Research Paper

Developing a Knowledge Management’s Framework for identification of Success factors in the Product Acquisition Cycles - case of aviation Industries Organization

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Determining the success factors of the product acquisition process has initialized extensive researches at the level of institutions and organizations. However, few studies have been done about the success requirements of knowledge management in the product acquisition process. Therefore, in this research it is attempted to deal with this topic with a mixed method of qualitative and quantitative studies. At the qualitative stage by the use of the studies and the half-organized interviews the key knowledge which was very important for the success of each of the product acquisition phases was determined. Then this knowledge was translated to knowledge requirements, and at the next stage, a new model of assessing the situation of each of these requirements in product acquisition phases was presented. Finally, each situation was assessed with the knowledge management cycle approach in above-mentioned organizations. The results indicate that the knowledge production step in all of the product acquisition phases has an inappropriate situation, but the sharing process has an inappropriate situation in all phases except the knowledge production phase.
1. Introduction

With intense global competition, successful new product development has become critical to the survival and growth in today’s dynamic business environment. New product development is getting progressively difficult as new technological developments and ever-changing customer demands have necessitated faster introduction of new or modified products. The increased pressure on the new product development process has forced organizations to create new ways to efficiently manage their knowledge assets. Knowledge management provides real competitive advantages for many firms engaged in agile new product development (Shankar, Acharia and Baveja, 2009). The design of new product development work is anchored in knowledge management (Verona, 1999). Organization design and knowledge management architectures have been identified as moderating factors in the success of the new product development successes (Adler and Docherty, 1998; Nadler and Tushman, 1999).

Project-based industries, e.g. the construction and engineering industry with permanent or semi-permanent project teams (Turner, 2006), regard knowledge management as highly significant (Ajmal et al., 2009; Kale and Karaman, 2011). Knowledge resources yield high returns because knowledge is rare and difficult to imitate or substitute (Badaracco, 1991). Managing knowledge helps companies to develop skills and competencies, sustain competitive advantages, and increase value (Kogut and Zander, 1992; Spender, 1996). As the work organization of project-based organizations often distinguish groups from one another and create subgroups with subcultures (Trice and Beyer, 1984), the challenges for project-based organizations regarding the effective sharing of knowledge are even greater. This type of company needs to overcome the organizational boundaries resulting from the project-based work organization (Ruuska and Vartiainen, 2005; Aliahmadi et al., 2009) and focus on knowledge sharing across organizational boundaries, such as between project teams.

The knowledge management literature addresses a vast number of topics such as knowledge creation, knowledge transfer, knowledge capabilities, knowledge strategy, knowledge management systems, micro-communities of knowledge or social networks of knowledge and knowledge worker. According to Newman and Conrad (2000) knowledge management is an “integrating practice” of meshing human and automated activities (the social and technical subsystems) (Shani, A. B.; Sena, J. A. and Olin, T. 2003).

In the author’s opinion, knowledge management is as a planned, structured approach to manage the creation, sharing, harvesting and leveraging of knowledge as an organizational asset, to enhance a company’s ability, speed and effectiveness in delivering products or services for the benefit of clients, in line with its business strategy. Knowledge management takes place on three levels, namely the individual level, team level and organizational level. It is a holistic solution incorporating a variety of perspectives, namely people, process, culture and technology perspectives, all of which carry equal weighting in managing knowledge (Du Plessis and Boon, 2004).

2. Statement of the Problem and its Importance

Nowadays knowledge is the essential component of the organization success. Knowledge management can be defined as a systematic approach that provides efficient disciplines and procedures to enable knowledge to grow and create value for organizations (Gupta et al., 2000; Alavi and Leidner, 2001; Rao, 2002; Katsoulakos and Zevgolis, 2004; Šajeva, 2010). As knowledge is the core element of knowledge management, organizational competitiveness will depend on how knowledge is applied, exploited and integrated (Davenport et al., 1998; Alavi and Leidner, 2001; Šajeva, 2010).

Peter Druker says that: “The secret of the organizations success in 21st century is knowledge management.” Another definition of knowledge management states that it is a collection of
processes that enables knowledge to be utilized as a key factor in adding and generating value. In this line, Garvin (1994) points out that it not only includes the processes of creation, acquisition and knowledge transfer, but is also a reflection of this new knowledge on organizational behavior (Perez and Pablos, 2003). Therefore, organizations should create an environment for sharing, transferring and constructing the knowledge among their members and instruct them in conceptualizing their interactions (Nonaka and Takeuchi, 1995) and attempt to contrive and to determine basis factors for establishing knowledge management in organizations. What makes the problem and the challenge is that knowledge management is a systematic subject. A topic for whose successful performance, a complete and pervasive attitude towards all the various factors of the organization are needed. On one side, since many models and methods have been posed to employ knowledge management in an organization, sometimes these models confuse the managers who want to implement knowledge management in their organizations.

