

Differentiating Criteria and Segmentation of Polish Startup Companies

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The results presented in the article are the first Polish analysis of startups, which are considered as a source of innovation and which are gaining in importance in the country's economy. In order for the country to efficiently support this group, more insight into the most important features characterising it, for instance location, used legal forms, employment and its forms, sources of financing and other resources, propensity to export or sources of innovation must be gained. Thus, the conducted study was aimed at identifying and characterising the population of economic entities considered as Polish startups according to applied criteria. In order to do so, a database of those entities was created, an original research questionnaire was prepared and a nationwide survey was conducted in collaboration with the Startup Poland foundation. Subsequently, a segmentation analysis was performed in order to isolate conspicuous classification groups and to identify important features in each group. The presented research results constitute the beginning of regular analyses in that scope.

Keywords: startup, innovativeness, digital economy, segmentation analysis, differentiating factors.

Kryteria różnicujące i segmentacja polskich przedsiębiorstw startupowych

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Prezentowane w artykule wyniki są pierwszym polskim badaniem startupów, które uchodzą za źródło innowacji o coraz większym znaczeniu w gospodarce kraju. Efektywne wsparcie tej grupy ze strony państwa wymaga pogłębionej wiedzy na temat najważniejszych cech, które ją charakteryzują, na przykład lokalizacji, stosowanych form prawnych, zatrudnienia i jego form, źródeł zasobów finansowych i innych, skłonności do eksportu czy źródeł innowacyjności. Dlatego celem przeprowadzonych badań było zidentyfikowanie oraz dokonanie charakterystyki populacji podmiotów gospodarczych uznanych według zastosowanych kryteriów za polskie startupy. W tym celu stworzono bazę tych podmiotów, autorską ankietę badawczą oraz przeprowadzono ogólnopolskie badanie ankietowe we współpracy z fundacją Startup Poland. Następnie wykonano analizę segmentacyjną prowadzącą do wydzielenia wyróżniających się grup klasyfikacyjnych oraz zidentyfikowania istotnych cech w każdej z grup. Przedstawione wyniki badań stanowią inaugurację regularnych badań w tym zakresie.

Słowa kluczowe: startup, innowacyjność, gospodarka cyfrowa, analiza segmentacyjna, cechy różnicujące.

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1. Introduction

The serious economic crisis overthrew the foundations of functioning of the economy in developed countries. Concurrently with the difficult situation, the digital revolution is creating new development opportunities and is characterised by a broad scope of impact. Its influence should be considered as important in economic and social terms and affecting all market participants (Pieriegud 2016). Digital economy is thus an area which is developing within “old” and “new” sectors; however, its social and economic significance is rapidly increasing (World Bank, 2015). Its influence causes conventional sectors to undergo a substantial transformation, whereas new digital era enterprises are providing unprecedented business solutions.

The subject of the research described in the article concerns “new” enterprises, i.e. those with the core of their operations based on the application of the digital information processing technology. It is mainly about firms producing proprietary software or using such software in their business model, which are included in the group called startups. This is the first study in Poland which subjects this area of economy to analysis in such a broad scope.

The research problem which it is to serve is the determination of significance of the digital industry in the Polish and regional economy. The analysis described in the article is one of the initial stages of the problem formulated as above. The objective of the analysis is to gain insight into factors characterising and differentiating the population. This is particularly important with regard to the challenge which is efficient support of development of startups using public funds. This is not only about evaluating the efficiency of already spent resources, but also the best and the most efficient planning of future expenditures for the following several years.

The structure of the article includes a justification of importance of the formulated research problem, the characteristics of the analysis and the research group, the presentation of results of conducted analyses and a discussion of obtained results. The authors intend to continue the research and monitor changes in presented results over time.

