frugalinnovation.how

# Regional Partnership Plan

## 01.A4

## COUNTRY: CROATIA

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# Contents

# Preface

This publication has been produced under the project supported by the Erasmus+ program entitled Frugal Innovation. It aims to promote frugal innovation mindset in any regions. This document outline the formative assessment of frugal innovation in the current economic climate, knowledge and skills gap, policy recommendations and a strategic action plan of the Republic of Croatia, Primorje- gorski kotar county as well as the European union.

This Strategic Partnership Plan can be utilized by academic actors, higher education policy makers as well as by business actors, organizations and chambers. It facilitates the creation of the conditions and organizational connections that are essential for the processes promoting frugal innovation.

Additional useful materials will be also produced in the framework of the Erasmus+ program entitled Frugal Innovation. These will be available free of charge on the following address: www.frugalinnovation.how. We recommend that those who are interested in this topic visit the official website of the project.

# 1 General overview

### *1.1 What is frugal innovation?*

Frugal innovation is a new phenomenon that considered as both a mindset and a series of techniques that enables entrepreneurs to innovate despite resource constraints. The concept has emerged from developing countries but given the current climate of austerity and economic uncertainty across large parts of more developed countries (such as Europe), the phenomenon has gained an increasing attention in more advanced economies (Pisoni et al., 2018) and academic researches (Radjou – Prabhu, 2015). The definition and the understanding of frugal innovation vary among scholars, practitioners and policymakers that calls for discussion among the previously mentioned groups of stakeholders (Hossain, 2017).

This new type of innovation is often referred as resource-constrained innovation although it includes a wide range of interpretation (Pisoni et al., 2018). Previous researches and literature reviews on the topic concluded that the terms of frugal innovation is often described with the following aspects: affordability, low-cost manufacturing, low-cost materials, design focusing on basic functionality and minimal feature. Interestingly, frugal innovation can yield more benefit for the society than traditional innovations, since frugal innovation does not necessarily need sophisticated labs and infrastructure, however relies on basic engineering skills (Mandal, 2014). The role of frugal innovation is important in emerging countries, since society face unserved needs which are less attractive for companies (Tiwari – Henstatt, 2012).

According to Nesta, we define frugal innovation with the following definition: Frugal innovation responds to limitations in resources, whether financial, material or institutional, and using a range of methods, turns these constraints into an advantage. (Source: https://www.nesta.org.uk/feature/frugal-innovations/)

### *1.2 Why it is important?*

Although the EU identified entrepreneurship as a key competence since 2006 and that is one of the most important aims of the Entrepreneurship Action Plan 2020, there is still a little focus on frugal innovation at European Higher Educational Institutions. While multinational companies change their global strategies and shift their focus to low-income countries to develop frugal innovation (Ojha, 2014), European universities continuously rely on high-investment research and development activities. We do not suggest that teaching traditional innovation would be a wrong way, but we raise attention to frugal innovation that should gain more emphasis in students' curriculum.

In order to better understand the current climate at Higher Education Institutions, we conducted a research that aims to understand the perception of frugal innovation among various groups (both students and professors). This study has two aims. Firstly, to identify common misunderstandings and the perception of frugal innovation in contrast to traditional (high-tech) innovation, secondly, to identify possible teaching practices that can be implemented into entrepreneurship education and innovation generation. The outcomes of our investigation will provide significant insights into the perception of frugal innovation in the higher education (both students and professors) as well as to local business experts / entrepreneurs and members of local non-profit organizations and local governmental and municipal actors institutions and will suggest teaching practices.

The results can contribute to the development of more effective teaching toolkits and seminars which can yield

useful knowledge for students and young entrepreneurs and will improve their problem-solving skills in case of resource constraints. Furthermore, the development of students' curriculum will lead to more entrepreneurial higher education and will enhance innovation generation.

### *1.3 Target groups*

The aim of the project is to bring together actors who have a need for and also the influence on the development of new ideas and implementation of frugal innovation concept in the region. By bringing them together, the actors get informed and involved, making it possible to exploit synergies stemming from that exchange. The Regional Partnership Plan clearly identifies the stakeholders that play essential role in the promotion of frugal innovation.

- **Higher educational actors (teaching staff, management, students):** They have the greatest influence on the young studying in higher education, their engagement during the project completion is essential. Fostering frugal innovation mindset at the university can be executed with the involvement of teaching staff and the commitment of the management. The teachers can demonstrate the relevance of frugal innovation at the courses and students can utilize it during their internship. Furthermore, students can contribute to economic development and social issues by developing new ideas aiming to fulfill social needs.
- **Local business experts / entrepreneurs:** They personally transfer the competences and motivations related to innovation through participating in the project and sharing experiences. They can also provide an important input in the development of the teaching toolkit created for the teachers.
- **Local non-profit organizations and institutions (e.g. Chamber of Commerce, professional community, club, etc.):** Involvement of such organizations can enhance the efficiency of implementing frugal innovation mindset in the region. The collaboration is more efficient if it is established on the basis of existing partnerships, using their experience and network of contacts. In most regions, alongside general professional organizations, there are organizations supporting teaching and innovation skills of students, thus their involvement offers a good starting point for better understand the current economic climate.
- **Local governmental and municipal actors:** Boosting innovation thinking among the key stakeholders is a priority in most regions for governmental and municipal institutions, and thus very often accompanied by publicly funded programs. In order to exploit the consistency and synergy between existing programs, it is practical to align the work of the partners with current as well as planned measurements. Naturally, this can be done most easily by involving relevant policy makers already at an early stage of the project.

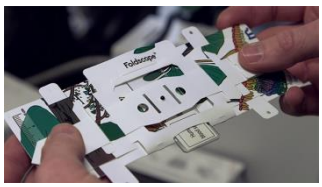
# 2 Assessment of frugal innovation in the current economic climate

Frugal innovation is not a well-discussed topic or term in general in the area of Primorje- gorski kotar county and even in the territory of the Republic of Croatia. In order to gain a better insight from the relevant stakeholders, we organized a one-day meeting with representatives of non-profit organizations (VET and Chamber of Commerce), teaching staff at the university and representatives of VET institutions and entrepreneurs. Our goal was to familiarize these stakeholders with the concept of frugal innovations and set up specific tasks to identify obstacles that could endanger the educational program of saving innovativeness.

After a one-day workshop, we created and conducted online surveys with the aim of gaining a better insight into Furthermore, an online survey is conducted to gain a better insight into stakeholders' perception of the subject, and to gain advice and opinion on learning resources.

