

Sándor Kerekes

## CREATIVE DESTRUCTION AND CIRCULAR ECONOMY. THE CONCOURSE AND THE ATTITUDE OF PHD SCHOLARS

### ABSTRACT

The circular economy strategy is closely linked to the EU's efforts to achieve a radical reduction in the amount of waste going to landfills. It is wrong to think, that packaging waste should be used within the packaging industry, as many have suggested in the strict sense of producer responsibility. Schumpeter saw creative destruction as one of the preconditions for development. The circular economy should be offensive. The economy must be transformed from a stock economy to a flow economy to achieve significant improvements in productivity and material efficiency. The public discourse on the state of the environment is very diverse. I would like to show, through a short empirical study with the help of Q methodology, how PhD students have very different views on issues related to sustainable development and the circular economy.

**KEYWORDS:** circular economy, Hungarian waste management policy, disruptive innovation

The need for a shift to a circular economy has been the subject of much debate. The most common arguments in favour of the switch can be grouped into three main categories. The majority of experts and politicians see the need to switch from a linear to a circular economy to reduce the amount of waste going to landfills. This is the main requirement of the EU and, to some extent, of the national circular economy strategy. The most important objective in these documents seems to be to radically reduce the amount of waste going to landfills. By 2035, we should achieve a target of less than 10% of municipal waste going to landfills. This is still 24 % on average in the EU and more than 40 % in Hungary.

Another important argument for a circular economy is the expected depletion of natural resources. This idea dominated the first report of the Club of Rome, (Meadows, Randers, and Meadows 2013) it was raised at the time of the first oil price explosion and has been regularly reiterated ever since, while a historical analysis of commodity prices clearly shows that, contrary to economic logic,

commodity prices have not risen in the last hundred years and it is generally accepted that the shortage of raw materials is in fact 'a long time coming'.

The third is the most striking argument for the need for a circular economy, and certainly the most significant for sustainable development, which is based on the premise that the current economy creates objects and infrastructure that we will eventually not use. Heck, Rogers, and Carroll (Heck, Rogers, and Carroll 2014) note that even mature, peak-of-life industries such as the automotive industry generate significant amounts of so-called structural waste. The authors rely on statistical data to prove that 9G% of the time over the lifetime of a car is spent in a parking lot. It spends 0.8 % of its lifetime looking for a parking space, 0.5 % of its lifetime stuck in traffic and only 2.G % of its lifetime in traffic. In addition, 8G % of the fuel used is not used to propel the wheel, marginal is the amount of energy that is used to move people. (Schulze 201G) (Foundation 2015)

The business world sees the possibility of growth without limits as the main advantage of the circular economy. The hope of creating an economic model without limits to growth is sometimes highlighted in the title of studies by consultancies that influence the business world. Lacy et al. publication is entitled Innovative Business Models and Technologies to Create Value without Limits to Growth (Lacy et al. 2014)

The circular economy should be understood in terms of network logic, as a complex system in which everything is interconnected. This is much easier said than done. When developing a circular economic strategy, one should bear in mind the very important idea of Schumpeter (Joseph A. Schumpeter 197G), which he called in his book "creative destruction", published in 1942. In the innovation process, he believed, the old must be overtaken, destroyed, which entails losses, possibly economic setbacks, but the possibility of marginal improvement of the old makes it impossible to create truly breakthrough innovations.

"Creative destruction refers to the incessant product and process innovation mechanism by which new production units replace outdated ones. This restructuring process permeates major aspects of macroeconomic performance, not only long-run growth but also economic fluctuations, structural adjustment and the functioning of factor markets. Over the long run, the process of creative destruction accounts for over 50 per cent of productivity growth. At business cycle frequency, restructuring typically declines during recessions, and this adds a significant cost to downturns. Obstacles to the process of creative destruction can have severe short- and long-run macroeconomic consequences." (Joseph Alois Schumpeter 197G)

There is another important idea that is worth mentioning at the outset when discussing the circular economic strategy. It was formulated by President John F. Kennedy on 25 May 19G1, and it is the "moonshot" philosophy. Kennedy saw clearly that radical innovation was needed to get a man to the moon. A few percent

improvements to existing systems will not get us any closer to such large-scale exploration. (Logsdon n.d.)

Social and economic systems need to be changed to achieve the desired 10-100 close efficiency improvements. Unfortunately, you cannot create the new without creative destruction. On some of Spain's over-visited tourist islands, for example, it has been realised that no more hotels can or should be built because the island's carrying capacity can no longer support them. Many hotels need to be demolished and, learning from the mistakes of the past, replaced by hotels that attract tourists who do not generate mass consumption. This will lead to temporary economic setbacks and social tensions, but in the long term, only such a radical approach will ensure that the island can be truly sustainable in the future.

