Marketing as the most critical factor in commercialisation of startups based on universities

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Abstract: This article described the most critical problems related to the marketing of startups created based on universities. The approach of a scientist developing and commercialising a prototype is significantly different from the process designed in a free market. In this study, methodological paradigms and research aspects of the need for marketing in the activities of startups are considered, especially those created based on scientific organisations, which is a little-studied topic. The authors conducted research based on data from Russia and Iran. This paper suggests focusing on the marketing plan, allocating funding for this area, and attracting marketers or including them in the project

team, which will allow a startup to create a new product or technology for the market's needs, and then search for a sales market. The approach proposed by the authors will increase the efficiency of commercialising results by startup companies.

Keywords: innovative product; starting company (startup); startup marketing; cluster analysis.

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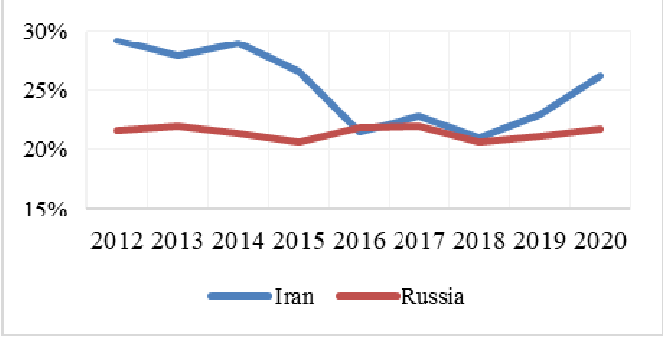
1 Introduction

As a rule, small innovative companies, particularly those created based on scientific organisations, receive funding as investments to develop an innovative product or technology. Startups spend money on patenting, testing, and making the most prototypes without information about the future buyer and the required sales volume. For example, today, the various existing programs to promote innovation in Russia and Iran do not contain in their cost structure, as a mandatory item is conducting marketing research and, based on this, building subsequent commercialisation by the marketing plan.

Necessary to note that the share of investments in GDP is the most critical indicator of the country's development. According to IMF statistics, the percentage of assets in GDP in Iran averaged 25.2% from 2012–2020, while in Russia, it was 21.4%. At the same time, in 2016–2018, the share of investments was comparable, but by 2020 the spread between the countries had grown again. For comparison, in the USA, the average percentage of assets in GDP for the same period was 20.5%.

Figure 1 The share of investments in the GDP of Russia and Iran, in % of GDP (see online version for colours)



Source: IMF data

According to the leading startup's activity, the founders and managers of university-based startups need to see how their project or development will realise. The ideal model of such a business is several potential investors, highly qualified staff capable of generating creative ideas, and an ever-growing stream of new customers.

However, university startups face severe problems promoting their products, speaking about the fundamental commercialisation process. It is necessary to focus on the issue of the imbalance between market requirements and the commercialisation of new products based on technology.

Most startup support centres, such as innovation and technology centres and commercialisation promotion centres, do not provide marketing services. Due to the absence of this service, the teams of many scientific startups do not consider customer needs and a market niche. They want to realise their idea and solve the most important scientific problems.

It is important to note that innovation and technology centres and commercialisation promotion centres help scientists receive support from the state through subsidies or grants for sample preparation. After providing consent, they are interested in getting a

positive result in the form of significant performance and a commercialised product or technology. Nevertheless, most startups cannot sell their sample to clients (B2B, B2C, or B2G markets). As a result, this becomes a considerable problem for startups and universities.

For such a startup enterprise to become successful, they need a marketing strategy unique to their type of business, and it is necessary to implement it from the very beginning, which will subsequently act as a very effective solution not only to generate income and attract new customers but also to solve other common problems when launching a product.

According to Gray et al. (2022), Nwakanma et al. (2007), Muhamedjanova and Kurpayanidi (2020), Kaiser and Berger (2020) and Rani (2021), marketing is an essential and fundamental stage in the activities of startups to survive and succeed in commercialisation in a crisis.

The problem is weak marketing or its complete absence. Many innovative startups are initially mistaken, thinking that their development, due to their uniqueness, will be widely in demand on the market. As pioneers, they will conquer the market with high sales. However, the actual situation shows that approximately 90% of startups eventually fail in the first two years.