2. Theoretical Framework

The notion of a startup is crossing into the world of science from the world of business. There are more and more scientists trying to capture and describe the phenomenon of these enterprises, despite the fact that the definition of the very notion of a startup remains ambiguous. For instance, the broad understanding which is dominating at Polish public institutions is based mainly on the criterion of the firm’s duration. This is a far-reaching simplification which does not contribute to learning more about that group of enterprises.

Other definitions which can be found in source literature define startups in a rather arbitrary manner. For instance, Deloitte, a global consulting company, describes startups in its report entitled “The diagnosis of the ecosystem of startups in Poland” (Deloitte, 2016) as “undertakings conducted to manufacture new products or services in highly uncertain conditions, with a history of no more than 10 years”. The definition is also imprecise, because terms such as “new”, “large” and “history”¹ are highly subjective. The most popular definitions by Steve Blank and Eric Ries, who define a startup as an “organization formed to search for a repeatable and scalable business model under conditions of extreme uncertainty”, are appropriate and intellectually responsive, however they are useless in case one needs to clearly determine what a startup is and what it is not, for instance while conducting quantitative research as that described in this article.

The most frequently occurring criteria distinguishing that type of undertakings include: revenue increasing at a high rate, the use of advanced technology, innovative products, above-average expenditures for research and development activities, no geographic restrictions, exploitation of market opportunities, a high share of external financing and other. Several popular definitions are presented in Table 1.

The analysis of definitions of the term startup shows that a very important factor differentiating a startup from a conventional company is something that can be referred to as an “ambition to grow”. This concerns the division into small business and dynamic entrepreneurship (Cieślik, 2010; Aulet and Murray, 2013). The first category applies to companies which do not intend to grow rapidly and increase their value, but rather to provide sustenance to its partners and any possible employees. They are mainly family-owned businesses operating locally, providing services, occupied with craftsmanship, trade, which are rather small and dispersed. The second category are innovation-driven enterprises which are ambitious and dynamically growing. They operate on a supralocal level, even globally. They are established by leader teams which build their competitive edge on innovations. A strong increase in value is their primary goal (Aulet, 2013). Aulet notes that over a short period of time small businesses seem to be more flexible and efficient; however, if one can afford to be patient, then an innovation-driven enterprise is the only model enabling a spectacular success (Aulet, 2013).

The thread of “technological entrepreneurship” frequently comes up in the context of startups. This, in turn, concerns a type of innovation which builds a competitive advantage in startups. In this case these are new solutions based on knowledge in the field of high technology, ICTs (Information and Communication Technologies) in particular. The researchers are not in full agreement as to the significance of new technologies in business. Aulet claims that due to their increasingly common use, it is inadequate to label companies using them as technological. This should be reserved

Author/authors	Key features of a startup according to the definition
Glinka and Pasieczny (2015)	A young or a newly created firm which is determining and testing its business assumptions.
Łuczak (2014)	1. an enterprise at an early stage of development; 2. an innovative enterprise with a high growth potential; 3. functioning in the mode of searching for an optimal business model.
Blank and Dorf (2012)	A temporary organisation occupied with search for a scalable, repeatable and profitable business model.
Ries (2011)	An institution created to develop new products or services under conditions of extreme uncertainty.
Damodaran (2012)	1. no history; 2. small revenue or a lack thereof; 3. dependency on borrowed capital; 4. high risk of failure.
Gemzik-Salwach (2014)	Enterprises which have just begun their operations and are offering innovative goods or services for which they believe there is demand or the demand is yet to be created.
Gemzik-Salwach (2014a)	Newly established firms at an early stage of development the operations of which are connected with the introduction of innovations and new technologies. Their operation is accompanied by an above-average level of risk.
Bursiak (2013)	Firms at an early development stage (the first 5 years of operations), using external financing.
Bursiak (2014)	1. An entity which started operating and which is at an early development stage, a micro- or a small enterprise during its first year of operation which is not yet selling its products commercially, but it is preparing its offer and gathering marketing data required to enter the market. 2. A young enterprise created as a result of division, expansion of restructuring and specialisation of existing firms.
Cieślik (2014), Blank and Dorf (2012)	Technological firms which are born to flip.
Konopka and Roszkowska (2015)	A new entity which does not yet have a history of operations.

