ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

Volume 33(2), 2024

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THE IMPACT OF REFUGEE STARTUPS ON HOST COUNTRY ECONOMIES: BUSINESS MODELS AND ECONOMIC ADAPTATION[7]

The current global economic landscape is characterized by turbulence and crises, such as the COVID-19 pandemic and military conflicts, which have disrupted the development of innovative startups. In this context, it becomes essential to explore how refugee startups influence the economies of host countries and facilitate their adaptation to specific conditions. This article aims to examine the most suitable and optimal business models for such startups, the industries they predominantly operate in, their overall impact on economic growth, and the potential for cross-border collaboration among refugee entrepreneurs. Additionally, the article intends to analyze the relevance of existing financing models for startup sustainability and explore innovative methods and instruments that can effectively address the challenges faced

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[7] This paper should be cited as: *Kolodiziev, O., Gukaliuk, A., Shcherbak, V., Riabovolyk, T., Androshchuk, I., Pas, Y. (2024). The Impact of Refugee Startups on Host Country Economies: Business Models and Economic Adaptation. – Economic Studies (Ikonomicheski Izsledvania), 33(2), pp. 175-201.*

by refugee startups. By investigating the alignment between financing models and the current economic state, this study provides valuable insights for fostering economic recovery and development in regions hosting refugee populations. In summary, this analysis offers insights into the impacts of refugee startups on host economies, focusing on their suitability and impact on economic growth, the relevance of financing models in sustaining these startups, and the potential for cross-border collaboration among refugee entrepreneurs.
Keywords: start-ups; business models; financing; turbulent
JEL: D25; G11; M13

1. Introduction

The global economic landscape faces turbulence and crises, like the COVID-19 pandemic and military conflicts, impacting innovative startups. Changing startup trends since 2019 offer lessons for 2022. Amid crises, like Ukraine's military actions, we must learn from these events and seek new solutions for economic recovery. Startup history shows financing's pivotal role, despite positive innovation infrastructure and venture capital. Globalization offers market access but adversely affects regional startups. Despite available financing tools, many startups (70-90%) cease within 2-5 years. We need to analyze existing business models and explore new ones. This study is relevant for: 1) Understanding startup financing models at different stages, 2) Identifying effective financing methods for economic recovery, and 3) Aligning financing models with the current economic state.

In today's turbulent economy, due to COVID-19 and conflicts like Ukraine, startups are vital for adaptive recovery and economic development. Different "business models" for startup financing create added value. However, the theoretical basis for financing startups depending on their lifecycle stage remains open. This article summarizes research on startup business models and defines their conceptual framework, structure and financing methods.

Refugee startups play a crucial role in adaptive economic recovery and economic development. This article explores their business models, conceptual framework, structure, and financing methods. It examines their impact on host country economies through a qualitative research approach, emphasizing their contribution to economic growth and innovative solutions. Successful business models include social entrepreneurship, impact investing, and collaborative networks, operating mainly in technology, healthcare, and food services. Understanding and implementing appropriate business models and financing methods can support refugee startups' growth and sustainability, benefiting host country economies.

2. Literature Overview

The study of startups has gained attention for driving innovation and growth. Startups introduce new products, services, and business models, often in high-growth sectors, using technology. Understanding startups is crucial for policymakers, investors, and researchers. They're prominent in tech, e-commerce, biotech, fintech, and renewable energy. These

sectors offer growth and disruption opportunities. Financing options include venture capital, angel investors, crowdfunding, and incubators/accelerators. Refugee startups, created by displaced entrepreneurs, face unique challenges like language barriers and limited resources but bring diverse perspectives. Ukrainian startups, influenced by the tech sector and local support, have their characteristics. Analyzing startup literature provides insights into their nature, industry preferences, business models, and funding. Researchers and practitioners can use this information to support startup growth and economic contributions.

1.1. Crowdfunding as a financing mechanism: Exploring the economics and challenges for startups

Agrawal et al. (2014) publication "Some simple economics of crowdfunding" explores the economics of crowdfunding as a financing mechanism for startups. The authors discuss how crowdfunding platforms enable entrepreneurs to access capital from a large number of individuals, thus bypassing traditional funding channels. They analyze the incentives and motivations of both entrepreneurs and investors in crowdfunding campaigns, highlighting the importance of signalling, social networks, and project quality in determining campaign success. While the study provides insights into the potential benefits and challenges of crowdfunding, it does not specifically address the use of crowdfunding for refugee startups. The article by Gokce et al. (2023) explores job satisfaction and organizational commitment in Syrian refugee textile enterprises in Turkey, providing insights relevant to the context of refugee startups. The study investigates the impact of Syrian refugee entrepreneurs in the Turkish textile industry on job satisfaction and organizational commitment among refugee employees (Carrigan, 2020). "2019 small business failure rate: Startup statistics by industry (National Business Capital and Services Report)." This report presents startup failure rate statistics by industry based on data from 2019. It provides insights into the challenges faced by startups across different sectors, including factors contributing to their failure. The report also includes valuable information on the failure metrics of refugee startups, taking into account the unique challenges they might encounter in the business environment of the recipient country (CB Insights, 2021). "The Top 20 Reasons Startups Fail." This analysis by CB Insights identifies the top reasons for startup failure based on an examination of startup post-mortems. It highlights common pitfalls and challenges faced by startups, such as market-related issues, team dynamics, and financial mismanagement. While the analysis sheds light on the general challenges faced by startups, it specifically discusses the unique challenges and solutions related to refugee startups (Chatterji et al., 2019). "When does advice impact startup performance?" In this study, the authors investigate the impact of advice on the performance of startups. They analyze the types of advice received by entrepreneurs and examine how different sources of advice, such as mentors and investors, influence startup outcomes. The unique challenges faced by refugee entrepreneurs, such as limited access to resources, language barriers, and legal constraints, require specific attention in the context of business model development and implementation. Future research should explore the applicability and effectiveness of different business models for supporting and empowering refugee startups, considering their distinct circumstances and needs (Chesbrough et al., 2006). "Open Innovation. Researching a new paradigm." This book explores the concept of open innovation, which involves leveraging external ideas,

technologies, and resources to drive innovation and create value. While it does not specifically focus on business models for startups, the concept of open innovation can be relevant to the creation of startup ventures, as it encourages collaboration, knowledge sharing, and the integration of external inputs into the business model (Dietsch, Petey, 2004). "Should SME exposure be treated as retail or as corporate exposures? A comparative analysis of default probabilities and asset correlation in French and German SMEs." This research paper analyzes the default probabilities and asset correlation in small and medium-sized enterprises (SMEs) in France and Germany. While it does not directly address business models for startups, understanding the credit risk and financial performance of SMEs is relevant to the assessment of the viability and sustainability of startup ventures. Drucker (2007). "Innovation and entrepreneurship: practice and principles." This book by Peter Drucker explores the concepts and principles of innovation and entrepreneurship. It provides insights into the entrepreneurial mindset, the importance of identifying and exploiting opportunities, and the role of innovation in creating and sustaining successful ventures. While it does not focus specifically on business models for startups, it offers valuable guidance on the overall entrepreneurial process (Fisch, 2019). "Initial coin offerings (ICOs) to finance new ventures." This journal article examines the use of Initial Coin Offerings (ICOs) as a means of financing new ventures. ICOs involve the sale of digital tokens or cryptocurrencies to fund projects or startups. The study explores the advantages, challenges, and regulatory considerations associated with ICOs. While ICOs are a specific form of fundraising, they represent an alternative business model for startups to secure capital (Hill, 2018). "Fintech and the Remaking of Financial Institutions." This book discusses the impact of financial technology (fintech) on the remaking of financial institutions. It explores how technological advancements and innovations in financial services are disrupting traditional banking and finance models. The utilization of specific business models for refugee startups and an understanding of the financial technology landscape in the recipient country can provide insights into the potential opportunities and challenges of refugee startups in the financial sector.

