

# Proposal of Continuous *Mieruka* Activities in the IT firm

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**Abstract.** Although IT (Information Technology) is being introduced much more widely to our social and economic activities, Information-technology Promotion Agency (IPA) reports that IT defects broadcasted by Japanese news media are increasing and Standish point out that worldwide failure rate of IT project has not improved in many years. The goal of this paper is to identify subjects to improve the achievement rate of quality, cost, and delivery goals of IT projects (ARP) and show how to move forward to resolve the subjects. This paper clarifies an actual situation of the IT firm by analyzing data not only from legacy IT project surveys but also a new survey conducted by IPA, which investigate IT project performance as well as the performance environment of IT companies. By comparing the IT actual situation and Toyota's situation which keeps continuing product improvement activities, we clarify the subjects to improve the ARP not only by IT project managers but also by their organizations. Furthermore, considering that IT is applied to enterprise area as well as embedded product area and integrated area of the both IT technologies, promoting the following activities named *Mieruka* is proposed to improve the ARP for IT vendor/user companies as well as embedded product manufacturing companies and associations related to these companies.

- 1) Research activities to develop tangible tools, whose specification had been defined by IPA, based on tacit knowledge in expertized IT project managers, which may disappear sometime (e.g. after their retirements).
- 2) Activities to propagate the tools and let the tacit knowledge be transferred to younger generations.
- 3) Organizational activities to promote project managers as well as their company organizations and associations to participate in the above activities, which Toyota have continued practicing as *Mieruka* activities for tens of years, and make them continue also in the IT firm.

**Keywords:** IT, Visualization, Project Performance, Organizational Project Management

## 1. INTRODUCTION

The national GDP is said to be raised by increasing IT investment and applications (MIC. 2004). Therefore, it is required for IT development projects (IT projects) to achieve their goals for quality, cost, and delivery (QCD) to meet with the growing IT investment nowadays when our society widely introduced IT systems. For better achievement of the project goals, methods for project managers such as PMBOK (PMI. 2013) and ICB (Caupin *et al.* 2006) have been developed. However, the achievement rate of QCD goals of IT projects (ARP) has not improved in many years, according to major surveys of IT projects including reports by Standish Group (Standish. 1994)(Standish. 2015). Moreover, increasing IT defects, which influenced negative effects to our social and

economic activities, are reported in Japan (Figure 1).

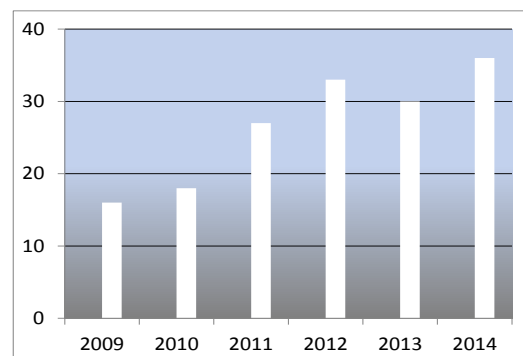


Figure 1: IT Defects/Year Broadcasted by Japanese News Media (IPA Report (IPA. 2014)(Matsuda *et al.*2015)).

It is required that future economic growth may not be hindered by troubled IT projects, which fail to achieve QCD goals. Goals of this paper is to identify subjects to improve the ARP and show how to move forward to resolve the subjects. For the goals, we first discuss the data obtained by surveying actual situation of IT company organizations as well as IT projects. We discuss to clarify subjects based on the data next. We also discuss countermeasures to meet with the subjects, while presenting specific suggestions for IT projects and their company organization as well as IT associations improve ARP.

## 2. DATA FROM SURVEY AND LESSONS

### 2.1 Methodology and Data Obtained

[Methodology]

Two typical legacy surveys, CHAOS by the Standish group (Standish. 1994)(Standish. 2015) and Nikkei BP (Nikkei. 2003)(Nikkei. 2008) are well known to have been measuring the ARP of IT projects. However, they cannot clarify the actual status of projects whose ARPs are not recognized by the company, since both do not collect information for every project within a company. It means that they suffer from the problem that they cannot analyze the relationship between a project and its company’s organization. Any other surveys conducted by industrial organizations and academia (JISA. 2010)(JUAS. 2012)(KPMG. 2005)(Miller et al. 2006)(KPMG. 2010)(Ambler. 2011) also fail to provide any solution to it.

To resolve it, a new survey is proposed, which requires a surveying agency to ask the surveyed companies to provide information about all projects and not exclude projects whose ARPs cannot be recognized by the surveyed organizations. This make it possible to analyze not only project performance (i.e., ARP) but also the performance environment (number of projects whose ARPs are recognized by the organization to the total number of company project, that is the rate of control by corporation (RCC)).

