# Practice on the Project Management to the Digital Transformation of Group Enterprise

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**Abstract:** This paper briefly introduces the construction scheme of digital transformation project management of group enterprises based on PDCA cycle. Firstly, the necessity of enterprise digital transformation and the role of project engineering management in the high-quality development of group enterprises are analyzed, and the PDCA circular project management method is proposed; Secondly, it analyzes the current situation of project management in the process of digital transformation, and points out the practical problems of project management in group enterprises, such as non-uniform manufacturing management, non-uniform R& D management, non-uniform supply chain management and non-uniform operation management; Finally, this paper systematically introduces the construction scheme of digital transformation project management of group enterprises based on PDCA cycle, and innovatively puts forward the enterprise project iterative management mode based on the combination of "basic ability base of enterprise digital management" and PDCA, which provides strong technical and tool support for the digital transformation of group enterprises.

## 1. Introduction

In 2020, with the rapid spread of the global epidemic, a large number of industries were impacted by the epidemic, and the activity of Global trade decreased significantly, which impacted the business model, supply and consumption, production efficiency, manufacturing coordination, technological iteration and other aspects, and prompted enterprises in various industries to accelerate reform and transformation.

Enterprise project management is not only an important part of the digital transformation of group enterprises, but also the cornerstone of promoting the high-quality development of group enterprises. Aiming at the current situation of project management in the process of digital transformation of group enterprises, this paper puts forward a construction scheme of digital transformation project management of group enterprises based on PDCA cycle, which solves the practical problems of project management of group enterprises, such as non-uniform manufacturing management, non-uniform R& D management, non-uniform supply chain management and non-uniform operation management, At the same time, based on information technology, build a "base of basic ability of enterprise digital management", and provide strong technical and tool support for group enterprises to improve quality, increase efficiency, reduce cost and make decisions through enterprise practice.

## 2. Enterprise digital transformation and high-quality industrial development background

### 2.1 Background of enterprise digital transformation

According to the "2021 digital transformation white paper" released by China enterprise digital alliance in 2021, in the post epidemic era, traditional enterprises are struggling to survive, and the digital boom is rising rapidly. Emerging technologies such as big data, artificial intelligence, cloud computing, mobile Internet and 5g have played an important role in this epidemic. More and more enterprises have begun to use innovative methods such as "cloud office", "online operation",

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"intelligent manufacturing", "contactless production" and "cooperation in different places" to promote the gradual formation of new models and new business forms of digital economy [1].

### 2.2 High quality industrial development background

In March 2021, the 14th five year plan and the outline of long-term goals for 2035 were officially released. The 14th five year plan points out that to promote high-quality development during the 14th Five Year Plan period, we must base ourselves on the new development stage, implement the new development concept and build a new development pattern. High quality development is the theme of China's economic and social development in the 14th five year plan and even in a longer period, which is related to the overall situation of China's socialist modernization.

At the same time, the high-quality development of group enterprises needs to be promoted simultaneously. Improving the enterprise's project management ability is the guarantee for the sustainable and high-quality development of the enterprise. The group enterprise needs to continuously optimize the industrial structure, release the innovation potential, improve the management coordination, enhance the productivity effectiveness, and improve the efficiency and efficiency of the enterprise to a higher level. It is urgent for the enterprise to establish and improve the digital coordination mechanism, project implementation management mechanism Incentive and restraint mechanism, etc. High quality industrial development will become an important guarantee and core competence for enterprises to enhance their comprehensive industry competitiveness.

## 3. Research on digital transformation project management of group enterprises

In the process of digital transformation, group enterprises need to simultaneously promote innovation such as industrial structure optimization, management reform and business collaboration. Enterprise project management is the guarantee of industrial collaboration, and industrial collaboration is the basis of high-quality development of enterprises.

