

# BARRIERS TO THE DEVELOPMENT OF UNIVERSITY-BASED SPECIAL PURPOSE VEHICLES

## BARIERY W ROZWOJU SPÓŁEK CELOWYCH JEDNOSTEK NAUKOWYCH

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**Abstract:** The aim of this article is to identify the barriers to the development of university-based special purpose vehicles (SPVs) in Poland and to identify the recommendations to address these barriers. As a consequence of the research objective formulated in this way, it was decided to use a literature review, analysis of secondary documents, and a case study method. As part of the case study, in-depth interviews were conducted with the SPV manager and its stakeholders. The literature review concerned the constrictions in the development of the cooperation between science and business on the part of both entrepreneurs and scientists, which consequently translates into barriers in the development of units created to commercialise the results of scientific research created in universities and research institutes, including SPVs. On the basis of the collected research material, barriers to SPV development were defined and then grouped according to the type of constraints (systemic, economic, competence, awareness-cultural) and according to the environment they directly affect (SPVs, scientists, entrepreneurs). In response to the barriers to SPVs development, actions have been proposed to overcome them. The originality of the article stems from the development of the issue of the functioning of SPVs, whose role and capabilities are little understood in both academic and business circles.

**Keywords:** university-based special purpose vehicle (SPV), cooperation between science and business, commercialization of research results, barriers to development

**Abstrakt:** Celem artykułu jest identyfikacja barier w rozwoju spółek celowych uczelni (SC) w Polsce i wskazanie rekomendacji niwelujących te bariery. Wykorzystano przegląd literatury, analizę dokumentów wtórnych oraz metodę studium przypadku. W ramach analizowanego przypadku przeprowadzono wywiady pogłębione z osobą zarządzającą SC oraz jej interesariuszami. Przegląd literatury dotyczył ograniczeń w rozwoju współpracy na styku nauki i biznesu, stojących zarówno po stronie przedsiębiorców, jak i naukowców. W konsekwencji przekłada się to na bariery w rozwoju jednostek utworzonych w celu komercjalizacji rezultatów badań naukowych, powstałych w uczelniach i instytutach badawczych, w tym SC. Na podstawie materiału badawczego zdefiniowano bariery rozwoju SC, które pogrupowano wg rodzaju ograniczeń (systemowe, ekonomiczne, kompetencyjne, świadomościowo-kulturowe) oraz wg środowiska, którego bezpośrednio dotyczą (SC, naukowcy, przedsiębiorcy). W odpowiedzi na bariery w rozwoju SC zaproponowano działania służące ich przełamywaniu. Oryginalność artykułu wynika z rozwoju problematyki funkcjonowania SC jednostek naukowych, których rola i możliwości są poznane w niewielkim stopniu zarówno w środowisku akademickim i biznesowym.

**Słowa kluczowe:** spółki celowe jednostek naukowych, współpraca nauki i biznesu, komercjalizacja rezultatów badań naukowych, czynniki ograniczające rozwój

### Introduction

Collaboration between science and business is an important element in the development of innovation at regional, national and international levels, if only because of the transfer of technology from entities generating new knowledge (e.g. universities and research institutes) to companies (Bengoa et al., 2021). Due to a lack of – or insufficient – resources (human, knowledge, infrastructure, financial), companies are often unable to carry out

research and development activities on their own and, as part of this, develop and improve innovative products or services (Matusiak, Guliński, 2010). Research institutes and universities are in a position to provide the necessary resources and, within the framework of the cooperation established with business, carry out specific implementation projects. To this end, research units may set up special organisational structures that act as

a bridge between the worlds of science and business, such as technology transfer centres and university-based special purpose vehicles. However, cooperation at the interface between science and business faces a number of barriers, which are also faced by units set up to commercialise research results in universities and research institutes.

