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# The role of networking in building a start-up business model

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## Abstract

The aim of this paper is two-fold. It focuses on the identification of crucial elements of the business model for the development of start-ups and for their potential to create innovation, as well as the influence of network cooperation on the components of their business model. The canvas model is used to illustrate the research outputs. Additionally, the research aimed at identifying what start-ups expect from the networks in which they exist (e.g., technological parks) in terms of creating appropriate conditions supporting innovations. The study was done using three expert panels in which 28 start-ups participated. The research and its results are qualitative and are presented as a case study. The research was conducted by the authors in 2019 and concerns start-ups participating in cooperation networks, but its results could be interesting not only for start-ups, but also for everyone interested in the issues of cooperation between various entities and its potential to stimulate innovation.

## Introduction

The current most innovative economies in the world, which include those of the USA, Finland, and Israel, owe their competitiveness to start-ups. Silicon Valley has become a global model for start-ups, along with ones described in the book *Start-up Nation: The Story of Israel's Economic Miracle* (Senor and Singer, 2011). However, under strictly market conditions, they have relatively little chance of bringing their innovative ideas to fruition or of developing. Therefore, an important role is played by cooperation networks and institutions that support the establishment of network cooperation, i.e., to match up business partners — so, for instance, start-ups with investors. These institutions<sup>1</sup> create an ecological environment which combines new scientific discoveries (knowledge) with the ecological business environment.

Research on business models (BMs) began in the 1990s, and since then, many business models have been designed for innovative ventures (Muehlhausen, 2018; Osterwalder and Pigneur, 2010). It has been shown more and more clearly that enterprises working with innovations and in industries going through an intensive stage of research, as well as new growth sectors of enterprises (IT, biotechnology, semiconductors, sound systems, electronic displays, and plastic materials) operate on innovative BMs. These enterprises specialise in the management of intellectual property rights and function in the “market for ideas” by offering licences for the rights to technological innovation, and not by independently commercialising their innovations (Massa and Tucci, 2015).

The most well-known business models are: the open business model (Chesbrough, 2007, 22), the Business Model Canvas (BMC) (Osterwalder and Pigneur, 2010) and Lean Start-up Manifesto (LSM).

Research conducted over the past 25 years has shown the important role played by start-ups in the creation, implementation, and diffusion of technological and social innovations. These companies need not only financial support, but also legal, business, and consulting assistance as well as an environment more stable than that of the market to test their products and cross-check BMs.

The literature review shows there are no studies which could demonstrate the impact of the cooperation network on the business model, how the BM changes under the influence of the cooperation network, or if the benefits of participation in the cooperation network are reflected in the BM created. Therefore, an interesting issue is the identification of those components of the business model which are crucial for the development of start-ups and for their potential to create innovation.

The article assumes that a start-up is an entity which does not yet have a defined business model and is still seeking one. Since start-ups often operate under network

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<sup>1</sup> For example: business incubators, science parks, technology parks, entrepreneurship accelerators and clusters.

conditions, e.g., in a cluster (Silicon Valley) or in technology parks, an interesting research question is one concerning the impact of cooperation networks on start-up business models and on the components of the model. The aim of this paper is the identification of crucial elements of the business model for the development of start-ups and for their potential to create innovation, as well as the influence of network cooperation on the components of their business models. These issues were studied in late 2019 in three technology parks in Poland: the Wrocław Technology Park (WTP), the University of Zielona Góra Science and Technology Park (UZSTP), and the Euro-Centrum Science and Technology Park in Katowice (ECSTPK).

## 1. Start-ups and cooperation networks — literature review

This section gives a review of the crucial literature focusing on selected issues: start-ups, cooperation networks, the cooperation of start-ups with selected entities, creating quasi-market conditions by institutions such as science parks, technology parks and clusters.

First of all, the definition of start-up should be taken into consideration. Colloquially, every newly established business is called a start-up. Steve Blank and Bob Dorf (2012, 34) define a start-up as a temporary organisation “searching for a repeatable and scalable business model.” Other authors indicate that start-ups are characterised by uncertainty as to the conditions of their functioning (Reis, 2011) and achievement of success (Robehmed, 2013). There is a lot of research focusing on start-ups as a trigger for innovation in regions (e.g. Silicon Valley) or countries (e.g. Senor and Singer, 2011). Many periodical reports are published which present the characteristics of start-ups (e.g. their size, number of staff, type of business, legal form, age) and the maturity of the ecosystems in which they operate (Deloitte, 2016). The conditions of these ecosystems and their forms (e.g. technological parks) are investigated in considerable depth. Other research on the start-ups concerned various factors and their effect on start-ups. For example, the latest research considers an additional factor, the coronavirus pandemic.

