

Risk Assessment Study of Academic Talent Data Management Platform Development Project

Yifan Qu^{1, *, †}, Xinxin Sun^{2, †}

¹Queen Mary University of London Engineering School, Northwestern Polytechnical University, Xian, China

²Faculty of Business Administration, University of Macau, Macau, China

* Corresponding author: qyf@mail.nwpu.edu.cn

†These authors contributed equally

Abstract. With the continuous promotion of talent informatization, to improve the talent development index system for social needs and talent growth needs, academic evaluation and talent data management type platforms have gradually emerged and rapidly developed, and have been more widely used. However, there are many risks in the process of developing such emerging data platforms, which seriously affect the final benefit of the project. Therefore, this reaseach take the Global Unified Artifact Distributed Autonomous project as an example and apply the FMEA method for risk identification and risk assessment. The results show that the technical risks are the most serious and the schedule risks are the least serious. At the same time, the paper proposes strategies for optimizing the risk management of software projects to help the projects be carried out correctly and orderly.

Keywords: Risk Management; FMEA Methodology; Risk Identification

1. Introduction

The rapid development of the Internet and the wide application of information technology have extensively promoted the process of informatization in various industries and injected new vitality and vigour into the field, playing a favourable role in promoting the application of data information platforms and other applications in multiple areas. Meanwhile, with the continuous promotion of talent informatization, academic evaluation and talent data management platforms have flourished. However, in recent years, under the environment of the open Internet, many website developers are always under the situation of passive response in the process of website development due to the lack of risk awareness, so it is vital to conduct a risk assessment of disciplinary talent data management and analysis system with the experience of project risk identification.

At present, the risk assessment research related to data information platform projects is still an emerging direction and needs to be continuously explored and improved. In the process of data information platform project construction, there may be certain risks at each stage. Project managers need to assess risk factors, risk types and risk levels, and analyze corresponding risk response strategies simultaneously. Zeng Zhaowen wrote an exploration of the risk identification of educational websites based on the perspective of project risk management focusing on the problems arising from website operation and maintenance, that is, most educational websites have more or fewer security vulnerabilities and hidden dangers in hardware configuration and operating systems, related support software, website programs, databases, etc. [1], coupled with the lack of financial resources and corresponding technical force support in website construction, most schools or This paper will focus on assessing the risk of such problems in the development process.

Software development projects are complex and are defined as creative activities that involve the temporary creation of a project team, the rational reorganization of financial, material, and human resources, and the achievement of expected project goals. The point of view made by Li Deping in the discussion of software development project risk management, the risk of a software project has a certain impact on the implementation of the project. Once the risk becomes a reality, it will cause the cost of the project to rise, the progress of the project to be affected, or even make it impossible to

achieve. Project risk management can minimize the occurrence of risks [2]. Therefore, in software development, risk management must be prioritised to avoid significant losses for the enterprise.

1.1 Risk Factors

The risk factors involved in the risk analysis studies of projects of other platforms of the same type are referred to in this paper and summarized in the following table 1.

Table 1. Risk factors in the analysis study of other similar platform projects

Author	Risk factor content					Reference
Fan Li	Technology Risk	Quality risk	Schedule Risk	Cost risk		[3]
Jing Guo et al.	Quality risk	Cost risk	Schedule Risk			[4]
Deping Li	Social Environmental Risks	Cost risk	Technology Risk	Schedule Risk	Managing Risk	[2]
Xinyue Wu	Technology Risk	Team Risk	Budget Risk	Requirements change risk		[5]
Yurong Zeng et al.	Human Resource Risk	Demand risks	Planning and budgetary risks	Development Technology Risk	Organizational and Environmental Risks	[6]

1.2 Risk Assessment Methodology

This paper also compares other platform development of the same type, such as the study of risk management for software development projects of M. The risk occurrence probability assessment criteria and risk loss assessment criteria are formulated in advance, the project process is decomposed, and risk factors are identified using hierarchical analysis, and the weights of each risk are calculated, and then, according to quantitative analysis and Delphi analysis, the risk factors are finally derived after expert modification and assessment. The probability of occurrence, possible loss, and risk value of the risk factors are finally obtained after expert revision and evaluation based on quantitative analysis and Delphi analysis. The research results were applied to Company M, enabling project managers and technical supervisors to more effectively grasp the potential risks at each stage of the project and ensure the smooth implementation of the project.

