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This research has investigated the retrospective trends in financing startups in Ukraine corresponding to the socio-demographic characteristics of startuppers (founders). Studying the dependences between the amount of funding and the qualitative characteristics of startuppers has made it possible to determine the socio-demographic predictors of making a positive decision regarding the financing of startups.

As the current study has shown, in order to receive an investment, a startupper must meet the investor's expectations regarding reliability, qualifications, experience, and potential prospects. The investor analyzes not only the business idea of the startup but also the potential recipient for compliance with a series of socio-demographic predictors such as gender, age, level, and specialization of education. It has been proven that the largest amount of funding for startups in Ukraine is received by male funders, aged 35 to 45, who have a higher technical education. Startup investors consider such startuppers a priority for their investments since they see the least risks and a high probability of successful deployment of invested funds.

The identified investors' preferences when choosing startup founders can be extrapolated to the startup environment of any country, however, they may change over time, depending on the specificity of the situation in the investment country.

To rationally solve problems in the financial subsystem of startup management, it is necessary to preliminary determine the socio-demographic predictors of priority investment of startups of the respective country and area of activity. The practical tools for determining such predictors have been tested during this study.

The practical significance of the research is due to the growing pace of development of startup technologies, the need to improve the effectiveness of the startup management financial subsystem, and increase the efficiency of the startup support infrastructure

Keywords: startup, startupper, startup management, financial support to startup management, priority startup investment, socio-demographic predictors

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DEFINING THE SOCIO-DEMOGRAPHIC PREDICTORS OF PRIORITY INVESTMENT IN THE CONTEXT OF TASKS FOR THE FINANCIAL SUBSYSTEM OF STARTUP-MANAGEMENT

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1. Introduction

The formation of an innovative model of development, the use of the intellectual potential of the nation, especially its younger generation, causes the need to obtain external investment resources to build a new economic structure and integrate it into the world economic community. The issues related to startups and the formation of a startup environ-

ment for their successful development become one of the priorities at the national level of any country in the world. This should be facilitated by a series of empirical studies aimed at understanding the phenomenon of a modern startupper and creating conditions for his/her entrepreneurial success.

The scientific community of developed countries of the world where the processes of active emergence and development of startups began significantly earlier has in recent years conducted a series of deep empirical studies aimed at studying the phenomenon of a startup, the formation of its socio-demographic portrait. The reported results were used to form the state and regional policies, to prioritize the development of the startup environment.

Given the spread of the startup movement in developing countries, it is necessary to form a scientific basis for managing the formation and development of startups (startup management). Such studies should determine the prerequisites for improving the success of startups by increasing the likelihood of obtaining the necessary funding for their launch and development.

One of the relevant scientific tasks that form financial prerequisites for the implementation of other components of startup management is to study retrospective trends in obtaining funding for startups and to identify factors that positively affect these processes, in particular, the socio-demographic characteristics of startup founders. This is a prerequisite for increasing the effectiveness of startup training efforts, in particular by startup support ecosystem institutions.

2. Literature review and problem statement

The expediency and importance of organizing monitoring of startup market development processes are perceived by many international institutions and consulting structures. Thus, EY Startup GSA specialists systematically (usually twice a year) conduct relevant research in the context of EU countries [1], as well as in-depth in Germany [2]. Their reviews cover information on the number of startups that received funding, their place of registration, the amount of financing of startups in terms of their specialization and stage of development, as well as leading venture investors (the number of supported startups and the amount of funding). However, the socio-demographic characteristics of startuppers who managed to get funding remain unattended, which significantly reduces the user value of these reviews to adjust the tasks and tools of the startup management financial subsystem both at the level of individual startups and startup market infrastructure institutions as a whole.

A much wider range of issues and information is contained in separate national studies, including [3]. Along with the information that has already been listed above, a separate section of this annual (since 2014) report addresses the socio-demographic portrait of a tech startupper, his/her age, gender, education, and entrepreneurial experience. However, it should be noted that a given study is based on a survey of startuppers, that is, the formed "portrait" characterizes the founders of all startups who became participants in the survey, regardless of whether they received funding or not. Therefore, there is no answer to the question of what socio-demographic features of startup founders are positively perceived by venture investors and increase the chances of obtaining financing.

It is noted in [4] that the presence of previous experience in the entrepreneurial activity for a startupper makes it possible to start implementing a business idea more actively and reach break-even points faster. However, the degree of criticality of this characteristic has not been determined and quantified.

In [5], based on a study of the world's 20 most successful startup systems, it is declared that the key to success is precisely the high level of women's representation among startuppers. As a result, it was concluded that individual countries do not realize their potential, which is due to the underestimation of the opportunities to intensify women's start-ups, which is advisable to take into consideration when developing national assistance programs. However, quantitative data on the critical or recommended level of women-startuppers among all initiated startups or other convincing evidence of an increase in the likelihood of getting funding by start-ups-startuppers are not given.

The authors of [6] proved the importance, for the start-up's success in obtaining venture funding, of such a factor as the founder's social capital, its popularization in social networks. It has been proven that the social connectivity of founders (their activity in the LinkedIn social network) is the best predictor of raising funds for the development of a startup. Study [8] noted a positive impact on sales growth and financing of a start-up by the social activity of startuppers, their presence on Twitter and social networks. The question remains unclear what exactly should be popularized in social networks – the identity of the startupper, his/her moral or business qualities, or the business idea that is the basis of the initiated startup.

