Three challenges for Japanese ICT professionalism

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Abstract

Although the establishment of ICT professionalism is an urgent issue in Japan, there exist challenges for it which can be classified broadly into the following three categories: (a) working environments of ICT professionals, (b) business practices in Japanese ICT industry and (c) Japanese education systems. In this study, we attempt to examine these challenges descriptively and to propose effective countermeasures to them in order to establish a globally acceptable level of ICT professionalism in Japan.

1 Introduction

Based on the recognition that information and communication technology (ICT) was becoming a key enabler of successful business systems as well as safe and affluent societies, in Japan, the Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society (IT Strategic Headquarters) was established within the Cabinet in January 2001. They developed a policy called “e-Japan Strategy” which was aimed at adapting the nation to the rapid and drastic changes in socio-economic structure caused by the development and spread of ICT and at creating an advanced information and telecommunication network society. The promotion of e-Japan Strategy and its subsequent policies resulted in the highly advanced broadband network infrastructure throughout the nation. In order to contribute to the e-Japan strategies, in 2006, the Ministry of Internal Affairs and Communications (MIC) adopted “u-Japan Policy” aimed at creating the ubiquitous network society where seamless network access would be realised by the integration of wired and wireless networks and people would enjoy high quality services provided by the ubiquitous network systems.

In the e-Japan strategies as well as u-Japan Policy, development of ICT professionals or nurturing of advanced ICT human resources has consistently been positioned as a top priority issue, because a serious shortage of such human resources, that are critical to maintain the international competitiveness of Japan in the modern information society, in the present and future has been expected. Considering that a number of people are and will be employed as advanced ICT human resources or ICT professionals and activities undertaken by them have and will have considerable influence over society, their development of a professional outlook and attitude is an urgent issue in order to create and maintain a safe and reliable society.

However, there exist challenges for establishing ICT professionalism in Japan. They can be classified broadly into the following three categories: (a) working environments of ICT professionals, (b) business practices in Japanese ICT industry and (c) Japanese education systems.

The purpose of this paper is to examine these challenges descriptively and propose effective countermeasures to them. The authors believe that the measures proposed in this paper have to reflect the Japanese circumstances and, simultaneously, be effective enough so that they are helpful to establish a globally acceptable level of ICT professionalism in Japan, because work conducted by Japanese ICT professionals can have influence over people throughout the world.

The remainder of this paper is structured as follows. In the next section, we explain why developing ICT professionalism is required in Japanese society. In section 3, through describing the working environment surrounding ICT workers in Japan, we consider policies for improving it. In section 4, based on the analysis of business practice in Japanese ICT industry, importance of the development of contract-consciousness in the industry is discussed. Finally, in section 5, we examine the necessity of reconstruction of Japanese education systems.

2 Necessity of establishing ICT professionalism in Japan

2.1 Requirements for ICT professionals in Japan

Throughout the Japanese national ICT strategic policies which have been developed since 2001, nurturing ICT professionals or advanced ICT human resources such as software engineers including ICT architects and embedded software specialists, digital content creators, project managers, information security specialists, ICT coordinators and ICT researchers has consistently been positioned as a top priority issue. Behind this is a recognition that the shortage of such human resources is currently and will be experienced even though they are and will be necessary to maintain as well as to improve Japan's and Japanese firms' international competitiveness. Acceptance of distinguished foreign ICT professionals is recommended due to the same reason. The Japanese business community has supported this governmental view; in December 2007 *Nippon Keidanren* (Japan Business Federation), for example, issued a policy proposal that recommended setting up the National Centre for cultivating advanced ICT human resources [Japan Business Federation, 2007].

"Skill Standards for IT Professionals" reported by IT Skill Standards Centre, a division of Information-Technology Promotion Agency which administers certificate exams for ICT professionals, defines a professional as follows.

> A professional is a person who successfully achieves business result in practice and contributes to the industry growth. A professional should
> - achieve commitments to his/her customers and company,
> - train and develop subordinates who will take over his/her experience and knowledge,
> - perform activities continuously to improves his/her own business capability, and
> - hold social responsibility and commitment to ethical standards as a professional.
>
> A professional attains business outcomes, which fulfils customers' requirements by utilising a combination of appropriate skills. Possessing advanced skills means providing great value for customers, project members, partners, and his/her company as a professional. To achieve a commitment to customers and the company, a professional needs to possess not only high technological skills, but also high level personal skills such as communication, negotiation, and leadership, and also business related skills. Moreover, for the succession of technology, a professional needs to contribute to training and development of subordinates such as by mentoring or coaching [IT Skill Standards Centre, 2008].

