Framework of Contemporary Japanese Project Management (1): Project Management Paradigm — Interpretation, Application and Evolution to KPM

Shigenobu Ohara
Professor of Management of Technology
Graduate School of Nippon Institute of Technology

1 Introduction

Orthodox-type project management (hereinafter referred to as PM) has been developed for engineering methodology of building an artificial system. In Japan, the similar context to PM has been spread in the naming of *Shikumizukuri*, which means designing of unique architecture by a team of cross-functional specialists. PM has been widely spread and applied in the engineering arena in Japan. It is deemed an essential skill to ensure steady achievement of project goals under rigid constraints and unique conditions. However, faced with the matured society, business demands are increasing beyond the sole engineering system. This change reflects the potential capability that PM may provide a variety of prospective applications for enhancement of value creation. Nevertheless, it is essential to note that the architecture shall meet requirements to unify reciprocal interaction between business and engineered systems.

This paper starts with a brief context of conventional PM for readers to further extend its application in different areas. The readers may learn its limitations, and expect the new framework of PM to overcome these issues. In 2001, Japan published the new standard and guide under the brand of P2M, which stands for project and program for enterprise innovation. The incentive was driven by METI (the Ministry of Economy, Trade and Industry of the Japanese government) in support of subsidies for the research and development of work represented by the author (Ohara, 2002). In the lapse of seven years, the scheme and thinking of the advanced version is disclosed in the paradigm of Kaikaku Project

Management (KPM). *Kaikaku* signifies the comprehensive contexts of the breakthrough implemented by innovation, development and improvement.

2 Interpretation of Project Management Context and Applications

2.1 *What is project management?*

In general, a project is construed to mean an independent undertaking with a unique purpose and conditions to be managed by a temporary organized body. Most projects are categorized in complex and artificial structure or technical systems. In fact, Japanese people remember monumental constructions like *Tokyo Tower* as a landmark in Tokyo, the dramatic story of *Shinkansen* bullet train railways, and *Aqua Line* expressway under the sea of Tokyo bay. Managing projects, therefore, means the capability to identify the system, control the work, and to capture its output efficiently and effectively under required conditions. Although managing the process of planning, implementing, checking and controlling overlaps with general management, it is more specified to meet the attributes and objectives of the project. Being differentiated from line organization, authority is highly delegated to the leader of a specific team. Undoubtedly, leadership is decisive in teamwork and motivation, which impacts on the success of managing a project (Morris, 1997).

Penetrating the project term in the society, its context is expanding from large to small in scale and long to short in lifecycle. Very occasionally, project success is achieved by team competency in small projects without having specific knowledge. Warning is advisable, however, that fragile competency could hardly comply with complex and large-size type of projects.

Principally, the volume of the task increases relative to size, complexity and difficulty, but the project shares the three common attributes of individuality, time limit and uncertainty. Each project is specific in its job and conditions, which leaves room for creative efforts in individuality. Time limitations vary from a few weeks to a decade, but all projects have a start and an end. Uncertainty is the concept which relates to unpredictable elements beyond human control.

To represent individuality, the lifecycle method is adopted widely as a project management tool. It is also effective to exhibit the S-shape curve as progress by earned value. By comparing actual costs and earned values,

the gap is easily figured out for control. The curve helps phased planning for managers by identifying milestones and intermediate outputs in turning points. The Work Break Down (WBS) is another basic and critical tool in managing projects. Primary targets like time, cost, quality and scope are more specified and segmented to the level of tasks and packages for greater control. This is the introductory outline of managing projects. Another requirement for success is related to the human factor in organizations. Though a project team is organized separately, it has to cooperate closely with the mother organization and negotiate to assume full delegation of authority to perform its tasks.

A summary is focused in the following three points:

(a) The term "project" is widely and flexibly used in contemporary society, and so it is likely to convey different messages and pursue individual styles of management.
(b) The orthodox type of PM knowledge is formulated mainly for the construction of a large-size engineering system.
(c) The ordinary methodology of PM is focused on the system construction in terms of lifecycle planning and execution to control time, cost, quality, scope and progress.

