Human Resource Management in Japanese Video Game Software Companies

Reika Kohashi (Osaka International University)
and
Toshio Nakanishi (Tokushima Bunri University)

Abstract
Recent decades have witnessed a rapid expansion of the computer software industry but, in general, the Japanese industry has not been a major participant in this growth. This overall lack of Japanese success has often been attributed to a conflict between traditional Japanese human resource management practices and the particular needs of the computer software development process. This paper reports on an investigation of this issue in the context of the one area, video and arcade game software, where Japanese companies have achieved a major, global presence, based on the intensive interview. Contrary to our supposition in advance, some of the findings do reflect overall Japanese practice and, by themselves, may appear to be inconsistent with the needs of the software development processes generally having been believed. The study suggests, however, the mechanisms whereby the overall set of human resource practices has been made compatible with the needs of this segment of the computer software industry.

1. INTRODUCTION

In recent decades the computer software industry has become an increasingly important part of advanced industrial economies. However, Japanese companies have not generally achieved major global market shares in most areas of the computer software industry. The relative lack of Japanese success in this industry has often been attributed to conflict between the need of the computer software development process for individuality and creativity and the organizational characteristics, in particular the human resource practices, of Japanese firms (cf. [Cusumano, 1991]). It is a fact however that a number of Japanese companies have become globally successful in TV and arcade video games and game software for personal computers, a segment of the software industry.
Although there is no accurate data, the annual sales related to computer game software and hardware in the global market amounts to over 17 billion US dollars, and Japanese companies have been playing a major role in this market.
Thus, these Japanese companies clearly have been able to establish, in Japan, human resource management practices which do adequately support the utilization of individual talent and creativity required in the development process. Our purpose in this paper is to describe the mechanism by which Japanese companies' successful human resource management is accomplished, based on intensive semi-structured interviews with eleven chief engineers at nine different Japanese computer game software companies. There are believed to be over 500 Japanese companies engaged in game software development and most are small or medium-size companies. the companies interviewed ranged in size from about 40 employees to over 3,000. Each interview required from two to three hours and all interview data was recorded in a written transcript.

2. FINDINGS REGARDING HUMAN RESOURCE PRACTICES

2. 1 General Commonsense

Before discussing the interview findings it will be helpful to first outline what, based on the relevant existing literature and general perspective from organization science viewpoints, including product development processes management, professional human resource management style, and Japanese management systems, we had expected to find.
We had expected to find that creative and efficient human resources practices in the software development industry generally reflected the following four characteristics.
First, that they would employ only a core of in-house development engineers and make use of relatively large numbers of outside engineers hired under short-term or project-based contracts, in order to make more flexible use of diverse talents.

Second, that company management would, in their recruitment and managerial practices, value most highly the individual professional and creative skills of software development personnel.
Third, that companies would make efforts to codify or formalize, which is believed one of the common Japanese companies' advantage, so far as possible, their development practices in order to provide a reliable and efficient structure for the development processes.
Fourth, and last, that, in order to foster the individual creativity of employees, management would impose much less restrictive norms regarding working hours, behavior, and attire than is common in other Japanese industries.
The main interview findings will be discussed under the same four categories. These interview findings are, to a surprising degree, contrary to the expectations outlined above.

2.2 In-house Production

The firms interviewed try so far as is possible to ensure that their products are produced in-house, by their permanent employees. This is especially so for promising *killer* software, which they feel might become a major success. It is true that they engage in subcontracting with outside independent professional creators or with smaller production firms. Often, however, these only involve routine debugging chores. Where they go beyond such routine tasks, the subcontracting activities are often based on long-term relationships with subcontractors in which the firm has confidence that the quality of the work will not differ greatly from that carried out in-house.

2. 3 An Emphasis on Interpersonal Skills

A group of interview questions explored such issues as: factors emphasized in recruiting decisions, the characteristics of successful software engineers, and desirable characteristics in project team leaders. The responses to these questions indicate that overall personality characteristics bearing on communication and cooperation skills are considered much more important than technical software engineering skills or artistic creativity. This reflects the fact that the game software development cycle nowadays extends for at least one year and involves the collaboration of a variety of professionals with very diverse skills, such as programming, graphic design, music and sound composition, and scenario writing. In other words, the reason engineers' interpersonal skills are so strongly emphasized by Japanese game software firms is because they, necessarily, must accomplish their work as a part of a team. While the size of the project team and the length of the project vary a great deal, in general project teams range in size from 30 to 100 people and projects range from one to two years in duration.

