International Journal of Business and Management 7 (4): 26-34, 2023
e-ISSN: 2590-3721

DOI: 10.26666/rmp.ijbm.2023.4.4

Managing Organizational Risk to Avoid Dispute For DX

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Received: 24 April 2023; Revised: 30 May 2023; Accepted: 20 July 2023; Published: 15 August 2023

Abstract: Although not only information technology (IT) systems but also collaborative work with IT vendors and IT users are indispensable for digital transformation (DX), disputes between IT vendors and IT users (IT disputes) have often been observed, after the abortions of IT projects and successive claims to compensate for individual losses. The vendors and users waste tremendous resources as well as opportunities, however, the root causes of IT disputes and measures to prevent similar incidents are not clarified. Lessons learned from such disputes have not been identified specifically enough to prevent the same troubles in the future. The goal of this paper is to identify the lessons learned. Applying a new analytical technique for troubled IT project cases, we identify individual root causes and business risks, whose threats have been overlooked by organizations, and derive the lessons learned. We also show specific management practices for avoiding the same disputes based on the lessons learned. Moreover, after showing that current institutes of project management have not considered the risk and have not involved the lessons learned in the management standards, we propose a revised organizational project management standard with specific practices for less loss of our social and economic activities in the future DX era.

Keywords: *DX Risk Management, Dispute, Project Analysis, IT Development, Organizational Project Management*

1. Introduction

New challenges by digital transformation (DX) may not be achieved sufficiently without information technology (IT) systems and collaboration between IT vendors and IT users. As shown in Figure 1, we have often observed disputes in which there occurs the argument about who should take responsibility after the abortion of an IT project (IT dispute). The IT dispute hiders the challenges for DX, and either of user or vendor may suffer from magnificent compensatory payment, which has been ordered by courthouses [1] [2]

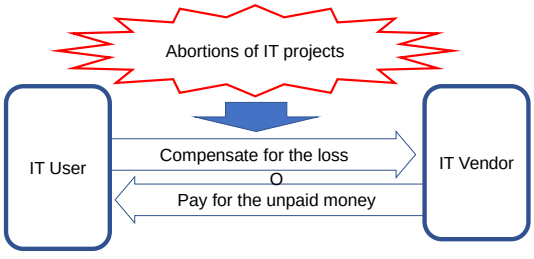

Figure 1 Example of IT disputes

[3] [4] as shown in Appendix 1. Thus, IT dispute is a major business risk nowadays.

However, in most cases, the root causes of IT disputes as well as how to avoid the major business risk, have not been clear. IT systems and software are much more difficult to be visualized compared with construction and other objects. Since the business risk of IT disputes has also been difficult to visualize, we have no countermeasure to mitigate the risk.

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Meanwhile, we have observed similar disputes again and again, due to a lack of lessons learned from IT disputes. This paper aims to let the user and vendor companies understand the business risk of IT project failures and successive IT disputes, and avoid them, by visualizing the risk and the lessons learned.

Therefore, after we review previous methods for IT project analysis and show that none of them has identified the root causes of the IT disputes, we present a new method to identify them. Next, based on the method, we analyze IT projects whose troubles caused IT disputes, where recent technologies are applied to realize DX quickly. Based on the analysis, we show the root causes and birds-eye-views of the business risks, whose threats have not been recognized by users and vendors. After deriving lessons learned, we also clarify the fact that societies of project management have not undertaken such lessons so far. Thus, we propose improved organizational project management for the era of DX challenges.

2. Legacy Methods for IT Case Analysis

Legacy methods for IT project analysis are classified as quantitative analysis, which has been conducted mainly by academia, and qualitative analysis, which has been conducted mainly by practitioners.

As for the qualitative analysis, Furuyama [5] and Serrador and Pinto [6] have analyzed IT projects and reported findings for the progress of software engineering, by using data sources provided by public sectors like IPA[7]. However, the data sources do not include data on troubled projects such as abortions or magnificent cost overruns, which cause IT disputes. Thus, the root cause and the business risk of IT disputes have not been identified by the quantitative analysis.