### Literature review

Regional and national innovation strategies such as the Productivity Strategy 2030 for Poland (2022) and international documents such as OECD Innovation Strategy (2015) call for an increase in the intensity of the cooperation between research units and business representatives. In addition, they also emphasise the importance of young innovative companies in the development of innovation (due to the openness and willingness to bear the risks associated with the innovation process). These companies can be the result of cooperation between science and business (academic spin off, spin out). Despite this, cooperation at the interface between science and business does not happen very often, as it faces a number of difficulties and barriers on both sides, both in the scientific community and among businesses. The research (Report..., 2016, p. 21) shows that the main problems perceived by entrepreneurs in collaborating with scientists are that scientists do not understand business questions and objectives, that the research conducted is not conclusive, and that the pace of work is too slow. On the other hand, the key barriers causing the above problems are: a negative image of science and scientists, the perception of small benefits from such cooperation, the belief in the asymmetry of the transfer of benefits, negative experiences from cooperation with scientists. Within another study (Wycisk et al., 2018), barriers to effective collaboration between entrepreneurs and academia include: formal constraints (e.g. recognition of the decision-maker, complex structure of the university, difficulties in commercial use of equipment purchased with EU funds), implementation time (e.g. difficulties in combining teaching, research and implementation work), funding model (e.g. low percentage of funding for enterprises compared to universities), lack of market approach to the problem (e.g. scientists propose solutions that are difficult to implement and expensive), divergence of goals (entrepreneurs – practical solutions, scientists – scientific development), intellectual property (e.g. keeping the knowledge acquired during cooperation with the entrepreneur confidential, costs related to the purchase of standards, licences, patents), communication (e.g. a lack of or limited access to the

implementation offer of the university). Based on the conclusions of a study of the system of technology transfer and commercialisation of knowledge in Poland (Matusiak, Guliński, 2010), the barriers occurring in the cooperation between the scientific community and entrepreneurs were divided into four groups: structural (economic, e.g. excessive formalisation and bureaucratisation of support mechanisms, inefficient allocation of EU funds), systemic (e.g. overgrowth of regulations and legal acts, mismatch between regulations and the challenges of an innovative economy), awareness and cultural (e.g. lack of trust and understanding of the work ethos of the other party, lack of willingness to bear the risk associated with commercialisation), competence (e.g. incompetence in terms of cooperation between universities and business, both scientists, entrepreneurs and university authorities or support institutions).

Countries characterised by a high level of innovation have, since the 1980s, started to shape systems and structures to support cooperation between science and business, and, consequently, processes of technology transfer and commercialisation of research results (Jefferson et al., 2017; Battaglia et al., 2017; Radło et al., 2020). Over time, informal personal contacts between scientists and entrepreneurs have been replaced by increasingly formalised processes of cooperation between science and business, and units have been set up to take responsibility for organising this cooperation. This was primarily aimed at encouraging researchers to engage in entrepreneurial activities and establish contacts with business, as well as increasing the efficiency of the management of the collaboration process (Brescia et al., 2014) and accelerating the technology transfer process (Bengoa et al., 2021). The structures created for technology transfer and commercialisation of research results take different forms – from completely dependent units operating within university structures (internal model) to companies independent of the university (external model). Sometimes there is an intra-university unit and a separate company (mixed model) within a single university (Brescia et al., 2014). There is no single universal model for organising the technology transfer system between university and business, as countries create a model to suit their needs and legal, economic, and cultural conditions (Szarek, Pachciarek, 2021). In Poland, there are two types of organisational structures for technology transfer and commercialisation of the results of researchers' work. The first is technology transfer centres (CTTs), which are part of universities, and the second is special purpose vehicles (SPVs), which are entities independent of universities (Ustawa z 20 lipca 2018 r.

Prawo o szkolnictwie wyższym i nauce). CTTs have a much longer history of existence in the Polish innovation ecosystem, as the first ones were established in the second half of the 1990s as grassroots initiatives of university authorities and researchers, and the Act on Higher Education of 2005 regulated the functioning of CTTs (Kardas, 2016). Research conducted by the Polish Business and Innovation Centers Association in Poland (SOLIIP) reveals the following barriers to CTT development in Poland (Bąkowski, 2012, p. 96):

- reluctance of the scientific community to commercialise cooperation activities with business,
- little interest in creating technological companies,
- the intricate legal procedures for technology transfer and commercialisation,
- no projects to commercialise,
- low budget, lack of financial support,
- misunderstanding of the idea of the Centre and its functions,
- lack of a market for modern/technological products and technologies,
- the poor economic situation in the region, malaise and stagnation,
- low business interest in the centre's offerings,
- grey area in consulting, commercialisation and technology services,
- legal restrictions and lack of technology transfer procedures,
- problems of cooperation with local and regional institutions.

