

## IDENTIFYING ORGANIZATIONAL ISSUE FOR DIGITAL TRANSFORMATION BY AN ANALYSIS BASED ON *KAIZEN*

**Hiroshi OHTAKA**

IT *Mieruka* Institute, Tokyo, Japan,  
otaka@mail.goo.ne.jp

**Motomu KOUMURA**

IT *Mieruka* Institute, Tokyo, Japan,  
koumuram@system-swat.co.jp

**Masahiro ISOKAWA**

IT *Mieruka* Institute, Tokyo, Japan,  
credit-si@tokyo.zaq.jp.

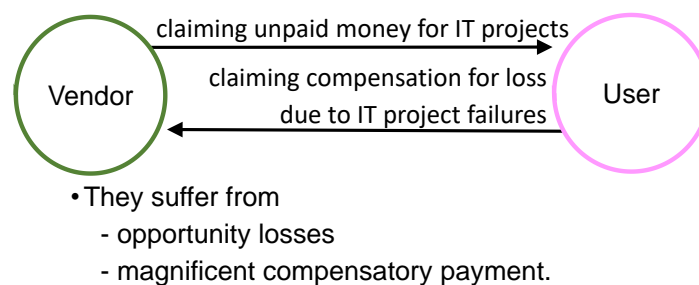
### Abstract

Digital transformation requires utilizing information technology (IT) system as well as collaboration between IT vendor and IT user. However, we have been observing disputes between the users and the vendors to compensate for individual loss due to failures of IT projects (IT disputes), which waste tremendous resources and opportunities. Nevertheless, not only root causes of IT disputes, but also why they failed to avoid the disputes, are not clear in most cases. The business risk caused by such IT disputes has been difficult to be visualized sufficiently enough to avoid the same dispute in the future. This paper tries to make it possible for them to manage the business risk of the IT disputes by visualizing the risk. By applying a new method based on *Kaizen* to analyze IT dispute cases of actual IT projects, where recent technologies of package software and agile are introduced for quick response to individual new challenge, we specify individual root cause and visualize a business risk, whose threat has not been understood by organizations. Furthermore, we also discuss development of improved management to cope with the threat of the visualized business risk, from the aspect of organization.

**Keywords:** Business Risk, IT Dispute, Case Analysis, IT System Development, Organizational Project Management

### 1. Introduction

Digital transformation or other new challenges may not be achieved quickly and sufficiently, without collaboration between vendor and user of information technology (IT) system. However, we have observed disputes between the users and the vendors to compensate for individual loss due to failures of IT projects (, hereafter IT disputes) as illustrated in Figure 1.



**Fig. 1** IT dispute due to project failures

When such disputes occur, both user and vendor consume tremendous resources and times to search and explain many evidences for proof, and they suffer from opportunity losses which could be avoided if they did without the IT disputes, even when winning a case. And when losing a case, one suffers from magnificent compensatory payment. Such IT dispute is becoming a major business risk, since it hinders the challenges and sometimes threaten business continuity of company organizations.

Nevertheless, not only root causes of IT disputes, but also why and how their companies failed to avoid the disputes, have not been clear in most cases. Just like IT systems are difficult to be visualized, business risk caused by such IT dispute has been also difficult to be visualized sufficiently. Meanwhile, we have observed similar disputes again and again.

This paper tries to make it possible to manage the business risk of the IT disputes, by visualizing the risk for the user and vendor companies to avoid the risk.

First, by reviewing legacy methods, we clarify that they have failed to specify root cases of the IT disputes and have failed even to show why and how the disputes occur. A new approach is necessary to analyze IT dispute cases. Thus, we present a new method to analyze project cases based on *Kaizen*.

We next apply the method to analyze IT dispute cases which occurred after abort or tremendous cost overrun in recent IT projects, where package software products or agile technology is introduced for quick response to new challenges. We also specify individual root cause and visualize a business risk, whose threat has not been understood and has been overlooked by organizations.

Furthermore, by investigating previous products of societies of project management, we clarify that they have not considered such risk so far. We also discuss development of improved management to cope with the business risk from the aspect of organization.