This definition seems to emphasise skills a professional should have, cultivate and impart. In fact, intensional as well as extensional meanings of "holding social responsibility" and "ethical standards as a professional" are not described in the report, also in the relevant governmental documents, whereas skills necessary for ICT professionals are elaborated. Additionally, well-established codes of conduct for ICT professionals such as "Software Engineering Code of Ethics and Professional Practice" are not well known to Japanese ICT professionals and they culturally tend to consider any written code is *Tatemae*, what is described for the sake of courteousness or respectability. Consequently, in Japan, what is required for ICT professionals is prone to be recognised as maintaining high levels of skills related to ICT. Whereas they are required to take responsibility to their company and customers, they are not explicitly expected to accept full social responsibility for their work and, therefore, to develop their professionalism.

2.2 Imamichi's "eco-ethics" and ICT human resources

In his ingenious study of "eco-ethics", Imamichi [1989; 1990; 1998] describes the necessity to develop appropriate ethics for the current technological society. In the modern eco-environment or the habitat of humanity which is composed not only of nature but of "technological conjunction", the practical syllogism described in Aristotle's *Nichomachean Ethics* has had to be reconsidered. The classical form of practical syllogism is as follows.

Major premise: A is desirable,
Minor premise: p, q, r, and so on realise A,
Conclusion: for some reason, I choose p as the means to achieve A.

Here, the ideal goal is obvious and the minor premise is the horizon of the freedom of choice, the object of which is a means to achieve the goal. This form of practical syllogism remains valid in our individual decisions even today. On the other hand, due to the extreme progress of technology and the advent of the technological society, the primacy of the means over goals has been brought about and a reverse logical structure of the practical syllogism has been experienced today.

Major premise: we have means or power *P*,
Minor premise: *P* can realise goals *a*, *b*, *c*, and so on,
Conclusion: we choose *a* as the goal of *P* for some reason.

There obviously exists powerful means or technology such as nuclear, electric and electronic technology, and goals attainable using the means are analytically considered; hence the means controls the goals. The means is so powerful that a decision on which goal is realised may have considerable influence over societies. However, this sort of means is usually controlled not by individuals but by groups or organisations; in the modern form of practical syllogism described above the subject is "we". This tends to result in a confusion of responsibilities for the goal setting. The problem here is not egoism but nosism of organisations.

Imamichi's argument suggests that ICT professionals' development of professionalism is vital for overcoming nosism of organisations in which ICT is developed and/or used as well as ambiguity over responsibilities for ICT development and/or use. Business organisations are usually thought to make decisions based on their productivity and economic efficiency, even though business ethics and corporate social responsibility has recently become a popular topic of conversation. Governmental organisations have tended not to hesitate to use technology in order to ensure social order and security especially since the September 11 attacks. In these circumstances, preserving human rights and ensuring social responsibility with respect to ICT development and use have often been understated.

In addition, Japan's group-oriented culture, in which one's self-actualisation is prone to be achieved based on his/her perception of relationships with members of his/her primary group [Nakane, 1978], may foment group nosism and a confusion of responsibilities for group behaviour. In order to ensure socially responsible development and use of ICT in Japan, it should be important for human resources who are engaged in development and use of ICT to develop a professional outlook and to maintain personal independence. However, there are obstacles for this in Japanese society as well as in Japanese ICT industry.

3 Working environments of ICT workers in Japan

3.1 Necessity to nurture professional ICT human resources

Providing ICT-based solutions for end-user companies has become main business for Japanese ICT industry. From the standpoint of end-user companies, ICT is an enabler of their successful business processes and they feel a desperate need for effective ICT-based solutions. The quality of ICT-based solution provided for end-user companies is a decisive factor of the quality of products and services they supply, and the quality of products and services provided to their customers determines the quality of the customers' business activities or the quality of life of the individual customers. Therefore, assurance of the quality of ICT-based solutions is important for ICT industry and end-user companies in order to maintain their competitiveness as well as for society as a whole to acquire its affluence.

A key success factor for assuring quality ICT-based solutions is undoubtedly to secure quality ICT human resources. Nurturing highly-qualified skills and knowledge of ICT human resources and developing their professional outlook is an urgent social issue and this should be addressed through a collaborative relationship among industry, government and academia. However, as it now stands, the shortfall of 150,000 ICT human resources is estimated and it is alleged that this shortfall has caused deterioration of software quality and frequent information system failures. In addition, the ICT profession has already become unpopular among young people in Japan. Results of a survey on Japanese university students' job seeking behaviour which covered 10,299 students show just 4.2% of them desired to work at ICT departments [Mainichi Communications, 2008]. Even the number of people who want to study at universities' department of electronics is decreasing. Behind these circumstances are poor working conditions in Japanese ICT industry.