Knowledge management can be defined as a systematic approach that provides efficient disciplines and procedures to enable knowledge to grow and create value for organizations (Gupta et al., 2000; Alavi and Leidner, 2001; Rao, 2002; Katsoulakos and Zevgoliš, 2004; Šajeva, 2010). As knowledge is the core element of knowledge management, organizational competitiveness will depend on how knowledge is applied, exploited and integrated (Davenport et al., 1998; Alavi and Leidner, 2001; Šajeva, 2010). More and more organizations have begun to introduce knowledge management processes and invest heavily in technologies to support these knowledge management processes to leverage knowledge resource (Kankanhalli et al., 2005; Lee and Choi, 2003). However, most knowledge management projects have failed (Butler, 2003; Schultze and Boland, 2000). The high failure rate of knowledge management projects may be largely ascribed to the fact that many organizations only focus on information technologies (Hsu et al., 2007; Pfeffer and Sutton, 1999). Thus, success of knowledge management initiatives requires that organizations should understand their knowledge requirements and implement appropriate technologies to meet knowledge processing needs (Zack, 1999).

Thus in this research, regarding the product acquisition process in the considering aviation company and the knowledge management cycle, it has been attempted to determine the success requirements for these organizations for the case of the performance and implementation of knowledge management and also to assess the relevant organization with this model (Fig.1).
3. Literature Review
3-1. Knowledge Management

Today’s most large organizations have found out that their success is because of the crafts and the human resource experiences and not because of the equipment, the machinery and the physical capitals and if they can’t augment the scientific and specialized level of the manpower in organizations, they will be put aside from the global market. Since in private organizations, competition is the most important topic, knowledge management subject is paid more attention as the main factor of the competitive advantage acquisition. While in governmental institutions competition is meaningless, knowledge management subject is not paid too much attention. According to the advancement of Aviation Company and international communications among these organizations, that globalize the business and communications in this area, aviation companies, even the governmental ones in countries have been propelled to the knowledge management approach unwantedly. Academic and scientific studies over aviation companies in which knowledge management has been initialized, indicates that in those organizations the performance is successful to some extent and the return is more than the average of those organizations.

Knowledge management authors have attempted a lot to expand this conception that most of it has been developed on the basis of the augmentation of the efficiency rate of the knowledge processes such as: production, development, dissemination, sharing and protection of the knowledge (Davenport & Prusak, 1998). Gloet and Terziovski (2004) describe knowledge management as the formalization of and access to experience, knowledge, and expertise that create new capabilities, enable superior performance, encourage innovation, and enhance customer value. Knowledge management is not solely focused on innovation, but it creates an environment conducive for innovation to take place (Du Plessis, M. 2007). Knowledge management facilitates sharing of the knowledge by creating a new working environment and cause to flow the knowledge to the right person at the right time for the more efficient and effective activity (Smiths, 2004).

Davenport and Prusak have considered knowledge management as a concept to describe the processes through which the organization proceeds to development, organization and sharing of the knowledge with the purpose of the competitive advantage achievement.

Gelinas et al. (Gelinas et al., 2004) have mentioned knowledge management as the process of counting, storing, recovering and distributing the knowledge of the organization’s individuals for the use of others in order to augment the quality or the efficiency of the decisions.

By all, knowledge management is on the focus as a management tool for the purposeful implementation and assessment of the knowledge that finally, using the inside and outside knowledge, cause to the development of the organization to augment the required efficiency. In order to implement the knowledge strategies, knowledge management employs all the required human, organizational and technological capacities to optimize the competition and augment the common skill at the level of the organization.

3-1-1. Knowledge Management Cycle

Knowledge management follows a cycle that can be defined as production and development of the knowledge, sharing the knowledge, exploitation of the knowledge and documentation and protection from the knowledge processes (Wiig, 1993).

Protection and development of the knowledge includes activities like research and development, consultation, instruction, rules and accounting, etc. that are done by professional persons and technical experts. Although at the individual level, the sharing process is enough to complete the knowledge management cycle, since the organizational knowledge is not equal with the individual knowledge in organization, converting the individual knowledge to the
organizational knowledge through two other processes, documentation and protection from the knowledge, is essential. If the individual knowledge is not shared with others, it won’t influence the knowledge base of the organization very much. So one of the important tasks of knowledge management is to facilitate the communication process among the organization employers and to sensitize them towards the environment’s motives in a way that the individual knowledge spreads in the organization and gets internalized. Knowledge is important since it opens new points of view towards the individual knowledge through the group discussions and critics. The exploitation process also means employing the knowledge at the right time and for the right person. Knowledge management cycle with this order has been shown in the figure below.

![Knowledge management cycle](image)

**Fig. 2. Knowledge management cycle (Wiig, 1993)**

### 3-1-2. Product Acquisition Phases

In most organizations presenting current products and services is the primary task of the product delivery system. The product delivery system is based on the resources and the production and market capabilities that undertake delivering of the products and relevant supported services for customer satisfaction. Delivery system includes all the required factors for the product value chain and delivers the products successfully to the customers. The product delivery system is vital for continuous success of any organization.

Product acquisition process is a rational stream that starts from the idealizing phase and after passing the development stages, comes to the end by presenting new products to the market. This process is accompanied with phases and revisions that assure the comprehensive progress of the actions which are related to the new product creation.

### 3-1-3. Product Acquisition Model

New product acquisition is a horizontal structure that connects the activities and actions with a systematic method in order to convert the inputs to the outputs. This process is accompanied with phases and revisions that assure the comprehensive progress of the actions which are related to the creation of new product. The main purpose of the acquisition process is to convert the various needs to the products or to a system that satisfies this need. The acquisition process includes six main phases:

1. **Idealizing:** At this phase according to the refinements which have been done for the customers’ needs and the general politics of the upper-handed organizations, the ideas are produced.
2. **Conceptual design:** At this stage the customer and market needs which are translated to technical characteristics, are presented for the product of a conceptual design.