## **2. Previous Methods for Project Case Analysis**

We review the following methods for analyzing project cases, and verify whether they have specified cases of the IT disputes or not.

Quantitative methods have been practiced mainly by academia. For example, Furuyama, et al. [2] have many empirical research achievements to prove recommended processes for IT project managers to practice, by statically analyzing disclosed quantitative data of actual development project cases, while the cases themselves are closed. They analyzed data of successful project cases as well as some project cases with minor problems. However, data of serious problem projects (, hereafter SPPs) like IT dispute cases, are excluded in their statistical analysis, because a book which provided the data source [3] says that if difference between the data and the mean value exceeds the limit, then they are treated as statically singular point (quite rare cases). Quantitative approach by Furuyama and other recent researchers such as Serrador and Pinto [18] have not clarified any root cause nor business risk of IT dispute so far.

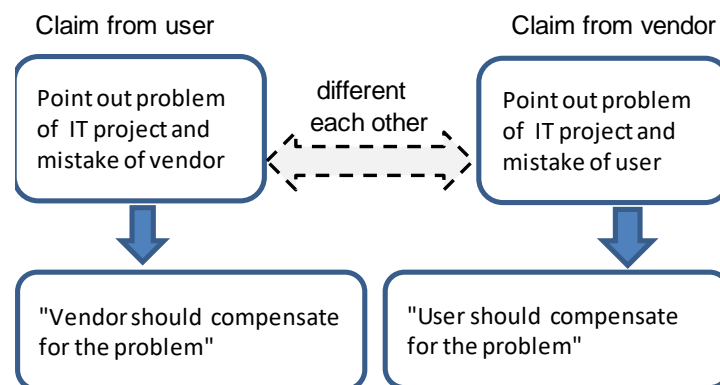
On the other hand, qualitative methods have been conducted mainly by practitioners. Smith [19, 20] proposed that troubled IT projects should have originated from 40 causes, by analyzing cases of many troubled projects. However, since he did not disclose the cases, there is no assurance of his proposal. Moreover, there is also no assurance that SPPs including IT dispute are involved in the analyzed cases. Other than above, there have been qualitative case analysis, including Yeo [23] and Sutterfield, et al. [22], Nikkei Computer [11] and Standish [21]. However, any of them have the following problems.

- We cannot expect that the root cause of IT dispute may be identified by them, since they have not focused on SPP cases.

- The validity of their proposal lacks proof, unless the analyzed cases are disclosed. They lacked efforts to disclose them by excusing that it may harm personal and corporate privacy.

Moreover, most of suggestions based on these qualitative analysis lack specifics. For example, “the management should be involved in IT project” is often suggested, however the management cannot recognize what specific business risk should be focused on, what actions should be made to avoid the risk and when the management should participate in IT project. Since the analyzed cases have not been disclosed, they have failed to visualize the risk sufficiently enough to show why and how the risk occurred and to suggest how to avoid the same troubles.

It is IPA (Information-technology Promotion Agency, Japan) that first disclosed problem project cases with which vendor project managers can recognize project risk and understand how the same troubles can be avoided. IPA aggregated 193 raw cases mainly from vendors and disclosed necessary information of them, by concealing harmful privacy information, while preserving facts that indicate what cause made what problem in the individual original case [4, 6, 7, 8]. 97 SPP cases, which caused magnificent influence to the management, are included in the 193 cases. By analyzing the SPP cases, research advanced to *Mieruka* (visualizing the risk symptom and to suggest who should and how to avoid the SPPs [12, 13] like Toyota’s *Mieruka* activities to make troubles and risks to be manageable) much specifically than legacy methods mention before. However, in IT dispute, user and vendor have different idea each other, regarding problem, mistake and causal relation between them. Thus they have different claims regarding cause (who is responsible) as illustrated in Figure 2. Since the IPA cases lacks such information, it is difficult to specify which one of user and vendor is true and what is root cause of IT dispute.