2.2 *PM applications in the engineering industry*

The Japanese engineering industry recorded $11 billion (¥12.7 trillion) of backlog in 2007. The domestic market shares 76.7%, while the remaining 23.3% is covered by the overseas market. Despite the global energy boom, the market for the engineering industry has matured and the firms are looking at the business domain. To grasp applications in the industry, it may be necessary to bear in mind the sharing of capital system. A chemical plant is ranked higher in a share of 18.5% to meet a renovation cycle. Urban development (18.5%) is conducted in big cities, which raises impacts as well as ICT hardware systems (16.1%). The supply capacity of a power station (13.5%) is still short and the construction is sustainable, but industrial plants (11.2%) like steel, cement, environmental system, etc., depend on the market (ENAA, 2008).

As aforementioned in the introduction, project management has developed to cope with the demands of system engineering methodology. A large technical system could be handled only by a group of engineers acquainted with the systems approach rather than those with narrow-depth

technological knowledge. The major players of the engineering industry are the capability holders of complex hardware systems. In Japan, they are those engaged in the construction of buildings, integrators of production and environment systems, and heavy machinery suppliers.

The role and responsibility of job sharing is definitely a practice in collaboration. The owner is responsible for producing definite requirements and configurations of the system, while the contractor plays the primary role in engineering, procurement and construction.

In Japan, the lump-sum contract is preferred to cost-plus fee base in the business climate so that risk-sharing is beneficial to either partner. In this Japanese style of contracting system, mutual trust is laid in the foundation of long-term friendly relations. Because they believe that delay destroys the reliability, the Japanese contractors make backtype scheduling from the end to the front. It goes without saying that Japan is the kingdom of quality management.

Thus, long partnership and trust is the strength of the Japanese engineering industry. Though it has the basic paradigm in common with the orthodox PM, it is clear that a delicate difference lies in transaction practice. As reiterated, orthodox PM underlines the role of contractors, in essence, how to construct and deliver a technical system to the owner at the end:

(a) The owner shall give a definite purpose and configurations on the technical system to the contractor, while the system construction is the contractor's full responsibility.
(b) In general, the primary job of the contractor is scoped, and limited maximum in engineering, procurement, and construction in the case of a lump-sum contract.
(c) Communication is the fundamental tool shared by the owner and the contractor to solve conflicts and friction arising on the interface of the system boundary.
(d) An orthodox type of PM knowledge and skill is still dominant in the industry, but some contractors are challenging this to exploit a broader range of business.

2.3 *Project management application in ICT industry*

ICT is an acronym for information and communication technology. Regardless of hardware and software, engineers in the industry have confidence in

applying project management. The industry is growing rapidly and widely in Japan — the size of the market is already four times bigger than the engineering industry over several decades. Likewise, the education and training are based on the orthodox PM paradigm (Yamamoto, 2006).

Despite the enthusiasm, it is worth noting that the owner is unable to warrant to provide the definite requirements and configurations to the contractor. The owner has the limitation of specific capability on ICT system offered by the contractor, and vice versa, the contractor may have little knowledge of business processes because of secrecy. There is no choice but to trust the proposed benefits of investment and proceed to the contract.

Meanwhile, the contractor conducts customization of packaged software to apply the business process by learning disclosed to clients, but the efforts are limited in partial coverage. The extra elaboration is more or less similar to developments in exploiting the fitting spot suited to the client. In the digital transcription to computer program from the analogue work, ICT engineering has even more risk of uncertainty. The additional burden of tasks is likely to result in trial and error developments. To avoid this, experience-based specialization is conducted in area segments of finance, logistics, manufacturing, service, etc. Beyond the extra elaboration, the industry is also faced with the issues of ambiguity of requirement definition and hidden risk of development. The controversy is popular and continuing as the issues are undoubtedly major causes of trouble.

The following is the summary:

(a) An institutional gap of information lies between the owner and the contractor.
(b) Although the ICT industry has commonalities with engineering, high hurdles exist in definite job sharing in equal footing.
(c) Project governance is indispensable to control the total lifecycle.
(d) Risk management shall be reviewed and reinforced in project management.

