

## Presenting the Strategic Orientation Model of Knowledge Transfer in University of Applied Sciences and Technology

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**Purpose:** The knowledge transfer in educational systems, especially higher education plays an important role in improving their educational and non-educational functions. Therefore, the purpose of this study was to present the strategic orientation model of knowledge transfer in University of Applied Sciences and Technology.

**Methodology:** This study in terms of purpose was applied and in terms of implementation method was descriptive from type of correlation. The research population was all the managers and employees in University of Applied Sciences and Technology in Tehran city with number 450 people. The sample size based on Cochran's formula was estimated to be 207 people, who were selected by multi-stage cluster sampling method. The tool of the present study was a researcher-made questionnaire with 36 items, whose face validity was confirmed by the opinion of experts and its reliability was calculated by Cronbach's alpha method 0.95. The data after collecting with a researcher-made questionnaire were analyzed with the methods of exploratory factor analysis in SPSS and Smart PLS software.

**Findings:** The findings of the present study showed that the strategic orientation model of knowledge transfer in University of Applied Sciences and Technology has 36 items in 6 categories including causal factors (with 6 items), central phenomenon (with 3 items), contextual factors (with 7 items), intervening factors (with 4 items), strategies (with 14 items) and consequences (with 2 items), which their factor load was higher than 0.40, their average variance extracted was higher than 0.50 and combined and Cronbach reliability was higher than 0.70. Also, the strategic orientation model of knowledge transfer in University of Applied Sciences and Technology had a good fit and the causal factors had a direct and significant effect on the central phenomenon. The central phenomenon, contextual factors and intervening factors had a direct and significant effect on the strategies and the strategies had a direct and significant effect on the consequences ( $P < 0.001$ ).

**Conclusion:** The results of this study about the strategic orientation model of knowledge transfer in University of Applied Sciences and Technology can help the officials and planners of the University of Applied Sciences and Technology to improve the educational status of the university through knowledge transfer.

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## 1. Introduction

Universities are key agents of economic and social progress, and their current mission includes interaction with industry in addition to education and research (Kapetanidou and Lee, 2017). Universities, as the most important sources of knowledge production, should have a proper relationship with the organizations that consume this knowledge transferring knowledge through this relationship. This relationship is a two-way process of interaction between universities and related community organizations to improve the effectiveness of the activities of universities and organizations (Trune and Goslin, 2015). Universities should adopt a strategic approach to identify a set of organizational goals and priorities and then try to achieve them with coherent actions (Axanova, 2012). Therefore, universities are places to produce science, economic and social progress and transfer knowledge to society and industry (Giuria, Munarib, Scandurac and Toschi, 2019).

Many studies have focused not only on educational and research goals, but also on the mission of interacting with industry through knowledge transfer. Knowledge transfer is a complex and evolving phenomenon based on the interaction of stakeholders, and universities may achieve goals such as providing services to professors, increasing innovation and practical use of research results, creating revenue streams, and strengthening local economic development, following national and institutional policies and achieving public value promotion through knowledge transfer activities (Bozeman, Rimes and Youtie, 2015). Today, in the competitive business environment, knowledge is considered as a vital resource. Because the effective application of knowledge is one of the important and strategic assets of any organization and has a significant impact on the productivity and success of the organization, and since knowledge transfer enables the organization to develop skills, competencies and sustain competitive advantages, many researchers consider knowledge transfer as the most important knowledge management process (Chen, Ma, Yu, Sun and Zhu, 2022). Knowledge transfer is defined as the process of transferring experts' knowledge, skills, and capabilities, whose ultimate goal is to facilitate and accelerate innovation (Moon, Ham, Kim and Lee, 2021). In another definition, knowledge transfer refers to an activity through which knowledge, information, skills and expertise are disseminated and shared among people and employees (Wang, Chen, Zheng, Zhang, Wu and Yu, 2021). Five effective factors in knowledge transfer include the relationship between the sender and the receiver, the form and place of knowledge transfer, the learner's aptitude for learning, the ability to share knowledge, and the extent of the knowledge transfer environment (Khanifar, Kameli and Nikkhah Keyarmash, 2020). Different organizations try to improve the knowledge of employees who participate in strategic processes so that they can maintain and improve their competitive position. For this purpose, they try to provide the infrastructure needed for the successful implementation of knowledge management and transfer and encourage their employees to actively participate in the management and knowledge transfer sector (Qiu and Haugland, 2019). In the knowledge economy, knowledge as a factor of wealth production is more important compared to other tangible and physical assets, and in the knowledge economy, unlike the industrial economy, intellectual assets and human capital are among the most important assets of the organization (Marchiori and Franco, 2020). Today, organizations attach great importance to the transfer of knowledge and how to do it, and the advances in information and communication technology have doubled its importance, and accordingly, knowledge transfer is considered an essential factor for the success of organizations (Leroux, Vankeirsbilck, Verbelen, Simoens and Dhoedt, 2020). The process of knowledge sharing and transfer is the key success factor of efficient and effective knowledge management programs, which causes rapid personal and organizational learning, expanding creativity and improving personal and organizational performance (Feng, Zhang, Yang and Liu, 2022).