The perception of the impact of the pandemic on the operation of start-ups is divided: 39% of them believe it to be negative, while 34% assess it as positive. Most start-ups do not intend to lay off employees (63%), while only 6% plan to reduce their workforce. More than a quarter of companies have changed their business model, seeing new revenue opportunities or a change in customer relationships. As many as 44% of the start-ups surveyed declared that they currently have no income. Almost one-third of start-ups (32%) now generate revenues greater than a year ago. When financing the development of their business, as many as 80% of start-ups use their own resources. (Arwaj et al., 2020)

Research conducted in 2020 shows that start-ups offer: a blend (of product and service) — 37%, product (32%), service (31%). Start-ups are almost equally divided into those selling physical products (48%) and digital products (52%) (Arwaj et al., 2020).

A second important term is cooperation network. Research on *cooperation* and *collaboration* can be distinguished in the context of network cooperation, focusing on macro- (Kastelle and Steen, 2015), meso-, and microeconomic effects. The subject of the research are the benefits and threats for entities participating in such networks (Knop, 2013), the impact of network cooperation on the competitiveness and innovation of countries, regions, or enterprises, as well as on the development of science. A separate type of research is one concerning the structure of a cooperation network and the strength of relationships between network participants (nodes).

Joseph Schumpeter, Michael E. Porter, and other authors indicated that networks favour the creation of innovation. “Innovation happens in networks — networks of the brain, networks of people and networks of firms” (Kastelle and Steen, 2015, 117). In 1973, Mark Granovetter studied the strength of connections in networks and found that weak ties promote information transfer and are a source of research. On the other hand, strong ties and established connections probably convey redundant information (Kastelle and Steen, 2015, 109). A more complete review of the literature regarding research on the effects of strong and weak links was written by Mark Dodgson (2015). Information, often obtained as a result of new collaboration, is an inspiration for innovation. Network structures are a determinant of innovation, and the development of the system (and implicitly also of enterprises) takes place through innovation (Kastelle and Steen, 2015, 109, 117). Shan et al. (1994) examined the relationship between cooperation among companies and the innovations created by start-ups in the biotechnology industry. Several control variables were associated with collaboration and innovation. However, the results only confirmed that cooperation among companies influences innovation. Dittrich et al. (2007) and Dodgson (2015) highlight the important role of cooperation in terms of a strategic alliance of venture capital, research and development consortiums, a partnership between universities and industry and between government and industry in creating innovation, even in companies that are already technologically advanced. Dodgson (2015) analyses collaboration from the perspective of enterprise and innovation. He attempts to identify its contribution to complementarity, encouraging learning, and developing the organisation’s potential, as well as dealing with uncertainty and complexity. Another example of a network are the industrial networks known as clusters, which achieve success due to close social relations between suppliers, producers, customers, and institutions (Bathelt, 2002). The literature (Centola, 2013) also examines the issue of joint activities of small companies in large groups.

Much research has been carried out on cooperation networks, the impact of various factors on the innovativeness of start-ups, or selected components of the business model. Conclusions from the study by Joel Baum, Tony Calabrese and Brian Silverman (2000) carried out for the biotechnology sector indicate that participation in alliances as well as the size of the network and the effectiveness of

its operation have a positive impact on start-up development. Veronique Schutjens and Erik Stam (2003) analysed the evolution of a network made up of new companies for the first three years following its establishment. The network was defined as the main business relationship in terms of sales, delivery, outsourcing, and cooperation. One of the main findings was that the behaviour of innovative companies influences the nature of the network. In turn, Cap (2018) discusses various mechanisms developed to help start-ups in different phases of their life cycle and the tools for creating a solid and effective business model of incubation from the very start.

An interesting organisational form supporting start-ups are incubators which, by offering office space, financing, and basic services to start-ups, allow them to reduce their operating costs and focus on product or service development (Hansen et al., 2000). Incubators have systems that encourage networking by creating more favourable conditions in the business environment, enable start-ups to use production and human resources more efficiently as well as the continuous development of knowledge-based business along with the activities carried out help companies in searching for new opportunities for cooperation with partners (Milius, 2008). There are also disadvantages of location at an incubator (McAdam and Marlow, 2007), mainly relating to privacy, intellectual property rights, and competitive strategies. It was also observed that as the company matures, it becomes more open to support and advice from the incubator management. The research on the importance of the network for start-ups and the role of incubators in this networking process presents that start-ups often resort to the network to work on their poor reputation and limited resources (Galvão, Marques, Franco and Mascarenhas, 2019). Incubators promote events that encourage the creation of partnerships and networks, between both start-ups within the same incubator and with external institutions. Most collaborative networks are informal and meet the needs which start-ups are unable to fulfil on their own. In turn, research by Frank J. van Rijnsoever (2020) was aimed at determining the impact of incubators on the occurrence of what are called weak network problems, by which the author understands the lack of links between the knowledge and business subsystem in the entrepreneurial system in which start-ups operate. The weak links in the financial support network (e.g., start-ups and venture capitals), and more specifically the chances of entities making connections, develop depending on the level/state of the conditions in which start-ups function, i.e., the ecosystem (Rijnsoever, 2020). He distinguished four states: undeveloped, emerging, maturing, and developed. The more mature the ecosystem, the better the chances of connections. By supporting only 20% of all start-ups, incubators can effectively create a network between start-ups and venture capitals (VC). The results he gained highlight the important role of incubators in creating conditions for establishing network cooperation both between start-ups and between start-ups and VCs.