The most recent study conducted by SOLiIP did not isolate individual innovation and entrepreneurship centres, but defined common barriers to the operation of these entities to which they belong (Mażewska et al., 2021, p. 91):

- the lack of financial instruments for SMEs under which the centre could provide services,
- lack of financial resources to contribute to projects,
- lack of suitably qualified staff,
- burdensome bureaucracy in obtaining external funding (including EU funding),
- the inability to use existing infrastructure resources as in-kind contributions to projects,
- pandemic-related constraints in the form of budgetary discipline in the centre's expenditure,
- no possibility of absorbing de minimis aid.

SPV is a single-member capital company formed by a university or institute, according to Art. 149 item 1 of the Act on Higher Education and

Science “for the purpose of indirect commercialisation, consisting in taking up or acquiring shares in companies (...)” (Ustawa z dnia 20 lipca 2018 r. Prawo o szkolnictwie wyższym i nauce). The University may entrust SPV with the management of the intellectual property rights of researchers and the management of research infrastructure. SPV is therefore a typical entity focused on business activity and profit (Spyra, Stanisławska-Kloc, 2019). To date, there has been a fair amount of attention paid to CTTs in the national literature<sup>1</sup>, in contrast to university SPVs, which date back to 2011 (Ustawa z 18 marca 2011 r. o zmianie ustawy – Prawo o szkolnictwie wyższym) and since then there have been few publications on the subject<sup>2</sup>. The exploration of the SPV research area seems important both theoretically and practically for the following reasons:

- research to date shows the low efficiency of SPVs while at the same time the potential for commercialisation is high (Narodowe Centrum Badań i Rozwoju report 2016, Naj-wyższa Izba Kontroli report 2018),
- SPVs are a well-designed tool in terms of formalities, providing greater opportunities to conduct commercialisation than when it takes place in the internal structures of the university, thus offsetting some of the limitations of CTTs (e.g. total dependence on the university, thus the need to apply public procurement law),
- SPVs respond to the existing need to intensify cooperation between science and business by being a commercial company, an entity independent of universities in organisational and legal terms, and are an equal partner for business representatives.

The following research question was therefore posed: what factors inhibit the realisation of the potential of SPVs and limit their dynamic development? The aim of the article is to identify the barriers to the development of SPVs in Poland and to identify the recommendations to address these barriers.

### Methodology and theoretical basis

The research process consisted of two stages. Firstly, an analysis of the literature and secondary documents – the SPV audit speeches and the report of the comprehensive audit conducted by the Supreme Audit Office (SAO) in 2018 in the SPVs in Poland – was carried out. The second stage of

<sup>1</sup> Surveys conducted in Innovation and Entrepreneurship Centres in Poland in 2010, 2012, 2018, 2021 include CTT as one of the main innovation centres.

<sup>2</sup> SPVs are not included in the survey of Innovation and Entrepreneurship Centres in Poland as a separate research entity, but treated together with CTTs (in 2018 and 2021).

the study involved a case study analysis. This method allows theory to be extended and generalised by combining existing theoretical knowledge with new empirical insights (Yin, 1994), thus providing a way of modifying or refining theory instead of rejecting or confirming it (Babbie, 2005, p. 321). The main limitation of this method is the difficulty in maintaining objectivity by the researcher and in generalising the results obtained from the study (lack of representativeness of a single case for the whole population) (Vissak, 2010, p. 379, Dondajewska, 2016, p. 46). The subject of the study is SPV<sup>3</sup> a university actively involved in the field of commercialisation (both direct and indirect), acting as a bridge between the world of science (mainly for researchers from the home university) and entrepreneurs across Poland. An in-depth interview with the President of SPV and interviews with stakeholders – a representative of the university authorities, members of the Supervisory Board, academics, entrepreneurs, a representative of the public administration – were conducted to obtain primary data in spring 2022. The collected material was transcribed and then analysed in depth, one of the results of which is this article. The juxtaposition of the information collected from secondary sources (SAO reports),

together with qualitative data obtained through interviews, is intended to enhance the credibility of the results presented. In contrast, the literature review confirms the importance of fostering cooperation at the interface between science and business through the development of internal and external structures for commercialisation within research units. The classification of the barriers was based on the division used in the study of the technology transfer and knowledge commercialisation system in Poland (Matusiak, Guliński, 2010).