### 3.1 Enterprise project management

Group enterprise project management is an important part of enterprise high-quality development. Project management of group enterprises involves sales, procurement, production, R& D, supply chain coordination, operation and management in the process of enterprise operation and development. At the same time, according to the enterprise functions and business areas, it is divided into multi-level management.

Efficient and powerful enterprise project management is an important way and means to improve the efficiency and market competitiveness of group enterprises. Digital and intelligent management system and scientific incentive measures are innovative measures to continuously optimize modern enterprise management, and they are also the basic guarantee to assist enterprise project management to improve quality and efficiency.

### 3.2 Current situation of enterprise project management

In the process of enterprise project management, group enterprises mainly establish a set of perfect management system for industrial structure, management process, business coordination and so on. By introducing advanced technologies such as cloud computing, big data and artificial intelligence, a set of digital, intelligent and visual information system is constructed as an auxiliary management means.

At present, the industrial structure in group enterprises is mainly managed by business areas and management structure. Because group enterprises involve a wide range of business, complex personnel structure, geographical dispersion, information island and other reasons, the usual enterprise project management will authorize subsidiaries to manage independently. Therefore, a chimney closed management mode is gradually formed in the direction of enterprise development and operation.

In terms of management processes, due to the different processes involved in various businesses

of the group and the differences in functional units and processing details, the whole management system is usually vertically divided into group level, company level and factory level; Horizontally, it is divided into corresponding horizontal functional management departments according to the sales, research, production, supply, service and management related to the project category.

In terms of industrial collaboration, whether it is manufacturing collaboration, R& D collaboration, sales collaboration, supply chain collaboration or management collaboration, the collaboration efficiency and results of each link will directly affect the quality, progress, resources, cost and risk in the process of project implementation, and will also have a butterfly effect on the overall operation and management of the group enterprise.

The continuous evolution of new technologies promotes the diversified development of industries. The personalized business needs and flexible production management faced by enterprises have become more and more common. How to make enterprises stand out in the rapid development of industry competition, we must constantly improve the enterprise project management methods on the road of digital transformation of group enterprises to ensure the high-quality development of enterprises.

### 3.3 Problems faced

In order to achieve high-quality development, group enterprises must constantly improve the management structure, optimize the management system, adjust the industrial form and improve the efficiency of enterprise project management in the process of digital transformation. At present, the digital transformation project management problems faced by enterprises are the key points to be solved urgently:

(1) Inconsistent manufacturing management and opaque production capacity

Due to the division of functions within the group according to the industrial direction, different industrial directions will form subsidiaries independently. At the same time, each subsidiary will formulate an independent management system due to the needs of business development and operation management. Manufacturing projects within the group will form a manufacturing collaboration mechanism according to the upstream and downstream relationship of the supply chain. Due to the inconsistency of manufacturing management, the group enterprises are unable to predict production capacity transparently and efficiently. When collaborative external empowerment is required, the manufacturing cycle is often uncontrollable.

(2) R& D management is not unified and resources are not balanced

Due to different business forms and differences in industrial fields, group enterprises will cultivate product R& D teams according to their respective product R& D needs, and the software and hardware resources such as technical solutions, R& D tools, research instruments and simulation detection tools they master and use will be scattered in each subsidiary or industrial unit. This has resulted in closed management of R& D system, isolated information island and unequal distribution of R& D resources.

(3) The supply chain management is not unified and the cost is uncontrollable

The procurement cost of supply chain is often affected by many factors such as procurement scale, resources and the credit degree of procurement enterprises. However, group enterprises usually authorize their subsidiaries to carry out independent procurement management due to wide business scope, many product types and scattered factories. With the development of industry and the increasingly fierce competition in the industry, the independent supply chain procurement mode brings uncontrollable risks to the cost link in the project management of group enterprises, mainly involving the quality management of purchased materials, procurement costs, after-sales maintenance costs, etc.