The qualitative analysis of many projects, not excluding the troubled projects, is conducted by Smith [8] [9], Yeo [10], Sutterfield [11], Nikkei Computer [12], and Standish [13]. However, their analysis has been investigated and disclosed with limited evidence of the troubled projects, due to the privacy policies of IT vendors and IT users. Since their analysis has been conducted under limited time and limited evidence, the suggestions for improvement of IT project management have largely relied upon speculation with less basis of evidence. The root causes of the troubled projects and the business risk of IT disputes have not been identified specifically by them, since there is no evidence that similar IT disputes have been reduced after their analysis. Therefore, their methods are also insufficient to clarify lessons learned to prevent the same IT disputes.

3. New Method for IT Case Analysis

The following procedure illustrated in Figure 2 has been conducted in this paper to obtain sufficient pieces of evidence to identify the root causes and the business risk of IT disputes in unlimited time.

1) Grasp abstract with conflicting claims of vendor and user
2) Ask why and collect additional evidence as the answer to the question, that was acknowledged objectively
3) If pieces of evidence are obtained, sufficiently enough to identify the root cause, then visualize the business risk by drawing a birds-eye-view of causal relations based on all evidence, else go back to 2) and repeat asking why.

The procedure is just like *Kaizen* [14] (an activity practiced in Toyota to identify the root cause of the automobile's accident or failure of the product line by repeating asking "why?" more than 5 times). Legacy methods to analyze IT projects mentioned in the previous section have asked "why?" once or so, far less than 5 times. Thus, they have failed to identify the root cause.

The courthouse also repeats asking "why?" in court hearings. However, in the first appeal in the courthouse, the procedure can be terminated earlier when the judge has the confidence to be able to explain the damages compensation order or when it is a time limit to practice the order the compensation, even if pieces of evidence obtained are insufficient to identify the root cause of the IT disputes. However, until the last appeal (such as that of the supreme court) is done, it may be more probable that the proof of evidence is sufficient enough for identifying the root cause and the lessons learned to prevent similar IT disputes.