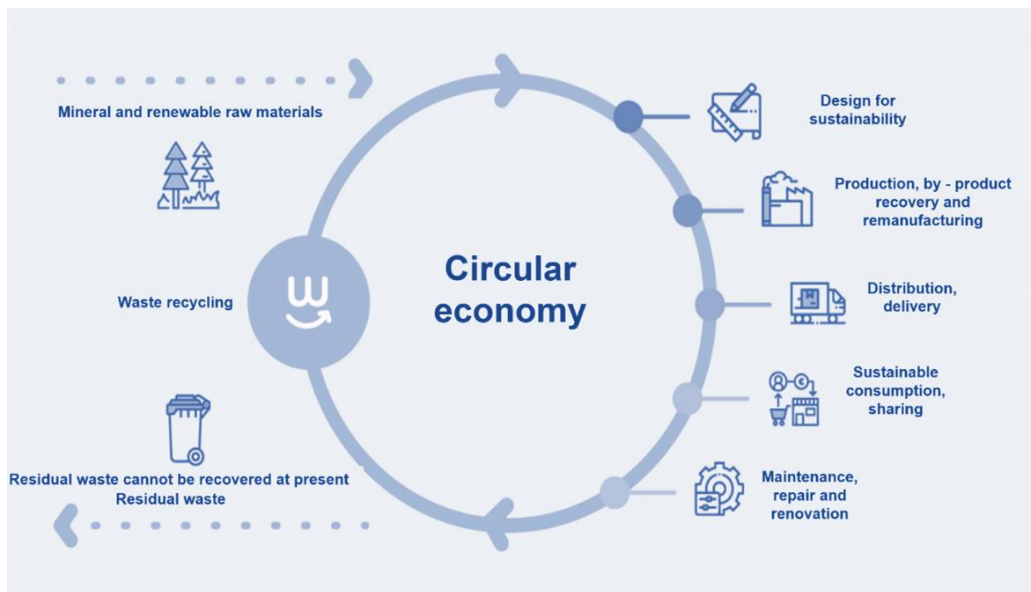
In the case of Hungary, it is not possible to think of a separate agricultural policy, waste management, tourism, water management or infrastructure construction. Some things have to be creatively destroyed to be replaced by something truly sustainable. The social scientist must act as a conductor in such a space to explore and resolve conflicts, to accept the pain of 'creative destruction' to create the new, ten times better and more efficient in place of the obsolete.

Industry 4.0 will free up labour, it will make sense again to improve what can be improved. The philosophy of use and discard is the ruin to be cleared away and replaced by a new form of a service economy based not on the sale of objects at any price, but the sale of the services provided by objects. This will minimise the use of raw materials and maximise the employment of labour. Industry 4.0 must go hand in hand with the implementation of the circular economy.

## 1. THE CIRCULAR ECONOMY CONCEPT AND BUSINESS MODELS

In the previous sections, we have used the term circular economy many times without explaining the concept. Of course, everyone has a colloquial idea of this concept, but it is time to attempt the impossible, since, as we know, an essential characteristic of "wild" problems is that we cannot even define what the problem is. The number of "designers" is the number of interpretations, and we can take this for granted. However, if we want to attempt to clarify our knowledge, I think that the following definition from 2015 is perhaps the most comprehensive one that captures the concept of a circular economy. "A circular economy is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at a time, distinguishing between technical and

biological cycles. This new economic model seeks to ultimately decouple global economic development from finite resource consumption." (Foundation 2015)



1. **figure The circular economy (Based on : <https://www.eupoliticalreport.eu/consumers-in-the-circular-economy/>)**

There are countless attempts to represent the circular economy on the internet. (Tóth 2019) In Figure 3, I have attempted to harmonise a referenced schema with the nine tools in the PwC study. The PwC's comprehensive study mentions the following nine instruments of the circular economy: (Osztovits et al. 2018)

1. Design for Sustainability (Sustainable design)
2. sharing
3. maintenance and repair (Maintenance, repair)
4. renovation
5. remanufacturing
- G. recycling
7. recycle during the manufacturing process
8. Reuse
9. Utilization of byproducts

My experience shows that the usual schemes do little more than circularise the linear model (extraction, production, distribution, use, waste), but give the impression that it is really the case that, say, the plastics industry uses extracted natural gas or oil to produce plastic, which is then used to make packaging, for

example, and then the packaging waste is used to make plastic and packaging materials again. This is a serious misunderstanding of the circular economy philosophy.

One can only agree with Laurent Auguste who says: " The emergence of innovative models leads to collaborative dynamics across industries, cities, and communities that reveal new fields of sustainable value creation, such as selling services instead of products, recovering resources from waste, sharing assets, and producing green supplies. Europe offers the perfect ground for a circular economy to truly take shape and for launching disruptive models. It represents a unique opportunity but will require true vision and leadership." Laurent Auguste, Senior EVP Innovation & Markets, Veolia (Schulze 201G)

This is the kind of vision that would allow the full economic potential of the circular economy to be realised. According to the McNamara Foundation's analysis, the results that could be achieved in each of these areas could be as follows:

1. Durable resources that are continuously regenerated over time and that not only last longer but last forever. Scrap metal, for example, can be reused indefinitely because it does not deteriorate. This is not true, for example, for the recycling of macromolecular materials (plastics, paper), where the "virgin" polymer is of much better quality than the reprocessed one. As mentioned above, it is possible to produce plastics that can be recycled back to the starting monomer from which virgin polymers can be produced. Renewable energy and biochemicals can account for about 40 percent of the total savings.

2. Optimal use of products and assets by ensuring that they are shared among users, making them easily accessible and adaptable to specific needs. Sharing idle (not in use) product and asset capacity, excess capacity is sold to others. This can generate at least 10 percent of savings.