3. **Technology development:** At this stage the current used Infrastructure and technologies are prepared to construct the product and the development designs of the required technologies are followed.

4. **Production and construction engineering:** At this stage the production and construction methods to reduce the cost and increase the end product quality are determined and by using the conceptual design and technical characteristics, the standards and tolerances, the end product is constructed.

5. **Commercializing and transfer to customer:** This step is related to commercialization of the produced product. The advertisements and required documentations for employing the product are prepared.

6. **After sale services:** At the final stage, a mechanism is prepared to support the products, logistic services, customer’s feedback system and accident and error feedback system for the product (fig.3).

![Fig. 3. Product acquisition process (Cooper, 1994)](image)

The purpose of presenting this comprehensive model is the successful development of the product acquisition process and the fulfillment of the business environment needs. In performing one product acquisition program, the fundamental approach of defining the phases, stages and the required revisions describing the details is a path that assures the presentation of a defect free product with value creation and time optimization. Product acquisition process presents a structure that assures communication of the activities with requirements of the upper-hand and the lower-hand and the beneficiaries. The decisions are adopted on this basis that what task at what time should be done. Product acquisition process depends on the organization’s capabilities and resource management.

### 3-2. Relation between Knowledge Management and Product Acquisition

It’s more than thirty years that several researches have been done in order to show the impressive factors of the effective product acquisition (Clark, Chew and Fujimoto, 1987; Cooper, Edgett and Kleinschmidt, 2004; Davenport, Delong and Beers, 1998). Today an extensive list of these factors is available. Since the publication of the impressive book Nonaka and Taguchi (Song and Parry, 1997), hardly is there any doubt that the regular and continuous knowledge management is an important factor in product acquisition. Knowledge activity is hidden at the center of the product acquisition processes. Noticeable amount of the organizational knowledge is distributed in the various product acquisition models and it’s not centralized and also some of it is implicit; it’s in the skilled employers mind (Newman and Conrad, 1999; Liebowitz, 2001). So knowledge management methods and experiences consider the quality of the creation, accumulation, accessibility and recombination of the
information in the product acquisition process, in both technical and methodological and procedural point of view. Noticeable amount of the knowledge like strategic designing knowledge, tactics and designing methods knowledge is fundamentally implicit. Therefore, several researches have introduced the product acquisition as a severe knowledge activity (Kreiner, 2002; Lester, 1998; Song and Parry, 1997; Tsoukas, 1996). Kourt states three topics of the knowledge of which the production designers use in the product development process: the general knowledge, the specialized knowledge and the knowledge related to the method (Jones, 1995).

Clark and Will Right indicated that the product acquisition strategy is an information process method and, in other words, that’s a correct and regular knowledge management (Cooper, Clark et al, 1999) found out that the product acquisition strategy depends on the knowledge integration a lot.

Knowledge management is an enabler to organization’s strategy and innovation leading to real competitive advantage (Sveiby, 1997; Nonaka and Takeuchi, 1995; Von Krogh et al., 2001; Zack, 1999; Tiwana, 2000). Most of the tangible assets can be copied except knowledge because they are context specific (Tiwana, 2000) and therefore, knowledge provides companies competitive advantage (Murray, 2000). Zack (1999) extends this by stating, “. . . to acquire similar knowledge, competitors have to engage in similar experiences. However, acquiring knowledge through experience takes time and competitors are limited in how much they can accelerate their learning through greater investment.” Overall, knowledge management system enables organizations to develop strategies and goals, which can foster innovation, and enhanced research and development, leading to new product development (Shankar, Acharia and Baveja, 2009).

3-3. Success Requirements of the product Acquisition Process with the Knowledge Management Approach

Many researches have been done about the key factors of the product acquisition process success. Generally, the first step to perform a system is recognition of the success key factors of that system. In designing and performing a system in organizations too, there are factors that play a more important and vital role comparing to other factors. The success key factors help the organizations to concentrate their forces on principal areas in order to facilitate and expedite the considering system performance trend and to prevent the resources dissipation. Therefore, recognition of the success key factors in the product acquisition phases is one of the first and the most important research steps in the mentioned area, too. Thereby, at the rest, these success key factors have been presented for aviation and aviation-space organizations.

Progress in the product acquisition process can guarantee the success of many institutions a lot. Poulton and Barkly (Poulton and Barclay, 1998), state that if the firms improve their efficiency in new products production, they can obtain a noticeable progress. Many studies have been done on the success factors of the product acquisition process. The results of several researches are shown in table 1.

| Table 1. Success factors of the product acquisition projects |
|-------------------------------------------------------------|
| Researches | Knowledge areas | Product acquisition phases |
|-------------------------------------------------------------|

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Paying attention to business environment, global orientation, international teams and products, customer’s need and desire, market share, long term strategies focusing on innovation, using the customer’s voice, searching a different and progressive product, defining the precise standards of the performance, achieved experiences from the past product development projects, conformity of the general strategy and the product development strategy, patterning, the project’s structure and process from the aspect of: the project programming level, transparency of the performance’s needs, accessibility to information of the potential markets

