

CHALLENGES OF TRANSITIONING TOWARDS A CIRCULAR ECONOMY, IN THE CONTEXT OF NON-REFUNDABLE EUROPEAN FUNDS FINANCED ROMANIAN START-UPS

Ciprian MANEA¹, Augustin SEMENESCU^{2,*}, Iuxel VÎJIAC³

¹ Engineering and Management Department, Materials Science and Engineering Faculty, University Politehnica of Bucharest 313 Spl. Independentei, 0632, Romania, maneaciprian17@gmail.com

² Engineering and Management Department, Materials Science and Engineering Faculty, University Politehnica of Bucharest 313 Spl. Independentei, 0632, Academy of Romanian Scientists, 3 Ilfov St, 0544 Bucharest, Romania, augustin.semenescu@upb.ro

³ Independent Advisers SRL & ASURA Association, Romania

* Correspondence: asemenescu2002@yahoo.com

Abstract: The establishment and financing using 100% non-refundable funds of Romanian Startups has seen a considerable advance since 2014, only in 2019 were established and financed, through European Funds, with amounts of up to 40,000 Euros, over 9,600 start-ups. At the same time, European paths and policies aim at transitioning from the linear economy, which currently characterizes the operation process and development of start-ups, towards a circular economy. It is in this context that a scientific analysis is needed, regarding the current financing policies and programs for Romanian start-ups, mirroring the principles and proposals at European level for the transition to a circular economy.

Keywords: Non-Refundable European Funds, Linear Economy, Circular Economy, Start-Up, Systemic Thinking.

1 THEORETICAL ANALYSIS OF SYSTEMIC MODELS WITHIN THE LINEAR ECONOMY AND THE CIRCULAR ECONOMY

Taking into account the last hundred years, we find that the global economy and especially the European economy, has generated an

unprecedented level of wealth, which has supported the progress of humanity, rising living standards, but at the same time, has put immense pressure on the planet's resources and on the environment. In short, it can be said that the unprecedented benefits gained by humanity in the last century have been fueled by a huge consumption of resources, which has ultimately put humanity in front of unimaginable

challenges that threaten its very existence. The increase in global population (9 billion by 2050), in association with the demand for high living standards, will scale up the demand for energy and natural resources; the need for food of a growing population, with changing dietary preferences, will imply the need to expand agricultural land to meet an increased demand for food; further economic practices based on means of production that do not integrate clean green technologies will accentuate the degradation and erosion of natural capital related to the environment, involving the risk of irreversible effects that can end a century of progress regarding human standards.

By virtue of the above, an obvious question arises, in whose answer lies the very preservation of our way of being (and even our survival as a species), namely: How can we maintain a high standard of living without irreparably affecting the resources that sustain our very existence?

In other words, it will be necessary to identify a way to decouple human progress from resource consumption, and to achieve sustainable development, while maintaining economic prosperity, social equity and environmental quality for the benefit of current and future generations.

This is the challenge of our generation and, to answer it, will require a major change in both the way we think (the shift to a systemic way of thinking – paying attention to the interconnections, to the way our decisions or actions affect the system as a whole) and the way we ensure our living standards (the transition from the linear economy model to the circular economy model, our transformation from consumers to users).

The European economy, whose success is largely due to continuous improvements in resource productivity, is still heavily dependent on them and continues to operate in a linear system - "take, make, use / throw", and which, despite the rapid adoption and integration of

new technologies, fails to capitalize on circular opportunities.

For instance, if we take into consideration the life cycle of a product (Figura 1) in the linear economic system as a rule, most economic stakeholders focus their management plans and risk management on the first 4 stages and less or almost not at all on the last 3 stages, which means that few solutions are related to the use of the product, to the processes associated with its end-of-life (EOL) and especially to those related to its elimination.