3. Promote design and production for the long life cycle. Products are built for longevity because they sell the service they provide, not the body of the product. In this case, it is in the producer's interest to extend the life of the product and even improve its quality through maintenance and renewal. This can achieve savings of around 30 percent.

4. linking the different value chains so that production and disposal ultimately generate zero waste. This implies close cooperation between different economic sectors, including flexible adaptation to each other, which may sometimes mean optimising common technologies rather than the company's technologies. (Peter Lacy et al. 2014)

Since all change affects people, and the success or failure of a new change depends on people's support or opposition, the future success of sustainable development and the circular economy also depends on people. In what follows,

we attempt to understand the opinions of a highly qualified group of students and to identify different types of attitudes using a quasi-quantitative mathematical method.

## 2. THEORETICAL FOUNDATIONS OF THE Q METHOD AND ITS APPLICATION TO THE STUDY OF PHD STUDENTS' ATTITUDES TOWARDS SUSTAINABILITY AND THE CIRCULAR ECONOMY

The Q method was developed by William Stephenson, who originally trained as a physicist and obtained a PhD in physics in 1926, then became a doctoral student of Charles Spearman, who became world-famous for his work on correlation calculus, among other things, and obtained a PhD in psychology in 1929. Stephenson developed the Q method in the early 1930s to study the psychological attitudes of individuals, as evidenced by a letter to *Nature* in 1935 (Stephenson, 1953). The method is essentially an inverse factor analysis, which, according to Stephenson, is a factor analysis of the individuals themselves and not of the traits. The mathematical basis of the method is the same as the mathematical basis of factor analysis. (Comrey, Lee, and Lee 2013)

The Q method aims to find the structure and form of subjective opinions that cannot be proven! "The Q method deals only with subjective opinions, and although these are typically unprovable, they can nevertheless be shown to have structure and form. The task of the Q technique is to reveal this form for observation and study." (Brown 1971) (Brown 1993)

In the Q method, a relatively large number of statements are evaluated with a relatively small number of people involved in the observation. The correlation coefficients that the method calculates represent the correlation between individuals (Comrey & Lee, 2013).

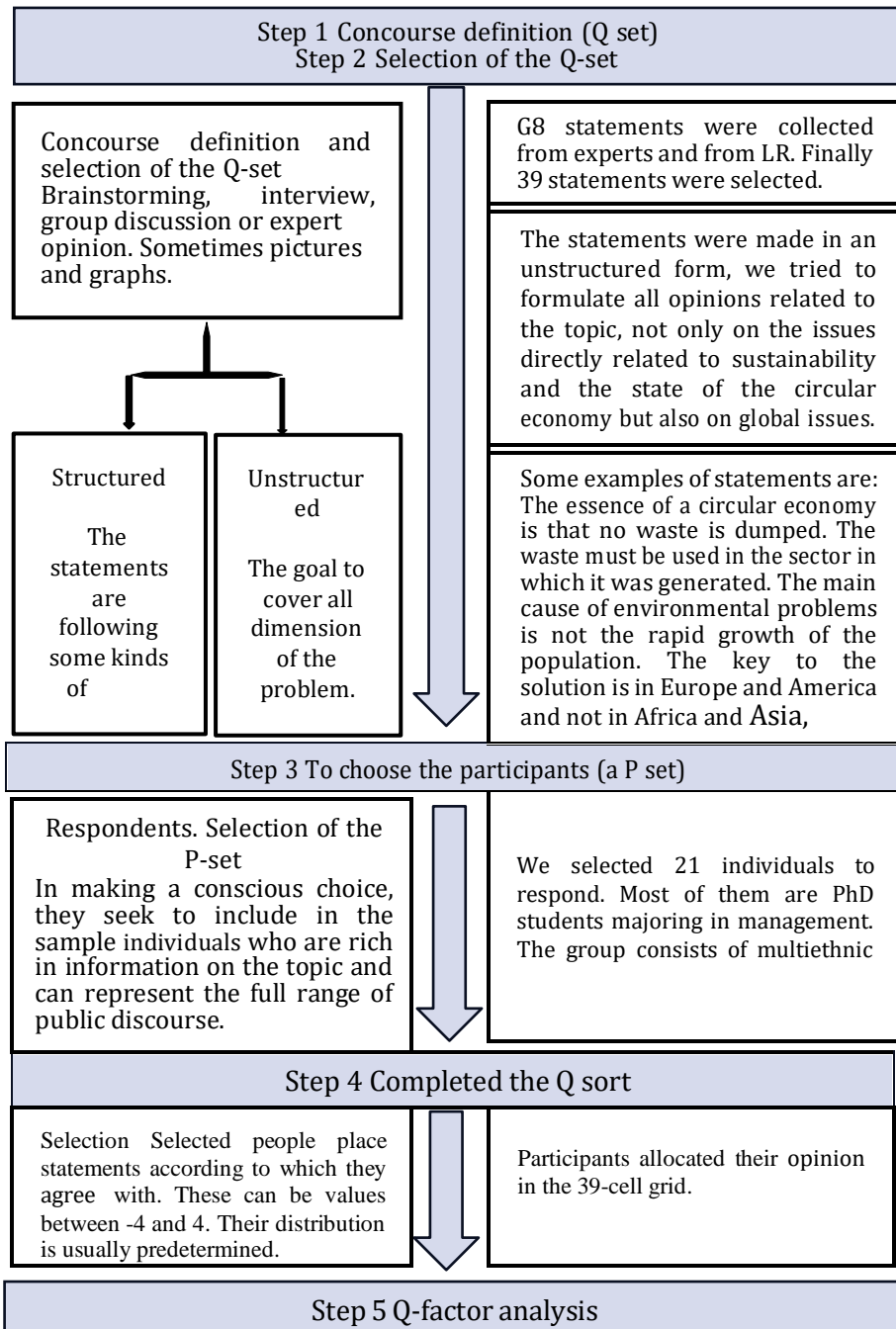
As with all statistical methods, the question of the reliability of the Q method is often raised. Since the method is used to investigate the attitudes of people, the most complex of "complex systems", in principle a very large number of variables and statements would be needed to fully capture the complexity. However, this would make the method impossible to apply. Practical experience has shown that there are only a limited number of differing views on any given topic (Brown, 1993). Therefore, if the set of statements "the Q set" is well constructed (i.e. it contains as wide a range of opinions as possible on the topic under study), we should be able to identify a wide range of different views in public discourse, using as few as 20-60 statements. (Thomas & Baas, 1992) In statistics, the reliability-representativeness of a study is important because we want to know how generalisable the results are. For analyses using the Q method, generalisability is of little importance. In this method, it is the individual persons who represent the opinions that play the main role and not the percentage of the population they represent (Van Exel and De Graaf 2005) p. 3). The Q method is described in several