### *2.1 Qualitative research – Awareness of frugal innovation*

At the beginning of the workshop (one-day meeting) held by the Rijeka Development Agency Porin Ltd, the following internationally well-known examples of frugal innovations were presented to participants, since they were not familiar with the term and thematic as well as the concept of frugal innovations, is was the best way to give them the impression and perception of frugal innovations so that they could fully understand the concept. Below are examples of frugal innovations:

| | |
|---|---|
| **Mitti Cool**<br>  | Mitti Cool **is a clay fridge without electricity. This product can keep food and water cold in high temperature regions (like in India) where the infrastructure is less developed and inhabitants do not have electricity in their houses. This is an** *infrastructural barrier* **that Mitti Cool can overcome.**<br>**https://www.youtube.com/watch?v=at0cwScRXHc** |
| **Foldscope**<br>  | **Foldscope** is a microscope that is made from paper and a single lens. The microscope is assembled by the user and aims to enhance scientific interest of the society with making this microscope available globally at an affordable price. Thus, this frugal innovation was developed due to ***cost barriers***.<br>https://www.youtube.com/watch?v=vQJDV4GE4aY&t=65s |
| **Nokia 1100**<br>  | **Nokia 1100** is a well-known mobile phone which was developed for developing countries where the newest cell phones with high-tech features are not affordable, but a wide range of the society need basic communication tools. Although this frugal innovation was inspired by overcoming **cost barriers**, it is also a good example of reducing unnecessary features of a product.<br>https://en.wikipedia.org/wiki/Nokia_1100 |
| **Solar light bulbs**<br>  | **Solar light bulbs** are also well known in developing countries, specifically in the Philippines where slums are growing without any plan and the infrastructure is less developed. Solar light bulbs aim to let sunshine into the "houses" because there are no windows and electricity in the houses. Basically, this innovation provides solution against ***infrastructural barriers***.<br>https://www.youtube.com/watch?v=hPXjzsXJ1Y0 |

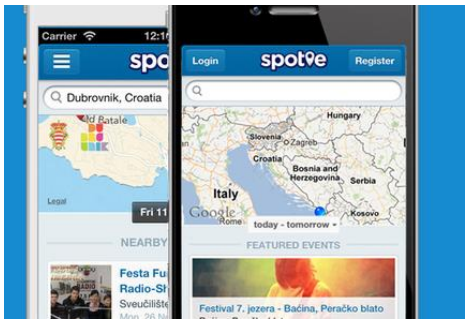
### 2.1.1. Frugal innovation examples in our region

After getting acquainted with internationally well- known examples of frugal innovations, we also introduced some examples of frugal innovations from our region. In Croatia as well as in Primorje- gorski kotar county, there are only two articles that are related to the subject of frugal innovations, so it was little bit difficult to find and set the examples, but through three criteria that are characterizing frugal innovation (cheaper than other available products (lower production and sales price), available to a wider population, concentration on basic functionality, we have identified some of the examples in our region:

| | |
|---|---|
| **The bookcross bookstore** | The bookcross bookstore wooden house is the first example of frugal innovation in our region ( Primorje-Gorski Kotar). It is located in City of Opatija and it is a part of a global movement that is based on the belief that the book is free and accessible to everyone. The houses are good for tourism promotion, they are educational and available for those who can not afford to buy or rent books. |
| **AnatoMRI**<br>  | **AnatoMRI** is an innovative and completely new approach and a method of learning the anatomy course, which can be used during learning as also as during the exam. AnatoMRI was created in the synergy of the Medical, Technical and Faculty of Civil Engineering of the University of Rijeka, and the equipment was obtained through the project RISK - Development Research Infrastructure at the University Campus of Rijeka. With the help of the new technology, AnatoMRI will be able to use replicas of real human bones created through 3D printers, which will then be able to be reproduced for the purposes of using and learning all students which will be more easier, cheaper and realistic. |
| **Outdoor gym**<br>  | Outdoor gym is placed in a municipality of Lovran, which is located near the city of Rijeka. The Fitness Park Urban S consists of six devices: mini fitness set, mini set fitness set, armchair, side swing, stretchers and abdominal equipment. All the products are the Croatian product of Vojtek Ltd made according to ISO 9001: 2008 and ISO14001: 2004 standards. The products are completely recycled and each device contains a tab with instructions for use, warning and description of functions performed by the body when exercising. Outdoor fitness will undoubtedly improve the tourist offer in the area of Lovran Municipality and will serve all recreational tourists whose sun and sea are not the only choice. By putting outdoor fitness in the environment it is promoting healthy lifestyles and encourage physical activity, |

| | |
|---|---|
| | reducing the number of diseases and problems of overweight in the local community, while also successfully contributing to the social and good psycho-physical condition of our members. "Komušćak". |

After a little of bit of group interaction, the participants that have participated in the one day meeting have listed just one example of frugal innovation in our region:

| | |
|---|---|
| **Mobile application Spotie**<br>  | Mobile application Spotie- it is the first Croatian application for sale and reservation hotel and private accommodation and belongs to the category of geolocation mobile applications. For the use of this application you don't have to pay the commissions, as is the case with some of the world's known reservation services such as Booking.com and Airbnb). It also highlights the events that are being filtered according to the distance, category and time, or according to the wishes and capabilities of the user. |

The conclusion of a workshop (one-day meeting) is as follows:

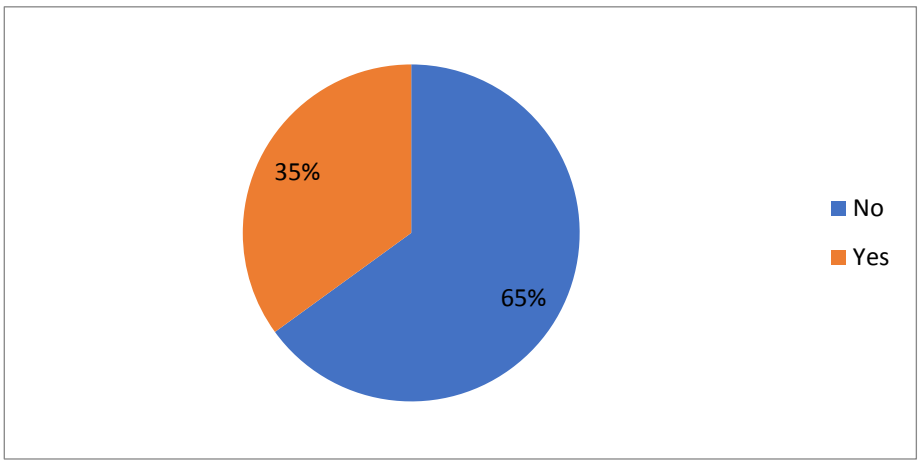
There is no exact Croatian term as well as the definition for the frugal innovation, so for this reason the participants did not even heard about it. Initially, it was difficult for them to understand the term, but after some good examples of the frugal innovations, they were very interested in the subject. Some of the participants are innovators themselves, so the theme for them is very useful and valuable. All participants want to participate in education and the project and think that this topic is very important and necessary for their career. They also consider that it is important to talk more about this topic and to learn more about it. Many people in Croatia believe that to make some innovation it is required a lot of money as well as using only high, expensive and hard-to-find technology.