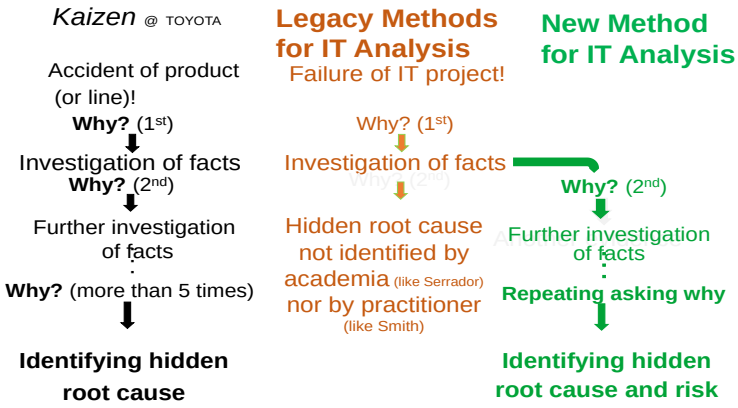


Figure 2. New IT analysis methodology based on *Kaizen*

4. Results of IT Case Analysis

4.1. Abortion of a Banking IT Project (Case1)

[1) Abstract]
A Japanese bank(*S*) that had wanted to modernize its legacy system, ordered a major IT vendor(*I*) to specify system requirements and propose the developing plan. After considering the system requirement for a while, the vendor *I* proposed the developing plan with cost, delivery date, and "system integration contract" has been agreed upon between *I* and *S*. However, after that, *I* came to be aware that the plan is difficult to execute and proposed to increase the initial cost plan and postpone the delivery date. *S* refused the proposal and cancel the contract agreement and stop the project. *I* claimed unpaid money from *S*, however, *S* refused it and claimed that *I* should compensate for the loss due to the project's failure.
[2) Evidence]
The following pieces of evidence sufficient enough to identify a root cause are clarified by surveying all evidence presented at all courts from the first appeal to the last appeal [15] [3] while resolving all questions which are asked more than five times during the survey.
(1) The vendor *I* started defining user requirements and considered the developing plan, upon the assumption that a banking package software (Corebank) can replace the legacy system.
(2) After that, *I* presented to *S* the development cost and delivery date based on the plan and proposed a "system integration contract".
(3) The last appeal of the court acknowledged the evidence, that *I* had already been aware of the gap between the functions of the Corebank and the mandatory requirement to keep the specification of the existing legacy system presented by *S*, before the contract of 2).
(4) Nevertheless, *I* proposed the contract based on the cost and delivery plan without trying to cope with the gap. And after *S* agreed upon the contract, *I* proceeded to define detailed user requirements and prepare to start development.
(5) After that, *I* proposed to change the initial plan by increasing the development cost and postponing the delivery date. *S* refused the proposal and cancel the contract agreement and abort the project. *I* claimed unpaid money from *S*, however, *S* claimed that *I* should compensate for the loss due to the project abortion.
[3) Birds-eye-view of causal relations]
The vendor project manager (PM) of *I* was given double missions. One mission was practicing project management to develop the system for user *S*. The other was the vendor's own mission to practice system integration business by using the packaged software (Corebank) for *I*. However, it was impossible to achieve both missions. Nevertheless, since the vendor organization failed to cancel the vendor's own mission, the PM proposed the "system integration contract" and made an agreement with *S*. After the contract agreement, the PM modified the cost and schedule plan based on detailed requirement definition, and propose the modified plan to *S*. The proposal was refused and an IT dispute began between *S* and *I*. The birds-eye view of the identified business risk of Case 1 is illustrated in Figure 3.

4.2. The Other IT Projects (Case2 and Case3)

[Case 2: 1) Abstract]
To realize a digitalized service, a user U2 called for proposals from vendors to develop the necessary IT system. A vendor V2 got a successful bid from U2 by proposing the system integration plan with the cheapest price by fully using packaged software. Although V2 started to develop the system assuming that U2's requirement may be realized by the packaged software, V2 recognized that much more addon software needed to be made than expected, to realize the required system, after starting the IT system development. V2 claimed to pay for the addon software, which was rejected by U2.

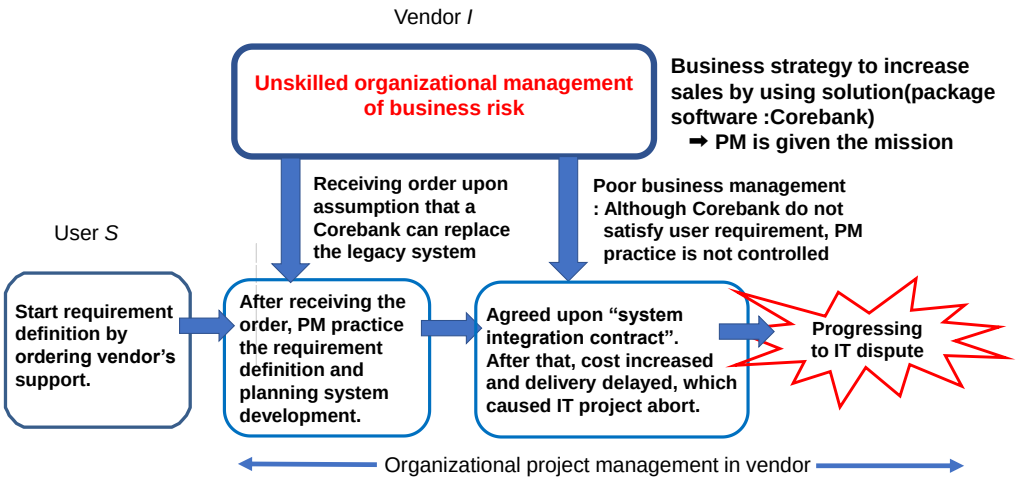


Figure 3. Bird's-eye-view of the business risk (Case1)

