima did his best to commercialise selected programs, much like an editor in a publishing company. In addition to the production- and promotion-related arrangements, he attempted to instil a commercial mindset in his developers. Such editorial activities were either simply absent or unwelcome in software houses like Square. Usually, creators did their jobs because they enjoyed working with PCs in small offices full of junkies, where outsourcing was unacceptable.

Consequently, Enix released a wide variety of PC games. Some games were adapted for Famicom. *Door Door* was amongst Enix's earliest Famicom titles, developed by programming prodigy Koichi Nakamura, one of the winners of the game programming contest. Other key persons for the *DQ* team were recruited through various routes. Horii, a writer, was one of the applicants like Nakamura. After graduating from Waseda University, he regularly wrote columns about computer games in a weekly comic magazine, *Shu-Kan Sho-Nen Jump* (*Weekly Boy's Jump*). This was the best-selling magazine in Japan, selling 6 million copies every week. Horii bought a PC for work, but it quickly became his hobby. As soon as he learnt of Enix's contest in *Jump*'s editorial room, he programmed a tennis game. He later discovered that his game became a finalist. At that time, Fukushima was in search of someone who could help him produce more Famicom games because Nakamura's *Door Door* sold as many as 200,000 copies. He involved Horii and Nakamura in *DQ* project.

Subsequently, they were joined by Horii's colleague, Torishima, one of *Jump*'s editors. He was as enthusiastic about video games as Horii. Torishima was an editor of the best-selling comic 'Dr. Slump'; its author, Toriyama, was invited to join the project as a character designer.

Lastly, a professional musician, Sugiyama, was enlisted. Sugiyama used to play in a pop band but was involved in more backyard jobs like composition and arrangements

at the time. He was very interested in PC and other video games and wrote a letter commenting on one of Enix's products, Shogi (Japanese chess). He was delighted to join the project.

Sometimes, DQ was described as 'a collection of pieces of the classic RPGs with a sensible refinement and integrity'. However, the Japanese consumer market was not well acquainted with RPGs. In fact, even a mere introduction of a new style of gaming was a major contribution to the industry. It should be noted that RPGs were toys for grown-ups; they were available only on PCs—which cost almost ¥1 million—and the more difficult ones could take months to complete. Enix's biggest contribution was porting this mode of playing onto a child-friendly platform with a simple interface and dynamic graphic processors. Interestingly enough, DQ captured the imagination of adults as well. In the following interview extract, Suzuki reminisces, 'Apple II had a line-up of great adventure games such as Ultima or Wizardry. Honestly, we adored them and they were our ultimate dream. But this was not very strategic. We loved these games too much to think about the consumers' needs. Then we were stunned by DQ in 1986. Enix assembled the best staff in the industry and made a maniac game like an RPG more accessible to general consumers. We just couldn't believe that they could do this, and we discovered the actual essence of commercialization.'

Initially, Enix and other key players thought DQ would sell a million copies, but their first shipment fell short of expectations, although it eventually sold 1.5 million copies. Not unreasonably, there was a considerable loss of opportunity. Within the Nintendo Model, ROM cartridges were produced before the first release of the game, based on a rough demand forecast, and the production lead time was very long. Publishers like Enix were expected to owe all the software development and inventory risks. Further, there was the possibility of Nintendo's censorship negatively impacting the decision to produce ROM cartridges. Nintendo could hesitate to give Enix the 'go ahead', simply because RPGs were a new genre. However, the subsequently released sales data for the rest of the Roto trilogy were impressive. DQ II sold 2.4 million copies in 1987 and volume III sold 3.8 million copies in 1988.

This excessive demand and the shortage of new RPGs naturally encouraged dozens of third parties to create copycats of DQ. Even though FF was described in a Famicom magazine as 'one of many' when it was first released in 1987, it had appeared at the right time.

Two paths of growth

As the two RPG giants grew in size, they increasingly constructed differentiated business systems within their companies. The following overview of these differences will reveal the rationales they used to lead and control their growth.

(1) Product lines: With a few exceptions, Enix tended to have broader product lines in terms of the platforms they employed as well as the genres of games. On the other hand, Square tended to concentrate their development efforts on one platform at a time and to focus only on RPGs.