### Results and discussion

By acting as a bridge between the worlds of science and business, SPV is confronted with the constraints of the scientific community, the regulation of science-business cooperation, the commercialisation process, as well as the SPV environment itself. In particular, the legal changes in higher education affect the operation of SPVs, as they are companies set up (and wound up) by the university president, thus the SPV is owned by the university. Table 1. shows the barriers to SPVs development, by type of constraints (systemic, economic, awareness-cultural and competence) and their sources, i.e. SPVs environment, researchers, entrepreneurs.

**Table 1.** Barriers to the development of university-based special purpose vehicles

Type of restriction	Environment		
	SPVs	Scientists	Entrepreneurs
<b>Systemic</b>	<ul style="list-style-type: none"> <li>• Frequently changing regulations</li> <li>• Excessive bureaucracy</li> </ul>	<ul style="list-style-type: none"> <li>• Little systemic incentive to stimulate cooperation with business</li> </ul>	<ul style="list-style-type: none"> <li>• Little systemic incentive to engage with researchers</li> </ul>
<b>Economic</b>	<ul style="list-style-type: none"> <li>• Lack of financial stability</li> <li>• Lack of projects targeting SPVs</li> <li>• Long time to wait for commercialisation revenues</li> <li>• Economic risks inherent in commercialisation</li> </ul>	<ul style="list-style-type: none"> <li>• Reluctance to engage in entrepreneurial activities in lieu of developing academic achievements</li> </ul>	<ul style="list-style-type: none"> <li>• Low willingness to undertake technological risks</li> <li>• Little demand for innovation from universities</li> </ul>
<b>Awareness-cultural</b>		<ul style="list-style-type: none"> <li>• Lack of trust and motivation to work with entrepreneurs</li> <li>• Lack of awareness of the existence and possibility of SPVs</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of confidence in working with scientists</li> <li>• Lack of awareness of the existence and possibility of SPVs</li> <li>• Negative attitude towards the benefits of collaboration with the university</li> </ul>
<b>Competence</b>	<ul style="list-style-type: none"> <li>• Shortage of specialists for commercialisation</li> <li>• No distinction between SPV and CTT</li> <li>• Competition with CTT</li> <li>• Insufficient commitment and competence of the manager</li> </ul>	<ul style="list-style-type: none"> <li>• Little knowledge of market needs</li> </ul>	<ul style="list-style-type: none"> <li>• Ignorance of the potential of scientists to generate new solutions</li> </ul>

Source: own elaboration based on research.

<sup>3</sup> At the request of the Chairman of SPV, the Company's details have not been made public.

The basic legal regulations for SPVs are contained in the Higher Education and Science Act. On the other hand, the Act on Innovative Activity, the Commercial Companies Code or the Intellectual Property Law are documents that also regulate the operation of SPVs. Frequently changing regulations, difficult to interpret and apply, are cited as one of the limiting factors for SPVs. Clear and comprehensible regulations for the cooperation between science and business and the management of the commercialisation process are essential for the smooth functioning of the SPV and for it to carry out its tasks in accordance with the purpose of its existence assumed in the Act.

The area of possible activity (under the Act) of SPVs in practice results in SPVs not always dealing with commercialisation, and taking the management of the university's infrastructure as their main focus. Moreover, the SPVs can replace the university CTTs as, according to the act, it can deal with direct commercialisation, which is the domain of CTTs operations. When the SPV is established, with the CTT in place, there is a need to share competences between the two units. Otherwise, there could be a situation where CTT and SPV are in competition with each other. A certain solution is personal unionisation, which takes place in the analysed case study. As the Chairman of the SPV emphasises, this solution streamlines the decision-making process for the benefit of the commercialisation process, because at the stage of creating a specific project, after contact with the entrepreneur and the scientist, a decision is made regarding the organisational and legal issues and whether a given project should be implemented by SPV or CTT (the main criterion is the effectiveness of the project implementation). Staff unionisation, on the other hand, can limit SPV's activities when projects are large in both number and scale. In such a situation, in the opinion of the Chairman of the SPV, separate management of SPV and CTT would be advisable. In addition, a clear articulation of the roles of SPV and CTT in the commercialisation of research results is important for the researchers – their awareness of potential support from CTT for direct commercialisation and SPV when there is potential to create an academic spin off company.