3 Development-Type Project Management and Risk Issues

3.1 *Project risk hazard*

In the late 1990s, Japanese projects in Asia encountered a financial bubble which caused risk hazards. The owner had to reschedule or divest the

recovery of capital, while the contractor implemented the payment hedged by insurance or had to agree to the postponement of amortization to be paid for construction. The risk hazard is hardly handled to protect parties by the contract stipulation (Kinoshita and Urata, 2000; Ohara, 2000).

Other types of trouble like the network system was reported in the news inside Japan. The merger of large banks had facilitated an integration of the separate networks, but lack of a holistic view had failed the connectivity of networks. Citizens could neither draw nor transfer cash by cards. The system shutdown of air ticket reservation had delayed or cancelled service operations. The coding trouble of price figures by human errors had generated a huge loss to stock companies. Nobody raised the objection that ICT systems are evidently strong weapons to revive competition as exemplified by business process reengineering (BPR), enterprise resource planning (ERP) and supply chain management (SCM). PM is considered a mandatory education and training for ICT engineers, and qualification programs are provided to reduce failures by approximately 70% as proven in surveys (Nakamura, 2003). Varied from hardware engineering, ICT engineering is based on solution service, which may encompass indefinite client requirements and the accompanying commitments.

In stiff competition, the contractor is likely to accept the desired requirements of the owner over his own capability. Landscape is the new methodology to see the sharing view by way of simulation/gaming (Deguchi, 2004). In the R&D world of manufacturing and assembly, the three-dimensional CAD is already an essential tool in the concurrent-type engineering of complicated hardware like aircraft assembly and the new design of cars. Regardless of hardware and software, the owner's view is essential to see to risks and to make a balanced assessment for control. Figure 1 is the general outlook of an assessment process to clarify the grey zone in so-called"failure". Unless there is critical failure of technology, it shows channels whereby settlements could be reached between the parties by negotiations in the business world. In fact, success or failure varies by the positions and roles in subjective evaluation. The owner has to make maximum effort for recovery of investment, while the contractor has to extend his best service to keep clients' trust in the market. What is critical to the risk issue is summarized by how the project management style shall be formulated.

In the case of the development type of project contract, ambiguity is left in the definition of requirements. That is why project governance is

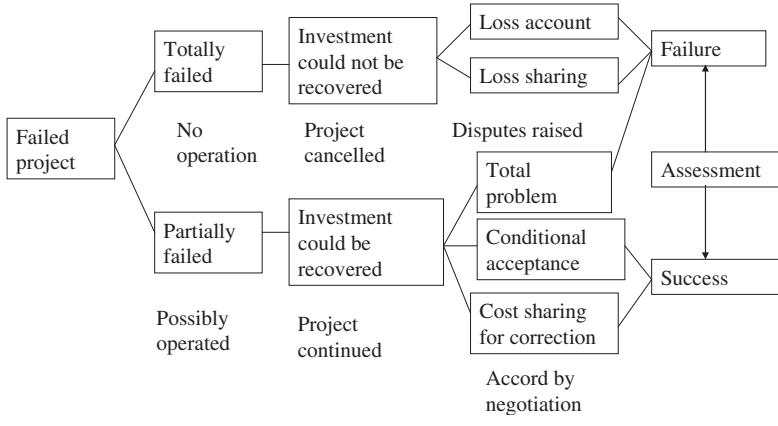

Fig. 1 Assessment threshold of a failed project

critical to improve risk-sharing in the project job. The success rate of a new drug varies between 1 to 1/100,000 orders. Regardless of rating, the owner permits trial and error challenges to projects. In R&D projects in machinery or process system, the success rate for marketable products varies under 20% on average, which is allowed within the range of owner's forecasting. So, projects shall be managed by multidimensional balancing under the project governance framework.

The key points are underlined below:

(a) Project assessment in the development type shall be conducted by the owner's view, because project governance is critical for risk control and decision-making.
(b) Project challenge of the development type is essentially involved with elements of external and internal environments.