Universities should have strategic choices and orientations about their organizational goals and priorities in knowledge management and transfer to guide resource allocation decisions and commercialization method choices (Ferraresi, Quandt, Dos Santos and Frega, 2012). Orientation refers to the willingness of the organization to accept values, norms, actions and activities that should be done in a certain way. When

orientation is placed next to strategy, it provides a description of how to allocate resources and coordinate patterns. For example, some organizations may follow the market-oriented strategy and implement the concept of marketing. In contrast, some other organizations may follow an entrepreneurial approach and seek new opportunities (Panahi and Najafi Tavani, 2020). Strategic orientation includes outlines for strategic or strategic actions and decisions, including a set of values that the organization's efforts to gain competitive advantage are based on (Mu, Thomas, Peng and Di Benedetto, 2017). This orientation reflects how the organization moves offensively and defensively and represents the organization's desire to develop capabilities and provide products and services (Adams, Freitas and Fontana, 2019). Strategic orientation refers to the principles that directly affect the activities of the organization and cause behaviors that strengthen the organizational performance and sustain the life and survival of the organization (Sabzinezhad and Abbasi, 2020). Strategic orientation is the guiding principles that influence the organization's marketing and business strategy formulation and reflect the guidelines implemented by the organization that improve the organization's performance (Chaney, Carrillat and Zouari, 2019). Strategic orientation allows organizations to act in a creative and innovative way and to actively shape their future. Therefore, all organizations need to have a strategic orientation and a well-organized roadmap (Kindermann, Beutel, De Lomana, Strese, Bendig and Brettel, 2021).

Very few researches have been done about the strategic direction of knowledge transfer and the results of the most important studies in this field are reported below. Ziyadee, Rezvani and Ahmadian (2021) conducted a study on the effective factors on knowledge transfer and its effect on the innovation performance of international strategic alliances and concluded that the effective factors include systems based on information technology, learning strategy, culture of trust, flexible structure, knowledge transfer, innovation performance and absorption capacity were for alliance. In a study Huikkola and Kohtamaki (2019) identified four parts for strategic orientation, including market orientation (the extent of an organization's orientation towards customers and marketing), entrepreneurial orientation (the degree of the organization's risk-taking measures and how active and innovative the organization is in the market), learning orientation (how to learn and change the organization) and technology orientation (the organization's approach to technology development). Giuria et al (2019) conducted a study on the strategic orientation of universities in the field of knowledge transfer and concluded that it included three general orientations: income product orientation, faculty service orientation, and local development orientation. Habibi and Mira (2018) conducted a study on the design of the strategic orientation model of knowledge-based companies and concluded that the model mentioned includes 18 micro-categories in 9 general categories, including dominance (with 1 aggressive spirit micro-category), futurism (with 2 organizational vision micro-categories and long-term goals), formalism (with 2 micro-categories of standardization of organizational processes and regular and coherent organizational framework), entrepreneurship (with 2 micro-categories of entrepreneurial capability and organizational opportunism), Learning orientation (with 2 micro-categories of learning culture and learning ability), innovation orientation (with 2 micro-categories of organizational capital development and use of organizational knowledge), cost orientation (with 1 cost management micro-category), brand orientation (with 3 micro-categories of brand image, brand awareness and brand loyalty) and market orientation (with 3 sub-categories of inter-task coordination, customer orientation and competition orientation). Huang and Lee (2015) in their study introduced the criteria affecting strategic orientation, including vision, strategic awareness and team orientation, along with structure together with learning, which can play an effective role in product development in competitive markets.