Global trends, conformity of the general strategy and the product development strategy, international teams and products, customer’s need and desire, defining the product expected standards, employing the achieved experiences from the past product development projects, patterning, cost reducing, product’s quality, correct conceptual definition of the product, correct definition of the product’s characteristics and necessities

Programmed production with sufficient researches, global orientation, international teams and products, defining expected standards of the product, achieved experiences from the past product development projects, exploitation of a formal and codified process for product development, patterning, cost reducing, product’s quality

Improvement and revision after the product production and belief in a long term perspective, achieved experiences from the past product development projects, exploitation of a formal and codified process for product development, on time dispatch of the product to the market, patterning, cost reducing, marketing activities quality, technical activities quality, market entrance quality, product development pre-activities (primary), on time and fast definition of the product

Improvement and revision after the product production and belief in a long term perspective, achieved experiences from the past product development projects, patterning, customer’s satisfaction, product’s quality

These factors were the most effective factors of innovation and product development. So the firms for the product acquisition have to achieve various purposes simultaneously. Supporting the product acquisition process changes, the firms need new tools and techniques. One of these tools for the useful employment and settlement of this process is knowledge management. On this basis, the present research has attempted to connect the acquisition phases requirements to new management concept according to this logic and by employing the knowledge management cycle and to prepare the organization success innovation and new product development infrastructure and to this purpose, according to nature of the aviation industry and the unique features of the progressive technologies and the acquisition process requirements in
this industry, through the interviews which have been done about this topic, for success of these phases, has presented a model by using the knowledge management cycle. Therefore, surveying the experiences of the aviation firms and the interviews which have been done in the groups, a model has been presented to assess the success requirements of the product acquisition process (Table 2).

**Table 2. Translation of the most important knowledge to knowledge requirements**

| Knowledge requirements                                                                 | Key knowledge                                                                                                                                                                                                 | Product acquisition phases                        |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| considerable knowledge of upper-handed sanctioned                                     | Paying attention to the business environment, global orientation, international teams and products, customer’s need and desire, market share, long term strategies focusing on the innovation, using the customer’s voice, searching a different and progressive product, achieved experiences from the past product development projects, conformity of the general strategy and the product development strategy, patterning, the project’s structure and process from the aspect of: level of the project programming, transparency of the performance’s needs | Idealizing                                        |
| considerable knowledge of documenting the decision’s structure and the behavioural information of upper-handed organizations |                                                                                                                                                                                                                |                                                   |
| considerable knowledge of refining the product and technology trends of competitive and progressive companies |                                                                                                                                                                                                                |                                                   |
| considerable knowledge of refining the customer’s need                                 |                                                                                                                                                                                                                |                                                   |
| considerable knowledge of documenting the decision’s structure and the exploitation’s feedback (CMR) |                                                                                                                                                                                                                |                                                   |
| considerable knowledge of documenting the assessment and refining the idea              |                                                                                                                                                                                                                |                                                   |
| considerable knowledge of compilation of the customer’s need proclamation’s documentation and translating it to technical characteristics |                                                                                                                                                                                                                |                                                   |
| considerable knowledge of defining the world and competitors designing trends          |                                                                                                                                                                                                                |                                                   |
| considerable knowledge of refining the aviation standards knowledge                    |                                                                                                                                                                                                                |                                                   |
| considerable knowledge of documenting the failures and experiences                      |                                                                                                                                                                                                                |                                                   |
| considerable knowledge of determining the designing standard procedures                |                                                                                                                                                                                                                |                                                   |
| considerable knowledge of the customer exploitation’s feedback                         |                                                                                                                                                                                                                |                                                   |
| considerable knowledge of the system of the errors reverse following and interaction with production |                                                                                                                                                                                                                |                                                   |
| considerable knowledge of documenting the test and assay knowledge of Flight test & Non-flight test operations |                                                                                                                                                                                                                |                                                   |
| considerable knowledge of the designing projects management                           |                                                                                                                                                                                                                |                                                   |
| considerable knowledge of interaction with customer                                    |                                                                                                                                                                                                                |                                                   |
| considerable knowledge of interaction with upper-handed organizations                  |                                                                                                                                                                                                                |                                                   |

Global trends, conformity of the general strategy and the product development strategy, international teams and products, customer’s need and desire, defining the expected standards of the products, employing the achieved experiences from the past product development projects, patterning, cost reducing, product’s quality, correct conceptual definition of the product, correct definition of the product’s characteristics and necessaries