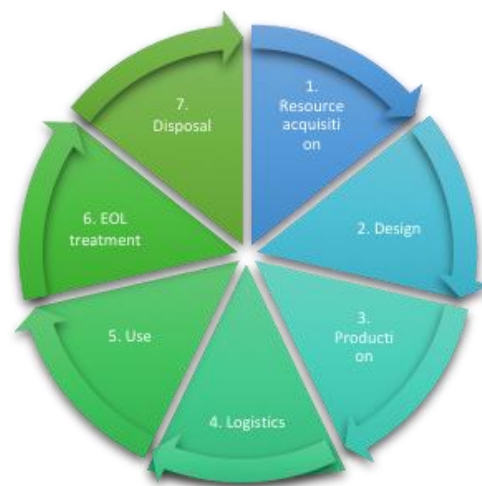


Figura 1. Lifecycle stages of a product

Unlike the linear economy, "a circular economy is based on the principles of designing waste and pollution generated, maintaining products and materials in use and regenerating natural systems". Thus, "the circular economy is an economic system that replaces the concept of "end-of-life" with the reduction, alternative reuse, recycling and recovery of materials in the processes of production / distribution and consumption. It works at micro level (products, companies, consumers), medium level (eco-industrial parks) and macro level (city, region, nation and beyond), in order to achieve sustainable development, thus simultaneously creating an environmental quality, economic

prosperity and social equity, for the benefit of current and future generations. It is activated by new business models and responsible consumers”.

The circular economy, as defined above, is based on a set of principles, as follows (Figure 2):

- systemic thinking - understanding the impact produced by one's own activity at system level;
- innovation - rethinking resource management in order to create value;
- administration - taking responsibility for the wave effects generated by the impact of your decisions and activities;
- collaboration - ensuring benefits at system level by cooperating with others;
- value optimization - keeping the materials at the highest value and functionality;
- transparency - to be open and honest in terms of the benefits and barriers of applying circularity.



Figura 2. Linear vs. circular economy - according to standard BS - 8001

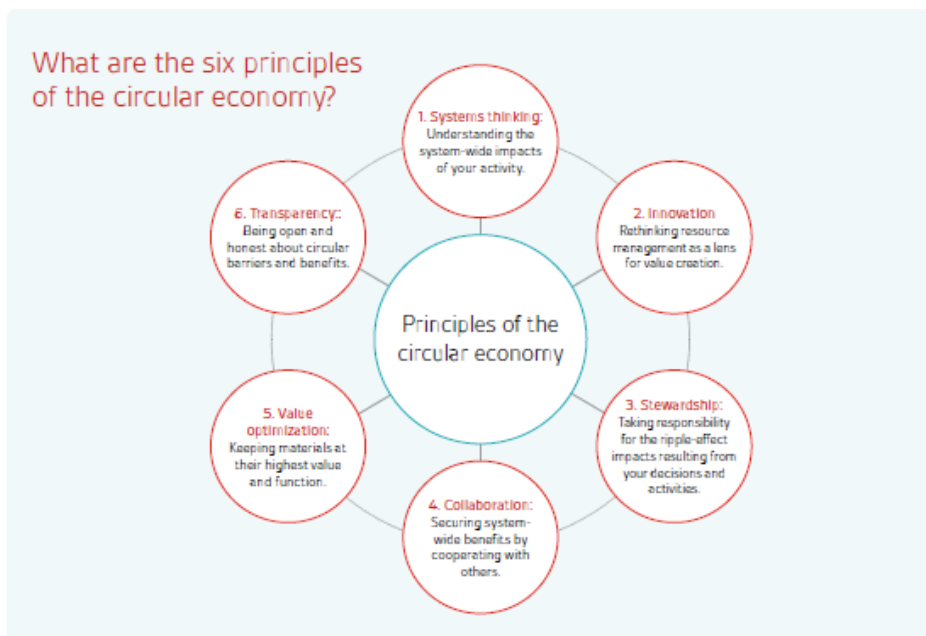


Figura 3. Circular Economy Principles by BS:8001 Standard

It can be said, in this context, that the circular economy is not a technical solution in itself but rather a socio-technical transition that involves systemic changes and requires a multilevel approach.

Therefore, the circular economy involves a systemic approach, and systems thinking is based on understanding a system by examining the connections and interactions between all components of the system itself, leading to a better understanding of complex problems and identifying those strategies, which are practical and integrated, to solve them.

If we define a system as “a set of interrelated elements, coherently organized to achieve a certain goal, an integer that cannot be divided into its parts, whose properties derive from the way its parts interact and not from the way each part, taken separately, acts”, we understand that it can be changed, improved only by changing the way its parts interact and that the performance of the whole system is given by the way its parts interact.