University of Applied Sciences and Technology is one of the universities that provides opportunities for the participation of governmental and non-governmental organizations and executive bodies for the training specialized forces needed by different economic, social and cultural sectors of the country. This university has competitive advantages in the scientific and educational environment of the country; So, one of its most important advantages is to create a link between the business environment, industry and university. A link

that may have received less attention in other universities, and this university should be able to have specific business goals while properly managing human resources by separating itself from the government budget, in order to achieve profitability in this way. Having a strategic orientation for knowledge transfer is very important, especially in a university of applied sciences. Furthermore, the study indicated that no study has been done in this field, and even very few studies were found about the strategic orientation of knowledge transfer. Therefore, there are many study gaps in the field of strategic orientation of knowledge transfer. So, conducting this study can help the planners of the University of Applied Sciences and Technology and even other universities in providing solutions to improve knowledge transfer. Knowledge transfer in educational systems, especially higher education, plays an important role in improving their educational and non-educational functions. Therefore, the purpose of this study was to present a strategic orientation model of knowledge transfer in University of Applied Sciences and Technology.

## 2. Methodology

This study was applied in terms of purpose and correlational in terms of descriptive method. The study population was all the managers and employees of University of Applied Sciences and technology in Tehran, all in all, 450 people. The sample size was estimated to be 207 people based on Cochran's formula, who were selected by multi-stage cluster sampling method. For this purpose, first, a list of all branches of the University of Applied Sciences and technology in different regions of Tehran was prepared and 3 regions were randomly selected from the 22 districts of Tehran, and then 4 branches were randomly selected from each region, and all of which were selected as samples.

To conduct this study, a questionnaire about the strategic direction of knowledge transfer in the University of Applied Sciences and Technology was designed based on theoretical foundations and interviews with a number of experts, and in the next step, sampling was done according to the process explained above. In the next stage, by referring to each of the selected branches and by explaining the plan and purpose of the study and coordinating with the managers and other officials, their consent to conduct the study was obtained. It should be mentioned that the importance and necessity of the study was explained to them and they were assured about the observance of ethical points such as confidentiality, confidentiality of personal information, general data analysis, etc. After completing the questionnaire on the strategic orientation of knowledge transfer in the University of Applied Sciences and Technology, managers and employees were appreciated for participating in the study and the data were prepared for entering the computer.

The tool of the current study was a researcher-made questionnaire with 36 items, which was designed based on theoretical foundations and interviews with a number of experts; So that these 36 six-part items include the central phenomenon (items 1 to 3), causal factors affecting the strategic orientation of knowledge transfer (items 4 to 9), intervening factors affecting the strategic orientation of knowledge transfer (items 10 to 13), effective background factors on strategic orientation of knowledge transfer (items 14 to 20), strategies of strategic orientation of knowledge transfer (items 21 to 34) and consequences of strategic orientation of knowledge transfer (items 35 to 36). To respond to each item, a 5-point Likert scale (1: completely disagree to 5: completely agree) was used and the score of each section was calculated with the total scores of the components of that section and the total score of the questionnaire was calculated with the total scores of the instrument. The face validity of the researcher-made questionnaire of the strategic orientation of knowledge transfer in the University of Applied Sciences and Technology was confirmed by the opinion of experts, and its reliability was calculated using the Cronbach's alpha method of 0.95.

