Formation of strategies for the development of startup ecosystems as a prerequisite for sustainable entrepreneurship

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INTRODUCTION

The global sustainable development of entrepreneurship is based on an innovative approach, which is implemented through the formation and development of startup ecosystems. In order to improve and develop startup ecosystems of countries, it is necessary to develop and implement comprehensive development strategies.

Purposes: formation of strategies for the development of startup ecosystems of the country on the basis of clustering as a prerequisite for the activation of entrepreneurship

METHODOLOGY

The analysis of startup ecosystems was based on the data presented in the Global Startup Ecosystem Index 2022 by StartupBlink. A sample of 100 countries.

Two criteria were chosen for the formation of clusters: Total Score and Rank Change (from 2021).

The sequence of cluster analysis involves the following stages:

- formation of a sample of objects for cluster analysis;
- definition of clustering criteria;
- conducting a hierarchical cluster procedure for creating groups of similar objects using various methods in order to form a hypothesis regarding natural clustering;
- testing the hypothesis of natural clustering using the k-means method;
- verification of the reliability of the obtained results of cluster analysis.

As a result of clusterization, homogeneous groups of countries with similar characteristics and, therefore, uniform approaches to further development were formed, which allows for the formation of strategies for the development of startup ecosystems of countries.

RESULTS

As a result of the cluster analysis, 4 homogeneous clusters were formed. The Fisher statistic reflects the significant contribution of each indicator to the differentiation of clusters, while the share of the Total Score indicator is the largest. Validity testing by analysis of variance and Fisher's statistics testifies to the validity of such a distribution. Each cluster is characterized by features. Thus, cluster 1 includes only one country - the United States - which has been leading with a large gap in this rating for the first year and has the maximum Total Score - 195.37 and shows absolute growth compared to the value of 2021. - 124.42.The second cluster includes countries that are representatives of the 20 leaders (a total of 14 countries from 2nd to 15th place). They are characterized by: a high level of acquired points (Total Score) from 52,555 (United Kingdom) to 15,914 (Ireland) and minor changes in the rank, both positive +3 (Singapore) and negative -4 (Switzerland), including and without rank changes (0).The third cluster is the largest and includes 46 countries. This cluster is characterized by the level of Total Score from 0.2600 to 14.4810 and minimal positive changes in Rank Change - 1; the absence of these shifts (0), but mainly negative changes (maximum -16 positions). The fourth cluster includes 35 countries, which are characterized by: the level of Total Score from 0.2750 to 14.193 and positive changes in Rank Change from 1 to 18.

Thus, the countries of the first cluster should apply the strategy of the absolute leader, generating constant growth and gap with other countries; countries of the second cluster - the strategy of maintaining leadership in a highly competitive environment; the countries of the third cluster choose a strategy of error correction (taking into account) to change the negative value of Rank Change to a positive one; it is expedient for the countries of the fourth cluster to choose a strategy of gradual growth and demonstrate annual positive growth.

characteristics of clusters

Cluster	Number of countries in each cluster	Rank Change (from 2021)		Total Score	
		Min	Max	Min	Max
1	1	0	0	195,37	195,37
2	14	-4	3	15,9140	52,5550
3	46	-16	1	0,2600	14,4810
4	35	1	18	0,2750	14,1930