Since Enix entered this business with the game programming contest and the commercialisation of the selected software, they released numerous games with a wide variety right from the beginning; 35 titles were released in 1985 and 19 in the following year. Only two of the PC games were ported onto the Famicom platform in 1985. During the development of the Roto trilogy between 1986 and 1988, no other Famicom titles were released.

The next Famicom software to be released was Actraiser, an action simulation game for Super Famicom (Nintendo Entertainment System). PC games continued to be developed until 1993, although the number of titles decreased with every passing year. A wide variety of Super Famicom software began to be released in 1992, including gaming styles such as action, simulation, and RPGs.

On the other hand, Square released a limited number of titles in their first few years. At the height of the Famicom boom, they released three titles that were lucrative; however, the following 10 titles held less promise. Once they experienced partial success with FF, they concentrated on producing successive volumes almost annually, in 1988, 1990, 1991, 1992 and 1994. This was because it was imperative for Square to differentiate their product from other copycats of DQ. Under Sakaguchi's leadership, Square began its continuing pursuit of CG technologies.

Consider the example of FF IV, V and VI. 3D computer graphics—more specifically, polygons—were first introduced in Sony's PlayStation; until then, only the 2D sprite animation approach was available in Super Famicom. FF VI was the last title developed exclusively for the Nintendo platform and was famous for its quasi-3D graphics, which made the game very similar to CG movies and were well beyond the perceived technical limits of Nintendo.

Meanwhile, Square developed some RPG series exclusively for Super Famicom, such as the Saga trilogy between 1989 and 1991 (called Final Fantasy Legend abroad); Romancing Saga from 1992 onwards; and Seiken Densetsu, ported from Game Boy in 1993, which later became one of their RPG series.

Square often resold old versions of FF transplanted on new platforms. To do this, they exceptionally outsourced engineering activities. The release of volume X-2 was also episodic; it was released to compensate for the limited success of FF XI. This title was an innovative and the first massively multiplayer online RPG (MMORPG) of the FF series, but the immature market did not generate affluent sales. The technophile shop floor was unhappy about the managerial decision to sell volume X-2 to assure the profit, which was primarily a rehash of volume X resources.

(2) Business administration: The administration systems of both companies had become more distinctive since Nintendo introduced Super Famicom in 1990. Hardware performance evolved continuously, while platforms such as Super Famicom (16 bit machine), PlayStation (32 bit machine) in 1996 and PlayStation 2 in 2000 competed for market dominance. This technical advancement of hardware made software development more challenging. Development costs increased rapidly since they were roughly dependent on the time spent and the number of developers involved. To manage the costs, the administration systems of both companies developed their own styles.

According to *Game Hiyou (Game Critics)*, Square was characterized by its huge financial commitments to each project, strict scheduling of title releases and in-house development policy. On the other hand, Enix was said to be cost sensitive, less time-constrained, and famous for its outsourcing policy.

Beyond the video game industry, Square became famous since 1988 for its aggressive incentive compensation scheme to develop most of its in-house technical capabilities under the new government labour policy. Its technical creative experts who accounted for 80% of the total employees were subject to this new scheme that included flexitime, royalty-based annual salaries and bonus vacations. In 1991 when FF 4 and other new RPG series were released, its annual turnover touched ¥16.6 billion and the ordinary profit-to-turnover ratio was over 20%. The new scheme

seemed to be an effective way of boosting the company's performance; however, it was actually a foretaste of the high labour cost of the company.

As with the Super Famicom software development, Enix lagged behind Square, and the difference between these two firms never diminished, particularly in terms of product release intervals. FF was released after Enix's DQ, but both series released volume V for Super Famicom simultaneously in 1992.

Enix never modified their policy to allow their contractors to take their own time. It released volumes VI, VII and VIII in 1995, 2000 and 2004 respectively. In contrast, Square released volumes VI and VII in 1997, volume VIII in 1999, and volume XI in 2002.

Enix established strict accounting principles to govern project management; however, doing so would be pointless if they had nothing to sell. In 2000, Volume VII was released as an insurance run, following SCE's resurgence in the platform competition with Nintendo; however, there was an unpleasant underside to this story.