SPV lacks a steady source of funding and therefore financial stability. The SAO report (2018) shows that financial instability was the main reason for the liquidation of SPVs. Commercialisation, which is the domain of SPVs operations, requires firstly, capital, secondly, its success is fraught with risk, and thirdly, it takes time for the effects of commercialisation to show. All of this is causing SPVs

to look for faster and more secure sources of non-commercialisation funding, e.g. in the form of research infrastructure management, training or consultancy services. In addition, there is a lack of projects targeting SPVs or where SPV can be the beneficiary (and gain a source of funding). The regional government representative confirms that there are no dedicated SPVs activities, but that the public administration can be a source of contacts to local business. The owner – university authorities – are reluctant to financially support SPV activities, although SPV management stresses that such support would facilitate SPV development by providing economic security and motivation to undertake commercialisation projects (e.g. by providing products for commercialisation), especially in the first years of SPV operation. The lack of financial stability also means that many SPVs do not choose to employ qualified staff on a permanent basis, but only use services on an ad hoc basis depending on the project opportunities (project-specific staff funding). In addition, there is a shortage of commercialisation specialists and the lack of permanent SPVs funding does not make it easy to recruit suitable staff (even on an ad hoc basis).

Another barrier to SPVs development is the attitude of researchers and entrepreneurs towards collaboration. There is a lot of doubt on the part of entrepreneurs about fruitful and smooth cooperation with the scientific community. Although SPVs are a separate, marketable entity, there are concerns among entrepreneurs about timely, speedy delivery of projects. On the other hand, scientists also lack confidence in business representatives to undertake joint development and implementation projects. In addition, they are often not sufficiently motivated for entrepreneurial activities, the main reason for which is the focus on academic and teaching work. Inadequate communication between scientists and entrepreneurs results in the former being unfamiliar with market realities, resulting in a mismatch between their research and market needs, and the latter being unfamiliar with the ability of the academic staff to generate new products and services. In turn, the mismatch between the university's commercial offer and business expectations results in little interest in it. Often, these are solutions with a low level of technological readiness, which involves a high level of risk that entrepreneurs are reluctant to bear. The low demand from business for innovation and cooperation with the scientific community is also due to negative attitudes towards the benefits of such activities, so it seems necessary to spread good

practices emphasising the benefits of such cooperation and to promote SPV activities.

A significant barrier both in academia and among businesses is the lack of awareness of the existence of SPVs and the role they play in the innovation ecosystem of universities. The National Centre for Research and Development report (Narodowe Centrum Badań i Rozwoju, 2016) shows that almost half of the researchers surveyed have no knowledge of whether an SPV is functioning at their university at all. This shows the weakness of the idea of commercialisation in Polish universities and the poor promotion of SPVs in the scientific community. According to the interviews, the main person promoting SPV's activities is the

Chairman of the SPV, who identifies the potential of academics for commercialisation and then connects the creators with interested business representatives. The manager is the driving force behind SPV, but can also be a barrier to its development. Secondary data analysis shows that there happen to be people holding this position who also hold important positions in the university, which may result in insufficient focus and time being devoted to the development of SPV activities. In addition, from the interviews with SPV stakeholders, it also emerged that it is desirable for the manager to have managerial skills, to be familiar with the realities of the market, but also with the scientific environment.