1.2. Banking System Stability and Refugee Entrepreneurship: Insights from Financial Perspectives and Policy Frameworks

Kolodiziev et al. (2021) propose an approach in their publication, "The Level of Digital Transformation Affecting the Competitiveness of Banks," focusing on the implementation of innovative digital technologies to maintain a bank's competitive position and assess the effectiveness of its investments, providing insights applicable to the financing stage of startup activity. Additionally, Wise and Feid's (2017) book, "Startup Opportunities: Know When to Quit Your Day Job," offers guidance on recognizing startup opportunities and transitioning to full-time entrepreneurship, emphasizing strategic considerations for aspiring entrepreneurs, albeit not extensively covering specific business models for startups. In the publication by Yehorycheva et al. (2017) "Actual Problems of the Ukraine's Banking System Capital Stability Management" the authors emphasized the need to overcome risks, which requires the construction of a strong and financially stable banking system that will effectively perform its main function – the optimal redistribution of capital to finance accelerated economic development. "Refuge: Transforming a Broken Refugee System" by

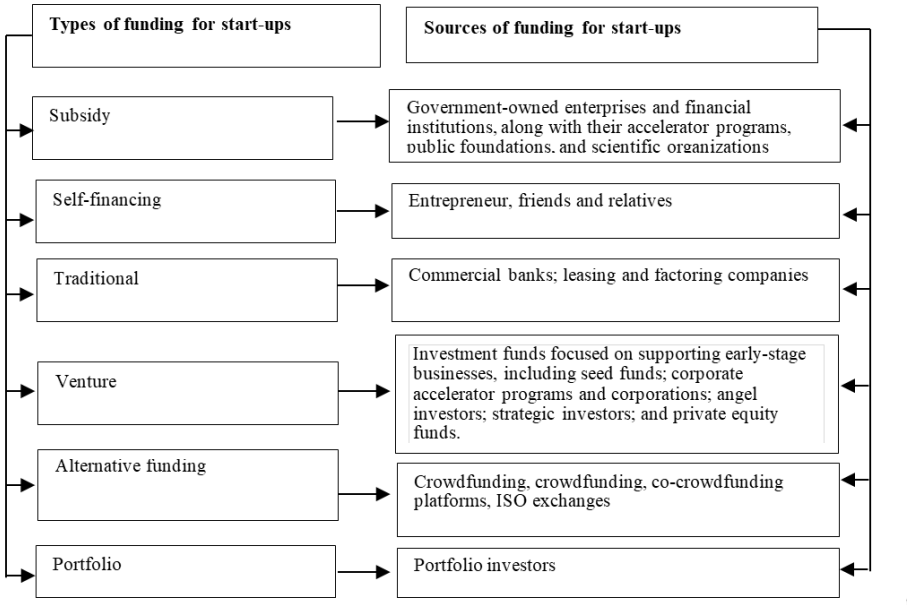
Betts and Collier (2017) sheds light on the challenges and potential solutions for improving the refugee system, which is crucial for creating a conducive environment for refugee startups. "Diasporas Reimagined: Spaces, Practices and Belonging" edited by Sigona et al. (2018) explores the concept of diaspora communities and their role in fostering entrepreneurship and economic integration, including among refugees. "Refugee Economies: Forced Displacement and Development" edited by Daccord and Lubkemann (2019) examines the economic impact of forced displacement and how refugee communities can contribute to local and national development through entrepreneurial activities. "Refugee Startups: Critical Approaches to the Social and Economic Integration of Refugees through Entrepreneurship" by Likić-Brborić (2020) offers a critical analysis of the social and economic integration of refugees through entrepreneurship and highlights the potential benefits and challenges they face in startup ventures. "The Refugee Entrepreneur: The Microeconomic Impact of Forced Displacement" by Ionescu (2018) explores the microeconomic impact of forced displacement and emphasizes the potential of refugee entrepreneurs in driving economic growth and innovation. "Refugees and Forced Displacement: International Security, Human Vulnerability, and the State" edited by Callo and Grote (2019) examines the intersection of refugee issues with international security, human vulnerability, and state policies, providing insights into the broader context of refugee startups. "Advancing Refugee Protection in a Turbulent Era" by Fine and Yamin (2017) focuses on the legal and policy aspects of refugee protection, which are crucial for creating an enabling environment for refugee startups. "Disrupting Entrepreneurship Education: Challenging Current Perspectives in Contexts of Refugee Migration and Forced Displacement" edited by Gerdes and Wadhwani (2020) explores innovative approaches to entrepreneurship education in the context of refugee migration, aiming to empower and support refugee entrepreneurs. "Refugees and Forced Labour: Regimes of Exclusion and Inclusion" edited by Wickramasekara and Carroll (2021) examines the relationship between forced displacement and labour exploitation, highlighting the importance of addressing labour rights and inclusion for refugee entrepreneurs. "Routledge Handbook of Migration and Development" edited by Weinar et al. (2018) provides a comprehensive overview of migration and development issues, including the role of entrepreneurship and startups in the economic and social integration of migrants and refugees. These selected sources cover a range of topics related to refugee startups, including policy frameworks, economic impacts, social integration, entrepreneurship education, and labour rights. They contribute to a better understanding of the challenges and opportunities associated with refugee entrepreneurship and provide valuable insights for policymakers, researchers, and practitioners working in the field of refugee startups.

1.3. Evolution of startup financing: A comprehensive analysis of funding types, sources, and life cycle stages

Over the past two decades, the financing landscape for startups has witnessed a substantial transformation on a global scale. Simultaneously, diverse funding experiences for startups have emerged worldwide. By examining, synthesizing, and organizing these varied financing experiences, it becomes possible to establish effective startup ecosystems through an analysis of both positive and negative instances. Throughout the history of the startup economy, it has

been intrinsically connected to the advancement of innovation and innovation infrastructure. Therefore, it is advisable to consider the innovation domain as the external environment for startups and explore the common innovation factors that influence their ability to attract funding. The analysis reveals various types and sources of funding available for startups (Figure 1).

Figure 1. Categories and origins of funding for startup enterprises



Source: compiled by the authors.

The examination of each funding type and its corresponding sources based on the startup's life cycle stage (LCC) will be conducted separately. During the seed and early stages of the startup life cycle, subsidized financing is commonly utilized. The primary sources of self-financing include the entrepreneurs themselves and funds from friends and relatives (Jabeur et al., 2017). Traditional startup financing sources in this stage encompass commercial banks, leasing companies, and factoring companies (Kaili et al., 2019). Venture financing is characterized by supporting entrepreneurial talent in transforming ideas into globally recognised products and services (Keogh, Johnson, 2021). The venture capital market comprises venture capital funds, accelerators, business angels, and strategic investors. In the early and expansion stages, venture capital funds are frequently employed as commercial financial institutions that invest in innovative and high-risk projects. Corporate accelerators aim to intensively develop companies through mentorship, training, and financial and expert support in exchange for equity participation (Melegati et al., 2019). Business angels, as individual investors, often provide their own funds in smaller amounts during the early stages of development. Strategic investors, whether individuals or entities, purchase shares in

companies primarily during later growth stages. Acquiring a mature company with significant potential can yield substantial synergy benefits for the buyer (Rupeika-Apoga, 2014).

After the acquisition, the company typically transitions from a startup to becoming part of an established business. Private equity funds are investment funds that secure a stake of at least 10% in a company's share capital in exchange for direct investment. Acquiring a stake allows the fund to have representation on the board of directors and participate in company management. Their activities primarily involve financing companies during later stages of growth. Alternative financing options are now widely utilized during the early stages of startup development. Crowdfunding is the prevailing model within alternative financing, encompassing crowdfunding, crowdsourcing, and crowdfunding platforms as funding sources for startups. Crowdfunding involves raising third-party funds from the general public through an intermediary, typically an online platform (Valanienea, Jegeleviite, 2014).