[Case 3: 1) Abstract]
To realize a new digitalized business quickly, user U3 ordered a necessary IT system development to vendor V3, whose proposal of the development style had been agile, by which the system might be completed faster than before. However, even after repeating several iterations of agile development, U3 could recognize any achievement, that U3 expected for the new business. After the abortion of the agile project, U3 canceled the contract agreement. However, U3 was requested to pay for the unpaid money by V3.
[2) Evidence in Case 2 and Case 3]
Many pieces of evidence have been obtained by hearings practiced several years (Details have been reported elsewhere [16]). The evidence shows the fact that the IT dispute occurred due to the cause of the user accompanied by the vendor's trigger, which made transitioning the state of the cause to the state of the IT project trouble, in Case 2 and Case 3 as shown in Table 1.
[3) Birds-eye-view of causal relations in Case2 and Case3]
Public sectors such as the Ministry of Trade and Industries (METI) and the Information Promotion Agency (IPA) request buyers (users) to take responsibility to define the requirement of IT systems [17] [18], before ordering IT system development to the sellers (vendors). Namely, a protective wall is constructed by them to reduce the risk of IT disputes due to insufficient requirement definition.
However, IT users with less manpower and less skill in IT technology often rely on defining the requirement for the users upon IT vendors. In that case, when salespersons of IT vendors explain that their solutions can let the users be free from the responsibility of requirement definition, and propose the users order IT development by the solutions to the vendors, the users often believe the explanation. However, since no solution lets users be free from their responsibility of requirement definition, the salespersons are selling "silver bullet" solutions which Brooks [19] denied. In Case 2 and Case 3, since the vendors sold the "silver bullet" solutions to the users as shown in the evidence of Table 1, "uncontrollable sales" of the "silver bullet" solutions are allowed actually.
Since the "uncontrollable sales" allows digging a hole in the protective wall made by METI/IPA, the vendor successfully received the order to develop an IT system. However, after starting the IT system developments, IT disputes occurred due to the troubled IT projects. Project managers (PMs) of the vendors could not manage IT projects not to progress to the project troubles and the IT disputes, since the vendor companies had given the PM the mission to manage the projects after completion of receiving the orders. Such a risk of IT dispute is not a project risk but should be a business risk, that must be managed and avoided by the vendor company organization. The organization, which gives salespersons only a mission to increase receiving more orders but fails to control to prevent selling "silver bullet" solutions, must have poor management skills to avoid IT disputes due to "uncontrollable sales". In Case 2 and Case 3, the unskilled organizational management of the vendors triggered the status of users' insufficient requirement definition to progress to receiving the orders, succussed by IT project troubles and IT disputes. The birds-eye view of the identified business risk of Case 2 and Case 3 is illustrated in Figure 4.

Table 1: Evidence summarized in Case 2 and Case 3

	User (Cause)	**Vendor (Trigger)**
Case 2	Insufficient requirements defined by the user	Vendor proposed its package solution for the user failing to investigate Fit Gap in the user requirement
Case 3	Insufficient user skills and resources for defining requirement	Vendor proposed its agile solution for the user to be free from the role of requirement definition (product owner)

Figure 4. Bird's-eye-view of the business risk (Case2 and Case3)

5. Lessons Learned

5.1. Problems of Previous Organizational Project Management

In Figure 3(Case1), the first lump-sum contract had been successfully practiced and the PM of the vendor *I* started practicing requirement definition and planning. The vendor organization had a strategy to grow its business by applying the packaged software (Core Bank) to its customers.

Although the Core Bank does not satisfy user requirements, the organization through every job to the PM, who proposed a cost and duration plan of system development to cope with the strategy of the organization (replacing *S*'s existing system with the Core Bank). Moreover, the "system integration contract" was agreed upon the plan, between *I* and *S*. After that, the PM proposed to change the plan to increase cost and postpone the delivery time to satisfy the user's system requirement, which caused the abortion of the IT project and the IT dispute. Therefore, due to poor organizational project management to control PM's proposal and contract, the dispute cannot be avoided.