In [7], it has been proven that serial entrepreneurs who already have experience in launching startups receive better conditions and greater funding than founders who do not have such experience. That is, the position of investors does not depend on the amount of funding and the success of the previous startup. The cited study proves the importance of startuppers' participation in any programs in order to gain experience and popularity but does not determine how critical it is to obtain financial support by having the status of a "serial entrepreneur" or by a person without this status, and with what probability to expect a positive perception by venture investors of the idea of their startups.

Thus, the lack of objectively defined socio-demographic predictors poses a problem for startuppers and institutions to support them, making it difficult to achieve the goals of the startup management financial subsystem.

3. The aim and objectives of the study

The purpose of this study is to empirically define a group of socio-demographic predictors, which are indicators of priority investment of startups and tools for improving the financial support of startup management. This would make it possible to devise recommendations for improving the training of a startup team and choosing a startup leader, taking into consideration the results obtained, which would increase the likelihood and amount of funding for startups.

To accomplish the aim, the following tasks have been set:

– to give our original interpretation of the definitions "the recipient environment of the startup investment field" and "investment donor";

– to analyze the existing trends in startup financing;

– to develop hypotheses about socio-demographic predictors of priority investment;

– to check the formed hypotheses about the factors that influence the financing from investment donors;

– to formulate proposals for improving the financial support of startup management and the format of a startup team, taking into consideration the results obtained.

4. Materials and methods to study the socio-demographic predictors of priority investment of startups

The information base of the current research is a wide range of literary scientific sources [1–8], as well as confirmed information on startups in Ukraine, which received funding, collected and published by Dealroom.co [9]. The latter is a global data platform about startups and their investors, as well as trends in the development of startups.

To conduct an empirical study, we formed samplings from the global database on the volume and number of funding rounds, depending on the stage of development of startups and the socio-demographic characteristics (portrait) of startup founders (hereinafter – startuppers).

To study the dynamics of startup financing, a dynamic analysis of the amount of funding received in general and in terms of the stages of startup development was carried out. In order to analyze the size of one round of financing, structural analysis and calculation of the weighted average size of one round were applied. Verification of hypotheses about the factors influencing the receipt of funding was carried out using single-factor analysis of variance employing the IBM SPSS Statistics software [10].

5. Results of studying the socio-demographic predictors of priority investment in the context of the tasks of the startup management financial subsystem

5. 1. Interpretation of definitions "startup management", "financial subsystem of startup management", "recipient environment of startup investment field", and "investment donor"

Startup management means a set of principles, methods, means, and forms of startup management that are implemented in the early stages of its life cycle, provide the necessary resources, skills, experience, and knowledge of all interested parties, make it possible to reasonably make and implement management decisions necessary to achieve the goals of creating and developing a startup.

One of the goals of startup management is to optimize startup funding sources and ensure the attraction of the necessary amount of financial resources. This goal has the highest priority since its achievement provides a financial basis for the implementation of other goals and objectives, providing the startup with the necessary amount of financial resources and investor support.

The financial subsystem (component) of startup management is responsible for achieving this goal, aimed at finding traditional and unconventional sources of financial resources necessary for product development, testing, and market entry; attracting a venture investor of a startup project, developing a viable and investor-attractive startup financial model.

We propose the definitions of "recipient environment of the startup investment field" and "investment donor" to enrich the terminology dictionary of management specialists and scientists investigating the startup management financial subsystem and to simplify the perception of the research results.

In the context of the management model of startups, the "recipient environment of the startup investment field" should be understood as a set of "entry points" of investment "injections" into the "body" of the startup. In practice, these include the business materials – a plan for the required volumes of investment investments, mechanisms for their development and payback period, and information on the persons responsible for the financial discipline of the startup.

"Investment donor" is a player in the financial services market who receives income from investment investments in startup projects.

In the financial subsystem of startup management, the "investment donor" is represented as an "external investment block", which covers all sources of a potential investment. Management decisions regarding the investment of a startup project are made by the owners of funds or heads of institutions – investment donors.

5. 2. The analysis of existing startup financing trends

Table 1 gives the total amount of funding received by startups (EUR million) and the number of funding rounds, including in the range of one funding round for 2014–2020. The total funding of startups of Ukrainian origin in the period from 2014 to 2019 systematically increased and grew from EUR 69.2 million (2014) to EUR 544 million (2019). The growth rate of total funding during this period was not steady; the largest growth rates were demonstrated in 2016 and 2018, respectively, 227.6 %, and 220.1 % year on year. Over 5 years (2014–2019), the amount of funding increased by 7.86 times. This positive trend was cut off due to the coronavirus pandemic (which is characteristic of the entire world economy). However, even under these conditions, Ukrainian startups received EUR 162 mi llion in the first half of 2020 for their development, although this amounts to only 19 % of funding in 2019 and 33 % in 2014.

