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MEASURING THE SUCCESS OF KNOWLEDGE MANAGEMENT IN THE ELECTRIC POWER INDUSTRY AND RANKING DIMENSION OF KNOWLEDGE MANAGEMENT USING AHP

(CASE STUDY: TARASHT POWER PLANT)

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ABSTRACT
Nowadays there are issues that could not be solved with previous methods. The main feature of today's issues is the extent of the large amount of the data and information that must be collected, stored, manufactured, processed, retrieved and analyzed. This feature, generating the bulk of organizational complexity moves towards the development of a new technology called information technology with the help of which working with data and information will be much easier. It is also important to note that other organizations are not evaluated based on performance, but their value is for what they are capable of doing.
In this article, it was tried to measure the relative success of knowledge management in the electric power industry (Tarasht power plant) and rank the dimensions of knowledge managementand in each dimension of measuring success, the company status is identified. Finally, some strategies are provided for improving the existing situation.

Keywords: Knowledge, Knowledge Management, Information Technology

1. INTRODUCTION

The study and analysis of the importance and characteristics of knowledge in the field ofperformance within organizations reveals that having updated knowledge and informationhas become an undeniable necessity for the survival of organizations.

Today's industrial society is an information society where power technology isbeing gradually replaced by knowledge technologies. Therefore, organization managemetn must rely on superior knowledge to able to manage wiser decisions on major issues and improve knowledge-based functions. That is why knowledge management is more important than knowledge.In fact, knowledge management is the process of creating value of invisible assets of the organization.

In today's complex, dynamic environment it is essential for organizations to continuously create new knowledge and to validate them. One area that plays an important role in achieving the goal isknowledge management in organizations. The issue of knowledge management is therefore more important than knowledge itself. It seeks to demonstrate how the information, personal knowledge and organization knowledgecan be turned into group and personal skill and knowledge in organizations.

Knowledge management is one of the most important factors for success in the competitive conditions and the information age. The importance of this issue is to the extent that today a number of organizations measure their existing knowledge and report it as an index for ranking businesses as intellectual capital of the organization. These institutions regardnecessary the establishment of knowledge management as part of the organization strategy. (Baskerville and Dulipovici, 2006)

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The most important role that can be attributed to knowledge management is to consider it as a change methodology.

Knowledge management can be the most important factor of change in an organization, on the one hand by absorbing the new knowledge into the system and on the other hand by effective management of the knowledge. Knowledge can be far more effective in improving the funciton and due to proximity to decisions and organization actions and as a result, the quality of the service in the organizations in general and public agencies specifically depend on it.

2. Review of the Literature

In Davenport's view, "knowledge is a fluid and variable combination of experiences, values, environmental information, and expert insight that provides a framework for evaluating and incorporating experiences and new information." Blanker defines knowledge as multi-layered, complex, dynamic, and abstract that exists in human mind (Davenport and Prusak, 1998).

Knowledge is a fluid mix of what we learn, the values, conceptual information and expert insight that provides a framework to evaluate and incorporate new experiences and information. Knowledge is created and developed by qualified expert people (Earl and Scott, 2007). Knowledge in organizations exists not only in documents and databases but also in experiences, efforts, processes and routine incidents. In Davenport's perspective knowledge exists in organization not only in documents, but also in all the activities, processes and actions of the organization.

According to another definition of knowledge, humans play a major role in knowledge creation. Knowledge is created through (informal) circulation and transmission among the members of integrated groups and remains in the organization. This defintion of knowledge shows that both creating and maintaining knowledge is the result of collective activity and effort in unitary groups and it is not a personal effort (Earl and Scott, 2007).

Hybard (1997) defines knowledge management as following: "knowledge management is the process of capturing the collective expertise of a company from wherever they are (databases, paper or peoples' mind) and distributing it to any place that can help create maximum efficiency."

Blount (2001) considers knowledge management as a process through which organizations employ collected information.

Petrach (1996)believes: "knowledge management is to provide the right knowledge for the right people and in the right time so they can make the best decision" and Beckman (1997) defines knowledge management as:"formal access to the experiences, knowledge and expertise that can create new capabilities, makes possible functioning of top management, encourages innovation and upgrades customer value."