In order to improve the way of thinking based on the concept of frugal innovations in the Primorje-Gorski Kotar region, it is important to introduce the concept as well as an the explanation of the term. This concept needs to be introduced at several levels: first in high schools, universities, since they are at the beginning of their work career and then as part of education for all directors and management. By applying this concept to their companies, they will reduce the cost of goods and completely change their businesses.

### *2.2 Online survey – Perception of frugal innovation in Croatia*

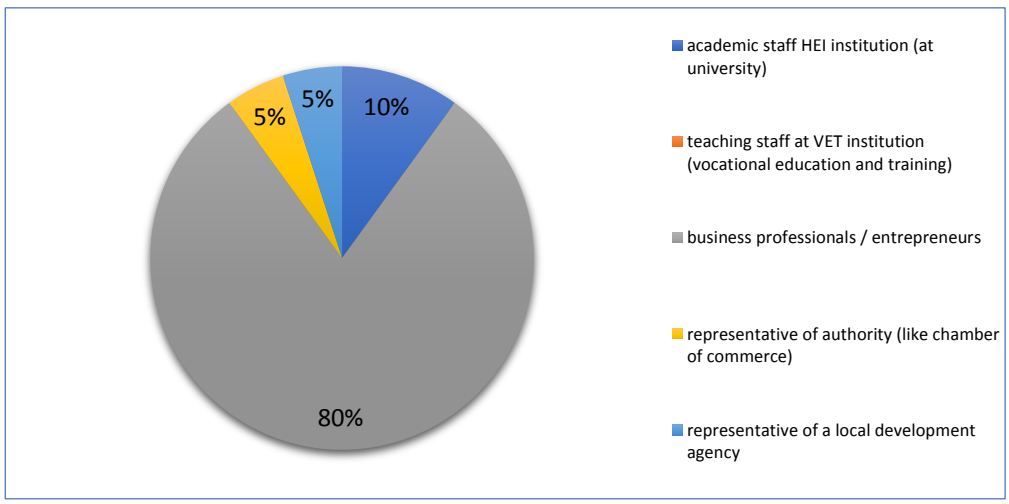
In order to get a better insight into the perceptions of respondents about frugal innovation in the Republic of Croatia as well as get recommendations for innovative approaches, we conducted an online questionnaire. According to the obtained results, only 35% of respondents, as can be seen in graph 1, has heard for the term of frugal innovation, which is really small percentage, especially if we add a percentage of 4.5% of the one day meeting participants who heard about the mentioned term. The above result shows that the term of frugal innovation is not a recognizable term in our area, as well as not precisely determined, and that the respondents are not fully acquainted with it.

**Chart 1.Have you ever heard about frugal innovation?**



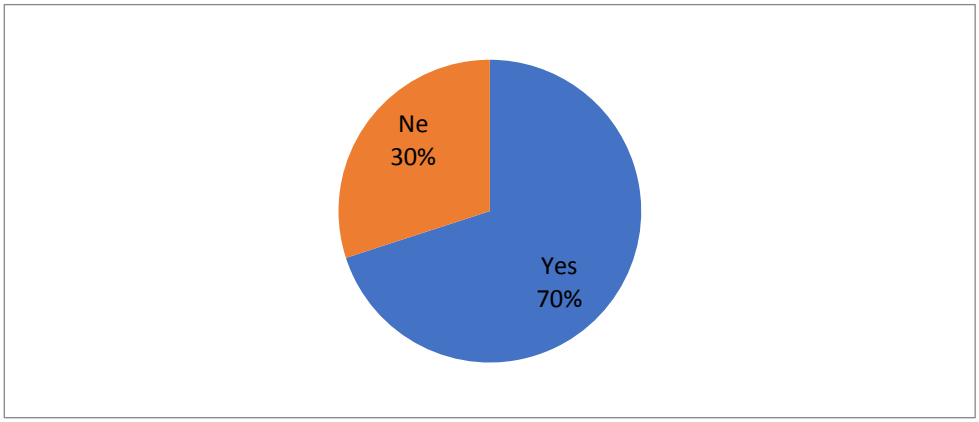

The information that is of great importance to us is the opinion of the respondents about innovations in general but according to their profession. In order to get that answer, we first needed to see the interests of our respondents. The following graph shows the distribution of respondents according to their current occupation. As can be seen, a total of 80% of respondents are business professionals / entrepreneurs, while 10% make academic staff at a HE and VET 5% of the total number of respondents are other occupations. Despite the fact that almost 80% of respondents are business professionals / entrepreneurs (as well as innovators), the percentage of 65% of respondents who have never heard about the term of frugal innovations is very small.

**Graph 2. General opinion about innovations**



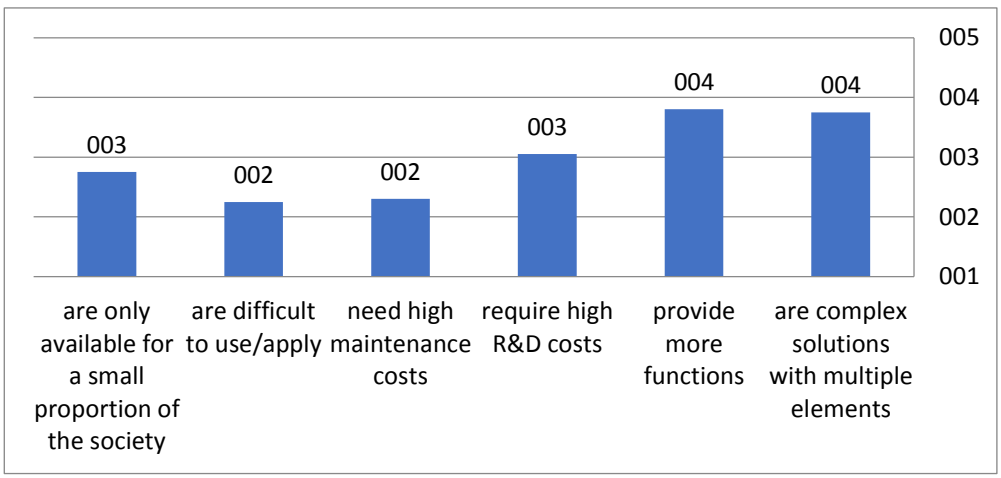
We also, through online research, wanted to find out how many respondents participated in innovation education. While the main goal of the project is education of stakeholders through an online frugal-innovation course, it was important to know if the respondents were educated at all about innovations. As shown in Graph 3, about 70% of respondents participated in one of the forms of innovation education. The result shows that there is a great interest in innovation, however, current education programs do not attach great importance to frugal innovations, especially as this concept is not recognizable in the territory of the Republic of Croatia, and as we have seen before, most respondents are not familiar with the term.