As a complex structure (stocks – flows - functionality / purpose / objective - feedback loops) of relations between different elements (which are not similar), in order to keep its dynamic balance in relation to the outside, the system uses internal loops balancing and/or strengthening to regulate its behavior, which means that, to a large extent, it is the source of their own behavior, therefore also the source of their own problems.

2 INTERVENTION MECHANISMS AT THE SYSTEM LEVEL

From this perspective, it is important to identify those mechanisms, or rather the levers through which we can intervene at the system level, which are those points, regarding a complex system level, through which a change of a small thing can lead to a change of the whole.

Donella Meadows identified 12 such support points through which one can intervene on a system, as follows (in ascending order of efficiency - Figure 4):

12. Constants, parameters, numbers (such as subsidies, fees, standards).
11. Dimensions of buffer stocks and other stabilizing stocks, in relation to their flows.
10. Structure of stocks and flows of materials (such as transport networks, age structures of the population).
9. Lengths of delays, in relation to the rate of change of the system.
8. The power of negative feedback loops, in relation to the impacts they are trying to correct.
7. The gain obtained around leading positive feedback loops.
6. The structure of information flows (who has and does not have access to information).
5. System rules (such as incentives, penalties, constraints).
4. The power to add, change, evolve or self-organize the structure of the system.
3. The objectives of the system.
2. The mentality or paradigm from which the system emerges - its objectives, structure, rules, delays, parameters.
1. The power to transcend paradigms.

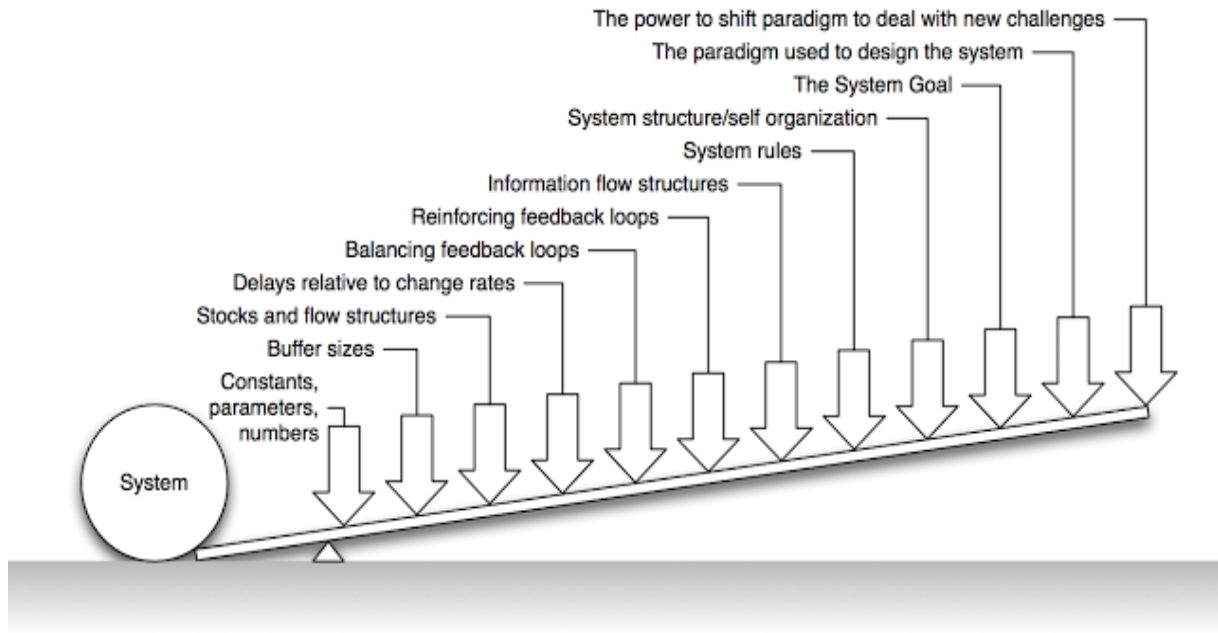


Figura 4. Donella Meadows' 12 leverage points for a system

In this context, the 4 systemic strengths of the social economy are highlighted:



- the strength of the inner loops



- the strength of cascade use



- the strength to circulate more



- the power of clean cycles

Revolving to the above question, by virtue of all that has been presented so far, it seems that the systemic circular economy would

qualify as a viable solution to take on the task of separating the continuous improvement of citizens' living standards from the growth of resources use, and that the rules of the circular economy could lead to "growth from within", a model that could bring promising results to the European economy. As such, given the encouraging economic potential, the circular economy could become the next major European political and economic project.