[Data Obtained by analyzing RCC and ARP]

Information-technology Promotion Agency, Japan (IPA) implemented the new survey only twice and reported them at

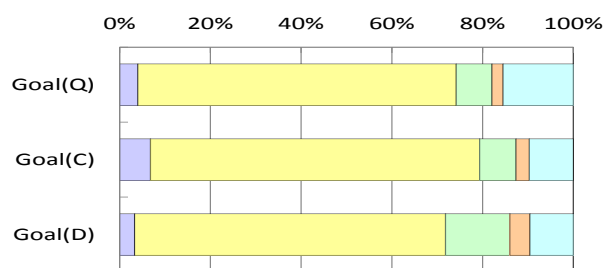
fiscal year (FY) 2011 and FY2012. The IPA website allows any company can obtain questionnaires electronically (IPA. 2011) (IPA. 2012-1) and complete the survey. Based on the responses of companies who voluntarily completed the survey and those who were randomly mailed a hardcopy, reports were made. A sample result from the survey reports (IPA. 2012-2)(IPA. 2013) related to IT project performance is illustrated in Figure2.

Each surveyed company was required to answer how many of their projects fit in the following five categories in the original questionnaire: “PG Exceeded”, “PG Achieved”, “PG Failed to Achieve”, “PG Seriously Failed to Achieve”, and “PG Not Recognized by Organization”. The first four indicate that the organization visualizes and understands specific PGs for their projects, while the last one means that it is unsure of the PGs. Detailed definition can be obtained elsewhere (IPA. 2011)(IPA. 2012-1).

By reclassifying the data into two categories “Organization doesn’t recognize PG” and the rest (“Organization recognizes ARP”, which is summation of “PG Exceeded”, “PG Achieved”, “PG Failed to Achieve”, and “PG Seriously Failed to Achieve” in Figure 2), we can obtain 1)User a) in Figure 3, which indicates the RCC for the user company/FY2011 or FY2012.

You can evaluate how well companies achieved their goals in FY2011 or FY2012 by 1)User b) in Figure 3. In this figure, the data of “PG Exceeded”, “PG Achieved”, “PG Failed to Achieve”, and “PG Seriously Failed to Achieve” totals 100%. Successful projects (“PG exceeded” and “PG achieved”) are shown as “Achieved” in the figure. While, unsuccessful projects (“PG Failed to Achieve” and “PG Seriously Failed to Achieve”) are shown as “Failed” in the figure. The reported success rates (Q-ARP, D-ARP and M-ARP in the figure) of the users in FY2012, which have achieved higher organizational performance (RCC), are larger than that of users in FY2011, with respect to quality, delivery and overall goals.

The RCC and ARP for the vendor company can be obtained in a similar manner. In Figures 3, 2)Vendor data also indicates that , compared to FY2011, the reported success rates of the quality, cost, delivery and mean goals (Q-, C-, D- and M-ARP) in FY2012 increased by increasing RCCs.

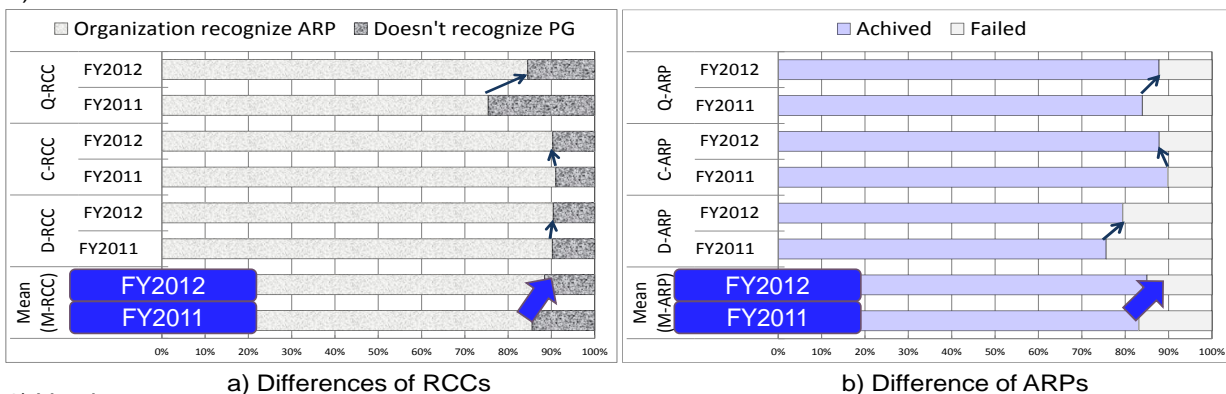


(Note) Goal(Q), Goal(C) and Goal(D): project goals of quality, cost and delivery respectively.