According to a report by the European Commission, crowdfunding platforms can be categorized as follows: debt and equity crowdfunding platforms, debt crowdfunding platforms, and invoice trading platforms where businesses sell invoices or receivables to investors (Silva, Carreira, 2017). Reward-based crowdfunding involves individuals or businesses contributing funds to a project or business and receiving goods or services in return. Philanthropic crowdfunding entails individuals or businesses donating funds to charitable projects without expecting any returns (Tomczak, Brem, 2013).

Hybrid crowdfunding models combine elements from different crowdfunding types. Portfolio funding relies on portfolio investors as funding sources for startups. These investors can be individuals, banks, or other financial institutions that trade the securities of startups that have reached the initial public offering (IPO) stage during late-stage growth. An IPO represents the first sale of shares by the issuing company on the open stock market (Teker et al., 2016). A secondary public offering (SPO) refers to the additional sale of shares after the IPO. Table 1 presents the main advantages and disadvantages of startup financing.

The various types and sources of funding are exemplified through different forms and instruments of financing (Kaili et al., 2019; Kaya, Persson, 2019). These forms of financing include subsidized funding, equity financing, debt financing, and hybrid financing. The "hybrid" form of financing refers to utilizing a funding source that combines elements of both equity and debt financial instruments, such as a profit-sharing loan or a convertible loan that transitions from debt to equity over time. The publication of Ponomarenko et al. (2017) “Benchmarking of Bank Performance Using the Life Cycle Concept and the DEA Approach” modified the technology of bank performance benchmarking based on the concept of the life cycle and the DEA approach, which determines the differences between certain stages in strategic orientations, intensity of development, financial needs and goals. The authors state that benchmarking can be considered as a method of assessing and comparing the situation in the venture capital market or a method of comparing the effectiveness of the management of small and medium-sized enterprises. These listed types, along with their corresponding sources, instruments, and forms of financing, are allocated to different life cycle stages of startups (see Table 2).

Table 1. Pros and cons of different startup funding types

Type of Financing	Advantages	Disadvantages
Subsidy	The potential for securing non-repayable funds. The chance to establish a reputation as a recipient of grants or subsidies. Connections and assistance from government institutions. Opportunities for knowledge acquisition and human resource development.	Challenges in completing technical documentation. Limited funding amounts. Primarily utilized during the early stages of the startup life cycle.
Self-financing	Potential for maintaining control over the business and the opportunity for independent management (though not always guaranteed).	Limited funding availability. Impeded growth potential due to insufficient external funding. Lack of communication channels with potential investors.
Traditional	Potential for maintaining control over the business and the opportunity for independent management (though not guaranteed in all cases). Ability to secure additional funding.	Challenges in completing technical documentation. Sectoral reluctance to provide loans to startups. High-interest rates and collateral requirements.
Venture	Opportunity to secure additional funding. Potential for knowledge acquisition and sharing experiences. Personal interest from investors, fostering personal relationships. Specialization in specific industries.	Organizational and financial obstacles in accessing funding. Lack of interest from investors in seed-stage companies.
Alternative	Potential to secure funding. Opportunity to validate and enhance the product. Time-saving by avoiding the need to search for individual investors. If investors are involved, it indicates their interest in the startup's further development.	Primarily employed during the early stages of the life cycle. Limited capacity to secure substantial funds for accelerated growth.
Portfolio	Potential to secure capital for expansion, acquiring assets, or fulfilling other corporate objectives. Capability to provide cash payouts to founders, employees, venture capitalists, and other investors. Enhancing the market value of the company. Achieving an exit strategy for the founders of the business.	Typically applicable only during the later stages of the life cycle. The IPO (Initial Public Offering) process is time-consuming and expensive. Following the IPO, owners are required to provide regular financial reports on the company's condition.

Source: compiled by the authors.

Table 2. Categorization of start-up financing elements across life cycle stages

Types of financing	Sources of financing	Forms of financing	Financing instruments	Start-up lifecycle stage*		
				1	2	3
non-commercial						
Subsidised funding	Government-owned enterprises and state banks, state foundations, and scientific organizations	Subsidy	Grants	✓	✓	✓
			Subsidies	✓	✓	✓
	Nonprofit organizations, benefactors of the arts	Subsidy	Donations	✓		
commercial						
Self-financing	Entrepreneurs, friends, relatives	Equity	Contribution to share capital	✓		
			Purchase of a block of shares	✓		
Traditional finance (banking, leasing, factoring)	Commercial banks	Hybrid	Convertible loan	✓		
			Profit-sharing loan	✓		
			Warrant	✓		

Types of financing	Sources of financing	Forms of financing	Financing instruments	Start-up lifecycle stage*		
				1	2	3
			Mezzanine loan		✓	✓
			Subordinated loan		✓	✓
		Debt	Bridge loan		✓	✓
			Bank loan		✓	✓
			Promissory note			✓
			Bond			✓
	Leasing and factoring companies	Hybrid	Leasing			✓
			Factoring			✓
Venture funding	Investment funds focused on supporting early-stage businesses, such as seed funds, and specialized banking divisions dedicated to start-ups.	Equity	Contribution to share capital	✓	✓	✓
			Purchase of a block of shares	✓	✓	✓
		Hybrid	Convertible loan	✓		
			Profit-sharing loan	✓		
			Warrant	✓		
			Mezzanine loan		✓	✓
		Debt	Venture loan		✓	✓
	Corporate accelerators, corporations	Shared	Equity contribution	✓	✓	✓
			Equity purchase	✓	✓	✓
		Hybrid	Convertible loan	✓		
			Equity loan	✓		
	Business angels	Equity	Equity contribution	✓	✓	✓
			Acquisition of shareholding	✓	✓	✓
		Hybrid	Convertible loan	✓		
			Equity loan	✓		
	Strategic investors	Equity	Equity contribution		✓	✓
			Equity purchase		✓	✓
	Private equity funds	Debt	Equity contribution			✓
			Acquisition of block of shares			✓
			Venture capital loan			✓
Alternative Financing	Crowdfunding platforms, and exchanges for Initial Coin Offerings (ICOs)	Equity	Equity contribution	✓	✓	
			Share purchase	✓	✓	
		Hybrid	Convertible loan	✓		
			Equity loan	✓		
			ICO	✓	✓	✓
			STO	✓	✓	✓
		Debt	Loan		✓	✓
Portfolio funding	Portfolio investors	Debt	Buying a block of shares			✓
			Promissory note			✓
			Bond			✓

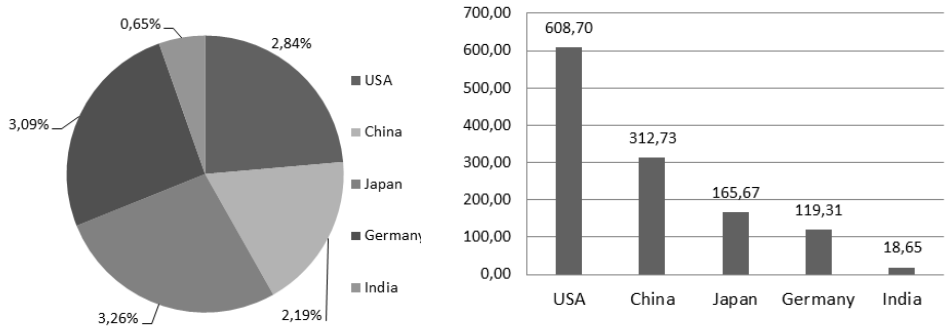
*Comment: * Start-up lifecycle stage (1-seeded, 2-early growth, 3-late growth).*

The provided classification demonstrates the established connection between funding elements, and its primary benefit lies in the flexibility to include or exclude any funding instrument.