Meaningful steps have been taken at the European policies level, in the sense of the above, if we take into account the European Union's Circular Economy Action Plan, the European Green Deal, the Green Agenda for the West Balkans and yet with little notable results, even though European regulations on resilience to climate change, innovation, biodiversity conservation, information and communication technology have been transposed into programs that have been the basis for European funding, especially in order to stimulate entrepreneurship and develop new businesses.

This article only reveals the surface of this phenomenon, in the context of the concrete analysis of a number of new enterprises, created on the basis of grants with non-refundable financing under such a program, having integrated at this level all requests of EU regulations related to the previously mentioned aspects - and which still failed to take the slightest step towards sustainability from the perspective of integrating the principles of circularity.

Given the limitation of the analysis, this article should raise more questions about whether or not these types of financing, (which, as we will see, supply the national economic system with considerable amounts), succeed or fail to achieve the objectives of European policies in terms of sustainability, resilience, climate change, added value and resource consumption, whether or not these types of interventions are true levers of influence of the national economic system, from the perspective of those presented above, and, based on the identified results, possible solutions to be studied at large in the future.

3 THE CONTEXT OF START-UPS THAT ARE BEING ESTABLISHED AND FINANCED IN ROMANIA THROUGH NON-REFUNDABLE GRANTS

From the perspective of the circular economy, it is very important to analyze the funding provided to the Member States by the European Union ⁱ, in order to financially support start-ups. Originating from this point, it is necessary to analyze the financing of start-ups by financing categories, in order to be able to estimate as accurately as possible the potential financial impact they have in a country's economic system, as well as the real possibility of switching from the linear economic model to a circular economy.

For this analysis we took into account the types of financing granted by the European

Union to Romanian start-ups. In Romania, from 2018, there have been four major categories of financing, through which potential entrepreneurs could / can access (based on business plan competitions) 100% non-refundable grants for setting up and developing a business:

- Financing of up to 40,000 Euros, intended for any Romanian national, with domicile / residence on the territory of Romania, who wishes to set up an LLC;
- Funding of up to 100,000 Euros, intended for students of Romanian nationality, domiciled / residing in Romania, being enrolled, at least, in the second year in undergraduate studies who want to set up LLCs;
- Financing of up to 100,000 Euros, intended for any Romanian national, with domicile / residence on the Romanian territory, who wishes to set up a Social Economy Structure - according to law 219/2015;
- Financing of up to 200,000 Euros, intended for any Romanian national, domiciled / residing in Romania, who wants to set up a Social Economy Structure involved in the field of maneuvering and processing of agricultural products - according to law 219/2015.

The start-ups financed during the 2018-2019 period, whose implementation and sustainability period ended in November 2020, can be analyzed at present time.

Given that start-ups are considered the "engine of a country's economy", the segment of start-ups financed with up to 40,000 euros, represents an extremely important part of the Romanian economic system for the following reasons:

- at the end of September 2019, 9,685 start-ups were set up and financed with amounts of up to 40,000 EURO;

- the sums allocated to these start-ups in the form of a 100% non-refundable grant amounts to over 290 million EURO;
- over 19,000 people were involved / employed;
- over 396 areas of activity were set in motion;
- Within approximately nine months, out of the 290 million euros, over 42 million euros were returned to the state budget (from taxes and salary contributions).

By virtue of the above, we analyzed a number of 72 start-ups, financed through the Human Capital Operational Program - Romania Start Up Plus, Priority Axis 3 "Jobs for all", Specific Objective 3.7. "Increasing employment by supporting non-agricultural enterprises in urban areas." Each of the 72 start-ups received a 100% non-refundable financing in the amount of 178,340.00 LEI, representing a total of 12,840,480.00 LEI (The grant administrators who managed the financing: ASURA Association, ADEPT Transilvania Foundation, SC E.CECA SRL).

Each of the start-ups received funding based on a Business Plan, with a 12-month implementation period and a 6-month sustainability maintenance period.