3.2 *Inquiry survey for project failure*

In view of the high rate of failure risk, the author intended to find a fact base to give a fair judgment of these issues. The survey had been conducted in the form of questions and answers, and the format was designed to identify elements caused in the three stages of scheme, system and operation. It is evident that the contractor's scope is limited in the system, while the owner is responsible for the total. Table 1 shows the results of implied causes. It is the analytic results from 137 of 794 project managers

Table 1 Causes of failure in stage approach

Scheme Stage	System Stage	Operation Stage
59%	32%	9%

Table 2 Risk elements to failure in stages approach

Scheme Stage	System Stage	Operation Stage
Ambiguity	Scope and quality	Operating troubles
47.4% (47)	41.0% (32)	34.8% (16)
Planning quality	Pressed budget	Ineffective system
15.2% (15)	17.9% (14)	26.1% (12)
Excessive aspiration	PMr competency	Inconvenient system
14.1% (14)	14.1% (11)	21.7% (10)
Scheme quality	Organization	Bad cost performance
9.1% (9)	12.8% (10)	10.9% (5)
Economic visibility	Pressed delivery	Bad support service
6.1% (6)	10.3% (8)	6.5% (3)
Cover ratio	Cover ratio	Cover ratio
91.9% (91)	96.1% (75)	100.0% (46)
Inquired response (99)	Inquired response (78)	Inquired response (46)

(response rate 17.2%) belonging to different affiliations like software systems and network (49%), hardware systems of engineering and machinery (25%), operational improvements (16%) and management consulting (9%). The fact analysis was less in project management, because the scheme and the operation stages had been out of the PM scope. Though most opinions were from the contractors, it is yet surprising that the failure is attributable to the scheme stage, which is almost double that of the system. This shows the lack of deliberate efforts in the upper stream to feed appropriate documents and information to the system stage.

Table 2 exhibits the breakdown of elements, which explains the top five reasons resulting in failures. Apparently, the primary player in the scheme stage is the owner, but open to the contractor, who may make use of the place for dialogue, proposal and negotiations prior to contracting. However, complexity could neither be solved within the issue of definition (Loucopoulos and Karakostas, 1998), nor the scope sharing by parties.

Ambiguity relates to the PM paradigm itself, and it looks like the interaction of negative impacts in the system step.

Table 2 represents the limitations of the orthodox type of project management, and project management shall be renewed under the owner's paradigm. In the last decade, R&D projects had been conducted by the technology-push model at large enterprises. Most of the decentralized R&D projects have failed to go over the Death Valley and Darwinian sea. Today, the high-performing enterprises have converted from the technology-push to market-pull models. The implications are summarized as follows:

(a) The primary cause of failure is centralized in the upper stream of project management control.
(b) Project governance shall be reflected to avoid risks uncovered by project management.

4 What is the Difference in Japanese Project Management?

4.1 *Project management standards*

The value of project management has been recognized in the United States. PMI (Project Management Institute) had challenged in 1985 and published the monumental standards of *PMBOK* (*A Guide to Project Management Body of Knowledge*) (Duncan, 1996). The framework guides the project context and then covers the scope of nine knowledge areas for managing time, cost, quality, scope, procurement, human resources, risk, communication and integration.

In 1996, the European professional organization of IPMA (International Project Management Association) subsequently established the *Competence Baseline* (Caupin *et al.*, 1999), and shared it in member countries for the qualification of professionals. This baseline underlines professional competence generated by the fusion of knowledge, experience and attitude. It is worthy to note that the baseline takes consideration of national culture and climate.

A national member association is allowed to design a baseline of 28 core elements plus certain selective options of 14 elements. UK and Australia also have original standards and an accreditation program.

Motivated by movements of PM standards, ENAA (Engineering Advanced Association) started the basic survey in 1998 and METI

supported its development funding for original Japanese standards. In 2001, P2M (Project and Program Management for Enterprise Innovation) was launched as the first standard guidebook (Ohara, 2006). Symbolized by the branded title, the unique features exist in program management and enterprise innovation, and its outline of knowledge framework is given in Figure 2. The basic thought behind these features is directed to an open system approach. If the potential power of project management could be applied, the major issue is the interaction of business and technical systems. An insightful idea is indispensable to put the two different systems together. The idea is normally complex, but valuable because it is close