places in the literature. One such description is found in Baker's article (Baker, Thompson, and Mannion 200Ga). The practical application of the method can be divided into six steps. The first step is the most important for the application of the method, as it has the greatest influence on the quality of the subsequent analysis. In the case of the Q method, representativeness must be ensured for the 'public discourse'. This means that the public discourse has to be explored in great detail and great depth to have a chance of reflecting all, or at least the most important elements of the public discourse in the statements made. This can be quite a difficult task. The number of statements cannot be increased at will, as too many statements may make it impossible to reliably generate a Q-series. Too many statements would make the ranking of statements very time-consuming. Many different methods can be used to learn about the "public discourse". Much can be learned from the experience of previous similar studies. We can use the method of brainstorming and involve the participants themselves in the formulation of the statements. We can also rely on the opinions of experts. In theory, there are two basic procedures for formulating claims. In one case, the statements are formulated in a structured form, in the other in an unstructured form. In the structured case, the claims follow the logic of some theoretical reasoning. In our case, such a theoretical rationale could have been to distinguish between global problems and public social opinion on local environmental issues. However, we opted for the unstructured method because we wanted to conduct a more general study. The flowchart on the next page, based on the diagram by Baker and colleagues (Baker et al., 200G), shows the principal steps of the method and the solutions I used. We selected 21 individuals to respond. Most of them are PhD students majoring in management. The group members belonging to different nationalities, only half of them are Hungarian.

The first step of the method is to describe the "public discourse" in the form of statements. This is the most important step. If the statements can be used to describe the totality of the "public discourse", we can hope to use the method to explore the structure of the public discourse. In general, 30-70 statements can describe relatively complex problems. We used expert work to formulate 39 statements and, using these 39 statements. The study revealed the environmental attitudes of 21 PhD students. All of the students are continuing or have continued their studies in the field of management.

The methodology has been tried many times by my PhD and Master's students (Luda 2012), (Aliyeva 2019), (Besenyei 2019), (Zsóka Ágnes 2005) in this study so I will not describe its application now, but only present it through the analysis of the results, how groups with different attitudes emerge based on subjective opinions, who of course have quite different views on the same thing and will be guided in their everyday decisions or positions by their views on reality.





**Figure 4 The principles and stages of a Q study**

(Source: (Baker, Thompson, and Mannion 200Gb)



### 3. QUASI-QUANTITATIVE ANALYSIS OF SUSTAINABILITY-CIRCULAR ECONOMIC ATTITUDE USING THE Q METHOD

Of the 70 statements collected in the first round, based on consultation with experts, the following 39 statements were finally left, which, in the opinion of experts, well reflect the public discourse on sustainable development and the circular economy. As we will see from the analysis, the statements were sufficiently divided among the students involved in the study. There was only one statement on which all actors had the same opinion, which is very rare in such investigations. Due to respect for personality rights, the demographics of the individuals involved in the creation of the P set were not included in the article, but the results were fed back to the students and the discussion revealed that the results were consistent with the study participants' own self-image. Students were surprised that the method relatively accurately mapped the real values of the actors. From the point of view of the application of the method, it proved to be particularly advantageous that the members of the P set were highly qualified persons committed to scientific research and formed a sufficiently heterogeneous group in terms of both gender and ethnicity ratios. About half of the foreign students come from rich Western European countries, while the other half come from developing countries, Africa and the Middle East. The public discourse is represented by the following 39 statements.

#### 1. Table The Q set. The concourse represented by 39 statements

1. International sustainability rankings are led by countries (such as the Scandinavians) that have too high an ecological footprint. These countries are not developing sustainably.	2. The global environmental crisis was created by rich countries in the last century. They must also solve the crisis!
3. The EU has made significant efforts over the last decade to reduce the risk of climate change.	4. Conservation is impossible on densely populated continents, biodiversity must be preserved where few people live!
5. The UN sustainability goals are unattainable for the poorer countries of the EU.	G. If we seriously want the countries of the developing world not to burn their forests, rich countries should compensate them for their lost profits.