The data obtained from the implementation of the researcher-made questionnaire on the strategic orientation of knowledge transfer in the University of Applied Sciences and Technology were analyzed with exploratory factor analysis methods in SPSS and Smart PLS software.

### 3. Findings

In this study, there were no missing questionnaires, and the frequency and frequency of gender, age and education of the participating managers and employees are presented in Table 1, based on which, most of them are women (53.63%) with the age range of 46 to 55 years (79.48%) and master's education (44.93%).

**Table 1.** Frequency and frequency percentage of gender, age and education of participating managers and employees

Variable	level	frequency	Frequency percentage
Gender	Male	96	38.46
	Female	111	62.53
Age	36-45	64	92.30
	46-55	101	79.48
	Over 55 years	42	29.20
Education	Associate degree	12	80.5
	Bachelor's degree	87	30.42
	PhD	15	24.7

The exploratory factor analysis of the strategic orientation model of knowledge transfer in the University of Applied Sciences and Technology was presented in Table 2, based on which, the strategic orientation model of knowledge transfer in the University of Applied Sciences and Technology has 36 items in 6 categories including causal factors (with 6 items), central phenomenon ( with 3 items), contextual factors (with 7 items), intervening factors (with 4 items), strategies (with 14 items) and consequences (with 2 items), whose factor load is higher than 0.40, and the average variance extracted is higher than 0.50 and their composite and Cronbach's reliability was higher than 0.70.

**Table 2.** Exploratory factor analysis of the strategic orientation model of knowledge transfer in the University of Applied Sciences

Components	Number of items	factor load	AVE	Composite reliability	Cronbach's reliability
Causal factors	6	0.90	0.66	0.92	0.90
A central phenomenon	3	0.90	0.83	0.94	0.90
Background factors	7	0.91	0.66	0.93	0.91
interfering factors	4	0.78	0.51	0.80	0.78
Strategies	14	0.86	0.72	0.86	0.82
consequences	2	0.80	0.83	0.91	0.80