1.4. Global trends in startup financing: A comprehensive analysis of sectors, valuation, and funding models

The examination of funding trends in the startup ecosystem involves analyzing the primary sectors and their funding amounts across different countries. For instance, according to research conducted by the Startup Genome research centre, the global startup economy (SE) witnessed a significant increase in its total valuation, reaching USD 2.8 trillion between 2016 and 2018. This indicates a growth of 21.7% from 2015 to 2017 (USD 2.3 trillion) and a 53% increase from 2014 to 2016 (USD 1.83 trillion). In 2019, the estimated value approached USD 3 trillion. However, due to the impact of the COVID-19 pandemic, the valuation dropped to USD 1.32 trillion in 2021 and had not fully recovered to pre-pandemic levels by 2022 (GFDR, 2021/2022) (Figure 2).

Figure 2. Startup financing across different countries

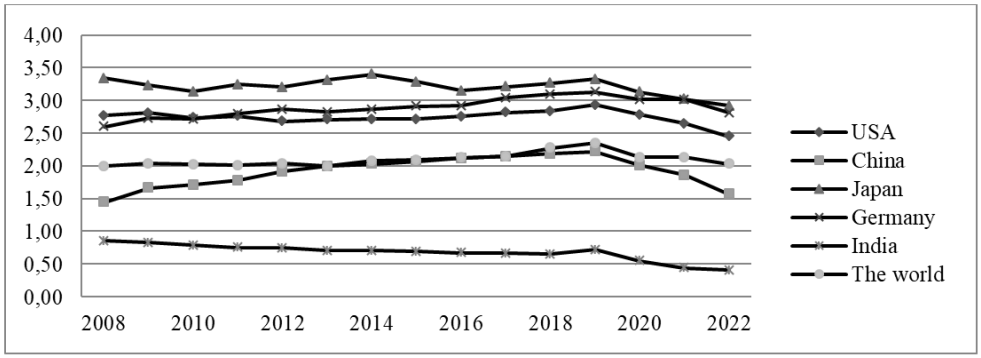


Share of GDP expenditure on R&D in 2022 *Estimated R&D expenditure in billion USD, 2022*

Source: GFDR, 2021/2022

Based on the 2022 GDP data in US dollars, the significant economic dominance of the USA is evident, followed by China, Japan, Germany, and India, reflecting the diversity of the global economic landscape. The analysis of statistical data during the period of startup proliferation reveals a significant surge in the global startup economy (SE), particularly in specific sectors, starting from 2008. In 2008, only one of the top ten largest companies globally was an innovative technology developer, namely Microsoft. However, by 2019, this number increased to seven, with Apple, Google, Microsoft, Amazon, Facebook, Alibaba, and Tencent all being recognized as major players in the industry. The proportion of GDP allocated for research and development (R&D) expenditures is depicted in Figure 3 (ITR, 2022).

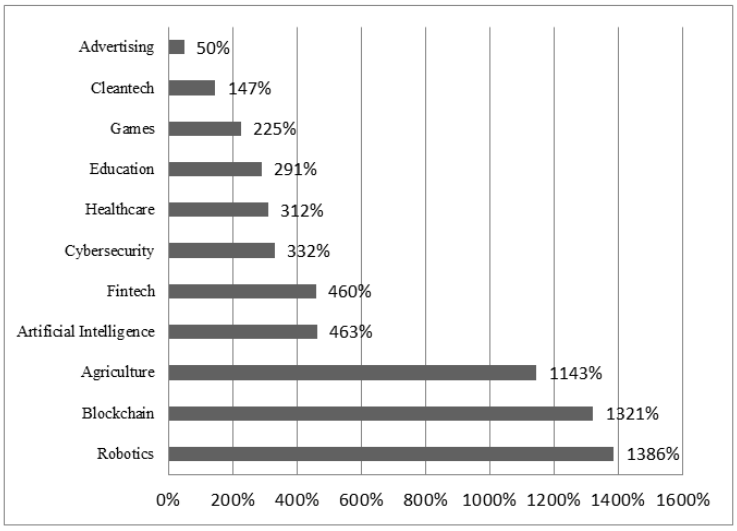
Figure 3. Proportion of GDP allocated to research and development (R&D) Expenditure (GAFMBR, 2020)



Source: ITR, 2022.

Figure 4 illustrates the progression of startup funding across various sectors from 2012 to 2022 (GSEIR, 2022).

Figure 4. Trends in Start-up Financing by Sector from 2012 to 2022



Source: ITR, 2022.

Factors leading to changes in startup financing in the current context

Examining the historical progression of startups within the financial technology sector and the broader financial industry sheds light on the shifting priorities of established traditional companies, financial institutions, and banks. While banks remain the primary source of credit for small and medium-sized enterprises (SMEs), the growth of the startup ecosystem has

brought about changes in the traditional finance sector. This shift has given rise to a plethora of new financial services and products, including peer-to-peer (P2P) and peer-to-business (P2B) lending, mobile payments, e-insurance, and others.

These innovative solutions offered by startups leverage modern digital technology and present viable alternatives to banks, with fewer barriers to obtaining funding. In 2022, the total value of alternative finance options reached $131 billion. Among these, the P2P consumer credit marketplace model emerged as the dominant alternative finance model globally, attracting $34.7 billion in investments.

The P2B consumer credit market model followed closely behind, accounting for 31% of total investment with $34.7 billion. Additionally, the P2B business lending market model attracted $15.4 billion (Table 3) (GSER, 2022). The market structure remains relatively unchanged when excluding the largest Chinese market; however, there are significant variations in volume.

Table 3. Quantities of alternative funding by model

Model of alternative funding	2020		2022	
	billion USD	market share (%)	billion USD	market share (%)
P2P consumer lending	103,1	59	34,7	31
P2P business lending	20,8	12	15,4	14
Business lending	19,8	11	28	25
Consumer lending	10,7	6	13,01	11
P2P property lending	4,6	3	3,1	3
Property lending	4	2	1,8	2
Account trading	3,7	2	3,9	3
Crowdfunding for property purchases	2,9	2	2,8	2
Equity crowdfunding	2,7	2	7	6
Equity crowdfunding	1,1	1	1,5	1
Benefit crowdfunding	0,9	0,51	1,25	1
Consumer financing	0,6	0,34	0,5	0,44
Debt securities	0,5	0,28	0,38	0,34
Microfinancing	0,2	0,1	0,15	0,13
Revenue/profit sharing	0,04	0,02	0,08	0,07
Common ownership of shares	0,02	0,01	0,02	0,02
Minibonds	0,01	0,00	0,43	0,04
Other	0,001	0,00	0,003	0,00
TOTAL	176		131	

Source: SGSE, 2022.

The study emphasizes the significance of alternative funding sources in facilitating the growth of the startup economy, particularly in the context of economic crises that have impacted the state of the startup ecosystem since 2022. To comprehend the factors influencing their development, an empirical study is necessary (Chatterji et al., 2019; Fisch, 2019). Existing literature reveals various business models, methods, and tools for funding startups. However, many entrepreneurs still tend to adhere to traditional approaches. Therefore, the research seeks to establish the necessity for new business models in financing startups in a turbulent world, aiming to identify key drivers and factors for effective economic recovery and development.

The rationale for initiating and investing in startups should be grounded in effective startup lifecycle management practices, leading to the formulation of two research hypotheses.

The first hypothesis, "The effectiveness of financing business models for refugee startups is influenced by the alignment with specific life cycle stages and needs," enables the development of a mechanism for utilizing these methods.

The second hypothesis, "Efficient startup financing and optimal industry selection for refugee startups are determined by threshold values identified through data-driven analysis," allows for identifying the threshold values of efficient startup financing and selecting the most viable industry for their operations.

3. Methodology

To confirm the *first hypothesis*, "The effectiveness of financing business models for refugee startups is influenced by the alignment with specific life cycle stages and needs", the following methodology is proposed:

Stage 1: Exploration of refugee startup characteristics:

Analyze existing refugee-founded startups in various industries and countries.

Study the factors contributing to the success or failure of refugee startups.

Identify the main needs and challenges encountered by refugees in creating and financing startups. This stage can employ observation methods.

Stage 2: Analysis of financing types:

Examine the key types of startup financing, including subsidized, traditional, venture, and alternative options.

Analyze the advantages and limitations of each financing type.

