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On the Value System as a Precondition for Sustainability: An Overview of Preliminary Survey Results for Slovenia

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Abstract: The Brundtland report (1987) defined sustainable development as a form of development which "meets the needs of the present without compromising the ability of future generations to meet their own needs''. Given that the concept of sustainable development closely links the desire for the development of a harmonious society aimed at higher welfare, social cohesion and environmental protection, it requires a shift in values of the society; a shift towards more aware, compashionate, better human. This further requires a shift in consumption and production patterns. We examine the readiness of Slovenian population to support the implementation of more sustainable patterns by examining their values system. The survey based analyis stems from the theoretical concept of happiness, a stream of economics, beginning in the 1970s with the Easterlin paradox. In the article we effectively demonstrate that Slovenian population is in many aspects very traditional. Given that the value system of the general public drives the politicians, this can act as a strong driver towards or against implementation of changes that would support sustainability.

Keywords: values, happiness determinants, sustainable development, ecology

JEL Classification: E01, E3, O11

Introduction

Sustainable development seems to be the current 'concept of the hour'. But despite it being a buzzword in everyday politics, actual changes are slow and accepted with

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far greater reluctance. Of course, because green farming is costlier, green production also, recycling exerts an effort from peolpe. It is costly for the voters. In order for sustainable development to be successfully implemented, people, the general public must develop an understanding of it and must support its ideas.

Sustainable development was defined by the Brundtland Report in already in1987 as a new developmental paradigm. A pparadigm that is expected to merge economic, social and environmental goals in order to achieve a sustainable future. A future that does not limit the well-being of the future generations by providing for the needs of the current (The Brundtland Report, 1987). The concept of sustainable development coincided with the increased environmental concern that emerged more vividly with the 1962 book Silent Spring by Rachel Carson, which stressed the link between toxicology, farming and eco-systems. The 1972 UN Conference on Human Environment and the Limits to growth (Club of Rome) are another two important milestones that led to more vibrant international activity in the field of ecology, environment and sustainability in 1980s, peaking with the aforementioned report. The environmental concern continued to produce international policy efforts, most notably the Kyoto protocol (1997). Since then a number of documents, organizations and intense research cooperate to develop the foundation for a better future.

But despite strenuous political activity the results have been lagging behind the ambitious goals set by the Kyoto and the EU, which have established an even more rigorous environmental strategy (European Commission, 2011). The question is why. The article examines the importance of public support to the idea of sustainable development as one of the key conditions for its successful implementation. Why is it important to examine the attitudes of individuals, interest groups and the society as a whole? The values of individuals shape the public opinion. And political choice theory (e.g. Grossman, 2000, Čok et al., 2009) shows that reforms are a political process and are as such pressured by the power of public opinion, that is the voters. The reforms namely impact the potential of re-election. Therefore, in order to successfully implement the model of sustainable development, which is based not solely on economic, but also on social and environmental goals, it is crucial to have public support. Public support implies that the society value highly the elements that are the core of such development.

We examine the problem by using the concept of happiness as our focal point. Economics of happiness emerged in 1970s, when R. Easterlin introduced his famous paradox, claiming that riches do not make people happy. In fact, happiness is relative. According to Frey and Stutzer (2002) happiness depends on: (1) demographich and personal factors (age, seks, family, nationality, education, etc.), (2) economic factors (income, employment, inflation, etc.) and (3) social factors (political and social circumatsances like culture, political stability, peace, inequality, etc.). If the sociatey at large is accuainted with sustainable development and its elemenets are being discussed or implemented, then it is rational to expect that these will have an impact on individual's happiness. If factors like clean air, absence of poverty, help to elderly, etc.

Contribute to one's happiness it is possible to assume that such an individual is more likely to support political measures needed to implement sustainable development.