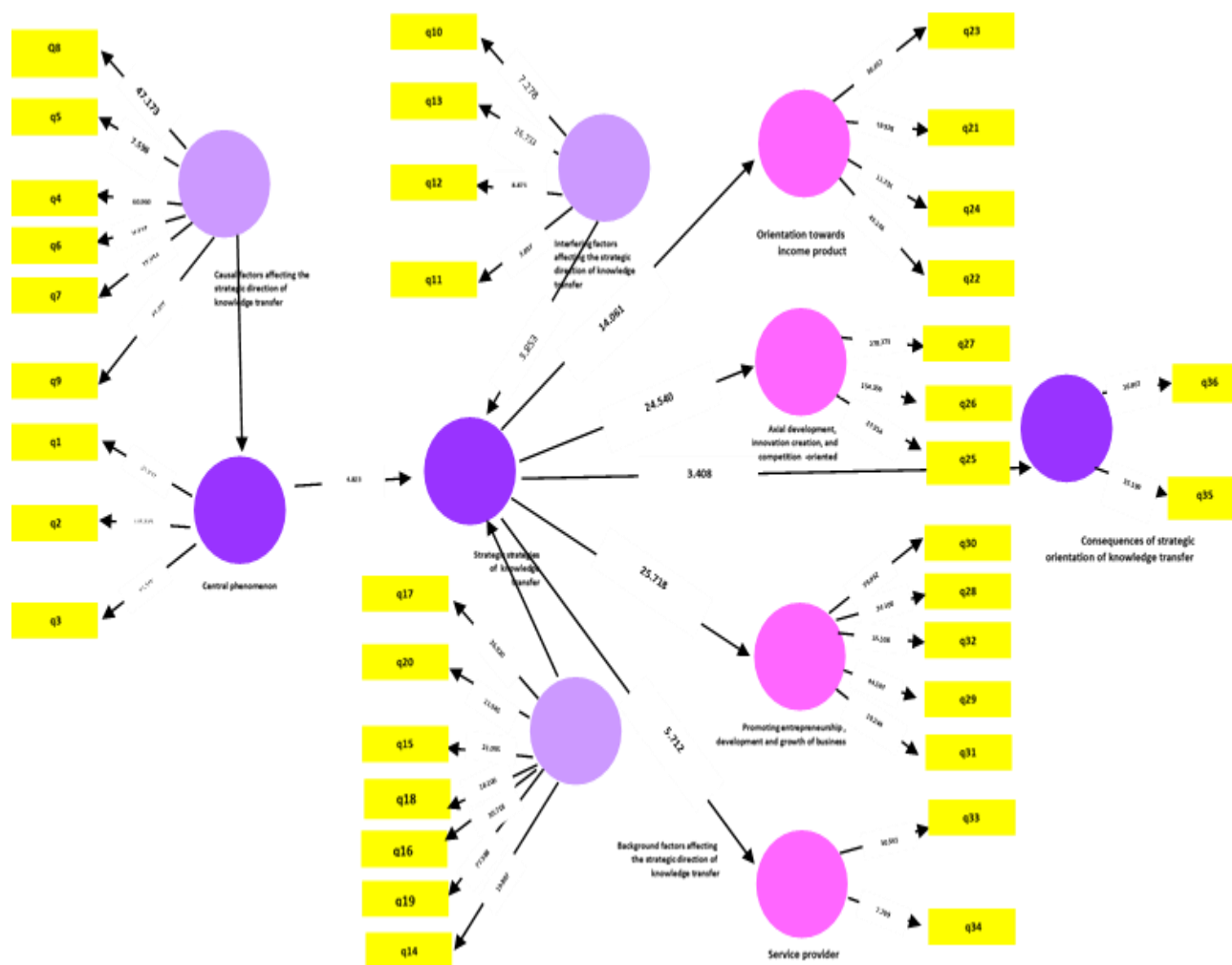
The results of the model fit indices showed that regarding the calculated value of 0.65 for the GOF index because it is greater than 0.36 and with the calculated value of 0.06 for the SRMR index it is smaller than 0.10 and with the calculated value of 0.90, due to the NFI index being higher than 0.80, the strategic orientation model of knowledge transfer in the University of Applied Sciences and Technology had a good fit. The second- and third-order factor loadings of the strategic orientation model of knowledge transfer in the University of Applied Sciences and Technology were presented in Table 3, based on which, the causal factors on the central phenomenon have a direct and significant effect, the central phenomenon, background factors and intervening factors have a direct and significant effect on the strategies which have a direct and significant effect on the results ( $P < 0.001$ ).

**Table 3.** Second- and third-order factor loadings of the strategic orientation model of knowledge transfer in the University of Applied Sciences and Technology