Evaluate the suitability of each financing type for the needs and goals of refugee startups. A prioritization dendrogram can be used for this stage.

Stage 3: Identification of life cycle stages:

Divide the startup life cycle into key stages, such as ideation, product development, launch, growth, and scaling.

Determine the main tasks and needs of startups at each stage.

Cluster analysis can be applied to this stage.

Stage 4: Development of selection criteria for business models:

Define a set of criteria that will help assess the suitability of each business model for refugee startups at different stages of their life cycle.

Develop an evaluation and weighting system for these criteria based on priorities and startup goals. Factor analysis can be utilized for this stage.

Stage 5: Application of the methodology:

Apply the developed methodology to individual refugee startups.

Evaluate each financing business model based on the criteria, considering the specific life cycle stages of the startup.

Analyze the results and select the most suitable financing business model for each stage.

The algorithm for developing the methodology for justifying the choice of business model for refugee startups should consider the specific research objectives and characteristics while incorporating stages for analysis, evaluation, and selection of the most appropriate business model based on the life cycle and needs of refugee startups.

To confirm the *second hypothesis*, "Efficient startup financing and optimal industry selection for refugee startups are determined by threshold values identified through data-driven analysis" to determine the threshold values of efficient startup financing and identify the most viable industry for their operations, the following methodology is proposed:

Stage 1: Data collection:

Gather information on the number of successful refugee-founded startups in various countries and industries.

Obtain data on the financing received by these startups. Statistical data collection and processing methods can be employed for this stage.

Stage 2: Assessment of financing effectiveness:

Conduct an analysis of the financing effectiveness for each startup using key indicators such as total investment volume, revenue growth, profitability, and other relevant metrics.

Evaluate the level of success and sustainability of these startups based on financial performance.

Factor analysis can be utilized for this stage.

Stage 3: Clustering of countries and industries:

Apply a clustering algorithm to group countries and industries based on the number of successful refugee startups and their financial effectiveness.

Determine threshold values for efficient financing by identifying clusters that demonstrate high productivity and stability.

Stage 4: Identification of the most viable industries:

Explore additional factors such as market trends, growth potential, competition, and innovation within each cluster.

Identify the most viable industries for refugee startups based on the analysis of financial effectiveness and development prospects.

Multiple correlation analysis can be employed for this stage.

The calculation algorithm for the second hypothesis includes data collection on successful refugee startups, assessment of financial effectiveness, clustering of countries and industries based on financial indicators, and identification of the most viable industries. This algorithm allows for the determination of threshold values for efficient financing and the selection of the most suitable industry for the activities of refugee startups.

4. Empirical Results

To confirm the first hypothesis in Stage 1, data for calculation were obtained from the following sources: Organizations and programs supporting refugee entrepreneurs, whose reports contain information on the number of startups by country and sectors: Mercy Corps (www.mercycorps.org), The Entrepreneurial Refugee Network (TERN) (http://wearetern.org), International Rescue Committee (IRC) (https://www.rescue.org/), Softr (https://www.softr.io/case-studies/skylight-ventures), United Nations High Commissioner for Refugees (UNHCR) (https://www.unhcr.org/), Centre for Entrepreneurs (CE) (https://centreforentrepreneurs.org/), Refugee Investment Network (RIN) (https://www.devex.com/), International Organization for Migration (IOM) (https://www.iom.int/), International Labour Organization (ILO) (https://www.ilo.org/). Some research organizations, academic institutions, and non-profit organizations release reports containing data on refugee startups. Information on the number of Ukrainian refugee startups by country and sector was obtained from reports by The Global Entrepreneurship Monitor (GEM), Migration Policy Institute (MPI), and other organizations (Table 4).

Data from public and government organizations indicate that the most common obstacles to successful startup development are limited access to external financing and a lack of funds to expand the team. This was indicated by 39.2% and 48.1% of the respondents, respectively. Among the surveyed startups, three-quarters are at the seed stage, and over 25% are in the early growth stage. 19.6% of these projects were initiated by a single founder. 24.7% resulted from the collaboration of three individuals, but the majority, 37.3%, were initiated by two founders. Among the surveyed business entities, the most numerous group of founders consists of eight individuals. 60% of startups operate on a B2B (business-to-business) model, creating products and services for other businesses (micro, small, medium, and large enterprises). Only 29% of the surveyed companies serve customers in the B2C (business-to-customer) segment. The majority of Ukrainian refugee startups operate in industries related to the development of new technologies and computer software. 84.2% of them rely on their own funds as one of the sources of financing, and for 39.2%, it is the only available source of funding. One-third of the enterprises (31%) have also utilized support from various funds and organizations. Another 18.4% have received funding from other government grants.

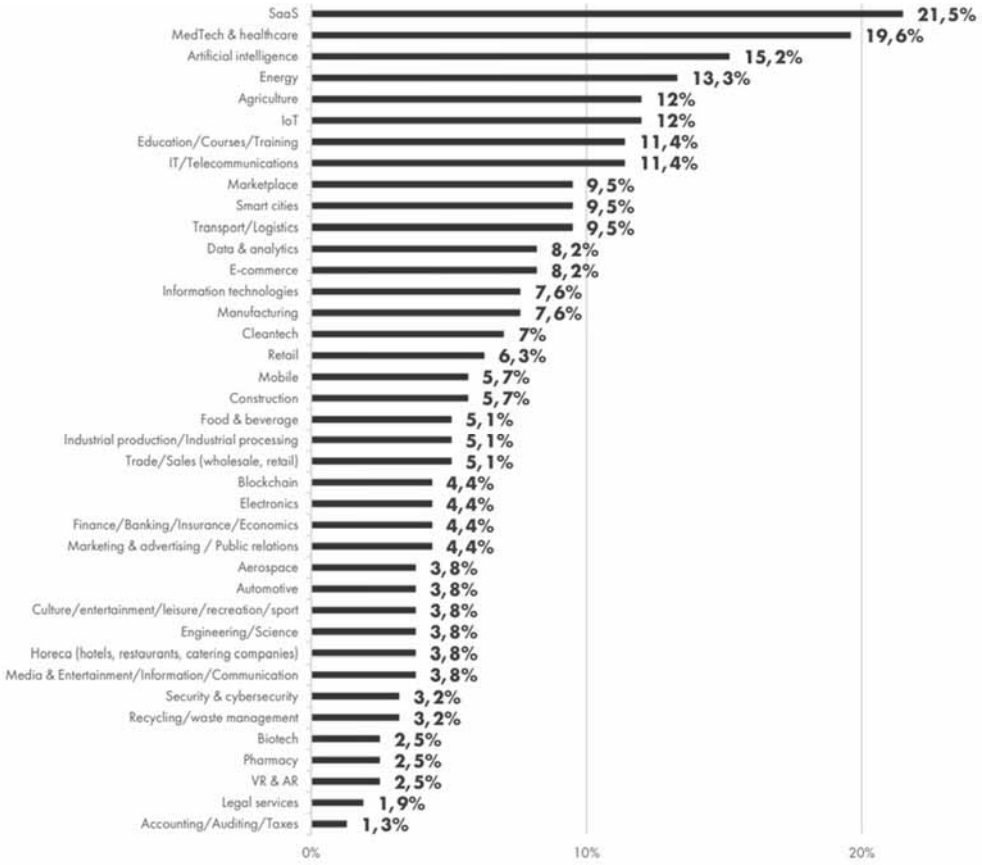
Table 4. Startups of Ukrainian refugees by types of activities and countries