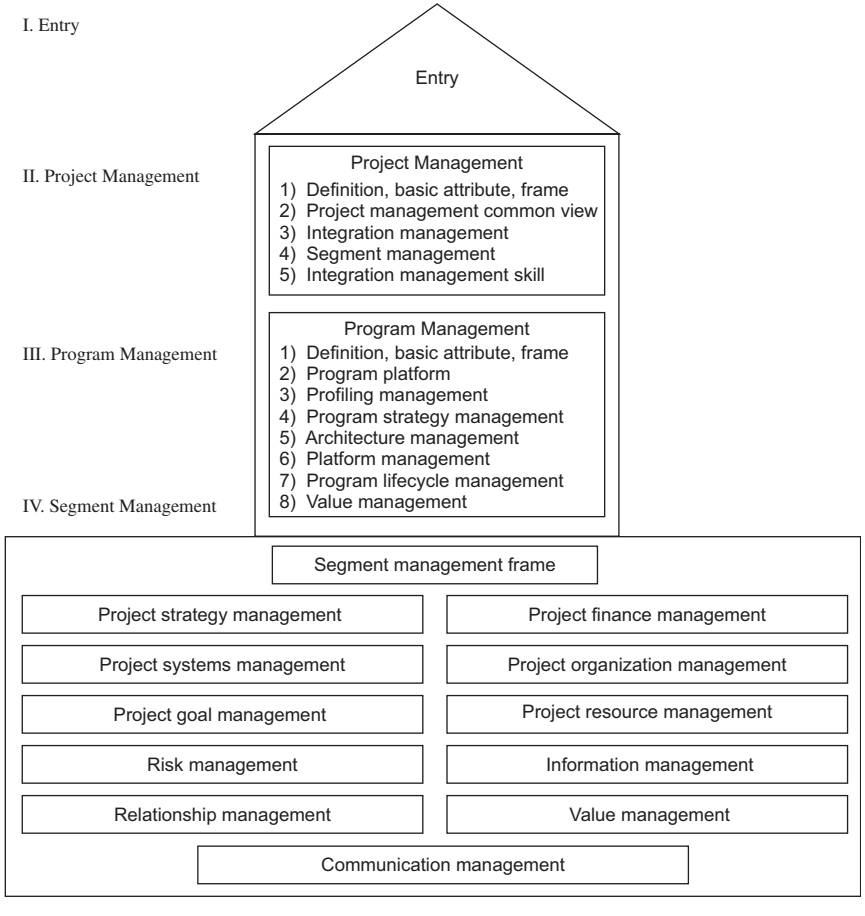

Fig. 2 Project management tower

to innovation. The only solution is to put plural projects together in an open environment. Of more importance is mindful and knowledge innovation driven by PM thinking, and this advanced further from P2M to KPM (Kaikaku Project Management) as outlined hereafter.

To summarize:

(a) There are two sorts of knowledge and competence in PM standards.
(b) The standards and its documents foster professional resources.
(c) P2M is the first guidebook in Japan, and it has been improved to KPM.

4.2 *Contemporary paradigm of Japanese project management?*

Orthodox-type PM thinkers have endeavored to formulate the knowledge framework for construction of a technical system, placing the contractor as the major player. Their paradigm may be explained in another way: they have been concentrating on "how to build a technical system surely and stably". Here, it is important to note again that the premise of job sharing by the thinkers is that a definite mission shall be given by the owner, while the contractor designs, constructs and delivers the system within the limited lifecycle. Apparently, the role of project manager is imagined as the lead in managing goals and process motivation to acquire a system. The system and major goals are stipulated in the contract and identified in the budget, delivery, performance, progress and specifications.

Contemporary Japanese PM is advocated in this version. Applying the open system thinking where human interaction is dominant, the contemporary PM depends on a "value creation paradigm". What is the value gained by managing projects? This is the basic question. The Japanese answer is the *breakthrough to Kaikaku.* The owner/entrepreneur initiates the innovation to create value in the future and discusses with the contractor. In line with this thinking, the central player is the owner, who is completely responsible for the total lifecycle. Two critical contexts of *mission* and *solution* are introduced in the PM paradigm. Mission is essentially the willingness to commit resources, which is generated by an insightful idea balanced on value. A solution is very occasionally implied

Table 3 Comparison and distinction

PM Version	Orthodox Type of PM Paradigm	Contemporary PM Paradigm
Holistic view	Technical system paradigm	Value creation paradigm
Role and position	The contractor's role and position	The owner's role and position
Mission	Definite mission	Definite and implicit missions
Premises	Solution is given by the owner	Solution is created jointly
Lifecycle	From contract to delivery	From mission to achievement
Managing	Budget, delivery, quality, progress	Value creation
Type	Managing independent projects	Managing compound projects

by the owner, but indefinitely. So the contractor collaborates to jointly achieve value creation, which means the development process is linked to the innovative mission (Ohara, 2006). Table 3 summarizes the comparisons and distinctions of major items between orthodox and contemporary PM in Japan.