Legend: Planned Goal(PG) Exceeded (grey), PG Achieved (yellow), PG Failed to Achieve (green), PG Seriously Failed to Achieve (orange), PG Not Recognized by Organization (light blue)

Figure 2: Obtained Sample Data Related to IT Project Performance (User. IPA Report (IPA. 2013)).

1) User



2) Vendor

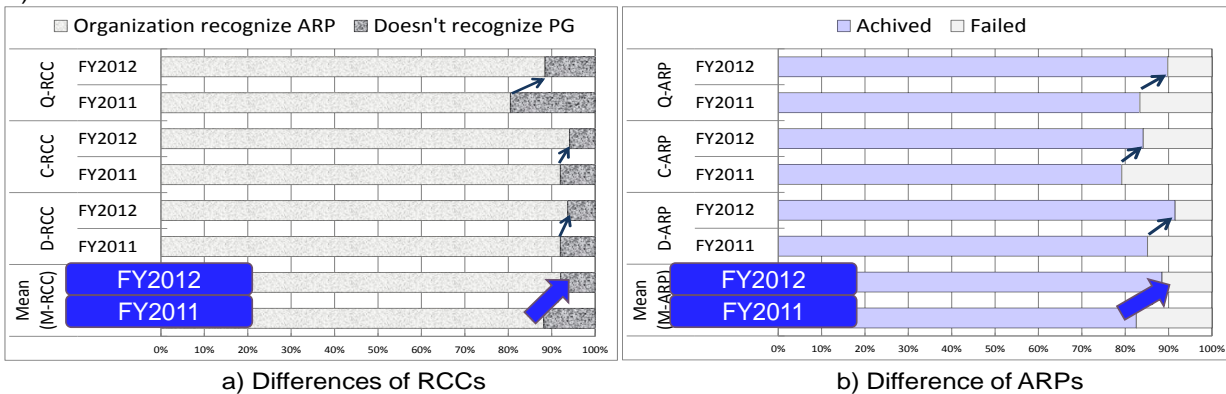


Figure 3: Differences of RCCs and ARPs

2.2 Identifying Organizational Subjects

*Kaizen* (Imai, 1986) is well known activities to improve products in Toyota. Incidents such as product line halts are immediately shared with executive managers by field operations at Toyota. Which phase is abnormal and the current status of the product line are also displayed by systems. Such organizational activities for visualization are called *Mieruka* (Endo, 2005). [*Mieruka* is just a concept but not a model which is applicable to any firms other than automobile industry. For example, a specific method is necessary to practice the *Mieruka* activities in IT projects, which had already been discussed in past conferences (Ohtaka et al. 2008) (Ohtaka et al. 2008)]. It becomes possible for the executive managers to have a greater opportunity to participate in fieldwork and support field persons to solve problems and improve quality

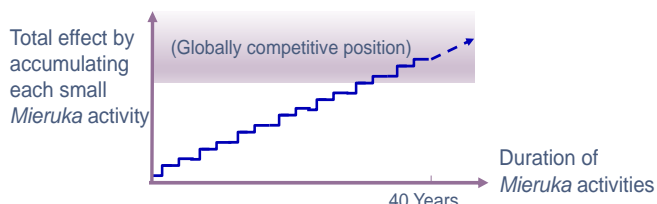


Figure 4 Incremental Improvement by *Mieruka*

and productivity by the *Mieruka*. Such practices to improve the products incrementally have continued for more than 40 years. The stable organizational philosophy to continue the activities without termination made Toyota’s quality and productivity have globally competitive (Figure 4).

From such viewpoint of organizational activity, the companies in the FY2012 group are compared to those in the FY2011 group next as follows. The visualization activity of project’s goals is more advanced in FY2012, since the M-RCC is higher for the FY2012 group compared to the FY2011 group. Thus, hereafter, we call the FY2012 group “group *Mieruka*” (a group of companies where the *Mieruka* activity is advanced in monitoring projects’ goals), while we call the FY2011 group “group non-*Mieruka*” (a group of companies where the *Mieruka* is less advanced compared with group *Mieruka*). Executive managers of IT companies in group *Mieruka* have greater opportunity to monitor projects and their goals with strong *Mieruka*, similar to the Toyota example. Therefore, group *Mieruka* should realize higher and much more competitive ARP, compared to group non-*Mieruka*.

However, since there is no assurance for the activity to continue for more than tens of years like Toyota, question is as follows.

[Subject1] It is not clear who should keep improving such

organizational *Mieruka* activities in IT companies.

Furthermore, although IPA ended the survey at 2013 by expecting private organizations in IT industry to succeed the survey, we cannot see anyone who keeps practicing the survey and providing such data for future improvement of IT.