<p>7. In rich countries, people live in the present and are not interested in the future. At most, they do something for the environment when it also affects their health.</p>	<p>8. The most serious environmental problem today is caused by flying dust because it enters our lungs directly and reduces our chances of life.</p>
<p>9. Substances that cause direct damage to health are only released into water or air in developing countries.</p>	<p>10. Tap water still contains hormones and residues that negatively affect human fertility.</p>
<p>11. In most European municipalities, the quality of tap water is the same as that of bottled water.</p>	<p>12. Most people are unable to decide what foods are harmful to their health.</p>
<p>13. The use of single-use plastics and types of plastics that can only be incinerated as hazardous waste (eg PVC, polystyrene) must be prohibited!</p>	<p>14. Plastics are essential in the economy. They are even less harmful to the environment than the materials used to replace them.</p>
<p>15. The general state of the natural environment of Central Europe is better than the average of the natural environment of the European Union!</p>	<p>1G. Biodegradable plastics do not degrade in the seas either. They cause more environmental problems than their environmental benefits.</p>
<p>17. The essence of a circular economy is that no waste is dumped. The waste must be used in the sector in which it was generated.</p>	<p>18. The essence of a circular economy is not waste management. It is an offensive strategy that is holistic and at the same time increases productivity and also reduces the burden on the environment.</p>
<p>19. Generally, the polluter has to pay for the damage caused, but the victim of the pollution also must do everything possible to reduce the cost of protection.</p>	<p>20. A more expensive product and service is usually also of better quality and less environmentally damaging. State intervention should also be used to restrict the marketing of rapidly obsolete products.</p>
<p>21. Wealthy people usually live in places where the impact on the environment is barely perceptible, so they do not feel they should act either.</p>	<p>22. Climate change could be reversed in the next thirty years, and to this end, citizens of rich countries would have to give up only 1-2 percent of their consumption.</p>
<p>23. Climate change cannot be stopped, but rich northern regions can adapt.</p>	<p>24. The main cause of environmental problems is not the rapid growth of the population. The key to the solution is in Europe and America and not in Africa and Asia.</p>

<p>25. Without global coordination, global problems cannot be solved, the powers of the United Nations would have to be significantly increased to play a kind of world-state role.</p>	<p>2G. Due to the spread of robotisation, the globalization of the economy is losing its significance. Some of the mass production is returning to Europe and the US.</p>
<p>27. Precision agriculture is radically reducing the environmental impact of agriculture, while yield averages are also rising.</p>	<p>28. The negative effects of urbanization can only be reduced by the rapid development of public transport. The electric car only delays the development in a favourable direction.</p>
<p>29. Urbanization improves eco-efficiency and reduces environmental impact. As urbanization progresses, the world's population will become poorer but the world will become more sustainable.</p>	<p>30. People die of cancer because they live longer and not because they are exposed to adverse environmental effects.</p>
<p>31. The electric car is just another dead end to mobility. Due to the progress of urbanization, traffic can only be solved by public transport.</p>	<p>32. Robotization frees us from hard and monotonous work. More free time intensifies our human relationships.</p>
<p>33. The world's global problems can only be solved by significantly reducing our consumption. This is not impossible, we should just give up what we don't need anyway.</p>	<p>34. The empowerment of the "desire to possess" is the main cause of the destruction of the environment. The needs of up to 10 billion people could be met if we did not want to own the objects, but just enjoy the services they provide.</p>
<p>35. We could live in much smaller apartments if we ate in restaurants and cafes and held family gatherings in restaurants.</p>	<p>3G. Automation allows you not to wash and iron at home. The laundry rooms in the flats will not be needed in the future.</p>
<p>37. Every living thing is a value in itself. Mosquito control and rat control should also be kept in mind.</p>	<p>38. In the 21st century, it is not the economy or politicians but climate change and epidemics that are shaping the world.</p>
<p>39. The food supply of humankind requires the authorization of genetically modified foods.</p>	

The 39 statements were rated by 21 colleagues on a 9-point scale, with -4 for strongly disagreeing and +4 for strongly agreeing.

#### 4. IDENTIFICATION OF FACTORS, RESULTS OF THE ANALYSIS

The PhD students evaluated the claims and entered data into the software and performed factor analysis. Without going into statistical detail, only the tables necessary for the interpretation of the results are reported below. The factor weight matrix below identifies the individuals associated with each factor.