Idealizing

Conceptual designing

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| Technology & sub-system development | Production & construction engineering | Commercialization & transfer to customer |
|-------------------------------------|--------------------------------------|----------------------------------------|
| - knowledge of refining the technology trends at the level of the world and competitors | Programmed production with sufficient researches, global orientation, international teams and products, defining the expected standards of the product, achieved experiences from the past product development projects, exploitation of a formal and codified process for product development, patterning, cost reducing, product’s quality | Improvement and revision after the product assembly and belief in a long term perspective, achieved experiences from the past product development projects, exploitation of a formal and codified process for product development, on time dispatch of the product to the market, marketing activities quality, technical activities quality, market entrance quality, product development pre-activities (primary), on time and fast definition of the product |
| - knowledge of refining the inside technology trends | knowledge of documenting the technology development | knowledge of the product’s advertisement and promotion’s documentation |
| - standard knowledge of documenting the technology development | standard knowledge of documentation of outsourcing | knowledge of conducting the exploitation and maintenance |
| - standard knowledge of documentation of outsourcing | knowledge of documenting the technology assessment and choice | knowledge of conducting the exploitation’s feedback |
| - knowledge of documenting the failures and experiences | knowledge of documenting the test and assay | knowledge of conducting the operator’s selection (the pilot) |
| - knowledge of documentation of interaction with production and the reverse following of errors | knowledge of the colleagues’ network | knowledge of the quality control |
| - knowledge of the colleagues’ network | knowledge of the exploitation’s feedback | knowledge of the product’s supporting documentations |
| - knowledge of the project management | knowledge of documenting the test and assay | knowledge of the quality control |
| Technical success rate, global orientation, international teams and products, supporters communion, achieved experiences from the past product development projects, exploitation of a formal and codified process for product development, patterning, cost reducing, product’s quality | Programmed production with sufficient researches, global orientation, international teams and products, defining the expected standards of the product, achieved experiences from the past product development projects, exploitation of a formal and codified process for product development, patterning, cost reducing, product’s quality | Improvement and revision after the product assembly and belief in a long term perspective, achieved experiences from the past product development projects, exploitation of a formal and codified process for product development, on time dispatch of the product to the market, marketing activities quality, technical activities quality, market entrance quality, product development pre-activities (primary), on time and fast definition of the product |
| - knowledge of documenting the construction’s engineering | standard knowledge of documenting the construction’s engineering | knowledge of the product’s advertisement and promotion’s documentation |
| - standard knowledge of documentation of outsourcing | standard knowledge of documentation of outsourcing | knowledge of refining the inside technology trends |
| - knowledge of the reverse following errors system | knowledge of the reverse following errors system | knowledge of conducting the exploitation and maintenance |
| - knowledge of repair and maintenance | knowledge of repair and maintenance | knowledge of conducting the operator’s selection (the pilot) |
| - knowledge of the exploitation’s feedback | knowledge of the exploitation’s feedback | knowledge of the quality control |
| - knowledge of the key knowledge deposit of the providing network | knowledge of the key knowledge deposit of the providing network | knowledge of the product’s supporting documentations |
| - knowledge of the quality control | knowledge of the quality control | knowledge of the quality control |
| - knowledge of the production process | knowledge of the production process | knowledge of the quality control |
| - knowledge of the human resources | knowledge of the human resources | knowledge of the product’s supporting documentations |
4. Research Methodology

The present research is a descriptive and analytical research that has been done as a field survey. The local area of this research has been one of the aviation companies in Iran that according to the purpose of this research and because of the limitation of the considering statistical society, the searching assistant center is composed of the experts who work in designing, production and after sale service processes and some of the individuals of the organization who have been familiar with the product acquisition process (fig. 4). The sampling method in this analysis is the simple categorical sampling that by determining the complete product acquisition process in relevant organizations, individuals in relevant units were determined and then by the use of a questionnaire, the comments were collected and at the end, 36 Questionnaires of the determined individuals in organization were collected successfully.

First, according to the existent literature reviews of the aviation company experiences related to knowledge management requirements of the product acquisition process, a study was performed in order to assess the situation of the knowledge requirements in the product acquisition process, and then according to the well-done interviews in relevant organizations, the parameters of this knowledge requirements were originated according to nature and features of the relevant industry. Considering these dimensions and requirements, a Questionnaire was prepared and in order to confirm the validity, the masters of the university and the industry’s experts were consulted. So the content validity of the Questionnaire was confirmed and in order to assess the certainty or the stability of the questionnaire of this research, some Questionnaires were distributed in the research society and the Cronbach alpha ratio was assessed by SPSS.

| Improvement and revision after the production and belief in a long term perspective, achieved experiences from the past product development projects, patterning, customer’s satisfaction, product’s quality | After sale services |
| --- | --- |
| • knowledge of the segments logistics system | • knowledge of the customer’s feedback and the complaints system |
| • knowledge of the system of surveying the accidents, following and amendment | • knowledge of the production, designing and providing feedback system |
| • knowledge of application (the product situation in the acquisition cycle) | • knowledge of assessing the customer and maintenance & exploitation manner of the product |

Fig. 4. Research performance process
software. The Cronbach alpha ratio of the completed Questionnaire was computed as 0.924 that is sufficient to confirm the certainty or the stability of the considered Questionnaire. On this basis, the research questions of the present research are:

**Main Question:**
1. What is the success knowledge requirement of the product acquisition process?

**Minor Questions:**
1. How is the situation of the knowledge management cycle of the organization at the idealizing phase?
2. How is the situation of the knowledge management cycle of the organization at the designing phase?
3. How is the situation of the knowledge management cycle of the organization at the technology development phase?
4. How is the situation of the knowledge management cycle of the organization at the production and construction phase?
5. How is the situation of the knowledge management cycle of the organization at the commercialization and transfer to the customer phase?
6. How is the situation of the knowledge management cycle of the organization at the after sale services phase?

**5. Results and Findings of the Research**

**5-1: First Question of the Research**

In order to answer the main question of the research, some of the key knowledge of the phases was determined by the use of the studies done in the area of the product acquisition phases. Then at the next stage by using the well-organized interviews and with the knowledge requirements determination approach, this key knowledge was surveyed by the experts of the industry and finally for each phase the success requirements were presented in the conceptual model of the research (Table 4). Using this model with the knowledge management approach, at the next stage it has been attempted to survey the gap of each knowledge management steps situation. The results are reported below.