On the contrary, Toyota has an organizational philosophy stable enough to continue the *Mieruka* activities, which surveys actual situations of field works inside Toyota for more than 40 years without termination. Endo(2005) point out the reason that total activities by accumulating each small *Mieruka* activity incrementally for more than 40 years should produce magnificent effects, even if each effect of the *Mieruka* activities contribute to a few percentage improvement, as illustrated in Figure 4. He also says that it is proved by Toyota’s global position today.

Although any organization may continue such *Mieruka* activities for surveying actual situations of IT user/vendor companies, no one actually has such stable organizational philosophy like Toyota in the IT firm. Thus, the second problem is as follows.

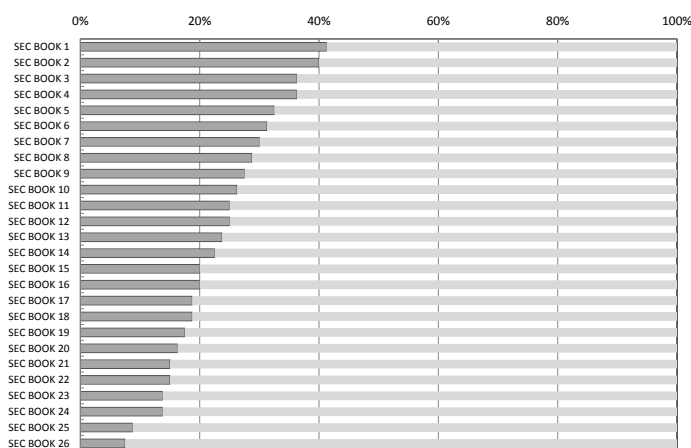
[Subject2] It is not clarified who keeps practicing the proposed survey in the IT firm.

### 3. ADDITIONAL DATA AND LESSONS

#### 3.1 Additional Data Obtained from the Survey

IPA’s Software Engineering Center (SEC) has published many methods so far to improve ARP. The survey mentioned before also obtained data which indicate how many companies use the methods. Each company was asked to select one from several options (“Introduced”, “Referred”, “Under consideration”, “Not decided” and “No answer”) for each of the IPA/SEC methods in the survey questionnaire. Figure 5 (IPA. 2012-2) shows obtained data from vendor companies. In Figure 5, companies which chose “Introduced” or “Referred” are supposed to have already read the corresponding method.

One which are read most among the IPA/SEC methods by the vendor companies (the best seller), is “*Mieruka* (Visualization) of IT Project”(SEC BOOK1 in Figure 5). However, less than 10% of the companies introduced the method as illustrated in Figure 6. Similar facts can be observed in user company survey (IPA. 2012-2).



(Note: ■ Introduced/Referred, □ Under consideration/Not decided/No answer)  
 Figure 5: Ranking indicating how many companies use (introduce or refer) each of IPA/SEC methods (IPA Report (IPA. 2012-2)).

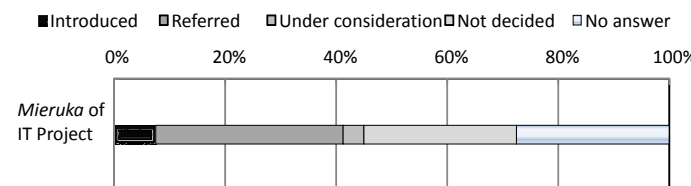


Figure 6: Details of the Best Seller (SEC BOOKS1) in IPA/SEC Publication (IPA Report (IPA. 2012-2)).

#### 3.2 Identifying additional Subject from the Viewpoint of Introduction of Methods to Improve ARP

The best seller method “*Mieruka* of IT project” systematizes tacit knowledge of actual field project managers by three management approaches (qualitative, quantitative and integrated) and provides tangible tools to practice IT project management as illustrated in Figure 7. The method includes management knowledge, which is required to actual prime contractors in the Japanese multi-layer contractor organization, but which is insufficiently covered by CMMI as described in Figure 8. It also includes IT specific management knowledge, which PMBOK do not cover (Figure 9).

Moreover, it is reported that loss by executed unsuccessful projects was reduced by 20% to 30%, after introducing and practicing the method (Ohtaka *et al.* 2008). *Mieruka* is also expected to promote business entries from non-Japanese Asian countries to Japanese prime or higher IT developing market (Ohtaka *et al.* 2009), when it is introduced as described in Figure 10.

Nevertheless, it is difficult to say that activities to propagate the method is sufficient, since approximately 60% of the companies have not even referred the method and

more than 90% of the companies have not introduced the method, since the method have been introduced only less than 10% of the companies. This indicates that it is necessary not only to propagate the method but also to support companies much more to introduce the method by transferring knowhow of the method.

Since IPA has less resources to practice it at present,

*Mieruka* systematizes tacit knowledge of actual field PMs and provides tools to practice IT project management.