Countries of location	Number of Ukrainian refugees, thousands.	Number of startups by types of activities								
		Agriculture and Food Systems	Inclusive Fintech	Service Sector	IT (Information Technology)	Cybersecurity	Construction and Infrastructure	Healthcare and Medicine	Educational Projects	Green Technologies
Poland	1577	120	200	280	220	20	17	50	57	28
Germany	1010	118	108	170	158	11	16	44	37	13
Czech Republic	502	118	109	166	152	10	25	41	25	10
Italy	173	118	107	176	151	11	34	48	50	17
Bulgaria	155,5	108	98	158	159	10	12	42	26	11
Spain	171	108	99	154	99	11	20	39	22	38
United Kingdom	147	108	97	164	99	11	28	46	28	15
Romania	123,8	89	81	134	90	11	10	41	25	10
France	118	89	82	130	90	11	21	38	23	37
Slovakia	112,7	88	79	139	98	11	29	45	27	11
Moldova	98	82	75	128	92	15	9	40	22	39
Austria	92,4	82	75	124	88	12	27	38	22	36
Netherlands	85,2	82	74	134	87	51	26	44	26	13
Switzerland	78,89	78	70	124	70	19	29	41	22	10
Lithuania	76,2	77	70	120	78	11	27	39	23	37
Ireland	72,6	79	70	132	66	12	25	44	16	13
Belgium	64,4	74	66	121	60	14	29	40	11	39
Portugal	57,1	73	66	116	68	10	27	38	12	36
Sweden	51,2	76	67	130	57	11	25	43	15	12
Finland	49,3	70	63	118	50	11	29	39	13	38
Latvia	46,9	69	62	112	48	11	27	37	12	36
Estonia	44,4	73	65	127	48	13	26	42	11	11
Norway	38,6	68	61	115	39	11	28	39	12	38
Denmark	37,7	66	60	109	39	13	28	37	11	36
Hungary	34,2	70	62	84	37	10	25	41	13	10
Greece	20,9	67	60	54	31	10	30	38	11	37
Cyprus	20,6	65	59	68	28	10	27	37	11	36
Croatia	20,5	69	62	73	19	23	18	40	12	10
Slovenia	8,7	72	27	82	16	19	16	39	8	13
Montenegro	7,9	67	17	72	16	18	15	39	11	9
Iceland	2,2	54	11	42	17	21	17	39	9	11
Malta	1,5	50	8	55	15	18	14	18	21	17
Serbia and Kosovo	1,2	45	9	37	19	17	14	17	20	17
Liechtenstein	0,54	42	7	38	16	19	15	44	47	13

Source: TERN, IRC, Softr, UNHCR, CE, RIN, IOM, ILO, GEM, MPI.

The industries in which Ukrainian refugee startups are represented are illustrated in Figure 5.

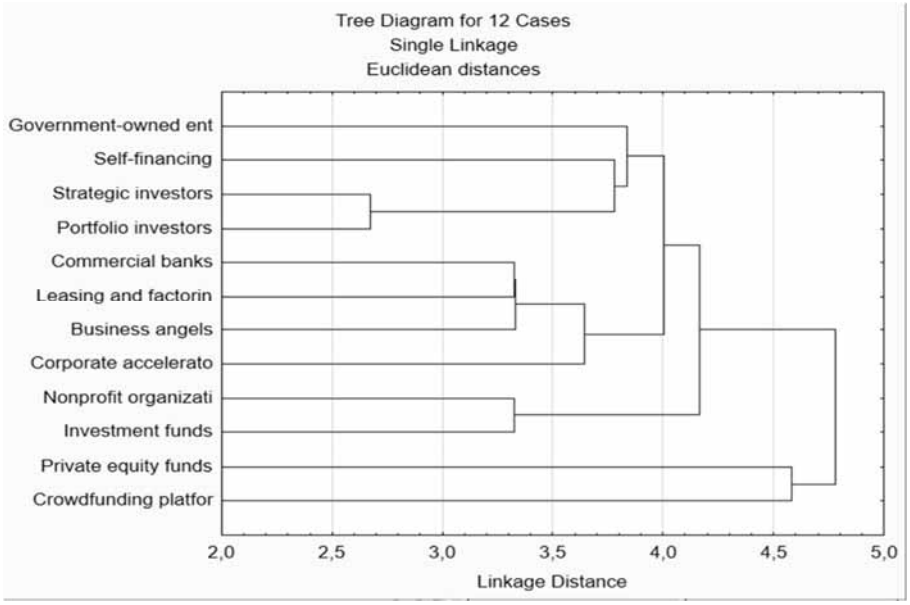
Figure 5: Percentage distribution of Ukrainian refugee startups by industries and types of activities



Source: GEM, MPI.

The analysis conducted in Stage 2 examined the main types of funding for startups, including subsidized, traditional, venture, and alternative financing. The results of the analysis are presented in Figure 6 in the form of a dendrogram.

Figure 6. Analysis of funding sources for startups



Source: compiled by the authors.

Advantages and limitations of each type of financing for Ukrainian refugee startups:

Business Angels:

Advantages: Business angels can provide not only financial support but also their knowledge, experience, and connections, which can be valuable for startups. They are typically willing to invest in the early stages of development when other sources of funding may be unavailable.

Limitations: Business angels may have limited resources and capabilities, so the amount of funding they can provide may be limited. Additionally, reliance on a single investor can create risks, especially if the business angel decides to exit the project.

Direct Investment Funds:

Advantages: Direct investment funds can provide significant amounts of funding, supporting the growth of startups at more advanced stages. They may also possess expertise and resources to aid in business growth and scalability.

Limitations: Competition for funding from direct investment funds can be high, and not all startups may attract their attention. Funds may also require significant equity stakes or controlling rights, which can limit the autonomy of entrepreneurs.

Crowdfunding, Crowdinvesting, Crowdlending platforms, and ICO exchanges:

Advantages: Crowdfunding and crowd-investing platforms offer the opportunity to obtain financing from a wide audience of people, which can help startups attract not only money but also popularity and community support. ICO exchanges provide a means to raise funds through token or cryptocurrency issuance.

Limitations: Crowdfunding and crowd-investing require active marketing campaigns and the ability to capture public attention. ICO exchanges may be subject to regulation and entail certain legal and financial risks.

According to the dendrogram, the most impactful types of financing are business angels, followed by direct investment funds, crowd-funding, crowd-investing and crowd-lending platforms, including ICO exchanges. These financing sources have their own advantages and limitations, and entrepreneurs should consider them when choosing the optimal funding path for their startups.

The analysis revealed that 84.2% of the surveyed enterprises rely on their own funds as one of the sources of financing, and for 39.2%, it is the only available source of funding. One-third of the startups (31%) have also utilized support from various startup funds. Additionally, 18.4% have received funding from government and private grants. It is worth noting that over half of the startups are not generating any revenue yet. This makes them highly dependent on external financing and vulnerable to obstacles in their development. This could result in falling behind the competition and the need to deviate from strategic goals in favour of short-term profitability. Barriers and expected forms of support for startups include limited access to external funding (39.2%), difficulties in finding customers (18.4%) and business partners (15.8%), as well as excessive bureaucracy (19%). These external challenges are indicated by founders as having a significant impact on the development of their projects. On the other hand, just over 48% of the respondents identified the lack of funds for expanding the team as the most significant internal obstacle to their development. Difficulties in financing the development of already employed workers rank second (25.9%). Practical forms of development are considered the most valuable: a practical approach to training based on the analysis of real examples from existing companies and their management decisions (39.9%), coaching (33.5%), and business simulations (30.4%). Forms of a more academic nature, such as lectures, theoretical training, and conferences, are perceived as less useful by founders. Expected forms of support also include activities that contribute to the implementation of enterprises' plans to enter external markets.

The criteria for selecting a business model for refugee startups at each stage of the lifecycle have been determined. A comprehensive evaluation system has been developed, weighing the criteria according to the startup's priorities and goals.

The following criteria have been considered:

1. Market fit: The extent to which the business model aligns with the needs and requirements of the target audience and market. The market potential and competitive advantages of the model have been researched.
2. Financial sustainability: Potential revenue sources, monetization opportunities, and funding requirements at each stage of the startup's development have been examined. The business model's ability to ensure financial stability and growth has been assessed.