**Fig. 2** Example of IT dispute case which the previous methods have failed to analyze

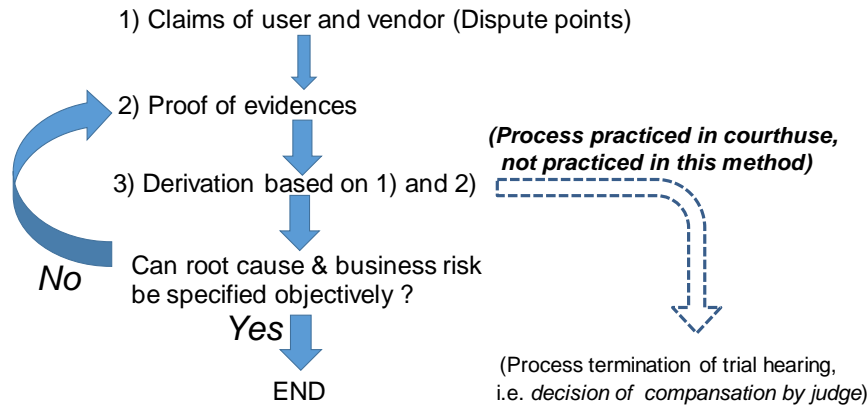
### 3. New Methodology

To resolve failures of previous methods, we need a new method that analyze cases objectively by obtaining sufficient information from both of vendor and user as shown in the following three steps as illustrated in Figure 3.

- 1) Conflicting claims of user and vendor
- 2) Evidences that both user and vendor acknowledged
- 3) Derivation based on the evidences without filtering

Specifically, causes of IT dispute and process until the dispute occur are objectively identified, based on all of the fair evidences. In particular, IT *Mieruka* Institute (ITMI) obtained two cases contributed spontaneously by members of ITMI, who have rich experiences of IT development in vendors and users and also had been members of sectional meeting in IPA. After applying information processing similar to IPA’s (limiting disclosure

by concealing harmful privacy information in the cases to satisfy mandatory privacy requirements from vendors and users) to individual case, we obtained the processed fact information (abstract of the case, 1) dispute points (claims of user and vendor) and 2) acknowledged evidences) as well as 3) derived results from the claims and the evidences.



**Fig. 3** New method for IT dispute case analysis

Note that, although courthouse practices similar process, the process differs from that of the new method, which does not terminate analyzing process until root cause and business risk are specified by introducing a junction point to judge termination of the analysis, as illustrated in Figure 3. On the contrary, in current courthouse, it is probable that process can be terminated when judge believe it even if the root cause is unclear, since mission of courthouse is to make judgement of claimed compensation. This may have been allowing similar IT disputes occur again and again due to the unidentified business risk. On the contrary, in the new method, the proof of evidences is continued until the root cause is identified for preventing similar IT disputes. The new idea is based on *Kaizen* (spontaneous activity self-organized in Toyota, which keeps asking “why?” until root cause is identified).

#### 4. Analysis of IT Dispute Cases

##### 4.1 Case1 (IT Project Which Introduced Package Software Technology)

[Abstract]

User P had a system development plan which provides a new service and presented the system requirement to vendor Vp. Vp made a proposal to develop the system by introducing Vp’s own package software and present the development price, based on an assumption that the package software satisfy the requirement and Vp can reduce the development cost. Vp received the order. However, while developing the system, Vp became to be aware of necessity to develop additional software much more than it expected, since the package software does not satisfy P’s full demand. Vp claimed to a large amount of pay for the additional cost for developing the additional software to P, however, P refused to pay for it.

[Dispute points (claims of user and vendor)]

Claim of Vp: Our proposal clearly states that the system should be developed by introducing our software package, and we received the order on the condition that you acknowledge the proposal. The increased development cost should be paid by L.

Claim of P: We selected Vp as a vender that committed to realize our requirement with the best price. Our requirement does not involve introducing the package software. Since Vp has been ordered by the fixed contract, Vp should pay for the increased cost.

[Acknowledged evidences (Ev1-Ev3)]

Ev1: Vp had a company rule, which any sales person should not present proposal of contract with price to user, unless the sales person and the sales person clarify the price accompanied with corresponding development cost, which is estimated by engineer.

Ev2: All skilled engineers of Vp had been already assigned to other projects for other customers. A responsible upper manager told the sales person to make an approval document for the contract with P, by fulfilling a name of other engineer, who have less skill of the package software, as a responsible person estimating development cost in the document.