The analytic hierarchy process (AHP) used in this study was developed by Thomas L. Saaty in the 1970s and is a method for organizing and analyzing complex decisions using mathematics and psychology. The method consists of three parts: the first part, is the ultimate goal or problem trying to be solved; the second part, is all possible solutions, called alternatives; and the third part, is criteria for judging the alternatives [7]. AHP provides a rational framework for the desired decision by quantifying the criteria and alternative options and relating these elements to the overall goal.

The quantitative analysis method used in this research is a method of analyzing quantitative characteristics, relationships and changes in social phenomena. Using a mathematical module to analyze quantifiable data of a company, the company's overall situation is analyzed and evaluated and a judgment is made accordingly [8].

The Delphi method used in this study is a systematic and qualitative approach to forecasting, also known as the estimate-talk-estimate technique (ETE). The Delphi method relies on experts with extensive knowledge of a topic and gathers opinions from a group of experts through several rounds of questions in order to predict the likelihood of events, predict future outcomes, or reach a consensus on a specific topic [9,10].

The risk management study of DW Food Company's measurement apparatus management platform development project is a targeted study of the risks in the execution of the project through in-depth theoretical analysis. Risk factors were identified using the brainstorming method and checklist method, and then the probability and impact matrix method was used for risk assessment, according to which targeted risk response plans were formulated, and finally, risk monitoring measures were proposed to ensure that the project could be carried out in a regular and orderly manner.

The brainstorming method used in this study is a common method used in problem-solving. The brainstorming method consists mainly of discussions and talks in a normal, cordial and unrestricted atmosphere in a meeting format, where all members of the team break the rules, think actively, speak freely, and spontaneously come up with ideas and ideas to come up with a creative and better solution to the group's problem, involving spontaneous contributions of ideas from all members of the group. The approach focuses more on the quantity of ideas thought up rather than the quality. The goal is for the team to come up with as many ideas as possible and to encourage members to come up with novel or out-of-the-box ideas [11,12].

The checklist method used by the Institute is based on previous analogous project information and other relevant information to develop a risk identification checklist. The checklists are generally arranged by risk source. The main advantage of using checklists for risk identification is the speed and simplicity of the process, while the disadvantage is the limitation of project comparability [13,14].

The probability and impact matrix method used in this study refers to the identification by the project management team and/or the project management team leader of the specific elements of a particular risk involved in one or more phases of the project or in activities that are part of the overall project. Using the probability and impact matrix, the two aspects of risk, i.e., the probability of occurrence of the risk and the impact on the objective should the risk occur, are considered together to determine whether the risk is minor, moderate, or major [15,16].

The application of risk assessment knowledge in data information platform projects is the primary research of this paper. Based on theoretical research, this paper defines the basic definition in terms of risk, explores the measures and processes that are usually used in the project developing process for risk, and supplies a solid theoretical foundation to the research work of this paper.

2. Research Method

2.1 FMEA Method introduction and Flowchart

The FMEA methodology used in this paper analyzes and assesses the risks of website developing. FMEA is a planning tool that assesses the severity of risk events by calculating the likelihood of risk, the difficulty of detection, and the impact of the risk [17]. FMEA can help online platform development projects identify potential risks and assess the severity of risk occurrence, evaluate current control plans, and be used as a basis for recommending improvements or control plans. FMEA is used to obtain risk likelihood, difficulty, and impact values, and then multiply the three factors to assess risk events by obtaining the risk priority number.