The main reasons for failure tend to be the lack of market demand and the lack of poor marketing programs. Thus, according to statistics, the main reasons for unsuccessful commercialisation when launching products (about 90% of startups fail) are a misunderstanding of market demand – 42% of cases, 29% of cases, a lack of funding and personal money. Other failures include a weak team of business founders, about 23%, and 60% defeated by competitors due to the lack of or inadequate marketing research (https://findstack.com/startup-statistics/).

According to the McKinsey B2B Decision-Maker Pulse analysis report of various survey data from researchers, scientists, and analytical agencies, more than 70% of the main reasons for startup failures are pricing and costs, user-unfriendly products, poor marketing, and late product launch.

It should be noted that according to our survey of university-based startups, many of the leaders do not pay enough attention to finding a market niche and potential customers. Still, they are guided by the desire to create something unique and implement their scientific idea.

And as practice shows, receiving supportive grants and subsidies does not guarantee market demand and successful product launch, and 80% of activity ends up in a ready-made sample with no commercial component.

In this regard, marketing analyses the potential market opportunities of the future innovative product for commercialisation. But it also has a direct impact on the performance of organisations. It is an integral element for the survival of university-based startups, indicating the relevance of the research on this topic.

We have analysed the works of scientists (Chorev and Anderson, 2006; Skowron and Skrzetuski, 2016) and more modern scientists (Crick et al., 2018; Tokarev, 2018; Salamzadeh and Dana, 2021; Baran and Zhumabaeva, 2018, etc.).

The object of the article research is startup enterprises created based on scientific organisations.

The purpose of our research is to determine the role of marketing in the mechanism of commercialisation of the results of intellectual activity of startups, information about an invention, technology or a new product among potential consumers and attracting their

interest in buying the final product. To maintain the competitiveness of science and the development of a professional environment, it is necessary to constantly ensure a high level of professional interest and the possibility of the implementation or commercialisation of scientific ideas for researchers.

It is of practical importance to understand the peculiarities of the formation of this type of motivation in the field of science. Because thanks to this, it is possible to determine the right direction and concentrate all possible efforts and resources on creating favourable conditions for increased productivity and effectiveness.

2 Theoretical background

In modern conditions of financial instability of the COVID-19 pandemic, the problem of entering the market and ensuring sales has become especially acute for innovative startup companies (startups). Startup managers realise that using new technologies alone is not enough to bring innovative products to market for the successful sale of their high-tech products (Kalogiannidis, 2020). For example, according to a report published by the OECD (2020), many small innovative companies are on the verge of bankruptcy, as the COVID-19 crisis has exerted much pressure on this segment.

According to various global economic, business, and technological experts (Cheng et al., 2020), most startups are characterised by fewer monetary resources to maintain staff salaries in emergencies and more problems with access to support.

Marketing is an important activity for the survival and growth of startups. Still, it is difficult for them to compete with industry giants and significant market players due to their limited budget and moderate capital. In this regard, we have analysed the work of scientists. For example, consider anything that can be offered on the market to satisfy a need or desire to be a product. As for the lean startup methodology, the idea of optimisation is to create a product that minimises the time and costs of production (Lyken-Segosebe et al., 2020; Hamilton and Philbin, 2020). The main point of this methodology is a constant connection with potential customers who are actively involved in creating the product. A startup acts as a catalyst that facilitates the conversion of ideas into products, and knowledge is more valuable for a startup than money. According to experts Romanovich et al. (2018), the innovation ecosystems of universities and research centres are also experiencing big problems in the commercialisation of technologies, where venture capital (VC) firms attract less new funds and startups receive less funding in such conditions.

According to Theocharis and Spyropoulos (2019), the next urgent problem is the digital gap. Access to digital infrastructure has become an essential requirement for doing business, but there are still significant differences in access between communities. In this regard, technological innovations that will make digital access a necessary means of doing business will develop and gain momentum.

However, if we compare all the current problems, the most significant one for small innovative startups is still the problem of the commercialisation of an innovative product. This is especially true for small innovative startups (the main generators of new ideas), which systematically face difficulties in bringing the final product to market.