Ev3: The engineer practiced Fit&Gap analysis by comparing between functions of the package software and the functions written in the requirement of P, before the sales person make the proposal to P with price estimation. However, since the engineer had less skill, the analysis were not sufficient to clarify difference of business flows provided by the package software and the flows that meets with critical business process, which were not specified in the requirement of P. The difference, which had not been considered by the engineer, caused increased amount of Gap and additional software development, after the contract.

[Derived results from the claims and the evidences]

1) Ev1 and Ev2 shows that Vp have a junction system, based on the company rule for sales person and the approval document, for avoiding troubles by leaving all the decision-making of proposal or contract to sales persons. And Ev3 shows that the sales person and the engineer practiced without provoking the rule of Vp, before getting approval for the contract.

2) Although skilled engineer could not be assigned for cost estimation, the upper manager did not give up proposing and let the sales person to receive order contract from P. Accompanied with insufficient requirement of P, this also caused increase of development cost and corresponding dispute.

#### **4.2 Case2 (IT Project Which Introduced Agile Technology)**

[Abstract]

User W, who had wants to create new business and service and had to remake existing IT system, ordered vendor Vw to develop a new system by agile. However, the agile project could not present any achievement expected by W. W decided to abort the project and told Vw to cancel the agreement of the order. Vw claimed the unpaid money to W.

[Dispute point (claims of user and vendor)]

Claim of W: Vw promised that its agile technology can develop a desirable system for W, before the contract. However, systems developed in every iterations in the agile project of Vw, had been differ from one, which realizes new business and service that W desired. W do not need to pay for Vw, who broke promise.

Claim of Vw: W ordered Vw to develop the system after agreement of semi-delegation contract. Therefore, W should pay Vw as much cost as the resources that Vw consumed for the agile project.

[Acknowledged evidences (EV4-EV7)]

EV4: The management of W requested IS (department of information system) in W to realize new system for new business and services. However, IS has insufficient resources and skill to cope with the request.

EV5: A sales person of Vw proposed IS of W to order system development to Vw, while insisting rich achievements of agile development projects executed by Vw, and explaining “Our agile technology can drastically shorten development period than legacy water-fall based development, while realizing a system desired by user. Moreover, Vw takes care of everything required to execute agile project, even if user has no experience of agile

development. User is just requested to acknowledge deliverables in every iterations, which are provided from team leader of agile project assigned by Vw”.

EV6: IS of W, with less experience of agile development, believed quick renewal of existing system, and got approval of the contract from the management of W.

EV7: After the contract agreement, the sales person of Vw resigned and got a new job in another company. However, no history of his sales proposals were preserved in Vw organization. The management of Vw did not take any control of sales activities, although he did as far as technical activities of IT projects are concerned.

[Derived results from the claims and the evidences]

1) Although agile has potential to shorten development period, by deterring requirement definition more quickly in its iteration process, it is not a magic, which can be applied to every cases unconditionally. It's a mandatory condition that user takes role of requirement definition, which are usually took by project owner (PO) in agile project. If the condition is not satisfied and user leaves all works of PO to vendor, there is no assurance that the agile project achieve its objective. Actually, EV4, EV5 and EV6 show that agile project could not achieve its objective and just repeating iterations, since W left most of works of requirement definition to Vw. It is thought that the agile project aborted because W did not take role of requirement definition itself.

2) EV5 and EV7 show that the management of Vw just left most of works of getting order from W to the sales person. After he tried to somehow complete the sales mission, “uncontrollable sales” occur, where his proposal become a magic that allowed IS of W to understand that IS has less obligation to define requirement, if the proposed contract is agreed. If the “uncontrollable sales” was controlled by organization of Vw, trouble due to agile project, which is self-organized without involving PO in it, and IT dispute could be avoided.

### 4.3 Summary

Each cause and each trigger of the two trouble cases can be summarized as Table1, based on case analysis mentioned above.