Tab. 1. Popular definitions of the term "startup" in domestic and foreign literature. Source: own work.

solely for enterprises the primary operations of which are concentrated on the development of new technologies, e.g. electronics or wireless communication. Therefore, it is not sufficient to use innovative technological solutions in order to be a technological company – the company needs to create them. This also indicates that newly established firms which utilise solely proven business models simply cannot be treated as startups.

The research described in this article is focused on startups comprising the digital industry in Poland. The authors did not intend to consider the characteristics of startups from the other two groups of solutions which are also referred to as startups. The groups are the creative industry and business projects commercialising development in broadly understood science. An assumption was made that an analysis of startups should consider the characteristics of the aforementioned three groups (digital, creative, scientific) and that it should be performed individually for each of them.

Therefore, the research discussed herein assumes a definition according to which a *digital industry startup* is an undertaking the business model of which contains innovations, i.e. an element requiring testing and confrontation with the market, and the key element in its business model is information processing or related technologies. The definition became the basis for determining and identifying entities included in the study group.

3. Research Framework

The research was conducted in 2015 in collaboration with the Startup Poland foundation on a group of Polish startups operating in the ICT industry. In order to be considered as a Polish startup, the entity has to be registered in Poland or have at least one shareholder who is a Polish citizen and conducts some of its operations in Poland (for instance, by producing software). On the other hand, branches of companies with headquarters abroad are not considered Polish startups.

A database of startups was created for the analysis. Their names were obtained from the following sources: venture capital funds, accelerators, business incubators, training companies, organisers of startup competitions, lists of subsidies, lists from specialised media websites, private rankings and databases of “startup activists”. This was the first undertaking with such a broad scope which was aimed at estimating the number of startups in Poland.

The population of Polish startups determined using the aforementioned method comprises 2,432 entities. Each of them was sent two e-mail messages asking them to fill in the survey questionnaire and there were either one or two phone calls made to them. Also, startup representatives could learn about the survey from the media and social media portals.

The research was conducted based on an original questionnaire created using own knowledge. The pilot study² was conducted within the period from 10 to 25 May 2015 (38 filled in surveys), during which the questionnaire was evaluated by the so-called competent judges, i.e. experts specialised in the topic of startups. After considering their remarks, some of them were implemented in the questionnaire.

The proper questionnaire was filled in by 423 entities from 10 June until 15 September 2015. The questionnaire contained 36 questions. Most

of them were multiple choice questions with some space for an additional comment. The startups had to indicate their name, the position occupied by the person filling in the questionnaire and they had to declare whether they were a startup according to the adopted definition. All remaining answers were not restricted in any way. In more than 80% of cases the questionnaire was filled in by persons who were (co-)founders and/or CEOs of these companies. Others were usually members of the management board and, sporadically, product managers, sales managers and assistants to the management board. The webankieta.pl website was used to conduct both studies: the pilot and the final study. Data obtained in the aforementioned manner was subjected to segmentation analysis using three methods:

- clustering – not using internal standardisation during the learning process and using centroids as the method for determining the maximum number of clusters;
- Kohonen's self-organising maps (SOMs) – using spread as a method of internal standardisation in the learning process and principal components as a method for dividing segments;
- cluster analysis – using correlation as a method for building a variable cluster analysis matrix and exporting only the best variables from each cluster.

The analysis involved 131 nominal variables and 416 entities. The results showed the most important classifying subgroups inside the entire population and factors differentiating the subgroups. Segmentation in each case was conducted with regard to differentiating factors, but without indicating the grouping superordinate variable (the target variable).

4. Research Results

4.1. Clustering

Clustering showed that the most important factors differentiating the analysed startup population are:

- client type (enterprise/individual client);
- product type (particularly software with various scopes of application);
- product's innovativeness (global, local, imitation);
- held patents, registered trademarks, licences for technology;
- type of conducted activity;
- collaboration with a university or a scientific centre.