Table 1

Dynamics of the total amount of funding received by Ukrainian startups and the number of funding rounds

Indicator	2014	2015	2016	2017	2018	2019	2020*
The total amount of funding received by startups, EUR million	69.2	61.5	140	194	427	544	162
Number of funding rounds, including one funding round	64	60	92	60	85	113	21
EUR 0–1 million	51	50	77	47	66	93	13
EUR 1–4 million	10	7	10	5	8	11	2
EUR 4–15 million	1	1	1	5	6	2	4
EUR 15–40 million	2	2	4	2	2	3	1
EUR 40–100 million	0	0	0	1	2	3	0
EUR 100–250 million	0	0	0	0	1	1	1
exceeding EUR 250 million	0	0	0	0	0	0	0

*Note: *– the first half of the* year. *Calculated by authors based on data [9]*

The analysis of the number of funding rounds depending on the size shows that during the entire period the largest number of rounds is small in volume – up to EUR 1 million. The share of this amount of funding in one round was 80 % in 2014, 82 % in 2019.

This approach is explained by the understandable desire of venture investors to provide investment resources to as many startups as possible, to give them financial sources for testing and scaling their entrepreneurial idea. This is carried out in the hope of finding a "unicorn", that is, a company that would be valued at more than USD 1 billion in the future and could provide super profits to its investors.

Under conditions of a significant reduction in funding in 2020, the situation changed significantly. The share of the number of rounds of small (up to EUR 1 million) funding decreased to 65 %. This trend was observed at all rounds of financing.

Despite the COVID-19 pandemic, 13 Ukrainian startups received EUR 2.3 million in the first half of 2020 as financing from venture investors. That allowed them to prevent a liquidity crisis and slow down the process of developing new products and services in the face of a significant decrease in consumer activity and buyer demand during the pandemic. Another 2 startups received up to EUR 4 million (10 % of the total number of funding rounds from EUR 4 to 15 million).

The number and share of rounds with more funding are significantly lower but have a steady tendency to increase. This indicates that startups are increasingly appearing in Ukraine, the potential of the "efficiency-risk" ratio of which is estimated by investors as very high. Interest in scaling up their entrepreneurial ideas causes them to provide a very significant amount of funding by the standards of the Ukrainian market. Thus, in 2018 2020, one Ukrainian startup received more than EUR 100 million annually in financing; on average, annually, two startups were provided with more than EUR 40 million. The share of rounds with this amount of funding is very small – 3 %, 4 %, and 5 %, respectively, in 2018, 2019, and 2020.

The result of structural shifts were different trends in the change in funding volumes in one round. There is a systematic and significant (more than 6 times) increase in the weighted average amount of funding calculated on the basis of normal distribution within the specified intervals of funds provision per one round (Table 2).

Table 2

Dynamics of financing of Ukrainian startups in one round and the weighted average volume of one round of financing

Indicator	2014	2015	2016	2017	2018	2019	2020*
Amount of funding in one round:							
EUR 0–1 million	0.1	0.2	0.2	0.1	0.1	0.1	0.2
EUR 1–4 million	2.1	1.7	1.8	1.5	1.9	1.9	1.8
EUR 4–15 million	6.4	4.5	5.7	6.8	5.8	7.0	6.9
EUR 15–40 million	18.2	16.6	25.0	22.8	22.8	21.8	29.1
EUR 40–00 million	–	–	–	100.0	82.0	63.7	–
EUR 100–250 million	–	–	–	–	159.0	244.0	100.0
The weighted average amount of one round of funding, EUR million	1.8	1.8	2.0	3.5	5.6	5.0	12.0

*Note: *– the first half of the year. Calculated by authors based on data from [9]*

The average amount of funding for a startup in the range of up to EUR 1 million is relatively small and ranges from EUR 100 to 200 thousand. The volume of financing in the range of up to EUR 4 million is systematically reduced (down to EUR 1.5–1.9 million). The average amount of financing in the range of EUR 4–15 and 15–40 million is growing steadily (EUR 6.9 million and EUR 29.1 million, respectively). There are single cases of providing financing in larger amounts (above EUR 40 million), while the amount of funding provided to one startup in these intervals is reduced.

The frequency and amount of funding depend significantly on the stage of development of startups, which is clearly confirmed by the data given in Tables 3, 4.

Table 3

Dynamics of start-up financing, depending on the stage of development, EUR million

Stage of startup development	Number of funding rounds	2014	2015	2016	2017	2018	2019	2020*
Stage of the idea	280	4.4	3.6	10.8	2.1	7.4	11.8	0.9
Early stage	187	12.2	24.4	18.5	17	18.2	16.8	1.8
Late stage	151	52.6	33.5	111	175	402	516	127
Maturity Stage	5	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Together	623	69.2	61.5	140.3	194.1	427.6	544.6	129.735

*Note: *– the first half of the year. Calculated by authors based on data from [9]*

Table 4

Start-up financing structure depending on development stage, %

Stage of startup development	Share in the total number of rounds, %	2014	2015	2016	2017	2018	2019	2020*
Stage of the idea	44.94	6.36	5.85	7.70	1.08	1.73	2.17	0.72
Early stage	30.02	17.63	39.67	13.19	8.76	4.26	3.08	1.39
Late stage	24.24	76.01	54.47	79.12	90.16	94.01	94.75	97.89
Maturity	0.80	n/a	n/a	n/a	n/a	n/a	n/a	n/a

*Note: *– the first half of the year. Calculated by authors based on data from [9]*

Significantly larger (55–80 %) in 2014–2016, and the prevailing (more than 90 % with a growth trend), amount of funding is received by startups that are at a late stage of development. This is logical and understandable from the position of investors. These startups have a product that is perceived by the consumer, establish uninterrupted production and sale of the product, and scale the business. The amount of financing of startups at this stage increased almost 10 times during the study period and reached more than half a billion euros.