Enix heavily advertised the release of this volume in 1999 but postponed the actual release three times. The sales did not contribute to the financial outcome in the fiscal year 1999. Although Enix's annual turnover was ¥18.3 billion and its ordinary profit-to-sales ratio was 21%, the turnover was approximately half that of the previous year. As a result, the stock price fell by 40% between March and April 2000.

(3) Diversification: There was also a difference in the way they diversified their businesses. Square tended to concentrate on entertainment software businesses and diversify vertically.

It had a strategic alliance with SCE and established a new mode of software distribution through DigiCube, a subsidiary founded in 1996. It also began to exploit the horizontal market overseas in 1995 and 1998, and the movie production based on their computer graphic capabilities in 1997. A movie titled *Final Fantasy* was released in USA in July 2001, but its sales record was so unsatisfactory that the huge debt incurred in the previous year made the company almost bankrupt. Further, DigiCube declared liquidation to the Tokyo District Court in December 2003 due to their inefficient operations, the market shrinkage and the global competitiveness in this industry.

Enix's diversification tended to be horizontal. Core businesses were built around the DQ brand, such as the production and sale of game-character themed goods, royalty management, magazine and comic book publishing, educational toy production, and content broadcasting via mobile networks. Other businesses were rather distant from the core and Enix was benevolent towards in-house venture start-ups. Music and food distribution and publishing businesses in Asian markets started between 1998 and 2000. The development of a fingerprint authorization system commenced in 2000. However, none of these businesses earned the firm profits.

ANALYSIS

As already observed, the expectation that video games would establish as large a market as they do today was not dominant at all. However, it was gradually accepted that the larger computer industry, which the video game industry was part of, would be one of the pillars supporting Japan's economy. New and unexplored technical and market opportunities created the need for appropriate business practices to be structured through the process of trial and error.

At this stage of industrial development, it was difficult to apply 'determinate systems' to managerial activities. Undoubtedly, Enix and Square popularized a game concept that was hitherto unknown in Japan; however, they did not intend to accomplish this

by displaying the highest level of rationality. Before analysing the ex ante rationales of the firms, let us contrast their ex post rationales by reviewing the practices that had emerged from the process of trial and error of Enix and Square, where the unique and exclusive sets of organizational and environmental factors were intertwined as coherent wholes.

Two modes of rationality

The creators of both DQ and FF were both keen computer enthusiasts and had known RPGs well. They believed that RPGs would appeal to a much larger population in the future. They had also known that RPG game systems were complex and required skilled creators and careful project management. Finally they needed to market their new products to Japan's consumer markets.

It was Fukushima, Enix's founder, who succeeded in the challenge of introducing the new product concept into the Japanese market. Enix promptly recruited creators on contract basis when technical constraints such as semiconductor memory capacity were being mitigated. It also made agreements with Nintendo for Famicom licenses and marketed the new DQ in combination with Shuei-Sha, a publishing company known for its best-selling comic magazine in Japan. Its very lean business system that pursued only an entertainment production function was appropriate for the active merchandising of its newly developed products such as RPGs.

By collecting new game concepts and recruiting creative experts on demand, Enix could flexibly time its marketing efforts. Moreover, subcontracts on project basis also made cost control more rigid.

On the other hand, independent subcontractors generally hesitated to compromise on quality in order to meet deadlines. Advancement in hardware technologies and an increase in the workload on creators made schedule controls increasingly difficult. Enix experienced longer product release intervals and more delays with regard to the announced date of sale, since the DQ series depended heavily on its charismatic scenario writer, Yuji Horii, as hardware improvements enabled him to invent his new environments more meticulously.

Further, Enix tended to diversify into new ventures, which were unrelated to the game software business. It limited its core capabilities to the entertainment production function and did not deepen the technical knowledge internally, although its intellectual properties from the DQ brand were substantial. Therefore, in addition to the lateral expansion made in order to utilize the properties, such as publishing and loyalty businesses, it began to diversify game categories and take on new, unfamiliar ventures to level off annual sales which often fluctuated largely due to its actual revenue dependence on the DQ series alone.

In contrast to Enix's concentration on the entertainment production function, Square was committed to traditional means of software development. Miyamoto, the founder of Square, was as acute and alert a connoisseur of technological progress as Fukushima, envisioning ongoing hardware development races for higher specifications along with the division of labour in the phase of software development. In contrast to Enix's strategy, however, Square constantly internalized creative experts and concentrated on the pursuit of new technological frontiers in order to compete as a follower in Japan's RPG market.