The article examines the support to sustainable development in Slovenia[1]. The empirical analysis is based on survey results, examining the edeterminants of happiness. The article is innovative in merging the empirics of the economics of happiness and sustainable development and by linking the foundations of political choice theory and economics of happiness. It is also the first empirical investigation into the determinants of happiness among Slovenes.

The structure of the article is the following. First, the concept of sustainable development is discussed, folloed by a presentation of the concept of happiness in economics. The theoretical foundations to the article are provided in the third part, where the concept of happiness is used to show the impact of individuals' preferences on the societal choices, including the support to sustainable development. Last, we provide the results of the empirical analysis.

On sustainable development

The concept of sustainable development is a concept used daily in political debates, economic debates, in newspapers, cooking shows, is taught in schools and discussed in the media. As Strange and Bayley (2008) claims, the word has become a conceptual touchstone, a word defining the modern society. But what does it mean?

The concept of sustainable development dates back into 1980s, when the Brundtland commission prepared the well known report 'Our common future', which is more often referred to as the Brundtland report (1987). The Brundtland Report (1987) defined sustainable development in the following manner: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." The concept of sustainability is based on two premises: (1) the concept of needs, which relates primarily to poverty and (2) the concept of limits, which are imposed to the society by the level of technological development, social organization and the environment's potential to meet the needs of current and future generations.

The practical implementation of sustainable development must take into account its three-fold dimension. Namely, according to Strange and Bayley (2008) sustainable development refers not only to ecological sustainability, but also to social and economic sustainability. Although the ecological explanation of sustainable development claims that both economic and social system are sub-systems of the global environment, all three aspects are important. Particularly in terms of its potential for success. The three pillar approach was stressed at the 2000 UN World summit and the Millenium development goals (2000).

The implementation of sustainable development is nonetheless, at least in developed economies, highly focused on its environmental component. The environmental

component was the absolute focus of sustainability till approximately 1990s, when also human rights, terrorism, poverty and other developmental issues caught more attention (Sustainable development timeline, 2002).

The environmental component received much attention and significant progress in terms of educating the public as well as policy changes. In order to tackle the challenges in a timely manner, several international treaties and numerous other activities have taken place. Most importantly, in 1994 the United Nations Framework Convention on Climate Change entered into force and by today it has been ratified by 192 countries. In 1997 the Kyoto protocol was adopted and entered into force in 2005[2]. As of 20th January 2012, 192 countries and 1 regional economic integration organization (EEC) have deposited instruments of ratification, accession, approval or acceptance (Status of ratification of the Kyoto protocol, 2012). European Union went even beyond the demands of the protocol with the first and second European Climate Change Programme (ECCP) and is taking the initiative to become the leader of the global policy initiatives in the fight against climate change. Current events are less encouraging, since the economic crisis caused reluctance in achieving more stringent actions. Nonetheless, the COP17 and CMP7 in Durban in 2011 was successful, resulting in a series of documents, plans and strategies (UNFCCC, 2012). Primarily, it was stressed that the 'the negotiations advanced, in a balanced fashion, the implementation of the Convention and the Kyoto Protocol, the Bali Action Plan, and the Cancun Agreements. The outcomes included a decision by Parties to adopt a universal legal agreement on climate change as soon as possible, and no later than 2015.' (UNFCCC, 2012).

Although the history of sustainability is not long, the range of activities is vast and results are also quite abundant, despite cyclical up or down-turns. Table 1 summarizes main successes and failures.

Table 1: The successes and failures of sustainable development

Successes	**Failures**
Ozone layer starting to recover	The breakdown of the Rio contract
The abundance of small projects with good results	Increased inequality
People are influencing decision groups in a positive manner	Consumerism
Emergence of corporate social responsibility	Pressure of the Washington Consensus caused negative impact on SD in developing countries
Due to IT information is widely available	Environmental component still not part of national accounting
Science progressed in understanding nature and developing new technologies	World peace
New indicators measuring progress towards sustainability	Oceans and fisheries endangered
The Kyoto Protocol: global problem, global solution	Scarce water resources
SD is in many countries accepted as a norm in politics	AIDS
Other promising starts: agreements on chemical and biological risks	Species extinctions continue unchecked

Source: IISD, 2012.