**Graph 3. Have you ever participate in innovation education?**



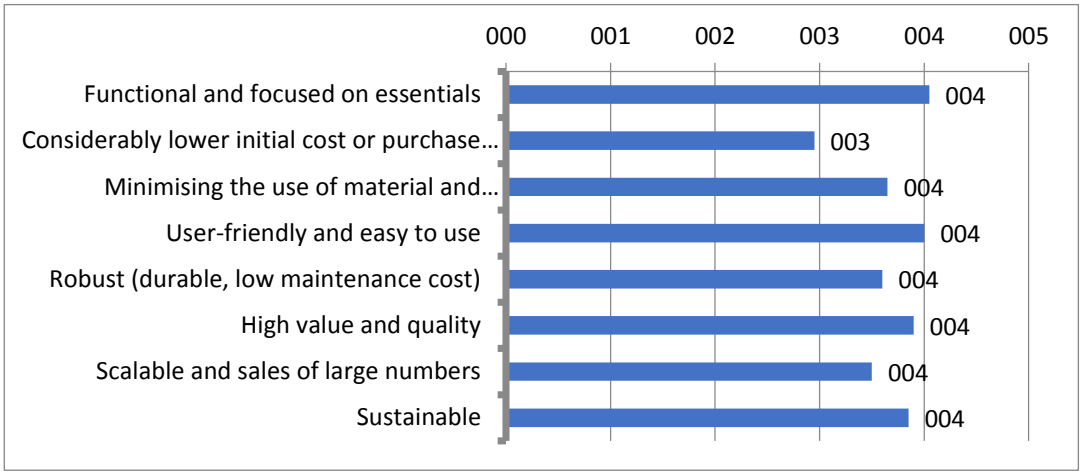

To get a better opinion about the perception of innovations in general, we asked the respondents to tell us their opinion about the features of innovation, because it can be really useful and can highlight some remarkable results in comparison to frugal innovation. As attendees of a one-day meeting stated, respondents in the online questionnaire consider that innovations are complex solutions with multiple elements. Namely, the survey participants were able to evaluate the following elements by grades from one to five, and the results presented are the average of their grades. As can be seen in Graph 4, respondents believe that innovations must provide more functions (3,80) and that are complex solutions with multiple elements but also require high R & D costs (3,05).

**Graph 3. General opinion about innovation**



In the next Graph 5. was presented the respondents' perception of the characteristics of innovation. Respondents were able to evaluate the above mentioned characteristics by grades 1-5 and the results shown in the graph are the average of the given grades. As we can see in the Graph, innovation features evaluate the following: functional and focused on essential elements (4.05), high value and quality (3.9), customizable and sales of a large number of products (3.5), robust (durable and It is important to note that the following features were rated at 2.95 "significantly lower initial cost or purchase price", which tells us that they think that innovation is needed a great financial resource that implements a high price.

**Graph 5. Characteristics of innovations**




The results obtained through the survey suggest the following: Although people believe that innovations are complex solutions, provide more functionality than existing alternatives and represent high value and quality, innovations are usually difficult to apply and are associated with high initial cost.

While in the previous section we showed results related to innovation in general, in this chapter we will summarize the results of frugal innovation. In the online research we gave a brief introduction to the concept of frugal innovations to participants and some examples to introduce them to the meaning of frugal innovations in practice. The introduction was similar to qualitative research where we realized that participants need to be more informed about the concept.

Question “Do you consider the concept of frugal innovations” interesting to compare with the results of the question “Have you ever heard of the concept of saving innovations”. By comparison, as can be seen in the following table, we came to the conclusion that 19 people considered the concept of frugal innovations interesting (19 of them 12 did not know the concept before, whereas 7 people who had previously met the term consider it interesting). Only one person finds the term unattractive. The results are shown in the Table 1.

**Table 1. Awareness and attention to frugal innovation**

| | | **Did you find the concept of „frugal innovation” interesting?** | | **Total** |
|---|---|---|---|---|
| | | Ne | Da | |
| **Have you ever heard about the frugal innovation concept** | Da | 1 | 12 | **13** |
| | Ne | 0 | 7 | **7** |
| **Total** | | **1** | **19** | **20** |

Although the expression is positive, and almost all the participants consider the concept interesting, we wanted to investigate whether the participants intend to participate in education and learn more about frugal innovations and generally about the concept itself if we gave them free online courses. From the number of 20 participants who participated in the survey, 16 wanted to participate in the online course, while only 4 people did not want to participate in the course. In the Table 2. are shown the results of the before explained results.

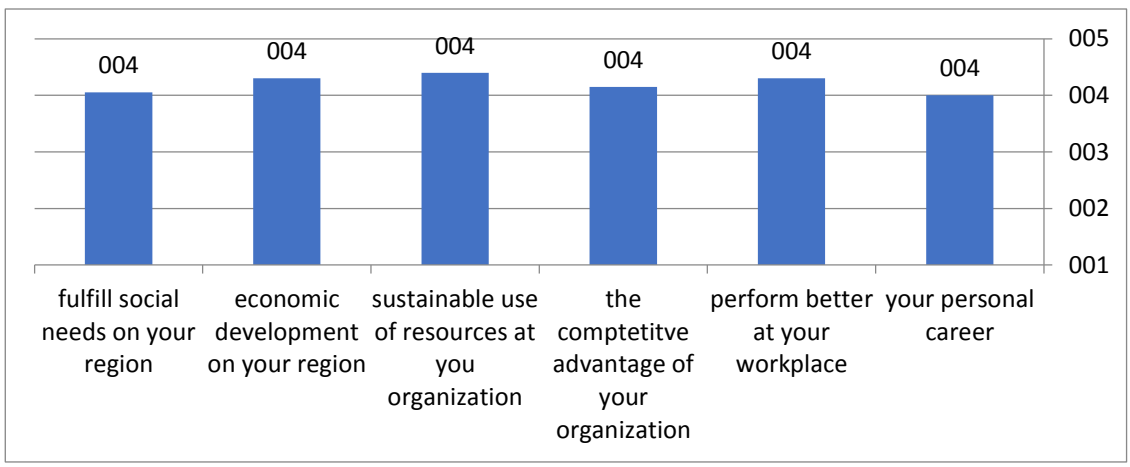
**Table 2. Intention to participate in frugal innovation training**