3. Resilience and adaptability: The business model's ability to withstand changes in the external environment, including economic, political, and social factors, has been evaluated. The model's adaptability to new conditions and trends has been considered.
4. Uniqueness and competitive advantages: The business model's unique value proposition, differentiation from competitors, and competitive advantages that will attract customers have been assessed.
5. Resource efficiency: The availability and efficient utilization of necessary resources, including finances, technology, human capital, and networks, have been examined. The business model's optimal resource allocation has been evaluated.
6. Growth and scalability potential: The business model's potential for growth and scaling at national and international levels has been explored. Opportunities for expansion and market share increase have been assessed.
7. Social and environmental value: The business model's consideration of social and environmental aspects, such as job creation, support for sustainable development, and addressing social issues, has been taken into account.

The evaluation and weighting system for these criteria has been developed in line with the startup's priorities and goals. The most significant criteria for the project have been identified and applied to assess and compare different business models.

Based on these criteria, two models were constructed using factor analysis, corresponding to the first two stages of the lifecycle: 1 - Seed Stage, and 2 - Early Growth Stage (Table 5).

Table 5. Results of factor analysis in constructing business models for Ukrainian refugee startups (STATISTICA 10 listing)

Variable	Factor Loadings (Unrotated) (data) Extraction: Principal components (Marked loadings are >,700000)	
	1 - Seed Stage	2 - Early Growth Stage
Market fit (MF)	-0,297093	***0,979545***
Financial sustainability (FS)	***0,995299***	0,097449
Resilience and adaptability (RA)	***0,808188***	0,322435
Uniqueness and competitive advantages (UCA)	-0,291799	***0,704990***
Resource efficiency (RE)	***0,858041***	0,137791
Growth and scalability potential (GSP)	-0,291575	***0,969519***
Social and environmental value (SEV)	-0,391173	***0,907704***
Expl.Var	6,027448	3,027447
Prp.Totl	0,317485	0,217474

Source: Calculated by the authors.

The results of the factor analysis are interpreted as follows: indicators highlighted in red have an impact on the process, while those in black do not. The Prp.Totl indicator shows the amount of variance explained by each factor (model).

As a result, two models were obtained.

The first business model describes a startup at the Seed Stage of the lifecycle and accounts for 31.75% of the variance:

$$1\ Stage = {}^{1}/_{6,027} \times (0{,}995 \cdot \mathrm{FS} + 0{,}808 \cdot \mathrm{RA} + 0{,}858 \cdot \mathrm{RE}) \quad (1)$$

The second business model pertains to a startup at the Early Growth stage of the lifecycle and explains 21.75% of the variance:

$$2\ Stage = {}^{1}/_{3,027} \times (0{,}979 \cdot \mathrm{MF} + 0{,}704 \cdot \mathrm{UCA} + 0{,}969 \cdot \mathrm{GSP} + 0{,}907 \cdot \mathrm{SEV}) \quad (2)$$

To assess each financing business model according to the criteria, taking into account the stages of the startup's lifecycle, we can analyze the factor loadings in the provided table. The variable factor loadings indicate the strength of the relationship between each criterion and the respective business model.

Based on the factor loadings, we can determine the suitability of each business model for the corresponding stage:

Seed Stage:

Financial sustainability (FS), Resilience and adaptability (RA), and Resource efficiency (RE) have significant loadings, indicating their strong influence on this stage.

Market fit (MF), Uniqueness and competitive advantages (UCA), and Social and environmental value (SEV) have relatively lower loadings but still contribute to the model.

Growth and scalability potential (GSP) has a non-significant loading in this stage.

Early Growth Stage:

Market fit (MF), Uniqueness and competitive advantages (UCA), Growth and scalability potential (GSP), and Social and environmental value (SEV) have significant loadings, indicating their strong influence on this stage.

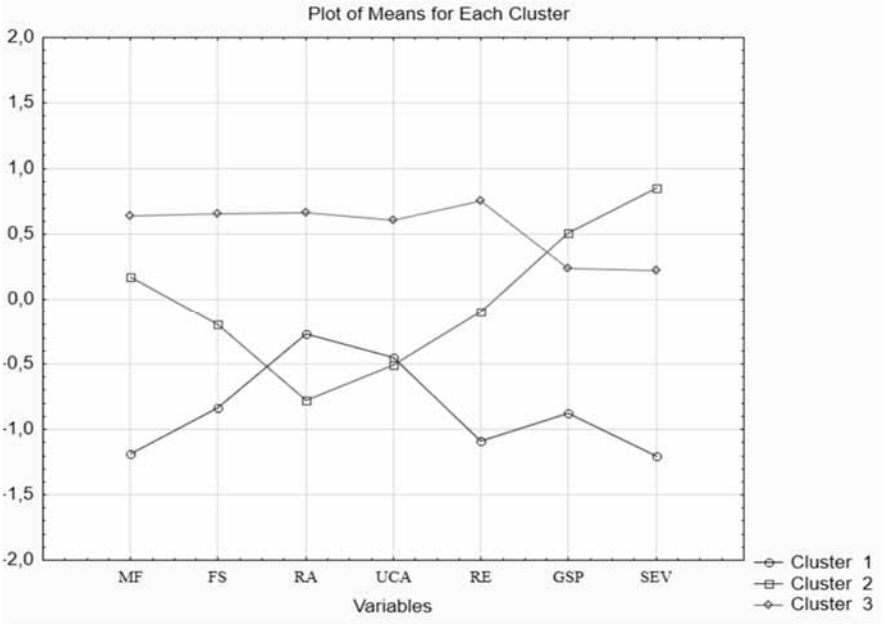
Financial sustainability (FS), Resilience and adaptability (RA), and Resource efficiency (RE) have relatively lower loadings but still contribute to the model.

By examining the factor loadings, we can conclude that for the Seed Stage, the business model with a focus on financial sustainability, resilience and adaptability, and resource efficiency (Equation 1) seems more suitable. For the Early Growth Stage, the business model emphasizing market fit, uniqueness and competitive advantages, growth and scalability potential, and social and environmental value (Equation 2) appears to be more appropriate.

It is important to note that the selection of the most suitable business model for each stage should be based on a comprehensive analysis that considers the specific characteristics and goals of the research. The algorithm for developing the methodology for justifying the choice of business models for refugee startups should encompass stages of analysis, evaluation, and selection of the most suitable business model, aligned with the startup's lifecycle and needs.

To confirm the second hypothesis, "The need for clustering countries and industries based on the number of successful refugee startups" in order to determine threshold values for effective startup financing and select the most viable industry for their operations, a cluster analysis was conducted. The analysis aimed to group countries and industries based on the number of successful startups and their financial performance (Figure 7).

Figure 7. Results of cluster analysis for country positioning of refugee startups

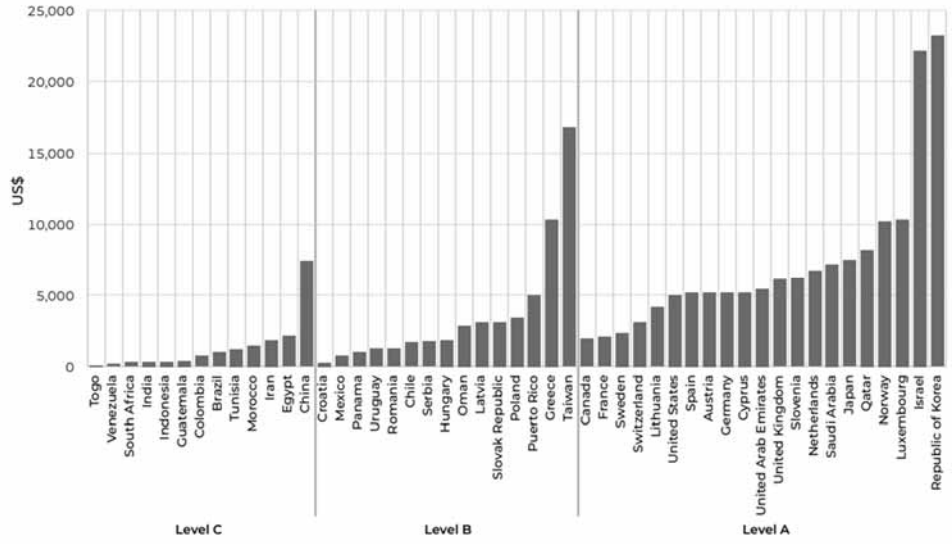


Source: Calculated by the authors.