(4) The operation and management are not unified and the development is not synchronized

Due to the business segmentation of group enterprises, each industrial unit operates and manages accounting independently. In the process of project management of group enterprises, due to the differences of management style, management system, personnel training and management process, the project coordination progress and quality are not synchronized, resulting in the digital

transformation and high-quality development efficiency of group enterprises.

## 4. Group enterprise digital transformation project management method

Aiming at the four key problems of non-uniform manufacturing management, non-uniform R& D management, non-uniform supply chain management and non-uniform operation management, this paper puts forward a construction scheme of digital transformation project management of group enterprises based on PDCA cycle, and applies new generation information technologies such as cloud computing, big data, block chain and artificial intelligence to build a "base of basic ability of enterprise digital management", Help enterprises with digital transformation and enterprise project management.

PDCA cycle was first proposed by Walter A. Shewhart, an American quality management expert. It was adopted, publicized and popularized by Deming, so it is also called Deming ring [2].

The digital transformation project management of group enterprises based on PDCA cycle proposed in this paper divides the management into four stages, namely plan, do, check and action. In the whole management process, first define the project scope, and then decompose the tasks through WBS (work breakdown structure) ; After that, all work shall be carried out according to the plan, and the implementation effect shall be checked; Finally, incorporate the successful and completed tasks into the project deliverables for management, and end this cycle; Those that are not successful or incomplete are left to the next cycle. The four stages of PDCA Deming ring are shown in Figure 1.

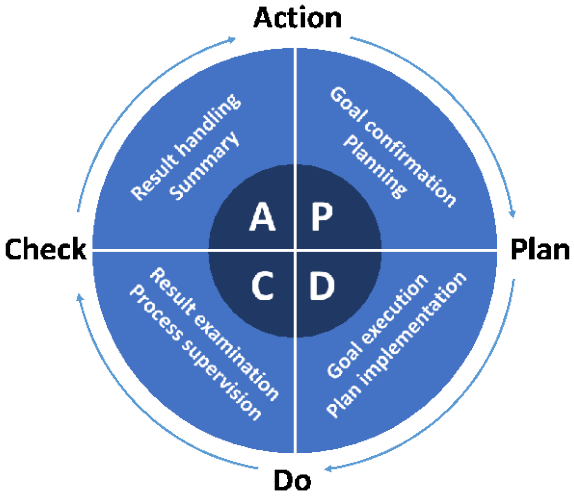


Figure 1 Four stages of PDCA Deming ring

### 4.1 Goal definition principle

Project objectives refer to the indicators that a project must complete in order to achieve the expected results. The formulation of project objectives shall comply with the smart principle [3]:

(1) Can be clear: it must be clearly expressed, not ambiguous, otherwise it will directly affect the implementation of the project and the acceptance of the results.

(2) Measurable: quantitative indicators should be used as project objectives, otherwise the success of the project cannot be accurately judged during project acceptance. At the same time, it will also make it impossible to split tasks more accurately because there is no quantitative index as the acceptance standard.

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(4) RELEVANCE: the formulation of enterprise project objectives cannot be separated from the project itself, but should be strongly related to the project itself.

(5) Time limit: the implementation of any enterprise project needs a time limit. Enterprise project management without time limit is out of control.

Enterprise project management is the basis of helping enterprises with digital transformation. Accurate target definition can make project implementation fast and management effective. Therefore, while complying with smart principles, the following principles should also be considered:

(1) Value: the advantages and values brought by the implementation of the project for enterprise operation and management, digital transformation and high-quality industrial development should be considered.

(2) Strategic: it should be able to guide the business management direction of the enterprise, and the project results play an important role in supporting the business strategy of the enterprise.

### 4.2 Task decomposition

According to the scope, cost, schedule and quality objectives of the project, combined with the PDCA cycle management mode, taking the critical path as the main line, the project tasks are divided into different levels and different PDCA cycle paths according to different management dimensions such as manufacturing collaboration, R& D collaboration, supply chain collaboration and operation management, The PDCA of each stage is further subdivided according to the project tasks, as shown in Figure 2.