| | | Would you like to participate in a FREE online training to learn more about frugal innovation? | | Total |
|---|---|---|---|---|
| | | No | Yes | |
| **Have you ever heard of the concept of „frugal innovation"?** | No | 4 | 9 | 13 |
| | Yes | 0 | 7 | 7 |
| **Total** | | **4** | **16** | **20** |

We also wanted to gain insight into the number of respondents who believe that frugal innovation can contribute to different areas. Respondents expressed a very positive view of the potential impact of frugal innovations. The research identifies various factors that can contribute to frugal innovations. The respondents were asked to give their opinion on how much and in what level can frugal innovation impact on a given factors.

Graph 6 shows the potential impact of frugal innovations on their own and on the environment in their opinion. Respondents rated the effects on certain parameters from one to five grades, and according to the results obtained, we evaluated the answers and the average rating was shown in the graph. By the respondents answers, frugal innovations mindset could have a significant impact on their careers, an average of (4,00) and the majority of respondents believe that they could contribute to better performing activities at the workplace. The vast majority of respondents believe that they could have a significant impact on the sustainable use of resources in their businesses. It is worth pointing out that all responses are above grade 4, which actually tell us that respondents consider that frugal innovations are very valuable and useful for their development and for global development in general.

**Graph 6. Potential impact of frugal innovation**



# 3 Knowledge and skill gap

In this chapter, we provide a brief overview of innovative knowledge and skills in the area of Primorje-Gorski Kotar County, the Republic of Croatia and the EU-28 average. We used the European Innovation Scoreboard for the demonstration of innovation in the Republic of Croatia compared to the EU-28 average because it provides a comparative analysis of the effects of innovation in countries EU in 2010 and 2017

## *3.1 Innovations in the Republic of Croatia and Primorje-Gorski Kotar County*

Croatia is a Moderate Innovator. Over time, performance has declined by 1.4% relative to that of the EU in 2010. Relative strengths of the innovation system are in Firm investments, Human resources, and Employment impacts. Relative weaknesses are in Intellectual assets, Attractive research systems, and Innovators. Notable differences are a larger share of employment in Agriculture & Mining, a smaller share of employment in High and Medium high-tech manufacturing, a larger share of foreign controlled enterprises, a lower share of enterprise births, lower buyer sophistication, lower GDP per capita, a lower and negative growth rate of GDP, a lower and negative growth rate of population, and lower population density.

**Tablice 3. i 4. Usporedba relevatnih podataka u Republici Hrvatskoj i EU28**

| Croatia | Performance relative to EU 2010 in 2010 | Performance relative to EU 2010 in 2017 | Relative to EU 2017 in 2017 |
|---|---|---|---|
| **SUMMARY INNOVATION INDEX** | 56.2 | 54.2 | 51.2 |
| **Human resources** | 48.8 | 53.7 | 45.0 |
| New doctorate graduates | 61.5 | 75.6 | 54.2 |
| Population with tertiary education | 60.4 | 66.4 | 58.6 |
| Lifelong learning | 19.0 | 12.5 | 12.2 |
| **Attractive research systems** | 24.8 | 42.5 | 37.2 |
| International scientific co-publications | 83.2 | 134.0 | 94.7 |
| Most cited publications | 20.6 | 33.0 | 32.5 |
| Foreign doctorate students | 10.0 | 16.0 | 14.4 |
| **Innovation-friendly environment** | 37.9 | 54.4 | 40.6 |
| Broadband penetration | 11.1 | 77.8 | 43.8 |
| Opportunity-driven entrepreneurship | 53.0 | 40.5 | 37.6 |
| **Finance and support** | 36.6 | 40.2 | 37.3 |
| R&D expenditure in the public sector | 54.0 | 54.0 | 56.0 |
| Venture capital expenditures | 14.3 | 22.5 | 18.4 |
| **Firm investments** | 104.1 | 108.1 | 96.7 |
| R&D expenditure in the business sector | 29.2 | 29.2 | 26.2 |
| Non-R&D innovation expenditures | 128.0 | 131.4 | 116.8 |
| Enterprises providing ICT training | 184.3 | 138.6 | 112.5 |
| **Innovators** | 79.1 | 62.0 | 72.1 |
| SMEs product/process innovations | 84.5 | 58.2 | 71.2 |
| SMEs marketing/organisational innovations | 74.5 | 69.1 | 83.4 |
| SMEs innovating in-house | 78.8 | 58.4 | 62.6 |
| **Linkages** | 91.7 | 67.2 | 66.5 |
| Innovative SMEs collaborating with others | 107.1 | 52.9 | 55.6 |
| Public-private co-publications | 87.4 | 65.7 | 62.1 |
| Private co-funding of public R&D exp. | 80.7 | 80.1 | 79.0 |
| **Intellectual assets** | 21.4 | 29.8 | 29.6 |
| PCT patent applications | 10.1 | 16.5 | 17.2 |
| Trademark applications | 49.7 | 60.2 | 53.3 |
| Design applications | 3.2 | 19.5 | 20.2 |
| **Employment impacts** | 27.4 | 69.0 | 68.6 |
| Employment in knowledge-intensive activities | 44.2 | 76.6 | 69.4 |
| Employment fast-growing enterprises | 15.5 | 63.5 | 67.9 |
| **Sales impacts** | 60.8 | 26.7 | 25.6 |
| Medium and high tech product exports | 72.9 | 50.0 | 54.0 |
| Knowledge-intensive services exports | 9.3 | 2.8 | 2.7 |
| Sales of new-to-market/firm innovations | 111.3 | 17.4 | 17.3 |

