

Central European Review of Economics & Finance

Vol. 28, No. 6 (2018), pp. 39–48

DOI: 10.24136/ceref.2018.030

Received: 17 November 2018. Accepted: 15 December 2018.

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## SOURCES OF KNOWLEDGE AND NETWORKING AS CONDITIONS FOR DEVELOPMENT OF INNOVATIVE UNDERTAKINGS IN POLAND

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*Start-up enterprises play a vital role in the knowledge economy, commonly acting as links between invention and innovation. Their development depends on an efficient start-up ecosystem including institutional environment. It comprises such classic institutions as business incubators, accelerators, technology parks, centres of technology transfer as well as increasingly popular forms of support like: mentoring, industry meetings, competitions, and hackathons. This paper is intended to analyse and evaluate non-financial support, mainly knowledge and business contacts (networking), in development of start-up enterprises in Poland.*

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**Keywords:** business environment institutions, innovation, start-up.

**JEL Classification Codes:** M13.

### Introduction

The knowledge economy (KE) provides conditions for growing creativity, innovativeness, and competitiveness of organisations operating in an uncertain and changing market environment. Knowledge and information become the basic resources that determine success of an organisation as part of the new economy. ‘*Traditional competitive*

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advantages are of reduced significance. It is therefore urgent to develop new advantages based on knowledge, intellectual and social capitals, and effects of digitalisation' (Strategia Rozwoju Kraju 2020). As a result of these shifts, start-ups become more important as driving forces of the economy. Innovative and unique undertakings that develop out of the traditional conventions of enterprise growth are a prevailing majority of start-ups. Their characteristics include (Kaliszczak, Sieradzka, 2018): innovation, operation in conditions of extreme uncertainty, ability to learn, potential for dynamic, above-average growth based on technological advantage or market niche, initial phases of growth, and search for a profitable, reproducible, and scalable business model.

It is the aim of this paper to analyse and evaluate non-financial support, mainly knowledge and business contacts (networking), in development of start-up enterprises. To this end, the following research hypotheses are posited:

- **H1:** Non-financial sources of support for start-up enterprises are important conditions of their development.
- **H2:** Mentoring, industry meetings, and participation in start-up competitions and events are major sources of knowledge and networking.
- **H3:** Need for qualified staff, business contacts, and specialist knowledge constitutes (beside capital requirements) the key factor conditioning development of start-ups at the current stage.

For the purposes of realising this aim and demonstrating the hypotheses, data and information in publications by Polish institutions and organisations are analysed, including: *Polskie startupy. Raport. 2015, 2016, 2017, 2018/ Polish Startups. Report. 2015, 2016, 2017, 2018* (Start-up Poland Foundation), *Diagnoza ekosystemu startupów w Polsce/ A Diagnosis of the Start-up Ecosystem in Poland* (Deloitte), and specialist literature is reviewed.

## Knowledge economy

The knowledge economy (KE) is based on creation, distribution and transfer of knowledge and information. Knowledge is a strategic success factor that drives development of both the entire ecosystem and of particular organisations. 'The KE is an economy where knowledge is treated as a factor determining production structure and economic progress at an advanced level of socio-economic development' (Skrzypek, 2008). Fundamental characteristics of the KE encompass:

- Rising importance of intangible resources,
- Replacement of the classic factors of production (labour, capital, land) with the knowledge resource,
- Greater importance of the service sector,
- Change of enterprise management methods (management of intangible resources),
- Changes of staff employment.

These shifts lead to emergence of a new type of society, '*knowledge society*' (Drucker, 1999), and of '*intellectual entrepreneurship*' (Kwiatkowski, 2000). The current transformations of the socio-economic realities and the rise of the knowledge economy require enterprises to turn into organisations based on knowledge. Authors keep pointing to the enterprise as the entity that should create added value based on knowledge resources (Drucker, 1995; Porter, 2006, Obłój 2000, Piech, Skrzypek, 2007). Knowledge is treated as a resource to be managed in order to take full advantage of its inherent potential. This requires enterprises to adopt a new approach to management. These changes concern inter alia numbers of staff with adequate qualifications and skills, ways of motivating, and visions of enterprise development.

To achieve and preserve its competitive advantage in the knowledge economy, an enterprise is required not only to choose its staff and business partners appropriately and to have state-of-the-art IT communications technologies, but above all to continue learning and prevent knowledge from escaping from the organisation. P.F. Drucker (1995) claims the enterprise has two types of key resources – knowledge (resources of creative staff) and money (Drucker, 1995), while K. Obłój (2000) points out only intangible resources are unique in that their value rises with rational management. Thus, intangible resources exhibit the greatest potential and knowledge is the key to success in knowledge enterprises.