The achieved requirements of the process acquisition phases, according to the organization’s feature, have been originated through the interviews for relevant organizations, then these knowledge requirements for each knowledge have been districted (Table 4).

| Knowledge requirements in phases | Product acquisition phases |
|---------------------------------|---------------------------|
| • knowledge of upper-handed sanctioned | Idea production &development |
| • knowledge of documenting the decision’s structure and the behavioural information of upper-handed organizations | |
| • knowledge of refining the product and technology trends of competitive and progressive companies | Conceptual designing |
| • knowledge of refining the customer’s need | |
| • knowledge of documenting the decision’s structure and the exploitation’s feedback (CMR) | |
| • knowledge of documenting the assessment and refining the idea | |
| • knowledge of compilation of the customer’s need proclamation’s documentation and translating it to technical characteristics | |
| • knowledge of refining the world and competitors designing procedures | |
| • knowledge of refining the aviation standards knowledge | |

Table 4. Knowledge indicators of the research conceptual model (source: researcher’s findings)
| Knowledge Areas | Technology & Subsystem Development | Production & Construction Engineering | Commercialization & Transfer to the Customer | After Sale Services |
|-----------------|-----------------------------------|--------------------------------------|---------------------------------------------|--------------------|
| Knowledge of documenting the failures and experiences | Knowledge of refining the technology trends at the level of the world and competitors | Knowledge of documenting the construction’s engineering | Knowledge of the product’s advertisement and promotion’s documentation | Knowledge of the segments logistics system |
| Knowledge of determining the designing standard procedures | Knowledge of refining the inside technology trend | Knowledge of documenting the technology development | Knowledge of conducting the exploitation and maintenance | Knowledge of the customer’s feedback and the complaints system |
| Knowledge of the customer exploitation’s feedback | Standard knowledge of documenting the technology development | Knowledge of the reverse following errors system | Knowledge of conducting the operator’s selection (the pilot) | Knowledge of the system of surveying the accidents, following and amendment |
| Knowledge of the system of the errors reverse following and interaction with production | Knowledge of documenting the technology assessment and choice | Knowledge of repire & maintenance | Knowledge of the quality control | Knowledge of the system of production, designing and providing feedback system |
| Knowledge of documenting the test and assay knowledge of Flight test & Non-flight test operations | Knowledge of documenting the failures and experiences | Knowledge of the exploitation’s feedback | Knowledge of the production process | Knowledge of application (the product situation in the acquisition cycle) |
| Knowledge of the designing projects management | Knowledge of documenting the test and interaction with production and the reverse following of errors | Knowledge of the key knowledge sediment of the providing network | Knowledge of the human resources | Knowledge of assessing the customer and maintenance and exploitation manner of the product |
| Knowledge of interaction with customer | Knowledge of the colleagues’ network | Knowledge of the quality control | | |
Below, according to knowledge requirements of the product acquisition phases, the situation of each of these knowledge requirements in the knowledge management cycle has been assessed in one of the aviation organizations. The achieved findings will be reported below.

5-2. Minor Question

In order to survey the research questions, the T test assay with the hypothesis ($H_1: \mu > 3$; desired performance) is used. Corresponding to tables 4-9 the achieved results of assays have been shown. The assays results are partitioned with the product acquisition phases as:

5-2-1: First Question of the Research

The achieved results of the T-test assay show that the knowledge production step and the knowledge sharing of the knowledge management cycle in the product acquisition process have a desirable situation in organization and this hypothesis is confirmed at a meaningful level of 0.05 but other dimensions such as the organization culture and documentation and protection from the knowledge in the knowledge management cycle have a desirable situation and their hypothesis is denied at the meaningful level of 0.05.

![Chart 1. Idealizing phase](image)

According to the T-test assay that is shown in table 5, it`s observed that at this phase the knowledge production and sharing steps have a good situation. This means that at the idea production phase, the organization is aware of the idealizing procedures in the environment and also the acquired knowledge of the cycle is shared. But this produced knowledge is not exploited in order to conduct the organization`s ideas. The situation of the idealizing phase in organization is shown in chart 1.

5-2-2. Second Question of the Research

As it is shown, the result of the T-test assay indicates that knowledge management cycle has an inappropriate situation in designing, sharing, exploitation and documentation and protection steps but the idealizing step has an appropriate situation. According to the table above it is obvious that the situation of the organization in knowledge management cycle is inappropriate in all steps except the knowledge production step. This means that the knowledge has been produced from awareness of the customer`s needs, refining
the competitors, the test knowledge, etc. but this produced knowledge has a problem in organization for sharing and exploitation and it doesn’t end in documentation finally.

![Chart 2. Designing phase](image)

**5-2-3. Third Question of the Research**

According to assay the result for the technology development phase in knowledge management cycle is that the organization doesn’t have a serious problem in knowledge production and exploitation but doesn’t have a desirable situation in sharing and documentation. The situation of the knowledge management cycle in the technology development phase shows that the knowledge production and exploitation of the knowledge are desirable and the only observed problem is about sharing and documentation (chart 3). The existent situation gap in sharing signifies that there is no reliance among the individuals of the organization, it signifies the defect of the organization’s cultural affair, too. It is understood from documentation that this step doesn’t have a determined organizational procedure and a specific format for this process of the knowledge management cycle, it doesn’t possess an appropriate efficiency at least, either.