3.2 3Ks or 7Ks workplace

Since the bubble economy burst in the early 90's, many Japanese companies have tried to improve their cost structure. In-house ICT departments, which had often been considered as cost centres, became targets of restructuring and many of them have been spun off into separate companies. Outsourcing, including offshore one, of information system development, operation and maintenance has already been commonplace. Japanese ICT companies now compete with domestic as well as overseas ICT companies and keenly feel the need to reduce cost.

The pressure to reduce personnel cost has made working environments worse in terms of labour conditions such as pay and labour time. The number of full time workers is decreasing and, in contrast, the number of dispatched workers and contract-based workers is increasing. The working environments of ICT professionals in Japan are no exception. Actually, characteristics of their working conditions are often described as 3Ks, which stands for three

Japanese words *Kitsui* (physically hard), *Kyuryo ga yasui* (low pay) and *Kaere-nai* (cannot go back home), and, moreover, recently have been described as 7Ks: in addition to 3Ks, *Kyuka ga tore-nai* (cannot take a holiday), *Kisoku ga kibishii* (stringent working regulations), *Kesho ga nora-nai* (have a rough skin due to irregular hours and lack of sleep), *Kekkon deki-nai* (unmarriageable).

Except *Kyuryo ga yasui*, 3Ks and 7Ks seem cleverly portray the working conditions of Japanese ICT industry. In fact, Japanese ICT professionals receive above-average payment. However, considering the heavy burden of their work, it is understandable that they feel their payment is low. Moreover, many of them have experienced imposition of overtime work on them without paying extra. According to a questionnaire survey covering 2,214 ICT professionals, one fourth of them felt that their jobs were not worthwhile and 72.6% recognised their profession was unpopular among young people [Nikkei Computer, 2006].

Eventually, Japanese ICT professionals cannot be proud of their profession and, therefore, development of professionalism is hard for them. ICT professionals' bad labour conditions are so notorious that young Japanese people tend to hesitate to become ICT professionals. Thus, it is difficult for the Japanese ICT industry to secure good human resources. This causes the situation in which a small number of capable ICT professionals are always forced to have a heavy workload.

3.3 Policies for improving the ICT working environment

Improvement of the ICT working environment is significant for establishing ICT professionalism which is an urgent social issue in Japan. A measure for this is to construct an independent organisation across firms/industries to support the improvement of the social status as well as the working environment of ICT professionals. The Programmers Guild (http://www.programmersguild.org/) would be a good example for this. However, to ensure the effectiveness of activities the organisation undertakes, it is necessary that Japanese ICT professionals who join the organisation recognise it as their primary group. The tradition of cooperative in-house unions in Japan would be an obstacle to the effectiveness of this organisation.

Developing self-driven outlook of Japanese ICT professionals should be a necessary condition to improve the ICT working environment. However, almost all of them are salaried employees and the amount of payment they receive is not necessarily based on their merits. Moreover, difference in pay among members of a system development team tends to be made small intentionally. Due to the Japanese egalitarian culture, if the members perceive significant difference in the amount of pay between them, effectiveness of team work may deteriorate. Japanese ICT professionals are usually motivated to take responsibility not for

their performance but for their teams and companies. These would imply the necessity of changing Japanese business practices.

4 Business practices in Japanese ICT industry

4.1 Alive myth of person-month

Among business practices in Japanese ICT industry there are several obstacles to development of ICT professionalism. “Person-month” is still used as a usual measure to estimate development cost of information systems. This way of cost calculation was originally adopted in manufacturing industry and is not necessarily fit for estimating cost of products of human intellectual activities like software. As Brooks [1995] describes, person-month assumes an ICT professional is substitutable with time. Additionally, this presumes that an ICT professional can be substituted with someone else ignoring a difference in skills and knowledge between them. These assumptions are based on the misunderstanding of intellectual work and workers.

The unrealistic way of cost estimation often results in unreasonably set deadlines of implementation of information systems and turning the gold-collar workers into blue-collar or entry-level workers. Because punctuality is the soul of Japanese businesses, frontline members of system development teams are often forced to work without letup to make deadlines sacrificing the quality of their job. What is required for them is not creativity, not power of idea but physical capacity and mental toughness.

Additionally, terms and conditions of a written contract for development and implementation of information systems are sometimes recognised as just *Tatemae* or a formality in Japan. In general, a written contract is prone to be considered far less significant than mutual faith and trust for all parties to the contract [Nakane, 1972], and a conflict between them, when it happen, tends to be resolved without invocation of the contract [Uchida, 2000]. The Japanese business culture of “customers are gods” often fosters this tendency and, consequently, scope creep without postponement of deadlines is nothing unusual.