The amount of funding for start-ups at an "idea" stage that has only a business plan for their entrepreneurial idea, a prototype, or the first version of a minimum viable product (minimum viable product, MVP), test the business model, increased from EUR 4.4 to 11.8 million. Despite this, the share of such startups in the total funding volume decreased from 6.36 % to 2.17 % in 2019, and to 0.72 % in the first half of 2020.

About a third of all funding rounds (187 cases) are in the early stages. As one knows, at this stage the materialization of the business idea is carried out, the necessary material and technological base and resource support of activities are formed, the staff is found, production is being established, distribution and sales channels for the startup product are formed.

Early-stage startup financing increased almost twice in 2015 compared to 2014 (EUR 24.4 million and EUR 12.2 million, respectively). In the years that followed, there was a tendency to shrink. In 2019, they amounted to EUR 16.8 million, or 3 % of the total funding of startups of all stages.

Comparing the share of startups at each stage in the number of funding rounds and funding volumes clearly proves a significantly more amount of funding at a late stage of development. This is quite balanced and understandable from the point of view of investors, taking into consideration the risks of financing. At a later stage, they are significantly lower.

Our analysis of the amount of funding per one round has revealed the following. At the stage of an idea origin, prevailing (more than 95 % of all cases) are the rounds up to EUR 1 million in financing but their number increased from 26 to 65 cases per year. Every year, 15–20 late-stage startups find funding but the amount of their funding varies significantly and is presented in almost all selected funding intervals. Thus, in 2019, 19 startups received funding, of which 6 – up to EUR 1 million, 3 – up to EUR 4 million, 1 – up to EUR 15 million, 3 – up to EUR 40 and up to EUR 100 million, 10 – more than EUR 100 million. That is, the amount of funding is determined more individually, taking into consideration the essence of the business idea, the stage of its implementation, the previously received funding, development tasks, and other factors.

The identified trends were confirmed by the calculation of the weighted average amount of funding in one round. According to the data in Table 5, the amount of funding at the idea stage is relatively stable and minimal in terms of volume (EUR 500–600 thousand). Early-stage startups receive funding in slightly larger volumes in one round compared to the sowing stage, from EUR 1.0 to 1.6 million. At the late stage of development, the average amount of funding in one round is significantly larger and has a steady tendency to increase (EUR 5.2 million in 2014, EUR 29.7 million in 2019, and EUR 42.6 million in 2020).

Table 5

The weighted average amount of funding in one round, depending on the stage of development of the startup, Euro million

Stage of startup development	2014	2015	2016	2017	2018	2019	2020*
Stage of the idea	0.6	0.6	0.7	0.5	0.6	0.6	0.5
Early stage	1.0	0.7	1.0	1.2	1.6	1.3	1.2
Late stage	5.2	2.8	5.9	11.4	21.7	28.7	42.6

*Note: *– the first half of the year. Calculated by authors based on data from [9]*

The data above characterize the existing trends in financing startups in Ukraine and can serve as a certain guideline for shaping the expectations of startuppers regarding the possible amount of funding. However, they do not answer questions about funding predictors, that is, factors and prerequisites that are positively evaluated by investors and contribute to a positive decision on startup financing.

5. 3. Development of hypotheses on the socio-demographic predictors of priority investment

The start-up database at the global platform Dealroom.co and its Ukrainian segment [10] contains certain information about startups that managed to get venture funding in the face of fairly fierce competition, as well as some socio-demographic characteristics of their founders: age, gender, education, and founders' experience.

The primary information contains data about the dynamics of the volume and frequency (number of rounds) of financing in the context of the above characteristics (identifiers) of startuppers: it is given in Table 6.

Table 6

The volume and frequency of financing of startups in Ukraine depending on the socio-demographic characteristics of startuppers in Ukraine

Indicator	Number of rounds	2014	2015	2016	2017	2018	2019	2020*
Received funding depending on the age of a startupper								
Under 25	8	0	0.6	2	0	10	0.15	0.27
25–35 years	92	10.8	6.8	46.8	22.8	181	62.3	122
35–45 years	80	38.4	23.5	47.3	154	354	408	100
Above 45	19	36.4	18.2	27.6	27.5	72.9	0.4	0.04
Received funding depending on the gender of a startupper								
Male	422	55.6	51.1	111	193	414	482	123
Female	61	2.2	4.4	7.6	9.4	13.4	0.9	13.9
Received funding depending on the education of a startupper								
Higher	133	39.6	29.5	53.3	162	353	409	122
Student	105	46	20.1	34.7	143	257	146	100
Post graduate	11	0	0	36.4	10.9	0.95	1.6	0
Received funding depending on the education specialization of a startupper								
Business education	105	41	29.2	54.7	156	370	388	116
Technical education	128	44.5	25.3	88.9	168	360	410	110
IT education	112	38	20.3	70.7	150	250	165	109
Social/Arts	24	0.103	0.152	1.3	1.1	2.8	6.2	0
Received funding depending on the experience of launching a startup								
Serial founder	104	3.1	6.2	7.8	21.5	202	135	114
Non-serial founder	395	55.6	48.7	110	186	384	427	117

*Note: *– the first half of the year. Calculated by authors based on data from [9]*

The structural analysis has made it possible to estimate the share in the total amount and amount of financing of startups with the corresponding socio-demographic characteristics of their founders (Table 7).