Considering the value of aforementioned factors in the analysis enabled distinguishing six segments with the following characteristics (presented according to the quantity of observations in the isolated groups):

- **segment 1** (quantity: 95 observations, 22.8% of the population):
 - they conduct B2B activity;
 - their primary clients are SMEs;

- they produce software for those companies, offering it as a finished product or SaaS;
- **segment 4** (quantity: 92 observations, 22.1% of the population):
 - they conduct B2B activity;
 - they provide services to companies of all sizes – from micro-enterprises to corporations;
 - they produce global new products;
 - the product is their main innovation;
 - they are planning further development by increasing employment appropriately to the level of their development;
 - they are looking for financial resources for development;
- **segment 2** (quantity: 90 observations, 21.6% of the population):
 - they provide services to individual clients;
 - they are looking for subsidies as a required resource for their further development;
- **segment 3** (quantity: 89 observations, 21.4% of the population):
 - they produce global new products;
 - the product is their main innovation;
 - they are planning further development by increasing employment adequately to the level of their development;
 - they are looking for financial resources for development;
 - frequently they are already co-financed by external investors;
 - they hold patents, registered trademarks and licences, and they collaborate with universities and scientific centres;
- **segment 6** (quantity: 28 observations, 6.7% of the population):
 - they conduct B2B activity;
 - they provide services to companies of all sizes – from small enterprises to corporations;
 - they produce software and provide SaaS services;
 - their products are globally new;
 - the product is their main innovation;
 - they are looking for financial resources for development;
 - they hold patents, registered trademarks and licences, and they collaborate with universities and scientific centres;
- **segment 5** (quantity: 22 observations, 5.3% of the population):
 - they conduct B2B activity;
 - they mainly provide services to medium and large companies, and corporations;
 - they believe the key innovation is their organisation and production process;
 - they produce software;
 - their products are globally new and highly profitable;
 - the characteristic feature of this segment is the presence of women among partners and founders.

The above breakdown shows that the strongest differentiating clustering factor was the type of the client – individual vs. enterprise, and in the case of enterprises their size was also considered. The second important criterion was producing and offering a global new product and placing the primary innovation in the product, production process or organisation. Other important factors proved to be offering services in the SaaS model, holding patents, registered trademarks and/or licences, as well as collaborating with universities and scientific centres. Entities included in the study are intensely searching for additional resources for their development, which is expressed, for instance, by their planned increase in employment.

Among the six segments, two basic subgroups of entities can be noticed, namely those which are very advanced in terms of technology and innovation (segments 4, 3 and 6) and entities at an early stage of development which are in the process of looking for their place on the market (segments 1, 2 and 5). Such characteristics indicate that segment 4 includes highly technological entities focused on creating innovations and searching for external financing. Segment 3 constitutes a subgroup of segment 4, at the stage of commercialisation of scientific achievements and development of patents. Segment 6 also can be qualified as a subgroup of segment 4, however one which is at an earlier stage of development and innovation than segment 3. On the other hand, segment 1 is not as innovative as the previous group. It rather aims to exploit a proven business model, for instance in the case of agencies producing software for SMEs. Segment 5 comprises entities at the highest stage of development in this group. They are mainly highly profitable companies producing software and conducting B2B operations. Segment 2 differs from other groups only in terms of being focused on individual clients (B2C operations). Considering the aforementioned, the results of clustering can be presented in a more synthetic manner. Then, the division into clusters is as follows:

- **the segment of innovative B2B startups** – 50.2% of the population (segments: 4, 3 and 6)
 - B2B clients;
 - product innovation;
 - planning to grow (including employment) and searching for external financing;
 - an isolated subsegment of startups commercialising science and having solutions which can be patented (segments 3 and 6), with startups from group 6 being at an earlier stage of development;
- **the segment of profitable software companies** – 28.1% of the population (segments: 1 and 5)
 - B2B clients;
 - a proven business model. i.e. producing software for companies;
 - satisfactory profitability;

- an isolated subsegment of startups providing services to large companies and corporations (segment 5) with above-average profitability;
- **the segment of scalable B2C startups** – 21.6% of the population (segment 2)
 - B2C clients;
 - Development consisting in scaling, i.e. acquiring a very large number of individual clients (mostly on a global scale) (Isenberg, 2012);
 - searching for financing for scaling.