The ongoing process of the shift to the knowledge economy causes a fundamental change in determinants of economic development, which include human capital (highly qualified staff), liaisons between science and business (universities, scientific centres, and business environment institutions), information and communication technologies, and, very importantly, actions of public authorities to provide conditions for building and development of the new economy.

## **Business environment institutions in the knowledge economy**

A knowledge economy is founded on conditions conducive to establishment and development of enterprises that base their competitive advantages on knowledge. Entities providing such conditions include: the state, local and regional authorities, business environment institutions, enterprises, intellectual and academic environments. International institutions and organisations like the OECD, UN, World Bank are some more parties fostering development of the KE. Transnational corporations also need to be mentioned as they incur huge financial expenses on research and development and become key beneficiaries of knowledge used as the source of competitive advantage. National states boost development of the knowledge economy by means of their pro-innovation, educational, research, and regional policies.

The World Bank Institute has defined conditions to be met by a country that is part of the knowledge economy (Skrzypek, 2011):

- Economic and institutional conditions should allow for a free movement of knowledge and expansion of investments rich in information and communication technology,
- Society should build or have knowledge creating and using skills,
- A country should have a dynamic information structure to effectively propagate and process data,
- A network of research centres, universities, advisor teams, private entrepreneurs, and social groups capable of using, assimilating and creating new knowledge is important.

Business environment institutions (BEI) play a special role in development of innovative undertakings in an economy. These include centres of innovation and entrepreneurship and non-banking financial institutions (Bąkowski, Marzewska, 2014). Centres of entrepreneurship are engaged in promotion and incubation of entrepreneurship oriented towards creation of businesses and jobs, supply of support services to small firms and support of local development. These functions are fulfilled, among others, by business incubators and training and advice centres. Innovation centres realise goals similar to those of the previous grouping, though targeted at development of innovative businesses, e.g. start-ups. They include:

- Technology parks,
- Technology incubators,
- Technology transfer centres,
- Academic business incubators,
- Centres of innovation.

Non-banking financial institutions, which offer financial support from EU and domestic sources, are the third group. They encompass loan, guarantee, and capital funds. However, as the authors of the most recent report on centres of innovation and entrepreneurship note, *'divisions between activity types vanish, for instance, incubated businesses are dispersed among firms already in operation, areas of activities overlap, namely, commercialisation and technology transfer services are no longer the preserve of Technology Transfer Centres. The latter become involved in areas formerly regarded as the domain of academic incubators, meanwhile'* (Bąkowski, Marzewska, 2018).

Systemic support for enterprise and innovation processes acquires increasing importance. Liaisons and cooperation between people, enterprises, support organisations and institutions designed to aid with creation and development of innovative undertakings make up the so-called ecosystem. Its components are: financing, legal regulations, human capital, social capital, and institutional environment. Financing is essential at every stage of undertaking development, though it should be remembered requirement for this type of support varies as projects develop. The institutional environment comprises institutions and organisations acting for development of the entire start-up ecosystem.

Human capital decides emergence of innovative concepts and their quality and development potential. Social capital is in turn 'the binder' of interpersonal contacts based on observance of norms and engagement in community life.

An analysis by Deloitte produces results concerning evaluation of development and maturity of the start-up ecosystem in Poland. Its 4-point scale (1-the highest score, 4-the lowest score) indicates areas of the minimum and maximum standard of development (*Diagnoza ekosystemu...*, 2016). The Polish start-up ecosystem is awarded the highest marks for its legal regulations (2.55) and institutional environment (2.5) and the poorest for its social capital (1.5) and financing (1.68). Human capital is moderately developed (scoring 2.27). Low savings in the economy, a limited number of venture capital funds and business angels, as well as lack of incentives to invest in start-ups are reasons for the low evaluation of financing. Social capital is the weakest link in the Polish start-up ecosystem. This is demonstrated with a low trust, inability to cooperate, aversion to risk, and negative attitude to failure. Openness to sharing of knowledge and involvement in public life are absent. Human capital is necessary at all stages of start-up development, in particular, its initial phases. As this is human capital that decides emergence of innovative concepts and development potential, it can be described as a strategic resource for development of start-up undertakings. Research results also suggest 'human capital, commonly measured as the number of years in education and percentage of labour with university qualifications, has positive impact on both standard of innovation and involvement in establishment of start-ups' (*Potencjał innowacyjny gospodarki...*, 2016). Potential of human capital in Poland is not utilised in full, due to a low applicability of university education and low work productivity. The institutional environment has been assessed as moderately but unevenly developed.

Central entities, local and regional administration, and scientific entities should engage in coordinated long-term actions. Collaboration of science and business is insufficient as its rules are not clear or transparent and incentives to arrange for them are not in place.