In Figure 4(Case 2 and Case 3), the vendor PMs cannot take responsibility, since the PMs were assigned after the vendors completed contracts of receiving IT system orders by selling the "silver-bullet" solutions. Nobody except the vendor's organizational project management can take responsibility for controlling the business risk of sales activities.

Based on the background mentioned above, we get questions to be discussed.

1) Why not introduce a junction system process to avoid IT disputes in the vendor's organizational management?

The project management standard introduces a junction process before moving forward to the next phase in project duration (or the next iteration in the agile project) for avoiding trouble risk in PMBOK [12]. Likewise, organizational management also should introduce a similar junction process before salespersons propose a solution to the user and complete the contract agreement of the IT system with the user. If vendor organizations through everything to the salespersons, the incidents of selling the "silver-bullet" solutions cannot be avoided and similar IT disputes like Case 3 may occur again and again.

The organizational management of the junction process is also necessary for PMs. As seen in Case 1, the organization gave every job to the PM, who proposed a cost and duration plan for IT system development. The vendor *I* should introduce the junction system before the PM's proposal and successive contract. It must be easy for a major vendor like *I* to organize the junction system by gathering reviewers/specialists and letting them check the proposal/contract beforehand. And if gaps between the proposal and user requirements are detected and the gaps can never be resolved, the vendor organization should make a decision to withdraw from the IT project business with *S*, and quit proposing the contract. If the vendor *I* could practice such management, the supreme court must not support the order in judgment, for *I* to compensate for the loss of the user *S*, due to breach of the duty of care.

2) Why not measure organizational management capability and improve the capability continuously?

Even IT vendor organizations, which have a junction process before receiving orders from users, could overlook the risk of IT disputes. In Case 2, since a senior manager, who chaired the junction process meeting, had failed to call specialists with sufficient skill to review the bet case of the receiving order, nobody in the meeting pointed out that the ordered IT system could not be developed by "silver bullet" solution. The successive IT dispute of Case 2 could not be avoided due to the insufficient skill of the senior manager, who was responsible for the business unit of the IT system development, and the called employee members of the meeting.

To grasp the vendor's level of organizational capability, vendors should first evaluate the risk management skill of senior managers, salespersons, and other employee members called at the meeting for IT specialist reviewers, by creating a database such as their skill inventory. The vendor organizations may evaluate the capability by monitoring how they are enforced to practice the process of the junction meetings with senior managers and employees, whose skills are not evaluated as insufficient level.

And by updating individual levels in the database in case of incidents including IT disputes and periodically, the level of organizational capability must be improved year by year continuously.

The problems mentioned above are difficult to be improved only by this research paper. To make the improvements practiced actually in industries, the improvements should be involved in management standards. However, the problems have not been considered in the well-known management standard PMBOK [12], which systematizes lessons learned for PMs to practice in projects. Thus, we should next survey the other management standards for organizations, whether they have considered the problem, and the lessons learned as follows.

PMI (Project Management Institute) has developed an organizational project management model OPM3 [11] to measure and certify the managing capability of the organization.

The OPM3 includes portfolio management [7] as well as project management and program (plural projects) management [10], there is no specification of risk of IT dispute like in Figure 3 and Figure 4, thus no management practices to reduce or avoid the risk can be found. IPMA (International Project Management Association) and other institutes of project management also do not have a scope for the organizational project management of Figure 3/ Figure 4, which involves sales/proposal activities of IT projects/programs in vendor organizations.

5.2. Improved Organizational Project Management Standard

The existing standards of organizational project management involve project/program management. However, they do not involve the organizational management of vendors mentioned in the previous section. It is necessary to improve the management standard for the IT firm to avoid IT disputes. Hereafter, we call the necessary new management "Project business management" and show the whole structure of organizational project management standard which involve the new management as illustrated in Figure 5.