4.2. Kohonen's SOMs

The analysis using Kohonen's self-organising map (SOM) showed that the most important factors differentiating the analysed startup population are as follows:

- producing software for companies;
- providing services to individual clients (not only companies);
- producing a global new product;
- generating revenue from foreign sales;
- co-financing by an external investor;
- the key innovation being a product or a production process.

Kohonen's SOM was parametrised to isolate four segments. The segmentation showed their following characteristics (presented according to the quantity in isolated groups):

- **segment 4** (quantity: 130 observations, 31.2% of the population):
 - they produce software for firms and individual clients;
 - their products are globally new;
 - the highest revenue is generated by foreign sales;
 - their growth is financed by external investors;
 - the primary innovation is a product or a production process;
- **segment 1** (quantity: 111 observations, 26.7% of the population):
 - they conduct B2B activity, and their main clients are large firms;
 - they provide SaaS services;
 - their products are globally new;
 - their highest revenue is generated by foreign sales;
 - their growth is financed by external investors;
 - they are continuously searching for additional financial resources for development;
- **segment 3** (quantity: 93 observations, 22.4% of the population):
 - they produce global new products;
 - they frequently produce their products on their own;
 - they frequently are hardware producers;
 - they provide SaaS services;
 - their primary clients are corporations;
 - they have branch offices abroad;
 - they finance their growth through external investors and on their own;

- **segment 2** (quantity: 82 observations, 19.7% of the population):
 - they produce global new products;
 - they frequently produce their products on their own;
 - they mainly offer software for firms;
 - they are looking for financial resources for development;
 - the founder of the startup is currently a co-worker;
 - they are not planning to increase the employment or they are only planning a small increase in employment in comparison to the current state.

Similarly, as during clustering, Kohonen's SOM analysis showed that the most potent differentiating factors are the type of the client and its size in relation to a corporate client. In this instance the production of a global new product proved to be important as well, as did the method used to produce it through one's own activities. The provision of SaaS services and the manner in which the startup is searching for resources for its further growth proved to be important, as was in the case of clustering. Additionally, however, the fact of having a branch office abroad and generating a significant part of revenue from foreign, rather than domestic, sales was noticed.

In the case of this analysis each of the segments shows different characteristics of the entities. Segment 4 comprises producers of software for export. Segment 1 comprises SaaS service providers who provide services to corporate clients, are scaling on a global level and are financially mature. Segment 3 comprises producers of hardware for large companies. Finally, segment 2 comprises software producers who are at an early stage of development, and who are offering their products on the local market. Considering the above description and own knowledge, the distinguished segments can be ranked according to stages of development of the undertakings:

- **the segment of startups at the initial development stage** – 19.7% of the population (segment 2)
 - they operate locally;
 - they produce software;
 - they are self-financed;
- **the segment of exporting startups** – 31.2% of the population (segment 4)
 - they produce software;
 - they use external financing;
- **the segment of mature startups** – 26.7% of the population (segment 1)
 - B2B activity, their clients are mainly large companies;
 - they handle sales using the SaaS form;
 - exporters;
 - they use external financing;
- **the segment producing hardware** – 22.4% of the population (segment 3)
 - their clients are large companies or corporations;
 - exporters.

