



## Original Article (Qualitative)

# Identifying the educational components of technology commercialization of universities with metacombination method

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**Abstract**

The purpose of this research is to identify the educational components of technology commercialization of universities with meta-composite method. This research is qualitative in terms of the method of data collection; and a meta-composite approach in terms of the research implementation method. The statistical population of this research includes 110 documented articles, which were adjusted to 86 and 30 during three stages of screening and refinement, and finally to 15 articles related to the educational components of commercialization of technology in universities, and were identified by the method of metacombining the components related to commercialization of technology of Universities. The findings of the research are based on 21 final reviewed articles out of 110 initial articles, which lead to the extraction of 20 concepts and open codes for the commercialization of universities' technology and 4 core codes including: 1- Hardware 2- Software 3- Brainware 4- Organization-software. At the end of the research, it is suggested that the authorities, with a more detailed understanding of the underlying conditions and factors of success in technology commercialization in universities, should formulate policies and design effective implementation plans.

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## Extended abstract

### Introduction

Commercialization is a process that transforms ideas, research results or inventions from the academic sector into marketable products, services and processes. The nature of the commercialization process requires the participation of the academic sector and the industry sector in transforming research results into innovation in the market, and during this process, the results of research in different stages of its development are exchanged and transferred between these two sectors (Ghaffari & Hesami, 2017). Commercialization is an important part of the innovation process without which no product will successfully enter the market. Creating platforms for the supply of knowledge and technology, in addition to providing significant economic values for organizations, leads to the economic and technological growth of society. One of the main reasons for the speed of technological progress and development in industrialized countries has been the attention to the commercialization process of those countries (Safari, 2018). Commercialization includes all the activities required to convert an idea, technical knowledge, work method, practice, process, product, service, organizational form, technology or a combination of any of these capitals into value-creating opportunities (Asadi et al. 2023). The process of development and commercialization of new technology is not a simple and linear process, but a very complex one that requires the role of different actors with different capabilities. The commercialization process requires skills such as: product development, market evaluation, market strategies, etc. (Musaei, 2008).

As knowledge storage bases, universities have paid special attention to the development of science, and senior managers have always thought about academic thinking. Economic progress based on knowledge must demand new innovation methods and new struggles. Beyond their traditional role as an educational institution, universities have always helped companies to reach developed industries (Kalar & Antoncic, 2015). Therefore, this research has identified the educational components of technology commercialization of universities, and as a result, the main question of the research is: what are the prominent, central, and common educational components that can be counted regarding the commercialization of technology of universities?

### Theoretical framework

#### Commercialization of technology

Commercialization is the process of transforming science and technology, new research, or an invention into marketable products or industrial processes. This can be done by existing companies or by creating new companies. Successful commercialization leads to product innovation and process innovation. It follows from the above definitions that commercialization is the process that transforms the idea, research result or invention from the academic sector into marketable products, services and processes (Jameson & O'Donnell, 2015). Other experts consider commercialization as the process of transforming technology into economically successful products. Commercialization is the process of transferring and transforming knowledge produced in research centers into various commercial activities. Also, commercialization has been considered as the process of transforming science and technology, new research, and invention into a product or industrial process that can be presented to the market (Hashemnia et al, 2009).

#### Education

Education as one of the pillars of development is closely related to employment in the society. As a dynamic system, the university plays the role of guidance and leadership of people's intellectual participation in the administration of society (Archer et al, 2008).



Sufi et al, (2024) investigated the identification of factors affecting the commercialization of the products of knowledge-based companies based in science and technology parks and growth centers. The results of the research showed that the model designed with 14 indicators were identified including causal conditions (management factors, information factors, financial factors), background conditions (laws and regulations, technological capabilities), core category (market factors, product factors), strategies (strengthening interactions, marketing and sales capabilities), outcomes (economic development, knowledge-based economy, entrepreneurship development), intervening conditions (individual factors, cultural-social factors), explaining the components of commercialization of products of knowledge-based companies. Barzegari & Aghajani (2024) investigated the cultural barriers of knowledge commercialization in universities. Through the study and analysis of the conducted research, it was found that the most important obstacles to the commercialization of knowledge in universities can be found in having views and beliefs of: lack of trust, lack of commitment to change, not accepting the team group, and lack of exchange of ideas and information..

### **Research methodology**

This research is qualitative in terms of the method of data collection; and a meta-composite approach in terms of the research implementation method. The statistical population of this research includes 110 documented articles, which were adjusted to 86 and 30 during three stages of screening and refinement, and finally to 15 articles related to the educational components of commercialization of technology in universities, and the components related to commercialization of technology of universities were identified by the method of metacombining.

### **Research findings**

The data analysis is a meta-composite method, and the research findings are based on 21 final reviewed articles out of 110 primary articles, which lead to the extraction of 20 open concepts and codes for the commercialization of university technology and 4 core codes including: 1- hard Software 2- software 3- software 4- organization software. At the end of the research, it is suggested that the authorities, with a more detailed understanding of the underlying conditions and factors of success in technology commercialization in universities, should formulate policies and design effective implementation plans.

### **Conclusion**

The current research was conducted with the aim of identifying the educational components of the commercialization of technology in universities with the meta-combination method. The results of this research corresponds with the results of Sufi et al, (2024), Barzegari & Aghajani (2024), Asadi et al, (2023), Davodi & Naderi Yeganeh (2022), Audretsch & Belitski (2021), Nawzad et al, (2019), Wynn & Jones (2017), and Rhoades & Stensaker (2017). Barzegari & Aghajani (2024) reached these results that the most important obstacles to the commercialization of knowledge in universities can be found in having views and beliefs of: lack of trust, lack of commitment to change, not accepting the team group, lack of exchange of ideas and information.

According to the results of the research, the following proposal is presented:

Establishing a technology and commercialization service center with the aim of providing technological and innovative services to opinionated students and professors and companies inside and outside the university can be the first step towards the commercialization of university technology. Effective communication in the workplace

Increasing educational skills and developing creativity and innovation