On economics of happiness

Economic analysis of happiness is a relatively new stream in economic thought. Its roots date back to 1970s, when Richard Easterlin in his noted article "Does Economic Growth Improve the Human Lot? Some Empirical Evidence." (1974) analyzed the determinants of happiness and found that there is no systematic relationship between development levels (incomes) and happiness, people are approximately equally happy both in poor and rich countries. Easterlin paradox, today often used, thus claims that money and happiness do not necessarily have a positive relationship. Why? Because material wealth should not be interpreted in absolute but rather in relative terms.

Easterlin's article is often used to earmark the beginning of economic analysis of happiness. The happinomics began to develop more intensly in the past twenty years (e.g.Coyone and Boettke, 2006, Graham, 2005, Frey in Stutzer, 2004, Clark et al., 2008, Layard, 1980, Easterlin, 1995; Easterlin, 2005) and is today one of the more dynamic fields in economic analysis. Economics of happiness also already provided a link to environmental issues (Welsch, 2009; Rehdanz in Maddison, 2005; Cogoy, 1999; Stevenson and Wolfers, 2008 and other), analyzing primarily the attitudes of consumers towards green products, production, etc.

The analysis offers several interesting alternatives to mainstream economics. First, because it can provide an alternative view on economic development, well-being or quality of life. It can also provide interesting information to policy marker sin different fields (tax policy, social security measures, education, etc.). Also, it can also provide data on how satisfied people are with the state of democracy, rule of law, equality, etc.

There are numerous factors that impact the happiness of individuals. In order to provide foundation for a systematic analysis, Frey and Stutzer (2002) grouped them into three main groups:

1. demographic and personal factors (age, seks, family, nationality, education, etc.);
2. economic factors, especially employment, income, inflation;
3. social and institutional factors, which include political characteristics, and broader social characteristics (peace, democracy, equality, and other).

Frey and Stutzer (2002) typology was also used as a theretical foundation for the questionnaire used in the empirical part of the article. Each of the groups provides a lot of flexibility and the ability to incorporate an arry of different determinants of happiness, which is very important for the validity of results. The richness of included elements on the other hand allows also more analytical options.

Values, society and sustainable development

Economics of happiness is a very interesting research field primarily because it can be used as a foundation for analyzing and understanding the individuals' stances

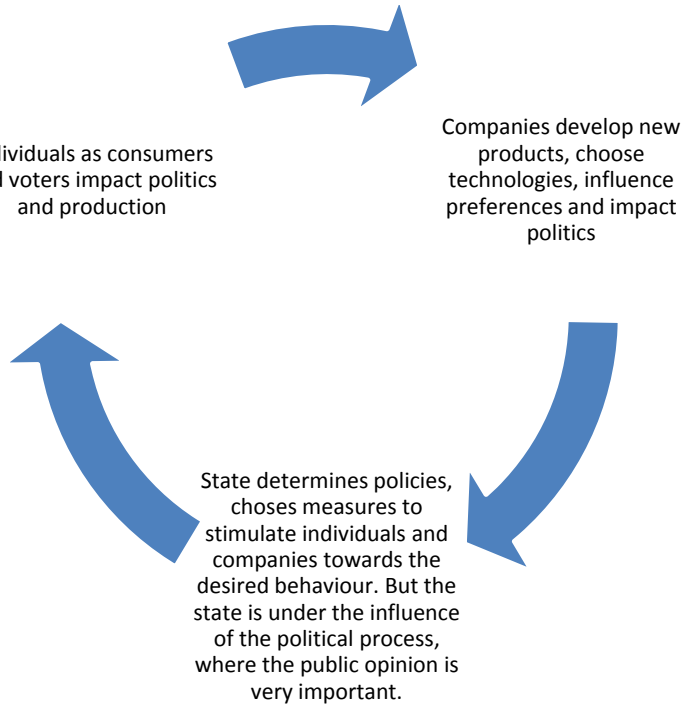
towards different socio-economic problems and consequently also the ability or the causes of social changes. It basically allows the analysis to stem from the individual and his attitudes, values, since it provides data on factors that make the individuals happy or not. The values and attitudes of individuals, which can be directly or indirectly observed from the results, shape public opinion, the prevailing attitude towards a specific social problem. Given that research stresses the importance of public opinion for the implementation of reforms (e.g. Čok et al., 2009), the analysis of happiness could provide a valuable input also to those planning reforms and building educational campaigns. Reforms are a political process and are consequently pressured by public opinion and the politicians' desire to be re-elected (Grossman and Helpman, 2001). Therefore, unless sufficient support among the general public is not provided and there is no external pressure for change, it might be avoided.