Incubation is an interdependent process of interaction that develops between the incubator, the incubated (the start-up), and external network actors (Hakansson et al., 2009, as cited in Petrucci, 2018). The existing network connections embed a new enterprise in the established configurations of resources and activities (Petrucci 2018). Incubated enterprises should be relatively homogeneous, because heterogeneity could lead to problems establishing mutual business contacts.

Research was also carried out on start-up accelerators (Seet, Jones, Oppelaar and Corral de Zubielqui, 2018) and science parks, for instance by Leite, A. Silva, J. Silva and S. Silva (2020).

Klaus Fichter (2012) introduced a new concept related with cooperation — “innovation communities,” which is an informal personal network of innovators. Empirical research in innovation management has shown that cooperation and effective networking are important factors of success in almost all innovation processes (Gloor, Dorsaz and Fuehres, 2011).

Another aspect studied was the effects of cooperation between business and science (Domańska, 2018). The start-ups founded by scientists more readily cooperate with universities (Stuart, Ozdemir and Ding, 2007). This cooperation translates into greater commercialisation of research results, and more intensive cooperation between start-ups and universities results in faster development and higher revenues for the start-ups. Formal and informal means of cooperation between small and medium enterprises (SMEs) in the post-communist Polish economy were also studied. Muent (1999) described how small businesses in academia use their social relationship networks to deal with some of the problems that are typical of SMEs. The paper highlighted the importance of personal contacts both between technical universities and companies as well as between individual companies. It was demonstrated that the use of these interpersonal relationships can lead to an effective transfer of knowledge between universities and the business sector.

The cooperation between start-ups and a large partner produces the following positive effects: product development, participation in a technology cluster, or the effects of scale, which all lead to a win-win situation (Rothaermel, 2002). It was discovered that the cooperation between corporations and start-ups has a positive impact on the digital transformation of corporations. The authors explicitly state that a corporation may need a portfolio of start-ups in order to carry out a more holistic transformation of its business (Steiber and Alänge, 2021). Research was conducted by Baum et al. (2000) in which they showed that cooperation between start-ups and large corporations with an established market position gives greater opportunities for organisational learning and reduces the risk of competition within the network. Cooperation with direct competitors (alliances in a narrow sense) has a negative correlation, i.e., start-ups show worse results (Baum et al., 2000). From point of view of this paper the research conducted by Monika Sheoran and Divesh Kumar (2020) seems important. They proposed a model showing the relationship between start-ups’ concern for the environment and their efforts to create

networks. The research was carried out in incubation centres at various institutions in Rajasthan, India. Environmental orientation was identified as a highly important aspect of networking for start-ups.

The most frequently used research methods for cooperation networks and start-ups are qualitative methods, e.g. semi-structured interviews (Muent, 1999; Langley, Zirngiebl, Sbeih and Devoldere, 2017; Lopes, Farinha, J. Ferreira and F. Ferreira, 2018) and case studies (Kassen, 2018; Domańska, 2018; Leite et al., 2020; Steiber and Alägne, 2021). At the same time, when studying social networks, the quantitative methods are mostly used, such as the network analysis method (SNA: Social Network Analysis) (Scott, 2013) and its derivatives.

## 2. Research method

Research on start-ups was conducted as part of meetings organised in three technology parks in Poland: the Wrocław Technology Park (WTP), the University of Zielona Góra Science and Technology Park (UZSTP) and the Euro-Centrum Science and Technology Park in Katowice (ECSTPK). In addition, start-ups' expectations regarding the support offered by technology parks were identified. The research was carried out using the open space method (Harrison, 2008) on organised, moderated<sup>2</sup> panels attended by not only representatives from start-ups but also from the technology parks themselves, and from enterprises that are not start-ups, but which operate within the parks. The panellists could complete a voluntary questionnaire. In total, 28 start-ups took part in the panels.

To comply with the rules of open space method, our goal was to bring together a group of people who would be interested in finding answers to the questions asked (we did this in each technology park separately). Thus, the topics and key questions were sent to the panel participants beforehand. The meetings were moderated by leaders who kept to the same set of topics for discussion. The panels concerned four topics:

1. Which components of the business model are crucial for: (a) the company's development as measured by sales revenues, profit, market share, and (b) creating innovations (in terms of product, process, organisation, marketing)?

2. To what extent does network cooperation in the business environment influence either the creation of the business model or a change in it: (a) with business partners (suppliers or customers in your value chain), and (b) within the wider cooperation network — outside the chain values?