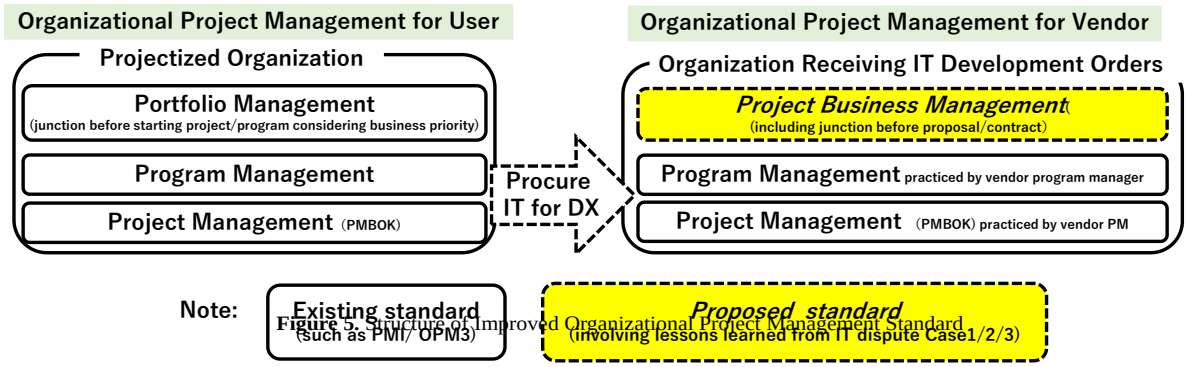


Figure 5. Structure of Improved Organizational Project Management Standard

In the figure, there is an existing standard of portfolio management, which involves the organizational process for users to practice the junction system before starting projects/programs by deciding their business priorities. Likewise, the "Project business management" process is added for vendors, who receive IT development orders from users, to practice the junction system before the proposal and contract agreement to start IT projects/programs. If vendors practice controlling project/program managers and salespersons by the junction system process in the standard of "Project business management", it is possible to reduce the risk of similar IT disputes in Case 1, Case 2, and Case 3.

6. How to Move Forward for DX

6.1. Suggested practice for IT vendor

Vendors have not developed and shared their common standard of the organizational process like "Project business management" in the IT firm so far. Although some major vendors practice a partial process of organizational management (junction system of each development phase in IT project after receiving order), they don't have a management process for the earlier phase (user requirement definition or system planning) and give everything to salespersons or PMs. The junction system process decides whether to approve the proposals of salespersons/PMs or not, after letting experts finish reviewing the proposals in the vendor organizations.

The IT disputes in Case 1 and Case 3 were caused by giving everything to salespersons or PMs in the earlier phase. To avoid similar IT disputes, any IT vendor should practice the process of the junction system.

Any project management institute is also suggested to develop a common standard of "Project business management", which includes the improved process as well as organizational management processes that the major vendors have been practicing so far, as illustrated in Figure 6. And if the institute discloses the standard to all vendors including medium or small vendors, and encourages them to practice based on the standards, the risk of disputes including Case 1 and Case 3 may be reduced in the IT firm.

6.2. Suggested practice for IT user

If the measured capability LEVEL of organizational project management including the "Project business management" of IT vendors could be judged objectively at competitive bidding, IT users could remove vendors with lower LEVELs from selected contractors and select the best vendor with a higher LEVEL, before the contract. Thus, if users practice such a procurement process, it may reduce the risk of IT disputes by selecting a vendor with the best capability and eliminating vendors with poor capability.