Starting from the requests provided in the Applicant's Guide - Specific Conditions, in relation to the "Romania Start-up Plus" call for projects and in conjunction with the selection procedures developed by the grant administrators, in terms of the business plan development, we have the following provisions:

- the entrepreneurs / managers / shareholders must attend at least one course of Entrepreneurial Skills Development;
- the business plan must contain all the specific elements of a business plan (context, justification, identified risks, activities, business description, budget, financial forecasts, sustainability etc.);

- all equipment / machinery purchased must be new;
- sustainability relates to only three major aspects: job sustainability (maintaining employees for a period of at least 6 months after the 12-month implementation period), institutional sustainability (avoiding bankruptcy, insolvency and / or closing the company for a period of at least 5 years) and the non-change of the destination of the acquired fixed assets, respectively the avoidance of the situations regarding the alienation of the acquired fixed assets.

4 PRACTICAL ANALYSIS OF 72 STARTUPS SET UP AND FINANCED BY 100% NONREFUNDABLE GRANTS, IN THE SOUTH-MUNTENIA AND CENTRAL REGIONS, DURING THE JANUARY 2019 - DECEMBER 2019 TIME PERIOD

The first and most important aspect to consider, when discussing the possibility of moving from a linear to a circular economy, is related to two very important elements in the sustainable functioning of an organization, namely: The manager of the organization / The shareholder and the equipment/ machinery used in the production / service process by the start-up, respectively.

From this perspective, following the analysis of the risks expected in the business plans by the 72 Entrepreneurs who received financing, we have two extremely important results, as shown in the figure 5.

We notice that a percentage of approximately 26% of the financed start-ups have identified the risk regarding the management as having a high degree of occurrence, and 10% of them identified a high

risk of occurrence at the level of equipment / machinery failure etc., respectively.

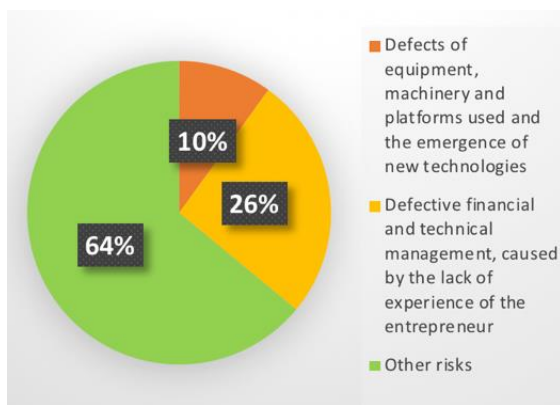


Figure 5. Distribution of risk categories with a high degree of occurrence in the 72 start-ups financed

We can consider these two elements as an important part of the mechanism necessary to move from the linear economy to the circular economy. For this reason, a series of result and achievement indicators, with real quantification potential, should be drawn and transposed in the guidelines / procedures for financing start-ups, regarding these two levels.

Taking into account the high probability of occurrence of risks related to failure and / or physical or moral aging of the equipment / fixed assets / equipment purchased, we analyzed the 72 start-ups from the perspective of spending

European non-refundable funds for the acquisition of: IT and peripheral equipment, Photo-video equipment, Audio equipment, Household and electronic equipment and Machinery and technical equipment for carrying out business activities.

Out of the total budget allocated for funding start-ups through two projects (RON 12,840,480.00), 32% is used by entrepreneurs for equipment / machinery necessary to carry out the activities of companies, while 68% of the budget is allocated by entrepreneurs for other types of expenses, such as: salaries and salary

contributions, accounting services, website promotion and development services, legal services, utilities, rents, etc.

It is important to analyze in this context the percentage of 32% funds spent for the acquisitions necessary to carry out the activities for which the companies were established and financed through those two projects ("Entrepreneurship Develops Transylvania - ADA" and "Entrepreneurship - An Excellent Career Alternative - ACE"), because these acquisitions represent in fact one of the main generation sources of products / services provided.

In the Romanian economic system, 2019 wise (taking into account the value of grants) over 36% of the companies funded with a non-refundable grant value of 178,340.00 LEI, obtained a cumulative turnover of 897,277.00 LEI and an average of profits up to 20,000.00 LEI, investing in equipment for carrying out activities approximately 3.48% of the total value for funding, regarding the two projects combined.