3. Where do the sources of innovation in the company come from? Does the fact that you operate in a park contribute to greater sources of innovation in your

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<sup>2</sup> The moderators were members of the research team from the Wrocław University of Science and Technology: Piotr Kubiński, Edyta Ropuszyńska-Surma, and Magdalena Węglarz.

company? What kind of support do you expect for creating innovation or for generating sources of innovation (in terms of the park, cooperation network)?

4. Recently, the concept of open innovation and cooperation between large companies with a mature business model (e.g., Tauron, GE, LG, Siemens, Volvo etc.) with start-ups that are only just seeking their own business model has become increasingly important. Do you cooperate with big business? Can you offer something interesting to mature companies? Could large companies be interested in what you have to offer or can they help you develop?

The blueprint called the Business Model Canvas (BMC) (Osterwalder and Pigneur, 2010) was used during the panels. The choice of this description method was dictated by the fact that it is the most used and best-known descriptive model.

To ensure anonymity of the panel participants, codes were given to companies according to the industries in which they operated. If companies operated in several industries, the dominant one was used. However, if the representatives did not feel that one industry was dominant, two were selected. The start-ups in the study operated in the following industries: biotechnology (BIO), biotechnology and pharmaceutical (BPH), construction (CON), electronic (ELN), electricity (ELE), IT (INF), space (COS), medical (MED), industrial (IND) and telecommunications (TEL). Within a given industry, companies were assigned successive numbers in alphabetical order.

There were 5 start-ups related to biotechnology at the WTP. Two start-ups had links to the IT industry and two to the electronics industry. One start-up was involved in space technologies, one in the electricity industry, and one in construction.

At the UZSTP, participants were involved in the following industries: construction (2), electronics (1), electricity (1), space (1), industrial, but related to research, and production of innovative materials (3).<sup>3</sup>

The sectors represented at the ECSTPK were IT (3), medical, but also IT-based (1), telecommunications (1), and industrial (2).

Panel participants also came from enterprises and institutions (including clusters, technology parks) that were not start-ups. Their responses are not included in this article.

In addition, the panellists had the opportunity to complete voluntary anonymous questionnaires, which included questions regarding:

- the impact of network cooperation on the individual components of the BM,
- the benefits gained and expected from cooperation at the park,
- sources of innovation,
- types of entities the start-up has cooperated with in innovative activities,
- benefits gained by start-ups from the innovations introduced.

The questionnaire return rate was over 32%. The results cannot be generalised, but they enrich the panellists' remarks.

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<sup>3</sup> The brackets indicate the number of start-ups in the panel representing each industry.

### 3. Results of the research

#### 3.1. Key components in business models

The first question addressed to the panellists was two-fold. It concerned the key components of their business models that contributed to the company's development and those elements that were key to creating innovation.

Table 1 shows the key components of the business model for each start-up. No panellist indicated distribution channels. Therefore, this component of the business model was omitted from the compilation (Table 1). The labelling indicates which of the components affected the development of the company (a) and which affected the creation of innovation (b).

The key elements of the BM for the company's development, are the customer and value for the customer. Biotechnology and construction companies in particular suggested the creation of a bespoke offer tailored to the client's needs. They emphasised that customer value is important, not just turning a profit. The panellists, especially those in the construction industry, indicated that additional value for the client is advice on making savings and providing eco-friendly services. Panel participants at the WTP highlighted the important role of storytelling, which they perceive as a more effective way to gain customers and create value for them than classic marketing tools. They said the story should explain why their offer is important to the customer or the end user. Although the participants in the other panels made no direct reference to storytelling, they pointed to the important role of the client in adjusting the offer to the client's individual needs, making them aware of, for example, at what stage of the construction savings can be made. Relationships and direct contact with the client were an important part of the model. The active role of the client in creating innovation was highlighted. It would seem that customer relations should be particularly important for start-ups in the B2B market. However, construction entities that were in the process of changing their business model from B2B to B2C also emphasised the important role of the client (individual investor) in the design process.

**Table 1.** Key components of the business model for the development of a start-up (a) and for creating innovation (b)

| Code | Value proposition | Customer relationships | Client segments | Key activities | Key resources | Key partners | Revenue streams | Cost structure |
|------|-------------------|------------------------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| BIO1 | a                 | b                      | b               | a, b           | a, b          |              |                 |                |
| BIO2 | a, b              |                        |                 | b              | a             | a, b         |                 | +              |
| BPH1 | b                 |                        |                 | b              |               |              |                 | +              |
| BPH2 | a, b              | a                      | a               |                |               | a            |                 |                |
| BPH3 | a                 |                        | a               |                |               |              |                 |                |