It is necessary to emphasise the relevance of this topic, which is the object of interest for scientists and researchers worldwide. At any stage of bringing an innovative product unknown to the consumer, some problems may lead to rejection. In contrast, products

known to consumers, including modified ones, are much less likely to be rejected by the market.

Thus, a study by Salamzadeh and Dana (2021) showed that innovative startup companies still face a shortage of market and marketing research, especially during the crisis period, more than ever before.

Before the crisis, companies analysed the market had undergone significant changes, and their current strategies may no longer work.

Thus, they had to revise the applied market and marketing plans following the new situation. They needed to consider further segmentation, target market research, and positioning in a new market.

Experts Cheng et al. (2020) note that it is essential to provide marketing research and revision of old strategies of innovative companies, as this will not only commercialise developments but also attract investment in projects for all participants in the innovation environment: startups, entrepreneurship, investors, business angels, and VC. This coordinated investment in R&D, talent, money, location, and exclusivity is necessary to strengthen regional innovation ecosystems. Considering the existing heterogeneity of approaches and opinions of scientists (Amry et al., 2021; Zellmer-Bruhn et al., 2021) to the definition of innovation, it is worth noting that some groups of scientists consider innovations as components of a marketing complex. This direction can be called innovative marketing with new approaches and tools that increase effectiveness.

Another category of scientists considers marketing features, considering the specifics of the innovation sphere, where marketing objects are innovative technologies, goods, and services. At the same time, the object of marketing is innovative products, services, and technologies, as well as the processes of their creation and entry into the market. Thus, this area can be called the marketing of innovative products or innovative marketing.

There are various possibilities for obtaining sales statistics of the product itself and its analogues and substitutes, analysing the dynamics of market indicators, a holistic study of consumer behaviour in actual conditions, and their attitude to the product. As for starting small innovative companies, these opportunities are almost absent from innovative products.

In the research on the activities of small innovative companies based on universities, (Nasser et al., 2020) note that the typical terms of commercialisation of innovative products, as a rule, range from one to three years. A startup has a short life cycle, and it is necessary to carefully approach the choice of marketing tools at every stage.

According to Sukhanova (2013), the experiment that has been conducted on the example of three national research universities. These are of the Russian Federation: Perm National Research University (PSNIU), Perm National Research Polytechnic University (PNRPU), and Tomsk State National Research University (TSNU). The various configurations of the innovation infrastructure were compared, such as the innovation and technology centres (ITC) activities. Analysis of existing innovative infrastructures, in particular, ITC, showed the presence of standard features, many differences in their functions, and the lack of infrastructure elements responsible for developing entrepreneurial abilities and stimulating entrepreneurial activity. So, in particular, considering the four elements of infrastructure and their functions in the main areas of the university's innovation infrastructure, it was noticed as one of the first and most important is the stimulation of research. The functions of this infrastructure element called the 'R&D Marketing Department' should be marketing research to study the

market niche and identify market segments, analyse potential sales markets and buyers and their preferences, and stimulate research on business orders.

Marketing is a critical element of the success of bringing an innovative product to market. The technology or development for bringing a product to market must pass all sorts of tests, from primary and secondary research methods to actual use by consumers.

3 Methodology of research

This study was conducted to identify problems and obstacles in the implementation process at all stages of the innovative product life cycle. One of the most effective methods and ways to identify and assess issues is using questionnaire-based surveys. The survey was carried out by e-mailing an online questionnaire form developed by Google Docs, conducted in the period 3.4 quarter of 2020 – 1 quarter of 2021.

The questionnaire was sent by e-mail to 145 companies randomly selected from the register of small innovative enterprises and created this manuscript based on the analysis of these data. They were randomly selected from the register of small innovative enterprises, where 75 are residents of the universities of BSTU named after V.G. Shukhov and NRU BelSU, Russia, and 70 are residents of Technology Incubator's Iran University of Science and in Technology and Pardis Technology Park (Iran).

The respondents were managers and cooperating partners of small startup enterprises that carry out research and development (R&D) and practical application (implementation) of the intellectual activity results in various fields. In particular: mechanical engineering; chemical technologies and materials science; technological process automation; software; service of automobile transport; quality of petroleum products; road construction; information technologies; technical cybernetics; education; energy saving and energy supply of enterprises, creation of reliability management systems in the energy sector; construction, production of concrete, gypsum, cement products; construction materials science, etc.