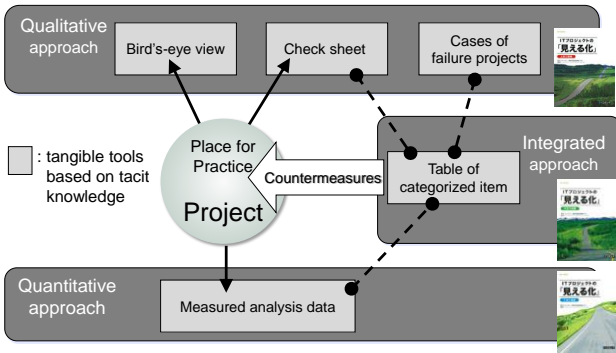


Figure 7: Feature of *Mieruka* of IT Project (1).

particularly after closing organizations or sectional meetings related to *Mieruka* of IT project and another activities, private organizations are asked to take role of IPA's activities now. Question is as follows.

[Subject3] It is necessary to clarify who takes a part of the mission of promoting the method to be introduced sufficiently in the IT firm.

*Mieruka* includes management knowledge, which is required to actual prime contractors in the Japanese multi-layer contractor organization, but which is insufficiently covered by CMMI.

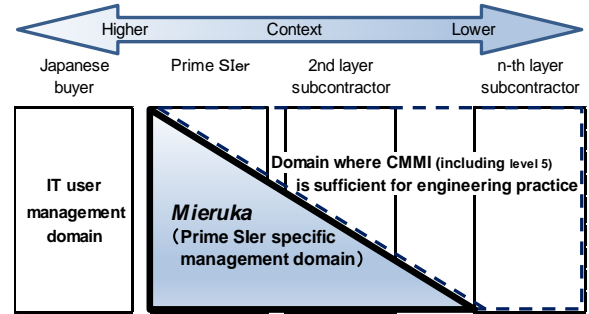


Figure 8: Feature of *Mieruka* of IT Project (2)

*Mieruka* includes IT specific management knowledge, PMBOK do not have.

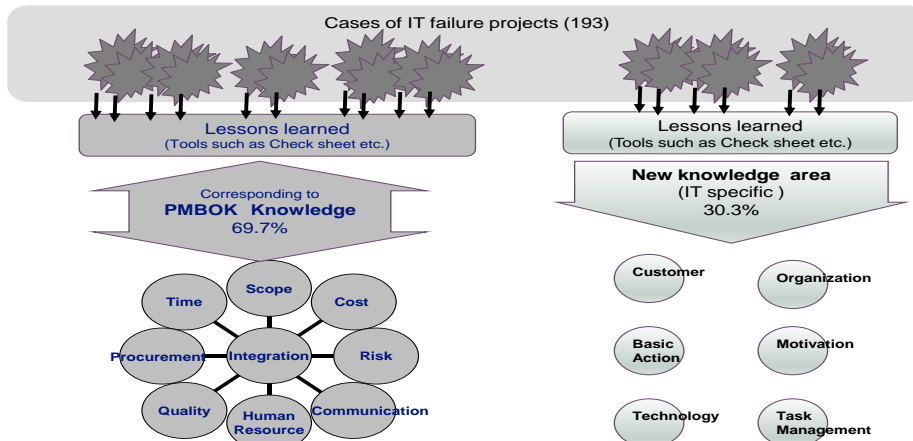


Figure 9: Feature of *Mieruka* of IT Project (3).

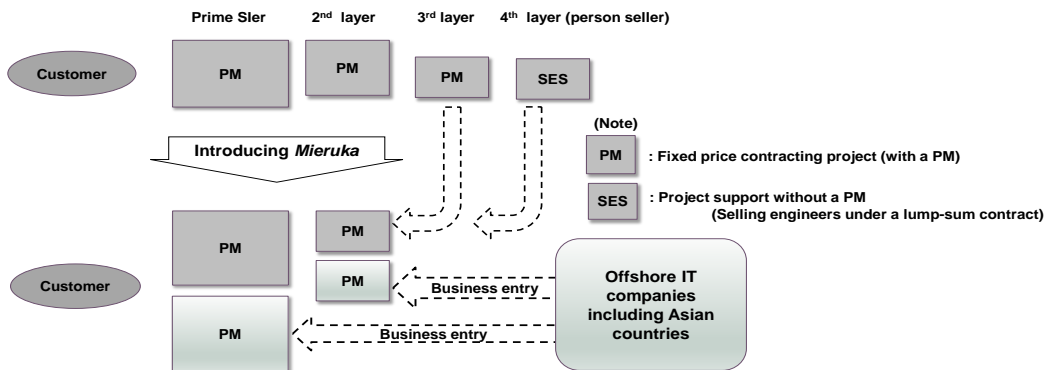


Figure 10: Feature of *Mieruka* of IT Project (4).