| | HR | EU |
|---|---|---|
| **Structure of the economy** | | |
| Composition of employment, average 2011-15 | | |
| - Agriculture & Mining (NACE A-B) (%) | 11.5 | 5.1 |
| - Manufacturing (NACE C) (%) | 17.2 | 15.6 |
| *of which High and Medium high-tech (%)* | *20.6* | *36.4* |
| - Utilities and Construction (NACE D-F) (%) | 9.8 | 8.6 |
| - Services (NACE G-N) (%) | 54.9 | 63.6 |
| *of which Knowledge-intensive services (%)* | *51.6* | *58.0* |
| - Public administration, etc. (NACE O-U) (%) | 6.5 | 7.1 |
| **Business indicators** | | |
| Composition of turnover, average 2011-2014 | | |
| - Micro enterprises (0-9 employees) (%) | 18.3 | 17.3 |
| - SMEs (10-249 employees) (%) | 41.0 | 38.0 |
| - Large enterprises (250+ employees) (%) | 41.2 | 44.1 |
| Share of foreign controlled enterprises, 2014 (%) | 2.75 | 1.18 |
| Top R&D spending enterprises | | |
| - average number per 10 mln population, 2011-15 | none | 29.9 |
| - average R&D spending, mln Euros, 2011-15 | none | 165.8 |
| Enterprise births (10+ empl.) (%), avg 2012-14 | 2.3 | 1.5 |
| Buyer sophistication 1-7 (best), 2013-14 | 2.7 | 3.6 |
| Ease of starting a business, Doing Business 2017 | 73.0 | 76.5 |
| **Socio-demographic indicators** | | |
| GDP per capita, PPS, avg 2011-13 | 15,500 | 25,400 |
| Change in GDP between 2010 and 2015, (%) | -2.4 | 5.4 |
| Population size, avg 2011-15 (millions) | 4.3 | 505.5 |
| Change in population between 2010 and 2015 (%) | -1.8 | 1.1 |
| Population aged 15-64, avg 2011-2015 (%) | 66.8 | 66.1 |
| Population density, average 2011-15 | 75.0 | 116.4 |
| Degree of urbanisation, average 2011-15 (%) | 68.4 | 74.4 |

*Values in green show performance above 120% of EU, values in red show performance below 80% of EU.*

Source: European Commission (2017) – European Innovation Scoreboard

Since 1995, the County of Primorje-Gorski kotar has been awarding grants through public tenders to the best innovators of the county for their work and contribution to the innovation activity. According to the Development Strategy of Primorsko-goranska County 2016-2020. innovations and new technologies are key factors of economic and social development in today's world and it is therefore necessary to create conditions for a swift and successful transformation of research results and technological innovations into competitive products in global markets, to encourage international technology transfer and the development of technologically-based small and medium-sized enterprises. This is an important part of the development of entrepreneurship, because by creating new innovations as well as their commercialization on the market, it enables the development of new and existing products and the creation of new jobs and technological progress.

From the start of the competition to this date, 176 best innovations have been selected and non-refundable incentives have been granted for the development of the best innovations in the amount of almost 3.000.000,00 HRK (about 400.000,00 EUR-os).

As of 2004, besides the incentives for nine best-rated innovations, non-refundable incentives have been awarded as a contribution to the effort invested and the encouragement of innovative work for all other rated innovators that are not ranked among the top nine sites.

Additional incentives for young innovators (up to 30 years of age) are also foreseen. Three innovations of young authors are stimulated by the author of the innovation, which at the highest place on the collector list is approved for 5.000HRK, the second for 4.000 HRK and the third for 3.000HRK.

In the region there are a dozen associations of innovators whose main activities are to develop awareness of the need to develop initiatives and creativity in the education system and to promote inventive work, introducing the principles and techniques of the invention into innovations, as well as:

- promoting the development of inventive work as a public need,
- influence on the policy of encouraging and developing inventive work,
- contributing to the strengthening of social support for the inventive work of young people,
- awareness of the need to develop creativity in the education system
- contribution to the valorisation of inventive work in the economy
- a training organization for qualified workers, innovators and entrepreneurs of associations and associations of innovators

# 4 Recommendations for innovative pedagogical approaches

The previous sections provided a brief overview of the awareness and perception of innovation in general as well as the perceptions of the examinees on frugal innovation. Now we provide insights into pedagogic approaches that can improve the implementation of the concept of frugal innovation, with an emphasis on educational program and learning about frugal innovations, and the results we get will greatly help with the further steps of the project, namely the implementation of frugal innovation in the European Education Program, as well as creating online course for the entrepreneurs. The results were collected during our survey (one-day meeting and online survey questionnaire).

**Research on pedagogical approaches**

Both surveys (one-day meeting and online questionnaire) provided significant insights into preferred pedagogical approaches in the region. The following sub-sections show the results of these researches.

Discussion on the teaching method highlights some important areas and thoughts that we have grouped into different themes. Some of the proposals referred to the content of the teaching material, while some comments are related to the teaching framework. Below we have pointed out some remarks in the case of entrepreneurs and students.

The majority of participating participants who participated on the frugal innovation workshop fall into a group of entrepreneurs or persons employed by entrepreneurs, so they have a lot of obligations and do not have much time to spend on education. Also, 80% of survey respondents are entrepreneurs / persons employed by entrepreneurs. However, a significant insight into pedagogical approaches was provided by staff employed at universities and vocational education institutions and employees in local non-profit institutions.

Below is a list of the preferred forms of education we have formed as a sum of collected responses from a one-day workshop and online survey questionnaire:

1. online course
2. a course of one month, once a week for 2-3 hours
3. one-day workshop

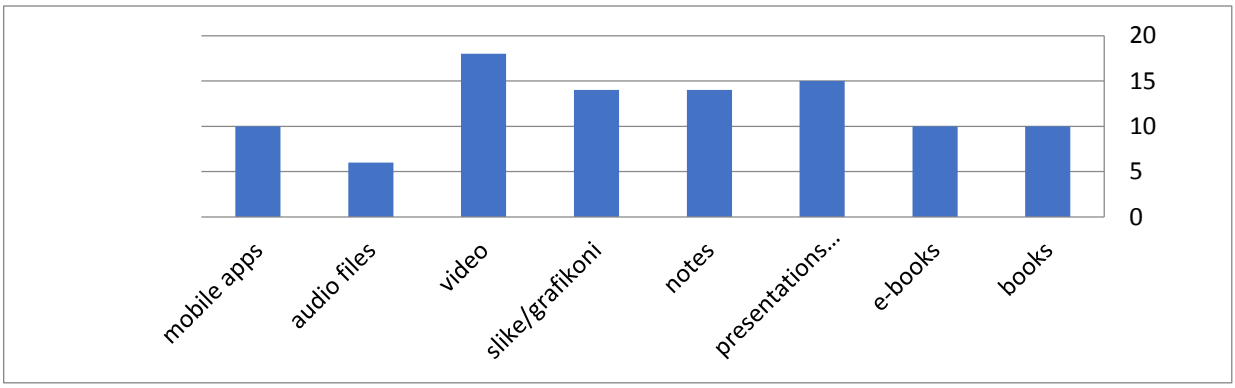
During the workshop, almost 80% of respondents, due to limited time resources, believe that they can only be educated through online courses, and the vast majority of respondents in the survey also chose the online course as a preferred learning resource. Unfortunately, neither one student has participated in our research, and only two students that have participated in a workshop said they prefer the one month course, since with the help of the teachers, they can easily master the material.