**2. Table The matrix of factor weights, the persons denoted by x belong to the given factor.**

QS	1	2	3	4	5
1	0.2920	-0.1G35	0.5972X	0.3774	0.1344
2	0.4G04X	0.1795	0.2175	0.2885	-0.1559
3	0.1G50	0.G088X	0.0927	0.3819	0.0181
4	0.2907	0.18G8	0.404G	0.1720	0.4274
5	0.4293	-0.0840	0.2414	0.7238X	-0.0511
G	-0.0203	0.0298	0.3990	0.295G	0.G775X
7	0.7G39X	0.0785	-0.0309	-0.2941	0.15GG
8	-0.0712	-0.0105	0.8118X	-0.0318	0.0087
9	-0.23G4	0.4597	0.11G5	0.G35GX	0.0451
10	0.1GG1	-0.0058	0.1397	-0.1334	0.G293X
11	0.24GG	0.G385X	0.0317	0.1899	-0.0959
12	0.75G3X	0.3022	0.0570	-0.074G	-0.0448
13	-0.1251	-0.1284	-0.7577X	-0.0791	-0.0577
14	0.1G59	0.2285	0.2540	0.G803X	0.03G5
15	0.5G59X	-0.1259	0.1124	0.34G0	0.077G
1G	-0.0547	0.4990X	-0.34G2	-0.1352	0.2274
17	0.073G	0.7953X	0.0938	-0.31G9	0.0259
18	0.5490X	0.2122	0.0219	0.4211	-0.0G19
19	0.4774X	-0.0373	0.1903	0.1104	-0.3221
20	0.1921	0.013G	0.2713	0.0G70	-0.5855X
21	0.25G7	-0.0103	-0.1255	0.G890X	-0.0105
Explored Variation %	14	10	11	14	8

The 21 colleagues were classified into five groups (factors) based on their responses. There were six in the first factor, four in the other four factors, 4; 3; 4; 3 and only one person who did not belong to any of the factors.

Two tables were used to identify the factors. One is a table of factor values, which for simplicity is summarised for each of the five factors. The analysis is facilitated by examining the order of the statements by factor. This step is omitted in this article due to space limitations, but these auxiliary tables have been taken into account in the analysis. The first column of the table shows the statements and the other four columns show the ratings of the four groups with different attitudes (The values represent nine discrete numbers between -4 and +4. The most frequent value for a given statement is shown in each factor.)

The second table is a table of the distinguishing statements for each factor, showing the statements in which the members of that factor have statements in common with each other and different from the others. The table is used below to characterise the most important features of each factor or group of opinions.

### 1<sup>st</sup> Factor **Committed greens** Communalities 14 %

They reject GMOs, they are not enthusiastic about robotization, Consumption must be reduced. Bottled water is the same as what flows from the tap, but tap water contains hormones and other residues. Developing countries would also have a role to play in sustainability. The future is determined by climate change, epidemics and not politicians.

### 3. Table Distinguishing Statements for Factor 1 ( $P < .05$ ; Asterisk (\*) Indicates Significance at $P < .01$ )

Statements	1 Factor	
	Q-SV	Z-SCR
7. In rich countries, people live in the present and are not interested in the future. At most, they do something for the environment when it also affects their own health.	4	1,G7*
10. Tap water still contains hormones and residues that negatively affect human fertility	2	1,04*
3. The EU has made significant efforts over the last decade to reduce the risk of climate change.	-1	-0,G1
19. Generally, the polluter has to pay for the damage caused, but it is also the duty of the victim of the pollution to do everything possible to reduce the cost of protection.	-2	-0,G4
32. Robotization frees us from hard and monotonous work. More free time intensifies our human relationships.	-2	-0,8G*
22. Climate change could be reversed in the next thirty years, and to this end, citizens of rich countries would have to give up only 1-2 percent of their consumption.	-4	-2,40*
39. The food supply of humankind requires the authorization of genetically modified foods.	-4	-2,42*

## 2<sup>nd</sup> Factor Business optimists Communalities 10%

They are satisfied with the EU's efforts, they do not want a sharing economy, they acknowledge that rich countries have more responsibility, they have a well-founded rational business approach.

### 4. Table Distinguishing Statements for Factor 2 (P < .05 ; Asterisk (\*) Indicates Significance at P < .01)

Statements	2 Factor	
	Q-SV	Z-SCR
3. The EU has made significant efforts over the last decade to reduce the risk of climate change.	4	2,11*
2. The global environmental crisis was created by rich countries in the last century. They must also solve the crisis!	3	1,65
8. The most serious environmental problem today is caused by flying dust because it enters our lungs directly and reduces our chances of life.	3	1,18*
33. The world's global problems can only be solved by significantly reducing our personal consumption. This is not impossible, we should just give up what we don't need anyway.	-1	-0,63*
7. In rich countries, people live in the present and are not interested in the future. At most, they do something for the environment when it also affects their own health.	-2	-0,72
3G. Automation allows you not to wash and iron at home. The laundry rooms in the flats will not be needed in the future.	-4	-2,02*

## 3. Factor Change and action-oriented Communalities 11%

They do not agree that pollution is only strong in developing countries. According to them, international sustainability rankings are well-founded and not misleading. Robotization is a blessing because it can result in more free time and more human contact. They would be willing to consume less and not take possession but only use the objects. State regulatory intervention would be needed. Contaminating plastics must be banned. They would agree that richer countries compensate poorer countries for protecting biodiversity!)