2.4 Intentional Minimal Codification of the Development Processes

In general, the companies interviewed provide a few weeks or months of basic training, focusing on fundamental software engineering skills and knowledge, for new graduates entering the company. But they also say that the real training begins on the job. Company manuals describing job procedures are either minimalist in content or they do not exist at all. Furthermore, many of those interviewed emphasize that they intentionally avoid codifying the development process for newcomers (we don't tell them anything voluntarily unless they ask). As the interviewees explained, in the game software development process, it is not enough for programmers to simply program in accordance with specified objectives. In fact, if they play the results of their game programming and think it is not attractive, their programming has not yet produced any value. It is necessary, in other words, for them to improve their program again and again, until they find the results satisfying. The direction sheets provided to programmers are based on *a-priori* images and assumptions. But the actual sense of "enjoyability" is too abstract and elusive to specify the means of realizing it in advance. Therefore, in order to promote a positive attitude and individual initiative among development team members, the companies avoid the use of standardized manuals and encourage them to think independently. As one interviewee put it, "we tell them, don't wait for instructions, steal whatever you can from your superiors, and then think for yourselves!"

2.5 Only Modest Divergence from the Japanese Group-orientation

The degree to which engineers in the software development department are free to choose an independent working style and the extent of pay incentives rewarding individual performance are much lower than is commonly supposed. Admittedly, some company rules, such as those limiting individual choice regarding work attire and the structure of the workday are less severe than those in the prototypical successful Japanese company. So too, on average, it is said that engineers in the industry can reasonably hope to become section leaders or project team leaders in about three years, and this may be rather sooner than is the case in other industries.
But the degree to which such practices diverge from the overall Japanese norms varied a great deal among the companies interviewed. Interviewees were asked whether it would be

possible for a young newcomer to the company to come up with a game idea which management would then take up and implement as a company project under an experienced team leader or, alternatively, for such a newcomer to be named as one of the core members leading the project development team. It was felt this would provide another, more direct, indicator of the extent to which the human resource system focuses on cultivating creative individual talent. While it is true that there were a couple of interviewees who said they would have a positive attitude to doing so, a larger number of the interviewees responded that, while not formally prohibited, the companies' systems made such an event almost impossible. This is another indication of the limits companies place on their efforts to cultivate individual creative abilities.

In many of the companies a certain percentage of product sales volume is returned to the development team responsible, and then distributed to the individual team members. While it is true that this is an obvious stimulation to individual effort, some interviewees stressed that the money itself was not the most important motivator. In most cases it is seen as being merely a temporary reward in recognition of success. In fact, even in companies where the salary system is formally based on an annual performance review, the estimation of an employees contribution reflects a long-term perspective focused on such things as accumulated experience and abilities, rather than on short-term factors such as last-year's sales volume.

3. DISCUSSION AND ANALYSIS

3.1 Interactivity

Asthe preceding section indicates, there is a considerable difference between the actual human resource management practices in Japanese game software companies reported by the interviewees and those which the existing literature would lead us to expect.

To understand how the human resource practices outlined above have supported the success of the Japanese companies employing them, it is necessary to consider them in their industry context. In this section we discuss the practices identified in light of specific product and production process characteristics of the game software industry.

There are some peculiar features of game software, but we can say that one of the most crucial characteristics of game software is its interactivity. In other words, unlike more passive forms of entertainment, such as movies, books, and so on, the game player must continue to actively handle their controller voluntarily in order to enjoy its value. Accordingly, the key factor for success with consumers is not simply a novel game concept but rather an implementation of the game which stimulates the player's active, continuing involvement. This requires a great deal of careful, detailed engineering work, such as debugging, so that players become engrossed in the game, but not unnecessarily stressed. As with many other industries, many industrial experts admit that American or European game software firms are superior to Japanese firms at producing revolutionary new games. Indeed, for most Japanese best-selling game software the essential game concept or rules are based on existing games which the Japanese firms refined to a very high degree. At the risk of excessive generalization, the success of Japanese game software is based on the perfection of its implementation; including such as beautiful graphics, minimum bugs, user-friendly operation, suitable setting of difficulty levels, and so on, rather than the novelty of the product.