### 3.3 Identifying the Last Subject from the Viewpoint of Tacit Knowledge for Improving ARP

The *Mieruka* of IT project aggregates tangible tools from tacit knowledge of experienced field project managers in IT industry, as shown in Figure 7. Many organizations in IT industry should have such tacit knowledge for IT development. A role of practicing activity to aggregate such tangible tools based on tacit knowledge (, hereafter *Mieruka* activity) had been taken by IPA. However, we can hardly observe such activity any more now, particularly after IPA closed the sectional meetings related to *Mieruka*.

Negative spiral may have been activated as follows. After changes including retirements of experts, tacit knowledge in IT experts acquired by field experience begun to disappear, which had not been aggregated by IPA's *Mieruka* activity. This might have been be a cause of increasing IT defects in Figure 1, since loss of the tacit knowledge for preventing IT defects increases reproduction of IT troubles. It is also probable that this has caused less improvement of ARP for a long time in the Standish reports (Standish. 1994)(Standish. 2015). Loss of such tacit knowledge may continue increasing, if no countermeasure is taken.

Another question is as follows, since IPA/SEC already ended almost all of its activities to improve ARP, by expecting some private organizations to take the role to keep aggregating and transferring such tacit knowledge to tangible tools.

[Subject4] Nobody takes leadership to continue IPA's *Mieruka* activities like Toyota's *Mieruka* in IT firm.

## 4. COPING WITH THE SUBJECTS

IT may applied to much more widely to our social and economic activities such as healthcare, energy, transportation or agriculture in the future. IT may be introduced not only to legacy information systems in enterprise user/vendor companies but also to various manufactured devices by embedding software inside them. Particularly growing market of IoT (Internet of Things) estimated by IDC Japan (IDC. 2015) requires manufacturing companies, which adopt embedded software in their products, to improve the ARP.

If the ARP of IT projects can be improved, then IT facilities may be increased by reducing projects, which could not satisfy QCD requirements of IT system facilities. This may increase the GDP as have been reported beginning at 2004 (by Ministry of Internal Affairs and Communications, Japan (MIC, 2004)) and even at present (by Accenture (ZD. 2015)). Increasing the GDP may also expand future business of IT companies (enterprise user/vendor companies as well as manufacturing companies) by getting much orders for IT service, IT systems or embedded products. Therefore, those who support the above idea are suggested to practice as follows.

#### 1) IT Companies

While each project manager is in charge of the ARP of each project, the executive manager, who is responsible long-term business goals for the company, should control the project environment to meet each project's goal. The following organizational project management should be implemented and should be kept practicing in IT companies by the executive managers to improve business.

- a) Take advantage of increased QCD information of each project by increasing the overall RCC.
- b) Direct field IT projects to introduce effective methods such as "*Mieruka* of IT project".

#### 2) IT Associations

Associations related to user/ vendor companies or manufacturing companies of embedded products are required to implement the followings for supporting IT companies to improve their ARPs.

- a) Keep providing necessary data to IT companies for their continuous improvement of ARP by implementing survey similar to IPA's. The IPA survey results involve achievement status of QCD project goals, performance environment and other potential keys to improve ARP (IPA. 2012-2)(IPA. 2013). Continuing such activities by the associations may contribute to increase ARPs, IT facilities in IT companies and develop the organizations their selves.
- b) Enhance the survey to meet with offshore development. Such development may be ordered not only by primary vendor companies but also by user companies directly in the future. Much more important keys to improve ARP may be obtained for implementing Plan-Do-Check-Action (PDCA) loop, by extending the survey from domestic to international one.

#### 3) Both of IT Companies and IT Associations

The government organization IPA had took a role to practice the *Mieruka* activity and created a system for aggregating tacit knowledge and share them in tangible information to increase ARPs of IT goals. However, IPA less takes the role anymore at present. Compare to Toyota, which has been practicing the *Mieruka* activity for more than 40 years, no one practices continuous *Mieruka* activity in IT industry. Thus it is necessary to create the system again, which we call IT *Mieruka* system and show in Figure 11.

IT *Mieruka* Institution (ITMI. 2015) was established by re-organizing former members of IPA/SEC sectional meeting of *Mieruka* to take leadership to create such IT *Mieruka* system for IT industry. Since the activities started this year, if IT experts participate in activities in the system to develop tangible tools and use the aggregated tools sufficiently, the negative spiral mentioned in previous section is expected to change to the positive spiral by reducing IT troubles.

Moreover, Accenture reports that estimated GDP can enlarged 1.2% at 2030, if planned investment for industrial IoT



is increased as much as 50%, and if the corresponding IT products are successfully developed in Japan. It also says that estimated GDP can enlarged 2.3% at 2030, by executing the same plan in US (ZD. 2015).Such estimated dreams by Accenture and IDC Japan (IDC. 2015), which is illustrated in the bottom of Figure 9 cannot come true, if IT development

projects fail. To make the dreams come true, we should improve productivities of developing IT products and systems, by continuing *Mieruka* activities and developing them.