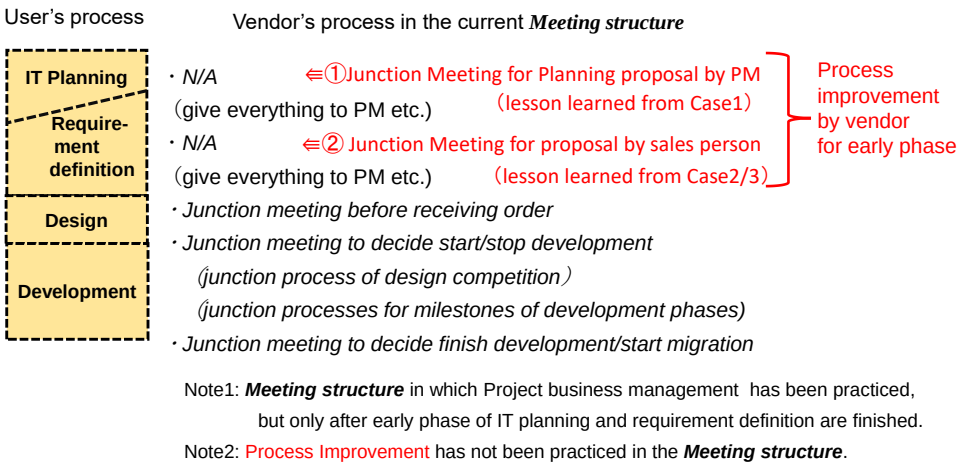
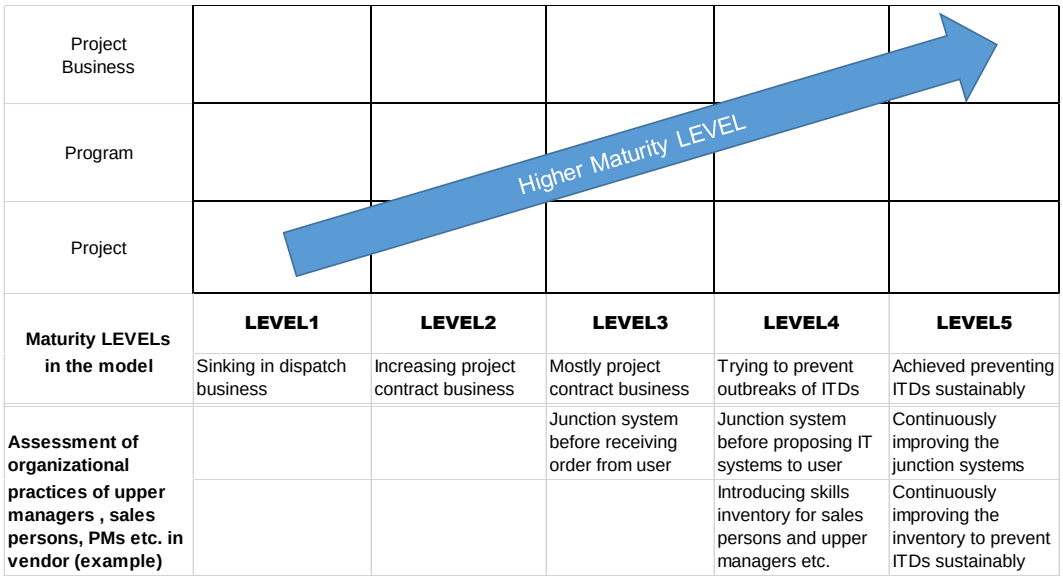


Figure 6. Whole scope of the project business management



Maturity LEVELs in the model	LEVEL1	LEVEL2	LEVEL3	LEVEL4	LEVEL5
	Sinking in dispatch business	Increasing project contract business	Mostly project contract business	Trying to prevent outbreaks of ITDs	Achieved preventing ITDs sustainably
Assessment of organizational practices of upper managers , sales persons, PMs etc. in vendor (example)			Junction system before receiving order from user	Junction system before proposing IT systems to user	Continuously improving the junction systems
				Introducing skills inventory for sales persons and upper managers etc.	Continuously improving the inventory to prevent ITDs sustainably

Figure 7. Revised maturity model for vendor capability to avoid IT disputes (ITDs)

Therefore, any project management institute is suggested to introduce a system to measure and evaluate vendors' organizational capability to cope with IT dispute risk as illustrated in Figure 7.