The questionnaire includes 15 variable reasons-statements that the respondents assessed and marked as the main ones hindering the product launch to the market or successful commercialisation presented in Table 1.

These questions relate to the problems arising in the company's activities and its external and internal environment and personnel. We are interested in innovative startups as an object of scientific research. Methods of descriptive statistics and correlation analysis were used to analyse the data. For a visual representation of correlations between the studied variables and their grouping, the SPSS Statistics program was used for cluster analysis.

Cluster analysis is a common name for a set of computational procedures used to create a classification. Cluster analysis is designed to divide the source data into interpretable groups so that the elements in the same group are as 'similar' as possible while the components from different groups are as 'different' as possible. Cluster analysis is designed to divide the source data into interpretable groups so that the elements included in the same group are maximally 'similar', and the parts from different groups are maximally 'different' from each other. *K*-means clustering method and hierarchical clustering are the most popular methods. When clustering by the K-means method, we are looking to divide a set of observations into a predefined number of clusters.

Table 1 Problems identified by respondents as the main ones in the work of small innovative enterprises

No. 1	*No. 2*	*No. 3*	*No. 4*
Introduction of products to the market at the wrong time	Strong competition	Lack of an optimal business model	Incorrect pricing policy
No. 5	*No. 6*	*No. 7*	*No. 8*
Unprofessional team, lack of specialists	Lack of a market where they can sell their product	Lack of demand for the product or technology	No market testing and no customer feedback
No. 9	*No. 10*	*No. 11*	*No. 12*
Lack of funding or investment	Poor marketing, the application of an ineffective marketing concept	Regulatory gaps	Problems with the management and resources of the company
No. 13	*No. 14*	*No. 15*	
Product sales did not meet expectations	Disagreements with investors/founders	Technical or production problems	

On the other hand, in hierarchical clustering, we don't know how many clusters we want to get. The tree-like algorithm ends with a visual representation of observations called a dendrogram, which allows us to see the partitions obtained for each possible number of clusters, from *1* to *n*. Each of the approaches has its advantages and disadvantages.

Choosing an approach in hierarchical clustering is a way to calculate the distances between clusters. One of the main clustering methods is the Ward method. Methods of variance analysis are used here to estimate the distances between clusters. Its essence and advantage, among other things, is that two clusters are grouped during the integration process to ensure a minimal increase in the intra-group sum of squares of deviation.

As the distance between clusters, the increment of the sum of the squares of the distances of objects to the cluster centre obtained as a result of their union is taken:

$$\Delta = \sum_{i} (x_i - \bar{x})^2 - \sum_{x_{i\in A}} (x_i - \bar{a})^2 - \sum_{x_{i\in B}} (x_i - \bar{b})^2$$

where *A, B* clusters, *a, b* are cluster centres, *x* is the cluster object.

Two clusters are combined at each step of the algorithm, leading to a minimal variance increase. This method is used for tasks with closely spaced clusters.

The purpose of the algorithm in the *K*-means method is to minimise the sum of the squares of the intracluster distances to the cluster centre by the following formula:

$$V = \sum_{i=1}^{k} \sum_{x_{i\in A}} (x - \mu_i)^2$$

where k is the number of clusters, *Si* is the resulting clusters, $i = 1,2,...,k,$ and μ_i are the centres of mass of all vectors x from the *Si* cluster.

The problems of the k-means algorithm include knowing the number of clusters and sensitivity to outliers in advance. And the main advantages include the possibility of visual interpretation of clusters using a graph of 'average values in clusters'.

When analysing the results of sociological research (surveys), it is recommended to study the methods of the hierarchical agglomerative family. We have grouped the problematic factors that prevent startups from bringing a new product to market using hierarchical clustering. Visual inspection of the dendrogram helps understand the data structure, especially in the case of small sample sizes. And to analyse the problems assessed by respondents, we use the k-means method with an assessment of cluster centres. Analysing the clusters' centres will allow us to evaluate the differences between the formed groups of problems.