Cogoy (1999) claims that the consumer is a social and environmental actor. Why? Looking from the perspective of long term development patterns, the consumer has a huge impact on the structure and nature of production via his consumption decisions. The companies are motivated to redirect its efforts to producing goods that are sought for and using the technology that is acceptable. During the past, there has been a lot of negative publicity over child labour, a lot of positive publicity for green production, corporate social responsibility demonstrated in charitable activities and so on. Given that publicity is very important part of corporate image and therefore impacts market shares of companies, companies will place a lot of emphasis on indulging the consumer. Of course, one must not overlook the power of value creation, which is a process impacted by consumers, firms and governments. Consumerism was also learned, it developed gradually, first in the US, then Europe and now it is becoming a major source of growth also in emerging markets (e.g. China) (more on this topics see for example Sanne, 2002). Within the context of a sustainable society, the consumer must be viewed as a key element of successful transition from a traditional to sustainable society.

Sustainable development requires a major shift in attitudes of individuals, spurring the changes in consumption, production, policies. It is an endogenous process, but we feel that without the support of the individuals, the consumers, the changes are much slower. Despite the fact that sustainability is much discussed and at the moment very popular, we feel that the individuals are to a much larger extent familiar with the process and support it on a general level. But when it comes to actually doing something, sacrificing money, time, consumption, the support might be much lower.

Of course, it is rational to doubt the possibility of such value shift in the short or medium term. But individuals, unlike the standard neoclassical theory claims, do not solely follow the 'I want to consume more' rule. Economic agents are not solely maximizing their selfish consumption, but also receive benefit or utility from consuming less, differently or from 'consuming' the fact of their charitable behaviour. Wagner (2006) speaks about an American artist Georgia O'Keefe that in 1940s enjoyed her

Figure 1: Achieving sustainability



frugal life in New Mexico, enjoyed her minimalist consumption there and spent less and less time in affluent New York City. Wagner (2006, p. 659) speaks about this example as a challenge to the 'more is better' axiom of the neoclassical consumer theory. A number of other authors speak about the formation of preferences and challenged the premise 'more is better'; here we only mention a few. Cogoy (1999) stresses that the consumers have a long list of alternative possibilities when deciding about that consumption and both the list and the choices are co-determined by the society one lives in and its cultural norms. Therefore, we can say that they are at least partially learned and imposed on us. Ulhoi et al. (1996) mention that the public concern over environmental problems is rising. Such concerns can change the process of choice and list creation. Consumption can alternatively be viewed also as all kinds of activities that an individual pursues in order to obtain life-enjoyment (following Georgescu-Rogen[3], 1971). Consequently, consumption can be viewed in much broader sense; it can refer to goods, services, skills, environmental goods and values, social relationships, culture, information and so on. Such an approach can support the development of a sustainable society trough environmental aspect. And this is also the aspect we relied on when building our research problem.