4.3. Cluster Analysis

The cluster analysis showed that the most important factors differentiating the startup population are:

- producing products for the foreign market and generating the highest sales revenue on that market;
- the current employment level and a tendency to increase it;
- the legal form of conducted activity;
- the current estimated value of the organisation;
- the type and size of serviced clients;
- the industry to which the primary product or service is addressed;
- types of offered services;
- the manner in which the ongoing activity and development are financed.

Seven clusters were identified through the analysis. The hierarchical dependency graph is shown in Figure 1.

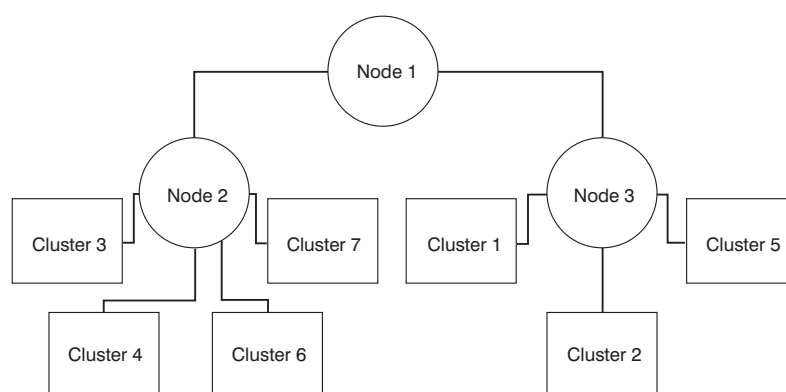


Fig. 1. The hierarchical layout of division of the population in the cluster analysis. Source: own work.

The cluster analysis distinguished two subsets of entities (Fig. 1 – Node 2 and Node 3), and within them 3 to 4 clusters which differentiate them. The distinguished clusters have the following characteristic features:

Node 3:

- **cluster 2** (quantity: 48 observations, 10.3% of the population):
 - having a branch office abroad;
 - products and services sold abroad constitute over 50% of entire sales;
 - the company was registered in 2000–2004;
 - current employment – over 20 people;
- **cluster 5** (quantity: 38 observations, 8.2% of the population):
 - legal form – 099 (natural persons conducting economic activity);

- financing operations using mainly own resources;
- the value of the company is estimated at USD 25,000;
- **cluster 1** (quantity: 34 observations, 7.3% of the population):
 - purchasing (instead of producing) the product;
 - offering a global new product;
 - tradition of collaboration with universities or scientific centres;
 - employing people holding an academic title;
 - current employment – 11–20 people.
- Node 2:
- **cluster 3** (quantity: 60 observations, 12.9% of the population):
 - selling products and services abroad;
 - the highest sales revenue is generated in Western Europe;
- **cluster 4** (quantity 153 observations, 33.0% of the population):
 - selling products and services abroad;
 - the highest sales revenue is generated outside Europe;
 - conducting B2C activity;
 - producing a local new product;
 - the value of the company is estimated at approx. USD 5 million;
 - the most common legal form is 118 (spółka jawna (registered partnership)) and 121 (spółka komandytowo-akcyjna (limited joint-stock partnership));
 - looking for financial resources for development;
 - additionally, specialised knowledge is a required resource in this group;
 - increase in employment conditions the level of further development;
- **cluster 6** (quantity: 74 observations, 15.9% of the population):
 - selling products and services abroad;
 - the highest sales revenue is generated outside Europe;
 - producing software for firms, most frequently from the marketing industry, considering access possibilities and mobile use;
 - providing services in the SaaS model;
 - they hold patents, registered trademarks, licences for technologies;
 - they are financed using resources from bank loans;
 - they operate in the area of analytics and research as well as intelligent technologies (Artificial Intelligence);
- **cluster 7** (quantity: 57 observations, 12.3% of the population):
 - selling products and services abroad;
 - the highest revenue is generated by sales to Asia and Eastern Europe;
 - their clients are companies – large or small;
 - the operations could be launched owing to an EU seed fund;
 - however, they are constantly looking for new resources – funds and qualified employees.