Table 7

Groups of startuppers, based on socio-demographic grounds, that received funding

Socio-demographic characteristic	Group by this characteristic	Share in total amount and amount of funding provided, %							
		number of rounds	financing amount, annually						
			2014	2015	2016	2017	2018	2019	2020*
Age	25–35 years	46.2	12.6	13.8	37.8	11.2	29.3	13.2	54.9
	35–45 years	40.2	44.9	47.8	38.2	75.4	57.3	86.7	45.0
Gender	man	87.4	96.2	92.1	93.6	95.4	96.9	99.8	89.8
Education	higher	53.4	46.3	59.5	42.8	51.3	57.8	73.5	55.0
	student	42.2	53.7	40.5	27.9	45.3	42.1	26.2	45.0
Education specialization	business education	28.5	33.2	39.0	25.4	32.8	37.6	40.0	34.6
	technical education	34.7	36.0	33.8	41.2	35.4	36.6	42.3	32.8
	IT education	30.4	30.7	27.1	32.8	31.6	25.4	17.0	32.5
Experience	serial founder	20.8	5.3	11.3	6.6	10.4	34.5	24.0	49.4
No experience	non-serial founder	79.2	94.7	88.7	93.4	89.6	65.5	76.0	50.6

*Note: *– the first half of the year. Calculated by authors based on data from [10]*

The structural analysis has made it possible to estimate the share in the total amount and amount of financing of startups with the corresponding socio-demographic characteristics of their founders (Table 7).

Our analysis of the derived data reveals the following. Venture investors give an undeniable priority in financing startups, the founders of which:

– are men (87 % of rounds and 90 % of the amount of funding provided);

– aged 25–45 (86.4 % of all rounds and 98.9 % of funding provided);

– with higher education or students at higher education institutions (95.6 % of rounds and 90 % of the amount of funding provided).

As for other characteristics of startuppers, investors' preferences about the priority of investing do not manifest themselves so clearly and change over time. Thus, startuppers with different specializations of education received funding with almost the same frequency and volume. The experience factor affects the number of funding rounds provided. The founder's serial experience is significantly less significant when receiving funding.

The above allows us to put forward the following hypotheses:

1. The volume of funding is influenced by the age of the founders.

2. The decision to finance startups is influenced by the gender (male, female) of the founders.

3. The amount of funding is influenced by the completion and quality of education of start-ups ("student", "higher education", "postgraduate").

4. The positive decision on the amount of funding is influenced by the specialization of education of the founders: "business-education", "technical education", "IT education" and "social, arts".

5. The presence or absence of entrepreneurial experience ("serial founder" or "non-serial founder") is the determining factor in a positive decision on financing.

5. 4. Verification of hypotheses about factors that influence the obtaining of funding from investment donors

Significant level (abbreviated Sig.), or p-level of significance (p-level), is the main result of checking the statistical hypothesis. In this work, when checking hypotheses, the level of significance $p=0.05$ is used. In other words, the hypothesis was accepted at $p<0.05$ [10].

To test the first hypothesis regarding the influence of the founders' age on the amount of funding among four age groups – under 25 years, 25–35 years, 35–45 years, over 45 years.

The processing of information has made it possible to identify statistically significant differences of average values in four groups, which indicates a rather low level of significance (less than 0.05): $p=0.011$ (Fig. 1).

Paired comparisons showed statistically significant differences between the group "35–45 years" and the groups "under 25", "over 45". The pairs of samples, for which the difference of average values is statistically reliable (with a level of significance less than 0.05), are marked with asterisks (Fig. 2).

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	102531,545	3	34177,182	4,613	,011
Within Groups	177802,389	24	7408,433		
Total	280333,934	27			

Fig. 1. Results of single-factor analysis of variance. Acquired by authors using IBM SPSS Statistics

Thus, our hypothesis regarding the impact of age on the amount of funding has been statistically confirmed. A significantly higher amount of funding (on average, 3 times more than the group of 25–35 years old, 5 times more than a group over 45 years old) is received by startuppers from the age group of 35–45.

We can agree with the objectivity of investors' consideration of this predictor and the priority of financing startuppers from this age category. This age group really inspires the greatest confidence of investors as it is characterized by a combination of experience and responsibility for the entrusted business and the received investment resources, the synergy of youth, perseverance, innovation, and creativity. The second-ranked priority is the age group of startuppers "25–35 years", which, although it may have a lower level of professionalism and accumulated experience, is mobile and easy to learn. It is these factors that would positively contribute to the scalability of the startup's business idea in case of confirmation of its success.