3.2. Game Software Development Processes

There is evidence that can support this opinion. To the interview question, what is the important thing in game software development, the two most common answers are; to make players feel engaged and excited, but not irritated and, the modifications and refinements of the game needed to realize that. Game software production processes generally follow three phases.

1. Core concept generation and initial experimental establishment of main programming
2. Product specifications and prototype development
3. Monitoring, modifications, and refinements

Needless to say, all three phases are important, but Japanese firms place particular importance on the third phase. The third phase is especially challenging because there are never any objective standards by which to declare the work finished. For example, there is no objective standard, applying to every game or game scenario, as to how many fractions of a second lead time there should be between pushing a control button and action on the screen. Similarly, though programming bugs need to be eliminated, it is almost impossible to be certain that they have been eliminated from every possible scenario that any player may ever encounter when playing the game. Mr. Shigeru Miyamoto at Nintendo, one of the most famous game software producer who produced the "Super Mario Brothers" series, makes this point in a comparison of movies and game software. For him, the definitive difference between the two is that, if an additional month of editing work is put into a movie only a modest improvement can be expected, but even thirty

minutes of additional programming can change the quality of a game from 70 out of 100 to near perfection. As a result, game developers work with a sense of fear, the fear that only another little bit of work will make an enormous positive difference. For example, only a little bit of additional programming work can, at the extreme, make the lead character immortal or eliminate the character entirely. Even a much more minor change in the game programming may drastically change the whole nature of the game itself. The fact that Japanese computer game software firms consider this third phase the most important inevitably makes total production time longer. Interviewees often said, "It is very common for us to stay, camping out, at the office for months just before final deadline. There are even cases where project team members have not returned to his/her family home for half a year except to exchange their clothing."

Much of the refinement work involves decisions about existing aspects of the programming which cannot be judged definitely wrong or deficient. These decisions, therefore, depend upon a process of ongoing communication and an active effort to offer suggestions and remain open to the ideas of others. This is true not just in the third phase of the development process but in the second as well. As we have noted, this game software development teams are composed of individuals of divergent skills and professional background and who have, naturally, their own styles, assumptions, and pride regarding their professional work. Under such conditions, more so than in other industries, they necessarily need long-term intimate communication and collaboration in order to built shared understanding and mutually supportive work patterns.

It is here, then, that the general interpersonal skills of engineers play a critical role in determining the ultimate success of the production process. Of course, the existence of an individual with abundant creative talent or a unique sensibility can profoundly affect the quality of the product. In Japanese game software firms, however, the key role of the core group of engineers is not to give clear one-way direction to other project team members but to orchestrate a highly non-linear development processes wherein all team members collaboratively generate ideas. Within such a team-based development process, much more than pure technical skills, artistic creativity, or innovative imagination, the ability most needed is the skill to communicate and collaborate with other team members. This need for intensive, intimate communication and collaboration is, at the same time, an important reason why Japanese game software companies emphasize in-house production. Sometimes, project team leaders or core members have to coordinate diverse team members' opposing opinions and unify them. The accumulated carriers of them which have brought reputation and confidence from team members contribute to their powerful decision making.

The fact that this pattern of software development has been so effective for Japanese game software firms is due, at least in part, to the origins of the industry. Before the introduction of TV video games, many of the Japanese game software companies initially focused on developing games not for personal computers but for arcade video games. These games are generally of the coin-consuming type and stimulate players physical reaction time and coordination ability, such as target shooting, car race simulation, and so on. In contrast, PC game software games are mainly of the time-consuming type, such as role-playing and simulation games - which require considerable thought on the part of the player.