In these circumstances, the more an ICT professional in a system development team is competent, the harder and the longer he/she tends to have to work in order to meet an “inviolable” deadline and, eventually, the more tends to sacrifice the quality of their job. Hence, whereas the quality of systems developed inclines to be dependent on his/her personal skills, it should be hard for him/her to take full responsibility for their performance.

4.2 Illegal employment and multiple tier subcontracts for work

Recently, “disguised contract for work” have become a serious social issue in Japan; contract-based workers are forced to work for their client companies as if they were workers

dispatched to the companies. However, this sort of illegal deed, which has been done to reduce personnel cost, has been commonplace in the Japanese ICT industry. Actually, many Japanese ICT professionals don't recognise disguised contract for work is illegal.

"Multiple tier subcontracts for work" are also commonplace; a project manager told the authors he has once experienced a project in which there was even 16th tier subcontractor. That engineers, say, working for 3rd tier subcontractor is dispatched to a prime contractor or an end-user company, due to the shortfall in skilled engineers, is nothing unusual, but is illegal as well. These business practices bring about difficulty in project management and tend to make ICT professionals programming machines.

4.3 Towards contract-conscious industry

One of the most serious problems with respect to business practices in Japanese ICT industry is that written contracts often don't have practical efficacy. Not only contracts for information system development between companies but employment contracts between ICT professionals and companies hiring them tend to be downplayed. In the industry, contents of implicit contracts are prone to be stretched so that relatively more powerful parties to the contracts become more advantageous.

In order to improve the business practices in Japanese ICT industry and thus to establish ICT professionalism, it is a pressing issue to examine how contracts including written and implicit ones should function in Japanese ICT industry. Everyone concerned in the industry is required to understand the importance of contracts as processes [Uchida, 2000] and to develop an appropriate attitude towards respecting contracts.

5 Japanese education systems

5.1 Eclipse of philosophy and ethics

The Japanese government as well as the Japanese business community has repeatedly emphasised the importance of developing engineers of high moral character. In fact, a lot of engineering universities have launched a course of lectures on professional and engineering ethics. However, the fierce competition to pass entrance exams to topnotch universities has distorted the Japanese primary, secondary and advanced education. Japanese high school pupils are usually separated into two courses. One is humanity course which is for pupils who are interested in humanity or social sciences or are not good at mathematics. The other is science course pupils who are interested in natural sciences or are good at mathematics select to enter. However, knowledge about philosophy and ethics is recognised not necessary for pupils in the both courses because it is unnecessary to pass entrance exam to universities. Such knowledge is also unnecessary for a majority of students to graduate from their universities.

Moreover, in Japanese society, practical sciences such as law, economics, business administration, engineering and medical science are frequently emphasised. In contrast, philosophy and ethics is often regarded as unpractical. Eventually, many Japanese people underestimate the social significance of philosophy and ethics and lack awareness of the linkage between these disciplines and other research fields. In fact, many people are prone to recognise that technology is not related to ethics. In these circumstances, it is very difficult to encourage students as well as ICT professionals to study about engineering and professional ethics and to develop a professional outlook. It symbolises this Japanese situation that neither philosopher nor ethicist is a member of Study Group on ICT Human Resources, which is a panel in MIC to discuss development of ICT professionals.

5.2 "*Takotsubo*" research

For long time, in Japan, the importance of interdisciplinary research had not been appreciated. Those who were engaged in such research subjects had been called dilettantes with scorn till recently. Maruyama [1961] described the state of Japanese academic activity as *Takotsubo* (fox hole) research; each researcher devoted him/herself to a narrowly limited research field.

In this academic tradition and culture, university education tends to focus on subjects related to traditional, established research fields, and subjects with respect to interdisciplinary study areas have tended not to be incorporated into university curriculums. Actually, the subject of computer/information ethics can rarely be found in curriculums for third and fourth year students at Japanese engineering colleges.

5.3 Reconstruction of Japanese professional education

The first step towards reconstructing Japanese professional education should be the rehabilitation of philosophy as well as ethics. These really basic disciplines as well as mathematic should be taught at any department of universities regardless of whether the department is in humanity course or science course. At primary, secondary and high schools, the subject of introduction to philosophy and ethics should be incorporated into their curriculums.

In order to yank students from *Takotsubo*, introduction of a double-major system into university education systems may be useful. Study on interdisciplinary research areas should be recommended to students.

6 Conclusions

In this paper, the three challenges for developing ICT professionalism in Japan are examined

and basic ideas on how to address them are proposed. The establishment of ICT professionalism is an urgent issue in Japan. However, resolving these challenges is not easy, because it requires changing social as well as industrial structure and business practices in Japanese ICT industry.

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