## **Sources of knowledge and networking in development of start-up enterprises**

A functional ecosystem that fosters emergence and development of start-ups provides a platform for collaboration between a range of entities and institutions including business environment institutions, research organisations, and public administration. Availability of services at the time of incubation, development and market expansion, of networking and office space rental services are tests of the ecosystem effectiveness as far as the business environment institutions are concerned. Numbers of start-ups at the various stages of development help to evaluate an ecosystem's efficiency in this respect.

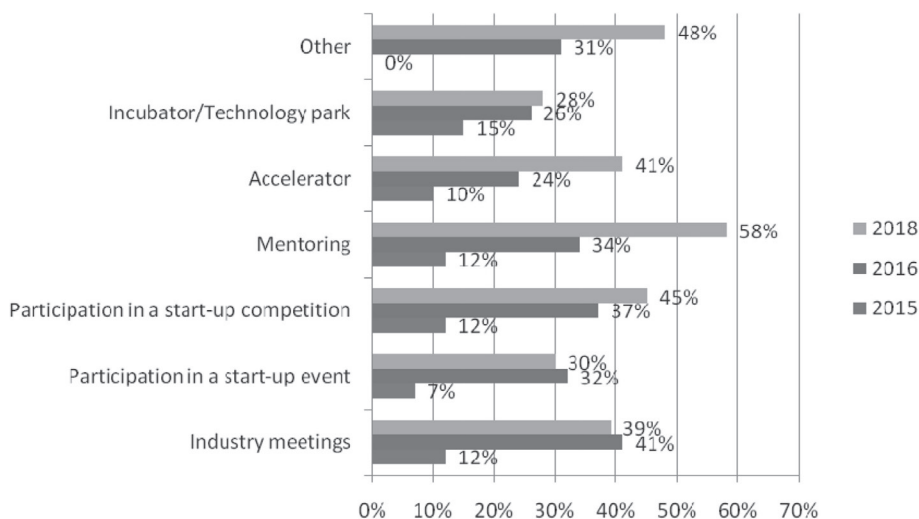
**Table 1. Numbers of start-ups at different stages of development**

Stage	Stage description	Number of start-ups			
		2015	2016	2017	2018
1. Problem Solution Fit	Formulation of business model assumptions and team creation	no data	no data	14%	18%
2. Solution Product Fit	Intensive product work, firm registration, prototyping, first income and/or users	no data	no data	41%	42%
3. Product -Market Fit	Stable sales and user base, a functioning business model	no data	no data	29%	24%
4. Scaling/Expansion	Rapidly growing numbers of customers and/ or users and income	no data	no data	16%	14%

Source: The authors' own compilation based on (Skala, Kruczkowska, Olczak, 2015), (Skala, Kruczkowska, 2016), (Beauchamp, Kowalczyk, Skala, 2017), (Beauchamp, Krzysztofiak-Szopa, Skala, 2018).

A majority of start-ups (about 60%) are at early stages of their development, i.e. when business model assumptions are formulated and work is under way on products and starting of activities. Most firms (40%) are at the second stage of product finishing and launch. The low share of start-ups at the first stage of forming business assumptions and personnel team is especially noteworthy. This suggests problems with ideas and creative and competent people capable of finding and launching new solutions. Establishment of business accelerators and incubators, education in entrepreneurship and digital competences or arrangement of industry meetings should stimulate development of the ecosystem in economic practice.

As far as non-financial sources of support used by Polish start-ups in 2015–2018 are concerned, dynamic fluctuations in significance of the individual forms can be observed (Fig. 1). Numbers of entities resorting to all the non-financial sources of support clearly tend to grow in the period analysed. Individual mentoring, industry meetings, and start-up events are named as major sources of knowledge and networking. More than a half of the enterprises studied (58%) indicated mentoring as the key source of knowledge in 2018. Its weight is due to insufficient economic and legal knowledge gained at university. Mentoring provides direct access to practical knowledge and new networks of business contacts.



\* Although statistics are not available for 2017, high importance of mentoring, industry meetings, and start-up events and competitions is indicated. Business incubators or technology parks, academic incubators, education at universities and transfer centres, and international accelerators are assessed as less significant.

### Figure 1. Sources of knowledge and networking in Polish start-ups

Source: The authors' own compilation based on (Skala, Kruczkowska, Olczak, 2015), (Skala, Kruczkowska, 2016), (Beauchamp, Kowalczyk, Skala, 2017), (Beauchamp, Krzysztofiak-Szopa, Skala, 2018).

Taking part in industry meetings, start-up competitions and events is of major importance to development of start-ups – ca. 40% describe them as significant sources of knowledge and networking. Small-scale industry meetings like Aula Polska, Open-Reaktor, Hive, Startup Stage, or Startup Poland Camp offer opportunities for making new contacts. Participation in days-long start-up events translates into development of start-ups. Such events include:

- Hackathons – events addressed to programmers, IT engineers, and software developers for purposes of solving specific design issues,
- Startup Weekends – three-day-long events for creative and enterprising people who work in teams to prepare foundations for start-ups, prototype services, tools or customer support. The objective is to bring together specialists from a range of fields like graphics, programming or marketing,
- (National and international) start-up competitions – a development opportunity drawing attention of domestic/ foreign investors and/or funds to a particular business. In effect, prestige and recognition expand and business contacts are developed, financial and other prizes may be won. Examples include Startup Spotlight, Barclays FinTech Accelerator, and BDL Acceleratestartup Competition.