Whig (1997) argues that knowledge management is the creation, renewal and application of knowledge in order to maximize the effectiveness and efficiency affiliated to corporation knowledge through its knowledge assets (Abtahi and Salvati, 2006).

Knowledge management is the combination of acquisition and storage of explicit knowledge, coupled with the intellectual capital management. By reviewing over a hundred definitions published on knowledge management, it is summarized in three perspectives:

1 - Business view: knowledge management is a business activity which has two main aspects. One is paying attention to the knowledge element in business activities reflected in the strategy, policy and proedures at all organization levels and the second is creating a direct relationship between intellectual assets and positive business effects. Based on this perspective knowledge management is an integrated and collaborative agent for knowledge creation, acquisition, organization, access and use of the intellectual capital of the organization.

2 - Cognitive Science view or Knowledge Science: Knowledge - the insights, perceptions and knlowledge of technical applications - is an essential resource that allows us to act intelligently. Over time, important knowledge turns into other forms - such as books, technology, practices and traditions- in all

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organizations and generally in the society. This transformation leads to the accumulation of experience, and when applied properly,will lead to increased effectiveness. Knowledge is one of the main factors thatmakes possible intelligent personal, social and organization behavior (Lee, k. C & kang, I.W, 2005).

3- Technology/process view: Knowledge management is a concept based on which the information isturned into applicable knowledge and can be used for people who can apply it by little effort.

In general, knowledge management is interdisciplinary in nature. These disciplines include:

• Organizational Science
• Cognitive Science
• Linguistics and Computational Language
• Information technologies such as knowledge-based systems, information management and documentation, and electronic performance support systems for database technologies
• Library and Information Science
• Technical writing
• Anthropology and Sociology
• Training and Development
• Storytelling and Communication Studies
• Cooperative / Collective Technology such as computer-based cooperative work and groupware, as well as intranets, extranets, portals and other web technologies.

Knowledge management encompasses the knowledge management process, technology, strategy and organizational behavior. Knowledge management in organizations must have a framework, and the framework should have the following characteristics:

* The ability to assess the decisions taken on the conceptual and contextual sources of the organization
*Guiding our vision toward existing problems and helping us to understand the reality
*Providing the conditions and tools for situation analysis
*Developing metrics to measure the situation
* Compatibility with existing systems and resources to solve problems and deal with challenges
* The ability to encrypt using any corporate language so that it can be used for as long as necessary.

Knowledge management should give administrators the ability to identify the sources of knowledge and to provoke practical ideas that are applicable (Ramezani, 2004).

Some of the benefits of knowledge management include:
Improving competitive response: to enable organizations to respond to market changes and accelerate time-to-market.

* Reducing the expenses and avoiding the waste of intellectual capitals: taking the implicit knowledge under control provides the possibility for the organization to use knowledge to maintain the processes for future functions and eliminate the expenses for providing repeated education for the staff and experts.

* Eliminating the needs for acting globally: practices that are geographically dispersed, demand specific challenges in cultural context and knowledge management. Organizations with efficient culture in knowledge management can finish the concept of "they and we". Whatever exists, will be "we" and efficient use of the dispersed sources will be maximized.

* Job Effectiveness: applying knowledge management infrastructure eliminates traditional limits,increases knowledge sharing among employees and thus enhances efficiency.

* Organization efficiency: tools, models, and the best applicatins of the knowledge which is along with the culture of knowledge sharing, forms the cooperation environment and increases organization efficiency.

* To determine the strategic direction: promotes using cultural knowledge, creativity and innovation, and a result influences the strategic (Entezari2006).

Personal and organizational knowledge are two different concepts. A number of researchers believe that organizations lack the ability to learn and people learn more in the organizations. Despite this, some

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researchers believe that the organizations gain their knowledge through documentation and daily scheduled activities. By organizational history and culture, new knowledge is created in organizations. The knowledge an organization creates for solving leading problems, is called organizational knowledge and the knowledge which is personally created by people is called personal knowledge. The knowledge created by the people as a whole within an organization becomes more than the sum of knowledge of the individual people(Kheir-Andish andAfsharnezhad, 2004).