One such method is Ward's method. Its essence and advantage, among other ways, are that the two clusters are grouped in the integration process to provide a minimal increase in the intra-group sum of squares of deviation.

Objects can be grouped by a hierarchical method using various distance functions. In the present paper, the function 'Euclidean distance' was used as the most commonly used measure for calculating the distance on the plane between points. The main result of hierarchical cluster analysis is a dendrogram – a graphical representation of the sequential clustering process carried out in the distance matrix.

4 Results and discussions

Why did we choose these questions in Table 1? Cause that similar studies were carried out in various analytical and marketing agencies that conducted such surveys:

- The study was commissioned by CB Insights specialists (Lorenzo, 2020); based on the results of such a post-mortem analysis, 101 startups compiled their list of the 20 most common reasons that caused their commercial failure (in this ranking, higher places are occupied by the reasons that the authors of post mortems themselves most often called).
- The study was commissioned by researchers of the agency 'HighTechSrategies' (Rani, 2021), which surveyed 200 startups in which they were focused on finding the main reasons for the failures of young high-tech companies. The rating reflected the 15 most significant reasons for the loss of startups (Rani, 2021).
- The study was commissioned by the 'synoptic' academic analysis of the key causes of failures of innovative projects presented in a theoretical review by Swiss researcher Jean-Philippe Deschamps, who wrote a special chapter on 'classic root causes of innovation failures' in the large monograph strategy and communication for innovation has been published in 2017 by Springer publishing house (Cantamessa et al., 2018).

Based on the findings of defining the research paradigm, the research approach, and our research strategy, the next step is to develop our research project. "Research design is the logic that links the data to be collected (and the conclusion to be drawn) to the original research questions". "Research projects always address certain key issues, such as who will be studied, how these people will be selected, and what information will be collected from or about them". Research design is the plan by which a strategy should be executed. It defines methods and procedures for data collection, measurement, and analysis.

After analysing various data from a survey of researchers, scientists, and analytical agencies, we found that according to a study by (McKinsey & Co., 2020a, 2020b) B2B

Decision-Maker Pulse, 96% of enterprises have had to change their model of entering the market because of the pandemic. In addition, most switched to digital customer interaction to survive in the market.

According to Cooper and Vlaskovits (2010) and the leading analytical agency, the following principal reasons can be technical or production problems, wrong time to market the product, strong competitors, higher costs than planned, insufficient marketing efforts, product shortcomings, and preliminary market analysis.

The online survey (Karpov, 2020) "The reasons for the failures of startups in Russia". This online study of various enterprises on the possible reasons for the failure of new innovative products showed that 30% and 23.5% of respondents count lack of product demand and money as the main factors of failure. In addition, 12 % of the respondents indicate the burnout of the founders or people in the team as a possible reason for the failure of an innovative startup company.

Representatives of small innovative startup companies note many problems that arise in the field of R&D related to production, testing, financing, and management. However, the issue of understanding the future consumers of an innovative product is crucial.

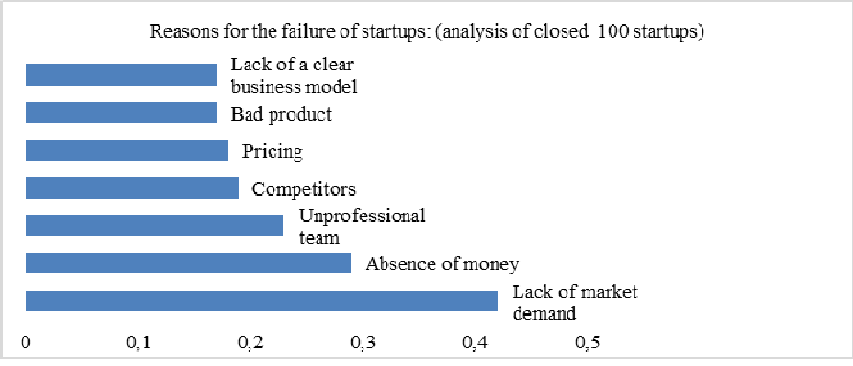
To find the reasons that prevent the startup company based on the university from launching and commencing a new product, we surveyed scientists from business incubators and technoparks in Russia and Iran. The survey included a list of reasons based on the response options in the study that researchers had conducted according to statistics (Figure 2 and Figure 3). We also added a personal opinion point to the answer options where each respondent could present their opinion and recommendations considering their own practical experience.