**5. Table Distinguishing Statements for Factor 3 (P < .05 ; Asterisk (\*) Indicates Significance at P < .01)**

Statements	3. Factor	
	Q-SV	Z-SCR
32. Robotization frees us from hard and monotonous work. More free time intensifies our human relationships.	4	1,82
34. The empowerment of the "desire to possess" is the main cause of the destruction of the environment. The needs of up to 10 billion people could be met if we did not want to own the objects, but just enjoy the services they provide.	3	1,45*
20. A more expensive product and service are usually also of better quality and less environmentally damaging. State intervention should also be used to restrict the marketing of rapidly obsolete products.	3	1,21*
3G. Automation allows you not to wash and iron at home. The laundry rooms in the flats will not be needed in the future.	2	1,15*
39. The food supply of humankind requires the authorization of genetically modified foods.	-1	-0,30
4. Conservation is impossible on densely populated continents, biodiversity must be preserved where few people live!	-3	-1,60*
9. Substances that cause direct damage to health are only released into water or air in developing countries.	-4	-2,14*

4. Factor Dissatisfied radicals  
Communalities (14 %)

Plastics are harmful, most of them need to be banned, people do not understand what is harmful to them, our consumption needs to be reduced, the environmental situation in Central Europe is better than average. Rich countries have caused environmental destruction they should make more efforts to improve. Tap water is not of good quality, the EU has not done enough for a better environment, the polluter should pay and the victim should not have to make an effort to protect himself. The electric car is also just dusting, public transport is the solution.



**6. Table Distinguishing Statements for Factor 4 (P < .05 ; Asterisk (\*) Indicates Significance at P < .01)**

Statements	4 Factor	
	Q-SV	Z-SCR
13. The use of single-use plastics and types of plastics that can only be incinerated as hazardous waste (eg PVC, polystyrene) must be prohibited!	4	2,34*
15. The general state of the natural environment of Central Europe is better than the average of the natural environment of the European Union!	2	1,00
31. The electric car is just another dead end to mobility. Due to the progress of urbanization, traffic can only be solved by public transport.	2	0,88
24. The main cause of environmental problems is not the rapid growth of the population. The key to the solution is in Europe and America and not in Africa and Asia.	1	0,58*
8. The most serious environmental problem today is caused by flying dust because it enters our lungs directly and reduces our chances of life.	0	0,04*
2G. Due to the spread of robotisation, the globalization of the economy is losing its significance. Some of the mass production is returning to Europe and the US.	-2	-0,80*
3. The EU has made significant efforts over the last decade to reduce the risk of climate change.	-3	-1,25
19. Generally, the polluter has to pay for the damage caused, but the victim of the pollution also must do everything possible to reduce the cost of protection.	-3	-1,34
14. Plastics are essential in the economy. They are even less harmful to the environment than the materials used to replace them.	-4	-2,4G*

**5. Factor Rational mainstream**

**Communalities (8 %)**

The 21st century is defined by climate change and epidemics. The circular economy is more than waste management. Consumption must be reduced. People do not know what is harmful to them. They would be willing to accept to dine in a restaurant but would like to wash at home and want to own the goods. All living things, mosquitoes, have a right to life. There could be a world without plastics, marketing should not be restricted. The citizens of rich countries do not live for the present either, and the main cause of the problems is population growth. The

EU has made significant efforts and the Scandinavian countries are developing sustainably in line with international rankings.

**7. Table Distinguishing Statements for Factor 5 (P < .05 ; Asterisk (\*) Indicates Significance at P < .01)**

Statements	5 Factor	
	Q-SV	Z-SCR
38. In the 21st century, it is not the economy or politicians but climate change and epidemics that are shaping the world.	4	2,29*
39. The food supply of humankind requires the authorization of genetically modified foods.	2	0,80*
25. Without global coordination, global problems cannot be solved, the powers of the United Nations would have to be significantly increased to play a kind of world-state role.	-2	-0,73
20. A more expensive product and service are usually also of better quality and less environmentally damaging. State intervention should also be used to restrict the marketing of rapidly obsolete products.	-2	-0,94*
14. Plastics are essential in the economy. They are even less harmful to the environment than the materials used to replace them.	-2	-0,95
11. In most European municipalities, the quality of tap water is the same as that of bottled water.	-3	-1,78
7. In rich countries, people live in the present and are not interested in the future. At most, they do something for the environment when it also affects their own health.	-4	-1,91*

**8. Table Descending Array of Differences Between Factors 1 Committed greens and 5 Rational mainstreams**

Statements	Type1	Type5	Diff.
7. In rich countries, people live in the present and are not interested in the future. At most, they do something for the environment when it also affects their own health.	1.GG7	-1.90G	3,573
11. In most European municipalities, the quality of tap water is the same as that of bottled water.	1.454	-1.783	3,238
10. Tap water still contains hormones and residues that negatively affect human fertility.	1.041	-0.G80	1,721

14. Plastics are essential in the economy. They are even less harmful to the environment than the materials used to replace them.	0.721	-0.953	1,674
37. Every living thing is a value in itself. Mosquito control and rat control should also be kept in mind.	-0.591	0.9GG	-1,557
9. Substances that cause direct damage to health are only released into water or air in developing countries.	-1.217	0.471	-1,688
35. We could live in much smaller apartments if we ate in restaurants and cafes and held family gatherings in restaurants.	-0.705	0.989	-1,695
3. The EU has made significant efforts over the last decade to reduce the risk of climate change.	-0.612	1.132	-1,744
22. Climate change could be reversed in the next thirty years, and to this end, citizens of rich countries would have to give up only 1-2 percent of their consumption.	-2.403	-0.292	-2,111
39. The food supply of humankind requires the authorization of genetically modified foods.	-2.418	0.798	-3,21G

The biggest difference in opinion is observed between the actors belonging to the first and the fifth factor. Committed greens and rational mainstream actors have very different views on important issues. Committed Greens tend to agree with statement 7, while the rational mainstream group disagrees with this statement. It is not difficult to understand when you consider that everyone in the mainstream group lives in a developed western country and holds a middle or senior management position in a multinational corporation and has a good standard of living where they live. The value system and life plan of people in Factor 5 reflect that they feel good in their skin.