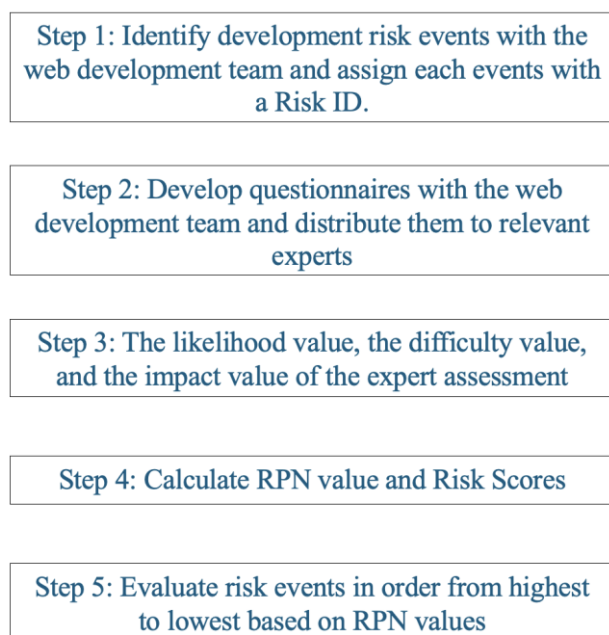


Figure 1. FMEA method steps

2.2 Risk identification

The first step is to identify risk events. The steering team identifies each risk event as x is the risk event and y is the impact of the x. The impact of an event occurring could be a significant time delay, increased cost, disruption of site usability, or even all three. A risk event may have triggered more than one impact, and this paper is a combination of additional data provided by experts and a review of previous risk assessments to reach agreement. Once a risk has been identified, it is critical that it be thoroughly analyzed and accurately assessed. This paper uses the FMEA methodology to further identify the following 12 development site risks from the top five risks with the help of the lead team.

Table 2. Risk identification results of the project

Risk ID	Risk Categories	Risk Content
A1	Technical Risks	Code Issues
B1	Schedule Risk	Deadline
B2	Schedule Risk	Expectations not met
B3	Schedule Risk	Low productivity
B4	Schedule Risk	Scope spillover
B5	Schedule risk	Project team members leaving
C1	Cost Risk	Budget issues
C2	Cost risk	Stakeholder issues
D1	Management Risk	Risk management
D2	Management risk	Project Management
E1	Social Environment Risk	User Response Risks
E2	Socio-environmental risk	External Risks

Step two, combined with the actual situation of the website named global discipline talent radar, the paper pre-developed risk occurrence probability assessment, risk inspection difficulty assessment and risk generation impact assessment values, as shown in table 3.

Table 3. Risk assessment criteria

Rating	Risk Level	OOO	DET	Impact Value
0	No risk	Never	N/A	No impact
1	Low	Unlikely	Very easy to detect and find risks at the right time	Minor impact on the schedule, minor change in costs, minor damage to the usefulness of the site
2	Slightly Low	The risk probably will not occur	Easy to detect and efficient	Impact on schedule <5%, increase in costs <5%, damage to the usefulness of the site (Technical) <5%
3	Medium	Equal chance of occurring or not	Fairly easy to detect and usually feasible	5-10% impact on the schedule, increase the cost 5-10%, damage the usefulness of the site (Technical) 5-10%
4	Slightly High	Probably will occur	Detectable but difficult, results may be unreliable or take an unknown amount of time	10-20% impact on schedule, 10-20% increase in cost, 10-20% damage to the usefulness of the site (Technical)
5	High	very likely to occur	Difficult to detect, no feasible or known detection method	Impact on schedule > 20%, resource cost > 20%, website usability (Technical) > 20%

The impact of a particular risk may vary, but the likelihood and detection values of the event are usually similar. In the third step, reliable likelihood value, impact value, and detection value are obtained by involving experienced professionals from different backgrounds to fill out the FMEA questionnaire to ensure the quality of the analysis. After entering the values of the three factors, this paper will calculate the risk score and RPN values in the fourth step.