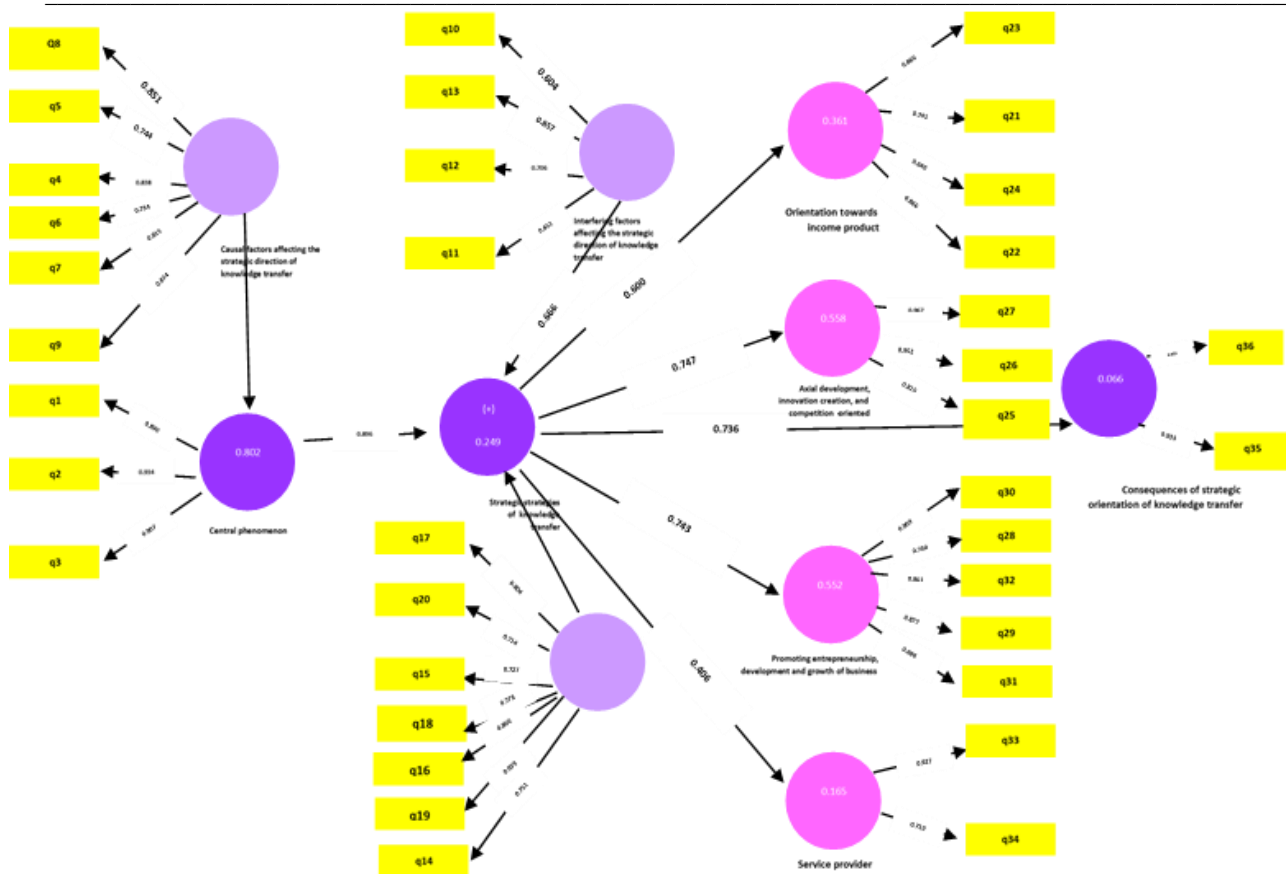
Variable path	factor load	T statistics	Sig.
Causal factors on the central phenomenon	0.89	91.56	0.001

A central phenomenon on strategies	0.90	4.82	0.001
Background factors on strategies	0.53	4.44	0.001
Intervening factors on strategies	0.67	3.85	0.001
Strategies on outcomes	0.74	3.41	0.001

According to the second and third order factor loadings, the model of strategic orientation of knowledge transfer in University of Applied Sciences and Technology was presented in the T-statistic mode in Figure 1 and in the factor loading mode in Figure 2.



**Figure 1.** The strategic orientation model of knowledge transfer in applied scientific comprehensive university in T-statistics mode



**Figure 1.** The model of strategic orientation of knowledge transfer in applied scientific comprehensive university in factor load mode

#### 4. Discussion

University of Applied Sciences and Technology among other universities can play an effective role in the relationship with society and industry and be successful in the field of knowledge transfer. Therefore, the purpose of this study was to present a strategic orientation model of knowledge transfer in University of Applied Sciences and Technology.