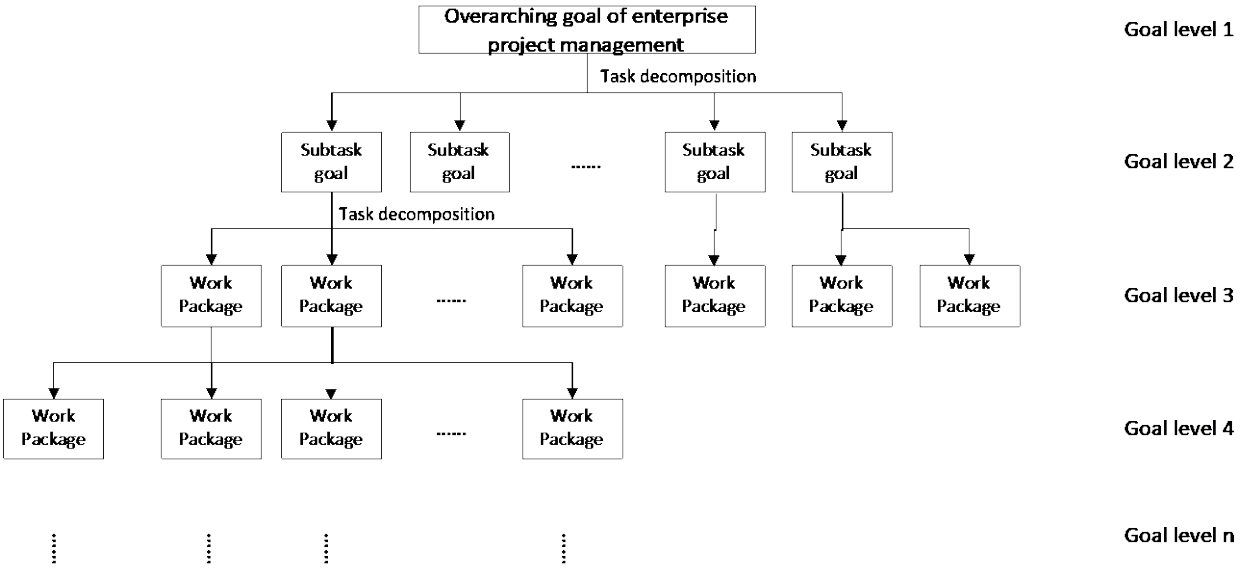


Figure 2 Breakdown of project objectives and tasks

### 4.3 Organization setting

In order to better promote enterprise project management, it is necessary to set the enterprise organizational structure from two dimensions: vertical (function division) and horizontal (Business Division). The relevant functions are organized as follows, as shown in Figure 3:

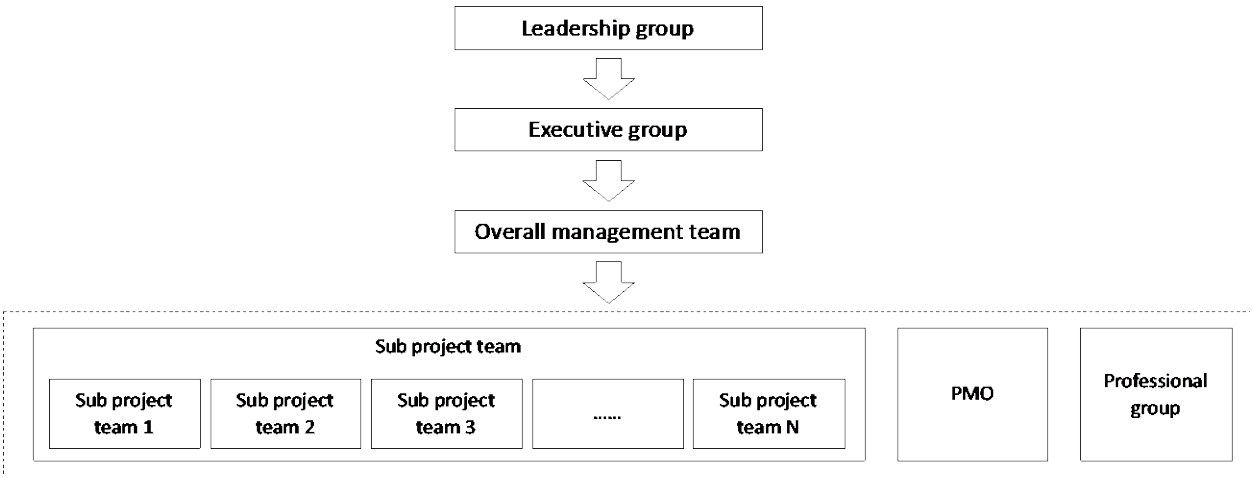


Figure 3 Organization setting

(1) Leading group: responsible for making decisions on project direction, objectives, promotion and investment plan; Review major matters to be decided in the promotion of the project; Guide and assess the implementation of the project;

(2) Implementation team: promote the implementation of the project plan around the relevant decisions of the project decision-making leading group; Take the lead in formulating the annual implementation plan and investment plan of the project and submit them to the project decision-making leading group; Take the lead in solving the problems that cannot be solved by each professional group during the implementation of the project; Review, guide and assess (motivate) the daily promotion plan, quality and target completion of the project;

(3) Overall team: take the decision-making content of the project decision-making leading group as the traction to refine the project scheme and implementation plan (sort out the current situation, optimize the scheme and benchmark) ; Evaluate and accept the phased results of project promotion; Put forward the evaluation and incentive suggestion report according to the completion of project implementation;

(4) Professional group: guided by the decision-making content of the project decision-making leading group, refine the technical scheme and implementation plan of each project according to the overall group framework scheme (sort out the current situation, optimize the scheme and benchmark) ; Evaluate and accept the professional and technical phased achievements of the project in charge;

(5) Sub project team: traction and promotion according to the project scheme; Orderly implementation in combination with business plan; Business unit organizations define business boundaries and responsibilities; Be responsible for the project implementation results;

(6) PMO: Promote project initiation, track and supervise the completion of the project, coordinate various resources required in the process of project implementation, and organize project acceptance; The specific members of each sub project team shall be determined by the team leader and reported to PMO for filing.

### 4.4 Project implementation

Project implementation is a very important management link. In addition to paying attention to the deviation between the three project benchmarks of scope, progress and cost and the project implementation process, it is also necessary to pay attention to the project scope, progress, cost, quality, resources, communication, risk, procurement, interested parties, etc. for each PDCA cycle management link after task splitting, And timely revise, coordinate and summarize at the end of each PDCA. Each enterprise project PDCA execution link needs to focus on the following steps, as shown in Figure 4:

(1) Prepare in advance and sort out the needs (leading group, overall group and professional group)

Before formulating each project plan, it is necessary to make advance preparations (identification of interested parties, risk assessment, etc.) for the task objectives and work package contents, sort out and analyze environmental factors and organizational process assets, and analyze the needs of work package contents to form data and information related to the guidance plan.

(2) Analyze tasks and make plans (overall group and professional group)

After the first step of sorting and preparation, according to the analysis of the task structure, split the specific steps of task execution, and clarify the required resource coordination, cost evaluation, scope definition, schedule, project coordination mode and other matters; At the same time, the influencing factors of the possible risks of the project shall be evaluated, and the risk response plan shall be formulated after a general understanding of various factors that may cause problems.

(3) Target quantification and node setting (overall group, implementation group and professional group)

In order to ensure the orderly and efficient implementation of PDCA enterprise project management, it is necessary to quantitatively analyze and split the PDCA stage objectives of the project, and set the completion nodes and evaluation standards for the quantified objectives.