![Chart 3. Technology development phase](image)

**5-2-4. Forth Question of the Research**

According to the results of the T-test assay for the production and construction phase, it can be perceived that at this phase the knowledge management cycle has a good situation in knowledge production step, but in other steps it has an undesirable situation. According to table 8 and chart 4, this situation is imagined for the product acquisition phase:
The situation of the organization in knowledge production that is acquired from the production process including outsourcing documents, repair and maintenance. Feedback of the exploitation, quality control and steps like these are assessed appropriate, but this produced knowledge has defect in knowledge management cycle steps. So it can be imagined that these problems have defect in process point of view.

Chart 4. Production and construction engineering phase

5-2-5. Fifth Question of the Research

According to the results of the T-test assay for the commercialization and transfer to customer phase, the situation for the knowledge management step of the knowledge management cycle is assessed appropriate but for the rest of the cycle it’s inappropriate. According to table 9, it can be observed that the organization has an inappropriate situation in sharing, exploitation and documentation and protection steps but the knowledge production step has a desirable situation which shows the communication process with the customer and taking feedback are performed in an appropriate process but this produced knowledge is not shared among the individuals. So exploitation and protection won’t be performed.

Chart 5. Commercialization and transfer to customer phase

5-2-6. Sixth Question of the Research

According to the results of the T-test assay for the after sale services phase, the knowledge production step has an appropriate situation in knowledge management cycle but other steps have defect at the present situation.
According to chart 6, it’s perceived that this phase, like the previous one, has an appropriate situation in the knowledge production step but for other steps of knowledge management cycle the situation is assessed inappropriate. This declares that the organization receives an appropriate feedback from the customers but in sharing and exploitation of the produced knowledge in this interaction, it has problems and so the knowledge is not documented and protected in organization.

![Chart 6. After sale services phase](chart6)

Below, the situation of all of the product acquisition phases at the knowledge management cycle has been shown.

![Chart 7. Situation of all phases of knowledge management cycle](chart7)

According to chart 7 it’s perceived that for all the product acquisition phases, the idealized step has a better situation relatively compared to other steps of the knowledge management cycle, but the situation of documentation and protection from the knowledge is assessed inappropriate for all the processes extremely and requires procedures and a systematic structure for these two steps of the knowledge management cycle. Finally for transfer and sharing and exploitation of the knowledge in phases, it can report an undesirable situation, too.

6. Conclusion and Suggestions for Future Studies

In this research, first, by library studies and the interviews which were done at the level of the industry, it was attempted to present a model for success of the new product acquisition process according to two approaches: the product acquisition phase and the beneficiaries of this
knowledge requirement process. Then according to this model and its phases with the knowledge management approach and surveying the situation of the knowledge management steps in each phase, a Questionnaire was collected at the level of the considering organization. In the following part, the results of this gap analysis are reported briefly.

According to the analysis of this model, it’s perceived that according to the success requirements of the product acquisition process in the target aviation organization and the performing and processing characteristics of these requirements at that industry and also the assessment of the relevant organization, the results show that the situation of the organization in the knowledge management cycles, in the first step which is the knowledge production step is appropriate relatively which is approved in high technology product production in the organization. But for sharing, exploitation, documentation and protection steps, the situation of the organization is not desirable. The reason is related to performing processes of the knowledge management such as: inappropriate procedures for sharing the knowledge among the individuals in relevant projects, lack of a systematic procedure and format for documentation, lack of a codified procedure for assessing the documents quality, not paying enough attention to cultural indicators, weak use of the knowledge management tool for sharing the knowledge, lack of an appropriate mechanism for sharing the knowledge with the suppliers and defect in determining the key individuals from both the knowledge and the experience point of view.

Paying attention to creation, maintenance, application sharing and documentation and protection from the knowledge and the knowledge management in the aviation industry totally, generating encouragements for augmenting the knowledge level of the employers and absorbing the knowledgeable individuals to organization in order to create the knowledge in organization, generating incentives and reward to use the knowledge in order to apply it in organization, supporting from knowledge makers and the organization’s intellectual capitals to maintaining the knowledge in organization, encouraging and assessing the performance on the basis of the knowledge sharing ratio in organization, particular attention to creating and applying the knowledge in the industry according to the great space between the present situation and the desired situation among the knowledge management indicators and adopting the policies for more knowledge sharing in organization are some of the required activities to improve the conditions of the knowledge management employment in the product acquisition process.

In general, in this research three pivotal approaches were studied: the product acquisition process, the beneficiaries and the knowledge management. One of the key results of this research is its conceptual model in which according to the aviation industry approach and its products with advanced technologies, the requirement of the product knowledge management process have been determined according to whose features, it can be used for the aviation productions-based organizations.
These suggestions can be offered for future studies:
1. Employing the developed conceptual model of this research in other aviation organizations.
2. Developing the designed conceptual model in knowledge management dimension or beneficiaries according to the target industry.
3. Developing the conceptual model of the present research with approaches in other industries and employing it in various industries.
4. Using various methods to weigh the knowledge requirements for the acquisition phases of the target industry.
5. Surveying the amount of the relation between the success of the knowledge management and the success of the product acquisition phases by using the statistical methods.