The findings of the present study showed that the strategic orientation model of knowledge transfer in the University of Applied Sciences and Technology has 36 items in 6 categories including causal factors (with 6 items), central phenomenon (with 3 items), contextual factors (with 7 items), interfering factors (with 4 items), strategies (with 14 items) and consequences (with 2 items) whose factor loading was higher than 0.40, their average extracted variance was higher than 0.50, and their combined and Cronbach's reliability was higher than 0.70. Also, the strategic orientation model of knowledge transfer in University of Applied Sciences and Technology had a good fit and the causal factors had a direct and meaningful effect on the central phenomenon, the central phenomenon, contextual factors and intervening factors had a direct and meaningful effect on the strategies having a direct and significant effect on the outcomes. Although very few studies have been conducted on the strategic direction of knowledge transfer and no study in this field was found on the University of Applied Sciences, but the findings of the present study are in agreement with the findings of Ziyae et al (2021), Huikkola and Kohtamaki (2019), Giuria et al. (2019), Habibi and Mira (2018) and Huang and Lee (2015) were consistent.

In the interpretation of the findings of the present study, it can be said that the causal factors of the strategic orientation of knowledge transfer included six parts, the first part being the characteristics of the transferred knowledge through the applicability of knowledge, knowledge in accordance with market needs, knowledge in accordance with the ability and expertise of experts, knowledge in line with career development, Up-to-date and efficient knowledge, dynamic and active knowledge, knowledge in accordance with new technologies and knowledge in accordance with the student's information level, the second part of effective actors in the transfer of knowledge including professors, experts, students, administrative and executive staff of the university, middle managers of the organization, knowledge-based institutions, growth centers, study institutes, scientific-specialized associations, science and technology parks, technology development and transfer offices and media, the third part soft techniques of knowledge transfer through interpersonal relationships, the number of contacts in functional groups and higher hierarchies, face-to-face contacts in formal and informal meetings and informal seminars, the fourth part hard techniques of knowledge transfer through electronic or documentary knowledge exchange, information technology database, social media and wikis, the fifth part interactive elements of knowledge transfer including the perceived value of source knowledge, motivational willingness of the source, willingness to Knowledge sharing, the existence and abundance of transfer channels, the recipient's motivational desire, the desire to acquire knowledge from the source, the recipient's capacity to absorb and the ability to acquire and use knowledge, and the sixth part of the interactive characteristics affecting knowledge transfer, including the open and interactive mode of communication in workshops and training sessions, creating creative chaos in interactive meetings, research and development teams with dense interactive networks and extensive out-group communication.

The central phenomenon of the strategic orientation of knowledge transfer included three parts, the first part is knowledge transfer to acquire the skills needed in the labor market, strengthening intellectual capital, improving the educational performance of universities, organizing and managing knowledge, providing infrastructure for the systematic transfer of knowledge to the target society, the second part is active strategic orientation of knowledge transfer by trying to match the resources of skills with market opportunities, systematic analysis of opportunities and threats, needs assessment and research management in line with real needs and priorities and introduction of work areas to students, and finally the third part is passive strategic orientation of knowledge transfer through systematic search potential markets, discovering the realities of the turbulent business environment and accepting risk in decisions.

Also, the background factors of the strategic orientation of knowledge transfer included seven parts, the first part of intellectual property strategies and policies including university policies, bureaucracy, rewards for professors' participation in knowledge transfer, compatibility of the goals set for technology transfer offices, intellectual property rights and clear missions and goals. The second part of communication with the industry includes the integration of technical expertise and extensive industry experiences in licensing offices, the understanding of technology transfer offices from industry needs, the impact of innovation networks on the dynamics of technology transfer, social communication and trust between industrial companies and academic research centers, the third part of incentives economic includes the regional concentration of venture capital and high technology, the degree of priority and support for higher education in a community or region, the location of technology transfer offices, GDP per capita, industrial density, private expenses on research and development, and government support, the fourth part of cultural dimensions includes cultural barriers between universities and organizations, cultural differences between the academic and commercial fields, the lack of open and complete cooperation between research and development centers with companies and industries, innovative culture and mentality (subjectivity) among employees and institutional support for scientists and professors to participate in the technology transfer process, the fifth part is the difference in normative goals and priorities, including the degree of alignment or organizational convergence in research goals, differences in market orientations, differences in normative priorities, academic freedom and independence in choosing research methods, differences in