| Code  | Value proposition | Customer relationships | Client segments | Key activities | Key resources | Key partners | Revenue streams | Cost structure |
|-------|-------------------|------------------------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| CON1  | a                 | a                      | a               |                | a, b          |              |                 |                |
| CON2  | a                 | a                      |                 | a              | a, b          |              |                 |                |
| CON3  | b                 | a                      |                 |                |               |              | b               |                |
| ELN1  | a                 | a, b                   | a               | b              | a             | a            |                 |                |
| ELN2  | a, b              | a                      | b               |                | a             | a            |                 |                |
| ELN3  | a                 |                        | a               |                | a, b          |              |                 |                |
| ELE1  | +                 | a                      |                 | a              | a, b          |              |                 |                |
| ELE2  | a                 | a                      |                 |                | a             |              |                 |                |
| ELE3  | a                 | a                      | a, b            |                | a             |              |                 |                |
| INF1  |                   |                        |                 | a              | a             |              | +               |                |
| INF2* |                   |                        | a               |                | a             |              |                 |                |
| INF3  | a                 |                        |                 | a              |               |              |                 |                |
| INF4  |                   |                        |                 | a              | a             |              |                 | a              |
| INF5  | a                 | b                      |                 |                | a             |              |                 |                |
| COS1  | a                 | a                      |                 | b              | a             | a, b         |                 |                |
| COS2  |                   |                        | a               | a              | a             | a, b         | +               |                |
| MED1  | a                 | a, b                   | a               |                | a             | a            |                 |                |
| IND1  | a                 | a                      |                 |                | a             |              |                 |                |
| IND2  | b                 |                        |                 |                | a             |              |                 |                |
| IND3  | +                 | a, b                   |                 |                | a             | a            |                 |                |
| IND4  | a                 |                        | +               | a              |               |              |                 |                |
| IND5  | a                 |                        |                 | b              | b             | a            | +               |                |
| TEL1  |                   |                        |                 |                | a             | b            |                 |                |

Key: a — components of the business model indicated by the panel participants as important for the development of the company (start-up); b — components of the business model indicated by panel participants as important for creating innovation; — important components of the business model that were not directly indicated by the panellist, but their remarks prove that they play an important role; \* — a panellist from a start-up did not answer all the questions but answered question 1

Source: own research based on the studies.

Delivering a unique product was the most frequent response to the question on the value delivered. There followed a clarification of what this uniqueness consists of. Answers worth quoting include: “saving money for the customer,” “reducing losses for the customer,” “personalised product/service,” “comprehensive service,” fitting into a market niche (“doing something that others cannot”).

Another important part of the business model were key resources, which were mentioned as being the major basis for the start-up’s development. Of 21 statements indicating resources as a key component of the BM, 13 responses were re-

lated to a broader or narrower understanding of human resources, e.g., staff skills, specialisation, knowledge, or know-how. Individual panellists mentioned the use of technology that is unique on a global scale, the existing infrastructure and the chance of access to it, or the need to have financial resources.

Thirteen panellists indicated that key activities are an important element of the BM. The panellists' comments in this regard were quite varied. It seems, although this should be confirmed on a larger research sample, that the nature of the key activities proposed depends on the type of business activity undertaken and the phase of the start-up's life cycle. The panellists mentioned "conducting R&D projects" (BIO), "training services" (BIO), customer education (INF), purchase of a ready-made module that saves time and money (BPH), a comprehensive service from design to maintenance (ELE), promotion (INF), relocation to another country due to a more convenient tax system (INF), expansion of business activity (diversification to related products) (COS), certification (COS, IND), participation in international projects (COS), introducing process innovations (IND), access to data (COS), carrying out activities to determine whether a product will be accepted onto the market (INF).

### 3.2. The impact of network cooperation on the creation of a business model

As part of the panels, entrepreneurs were asked to assess which elements of the BM are influenced by membership in a cooperation network. Participation in a cooperation network is understood as much broader than belonging to a technology park; companies can be associated formally or informally in various joint initiatives, clusters, associations, networks, chambers of commerce, etc. Since the cooperation network can affect the components of the value chain as well as ones that do not belong to this chain, this is reflected in the different colours in Figure 1. The components that belong to the value chain affected by the cooperation network are marked in yellow, and the components that do not belong to the value chain are marked in orange. 28 start-ups took part in the panels, but 24 companies answered this question.