Learningin organization is greatly dependent on complexity of the task and the organizational environment. As mentioned, individual knowledge and organizational knowledge are distinct from each other but are still related. This view is accepted because in the present circumstances, individuals within organizations need quick decisions to solve customer problems. This means instead of using rules and regulations as directed hierarchical problem solving method, the staff hasto provide efficient solutions to solve business problems efficiently (Entezari2006).

3 - METHODOLOGY AND RESEARCH MODEL

Management structure base model is used for this research model as shown in Figure 1. This model is named the knowledge management building bases (building blocks) by Probst, Rob and Rumhart (2000). This model is one of the most complete models in performance model field. The designers of this model see knowledge management as a dynamic cycle in constant rotation. The process consists of eight components that make up the two cycles: one internal cycle and another external cycle (Probst et al, 2000)

The internal cycle: is created by building blocks of discovery (identification) acquiring, developing, sharing, application (operation) and maintenance of knowledge.

The external cycle: consists of blocks of knowledge goals and knowledge assessment that characterize the knowledge management cycle. Feedback completes the two-cycle. Components of this model are shown in the following figure.
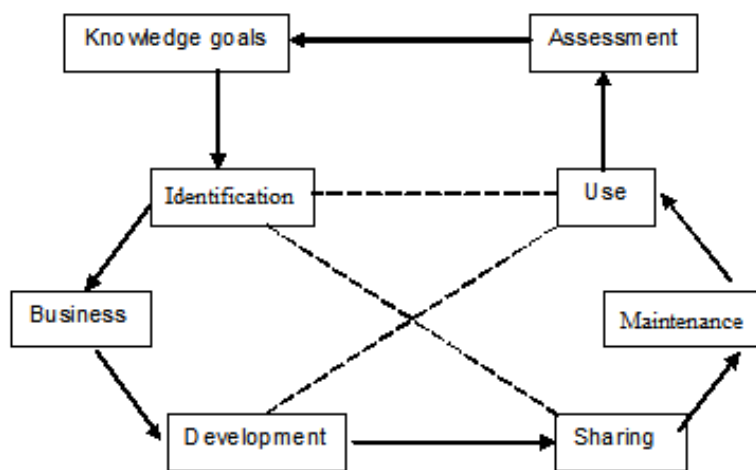

Figure 1 - The knowledge management building bases model (Probst et al., 2000)

According to the above figure, the conceptual research model for designing the questionnaire and indicators are used in figure 2.

Given that the results of this study can be used in Tarasht power plants, this study isaimed to be practical and due to the presence in the organization and acquiring information within the organization using a questionnaire to gather information from experts, the research methodologyis field survey. Also, given that the result of the power plant is related to Tarasht, the research is a case study.

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Figure 2: Conceptual model of research

4 - Research Questions and Objectives

This study aims to determine the status of Knowledge Management in Tarasht power plant so as to identify the existing gaps and offer strategies to compensate for them. According to the research objectives, research questions include:

1- What is the level of each index forming knowledge management in Tarasht power plant and how much is the gap of each index to the desired level?

What is the success level of the knowledge management in Tarasht power plant and how much is the gap relative to the desired level in each dimension?

3 –What are the strategies to compensate for gaps and to improve each dimension of knowledge management at Tarasht power plant?

4 –How is the ranking of knowledge management in Tarashtpower plant?

POPULATION

Tarasht power plant company is Iran's first thermal unit which its units were operated in 2009. The main activities of the plant include electrical power generation, simulator training center, issuing technical certificates for small-scale generators and sports services.

Table 1: Education information and work experience of the population

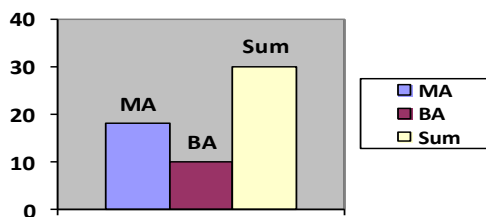| Education	Average Work Experience (years)	Total Percentage	Number
BA	18	51.43	16
MA	10	42.86	14
Sum	14	100	30

Figure 1: The population frequency based oneducation

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Regarding the limited number of experts, the research was performed taking all smaples into account. So, middle managers, top managersand experts in Tarasht power plant holding BA and MA and with work experience over one year form the population of this research. (Table 1)

6 -Summary of Findings
The first research question: what is the level of each index forming knowledge management in Tarasht power plant?
Considering the collected data, using the questionnaire and summing them up, the condition of the knowledge management
inTarashtpower plant in each of theindices were determined as in Table 2.