3. Result

3.1 Calculation

3.1.1 Analysis of experimental results

Table 4. Summary of risk occurrence frequency

Frequency of occurrence of risk (OOO)	
Risk Category	Average
Technology Risk	2.75
Cost Risk	2.06
Management Risk	1.94
Schedule risk	1.89
Social and environmental risks	1.84

As shown in the above table 4, this paper ranks risk events from highest to the lowest frequency of occurrence, with the most frequent being technical risk events. Whereas technical risk refers specifically to code risk, half of the expert team believes that the code risk involves issues, which occurs weekly. Rushed work and many other factors projects could result in poor-quality code. And expert teams assess the frequency of social environment risk as occurring only a few times a year because unpredictable factors such as legal changes in external threats are relatively rare compared to other risk events.

3.1.2 Detection

Table 5. Summary of difficulty detection level

Detection	
Risk Category	Average
Schedule Risk	3.29
Social and Environmental Risks	3.23
Management Risk	2.5
Technology Risk	2.25
Cost risk	1.81

As shown in the above table 5, this paper ranks the risk events from highest to the lowest in terms of detection, with the most difficult to discover being schedule risk. And schedule risk contains low productivity risk events from B1 to B5, etc. More than half of the expert team considered low productivity risk events to be relatively difficult to detect. In contrast, the expert team assessed cost risk to be the easiest to detect, creating a team that could easily detect the flow of funds and whether they were sufficient.

3.1.3 Impact value

Table 6. Summary of impact value

Impact Value	
Risk Category	Average
Technology Risk	4.5
Management Risk	3.25
Schedule risk	2.05
Social and environmental risks	2
Cost risk	2

As shown in the above table 6, this paper ranks the risk events in order of impact from most severe to the least severe, with the highest effect being caused by technical risks, also known as risks caused by code. More than half of the expert team identified code risk as the most impactful because it would result in unusable or delayed project submissions. In contrast, the expert team assessed item cost risk as the lowest relative impact.

3.2 Risk Assessment Results

Table 7. Risk Assessment Results

RPN Value	
Risk Category	Rank
Technology Risk	40.5
Management Risk	29.73
Social and Environmental Risks	13.24
Cost risk	11.25
Schedule risk	8.57

Risk Score	
Risk Category	Rank
Management Risk	3.66
Cost risk	3.6
Social and Environmental Risks	3.125
Technology risk	2.8
Schedule risk	2.75

Step 5 is based on the calculated RPN value to assess the risk, and risk events with both risk scores and RPNs above the average are prioritized for risk assessment. It is expected in this paper that a risk event may have a high impact value, but if the risk can be detected early enough, the event has a low detection value and subsequently resulted in a low RPN value. After identifying the risk, this paper will have to evaluate the risk score and RPN values. Different means, but relative data are used to assess whether a risk event, if it occurs, will impact the project. Moreover, if the impact is severe enough to cause project failure, whether there is still meaningful in developing a risk response plan.

There is a slight discrepancy between the severity obtained using the FMEA methodology and the severity ranking of the website founding team. This paper will provide insight into the causes of this situation in subsequent studies. Based on the calculated RPN, it was concluded that low-quality code is a significant risk in the development of a website. Rushing and other factors can lead to the inclusion of low-quality code in a project. Problems in the code may include bugs, logic holes, etc. So after calculating the RNP value, it is predictable that the code risk is the most severe risk in developing a website. The web development team thinks that the management risk is higher than the code risk, which may be a discrepancy caused by the average, or perhaps the management problem is more troubling to the web development team than the code problem.

The RPN value calculation and the development website team evaluation both agreed on the lowest severity of schedule risk, which includes deadline, unmet expectations, low productivity, scope change, and project member risk. Based on the previous calculations, it can be concluded that these risks are easily detectable risks, so this may also be the reason for the low RPN value. It is also predictable that team members assess schedule risk as the lowest risk. Another risk involved in web development that is included in schedule risk is that the estimates vary from the actual situation, which can subsequently affect the cost, time, or product performance not to meet expectations. Often, web development projects require estimates of costs, deadlines, results, and inaccurate estimates may result in web development projects that do not even meet client expectations. The development team has a detailed schedule for above issue, so such risk assessments are relatively minor.