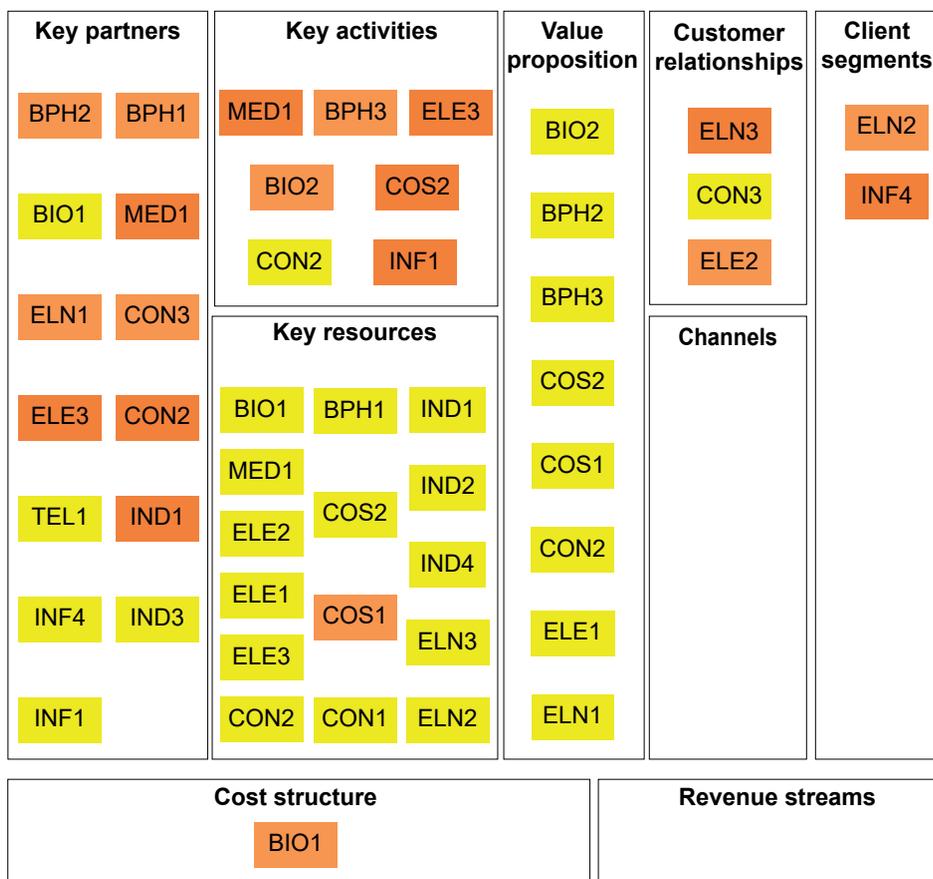
According to panel participants, the network cooperation in which companies are involved affects the following components of the business model: (1) key company resources (this answer was mentioned by 62.5% of panellists), (2) key partners (54.2%), (3) value propositions (33.3%), (4) key activities (29.2%) and, to a lesser extent, the effect on customer relationships (12.5%) and customer segments (8.3%). None of the start-up representatives mentioned distribution channels and revenue streams as influenced by participation in the cooperation network.

However, if we look at network cooperation through the prism of the value chain, we can see some differences (see Figure 1). Thus, within the value chain (marked with yellow), the cooperation network mainly influences the value prop-

osition, key resources, and key partners. In addition to the value chain (orange), the cooperation network mainly affects key partners, key activities, customer relationships, and customer segments.

In key resources, entrepreneurs highlighted the high impact of cooperation networks on:

- access to research infrastructure, laboratories, and equipment,
- opportunities to recruit staff,
- an increase in the owners' knowledge and experience,
- an increase in staff knowledge and skills.



**Figure 1.** Diagram showing which components of the business model (BMC) are influenced by the cooperation network

Source: own research.

More than half of the panel participants noted the impact of the various networks in which they take part on cooperation with key partners, on acquiring new partners, and on establishing cooperation with universities. Their comments in-

cluded information on the activities of parks, which consisted in organising events that help in finding or acquiring partners, helping set up cooperation with a large partner, or assisting in the search for partners at the highest levels of government. One of the companies described a case where they changed their business model after going into an alliance with their partners and setting up a company consisting of previous clients. Another representative described a support group for exchanging knowledge between companies on orders and free resources, so that they could connect and support each other in projects for creating Polish products. They take advantage of the synergy effect because there are many companies in their market that could do the work but are lacking free resources, while other companies have free resources but have not won a contract. This approach is in line with Porter's concept of a cluster as a concentration of people working in the same industry. Despite the competitive aspect, their companies have access to staff, suppliers, and information. A representative from one of the parks said that they were trying to create industry cooperation networks, but companies were afraid of losing staff and customers. He remarked that they treated each other as competitors, that it was impossible to establish cooperation under these conditions, and that there was no "sharing" of staff. This comment could be the focus of extensive research as to why this effect occurred. Why is there cooperation in most Italian clusters, yet here a negative effect was observed? It seems that the cause of the synergy effect or the lack thereof are the conditions in which the network cooperation is established. Porter emphasised the ties between cluster participants. In the example cited, the creation of an industry cluster was "top-down," and it seems to have been assumed that the mere establishment of the cluster was enough for the synergy effect to occur. There is no such cause-and-effect relationship, as vividly described by Senor and Singer (2011, 173), when comparing clusters in Arab countries and in Israel: "[...] a simplistic view of clusters — one that maintains that a collection of institutions can be mechanically assembled and out will pop a Silicon Valley — is flawed."

A third of the participants highlighted the impact of cooperation networks in creating value propositions. They noted the fact that the network: (1) makes it possible to acquire knowledge and technological innovations, (2) teaches the "functioning" of communication, (3) makes it possible to cooperate, thanks to which they can develop a new value or service, (4) enables the creation of a synergy effect, as the result of which they create projects that are valuable for the Earth or for the environment.