Thus, IT companies are required to promote IT experts to participate in such *Mieruka* activities and IT associations are expected to support such activities.

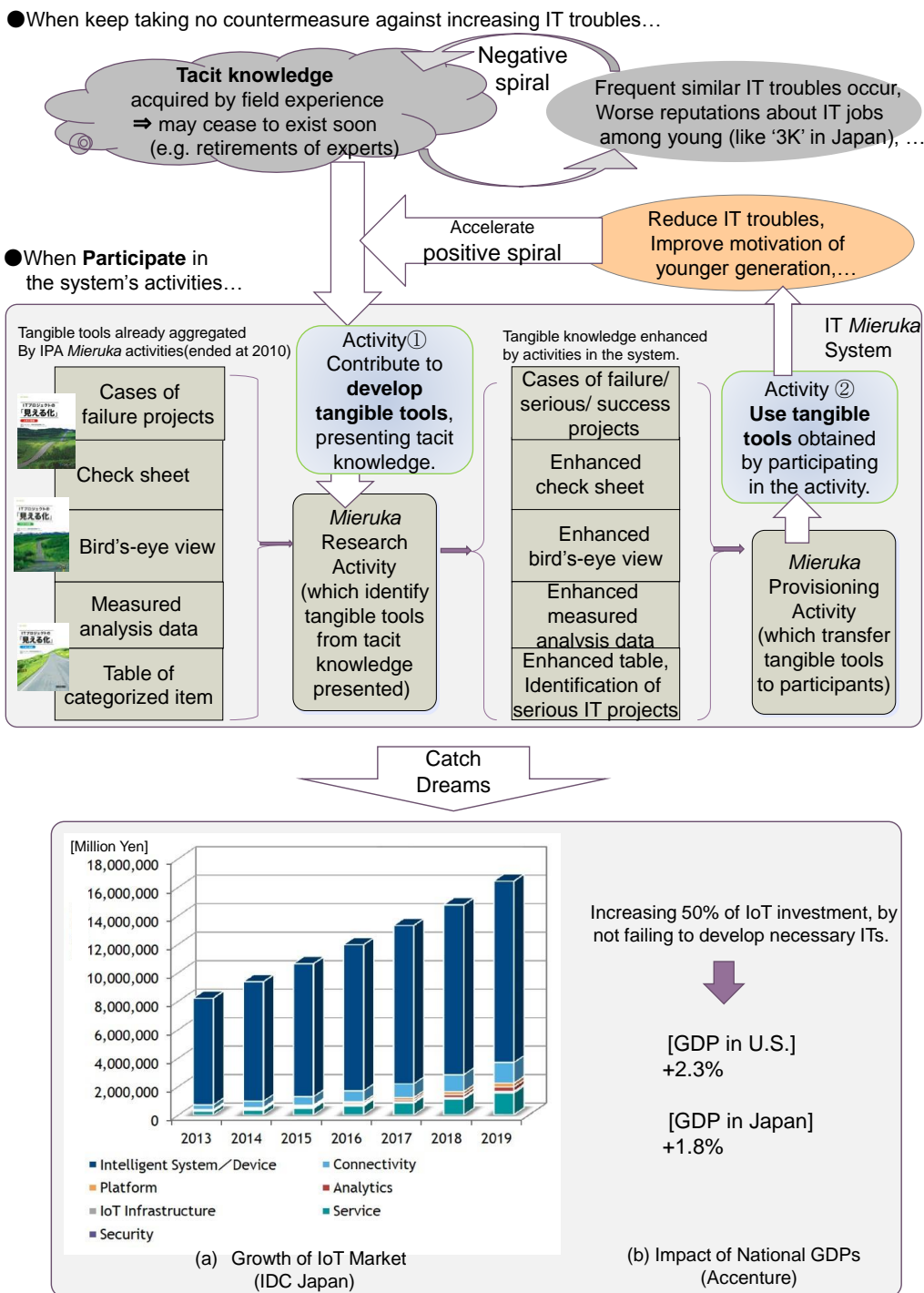


Figure 11: Proposal of “IT Mieruka System”.

## 5. CONCLUSION

To enlarge GDP by increasing investment for IT including growing industrial IoT, it is necessary to develop corresponding IT products and systems successfully.

We showed specific examples and features of IPA's method "Mieruka of IT projects", which aggregated tangible tools based on tacit knowledge of IT project experts to improve success rate of IT projects (ARP). After that, we proposed to promote and practice continuous *Mieruka* activity, which aggregates much more tangible tools based on wider tacit knowledge of experts in the IT *Mieruka* system.