Table2: Knowledge Management inTarashtpowerplant in each of theindices

Dimensions	Index	The gap (%)	Indexaverage (%)
Knowledge Goals	How much of the company's prospects and future needs have been identified?	24.67	75.33
	How much the organizational knowledge management strategy has been given priority by the company?	45.33	54.67
	How much is the company's knowledge of its weaknesses in specialized fields?	36.17	63.83
Knowledge identification	How much of the company's databases and documentation in the company have been identified?	27.33	72.67
	How much the colleagues' knowledge and expertise in the company have been identified?	44.33	55.67
	To what extent the company databases and documentation outside have been identified?	34.67	65.33
	How much of the knowledge and expertise of the users and partners outside the company have been identified?	55.33	44.67
Acquiring knowledge	To what extent the internal and external experts and consultants are used by the company to gain the required knowledge?	31.67	68.33
	To what extent are the joint research projects with other organizations and research centers?	40.67	59.33
	How much is the participation share of the company in national conferences?	23.33	76.67
	How much is the company involved in organizing international conferences?	61.67	38.33
	How active is Tarasht power plant in holding training courses and professional workshops?	32.33	67.67
	How much does the company provide access to primary sources (papers, journals, research projects, theses, patent license, patent, etc)?	49.00	51.00
	To what extent does the company provide access to secondary sources (books, encyclopedia, review articles, etc.)?	41.33	58.67
	How much does the company provide access to websites and important internal information bases?	24.33	75.67
	How much does the company provide access to websites and important external information bases?	38.00	62.00
	How much effective access to the intranet and internet information superhighway is provided in the company?	45.33	54.67
	How much attention does the company pay to using electronic	33.33	66.67

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|	communication (e-mail, etc)?		
Knowledge Development	How much is the company's attention to synchronization and updating knowledge with regard to the environmental changes and the company's plans?	39.00	61.00
	How much does the acquired knowledge assist the change in company's business objectives and procedures, and working processes?	24.67	75.33
	How quickly does the company act in attracting experts with needed knowledge?	36.67	63.33
Knowledge sharing	How active is the faculty participation in scientific meetings to share knowledge?	45.33	54.67
	How much does the company attach importance to creating forum (Internet discussion) for discussion and sharing ideas?	43.00	57.00
	To what extent there is effective job rotation (labor mobility)?	40.67	59.33
	How much of the work in the company is done as teamwork?	38.33	61.67
Applying knowledge	How much attention in the company is paid to benefiting from academic knowledge?	45.67	54.33
	To what extent does the company pay attention to reviewing existing and new documents and reports?	51.38	48.62
	To what extent does the company pay attention to risk creation in innovative projects?	51.67	48.33
Maintaining knowledge	How active is the company in the storage and maintenance procedures?	48.33	51.67
	How active is the company in creating knowledge banks (such as libraries and web sites, etc)?	56.33	43.67
	How active is the company in updating knowledge bases?	47.33	52.67
	To what extent can partners in a company have access to each other's academic and professional background?	38.33	61.67
Knowledge Assessment	How much suggestion system is used in the company?	41.33	58.67
	To what extent the quality of the company's knowledge is preferred over quantity?	39.00	61.00
	How much feedback is provided for knowledge based performance?	29.33	70.67

The second research question: What is the success level of knowledge management at Tarasht power plant?