This internalization of more professional employees implied that Square became known for its high fixed costs, particularly labour costs. However, paying a huge amount as wages created a consistent system of rigid deadline controls, levelling off the intervals of the FF series products and annual revenues from them and higher

incentive compensations for hard work. This consistent and high concentration on RPGs characteristic of high-quality CG technologies sharpened its technical capabilities and enabled a more effective pursuit of its differentiation strategy.

However, this system was not flawless. The larger proportion of creative employees amongst the entire workforce and its intentional focus on pursuing technical capabilities implied greater power on the side of the shop floor. Since the management tended to be relatively ignorant of technology, there was always a risk of affecting managerial decisions. In the case of Square, it was said that its cost controls were less rigid than those of Enix and also that there was some difficulty in arriving at a consensual marketing strategy between the management and the shop floor. Further, Square was happy with its current competitive position as a follower making the most of the market somebody else pioneered, although it vertically diversified into a software distribution business. It was unable to spread its business risks due to its RPG focus and there was no incentive for it to overreach the market frontiers. Its movie production business appeared to be an example of horizontal diversification but was intended to be a natural extension of current CG technologies.

The new approach

Further, a close look can shed light on a few facts that are more fully understandable by applying the new approach. The facts are as follows. Square did not always pursue its unique strategic position. It occasionally sympathised with Enix's view in that it was sometimes tempted to pursue short-term profitability in contrast to its technophile culture. On the other hand, Enix appeared to maintain its traditional method, rather than pursuing a stable stream of revenues by regularly releasing products. What could occasion Square's one-sided yet self-restrained sympathy for Enix?

It is here that we can apply the real option approach. Let us recollect their business practices. Square tended to internalize fixed capital and creative experts as regular employees at an earlier point in time, which entailed considerable risks. On the other hand, Enix always ensured scope for withdrawal from unpromising projects by undertaking gradual financial commitments. These two perspectives regarding the manner in which two different business systems can be organized are depicted in Table 1.

TABLE 1. Two modes of rationality to approach uncertainty

	Enix	Square
Approach to Uncertainty	Ensuring scope for withdrawal by postponing large capital commitments as much as possible	Committing resources at an earlier point by not taking the risk of pioneering market exploration
Business Systems	Vertical and lateral fractionation and focusing on the production function	Vertically wide business domain and complex business system
Advantage	Seemingly more profitable investments as market conditions become increasingly uncertain	Technical capabilities backed by a strong technophile culture
Disadvantage	Experiential learning and trial-and-error method	Not adept at swiftly adapting to changing circumstances

	underestimated	
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It was characteristic that the uncertainty of consumer demands was the cause of the high rate of failure of game titles and software houses. The technical environment was becoming increasingly severe because the technical progress in hardware automatically implied greater software development costs. Consumers were accumulating more experiences and becoming more specific in their gaming tastes and also more cost conscious

Under such a difficult circumstance, ensuring scope for withdrawal and making financial commitments only after technical possibilities and market demands became evident might well have been a very rational option to exercise. More specifically, any vertical and lateral fractionation of development organizations and specialization of the entertainment production function appeared to realize a higher rate of returns to capital investments, at least perceptually.

Enix was characterized by such a fragmented organization and functional specialization, and the success of DQ proved that this worked. It would never be motivated to internalize physical and human resources from outside unless its business environment became stable and predictable. This approach to uncertainty increases the perceived present value of the project's future success. However, this approach tends to underestimate the value of experiential learning through the trial-and-error method, since learning opportunities can be created only by a certain level of capital commitment. This may cause the problem of a lack of core technical capabilities.

Square adopted a contrary course of action. It pursued a traditional differentiating strategy as a follower in the infant market, which its leader, Enix, opened up. Its mission was to continue developing RPGs characteristic of CG technologies. Its technical core capability was to 'excavate' hardware, to discover and make the most of the potential properties of hardware, which even platform holders were unaware of. Their advanced knowledge of both hardware and software effectively realized attractive and appealing game concepts, lengthy scenarios and state-of-art graphics and sound effects with high integrity.