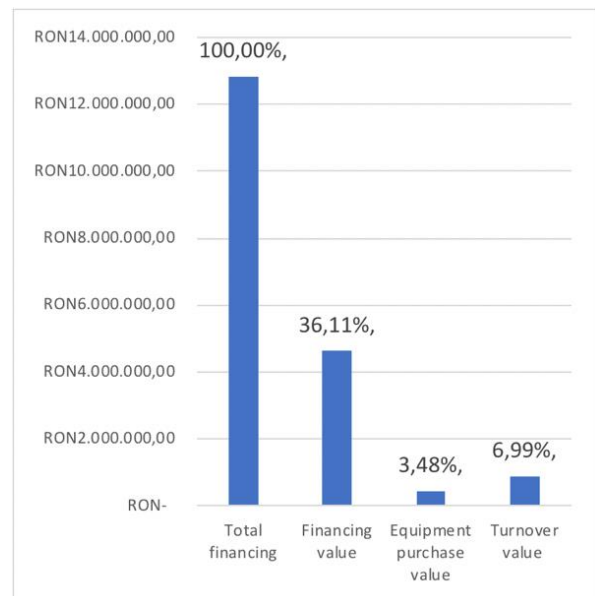


Figure 6. The value of the equipment, fixed assets, turnover and their percentage of the total financing granted, in the case of companies with profit between 0-20.000 RON in 2019

Approaching the funded companies that made a profit between 20,001 - 50,000 LEI, we notice that they represent a percentage of 20.83% of the total financed companies, and have allocated for the purchase of equipment a budget of 400,288.83 LEI, obtaining a turnover of 813,262 .00 LEI.

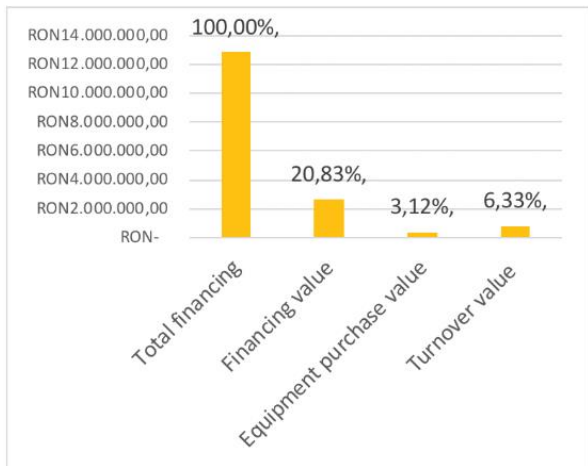


Figure 7. The value of the equipment, fixed assets, turnover and their percentage of the total financing granted, in the case of companies with profit between 20.001-50.000 RON in 2019

By overlapping the 2 previous graphs, a series of important elements appear, in reference to the share of equipment purchases of the total budget allocated for each start-up. On the two levels of examination (profit up to 20,000 LEI and profit between 20,001 - 50,000 LEI), the start-ups obtained approximately the same turnover, investing a percentage of approximately 3% in the acquisition of equipment / machinery. However, the average profit obtained in 2019 is considerably higher (between 20,001 - 50,000 LEI) in the case of 15 start-ups, compared to the average profit obtained by the other 26 start-ups (with a profit up to 20,000 LEI).

At first sight, we would tend to assume that the companies which allocate larger amounts of

money for the procurement with new equipment will have a higher turnover and profit, respectively, as that should streamline the production / service provision processes, but the actual state of facts is different. A surprising situation occurs in the case of 8.33% of the funded companies (6 start-ups) which, despite the fact that they have allocated a total budget of 150,938.08 LEI for the purchase of new equipment / machinery have achieved a of 1,567,281.00 LEI (as the turnover of 41 companies out of the total of the 72 financed).

Unfortunately, 25 start-ups (financed with 4,458,500.00 LEI) had negative profits in 2019, although they benefited from the same financing conditions and allocated a total budget of 2,306,481.32 LEI for purchase of equipment and machinery.