Figure 2 Winning at new products (see online version for colours)

Source: Cooper and Vlaskovits (2010)

As a result, we found that the majority of respondents noted their main reasons for the failure of startups as 'poor marketing', 'application of an ineffective marketing concept', 'launching a product at the wrong time', and 'lack of market testing and customer feedback' and these are different from the reasons described by various researchers. It gave us the basis to conduct our in-depth research and analysis, adding new versions of the main current problems of startup companies to the initial list of factors.

Figure 3 Startups roads to failure (see online version for colours)



Source: Made by the authors based on data (Cantamessa et al., 2018) and https://www.cbinsights.com

When analysing the responses about ranking the problems of startup companies, we used cluster analysis and, in particular, the hierarchical method to obtain the final data. Figure 3 shows a vertical dendrogram of the problematic factors that prevent startups from launching a new product on the market. The results of the cluster analysis indicate that the following problems noted by respondents as the main ones in the work of small innovative enterprises are very close:

- "The presence of strong competition", "incorrect pricing policy", "gaps in normative regulation", "sales of products did not meet expectations", and "disagreements with investors/with the founders".

This cluster characterises the problems of intense market competition and incorrect pricing policy. The most significant correlation is observed between the variables "the presence of fierce competition" and "incorrect pricing policy" (r = 0.60). This cluster's average value (centroid) is 5.34, the smallest among the formed groups.

- "Lack of an optimal business model", "Poor marketing, application of an ineffective marketing concept", "Launching product at the wrong time", "Lack of market testing and customer feedback", and "Lack of a market where they can sell their product". This cluster characterises the problems of small companies related to the promotion of products and services and the vision of the company's status in a competitive environment. These problems have a close positive correlation with each other. The most significant correlation is observed between the variables "Lack of an optimal business model" and "Poor marketing and the ineffective marketing concept" (r=0.67). The average value of this cluster is 9.74 and is the largest. Marketing and other problems that correlate with it are noted as very important for small companies.
- "Lack of funding or investment", "Problems with the management and resources of the company", "Unprofessional team, lack of specialists", "Technical or production problems", and "Lack of demand for a product or technology". This cluster characterises the problems of small companies related to resource management: financial and human resources and production problems.

The most remarkable correlation is observed between the variables "lack of funding or investment" and "problems of management and company resources" (r = 0.45). The average value of this cluster is 8.92. Management and production problems against the background of a lack of professional personnel and difficulties with access to financial resources for small companies are the second most important ones.

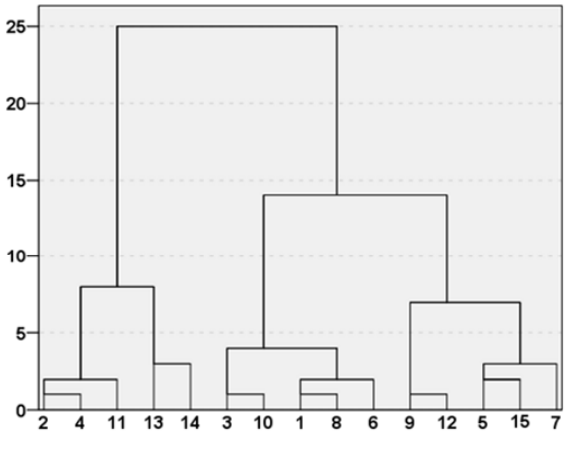
Thus, according to the survey results and the clustering of variables, the most critical problems of small companies are market choice, understanding of customers, and promotion of products and services in the market. Dendrogram using the Ward method and combining a cluster of recalibrated states.

In the second step, the *K*-means method in SPSS software is performed clustering. Figure 4 shows the average indicators of the problem intensity associated with small company activities. The *k*-means process creates *K*-groups from a set of objects so that the group members are the most homogeneous. This is a popular cluster analysis technique for examining a data set. The choice of the number of clusters was made by conducting a hierarchical analysis and was determined by the number 4. To estimate the cluster centroids from observations, 100 iterations were performed. Figure 4 shows the average values of the characteristics for the 4 clusters sorted in descending order. The second and fourth clusters comprise 75% of respondents. The numbering of the traits is shown in Table 1.