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## Appendix:

### T- Test Assay for Idealizing Phase

| Hypothesis Assay | Test Value=3 | Level of meaningfulness 0.95% | Average deviation | Level of meaningfulness | Statistic | Statistic Value |
|------------------|--------------|--------------------------------|-------------------|------------------------|-----------|-----------------|
|                  |              | High limit                      | Low limit         |                        |           | Knowledge production |
| Non meaningfulness | 0.9694       | 0.2306                          | 0.6               | 0.05                   | 3.674     | Sharing          |
| Meaningful       | -0.5264      | -0.7264                         | -0.1              | 0.726                  | -0.361    | Exploitation     |
| Meaningful       | -0.0306      | -0.7694                         | -0.4              | 0.037                  | -2.449    | Documentation & protection |
| Meaningful       | -0.2375      | -1.3643                         | -0.8              | 0.011                  | -3.207    | Documentation & protection |

### T-test assay for Designing Phase

| Hypothesis Assay | Test Value=3 | Level of meaningfulness 0.95% | Average deviation | Level of meaningfulness | Statistic | Statistic Value |
|------------------|--------------|--------------------------------|-------------------|------------------------|-----------|-----------------|
|                  |              | High limit                      | Low limit         |                        |           | Knowledge production |
| Non meaningfulness | 0.1739       | -0.4896                         | -0.1578           | 0.331                  | -1.000    | Sharing          |
| Meaningful       | -0.6407      | -1.3593                         | -1.000            | 0.000                  | -5.848    | Exploitation     |
| Meaningful       | -0.4729      | -1.3166                         | -0.8647           | 0.000                  | -4.456    | Exploitation     |
| Meaningful       | -1.3345      | -1.8234                         | -1.5789           | 0.000                  | -13.568   | Documentation & protection |

### T-test for Technology Development Phase

| Hypothesis Assay | Test Value=3 | Level of meaningfulness 0.95% | Average deviation | Level of meaningfulness | Statistic | Statistic Value |
|------------------|--------------|--------------------------------|-------------------|------------------------|-----------|-----------------|
|                  |              | High limit                      | Low limit         |                        |           | Knowledge production |
| Non meaningfulness | 0.6105       | -0.055                          | 2.777             | 0.096                  | 1.761     | Sharing          |
| Meaningful       | -0.0736      | -9.9264                         | -0.500            | 0.024                  | -2.474    | Exploitation     |
| Meaningful       | 0.1179       | -0.7846                         | -0.3333           | 0.138                  | -1.558    | Exploitation     |
| Meaningful       | -1.4254      | -1.9079                         | -1.666            | 0.000                  | -14.557   | Documentation & protection |

### T-test Assay for Production & Construction Engineering Phase

| Hypothesis Assay | Test Value=3 | Level of meaningfulness 0.95% | Average deviation | Level of meaningfulness | Statistic | Statistic Value |
|------------------|--------------|--------------------------------|-------------------|------------------------|-----------|-----------------|
|                  |              | High limit                      | Low limit         |                        |           | Knowledge production |
| Non meaningfulness | 0.57         | -2.624                          | 0.1538            | 0.436                  | 0.805     | Sharing          |
| Meaningful       | -0.3311      | -1.2074                         | 0.7692            | 0.002                  | -3.825    | Exploitation     |
| Meaningful       | -0.0348      | -1.196                          | -0.6153           | 0.40                   | -2.309    | Exploitation     |
| Meaningful       | -0.9925      | -1.9306                         | -1.4615           | 0.000                  | -6.789    | Documentation & protection |

### T-test Assay for Commercialization and Transfer to Customer Phase

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### Hypothesis Assay

| Hypothesis Assay | Test Value=3 | Level of meaningfulness 0.95% | Average deviation | Level of meaningfulness | Statistic |
|------------------|--------------|--------------------------------|-------------------|------------------------|-----------|
|                  |              | High limit | Low limit   |                          |           |
| Non meaningfulness | 0.8389 | -1.2389 | 0.200 | 0.621 | -0.535 | Knowledge production |
| Meaningful       | -0.5244 | -0.939 | -0.7317 | 0.000 | -7.023 | Sharing |
| Meaningful       | -0.568 | -0.9885 | -0.7778 | 0.000 | -7.379 | Exploitation |
| Meaningful       | -0.4929 | -0.9571 | -0.725 | 0.000 | -6.217 | Documentation & protection |

### T-test Assay for After Sale Services Phase

| Hypothesis Assay | Test Value=3 | Level of meaningfulness 0.95% | Average deviation | Level of meaningfulness | Statistic |
|------------------|--------------|--------------------------------|-------------------|------------------------|-----------|
|                  |              | High limit | Low limit   |                          |           |
| Non meaningfulness | 0.4924 | -0.2067 | -.1428 | 0.356 | 1 | Knowledge production |
| Meaningful       | -0.0771 | -1.0658 | -0.5714 | 0.030 | -2.828 | Sharing |
| Meaningful       | -0.0771 | -1.0658 | -0.5714 | 0.030 | -2.828 | Exploitation |
| Meaningful       | -0.7009 | 2.1562 | -1.4285 | 0.003 | -3.804 | Documentation & protection |