To increase ARP, we suggest IT companies as well as associations related to IT projects to promote *Mieruka* activity by participating in it. We also recommend executing the following practices.

[IT companies]

Organizational project management should be provided by executive managers in IT companies to increase RCC. Effective methods such as "Mieruka of IT project" should be promoted to be introduced to field IT projects in IT companies to improve ARP.

[Associations related to IT projects]

The proposed survey demonstrates that it valuable lessons to improve ARP. However, the government agency in Japan ended it. To promote *Mieruka* activities, Japanese experiences of the survey as well as aids from association around the globe is necessary to continue the survey.

After the government agency in Japan ended the *Mieruka* activity, continuation of the activity is now the responsibility of private organizations related to IT. A nongovernment association ITMI was established and started the *Mieruka* activity this year. Supporting the above practices and expanding activities in ITMI is our missions in the future.

## REFERENCES

- Ambler S. W. (2011) 2011 IT Project Success Rates Survey Results.  
<http://www.ambysoft.com/surveys/success2011.html>.
- Caupin G., et al. (2006) *ICB IPMA Competence Baseline, Version 3.0*, IPMA, UK.
- Endo I. (2005) *Mieruka*, Toyo-Keizai-Shinbun-Sha, JP.
- IDC Japan. (2015) Report of IoT (Internet of Things) Market in Japan.  
<http://www.idcjapan.co.jp/Press/Current/20150205Apr.html>.
- Imai M. (1986) *Kaizen: The Key to Japanese Competitive Success*, McGraw-Hill, US.
- IPA. (2011) Question-Answering Sheets for Software Industry Survey 2011.  
<http://sec.ipa.go.jp/reports/20111212.html>.
- IPA. (2012-1) Question-Answering Sheets for Software Industry Survey 2012.  
<http://sec.ipa.go.jp/reports/20120907.html>.
- IPA. (2012-2) Report of Software Industry Survey 2011.  
<http://sec.ipa.go.jp/reports/20120427.html>.
- IPA. (2013) Report of Software Industry Survey 2012.  
<http://sec.ipa.go.jp/reports/20130426.html>.
- IPA. (2014) Summary of Lessons Learned for Reliable Information Systems –IT Service Cases-.  
<http://www.ipa.go.jp/sec/reports/20140513.html>.
- ITMI (IT Mieruka Institution). (2015) About ITMI,  
<http://www.it-mieruka.com/>
- JISA (Japan Information Technology Service Industry Association). (2010) Report of Survey of Technical Trends in IT Service Industry.  
<http://www.jisa.or.jp/committee/2009/prj/spes.html>.
- JUAS (Japan Users Association of Information Systems). (2012) *Software Metrics Survey2012*, JUAS, JP.
- KPMG International. (2005) *Global IT Project Management Survey*, KPMG International, SZ.
- KPMG New Zealand. (2010) *KPMG New Zealand Project Management Survey 2010*, KPMG New Zealand, NZ.
- Matsuda K. and Yashima S. (2015) IT Deffect Report, *SEC journal* No.40, Vol.10 No.6, Mar 2014,44-47.
- MIC (Ministry of Internal Affairs and Communications). (2004) Reports Regarding Economical Analysis of IT.  
[http://www.soumu.go.jp/johotsusintokei/linkdata/it\\_keizai\\_h16.pdf](http://www.soumu.go.jp/johotsusintokei/linkdata/it_keizai_h16.pdf).
- Miller M., Bradley M., Dawson R. and Miller K. (2008) New Insights into IT Project Failure & How to Avoid IT, *Proceedings of IPMA World Congress*, IPMA.
- Nikkei Computer. (2003) *Investigation of Actual Situation of IT Investment*, Nikkei BP, JP.
- Nikkei Computer. (2008) *2nd Investigation of Actual Situation of Projects*, Nikkei BP, JP.
- Ohtaka H. and Nagaoka R. (2008) Visualization of IT Project -Mieruka -, *Proceedings of ProMAC*.
- Ohtaka H., Mitani Y. and Fukazawa Y. (2009) A Proposal for Applying the *Mieruka* of IT Project to Non Japanese Asian Countries, Serial Session (Special Lecture2), *Proceedings of ProMAC*.
- PMI. (2013) *A Guide to the Project Management of Knowledge (PMBOK) 4th Ed.*, PMI, US.
- Standish Group. (1994) *CHAOS Report*, Standish Group, US.
- Standish Group. (2015) *CHAOS Report*, Standish Group, US.
- ZD Net Japan. (2015): Industrial IoT will raise GDP 2.3% in U.S. - 1.8% in Japan- : reported by Accenture.  
<http://japan.zdnet.com/article/35059357/>.