Based on the data obtained, we can characterise the clusters as follows:

1 *Cluster 1.* The number of respondents is about 10%. This cluster is characterised by the fact that the most critical problems for the participants are intense competition and incorrect pricing policy against the background of a lack of financial resources. A possible problem for this group of respondents is the lack of particular relevance of their products and an inflated price relative to analogues. The solution may be to deepen and expand cooperation with the university in terms of introducing innovative solutions to the production process and improving the quality of product characteristics.

Figure 4 Dendrogram using the ward method



Notes: The main reasons noted by the respondents for refusing to work in scientific institutions (see Table 1 for the name of the characteristics).

Source: Author's construct

2 Cluster 2. The number of respondents is about 35% of the total number. The most critical problem for this cluster is the marketing strategy and positioning of the product on the market. Since most inventors and representatives of small companies initially make the big mistake of underestimating the importance of marketing, developing and producing a finished product or technology without elementary segmentation, targeting, and positioning of the market.

   Inherently there is no market demand and demand for a ready-made innovation, there is no clear understanding of the type of B2B, B2C, or B2G market for segment allocation and commercialisation, and as a result, sales fail after the product is put on the market due to the lack of a customer.

   The second most important factor, if there is a customer, is the absence of a proper marketing strategy for the company and the concept of market survival in current or potential competition conditions. The solution may be to invite a marketer to the team, order and use these services on the terms of outsourcing or with the help of a university, for example, when receiving comprehensive information and consulting support based on established innovation centres where a marketer can be on the staff.

3 Cluster 3. The number of respondents is about 15% of the total number. For this cluster, the most critical problems are related to management and financial resources against the background of a lack of professional personnel. The solution can also be using these services in case of outsourcing or assistance from the university, for example, when obtaining comprehensive information and consulting support based on established innovation centres and services of effective scientific management. This management type will help identify more valuable and practical scientific cooperation conditions.

   Scientific analysis is also used to determine the best ways to achieve goals and solve problems: the importance of selecting competent researchers, their training, and providing these employees with the resources necessary to perform their creative tasks effectively. Assistance in the management of various types of accounting and protection of intellectual property rights, preparation of draft agreements and contracts on the transfer of exclusive rights to intellectual property objects, and additional financial support in the form of grants and subsidies.

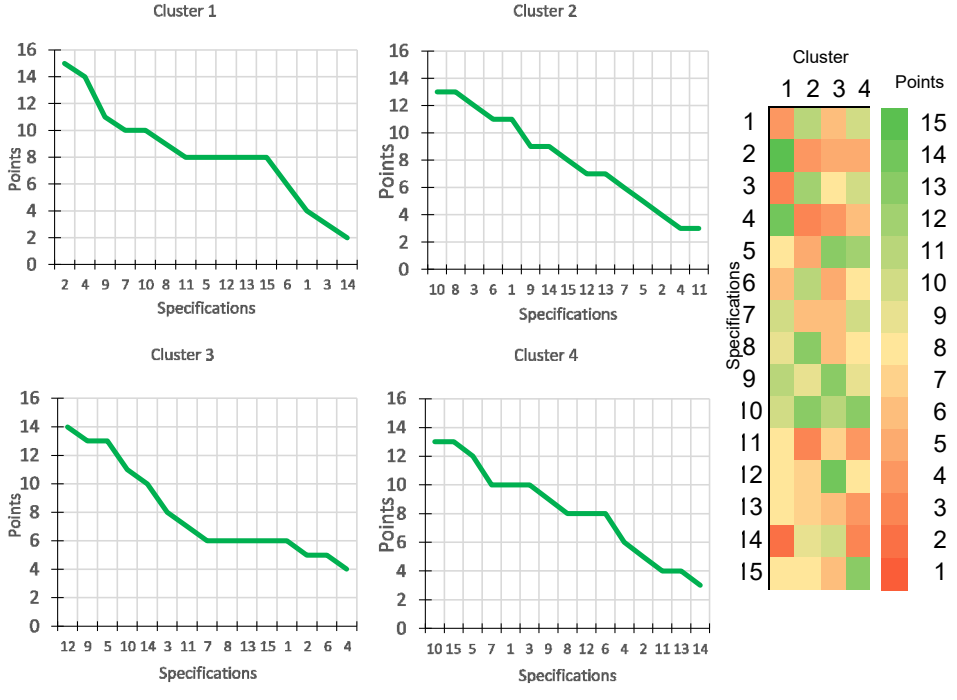
4 Cluster 4. The number of respondents is about 40% of the total number. For this cluster, the most critical problems are related to the production process and the market promotion of products and services. Promoting products also depends on proper marketing, analysis, and understanding of the market, its needs, and competitors. In addition, a close relationship with laboratories and technical and production sites of scientific organisations will eliminate emerging problems and improve the quality characteristics of products or technologies.