**Table 2.** Recommendations for breaking down barriers in the development of university-based special purpose vehicles

Barriers to SPV development	Recommendations
<ul style="list-style-type: none"> <li>• Frequently changing regulations</li> <li>• Excessive bureaucracy</li> </ul>	<ul style="list-style-type: none"> <li>• Clear and comprehensible regulations for the cooperation between science and business and for the management of the commercialisation process</li> </ul>
<ul style="list-style-type: none"> <li>• Lack of financial stability</li> <li>• Shortage of projects targeting SPVs</li> <li>• Long time to wait for commercialisation revenues</li> <li>• Economic risks inherent in commercialisation</li> </ul>	<ul style="list-style-type: none"> <li>• Support from the owner in the form of products for commercialisation and possibly financial support in the first years of operation.</li> <li>• Cyclical projects (at national or regional level) in which SPVs can be the beneficiary.</li> </ul>
<ul style="list-style-type: none"> <li>• Shortage of specialists for commercialisation</li> <li>• No distinction between SPV and CTT</li> <li>• Competition with CTT</li> <li>• Insufficient commitment and competence of the manager</li> </ul>	<ul style="list-style-type: none"> <li>• Greater promotion of the commercialisation units and their activities to the public</li> <li>• Clear division of responsibilities between SPV and CTT</li> <li>• Selection of a fully committed person with managerial experience and knowledge of the scientific community as President</li> </ul>
<ul style="list-style-type: none"> <li>• Little systemic incentive to stimulate cooperation between science and business</li> <li>• Reluctance to commit time to entrepreneurial activities in lieu of academic output development</li> </ul>	<ul style="list-style-type: none"> <li>• Programmes and regulations to encourage collaboration between researchers and entrepreneurs and vice versa</li> <li>• Promotion of the real benefits of entrepreneurial activities by researchers</li> </ul>
<ul style="list-style-type: none"> <li>• Lack of trust and motivation for cooperation between entrepreneurs and scientists</li> </ul>	<ul style="list-style-type: none"> <li>• Promoting good practices, highlighting the benefits of this type of cooperation</li> </ul>
<ul style="list-style-type: none"> <li>• Lack of awareness of the existence and possibility of SPVs</li> <li>• Little knowledge of market needs on the part of researchers</li> <li>• Ignorance of the potential of scientists to generate new solutions</li> </ul>	<ul style="list-style-type: none"> <li>• Promotion of SPVs activities in academia and business</li> <li>• Increasing the relevance of researchers' research to market needs</li> <li>• Realistic and accessible offer of the university in terms of research conducted</li> </ul>
<ul style="list-style-type: none"> <li>• Low willingness to undertake technological risks</li> <li>• Little demand for innovation from universities</li> <li>• Negative attitude towards the benefits of cooperation</li> </ul>	<ul style="list-style-type: none"> <li>• Promoting the idea of commercialisation and the benefits of collaboration with scientists, spreading good practices in this area</li> </ul>

Source: own elaboration based on research.

## Conclusions

The theoretical elaboration presented in this article points to the existence of barriers related to the cooperation at the interface between science and business, which are evident both on the side of the scientific community and on the side of businesses, and which may be structural, systemic,

competence, or awareness-cultural in nature. These barriers also apply to organisational units acting as intermediaries in the implementation of the commercialisation process and linking representatives of science with representatives of business. As researchers point out (e.g. Bruneel et al.,

2010), the identification of barriers and problems is very important in order to break them down, to find solutions, therefore, in addition to the defined barriers to SPVs development, confident actions to break them down have been proposed. Analysis of secondary data and conclusions resulting from the case study analysis indicates that the dominant barriers to development are systemic (unclear and often changing regulations, a lack of systemic incentives to stimulate cooperation between science and business), economic (a lack of financial stability of SPV, shortage of projects directed to SPV, risk and long waiting time for the effects of commercialisation, low demand for innovations and unwillingness to bear technological risk on the part of entrepreneurs, unwillingness to engage in commercialisation processes on the part of scientists), awareness and cultural (a lack of trust between entrepreneurs and scientists, negative attitude of entrepreneurs to the benefits of cooperation with scientists, lack of awareness of the existence and possibilities of SPV), competence (shortage of specialists in commercialisation, rivalry between SPV and CTT, a lack of division of competencies

between SPV and CTT, insufficient commitment and competence of the person managing SPV, little knowledge of market needs by scientists, ignorance by entrepreneurs of the potential of scientists to generate new solutions). The identification of recommendations in relation to barriers to SPVs development can serve both SPVs managers in SPV management, university authorities setting up SPVs, but also decision-makers responsible for shaping regulations and allocating funds for the development of cooperation at the interface between science and business.

According to the "Future of Polish science..." report, 70% of the surveyed entrepreneurs with experience in cooperation with scientists rate this cooperation positively, whereas 75% express a desire to establish more contact with the scientific community (Raport..., 2016, pp. 18-19). Therefore, in addition to analysing the barriers present in SPVs activities, it seems equally important to analyse the benefits of science and business collaboration involving SPVs, which may be an area for development in the next work.

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