In order to examine the individuals' attitudes towards sustainable development, we relied also on the concept of happiness. We examined a series of determinants of happiness, besides the standard (family, health, friends, etc.) also factor from sustainable development (equality, clean environment, etc.) and asked the respondents to state whether a determinant is at all important for determining his/her happiness and if yes, to what extent. If a factor contributes to individual's happiness, then it can be expected that he will be willing to act in order to increase his happiness. Therefore if factors stemming from sustainable development are relevant determinants of individuals' happiness, then it is more likely that the society will support such a model which can thus be more easily implemented.

Empirical analysis

The empirical analysis first provides a brief methodological summary, followed by descriptive statistics and data mining analysis, both aimed at identifying how important determinants of sustainable development are to Slovenian population.

Methodology

The empirical part of the analysis is based on survey results. The survey was conducted in May 2011 with the assistance of an agency specialized in the research of public opinion. Stratified sampling was used in order to capture the characteristics of the population.

The questionnaire consisted of 8 questions. The questions were structured and had up to 3 sub-questions. The purpose of the questionnaire was twofold: (1) to examine the determinants of happiness among Slovenes and (2) to determine to what extent sustainable development is important to individuals, if it contributes to individuals' happiness.

The sample consisted of 800 individuals, 51.9% men and 48.1% women. The age of the respondents was between 15 and 65 years. If grouping the respondents into age groups, the sample shares of those aged between 15-20, 21-25 and 61-65 was slightly less than 10%, while the share of the rest was slightly over 10% (between 10.3 and 11.0%). The majority of respondents finished secondary education (4 or 5 year programmes, 44.5%) or had a university degree. The share of those with no degree was 5% and the share of those with MSc and PhD combined was 4.1%. The majority of respondents (43.8%) were working, 18% were still in the process of education, while 14.4% were retired. The majority, 58.1%, lived in a household with 3 or 4 members, only 7% lived alone.

Results

The empirical analysis is divided in two parts. First, the summary statistics and some other relevant points are made in order to provide an overview of the data. The empirical testing results are provided in the second part, using the data mining technology.

Descriptive statistics

On average, the people in Slovenia are in general not well acquainted with the concept of sustainable development. Overall, about half of people believe to be familiar with the concept. Interestingly, men are on average more familiar with it, they prevail among those that are familiar with the concept with 54.5% over women (45.5%). Also, among all men 31.8% are familiar with the concept, while less than 30% of women are (Table1). But the differences are too small to be statistically significant (Chi-square test).

Table 1: Answers to question: Are you familiar with the concept of sustainable development?

			Gender		
			Men	Women	Total
Q1 Are you familiar with the concept of sustainable development?	Yes	Count	132	110	242
		% within Q1	54,5%	45,5%	100,0%
		% within Gender	31,8%	28,6%	30,3%
	No	Count	283	275	558
		% within Q1	50,7%	49,3%	100,0%
		% within Gender	68,2%	71,4%	69,8%
Total		Count	415	385	800
		% within Q1	51,9%	48,1%	100,0%
		% within Gender	100,0%	100,0%	100,0%

The differences among age groups in their familiarity with the concept exist, but are not dramatic. 26 to 30-year olds are most acquainted with the concept, 37.9% know the concept of sustainable development, followed by 31-35 year olds (36.4%) and 36-40 year olds (32.9%). The young have significantly smaller knowledge of the concept, with only 13% of those aged 15 to 20 claiming to know the concept. But 25.9% of oldest (61-65 years) are familiar with it, which is surprising, given that the younger population would be expected to know the concept from school[4].

Education impacts the knowledge about sustainable development. While 54.5% of those with MSc. or higher education know the concept, only 2.5% of those with unfinished primary school an 17.9% of those with vocational training (2-3 year pro-

grammes) are familiar with sustainable development. 41.1% of those with university degree and 25.8% of those with secondary school degree also know the concept.