4.3 *A case study of the introduction of the contemporary PM paradigm*

The top management of a printer machine company got a strategic idea to capture the dominant market share in the office segment. To achieve their goal, they formulated a strategic plan to develop a new model of office printer. The strategy intended to establish the dominant advantage by individual differentiation of the office printer against competitors by detailing the novelty of multiple usages with an ecology functionality. It is not unusual for a functional department to not take responsibility when new products go wrong and accuse others instead. So, a unique single responsibility system was adopted. Those who respond to the public announcement inside the company are obliged to explain the justification of their respective development plan to the steering committee for obtaining authority of delegation.

For example, the mission is announced in such a way that the person responsible for the new model development is wanted in closeout of one year for the prospective career path of the challenge, on the condition that $30 million in sales shall be secured for the first six months of production. Compared to the orthodox-type PM, applicants have to plan by themselves not only the total lifecycle plan, but the solution itself guided by instruction. The justifiable scheduling, risk estimate and visibility shall be programmed, while the owner is ready to delegate full authority and desired budget. In effect, what they are doing is creating a solution for business scheme, system model development, assembly test and quantity test production, and giving them accountability.

5 What is Kaikaku Project Management?

5.1 *Kaikaku: Strategy linkage reform*

Kaikaku or innovative reform is a popular and meaningful word in Japan, because it is being pursued in contemporary enterprises of political administration, industry and the company. In particular, project management may be converted to provide dual advantages in dealing with the unique undertaking of creative entrepreneurship and solid implementation of business managers if contrived in the new version. *Kaikaku* is congruent to the strategy context that enterprises have to create and to sustain changes of organizational capability complying with the external environment. In general, corporate strategy is handled to formulate planning by the head office, and implemented to capture outcome by organizations. *Kaikaku* is certainly a challenge and a risk, but value creation sustainability can neither be conscious nor be in hand without it, because it is strategic capability itself in pursuit of uniqueness and novelty at any level. This is why the new version after P2M is named Kaikaku Project Management (hereinafter called KPM).

5.2 *Three layers composition of Kaikaku*

Represented, motivated and encouraged by *Kaikaku,* the versatile challenges of uniqueness have been nominally implemented in Japan. Though the word is widely used in a number of visions at enterprises, the context is not substantially articulated, and its assessment of outcome is varied as well. The comprehensive context is engraved in many ways, and so *kaikaku*

differs in what it means to stakeholders. Some use it as radical innovation, while others use it as small innovation. Likewise, some emphasize digital business development, while others give priority to marketing development. To avoid confusion, KPM is defined here as encompassing the 3 K's of *Kakusin* (innovation), *Kaihatsu* (development) and *Kaizen* (improvement), or more specifically, the synergetic unity to be challenged and linked to corporate-level strategy.

Table 4 shows a brief outline of 3 K's components with the detailed explanation hereafter.

(a) *Kakusin* (innovation) means the radical type of comprehensive breakthrough by uniting all layers of a new combination of knowledge and wisdom. With the objective of dramatic upgrade in performance, the top managers shall be conscious of the decisive will to play the primary role of leadership in initiating strategic uniqueness, big changes and high impacts.

(b) *Kaihatsu* (development) means the challenges to acquire new knowledge and information. It is intended to enhance competitive advantage. Development does not necessarily refer to technology, but covers more extensively business, product, process and even market as well. Nevertheless, it has risks and uncertainties in common and is linked more or less with innovation.

In today's competitive environment, the lead-time speed is also detrimental. It ranges from short to long terms, and from small to large scales and scopes. Impacts are extremely variable.