The value system of committed greens is not so stable. They oppose everything that the Greens tend to oppose. They definitely do not want to allow the economic use of GMOs, but interestingly they are not committed to denying mosquito control or accepting a smaller home. While rational mainstreams could accept both, greens would not be ready for that. It is so clear that although they are considered green in this sample, their position cannot be considered to be on the ground of a "deep ecological" trend. The group consists of six people, including three women and three men. interestingly, men are people living in families with two children they work for a multinational company but live in a family house. The ladies have different marital statuses, one has four and the other has one child, the third is still young under the age of thirty, what is common to all of them, that although they all studied business, they worked for many years in various green NGOs. Their factor weights are relatively low in the first factor, while each of the three men has high factor weights, so the type of the first factor is more dominated

by their value system. The first factor thus mixes the emotional and the rational green position, while this effect does not burden the fifth factor.

It is very rare for groups to have different opinions in almost all of the claims. In our case, this happened because only one, statement 1G (1G. Biodegradable plastics do not degrade in the seas either. They cause more environmental problems than their environmental benefits.) Was what was not a distinguishing statement, because 1G almost all groups voted 1 or 0. This statement may likely have seemed too professional to the group with an economics degree, so all five groups tended to take a more neutral position.

#### REFERENCES

- Aliyeva, Dinara. 2019. 'The Recent Trends in the Pharmaceutical Industry with Special Attention for the Republic of Kazakhstan!' PhD Thesis, Kaposvári Egyetem.
- Baker, Rachel, Carl Thompson, and Russell Mannion. 2006a. 'Q Methodology in Health Economics'. *Journal of Health Services Research & Policy* 11(1):38–45.
- Baker, Rachel, Carl Thompson, and Russell Mannion. 2006b. 'Q Methodology in Health Economics'. *Journal of Health Services Research & Policy* 11(1):38–45.
- Besenyei, Mónika. 2019. 'Egyetemi Fenntarthatósági Kezdeményezések Összehasonlító Elemzése [Védés El\Hott]= Comparative Analysis of University Sustainability Initiatives'. PhD Thesis, Corvinus University of Budapest.
- Brown, Steven R. 1971. 'THE FORCED-FREE DISTINCTION IN Q TECHNIQUE 1'. *Journal of Educational Measurement* 8(4):283–87.
- Brown, Steven R. 1993. 'A Primer on Q Methodology'. *Operant Subjectivity* 16(3/4):91–138.
- Comrey, Andrew L., Howard B. Lee, and Howard B. Lee. 2013. *A First Course in Factor Analysis*. Psychology Press.
- Foundation, Ellen MacArthur. 2015. *Towards a Circular Economy: Business Rationale for an Accelerated Transition*. Ellen MacArthur Foundation London.
- Heck, Stefan, Matt Rogers, and Paul Carroll. 2014. *Resource Revolution: How to Capture the Biggest Business Opportunity in a Century*. Houghton Mifflin Harcourt.
- Lacy, Peter, J. Keeble, RJTMACKPAT McNamara, J. Rutqvist, T. Haglund, M. Cui, A. Cooper, C. Pettersson, E. Kevin, and P. Buddemeier. 2014.

- ‘Circular Advantage: Innovative Business Models and Technologies to Create Value in a World without Limits to Growth’. *Accenture: Chicago, IL, USA*.
- Logsdon, John M. n.d. ‘Space Politics and Policy Is a Product of This Golden Age of Space Development, When President Kennedy Committed the US to Sending Americans to the Moon. The US Was Taking the Lead in Bringing the Benefits’.
- Luda, Szilvia. 2012. ‘Vidékfejlesztés Integrált Szemléletben. Agrárvállalkozói Életutak És Értékrendek= An Integrated Approach to Rural Development. Profiles and Values of Agricultural Entrepreneurs’. PhD Thesis, Budapesti Corvinus Egyetem.
- Meadows, Donella H., Jorgen Randers, and Dennis L. Meadows. 2013. ‘The Limits to Growth (1972)’. Pp. 101–16 in *The Future of Nature*. Yale University Press.
- Schulze, Günther. 2016. ‘Growth Within: A Circular Economy Vision for a Competitive Europe’. *Ellen MacArthur Foundation and the McKinsey Center for Business and Environment* 1–22.
- Schumpeter, Joseph Alois. 1976. *Capitalism, Socialism and Democracy*. Routledge.
- Tóth, Gergely. 2019. ‘Circular Economy and Its Comparison with 14 Other Business Sustainability Movements’. *Resources* 8(4):159.
- Van Exel, Job, and Gjalte De Graaf. 2005. ‘Q Methodology: A Sneak Preview’. Retrieved January 24:2009.
- Zsóka.Á. 2005. ‘Következetesség és rések a környezettudatos szervezeti magatartásban’. *Phd Disszertáció, Budapesti Corvinus Egyetem*.