Another important element influenced by the cooperation network are key activities. Since companies operate in different industries and have different BMs, the key activities also vary widely. Among the activities, the entrepreneurs mentioned participation in international projects, joint organisation of work by sharing resources, joint problem-solving, lobbying of partners at higher levels, and lobbying over legal regulations.

During the discussion, the entrepreneurs expressed what benefits they expected from the cooperation network. These were:

- cooperation, defined as entering into joint ventures with other businesses,
- reduction in costs (business activity),
- easier access to distribution channels,
- consultancy,
- marketing,
- protection from competitors,
- legal assistance,
- increase in knowledge of management,
- increase in communication skills,
- the possibility to make new contacts.

One of the interviewees shared his experience by pointing out that his business had already come up with many innovative solutions, but the condition for success was that the client understood the innovation. For this, you need a good relationship with the customer and the right marketing activities. Unfortunately, these are expensive and time-consuming for start-ups, and they lacked the ability to visualise and animate their suggested solutions. From this, it can be concluded that this type of professional service would be expected from a cooperation network.

When discussing cost reduction, the panellists expressed the need to acquire more and more customers.<sup>4</sup> Their research, along with the development of innovative technologies and products and services, require a considerable amount of work and funding. Gaining more customers through networking allows one to reduce unit costs, which in turn helps maintain a competitive advantage. The entrepreneurs also assessed the benefits they gained from cooperation in a park, cooperation network, or cluster — most businesses remarked that these included the chance to make new contacts and reduce costs. No business stated that it had achieved benefits related to easier access to distribution channels, consulting, marketing, protection against competitors, or widening management knowledge. These answers seem to be surprising, as the parks usually offer advisory assistance, including marketing, along with management or communication training, or give information on such events. Based on the observations of the panel participants, it is obvious that they have knowledge of both management and marketing activities as well as possess communication skills. Therefore, the following hypotheses can be formulated:

- This type of activity that goes on at parks is not at a sufficiently high level that would enrich the knowledge and skills of park participants.

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<sup>4</sup> This effect should be distinguished from the typical networking effect, which determines the increase in value of a given good for its users with the growth of these users (e.g., Facebook). Here, we can observe a typical economies of scale effect, assuming very high inputs and, in the short term, fixed costs.

— Park participants do not believe that their knowledge in the above areas has been enriched by cooperation as part of the park.

### 3.3. Cooperation networks and collaboration with universities as a source of business model innovation

All the start-ups declared that they had created their own innovations, mainly in products and processes. As part of the voluntary questionnaire, in a multiple-choice question (up to three answers) on the sources of innovation in the business, the panellists chose “customers or suppliers or competitors” (nearly 78% of responses). However, comments made during the panel indicate that these were primarily customers. A smaller percentage stated that the source of innovation was managerial staff, staff in R&D departments and other staff. Almost 45% of the panellists stated that each of these three staff groups was a source of innovation. Cooperation with academic institutions as a source of innovation was mentioned by 33% of the respondents. Start-ups expected technical rather than intellectual support from universities. It is worth noting that participants on the panels included PhD students and academics who have set up spin-off companies. Some panellists explicitly stated that they had “emancipated” engineers who “create and carry out their own projects.” Another panellist said he was seeing a relatively large outflow of staff from universities to industry.

Opinions on cooperation with universities varied. Red tape was the main barrier; some panellists pointed out that access to equipment and laboratories depended on the organisation of the academic year and the research work carried out by the staff at these institutions, and that they — start-ups — expected immediate access to highly specialised laboratory and research equipment. There were also comments indicating that universities in Poland differ in the quality of the services they provide regarding the promotion of inventions (this was from a long-term research worker at one of these universities). Hence, from their point of view, collaboration with research departments does not bring them the expected benefits. However, there were also comments that the process of signing an agreement with a university in Poland and, for example, the USA does not differ greatly. This comment provides a good example: “We should not demonise [...] the forms of promotion and the non-commercialisation of various solutions in Poland, because a contract with an American university also runs six months.” In turn, a biotechnology start-up participant noted that it is now much easier than just a few years ago to access specialised research equipment at universities, which allows experiments to be planned. The founder of one of the start-ups, who, as a researcher employed at a university, has carried out hundreds of projects with industry, spoke in a similar spirit. In his opinion, the procedure was simple: “There’s a commission, there’s money, and access to equipment is via goodwill.” The problem was commissions for another faculty because a fee had to be paid for a given service.

Another interviewee commented on the university staff motivation system, which is not conducive to the commercialisation of research. Despite such varied statements during the panel discussion, the answers given in the questionnaire on cooperation on innovative activities over the last three years indicated that most respondents were discussing universities and/or departments at the Polish Academy of Sciences. Very few comments (1 or 2) concerned cooperation with suppliers, competitors and other entities from the same industry or consulting companies. In response to the closed question, no one mentioned that they cooperated in creating innovations with other businesses from their own group.