Business accelerators and incubators and technology parks are a little less important in development of innovative undertakings. The accelerators and incubators are institutions tasked with (material and practical) support for development of projects at their initial stages. The former are oriented towards enterprises at further stages of development (clear business ideas) that look for practical knowledge, (local and international) business contacts, knowledge of customers and financing opportunities, and cooperation with large enterprises. Numbers of entities taking advantage of acceleration programmes have grown distinctly since 2015 (10% in 2015 and 42% three years later). This is a result of the growing range of acceleration programmes financed by the Polish Agency for Enterprise Development PARP as part of the Scale Up instrument, on the one hand, and the rising demand for such services as start-ups develop, on the other hand. Numbers of firms employing services of (domestic and international) business incubators and technology parks have also grown substantially, from 15% in 2015 to 28% in 2018. Academic incubators, institutions associated with universities and supporting young entrepreneurs at preliminary stages of their businesses, were distinguished in this grouping (for the first time in 2017). In 2018, 8% start-ups pointed to academic business incubators as sources of their knowledge and business contacts. 48% enterprises indicated other sources of non-financial support for their economic undertakings, 17pp more than in 2016. Most (36%) in this group took advantage of other training and took part in education offered by universities or centres of technology transfer (12%).

**Table 2. Resource requirements at the current stage of start-up development (multiple choice)**

Resources	2015	2016	2017	2018
Financial	61%	63%	65%	61%
Human (staff)	49%	44%	43%	49%
Network (business contacts)	50%	42%	41%	41%
Specialist knowledge (mentors, training, etc.)	23%	14%	14%	15%
We have all the resources we need	6%	6%	No data	4%

Source: The authors' own compilation based on (Skala, Kruczkowska, Olczak, 2015), (Skala, Kruczkowska, 2016), (Beauchamp, Kowalczyk, Skala, 2017), (Beauchamp, Krzysztofciak-Szopa, Skala, 2018).

The undoubtedly innovative undertakings like start-ups signal a range of needs that determine their survival and development in the market. These are primarily capital and personnel requirements and a distinct need to expand their business contacts. While treating knowledge as a resource, barely 15% start-ups confirmed collaboration with science. *'As part of acceleration programme evaluations, however, knowledge and business experience shared are valued very highly'* (Beauchamp, Krzysztofciak-Szopa, Skala, 2018). Thus, entrepreneurs realise getting to know their customers and markets should be a priority and development should result from this awareness.



## Conclusion

The processes of globalisation, propagation and development of information and communication technologies lead to internationalisation of business operations and hyper-competition on the international scale, which enforces the ability to quickly adapt to the constantly changing environment. Enterprises like start-ups frequently offer intangible products in a virtual environment in the global market. They play an important role in the knowledge economy, often by acting as links between invention and innovation. It should be remembered such entities stand limited chances of independent development in market conditions as, for instance, their business ideas may be taken over (bought out) by large enterprises or corporations. Hence a clear need to support these young and innovative firms.

The environment, or ecosystem, plays an extraordinarily important role in development of start-ups. It consists of five sub-systems including the institutional environment that determines incubation and implementation of innovative business ideas. Its components are: business environment institutions, research organisations, and public administration authorities. The development standard of the Polish start-up ecosystem is ranked below average and of the institutional environment as quite high.

Our analysis of the significance of knowledge and networking sources in development of start-ups in Poland in 2015-2018 leads to the following conclusions:

1. Mentoring, industry meetings and participation in start-up competitions and events are indicated as the essential sources of knowledge and networking in the entire period studied,
2. More than a half of the enterprises examined (58% in 2018) point to the special importance of mentoring in acquiring practical knowledge of marketing, management, sales techniques, and legal regulations,
3. Taking part in industry meetings, start-up competitions and events is very important for development of start-ups (39%, 45% and 35% of the businesses, respectively),
4. Numbers of businesses using accelerator services have risen considerably (by 32pp since 2015), chiefly owing to more acceleration programmes financed by the PARP,
5. Academic incubators, education offered by universities or centres of technology transfer, and all non-financial foreign sources, possibly due to insufficient information and availability of the latter, are the least significant sources of knowledge and networking.
6. In spite of the undoubted prevalence of capital requirements, as start-ups progress to successive stages of their development, the need for qualified staff, business contacts, and specialist knowledge becomes more pressing.

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