(4) Project implementation and implementation objectives (implementation team and sub project team)

After the above three steps are completed, the project implementation will be orderly promoted around the content of the critical path according to the plan formulated in step 2 and the quantified objectives and node requirements in step 3. In this process, the implementation shall be carried out in strict accordance with the plan and realized step by step according to the measures. At the same time, we also need to constantly find problems, solve problems, think about optimization and other operations. Ensure that the project completes the work on time and quantity according to the requirements of the critical path.

(5) Process supervision and target verification (executive group, professional group and PMO)

This process requires the enterprise management team to implement the process supervision and management of the enterprise project in strict accordance with the plans and objectives formulated by the PDCA cycle. At the same time, it needs to compare and analyze the completion of the node with the node objectives.

(6) Test verification, process inspection (executive group, professional group, PMO)

Compare the implementation results with the required objectives. During the inspection, the plan shall be checked by stages, and only the plan objectives at that time shall be checked at a fixed time, which is conducive to the comparison of the completion results.

(7) Implement incentives and summarize experience (leading group, overall group and sub project group)

Summarize the successful experience and form the corresponding system. In the process of completing the plan, we must have successful experience. We should summarize the successful experience and copy it to the next plan.

(8) Transfer the problems / to-do items into the new PDCA cycle (leading group, implementation group, overall group, professional group, sub project group, PMO)

The problem / goal can not be solved / completed by one PDCA cycle. It is necessary to introduce the unsolved problems and to-do items into the next PDCA cycle to solve them. At the same time, according to the experience summarized in step 7, optimize the enterprise project management method of the next PDCA.

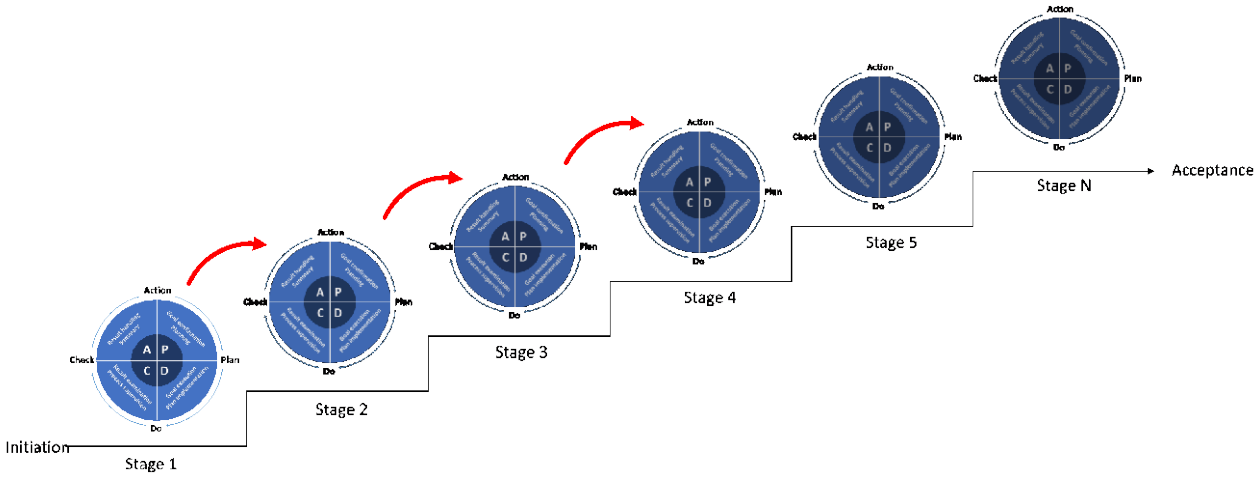


Figure 4 Process of group enterprise digital transformation project management model based on PDCA cycle