Thus, the development and implementation of an individual educational and career trajectory can act, on the one hand, as an effective predictor of the employment of university graduates, on the other hand, as a tool for neutralising the risks of a low level of graduate employment, as well as generally optimise the process of forming the personnel potential of the region.

The proposed approach makes it possible to solve a set of issues related to improving the level of adaptation of specialists and young people in the labour market while

advancing to a new technological level. It becomes particularly relevant in the transition to new technical solutions of Industry 4.0.

Figure 5 Average values of observations for 4 clusters in descending order (see online version for colours)



Note: For characteristics, see Table 1

Source: Author's construct

We have analysed and identified the most significant problems, such as the lack of a market and potential buyers, weak marketing of the company or the lack of a specific marketing strategy, and misunderstanding of competitors' strategies. Thus, we can conclude about the urgent need of companies for clever marketing.

5 Conclusions

As a result of this research, the author's interpretation of the role of marketing for a startup is presented, taking into account the innovative specifics of small innovative university companies. This study was conducted to understand innovative startup companies' activities and maintain their sustainability for a successful life cycle from idea to market launch.

Universities have historically been one of the critical centres of innovation generation within the framework of scientific activity. However, in current conditions, only creating a promising technology or product does not guarantee commercial success.

Innovation may not occur because the breakthrough development of the university is not adapted to the market, is not integrated into sales channels, and information about it is not trite brought to the decision-makers about the purchase.

Thus, the results of this research confirm that effective, innovative activity of the university is impossible without competent marketing support.

All of the above is confirmed by the experience of innovative and successful enterprises and organisations, according to which it is marketing technologies and tools integrated into their activities that make it possible to increase its effectiveness and adaptability in the context of the development of global markets and tougher competition for consumers.

The cluster analysis of the problems of small companies allows us to conclude that it is necessary to pay increased attention to the marketing and promotion of innovative products to the market. The most common problems of startups are related to promoting products to the market.

The results obtained allow us to draw the following conclusions that the choice of marketing as one of the first stages will allow:

1 For startups created based on scientific institutions to fix sales, analyse the prospects and sales of the product, consumers themselves, and the possibility of increasing sales, improving the product and expanding its range.

2 To improve the mechanism of the support provided by innovation and technology centres and commercialisation promotion centres established at universities. It will allow companies to develop a minimally working product, study its values and usefulness for the consumer, as well as find the first consumers and adapt the product to their actual needs.

3 To improve the support mechanism provided by innovation and technology centres and commercialisation promotion centres established at universities. This will allow companies to develop the product needed by the market, study its value and usefulness for the consumer, as well as find the first consumers and adapt the product to their actual needs.

4 To improve sales, it is essential to analyse customers and product prospects.

5 To promote science and successful commercialisation of projects, scientific ideas, and results of intellectual activity. This will enable success for this company that has chosen such a complex but exciting activity since science is the engine of progress.

6 The successful development of university-based startups will improve the rating of research institutions in the market for scientific and educational services and create attractiveness for scientists and young workers.

7 In the structure of investments and government support in the form of grants and others, it is essential to include, as a mandatory item, marketing expenses and remuneration of marketers, who should be included in startup project teams.

The results obtained in the management decisions of startups contribute to the practical choice of marketing methods and tools and market opportunities to successfully sell their high-tech products.

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