The composition of the resulting three clusters is presented in Figures 8, 9.

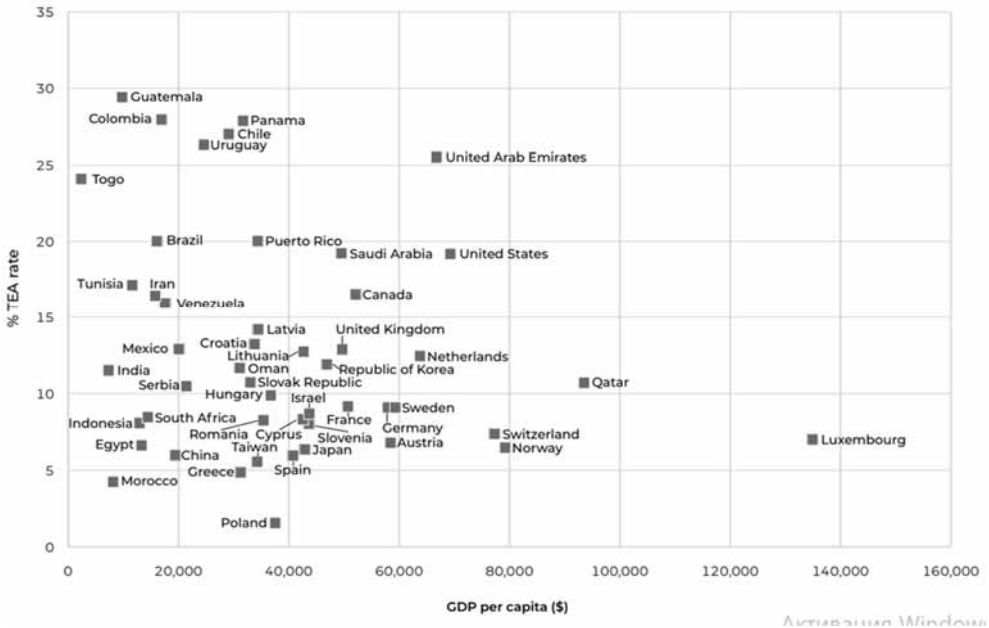
By identifying clusters that demonstrate high performance and stability based on the median investment amount ($US) in new businesses, threshold values for effective financing can be determined.

Figure 8. Median investment amount ($US) among investors in new business



Source: GEM Adult Population Survey 2022

Figure 9. Relationship between total early-stage entrepreneurial activity and GDP per capita



Sources: GEM Adult Population Survey 2022 and https://data. worldbank.org

Figure 7: The cluster analysis revealed distinct groups based on the number of successful refugee startups and their financial efficiency. This analysis helps in identifying clusters that demonstrate high performance and stability, aiding in the determination of threshold values for effective startup financing.

Figure 8: The clustering of countries and industries based on the number of successful startup ventures provides valuable insights into the positioning of refugee startups. The composition of the clusters indicates different levels of entrepreneurial activity and financial performance, which can guide decision-making regarding industry selection and investment opportunities.

Figure 9: The relationship depicted between the levels of total early-stage entrepreneurial activity and GDP per capita highlights the potential correlation between entrepreneurial activity and economic development. Higher levels of entrepreneurial activity in a country could contribute to economic growth and prosperity.

These findings underscore the importance of considering clustering and economic indicators in supporting and fostering the success of refugee startups. The analysis provides valuable insights for policymakers, investors, and stakeholders in designing effective strategies and allocating resources to promote entrepreneurial initiatives and economic development.

The article discusses the advantages and limitations of different types of financing options for Ukrainian refugee startups. One of the financing options discussed is business angels. Business angels can provide not only financial support but also valuable knowledge, experience, and connections to startups, especially in the early stages when other funding sources may be unavailable. However, the limitations of relying on business angels include limited resources and funding availability, as well as the risk of relying on a single investor who may exit the project Betts and Collier (2017).

Another financing option mentioned is direct investment funds. These funds can provide significant funding for startups in more advanced stages of growth. They may also offer expertise and resources to support business growth and scalability. However, competition for funding from these funds can be high, and they may require significant equity stakes or controlling rights, limiting the autonomy of entrepreneurs Calabrese and Osmetti (2013).

Crowd-funding, crowd-investing, crowd-lending platforms, and ICO exchanges are also discussed as financing options Agrawal et al. (2014). These platforms allow startups to obtain financing from a wide audience, which can help attract not only funds but also popularity and community support. ICO exchanges provide a means to raise funds through token or cryptocurrency issuance. However, these crowdfunding and crowd-investing platforms require active marketing campaigns and the ability to capture public attention, while ICO exchanges may be subject to regulation and involve legal and financial risks.

The article highlights that Ukrainian refugee startups face challenges in accessing external funding, finding customers and business partners, and dealing with excessive bureaucracy. The lack of funds for expanding the team is identified as a significant internal obstacle to their development. The startups express a need for practical forms of support, such as practical training, coaching, and business simulations, rather than more academic approaches like lectures and theoretical training Callo and Grote (2019).

To determine the most suitable business models for Ukrainian refugee startups at different stages of their lifecycle, a comprehensive evaluation system based on several criteria is developed. The criteria include market fit, financial sustainability, resilience and adaptability, uniqueness and competitive advantages, resource efficiency, growth and scalability potential, and social and environmental value. Two business models are constructed based on factor analysis, one for the Seed Stage and another for the Early Growth Stage. Each model emphasizes different criteria based on their factor loadings Carrigan (2020).

The article also discusses the clustering of countries and industries based on the number of successful refugee startups and their financial performance. Cluster analysis helps identify high-performing and stable clusters, enabling the determination of threshold values for effective financing. The relationship between total early-stage entrepreneurial activity and GDP per capita is examined to understand the potential correlation between entrepreneurial activity and economic development Chesbrough et al. (2006).

Overall, the article provides valuable insights into the advantages and limitations of different financing options for Ukrainian refugee startups. It emphasizes the importance of considering specific criteria and stages of the startup's lifecycle when selecting the most suitable business models and the need to analyze clustering and economic indicators to support the success of refugee startups and promote economic development.

5. Concluding Remarks

Assessing the financing landscape for Ukrainian refugee startups, this study investigates the validity of its hypotheses within the scope of “The Impact of Refugee Startups on Host Country Economies: Business Models and Economic Adaptation”. The research underscores the significant role of business angels in providing expertise and connections to Ukrainian refugee startups but highlights associated risks due to overreliance on a single investor and limited resources. While direct investment funds offer substantial funding, potential drawbacks include limitations on autonomy and heightened competition.

Exploring diverse financing avenues such as crowd-funding, crowd-investing, crowd-lending, and ICO exchanges, the study acknowledges their potential benefits but emphasizes the importance of meticulous attention to marketing and regulatory compliance. The article emphasizes the essential role of external financing for startups while cautioning against potential vulnerabilities and deviations from long-term goals.

The proposed evaluation system in the article proves valuable for selecting suitable business models based on diverse criteria, taking into account the varying importance of these criteria across different stages of a startup's lifecycle.

Furthermore, the study delves into the clustering of countries and industries based on successful refugee startups. The cluster analysis identifies high-performing clusters, providing strategic insights to guide investment decisions.

In conclusion, the article enriches our understanding of financing options for Ukrainian refugee startups, offering practical guidance on business model selection and considerations

related to clustering and economic indicators. Suggested avenues for future research encompass a long-term impact assessment, comparative analysis, policy examination, investor engagement, impact investing, mentoring programs, capacity-building initiatives, and cross-sector collaboration.

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