Table 4 The three components of *Kaikaku*

Components	Methodology	Targeting and Organizational Impact
Kakusin (innovation)	Breakthrough by a new knowledge combination	Targeting to upgrade dramatic performance on the whole
Kaihatsu (development)	Acquiring front-edge knowledge and information	Intending to capture competitive advantages in specific fields
Kaizen (improvement)	Incremental and continuing efforts in proactive work life	Implanting project-based thinking to link to the whole

(c) *Kaizen* (improvement) means the incremental and continuing efforts for improvement at work-floor level. The *Kaizen* activity in the Toyota group is renowned as one of the best practices. It is an autonomously driven small group activity, which is initiated for a discovered issue solution. A typical example of the agenda is related to the efforts in proactive work life where a clean, well-ordered environment is preferred as represented in 5S (*Seiri*, *Seiton*, *Seisou*, *Seiketsu*, *Sitsuke*) symbols.

Kaizen is positioned between routine and project activities, including the quality control activity, but the incremental efforts have borne far bigger outcomes in corporate performance. The 3 M's (*Muri*, *Muda*, *Mura*) also need to be overcome. *Muri* means enforced styling work where good quality is hardly produced. *Muda* is symbolic of non-valuable junks or wastes, where people are not aware that they are producing more stocks of parts than needed. *Mura* means deviations or variations from a certain standard, which might result in lack of control or improper handling of process. KPM implants project-based thinking in *Kaizen* and links the work floor and market front efforts of knowledge.

5.3 *KPM knowledge framework*

The strategic capability of human resources is designed to be congruent with the organizational hierarchy and functions, because it is fostered by awareness of roles and learning by doing work in the organization. Though cross-functionality of teams has been emphasized in project management, the lateral phase of collaboration may be significant, with room for further practice. KPM intends to explore the framework of enhanced methodology of strategy implementation in the form of the hybrid of lateral and cross-functional collaborations (see Figure 3).

In the value creation paradigm, there exists *Kakusin* (innovation), the intent process of entrepreneurship, and *Kaihatsu* (development) of the creative process in the upper stream. *Kaizen,* relating closely to implementation of project(s), is the subsequent process thereafter, which the contractor may collaborate with as a partner. The final process is the operation and maintenance, which is occasionally taken over by divisional organizations, after which the project is deemed to be terminated.

The sophisticated distinction arises in project termination, because the true end is the recovery of invested capital in terms of the owner's view.

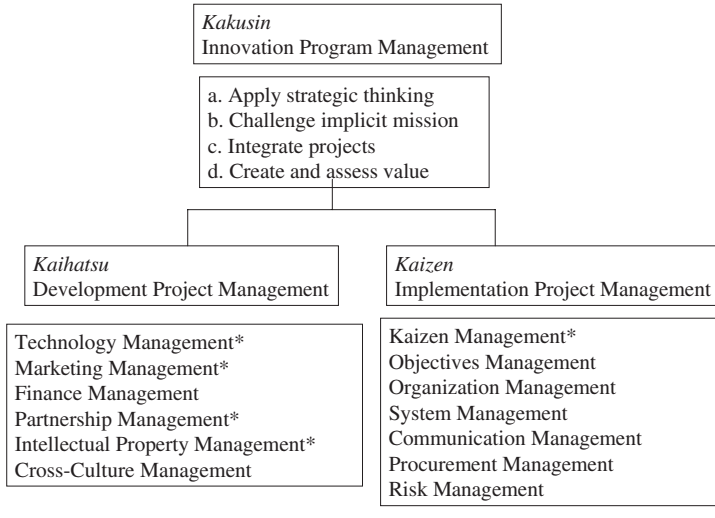

Fig. 3 KPM knowledge framework

Note: P2M version has no classification by 3 K's. Asterisk mark has been newly included in the KPM version.

Kakusin Innovation Program Management (IPM): Being seriously conscious of innovation, the program manager has to perform critical roles on behalf of the owner. To accomplish the job, it is needless to reiterate that higher and broader knowledge has to be covered. In addition to this competency, innovation links and interacts further with plural development projects. Accordingly, organic managing of projects is demanded in the form of integration of horizontal models and lateral projects.