**Table 1** Summary of analysis of IT dispute cases

Case	Cause of project abort	Trigger of trouble due to the cause
1	Insufficiently detailed requirement definition by user	Vendor proposed its package solution for user failing to investigate Fit&Gap in user requirement
2	Insufficient skill and resource to define requirement in user	Vendor proposed its agile solution for user to be free from role of requirement definition (product owner)

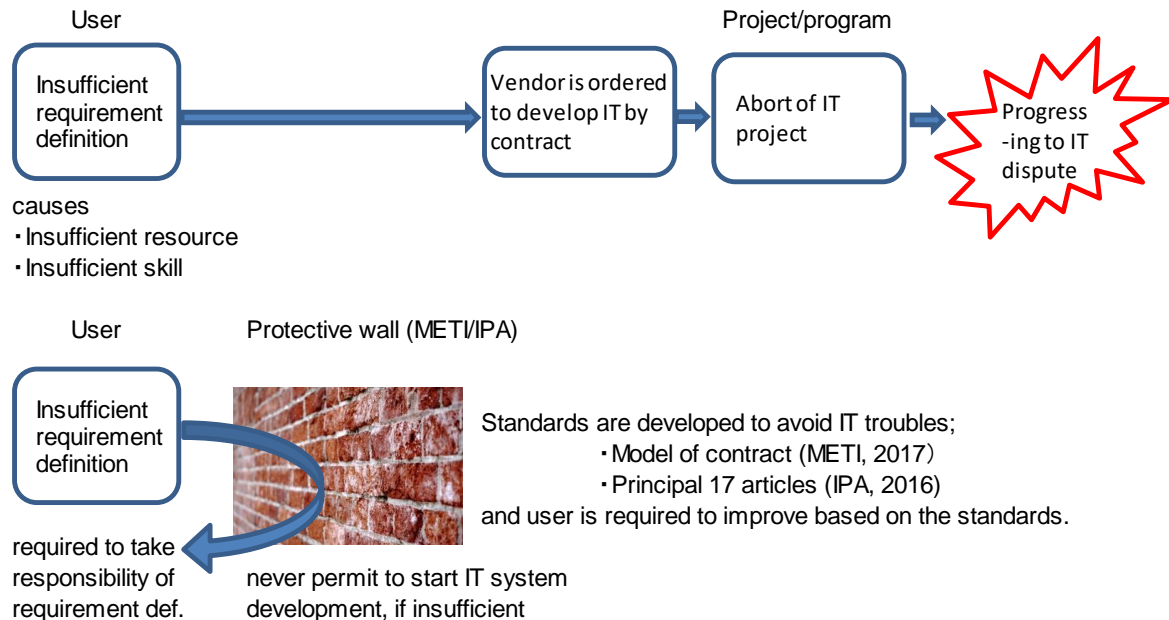
### 5. Visualizing Business Risk Based on the Analysis

Conclusions of previous case analysis have been unclear as far as avoiding serious troubles like IT dispute. For example, “the management should be involved in IT project” has been often concluded by the analysis, however since the management can have less vision of what specific action should be made in actual company, such conclusions have failed moving forward further improvement in actual for many years. To make clear specific action in actual, we first survey the actuality of user and that of vendor, and then visualize the specific business risk based on the analysis accompanied with the surveyed actuality.

[Actuality of User]

IPA [5] has been alarming that if user orders to develop IT system with insufficient

requirement definition, it is highly probable that troubles such as delay or cost overrun of the IT project. IPA and METI disclosed a principal that buyer (user) should take responsibility of requirement definition [5, 10] to avoid troubles like IT disputes (that is, they made a protective wall to prevent the troubles as illustrated in Figure 4). Thus, user is required to make every efforts to observe the principle by taking the responsibility by strengthening its ability to define requirement of IT system.



**Fig. 4 Typical procedure until IT dispute occur and its prevention by METI and IPA**

However, it is not easy matter for user to observe the principle, since most of IS in the user has been allocated limited resources in actual. User, who has insufficient power of requirement definition, are apt to rely upon help of outside vendor.

In such situation, it is easier for sales proposal of vendor to let user misunderstand that there exist a magic which breaks a hole in the protective wall, and let user go forward through the hole without taking sufficient requirement definition obligation. However, the magic is just like “silver bullet”, which is denied its existence as far as software are concerned by Brooks [1]. Actually it made holes in the protective wall, but caused troubles of IT projects and progressing to IT disputes, which are proved by Case1 and Case2, as follows.