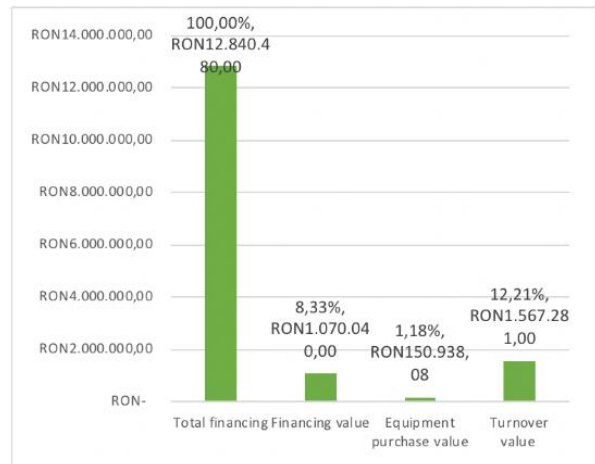


Figure 8. The value of the equipment, fixed assets, turnover and their percentage of the total financing granted, in the case of companies with profit over RON 50,000 in 2019

Regarding the principles of the circular economy, it is important to take into account the depreciation periods that fixed assets have, depending on their specificity. Within the 72 start-ups the equipment/ machinery purchased have an average depreciation between 2 years and 9 years.

IT equipment and peripherals occupy a leading place among the acquisitions of fixed assets at the level of start-ups (40%) - 206 new units purchased within the 72 start-ups, being followed by a series of machines and equipment necessary for the production process (24%), household and electronic equipment (21%) and audio, photo-video equipment (15%).

We observe a trend among entrepreneurs, in terms of object of activity, for CAEN codes in section C - Manufacturing Industry (Division 18 - Printing and media reproduction on recordings), section N - Administrative Services and Support Services (Division 77 - Rental and leasing activities), section M - Professional, Scientific and Technical Activities (Division 70 - Activities of directorates' offices, centralized administrative consultancy offices; management and management consultancy activities; and Division 74 - Other professional, scientific and technical activities). These objects of activity have a total share of 15.29 percent.

5 CONCLUSION

Having a synthesis of the research in this article, we can observe how, at European level, the transition to a circular economy is pursued, as the current economic model becomes inefficient or even harmful in the long run, from the perspective of resources that the planet still has in the medium and long term. .

Development strategies and action plans have been developed in the last five years regarding this transition, but these efforts are only transposed into national legislation and funding programs and procedures to a very small extent (sporadic elements appear with on sustainable development, carbon reduction, innovation, etc., but not mandatory).

The sustainability of start-ups from the point of the transition to a circular economy is not taken into account in any financing program, the only mandatory elements are largely related to: the preservation of jobs created at the start-

up level, the acquisition of new equipment / machinery, avoiding bankruptcy, insolvency or deliberate closure of a start-up within a period of five years from receiving the financing and avoiding the alienation of the purchased goods or changing their destination. Under these conditions, the following question arises: How can the transition to a circular economy that promotes principles such as alternative reuse of certain goods / equipment / vehicles be made, given that start-ups are obliged to purchase only new equipment and machinery?!

Also, the business plan that start-ups must follow in order to receive non-reimbursable financing does not contain any mandatory element that will to some extent support the transition to the circular economy. Starting from this aspect, another question arises: In order to move to a circular economy, is it not necessary to rethink the principles on which the elaboration of a Business Plan is based?!

Finally, the discrepancy between EU policies on the transition of Member States' economies to the circular economy and effective start-up financing interventions may have its source in the inadequacy of financing grants to meet the standards of circular economy principles.

BIBLIOGRAPHY

- Comisia Europeană, *Articol de la o adresă de internet*, descărcat la: 14 decembrie 2020, de pe [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en;);
- Comisia Europeană, "Circular Economy Action Plan", *Articol de la o adresă de internet*, descărcat la 14 decembrie 2020, de pe [https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf.](https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf),
- Groves A., 2018, *Articol de la o adresă de internet*, descărcat la: 14 decembrie 2020, de pe <https://medium.com/@adam.d.groves/from-service-design-to-systems-change-72fa62b1714c>

Kirchherr J., Reike D., Hekkert M., 2017, "Conceptualizing the circular economy: an analysis of 114 definitions", *Resources, Conservation & Recycling* 127, vol. 127

Meadows D, 1999, "Leverage points places to intervene in a system", The Sustainability Institute, Hartland

McKinsey & Company, 2015, *Articol de la o adresă de internet*, descărcat la: 14 decembrie 2020, de pe <https://www.mckinsey.com/business-functions/sustainability/our-insights/europes-circular-economy-opportunity>.

OECD, 2012, "Environmental Outlook to 2050", OECD Publishing