(I) age	(J) age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
under 25 years	25-35 years	-62,78000	46,00755	,533	-189,6969	64,1369
	35-45 years	-158,88000*	46,00755	,010	-285,7969	-31,9631
	over 45 years	-24,34343	46,00755	,951	-151,2603	102,5734
25-35 years	under 25 years	62,78000	46,00755	,533	-64,1369	189,6969
	35-45 years	-96,10000	46,00755	,185	-223,0169	30,8169
	over 45 years	38,43657	46,00755	,837	-88,4803	165,3534
35-45 years	under 25 years	158,88000*	46,00755	,010	31,9631	285,7969
	25-35 years	96,10000	46,00755	,185	-30,8169	223,0169
	over 45 years	134,53657*	46,00755	,035	7,6197	261,4534
over 45 years	under 25 years	24,34343	46,00755	,951	-102,5734	151,2603
	25-35 years	-38,43657	46,00755	,837	-165,3534	88,4803
	35-45 years	-134,53657*	46,00755	,035	-261,4534	-7,6197

Fig. 2. Paired comparisons. Acquired by authors using IBM SPSS Statistics software

Checking hypothesis 2 about the gender impact on startup financing decisions also involved comparing averages in funding between men and women. According to the results from a Student test (Fig. 3) for two independent samplings, we received a statistically significant difference (p=0.002) between these groups, namely: men receive a much greater amount of funding than women.

To test hypothesis 3, regarding the impact on the level of funding exerted by the level of education of startuppers, a single-factor analysis of variance was conducted for three groups: "student", "higher", "postgraduate".

The value of the level of significance p=0.028 indicates that the difference between the average values for these three groups is statistically reliable (Fig. 4).

The analysis of paired comparisons revealed a statistically reliable difference between the "higher" and "postgraduate" groups (Fig. 5).

		Levene's Test for Equality of Variances	
		F	Sig.
The_amount_of_funding	Equal variances assumed	16,540	,002
	Equal variances not assumed		

Fig. 3. Comparison of average values in the amount of funding between men and women (according to a Student test). Acquired by authors using IBM SPSS Statistics software

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	91173,850	2	45586,925	4,406	,028
Within Groups	186232,123	18	10346,229		
Total	277405,974	20			

Fig. 4. Results of a single-factor analysis of variance. Acquired by authors using IBM SPSS Statistics software

(I) освіта	(J) освіта	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
higher education	student	60,22857	54,36971	,522	-78,5318	198,9889
	postgraduate	159,79329*	54,36971	,023	21,0329	298,5537
student	higher education	-60,22857	54,36971	,522	-198,9889	78,5318
	postgraduate	99,56471	54,36971	,188	-39,1957	238,3251
postgraduate	higher education	-159,79329*	54,36971	,023	-298,5537	-21,0329
	student	-99,56471	54,36971	,188	-238,3251	39,1957

Fig. 5. Paired comparisons. Acquired by authors using IBM SPSS Statistics software
*Note: * The average difference is significant at 0.05*

Thus, our study proved that the level of education is a significant factor that is taken into consideration when deciding by investors on financing Ukrainian startups. Priority is rightly given to persons who have higher education, since such startuppers are prepared for future entrepreneurial activity, have the necessary soft skills and professional skills, are able to learn and achieve their goals. The second priority is a group of startuppers-students (the difference in the amount of funding received is relatively insignificant, 30 %), which is also perceived as a logical choice of investors, especially in combination with the age of startup founders.

Hypothesis 4 implied the study of the impact exerted on a positive decision on the amount of funding by such a factor as the nature or specialization of education of the founders. The available information base identifies the following types: "business education", "technical education", "IT education", and "social, arts".

Fig. 6 shows that the level of significance *P* is 0.039. This level of significance proves that the difference between the averages in these four groups is statistically reliable, that is, the direction (specialization) of education really affects the amount of funding.

Based on the obtained data, we can conclude that the statistically significant difference between average values is present only for two groups: "social, arts" and "technical" education (Fig. 7).

Thus, the most funding would be received by applicants with technical education, in the second place – with business education, then – IT education, and the least funding would be received by applicants with social/arts education.

The focus on technical education is quite correct. The priority areas for starting new businesses (startups) are the development of new materials and technologies, including information and communication. This specialization of startups requires appropriate knowledge and skills inherent in startuppers with technical education.

The fifth hypothesis is related to the verification of the influence of the factor of entrepreneurial experience on obtaining funding for a startup, that is, the presence of previous positive cases of funding obtained ("the founder who has participated in other projects (serial founder)"). To compare the average values in the amount of funding between the "serial founder" and "non-serial founder" sample, a Student T-Test was conducted for two independent samplings (Fig. 8). As a result, the researchers did not find a statistically significant difference between these groups (p=0.112), that is, the decision to finance does not affect the "founder's experience" factor.

Such a priority of the investor can be explained by the importance of fully involving the founder in the implementation of this particular business project. The presence of pre-founded businesses or motivation to serially start a business, from the investor's point of view, are evaluated negatively. Such a founder is less mobile (if there is another business), which, from the investor's point of view, increases the risks of interacting with it.