For the latter, the early, detailed conception and complex specification of the games' world-view and various scenarios is a crucial and not so easily revised step in the development process. In contrast, for the former type of game, in which Japanese firms have been particularly successful, the later refinement and implementation of an essentially simpler game concept is the key to success. It is the crucial importance to the success of such games of such an unclear and subjective standard as "enjoyability" that is problematic. It is not possible to specify how to achieve this in the final version of the game. This is what makes it necessary, and effective, to involve all project team members in a collaborative, reiterative effort to clarify the means to achieve that goal.

Of course, it is relevant to note that, nowadays, Japanese firms are involved in many different game genres, and these may present differences in product or production process characteristics which would benefit from different human resource practices. However, even if the effectiveness of this development style depends on the game genre, their experienced and shared development style remains effectively in each software company regardless of their game genre and it does explain some part of Japanese game software companies' success to date.

3.3. Japanese Human Resource Management Style Supporting Creative Innovation

Clearly the development processes just described have an intimate link to the recruitment, management, and reward system practices described in the former section of this paper. Recruitment emphasizes general interpersonal skills more than purely technical skills. Although team leaders or a few core team members take the initiative, the processes focus on the total collaboration of all team members' skills and

efforts. This is, necessarily, realized primarily by project teams composed of in-house employees with long-term linkages to the firm and to each other. Consumers cannot easily predict whether they will enjoy game software before they purchase it. For that reason such things as sales promotion activities, sequels and spin-offs, brand recognition and various other factors can affect sales more than does the essential quality of the software itself. For these reasons, even if the devotion of the project team's members results in a very high quality piece of software, does not necessarily mean it will be a commercial success. It is crucial, nevertheless, that the software engineers, sometimes including with people in other teams, be encouraged to make every effort to improve the product until the final deadline, in pursuit of ultimate perfection. As the occasion calls for, it is even desirable that they feel they can risk failure in their efforts. For these reasons as well, in-house production and a reward system which gives weight to individuals' accumulated experience and medium- and long-term contributions is more appropriate than a system focused on short-term numerical measures such as sales performance. In this way, the product and development process characteristics, on the one hand, and the human resource management are articulated in a way which ensures that the mechanism as a whole produces internationally best-selling software.

4. CONCLUSION

In this paper, we described human resource management at Japanese game software companies from multiple perspectives and showed how this management style is functionally coordinated with the product and production process characteristics of the industry. We do not say that this style is necessarily perfect, nor is it the case that all Japanese game software development companies and teams perfectly implement this style.

Actually, taking TV video games as an example, there has been a trend towards more technological complexity in game software, an expanding number of new titles and, compared to earlier years, a clear decline in the number of blockbuster hit titles. In response, many of the Japanese companies are making vigorous efforts to identify new outside creative talent and to implement annual contract salary systems. However, if Japanese companies aim to transform this system they must, nevertheless, continue to maintain an organic fit between the requirements of the product genres they participate in and their human resource practices. This basic proposition, of course, applies not just to the game software industry but also all industries.

5. REFERENCES

Campbell, D. T., "Variation and Selective Retention in Socio-Cultural Evolution", in H. R. Barringer, G. I. Blankstem, and R. Mark (eds.), *Social Change in Developing Areas*, Schenkman, 1965.

Cusumano, M. A., *Japanese Software Factories: A Challenge to U.S. Management*, New York, Oxford: Oxford University Press, 1991.

Kagono, T., I. Nonaka, K. Sakakibara, and A. Okumura, *Strategic vs. Evolutionary Management: A US-Japan Comparison of Strategy and Organization*, Amsterdam: North- Holland, 1985.

Kohashi, R. and T. Kagono, "*The Exchanges and Development of Images: A Study of the Japanese Video Game Industry*", presentation paper prepared for the Hitotsubashi-Organization Science Conference on 'Asian Research in Organizations: Emerging Paradigms in Organization Studies', at Hitotsubashi University, Japan, November 1995.

Nonaka, I., and H. Takeuchi, *The Knowledge -Creating Company*, New York: Oxford University Press, 1995.

Roth, I., and J. P. Frisby, *Perception and Representation: A Cognitive Approach*, Philadelphia: Open University Press, 1986.

Weick, K. R., *Sensemaking in Organizations*, CA: Sage Publications, 1995.

Yin, R. K., *Case Study Research Design and Methods*, CA: Sage Publications, 1984.