Kaihatsu Development Project Management (DPM): Research and development is a specific form of acquiring new knowledge, system or information. In managing these projects, risk and return are the principal issues of concern. Depending on the project types, probability and lead time are also important parameters to manage. Since development itself is a creative activity, team formation, partnership, collaboration, communication channels and frequency of contacts among members are essential points for managers to control. Some of this knowledge was insufficient in the orthodox type of project management.

KPM supplements the comprehensive knowledge framework hitherto rarely compiled.

Kaizen Implementation Project Management (KIPM): The orthodox type of project management is still dominant, and its scope of knowledge is more or less the same in its intent. Nevertheless, it shall be noted that smaller sizes of software projects in the short-term are increasing in numbers rather than the large, long-term ones of hardware. In KPM, *kaizen* management, thinking and its attitudes have been newly included in the framework to cope with demands for success. In particular, incremental efforts of knowledge stock is extremely useful.

To summarize:

(a) KPM is the advanced version of P2M, linked to corporate strategy and positioned as practical implementation methodology in terms of the owner's view.
(b) KPM intends to explore the framework of enhanced methodology of strategy implementation in the form of the hybrid of lateral and cross-functional collaborations.
(c) KPM may encompass the 3 K's of *Kakusin* (innovation), *Kaihatsu* (development) and *Kaizen* (improvement), the synergetic unity to be challenged.

6 Conclusion

In project management paradigm, systems thinking is in the background. In particular, the large complex of the technical system had been the first choice since system engineering took part of the domain. As repeatedly explained, the orthodox project management had been colored by closed system thinking. Unless the value premise is given, the contractor and system engineers would be at a loss as to where to go.

Emerging technology has changed the environment. Technology has penetrated and become essential engines for productivity and digital transformation, resulting in the interaction among open systems. Undoubtedly, paradigm shift is mandatory whenever technical system is used for business purposes.

P2M had steered the first step in Japan by publishing the first standard guidebook in 2001. In the lapse of eight years, the orthodox type is still dominant, but high-performing enterprises have started shifting from the contractor's view to the owner's view. The knowledge framework of the newest version has been presented and the subsequent applications further detailed in this paper.

Acknowledgments

The author is delighted to thank World Scientific Publishing, Yasuhiro Monden (Professor Emeritus at Tsukuba University and Professor at Mejiro University) and Takayuki Asada (Professor at Osaka University) for the opportunity to publish on contemporary Japanese project management. My appreciation is also extended to Professor Yamamoto of Hitotsubashi University for his precious advice.

References

Caupin, G., Knopfel, H., Morris, P., Motzel, E., and Pannenbacker, O. (1999). *IPMA Competence Baseline*, IPMA.

Deguchi, H. (2004). Organizational failure assessment and landscape learning, *Organizational Science* 38, pp. 29–39 (in Japanese).

Duncan, W. R. (1996). *A Guide to the Project Management Body of Knowledge,* PMI.

ENAA (Engineering Advancement Association Japan) (2008). *Engineering Industry Fact Survey* (in Japanese).

Kinoshita, T. and Urata, S. (2000). Asian economy — Challenge to risk, in *Economic Development of East Asia and International Capital Flow,* Keiso Shobo, pp. 17–72 (in Japanese).

Loucopoulos, P. and Karakostas, V. (1998). "System Requirements Engineering" Wilhelm Scheer "Aris Business Process Framework" "Aris Business Process Modeling" Springer Verlag Heidelber.

Morris, P. (1997). *The Management of Projects*, London: Thomas Telford.

Nakamura, K. (2003). *Unoperatable Computor, Research on Information System Failure,* Nikkei BP Computor (in Japanese).

Ohara, S. (2000). Reform of Asian economy and roles of entrepreneurs, in *Economic Development of East Asia and International Capital Flow,* Keiso Shobo, pp. 109–148 (in Japanese).

Ohara, S. (2002). *P2M, Project and Program Management for Enterprise Innovation,* ENAA (Engineering Advancement Association Japan)/PMCC (Project Management Certification Center Japan).

Ohara, S. (2006). Mission-driven approach (MDA) of managing complex projects — Demystifying the new framework and its background, *Journal of International Association of Project & Program Management* 1(1), pp. 61–70.

Yamamoto, H. (2006). Methods of sharing information about IT system construction in strategic program management, *Journal of the International Asssociation of Project & Program Management* 1(1), pp. 11–20.