Table 8 provides general information on conclusions on the adoption (non-acceptance) of the hypotheses.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	130387,826	3	43462,609	3,264	,039
Within Groups	319624,254	24	13317,677		
Total	450012,080	27			

Fig. 6. Results of a single-factor analysis of variance. Acquired by authors using IBM SPSS Statistics software

(I) type_education	(J) type_education	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
business education	technical education	-7,40000	61,68509	,999	-177,5650	162,7650
	it-education	50,27143	61,68509	,847	-119,8936	220,4365
	social, hum	163,32071	61,68509	,063	-6,8443	333,4858
technical education	business education	7,40000	61,68509	,999	-162,7650	177,5650
	it-education	57,67143	61,68509	,787	-112,4936	227,8365
	social, hum	170,72071*	61,68509	,049	,5557	340,8858
it-education	business education	-50,27143	61,68509	,847	-220,4365	119,8936
	technical education	-57,67143	61,68509	,787	-227,8365	112,4936
	social, hum	113,04929	61,68509	,283	-57,1158	283,2143
social, hum	business education	-163,32071	61,68509	,063	-333,4858	6,8443
	technical education	-170,72071*	61,68509	,049	-340,8858	-,5557
	it-education	-113,04929	61,68509	,283	-283,2143	57,1158

Fig. 7. Paired comparisons. Acquired by authors using IBM SPSS Statistics software
*Note: * The average difference is significant at 0.05*

		Levene's Test for Equality of Variances	
		F	Sig.
amount_of_funding	Equal variances assumed	2,935	,112
	Equal variances not assumed		

Fig. 8. Comparison of the average according to a Student test. Acquired by authors using IBM SPSS Statistics software

Table 8

General information on hypotheses

Hypothesis	Methods and models of statistical analysis to test the hypothesis	Criterion for making a decision. Level of significance	Conclusions on the adoption of the hypothesis
1. Does the age of founders affect the amount of funding?	Single-factor analysis of variance ANOVA	p=0.011	Yes, it does. The hypothesis is accepted.
2. Does gender (male, female) affect startup financing decisions?	Student's test for two independent samples	p=0.002	Yes, it does. The hypothesis is accepted
3. Does the level of education of start-ups for three groups affect the amount of funding: "student", "higher", "postgraduate"?	Single-factor analysis of variance ANOVA	p=0.028	Yes, it does. The hypothesis is accepted
4. Does the specialization of education of the founders affect the amount of funding: "business education", "technical education", "IT education" and "social, art"?	Single-factor analysis of variance ANOVA	p=0.039	The hypothesis is accepted
5. The hypothesis of the influence of the factor of entrepreneurial experience on obtaining startup financing is checked, namely between the sample "founder who participates in other projects" and "founder who does not participate in other projects"	Student's test for two independent samples	p=0.112	No statistically significant difference was found between these groups. The hypothesis is not accepted

The results that are given in Table 8 testify in favor of such predictors that motivate investors to finance a startup: age, gender, education, and its specialization. The startupper's entrepreneurial experience does not affect the decision-making on the provision and volume of investments.

5. 5. Proposals for improving the financial subsystem of startup management, taking into consideration the study results

Our research has made it possible to devise the following recommendations for improving the financial subsystem of startup management:

– at the stage of the idea of the project, startuppers (founders, co-founders) should have a clear idea of financial support for the startup development process. Forecasting opportunities for internal and external investment is a responsible "front of work" for startup managers;

– if it is necessary to attract an external investor (which is a prevailing practice), the most important component of the work is the presentation of a project in the financial services market. In this case, the "portrait" of the startupper, who is "stated" (defined in the application) as the team leader, must correspond to the socio-demographic characteristics defined in the current article;

– the proposed methodological toolset has no geographical boundaries, it allows investors of any country to get a representative, for a given historical moment and economic situation, "portrait" of a startupper that would provide lower risks and more effective investment results;

– it is recommended to take into consideration the hypotheses proven in this study because, with all the variety of factors influencing the decision to invest in startups, the following socio-demographic characteristics of startuppers are dominant among them: gender, age, level, and specialization of education;

– when drawing up an investment forecast, it should be taken into consideration that the largest amounts of funding are received by the founders – men, aged 35–45 years, who have a higher technical education. Startup investors consider financing such startuppers their priority. According to investors, this reduces the risks of negative interaction and increases the likelihood of further successful development of the provided investment resources and achievement of certain goals and objectives of development;

– to solve the problems of financial support to startup management, it is necessary that the "recipient environment of the startup investment field" is built on a scientific basis, in accordance with the recommendations for the formation of a "portrait" of a startupper, based on the definition of the socio-demographic predictors of priority investment. In practice, one can create an "integrated portrait of the startup team" and attract co-founders, professional managers who meet the recommended socio-demographic predictors of investment attractiveness.

6. Discussion of results of determining the socio-demographic predictors in order to improve the financial subsystem of startup management

Understanding current financing trends and investor priorities (Tables 1–5) would make it possible for startuppers to better understand their chances of receiving funding and consciously form the socio-demographic composition of their startup team. The use of the results of the study by

state and local authorities would make it possible to focus efforts on building a national start-up support ecosystem.