In the case of the cluster analysis the distinction of foreign sales as the most important factor differentiating the subgroups can be seen. The type

of the client and the size of serviced companies remain important parameters, but there is also emphasis on the type of the startup itself – the employment level, its legal form and current estimated value, as well as the method of financing and growth of conducted activity. Offering SaaS services and mobility, as well as being assigned to the industry to which the produced products are dedicated were also distinguished. However, the significance of the type of innovation and the scope of innovativeness of the offered product/service were not emphasised in the same way as they were in the case of clustering and Kohonen's SOM analysis.

The hierarchical structure of connections between clusters distinguished two basic subgroups of clusters 2, 5 and 1 as well as clusters 3, 4, 6 and 7. The first group includes startups with vast experience which have been very successful on the market (cluster 2), the same which are at an early stage of creation of ideas and placing products on the market (segment 5) as well as startups at the stage of creation of ideas, but considering commercialisation of scientific achievements (segment 1). The second group are mainly exporters whose outlet is in Europe (cluster 3), who service individual clients (cluster 4) or companies (cluster 7) outside Europe, and the best, innovative, exporting startups undergoing scaling and with the highest growth potential (cluster 6). To sum up this type of analysis, considering own knowledge, the distinguished nodes can be characterised as:

- the segment of very mature startups or those at the initial stage of development – 25.8% of the population (node 3);
- the segment of exporters – 74.1% of the population (node 2), within which the subsegment of innovative startups undergoing scaling and with the highest growth potential – 15.9% of the population (cluster 4) – should be distinguished.

5. Discussion of Results

If one assumes that the key criteria for segmentation of startups are the level of innovativeness and the stage of development of the entity, the obtained results can be illustrated in the form of a 2D graph (Fig. 2). Figure 2 shows identified segments, whereas the size of the figure reflects the share of the group in the entire population of Polish startups.

We consider segments in which entities show the following features in the analysis as “highly innovative”:

- they obtain patents and collaborate with universities;
- their innovation is a product one and it is on a global level (at least according to their declaration);
- they export.

On the other hand, there are startups at their initial development stage:

- they sell to small and medium enterprises or to individual clients;
- they are self-financed and looking for external financing;

- they collaborate with scientific centres;
 - they export small amounts or none.
- Startups undergoing scaling are those which:
- offer products and services for companies;
 - are intensely looking for external financing;
 - declare an intention to increase or are increasing their current employment;
 - collaborate with scientific centres and use results of academic research;
 - export a lot.

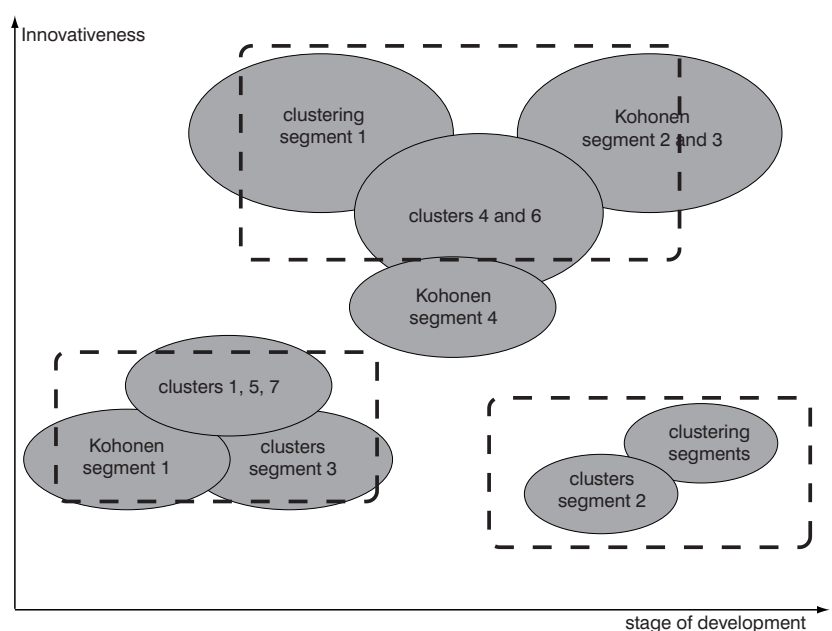


Fig. 2. Illustration of results of segmentation of the population of Polish startups. Source: own work.