4. Risk response

Execution of a risk response process is the implementation of a risk action plan that companies should make a priority to reduce risk to an acceptable level, which includes the following actions:

Respond to notification of triggering events: Authorized persons must respond to triggers (appropriate responses include reviewing current reality and updating action plans) and assigning risk action plans.

Implementing risk action plans: Risk action plans need to be formed in advance with timely risk assessments. Written risk action plans should be followed when formally confronting risks.

In the risk planning process, the company should prioritize the list of risks into a risk response plan as follows: First, develop a risk response strategy, which includes acceptance, avoidance, mitigation and dispersion. Second, build risk action plans, which detail the chosen risk response path.

Risk avoidance refers to the avoidance measures for some uncontrollable risks. For example: In the process of website development, there may be personnel leaving the job, and some other factors are unforeseen and uncontrollable. In practice, this paper adopt the way of making a reserve of personnel in advance. When there are personnel departing the project, this reseach suggests immediately draw reserve personnel to participate in the current work.

Risk diversification means trying to reduce the adverse impact of risk events to an acceptable level.

Risk acceptance is the explicit acceptance of those risks that are not intended to be disposed of by changing the project's target plan. For example, if the project will continue for a certain time, during which the price of the hardware and software to be purchased may increase in response to changes in the market. The development team cannot change the objectives of the project due to the price increase factor, then this paper suggest to adopt an acceptance strategy. The response strategies and measures for each risk event of this project are shown in the table.

Table 8. Risk response plan

Risk Number	Coping strategies	Specific measures
A1	Risk Mitigation	Increase experienced technical staff to reduce code vulnerabilities; increase the frequency of testing code: multiple tests and solve known bugs and logic errors.
B1	Risk Avoidance	Do the project time planning ahead and check the time with Party A; link with the developer treatment, but should be adjusted dynamically according to the actual situation of the developer.
B2	Risk diversification	Carry out user experience improvement plans with mathematical reliability; recruit professional product experience officers, etc.
B3	Risk Acceptance	If such factors affecting the progress and efficiency, the deadline can be extended appropriately
B4	Risk diversification	Regularly check project progress and keep a summary
B5	Risk Avoidance	Prepare the personnel reserve in advance. When there are personnel leaving, immediately put the reserve personnel to participate in the current work.
C1	Risk Acceptance	Budget increases as appropriate
C2	Risk diversification	Regular communication with stakeholders
D1	Risk Avoidance	Hire professionals to have control management on risks related content on time
D2	Risk Avoidance	Hire professional project managers to control issues related to project management promptly
E1	Risk Acceptance	Timely return surveys to user groups and system modifications and upgrades
E2	Risk Mitigation	Carry out detailed preliminary research, collect and analyze all kinds of external information and understand macro policies

Report on progress as planned: Determine the project progress according to the original plan. Regular reporting of risk conditions enhances communication between groups, and groups also need to conduct regular assessments of risk conditions.

Fix deviations from the plan: the results are not ideal, and in need to find another way out. Compare and analyze the status of the project and implementation during the meeting, record corrections and make appropriate adjustments on time.

5. Conclusions

This paper takes a specific project as an example, fully integrates the software development lifecycle, uses the FMEA method to conduct a scientific and practical risk assessment, and carefully analyzes and studies the technical risk, cost risk, schedule risk, management risk and social and environmental risk in the development process of the global disciplinary talent radar project. The research results of this paper are applied in the Global Unified Artifact Distributed Autonomous, so that project managers and technical supervisors can more effectively grasp the potential risks in all phases of the project and guarantee the smooth running of the project. By conducting the series of activities, it provides a reference and helps for the successful completion of the project, and also provides some references for the development and conduct of similar projects.

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