All respondents agreed that they could work the best and most efficiently through the interplay of tasks, situations task and brainstorming to enter to the subject.

The aim of our project is as we have already mentioned, educating the population about frugal innovations. Since during the qualitative research we paid attention to learning methods, we also explored the learning materials and teaching methods in the online survey. As the results show, respondents chose the video (18) as the most important learning material, as through videos they can easily perceive the subject. Most of the respondents mentioned the presentations (15), referring to the Power Point presentation or Prezi etc., and behind the above mentioned results, the respondents also selected the notes (14) and the images and graphs (14). Next, there are books, e-books and mobile applications (10 selections), and the least of the respondents selected audio tracks as

their preferred learning resource. Online research has shown us that in future online courses we need to include videos to get better results, so the participant can get more information about the subject.

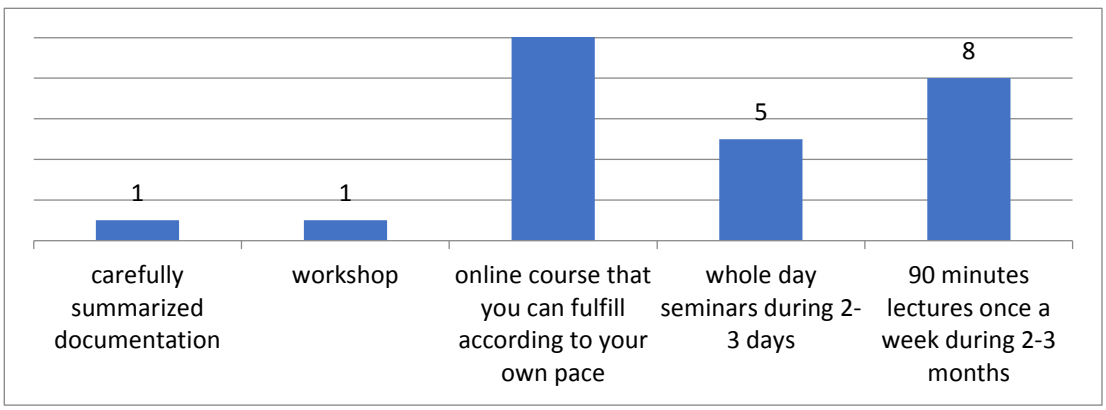
**Graph 7. Preferred learning materials**




Respondents had doubts about the preferred learning method, and some respondents chose multiple responses. The vast majority of respondents 11, has chosen the online course as the best learning method, since they can attend it at their own pace, as all respondents are employed. The teaching method followed is 90 minutes of lectures, once a week for 2-3 months, and a total of 8 respondents decided for this method of learning. Next, they choose all-day seminars for 2-3 days for which 5 people are selected, and 1 for the workshop, and carefully summarized documentation (up to 10 pages). Also, some respondents indicated an interactive workshop through practice, by learning their own mistakes as the best method. In addition to the above, some respondents responded following:

1. Time is the most important element - short-term results must be achieved, more importantly, as soon as possible after the education you should start applying the learned concepts. By me, the ideal way to teach is "learning by doing," with a person who has practical experience and can provide advice at any time. Theoretical terms and concepts are extremely useful for the mentality of an individual (based on such knowledge decisions will be made, projected alternative solutions to the problems, and a much wider concept of each situation and activity). - this can be covered with a written document (up to 10 pages max). - long-term benefit is small but not negligible (in certain situations, only knowing the meaning of the term "frugal innovation" can bring extraordinary benefits, as it will stimulate detailed self-study and application of innovation concepts that perfectly fit the concept and are planned to develop in a given company). Practical activities and concepts that can be immediately applied in business - exceptional short-term and long-term benefits in terms of productivity and competitiveness. If education (practical lecture) destroys 5-10 practical concepts efficiently and each participant starts applying one concept - this is the top education.

**Graph 8. Preferred time frame**



# 5 Strategic Action Plan

The Strategic Action Plan summarizes the necessary steps that should be carried out to implement frugal innovation mindset in any region. This plan can be adopted by any organization that decides to engage in frugal innovation promotion.

The Strategic Action Plan consists of the following phases:

1. PHASE 1: Setting up the team
2. PHASE 2: Approaching potential partners for cooperation
3. PHASE 3: Engaging partners in cooperation
4. PHASE 4: Organizing the educational activities
5. PHASE 5: Monitoring the execution and sustainability

***PHASE 1: Setting up the team***

As in every project, there is a need for a coordinating team that is responsible for organizing all activities and delegate tasks within the participants. The coordinator team performs the following functions:

| Functions | **Tasks** |
|---|---|
| Account management deputy | ▪ Establishing and keeping contact with the stakeholders and members of the cooperation partners<br>▪ Creating contact lists<br>▪ Requesting stakeholders, making arrangements with them<br>▪ Keeping ongoing contact; informing and getting feedback from the stakeholders |
| Education deputy | ▪ Educational organizational duties<br>▪ Drawing up the related educational program (course, summer school, student competition, etc.)<br>▪ Implementing frugal innovation mindset in the educational materials<br>▪ Keeping contact with HEI and VET actors |
| Dissemination deputy | ▪ Communication activities<br>▪ Promoting the project among relevant stakeholders<br>▪ Informing local media about the milestones of the project<br>▪ Producing dissemination materials (flyers, posters, etc.) with customized content targeting stakeholders from businesses and academia |

***PHASE 2: Approaching potential partners for cooperation***

At the beginning, the team should prepare **a list of potential cooperation partners**. When compiling a potential partner list, it is more useful to start with a broader list because usually less stakeholder join the project than the expected. As the previous research highlighted, the target group is usually not familiar with the concept of frugal innovation, thus a wider audience should be approached. The following partners should be added to the list:

- Educational institutions (both HEI and VET institutions)

        - Management of the organization (deans, directors, heads of departments)
        - Teaching staff
        - Representatives of student organizations (student unions, student clubs)
        - Representatives of start-up communities and organizations in the region
        - Management of university spin-off companies
    - Non-profit organizations
        - Representatives of the Chamber of Commerce in the region
        - Local authorities
    - For-profit organizations
        - Entrepreneurs in contact with the university (especially those who have already been at the universities as lecturers and/or students)
        - Management of incubator houses and accelerator programs
    - Actors of regional media

After drawing a list of potential partners the team should prepare an **"offer"** that clarifies the ways a partner can be involved in the implementation of the project. In the present formulation, "offer" refers to these opportunities and "ways to be involved" which can be offered to the partners. In order to define the offers, it is practical to divide the potential partners in the following categories:

**Teaching staff:**

- **Giving a lecture**: It is useful to involve teachers and professors with extensive knowledge in management, marketing and innovation in the program to extend the general innovation knowledge of students through short lectures.
- **Mentoring:** Similarly to professionals, teachers with theoretical experience can also give important feedback to students through direct interaction. It is particularly efficient if mentoring by an entrepreneur and a teacher is applied in combination.

**Local SMEs and entrepreneurs:**

- **Defining the problem:** The opportunities and challenges of local economic climate and market. Entrepreneurs should be involved in defining the central problem as well as in filtering the student venture ideas; moreover, they may be requested to define potential entrepreneurial ideas.
- **Sharing experience:** A teaching toolkit can be prepared for the purpose of a wider use of the educational activities carried out by the team, for which entrepreneurs may provide valuable input as well as feedbacks for already prepared teaching material.
- **Mentoring:** The most efficient way of transferring knowledge is having direct, personal interaction between the entrepreneurs and the student. Mentoring may refer to team work incorporated in an academic course, to supporting a team participating in a university competition, and even to giving advice to a start-up (student) firm.

**Other stakeholders:**

- **Dissemination:** It is an important element in the success of the program to raise the awareness of the program by the most stakeholders possible. In this respect, every stakeholder can contribute by advertising through their own communications channels. It is itself valuable information if they share the news about participating in the program on their online platforms.

After the offer is completed, that should be sent out to the contact lists prepared in the previous sections. The following aspects should be considered in sending out the call:

- **Segmented message:** As the partners in the team may have various, different motivations and interests, a one-size-fits-all general approach should be avoided. Instead, it is practical to send out the call by segments separated.
- **Personalized sending:** The importance of personalization has already been emphasized, according to which it is useful to register the name of the internal contact person who has a direct (personal) relationship with a given member of the contact list. Instead of using the central email address of the project, each contact should receive messages or calls from this internal contact person**.**
- **Brief content:** While sending the message to the stakeholders,it is still practical to announce only the most important message. It is enough to provide the details when it is clear who is actually involved in the project. Providing too long and complicated content, results in refusal without reading.
- **Monitoring the process:** Establishing contact may take place via email, as well as social media channels. Whatever channels are chosen, it is important to ensure ongoing monitoring (opening rate, clicking rate, etc.), and, where justified, resend the message ("reminder"). It is useful to put a link in the first message to be used by those interested, thereby separating uninterested people (who opened it but did not click on the link) from unaware people (who did not even open it).

***PHASE 3: Engaging partners in cooperation***

Now, the potential partners are invited to join the project and hopefully we received all feedbacks who will join and who won't. Based on the feedbacks, the interested stakeholders should meet, thus a kick-off meeting should be organized. The following topics must be covered by the coordinator team in the meeting:

- The aim of the project
- Brief description / introduction of members
- Brief description / introduction of frugal innovation – the previous research highlighted that a short introduction and discussion of frugal innovation is necessary for deeper understanding of the concept
- Presentation of the possibilities of involvement in the program targeted at frugal innovation
- Collection of attendant feedback
- Dedicating tasks for partners

A needs assessment should be sent out to the attendants of the kick-off meeting (and the ones who cannot attend but express their interest), in which they indicate their expressions of interest and the form of involvement. As the offers are presented in detail in the kick-off meeting, every stakeholder is aware of how they can take an active role in the project.

In order to record the ways of involvement approved it is practical to formally confirm an action plan. This document should include the following:

- The fact of and rationale for establishment of cooperation
- The name of involved parties and organizations
- The aims of the project
- The measures needed to pursue the aims of the project

Signing this document offers a good opportunity for the involved parties to meet again and elaborate the practical implementation of the collaboration in the course of a final consultation before starting the actual educational activities.

***PHASE 4: Organizing the educational activities***

The formal establishment of the project can be followed by carrying out the actual activities fostering frugal innovation. This process can be divided into three sub-steps:

- **Recruitment:** In this step, students, entrepreneurs and teachers (at HEI and VET) need to be informed about the frugal innovation program and the platform for application. Participants may be accessed via the following communications channels:
    - Online interfaces (its website, Facebook page, Twitter channel)
    - Online advertisement
    - Encouraging the applied participants to share their own participation on their social portals
    - Informing the management of each faculty through the central educational and/or marketing directorate
    - Informing students in person (during courses) through fellow lecturers involved in the program

- **Education:** This is the implementation of the educational program itself, which may take various forms, for example:
    - Part of an existing course
    - Online course
    - Workshop
    - Competition (for students and/or entrepreneurs)
    - Summer school
    - International Week course

- **Evaluation:** It is essential to provide acknowledgment outside the scope of mere knowledge transfer to motivate the participants involved in the program. It may take place – depending on the implemented way of education – in the form of:
    - Credit obtained for accomplishing the course
    - Prize achieved in competition
    - Document (certificate) verifying the completion of course

***PHASE 5: Monitoring the execution and sustainability***

In the course of implementing the educational activities, an open and flexible attitude on the part of both the organizers and the participants is crucial. It is important to emphasize that there are no two identical programs, the

outcome of a program changes in place and time, generally according to the specificities of the involved parties. This is the reason why the ongoing monitoring of the program is important.

The following measures may serve as a solution to the described challenges:

- Taking part in local events with the aim of promoting the program and frugal innovation mindset, as well as recruiting members.
- Joining other programs, projects and applications in the region where frugal innovation can be presented
- Promoting the educational elements using online media
- Including participants representation to the project to help strengthen the programs

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