organizational norms, and differences in different logics in knowledge sharing, and the sixth part of human capital includes the set of business skills of academics, access of academics to advanced technology equipment, the motivation of faculty members in the technology transfer process, active and motivated employees in technology transfer offices, the work experience of technology transfer office employees, the possibility of improving the qualifications of technology transfer office employees according to their needs, the competence of technology transfer offices in identifying licenses, business skills and management capabilities in technology transfer offices, compensation measures and rewarding employees of technology transfer offices, organizational structure and operational processes of technology transfer offices, university management support for technology transfer offices, participation of professors in the licensing process and the size of technology transfer offices and finally the seventh part of communication quality included regular contact during cooperation between technology transfer offices and industry, active scientific service marketing by university researchers and effective and regular marketing campaign of technology transfer offices.

The intervening factors of the strategic direction of knowledge transfer included four parts; the first part emphasizing the activities aligned with the goals of the University through the alignment of activities with the goals of the university and the different strategic focus of the University, the second part is the difference in fields and scientific fields through the existence of various applied fields in the university, the presence of engineering and applied sciences units with official commercialization activities, the third part of the university's background including spin-out and licensing activities in the university, previous experiences of research collaboration with industry and the reputation of the university, and finally the fourth part of the difference in resources and capabilities including the size of the university, the number of university employees was the number and quality of the research outputs of the University of Applied Sciences and Technology, the location of the University and the framework for excellence in teaching and research.

In addition, the strategic orientation strategies of knowledge transfer include fourteen sections in four areas of income product strategies (graduation programs, conducting applied and consulting research, training and receiving financial and non-financial support), local development, creating innovation and competitiveness (research and development activities, providing consulting services and cooperation with knowledge transfer partners), promoting entrepreneurship, development and growth of businesses (participation of the graduates in knowledge transfer, university spin-outs, growth of knowledge networks and industrial clusters, encouraging the development of intellectual property and international links) and service providers (capital development, human, regional skills, social and cultural development of the region).

The consequences of the strategic direction of knowledge transfer included two parts, the first part of the university includes educating students with strong literacy and knowledge, increasing the reputation and ranking of the university, strengthening the university's competitiveness at the national and international level, increasing the motivation of personnel, reducing time and saving time for more desirable things. And more importantly, helping to transfer university experiences to industrial sectors and contributing to national interests, empowering human resources, increasing university productivity, increasing the level of interaction between students and the university, and students and professors, and increasing the level of knowledge and culture exchange at the national and international levels, and the second part, the community included the growth of talents according to the labor market, increasing the technical and professional skills of students, creating jobs, developing technology and entrepreneurship.

The most important limitations under the control of the researchers include the limitation of the community to University of Applied Sciences and Technology in Tehran and the use of researcher-made questionnaires to collect data, and the most important limitations beyond the control of the researchers include the spread of Covid-19 and the difficulty of accepting managers and employees to participate in the research the withdrawal and replacement of some of them. The most important research proposals included

conducting this study on other universities, conducting study on comprehensive applied science universities in other cities, and using hierarchical and fuzzy analysis methods. The results of this study about the strategic orientation model of knowledge transfer in the University of Applied Sciences and Technology can help the officials and planners of the University to improve the educational situation of the university through knowledge transfer. Another practical suggestion is that university professors should be more careful in presenting research titles to graduate students and design their titles according to market needs and in line with entrepreneurship and income product. Also, it is suggested that in order to introduce the university's research achievements, appropriate interactions between university professors and industries as well as businesses should be provided by providing high-speed internet, removing the filtering of social networks and allocating sufficient funds for the participation of professors and students in domestic and foreign seminars and conferences. In addition, in order to improve the interactive mechanisms of universities with industries and businesses, it is suggested that a public information system be launched in universities and by industries so that researchers can submit complete reports related to their research projects in this system. The last practical suggestion is to make an effort in universities to allocate sufficient funds to provide necessary laboratory and physical facilities for engineering and science fields that are more related to industries and the market, so that students and professors have the possibility of higher quality research output.

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