As part of the panel discussion, and at one of the parks, in a group session, the participants listed the most important tools and activities for supporting innovation through network cooperation. They suggested:

1. organising opportunities for making contacts with investors and assistance in attracting investors,
2. creating a base of passive and active investors and a database on access to infrastructures,
3. networking and creating an environment to support it, as well as organising regular meetings that will act as an information exchange channel,
4. organising business consulting support groups, including
5. communication,
6. X-PRIZE — the creation of a pre-filtered challenge delivery system,
7. establishing cooperation between universities and businesses,
8. “business sharing,” “on demand” knowledge, mastermind groups,
9. hackathons,
10. an interdisciplinary R&D team based on human and equipment resources.

Action not aimed directly at already existing start-ups, but with an impact on innovation, was a proposal to teach young people how to work in groups.

## Conclusions

This study enriches knowledge of start-ups’ BMs and provides information on their expectations regarding cooperation networks and support provided by parks. It is the first study which made an attempt to identify the impact of network cooperation (in technology parks) on BM components in accordance with the canvas model and explain which components of the model are important for creating innovations by start-ups.

Muehlhausen (2018, 59) wrote that a great business model solves customers’ problems in a creative way and generates profits far exceeding earlier assumptions. The research shows that the key element of BM for the development of a start-up is delivering often unique value for customers and relationships with customers who are included in the process of creating innovation. Fitting into

a market niche was mentioned by some panellists, which is in line with the research (Muehlhausen, 2018, 98–99). Another important element of the BM are resources, mainly human, including the skills and experience of staff, their knowledge and know-how. The panellists also mentioned the important role of key partners. The crucial role of actions as a significant element of the BM influencing the development of a start-up was mentioned much less frequently. The type of key activities proposed seems to depend on the type of business and the stage of the life cycle of the start-up, e.g., whether it is from the space or biotechnology industries. This conclusion requires further in-depth research.

The comments from panellists representing start-ups from the space, biotechnology, and IT industries show that they are organisations with a project structure. Carrying out and participating in projects affects the method of acquiring staff (associates), partners, and sources of financing. This structure justifies the expectations of start-ups regarding support in completing application forms.

All panellists saw the need for cooperation and many of them, apart from participating in technology parks, are members of other cooperation networks. 62% of the panellists declared that networking influenced their resources, which is in line with, e.g., the results of the research given in Centola (2013) or Milius (2008). Other elements of the BM that are influenced by networking are key partners, value proposition and key actions. These played a leading role in cooperation with customers. Former university employees spoke positively about working with universities, which is consistent with the findings of Stuart et al. (2007). They also pointed to the inconveniences and limitations of such cooperation (e.g., red tape at universities). Collaboration within the value chain most often affected the value proposition, and only then resources. The resources they mentioned were mainly access to human resources (staff), their knowledge and research infrastructure. The results of the research are in line with other studies (Bathelt, 2002). However, the panellists did not directly mention gaining access to sources of financing because of network cooperation, although this aspect seems to be important, which was visible in the responses to the surveys on the support from technology parks, which was obtained and expected.

Some pointed to the inconvenience of cooperation with a large enterprise and the perception of a start-up as a potential competitor. This observation is both consistent with the results of research (Baum et al., 2000) and does not confirm the results of research (Rothaermel, 2002; Steiber and Alänge, 2009) regarding the benefits for corporations deriving from cooperation with start-ups. Some panellists saw similar threats in participating in industry networks. This does not confirm the results of research that it is easier to cooperate in homogeneous networks (Petrucci, 2018). Thus, it seems that these comments indicate that the basic building block of cooperation is trust between network participants, which requires contact and is not created by an external entity. The theorem formulated in this way is in line with the concept of Frank J. van Rijnssoever (2020) that to establish

cooperation, it is not enough to organise meetings, but another stage is required, known as mating.

When start-ups create innovations, the most important aspects are customers and the cooperation with them, along with human resources and knowledge. Thus, in subsequent studies, areas of in-depth research should include open business models and the process of creating open innovations. In this context, a further prospect for research is to what extent technology parks fulfil the function of institutionalising open innovation.

The most important tools and activities for supporting innovation through network cooperation within parks, indicated by the panellists, can be grouped into:

— Assistance in establishing contacts and information on potential partners (universities, investors).

— Access to human and equipment resources or a database of available resources in other organisations, e.g., universities. This could be organised similarly to registration for, e.g., squash at sports clubs.

— Activating the consultancy, information exchange, access to knowledge, and sharing experience environments. Here, the desired forms of cooperation were networking and organising hackathons.

This qualitative research carried out using the open space method allowed us to obtain statements that do not always confirm the results of other authors' research. This provides the basis for in-depth research on a larger sample and formulating new research hypotheses.

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