This business system is similar to that assumed by the DCF approach, where one does not give up projects once the decisions to conduct them are made; however, this assumption is not always easy to make, especially under a high level of uncertainty.

Subsequently, Square was sometimes tempted to squeeze profits by subcontracting. Reselling old versions is an example. Another example is volume X-2 that was released to compensate for the limited success of FF XI. From the managerial viewpoint, it is attractive to seize the income that is clearly apparent; this is generally what the real option approach assumes. Further, it is wise to fix the gains from the investment made thus far, especially when the current stream of cash-in is uncertain, in order to maintain the level of cash-out to invest in experiential learning, which the project portfolio is expected to function on. However, the difficulty to reach the high level of profitability due to its heavy capital commitments may have dissuade Square from an entire sympathy for Enix.

Further, it is viable to lag behind the market leader when organizing large capital commitments for organizational accumulation of technical knowledge, comprehensive incentive schemes for professional employees and strong leadership from among technical middle management. This intricate web of managerial methods to fulfil its ambitious mission, which has been sublimated into an organizational culture, should never be designed over a short period with a small capital commitment.

However, a monolithic culture may create fetters in the organization when changes are required. For example, when it faces a high level of uncertainty, its mission needs to be redefined, particularly when restructuring and downsizing is urgently required. More rigid organizational cultures may become more resistant to changes. This is perhaps why the temptation to become flexible and profitable has been restrained.

CONCLUSION

This paper highlights a subjective aspect of the entrepreneurial decisions through a case study of the development race of Japanese RPGs in the 1980s. There can be different modes of 'management' based on 'rationalist' and 'semi-rationalist' assumptions. Real-life industries always have both aspects of 'management', but depending on the developmental stage, one of them tends to predominate, as is well illustrated by 'life cycle' models of industrial development processes. To approach the video game industry in its infancy, which was characterized by a high level of uncertainty, this paper considers that the 'semi-rationalist' assumption is appropriate and that the strategic behaviour of entrepreneurs is most strongly determined by how they view their complex and dynamic environment. The real option approach can provide an effective perspective from which to approach the trade-off relationship that may constrain the entrepreneurs, who are required to pursue both perceived profitability and experiential learning while facing a high level of uncertainty.

This paper has started with the scepticism about the 'best practices' elucidated by existing industry analyses, due to the lost competitive position that Japanese software houses had enjoyed in the global competition. In a continuously changing environment, it is not enough for management researchers to conduct retrospective analyses to draw lessons from the 'best practice'. In other words, to know any ex post rationale of the 'best practices' is one thing but to ask for any ex ante rationale to lead trial-and-error learning to become the best is quite another. This paper considers the latter to be a more comprehensive approach to real-life 'management'.

For example, when asked for advice by a small venture firm in the process of trial and error, one can explain about a possible trade-off relationship between perceived profitability and the importance of experiential learning. It could also be said that a good rivalry is important because one firm cannot pursue both simultaneously until uncertain factors in the environment are relatively known. Further, the rivalry should be based on the trade-off constraint since it serves as a defence against the rival's challenges in the process of experiential learning.

We now discuss future research directions. This paper is based on the gap between theory and practice and initiates a critical assessment of the term 'management' in general. This task is too ambitious to be dealt with in a single paper, but in order to guarantee a certain level of validity of argument, the case analysis points out the anomalies that the new approach may be able to more fully explicate, such as Square's one-sided yet self-restrained sympathy for Enix. The author believes that a theory should be evaluated according to the extent to which it can explain observable but inexplicable phenomena according to existing theories. For constructing more comprehensive theories to view real-life industries, such fact-finding efforts are welcome.