Table 3: Comparison of the existing level and optimal level of each dimension of knowledge management

Dimensions	The gap(%)	AVERAGE(%)
Knowledge Goals	35.39	64.61
Identifying Knowledge	40.42	59.58
Knowledge acquisition	38.27	61.73
Knowledge Development	33.44	66.56
Knowledge sharing	41.83	58.17
Applying Knowledge	49.57	50.43
Maintaining Knowledge	47.58	52.42
Assessment of Knowledge	36.56	63.44
Conclusion	40.15	59.85

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Comparison of existing success at knowledge management for each dimension and the gap to desired level are in Table 3 and Figure 2.
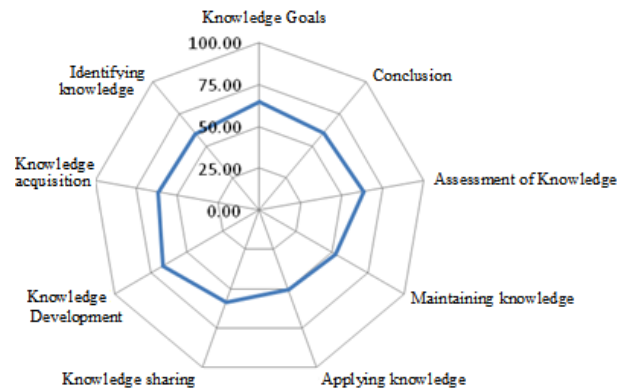
The third research question: What compensation mechanisms exist for each of the dimensions of knowledge management in Tarasht power plan?

• Knowledge goals dimension

This dimension is considered to improve the status of prospect index and future needs, witha 24.67 percent split. It is proposed that more effort be made for moving in the direction of the country's 20-year vision and this important goal requires providing some infrastructure such the approach to move towards privatization.

This dimension is considered to improve status of knowledge management index with a45.33 percent gap. Greater effort is suggested to increase this index, including serious attention to the intellectual capital of the organization.

This dimension is considered to improve knowledge weak points index with a 36.17 percent gap. It is suggested to turn weaknesses into strengths in order to achieve staff information, develop knowledge and exchange knowledge. In this regard, particular attention shall be focused on the knowledge chain. Knowledge management chain includes internal awareness, internal accountability, external accountability and external awareness and it is a set of interactions that make up the cycle of organizational innovation.

Internal awareness is the organization ability to quickly achieve existing skills and core competencies, interactions, process functions and great emphasis on functional structure which is mostly penetrated in traditional companies and prevents the development of inner awareness.

Internal accountability is a core feature of the operation for inner awareness. The organization may well be aware of the strengths and market demands, but may not be able to exert needs and changes to meet market goals.

In case of external accountability and external awareness, the organization must identify and guide the understanding of the value of products and services for markets, customers, competitors and their capabilities, government regulations, and any other power that exists outside the organization.

• Knowledge Identification Dimension

In order to improve the condition of identifying databases and documents in the company with a gap of 27.33 percent, it is suggested to share the knowledge among individuals and the gained knowledge be used to meet the objectives of theorganization.

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To improve the knowledge identification index, and the expertise of colleagues inside the company with a44.33 percent gap, it is suggested to create systems for building and maintaining knowledge sources, developing and facilitating knowledge and organization learning and to regard knowledge as a capital in the organization.

In order to improve the detection of databases and documents outside the company with a 55/33 percent gap, given that the distance of the gap to the improved condition is great, it is suggested to attempt through evaluation and information acquisition on the external environment through key staff and identification of strategic factors and avoiding strategic myopia.

* **Knowledge Acquision Dimension**

In order to improve knowledge acquision index through experts, internal consultants and external consultants with a31.67 percent gap, it issuggested to form a think tank forcreating thoughts and new ideas in the field of knowledge management to meet organization purposes.

In order to improve research plan index for joint research projects with other organizations and research centers with a40.67 percent gap, regarding the great gap to improved condition, it is suggested to the organization to develop its virtual borders and eliminate the challenges that exist in physical places by software agents, search tools, intranet and internet.

In order to improve the status of holding national conferences index with a23.33 percent gap, it is suggested to take action through advertising, partnerships, professional societies and trade unions.

In order to improve the status of international conferences index with a61.67 percent gap, it is suggested to provide opportunities for providers and seekers of knowledge management in global knowledge markets parallel with the concept of portals on the internet.