Scatter diagram startup ecosystems of the countries of the world
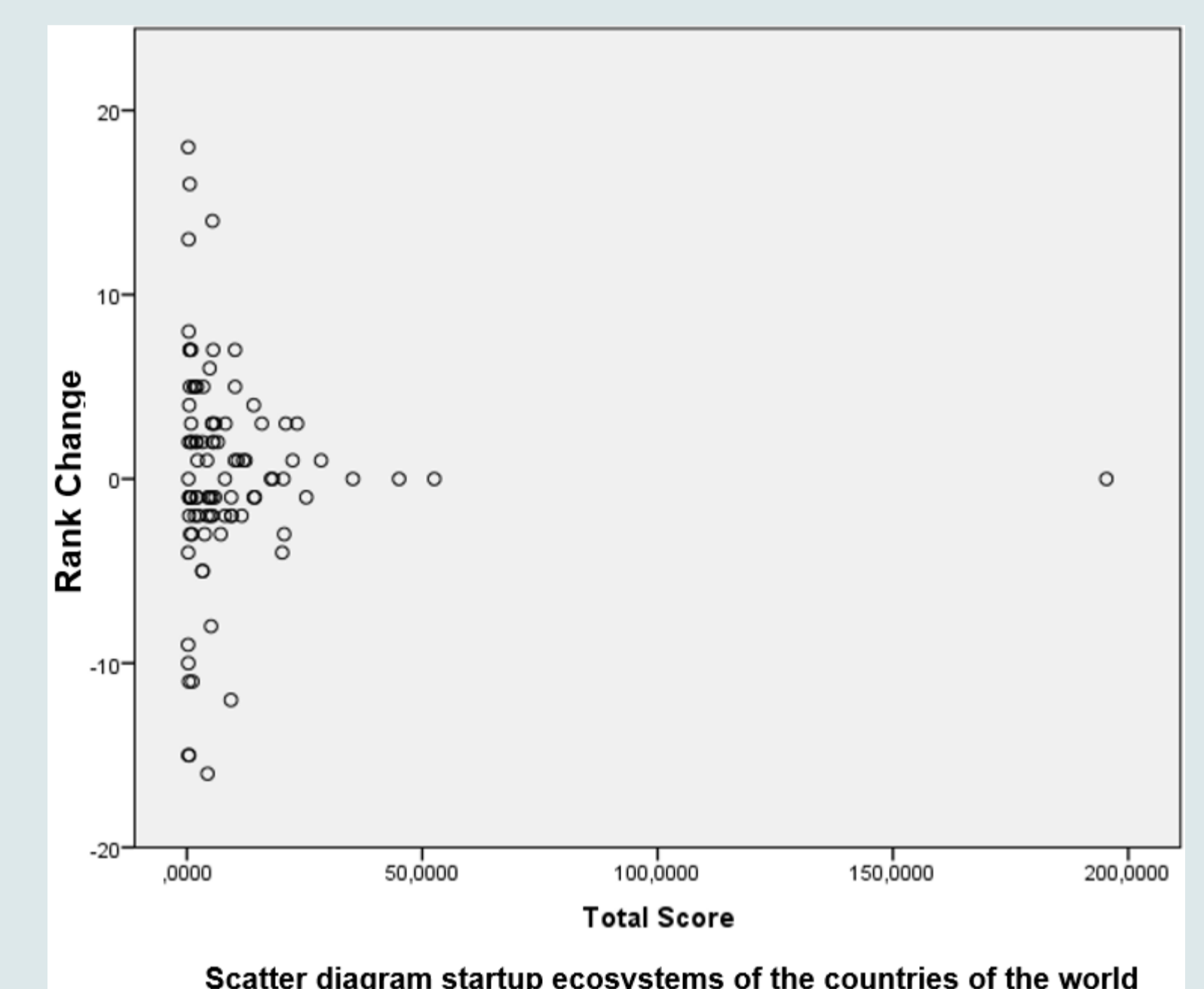
CONCLUSION, CONTRIBUTION AND NOVELTY

The United States is a constant leader in the *development* of the startup ecosystem and has a significant gap from other leaders of the rating, which is explained by the high value of the Quality Score. The ranking also clearly shows the three leaders of the United Kingdom (rank 2), Israel (rank 3), Canada (rank 4).

4 homogeneous clusters were formed on the basis of k-means cluster analysis and their characteristics were provided;

4 types of strategies are defined (absolute leader, retention of leadership, taking into account errors, gradual growth), which are based on 4 identified clusters and are appropriate for use by cluster countries. Contribution: a cluster model was built and a typology of startup ecosystems of the countries of the world was carried out. Novelty: strategies for the development of startup ecosystems of the countries of the world are proposed based on the criteria of Rank Change and Total Score

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