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BIBLIOGRAPHY

- Amram, M. & Kulatilaka, N. 1999. Disciplined decisions: aligning strategy with the financial markets. *Harvard Business Review*, 77(1), 95–104.
- Aoyama, Y. & Izushi, H. 2003. Hardware gimmick or cultural innovation? Technological, cultural, and social foundations of the Japanese video game industry. *Research Policy*, 32, 423–444.
- Baba, Y. 1998. *Dejitaru kachi souzou: mirai karano monodukuri genron*. NTT shuppan, Tokyo.
- Chesbrough, H. 2003. *Open innovation*. Harvard Business School Press, Boston: Massachusetts.
- Fujita, N. 1998. Beikoku niokeru bideo ge-mu sangyou no keisei tokyuugekina houkai: gendai bideo ge-mu sangyou no keisei katei(1). *Keizai ronsou*, 162(5–6), 440–457.
- Fujita, N. 1999a. Fuxamikon toujou mae no nihon bideo ge-mu sangyou: gendai bideo ge-mu sangyou no keisei katei(2). *Keizai ronsou*, 163(3), 311–328.
- Fujita, N. 1999b. Fuxamikon kaihatu to bideo ge-mu sangyou keisei katei no sougouteki kousatu: gendai bideo ge-mu sangyou no keisei katei(3). *Keizai ronsou*, 163(5–6), 511–528.
- Fujiwara, M. 2002. Seiko Epson: purinter gigyou no gijutsu senryaku. *Hitotsubashi Business Review*, 50(2), 148–163.
- Fukushima, E. 1999. Shijou no seiseiki niokeru hyoujunteki seihin sekkei no wana: shinki jigyou no soshikinai seitouka no kanten karano ichiikousatu. *Business Review*, 46(4), 69–87.
- Henderson, R. & Clark, K. 1990. Architectural innovation: the reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly*, 35, 9–30.
- Katou, T. 2000. Riaru opushon apuro-chi no zittai to kouka: petorobureisu sha to amugensha no jigyou toushi hyouka. *Diamond Harvard Business*, 25(5), 86–95.
- Kohashi, R. 1993a. Kansetu seigyō gata nettowa-ku to fukakujitsusei. *Rokkoudai ronshu*, 41(2), 114–125.
- Kohashi R. 1993b. Kateiyō terebi ge-mu sofuto sangyou no senryaku to soshiki. *Business Insight*, Autumn, 74–90.
- Kohashi, R. 1998. Sofuto no inobe-shon: Nintendo no defuxakuto sutanda-do keisei to sofuto kaihatu. Itami, H. et al eds., *Ke-su bukku Nippon kigyō no keiei koudou, Inobe-shon to gijutu chikuseki*, 3, Yuhikaku, Tokyo.
- Kohashi, R. 1999. Nihon no ge-mu sofuto geisha no jinzai manejimento. *Kokusai*

- kenkyuu ronsou*, 12(4), 1–22.
- Leonard = Barton, D. 1995. *Wellspring of Knowledge*, Harvard Business School Press, Boston: Massachusetts.
- Luehrman, T. 1998a. Investment opportunities as real options: getting started on the numbers. *Harvard Business Review*, 76(4), 51–8.
- Luehrman, T. 1998b. Strategy as a portfolio of real options. *Harvard Business Review*, 76(5), 89–99.
- March, J. 2000. Soshiki ni tsuite no kenkyuu: sono kako, genzai, mirai. *Soshiki Kagaku*, 33(4), 4-8.
- Miles, R. & Snow, C. 1978. *Organizational Strategy, Structure, and Process*, McGraw Hill, New York: New York.
- Nelson, R. & Winter, S. 1982. *An Evolutionary Theory of Economic Change*, Harvard University Press, Cambridge: Massachusetts.
- Porter, M. 1980. *Competitive strategy*, Free Press, New York: New York.
- Porter, M. 1998. *On Competition*, Harvard University School Press, Boston: Massachusetts.
- Sakakibara, K., Otaki, S. & Numagami, T. 1989. *Jigyuu souzou no dainamikusu*, Hakutou shobou, Tokyo.
- Shintaku, J., Yanagawa, N. & Tanaka, T. eds. 2003. *Ge-mu sangyou no keizai bunseki*, Touyou keizai shinpou sha, Tokyo.
- Sunagawa, K. 1998. Nihon ge-mu sangyou ni miru kigyousha katudou no keiki to gijutsu senryaku: Sega to Namuko ni okeru sofuto uxea kaihatu soshiki no keisei. *Keieishi gaku*, 32(4), 1–27.
- Thompson, J. 1967. *Organizations in action*, McGraw-Hill, New York: New York.
- Utterback, J. 1994. *Mastering the Dynamics of Innovation*, Harvard Business School Press, Boston: Massachusetts.
- Watkins, K. & Marsic, V. 1993. *Sculpting the learning organization*, Jossey-Bass, San Francisco: California.