In order to improve the status of holding courses and professional workshops index with a 32.33 percent gap, it is suggested to establish an active system for knowledge management of training with the users of the training department and the database of the training services.

In order to improve access to primary sources index(Papers, journals and research projects) with a 49 percent gap, it is suggested to establish a unit for Research and Development (R & D) in line with the goals and mission of the organization in the center of the reputable publications and thereby provide access to the references and primary articles.

In order to improve the status of absorbing people who own the needed knowledge, with a36.67 percent gap, it is recommended that the company sign contracts for consultation and the association of industry and universities to attract people who own the knowledge.

In order to improve job rotation index with a 40.67 percent gap, it is suggested to take required action using career table.

In order to improve knowledge database index with a 56.33 percent gap, it is suggested to launch web sites and electronic publication in the company.

In order to improve the result of peoples' knowledge function index, with a 29.33 percent gap, it is suggested to pay more attention to knowledge-based activities so that the traditional approach is gradually replaced by traditional approach.

The fourth research question: How is the ranking of knowledge management in Tarashtpower plant?

To answer the fourth research question, paired comparison method and the analysis of hierarchical model AHP was used. This method compares paired dimensions of knowledge management and the ranking has been determined using Expert choice software. To obtain a matrix of paired comparisons with AHP questionnaires, the views of managers and related experts were collected. The collected data were analyzed by Expert choice software and the dimensions of knowledge management were ranked according to Figure 3.
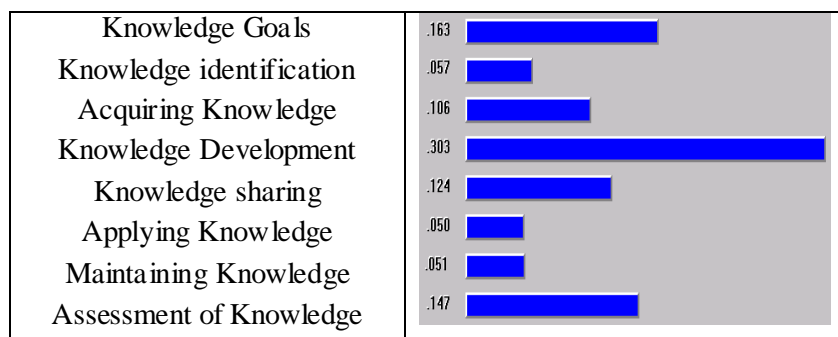
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Figure 3: Determining the ranking of knowledge management using AHP

As can be seen in Figure 3knowledge development has the highest rank andapplying knowledge has the lowest ranks among knowledge management dimensions in Tarasht power plant.

RESULTS
According to the results in Table 2:

- In knowledge goals dimension,thehighest points were related to outlook index and the future needs of the organization,and the lowest points were related to the management of organizational knowledge index.
- In knowledge identification dimension, the highest points were related to databases index and documents inside the company, and the lowest points were related to the knowledge and expertise of users and partners outside the company.
- In knowledge acquision dimension, the highest points were related to holding national conferences index and the lowest point was related toholding international conferences index.
- In knowledge development dimension, the highest points were related to change indexin objectives and procedures as well as work processes and the lowest score was related to the environmental and company program changes.

- In knowledge sharing dimension, the highest points were related to the index of work as the teamwork and the lowest points were related to the index of scientific meetings.

- In knowledge implementation dimension, the highest points were related to the index of utilizing the knowledge of academics and the lowest points were related to the risk-taking index in performing innovative plans.

- In knowledge maintenance dimension, the highest points were related to the index of access to scientific and other professional records of coworkers and the lowest point was related to creating knowledge database index.

- In knowledge assessment dimension, the highest points were related to feedback index and the lowest points were related to the suggestions system index.

Also, according to the results in Table 3:

Among the dimensions of knowledge management, the "knowledge development" dimension with 66.55 percent was the strongest and "knowledge application" with 50.43percent was the weakest.

Among the dimensions of knowledge management, the "knowledge development" dimension with 33.44 percent had the minimum gap regarding the desired level by the experts and then "knowledge application" with 49.57had the maximum gap regarding the desired level by the experts.

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