### 4.5 Digital management

The digitalization of enterprise project management can ensure the project implementation of group enterprises orderly and efficiently, and solve the unity of manufacturing management, R& D management, supply chain management and operation management. The specific management is as follows:

(1) Base construction of basic capability of digital management: according to its industrial organization structure and business field, based on the actual business process and management requirements, the group enterprises use software development technology and development tools, and rely on cloud computing, big data, artificial intelligence and other technologies to build software modules that can solve the management problems of a specific business scenario / a certain type of business field, together with computer systems Database, network, security facilities, communication technology, virtual resources, etc. are organically integrated into the information system with clear boundaries according to the planning structure to form a base of digital management infrastructure of group enterprises covering the group's business from sales, procurement, production, R& D, product extension service, after-sales management, logistics, energy control, security and environment management [4].

(2) Optimization of enterprise project management process: in order to better optimize the enterprise project management of the group enterprise and support the high-quality development of the industry, it is necessary to make a unified plan for the R& D capacity, manufacturing capacity, supply chain resources and operation and management mode of each industrial unit within the group enterprise, aiming at the synergy, business scope, technical support and human resources involved in different businesses, Establish a proprietary management mechanism and implement unified construction, implementation and operation and maintenance. Optimize the resource allocation of group enterprises to the greatest extent.

(3) Establishment of consensus mechanism for collaborative task allocation: after the collaborative task allocation of group enterprises' projects, it is necessary to timely establish a reasonable task allocation scheme within the project and among sub project groups, and form a management consensus on project milestones and project delivery and a project management mechanism based on the basic ability base of digital management. Using the consensus algorithm and smart contract integrated in the system, by setting condition trigger in the process of enterprise project implementation, the resource coordination, progress early warning and management, cost control and other aspects of collaborative projects of group enterprises are more convenient, fast and accurate, and the implementation of resources, cost and progress is more transparent and controllable[5].

(4) Construction of PDCA project management algorithm base model: in order to orderly

promote the implementation of group enterprise projects, based on the method of PDCA cycle, combined with the requirements of task allocation and target content, an enterprise project management algorithm base model is established in the basic ability base of digital management, and combined with the task allocation consensus mechanism to form a quantifiable, optimized and evaluable PDCA project management[6].

(5) Construction of PDCA project management algorithm base model: in order to orderly promote the implementation of group enterprise projects, based on the method of PDCA cycle, combined with the requirements of task allocation and target content, an enterprise project management algorithm base model is established in the basic ability base of digital management, and combined with the task allocation consensus mechanism to form a quantifiable, optimized and evaluable PDCA project management. Formation of phased evaluation and incentive distribution system: in each PDCA project management stage, set phased evaluation and incentive distribution mechanism, stimulate the project implementation enthusiasm of each organization team with the help of intelligent management means of digital management basic ability base, and provide inexhaustible power for the promotion of each PDCA cycle[7].

## 5. Conclusions

By analyzing the current situation of project management in the process of digital transformation of group enterprises, this paper points out the challenges faced by group enterprises in the process of high-quality development and four key problems in project management, and systematically puts forward a construction scheme of digital transformation project management of group enterprises based on PDCA cycle: firstly, it introduces the goal definition principle of enterprise project; Secondly, task decomposition, organization setting and project implementation management are carried out according to the target requirements; Finally, it innovatively proposes to build enterprise project digital management model and algorithm based on cloud computing, big data, blockchain, artificial intelligence and other new generation information technologies, create a "base of basic ability of enterprise digital management", further optimize the project management mechanism of group enterprises, and help the digital transformation and upgrading of group enterprises. Through the verification of enterprise practice, the project management problems of group enterprises such as non-uniform manufacturing management, non-uniform R& D management, non-uniform supply chain management and non-uniform operation management have been well solved, and strong technical and tool support has been provided for the digital transformation, quality improvement, efficiency improvement, cost reduction and decision-making of group enterprises.

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