Case1: User misunderstood that a new (package software) solution proposed by vendor must be “silver bullet”, which let user free from obligation of detailed requirement definition.

Case2: User misunderstood that a new (agile) solution proposed by vendor must be “silver bullet”, which let user free from requirement definition (PO) obligation.

[Actuality of Vendor]

Vendor organization generally impose an order quota to sales person. To fulfil the quota, it is usual that the sales person proposes company’s solution to user for getting order by insisting its merit. However, the sales person could lead the user to misunderstand the solution as “silver bullet”, which don’t have any applicable constraint (demerit), whether intentionally or not intentionally as can be seen in the following cases.

1) Selling “silver bullet” without intention

Generally, solutions have their various applicable constraints. It is probable that sales person, who have less technical skill, may propose solutions without understanding every applicable constraints. In this case, the sales person might sell “silver bullet” without intention.

## 2) Selling “silver bullet” with intention

If sales person disclose all applicable constraints to user, risk of failure to receive order increases, since the user may understand the disclosed constraints as demerits and quit order to the sales person. Particular in the organization where the upper manager of the sales person do not accept the failure and pressures the sales person to receive order from the user, the sales person is apt to avoid the risk of the failure by sealing necessary constraints to the user, while another risk of IT trouble becomes greater after receiving order. In this case, the sales person might sell “silver bullet” intentionally.

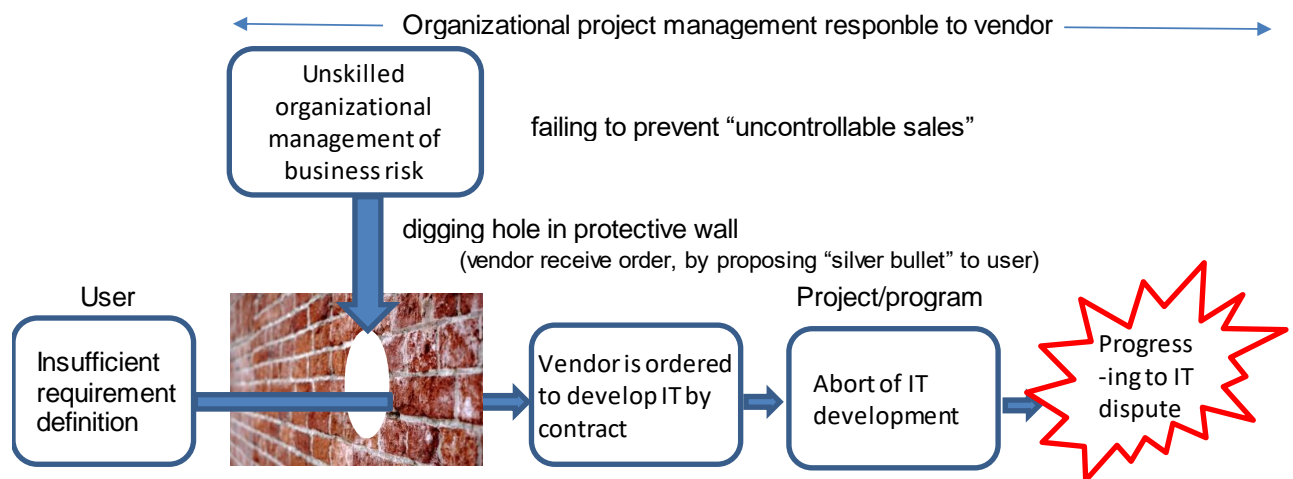
[Visualizing Business Risk Related to IT dispute]

It is probable that “uncontrollable sales” may occur in any vendor company, if the company organization fails to control sales person not to sale “silver bullet” solution to user.

Since “uncontrollable sales” allows to dig a hole in the protective wall of Figure 4, the vendor might receive order to develop IT system, however after agreement of the contract, troubles of IT project/ program and successive IT dispute might occur. This must be a business risk, which cannot be managed by project/program manager nor by sales person. No one except the vendor company organization can manage the business risk and take the responsibility to avoid the risk.