Mature startups are characterised by:

- their clients being companies, particularly large ones and corporations;
- using a significant amount of external financing;
- having a high employment level (over 20 people);
- producing software;
- exporting a greater part of their sales.

In order to sum up the results, one could propound a thesis according to which the examined population of startups creates three main clusters (segments) shown in Figure 2:

- **the segment of innovative startups at their initial development stages** (approx. 20% of the population) which:
 - are not highly profitable;
 - are undergoing scaling;
 - are looking for new sources of resources, including financing;
 - cooperate with individual clients (B2C) and companies (B2B);
 - operate locally;
 - collaborate with scientific centres and utilise research results;
- **the segment of innovative startups at the expansion stage** (approx. 60% of the population) which:
 - provide services almost exclusively to companies (B2B prevails);
 - work on a global product innovation (also in the area of hardware);
 - collaborate with scientific centres and prepare patents;
 - develop exporting of their products;
 - are usually profitable or will be profitable soon;
 - are increasing or are expressly planning to increase their employment level;
 - have undergone the first rounds of external financing;
- **the segment of mature companies** utilising a proven business model which:
 - are highly profitable;
 - preferably service business clients, including mainly large enterprises and corporations;
 - produce software.

Figure 3 shows a schematic division into the described segments, whereas the size of the figure reflects the group's share in the population, and the colours symbolise the level of achieved profitability (■ – low, ■ – medium, ■ – the undertaking is highly profitable).

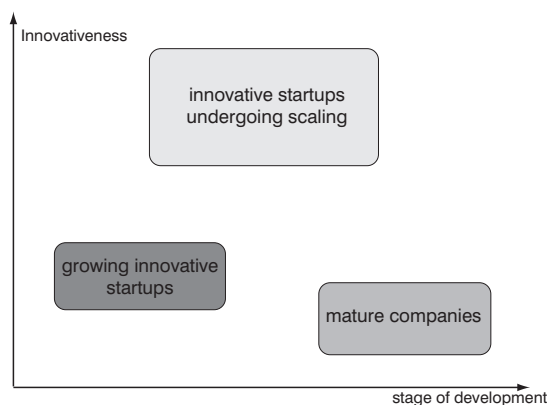


Fig. 3. Illustration of segments isolated among the population of Polish startups. Source: own work.

6. Conclusion

The presented results of the study enabled the achievement of goals defined in the introduction. The basic segments were determined and identified within the population of Polish startups, and the following three were distinguished: 1) innovative startups under development; 2) innovative startups undergoing scaling; and 3) mature companies. Also, information on key factors characterising the groups and differentiating the population was gained. They are mainly: 1) the level of innovativeness, and 2) the stage of development. They are, in turn, determined by other features among which the following are the most important: the type of serviced clients (individual vs. enterprises and their size), the amount of sales for export and the fact of maintaining and pursuing collaboration with science.

The observed tendencies and dependencies will be used in subsequent studies which, to some extent, will continue the study presented herein and expand it. This creates opportunities for complementing the information presented in this article, as well as for identifying unknown tendencies with regard to change and development within the previously analysed group. The entire study is a contribution to knowledge on Polish startups as well as their needs, possibilities, and, to some extent, also problems they face during their operations.

Endnotes

- ¹ For example: we do not know whether the “history” started at the moment of formal registration of the firm or when the work on the project (idea) started.
- ² The results of the pilot study were described and presented during a scientific conference – “Digital Ecosystems” – organised by the University of Warsaw’s Digital Economy Lab (DELab) in June 2015 (Skala and Gieżyńska, 2015).

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