Startuppers that do not meet the socio-demographic characteristics identified in the analysis process to inspire investor confidence, in order to increase the likelihood of obtaining funding (Table 8), should expand the composition of their team. In particular, they are recommended to include in the startup team the like-minded specialists who meet the priority predictors in the startup investment recipient field. That would increase their chances of financing by the investor. It is also recommended to focus on the socio-demographic characteristics of a startupper in information and advertising materials, pitch presentations, etc.

Our study is trustworthy due to the use of a reliable source of input information, which is the Dealroom.co. platform, as well as the use, when checking the hypotheses, of the generally accepted level of significance p=0.05.

The reliability of hypothesis 1 "Does the age of founders affect the amount of funding?" is justified and analytically confirmed by calculations illustrated in Fig. 1, 2. Conclusion: startuppers between the ages of 35 and 45 are attractive to investors, all other alternative age groups do not meet the interests of an investment donor. It is the startuppers of such mature and energetic age that donors dream of financing because they see this age as the key to the rational use of investment resources and higher chances of entrepreneurial success.

The reliability of hypothesis 2 "Does gender (male, female) affect startup financing decisions?" has been confirmed by the results shown in Fig. 3. Statistical analysis shows that the most attractive startuppers for investments are males, which confirms the generally accepted statement on gender inequality in business.

Hypotheses 3 and 4, put forward to clarify the impact of the level of education and specialization of startuppers on the amount of funding, have been recognized as reliable (Fig. 4–7). That is, the decision to finance a startup project is influenced by such quality characteristics of startuppers as specialization and the level of education. As evidenced by the results given in Tables 4–7, startuppers with higher technical education have an advantage in the line for financing.

The fifth hypothesis has not been analytically confirmed for accuracy (Fig. 8), that is, the fact of having or lacking previous entrepreneurial experience is not an important factor in investors making decisions on financing startup projects. This adds optimism to newcomers in business, stimulates the introduction of innovative ideas.

The list of hypotheses regarding the predictors of priority financing of startuppers (Table 8) could be significantly wider but it is predetermined by the current information base at the platform Dealroom.co., in particular, the list of information signs and characteristics) that is accumulated. Research needs and objectives require a significant expansion of the signs of success of startups and startuppers. This would create informational prerequisites for deeper research. That is why Dealroom.co. should expand the list of characteristics of startuppers based on consultations with specialists in the consulting market. Significant socio-demographic predictors are the number of years after graduation from the higher or postgraduate institution, the place and position where the future startupper worked before its start-up; the success of previous experience in entrepreneurial activity. These hypotheses cannot be verified right now because the required information is missing.

The most controversial result of our study is the prioritization of investors' attention only on "male" startups (Table 6, Fig. 3). The result of our study is scientific proof of gender inequality in startup funding issues (Table 8). The identified situation contradicts objective No. 5 "Gender Equality" of the UN Global Development Goals by 2030. Female startuppers have repeatedly demonstrated their high entrepreneurial abilities, in particular, papers [1–8] give numerous examples of successful women's startup projects. To overcome the existing stereotype, it is necessary to support women's start-ups by international institutions and countries of the world. However, since investment donors still prioritize financing male start-ups, it is advisable to determine the male person as the team leader when forming an investment request. This would increase the chances of attracting the investor's attention to the startup and getting the necessary funding.

The substantiated list of socio-demographic predictors of priority investment of startups makes it possible to resolve the issue related to the lack of objectively defined socio-demographic predictors of priority investment for startups, which makes it difficult to achieve the goals of the startup management financial subsystem.

Clear guidelines have been set for startuppers and start-up support institutions regarding the scientifically sound format of a startup team and the startup leader, which would increase the chances of attracting the attention of investment donors and, therefore, achieving the goals of the startup management financial subsystem.

7. Conclusions

1. To enrich the terminology dictionary of specialists – managers and scientists – startup management researchers, definitions of "the recipient environment of the startup investment field" and "investment donor" were introduced. Currently, such definitions are absent in the content of the management model of startups. They have an associative user perception and simplify understanding the essence of the problem, which is reduced to a concise interpretation – synonym: "a (financial) donor is needed for (financial) injection".

2. Patterns for obtaining investments by startuppers were identified. The results of the study of modern financing trends pointed to the growing dynamics in the development of start-up technologies but qualitative analysis indicates the differentiation of investors' preferences in Ukraine in 2014–2020 on investing investment capital in startup projects.

3. Differentiated investor approach to different investment recipients has been identified. Hypotheses about the priority of investing startuppers that correspond to certain socio-demographic characteristics have been put forward and tested.

4. The following socio-demographic actors dominate in obtaining investments: startuppers are men, aged 35 to 45, who have a higher technical education. Startup investors consider such startuppers their priority. At the same time, when making a decision on investment, the factor "experience of the founder" does not matter. Although Ukrainian startups became the study environment, the result may be extrapolated to a large number of

countries. It sure cannot be denied that in the financial management of a startup, the proposed approach is useful for startuppers.

5. Startuppers and institutions of the startup support ecosystem are advised to follow the recommendations set out regarding the identified socio-demographic predictors of priority investment and the formed investment attractive "portrait" of a startupper. This would increase the likelihood of obtaining venture funding and could become an effective tool for the development of startups.

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