If the vendor organization, who usually pressures sales person to receive more orders, fails to prevent “uncontrollable sales”, it is a proof that the organization has unskilled management of the business risk. In this sense, the unskilled organizational management of the business risk, which allows “uncontrollable sales”, triggers business risk of IT dispute to occur (Figure 5).

The business risk provokes dispute related to IT project/program, particularly when insufficient requirement definition is practiced by user, and have magnificent influences to both of the managements of vendor and user.



**Fig. 5 Business risk of IT dispute visualized by the new methodology**

## 6. Discussion

The IT disputes, whose cases were disclosed in this paper, could be avoided, if individual user took sufficient role for requirement definition. Efforts of software engineering have been practiced, such as developing requirement engineering body of knowledge (REBOK) [9] and other books for empowering requirement definition skills in users. However, IT disputes have not been prevented for many years in reality. This indicate that there is a limit to prevent IT dispute, if we only rely upon software engineering approach.

This also indicate that it becomes necessary to take one more approach, which copes with the business risk of IT disputes, based on an assumption that incidents of insufficient requirement



can be happen in reality. That is, management approach to reduce IT disputes by managing the business risk is also needed to be consider, as well as software engineering approach.

From viewpoint of management approach, the bushiness risk has its root before agreement of the contract to start project/program in Figure 5. Thus, project/program manager cannot take the responsibility. However it is clearly organizational project management of vendor that should take responsibility of the bushiness risk as illustrate in Figure 5. And if user could know capability of organizational project management of vendors before contract, user could mitigate the risk of IT disputes by selecting a vendor with the best capability and eliminating vendors with poor capability.

Based on the cases analyzed and the background mentioned above, we get three questions to be discussed.

1) Why not introducing junction system to sales process in vendor's organizational management?

Project management introduces junction system before move forward to next phase (or next iteration in agile) for avoiding trouble risk. If vendor organization allow sales person to propose system development to customer without similar junction system, it may bring serious trouble, which is proved by the actual IT dispute (Case2). At least, organizational management should introduce junction system before move forward to sales proposal.

2) Why not evaluate and continuously improve capability of vendor's organizational capability?

Furthermore, even if the junction system is introduced, the vendor with insufficient capability of organizational project management could cause the actual IT dispute (as proved by Case1). Vendor organizations are required to evaluate individual level of capability and continuously improve the level. For example, organization should investigate skill of every employees (including not only project managers and engineers, but also senior managers and sales persons) and develop skill inventory. It should use the skill inventory from elementary to Meister level at necessary milestones such as proposal or contract judgement, for avoiding business risk of IT dispute. It should also practice continuous improvement of its capability of organizational project management by evaluating its management and outcomes again and again.

3) Why not societies related to project management considering avoidance of IT dispute also for project management of user in the future digital transformation era.

Project Management Institute (PMI) developed organizational project management standard, OPM3 [16] to measure and certificate capability of organizational project management for individual company. Although it also specifies portfolio management [14] as well as project/program management [15, 17], we cannot find any specification of risk of IT dispute like Figure 5 nor find management standard for the risk. Thus, user cannot select a proper vendor for avoiding IT dispute, by evaluating individual capability of organizational project management of vendors based on the OPM3.

International Project Management Association (IPMA) and other societies related to project management also do not have scope of the organizational project management of Figure 5, which involves sales activities before starting activities of IT projects/programs in vendor organization. Therefore, we cannot observe any activity to cope with risks caused by problems like "uncontrollable sales" in Figure 5 and any solutions to measure organizational capability for avoiding the risks in the societies.

If the societies related to project management develop a system to certify vendor's organizational capability, and allow project manager of user to select the best vendor with higher organizational capability, IT dispute may be reduced.

## 7. Conclusion

This paper figured out a business risk of IT disputes, which previous methods have failed to visualize and also discussed how to cope with the business risk. However, too many years have been spent for collecting just two cases in this paper, because of heavy obstacles due to security policy of user/vendor companies. We will also try to ask for support from courthouses for moving forward our research of visualization in the future.

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