The maturity model includes best practices for each LEVEL in Figure 7. For example, LEVEL3 requires practicing the junction system before receiving orders from the user and LEVEL4 require a much earlier junction system at vendor proposal for the earlier phase such as planning. The maturity model includes best practices for each LEVEL in Figure 7. For example, LEVEL 3 requires practicing the junction system before receiving orders from system development to avoid IT disputes like Case 1 and Case 3.

The model also requires introducing quantitative skills inventory for upper managers and other key persons at LEVEL4 and requires achieving preventing IT disputes or serious problem projects sustainably by using the inventory which has been continuously improved at LEVEL5 to avoid IT disputes like Case2.

The project management associations, which involve members of the IT firm (IT vendors and users), are suggested to operate a certification system that assesses organizational practices in IT vendors and certifies the LEVEL (from 1 to 5) for each IT vendor.

Then, IT users can reduce the risk of IT disputes also by requesting IT vendors with higher LEVELs to apply, before selecting an IT vendor in their procurement process.

7. Rational of This Study

Industries whose IT disputes are discussed in this paper are Banking (Case 1), Telecommunication (Case 2), and Sales (Case 3). Although Case 3 occurred after Case 2, Case 3 could not be prevented, since the causes, the business risk, and the lessons learned from Case 2, mentioned in the

previous section, had not been identified. If the lessons learned and other information from the three cases had not been identified, similar IT disputes due to the same causes might occur again and again, not only in the three industries but also in other industries such as Manufacturing, Securities, and Healthcare, or public sectors, which introduce IT systems.

When user/vendor companies are ordered to pay for magnificent damages compensation due to IT project abortions and IT disputes, they suffer from magnificent economical profit losses as shown in Appendix 1. For example, the vendor company (*I*) was ordered to pay more than ~~14~~43 billion yen by the courthouse in Case 1.

Moreover, user companies, whose IT systems were not realized due to abortions of their developments, lost business opportunities (such as starting up new digitalized services or selling strategic products, which are objectives of developing the IT systems). If we fail to prevent such project abortions also in other industries and public sectors due to the same causes, our social and economic activities may suffer from greater losses in the future of the DX era.

All losses mentioned above may be reduced if IT vendors and IT users prevent IT disputes, by applying the lessons learned mentioned in section 5. For that purpose, it is required to also suggest practical standards for IT vendors and IT users to practice in individual companies. Therefore, the specific new standards (practical examples of the project business management or the capability model for the new organizational project management) are also suggested in section 6.

8. Conclusion

The business risks of IT disputes are identified by the new analysis and lessons learned for avoiding the same IT disputes are derived in this paper. We also proposed a new organizational project management standard to avoid business risk for societies related to management. We hope it may be standardized and introduced to the IT firm (vendors and users) soon by the societies for moving forward future DX in industries and public sectors.

Acknowledgments

We'd like to express immense gratitude to Dr. Matsuda, Mr. Yokoyama, the lawyer, and other members of the IT dispute Institute of Lessons Learned, and Mr. Koumura, Mr. Isokawa, and other former members of IT Mieruka Institute who supported to aggregate and review pieces of evidence of the IT disputes. Prof. Dr. Fukazawa also advised me to revise the paper. Without their support, this research has not have been accomplished.

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Appendix 1

Examples of the damage compensation orders for IT Disputes (accompanied by abortions of the IT projects, broadcasted by Japanese media) are shown below.

Industry	IT user in the industry	Damages Compensation Order [million yen]	Court that ordered the Compensation (Ordered Date)	Who is ordered to pay for the damages
Manufacturing	Bunka Shutter	**1,983**	Tokyo District Court (17 June 2022)	Vendor
Securities	Nomura Holdings	**112**	Tokyo High Court (21 April 2021)	User
Healthcare	Medical University of Asahikawa	**1,415**	Sapporo High Court (31 August 2017)	User
Banking	Suruga Bank	**4,172**	Tokyo High Court (26 September 2013)	Vendor