But, given that people are inclined towards overrating their knowledge, we asked those that claimed to know the concept of sustainable development, to briefly summarize its main characteristics. We received 242 answers in total. Despite the fact that (not surprisingly) many people relate the concept of sustainable development to environmental issues, many are familiar with its tri-fold meaning. Table 2 summarizes typical answers.

Table 2: Typical definitions of sustainable development

Please, briefly describe the concept of sustainable development.
Human actions take into account the impact on local and natural environment
Economic, social and environmental equilibrium
The concept of local production, development and support of local enterprises, energy self-sufficiency
Education, human progress, adapting to the new environmental standards
Co-existence with the basic laws of nature and micro-environment one lives in
Development that does not destroy nature
The use of natural resources with such intensity that allows their regeneration
A vision of progress that encompasses economic progress, environmental protection and social justice.
Economic development, environmental protection, progress of social affairs.
Satisfy the needs of current generation but not endanger the same potential to future generations.
Use of renewable sources.
Not destroying the nature and using resources, but leaving some to future generations.

Table 3: Statements on sustainable development*

Answer to Q1: Familiar with SD?		Sustainable development deals with the problem of environmental protection, use of natural resources and the ability to grow and develop with the nature.	Sustainable development deals with the development of the society, social protection and security, equality, peace, etc.	Sustainable development refers also to economic progress, economic development, growth.
All	Y	80,5	79,0	71,1
	N	2,8	3,9	7,8
	NK	16,8	17,1	21,1
Y	Y	96,7	92,6	80,2
	N	2,1	3,3	9,9
	NK	1,2	4,1	9,9
N	Y	73,5	73,1	67,2
	N	3,0	4,1	6,8
	NK	23,5	22,8	26,0

* Y – yes, N-no, NK-do not know

On average, people are most familiar with the environmental component of sustainable development, and least with economic (Table 3). The difference is especially pronounced among those that claim to know the concept. While over 96% agree that sustainable development deals with environmental protection, only 80% agree that the concept also has economic growth ambitions.

Table 4: Attitudes towards selected elements of sustainable development (agreement on a scale 1-5)

Item	N Valid	Mean	Mode	% with modal answer
Global warming cannot be stopped.	800	3,11	3	27,1
Corporate responsibility is very important for successful implementation of sustainable development	800	4,56	5	63,5
In order to keep the eco-systems working efficiently, their balance must be preserved.	800	4,60	5	66,8
Individuals should be educated about the importance of sustainable development.	800	4,48	5	56,6
It is important to preserve nature and natural resources so that our children can also benefit from them.	800	4,68	5	75
The state should tax the production that is harmful to the environment.	800	4,40	5	59,1
The state should stimulate by lower taxation and subsidies the use of environmentally friendly technologies (green cars, green farming, eco food, etc.)	800	4,67	5	73,6
Sustainable development is not discussed enough in public.	800	4,45	5	53,8
The consumers can significantly influence the companies and their environmental behaviour with the choice of products that we buy.	800	4,22	5	47,3

We also investigated individuals' attitudes towards sustainable development (Table 4). In order to obtain their view on what they feel is the appropriate social orientation, what the society and the state should do, we asked them to rate very general statements on a scale 1 to 5 (1- completely disagree, 5- completely agree). The results show that the individuals highly agree with the importance of sustainable development and on a generalized level also support changes.

Descriptive statistics implies that the Slovenian population is very knowledgeable about sustainable development and also very supportive to it. But the statements in the first part were very general and were not addressing the individual and his/her actions much. Since it is much easier to agree with general statements than actually changing own attitudes or behaviour we examined also the importance of sustainable development for the individuals, his own actions and attitudes using the concept of happiness. Our belief is, that if something impacts the happiness of an individual, for example in a positive manner, he/she will be more motivated to behave so as to improve the situation and thereby positively influence his/her happiness. For example, if one values leisure and leisure increases his happiness, he will be prone to devoting more time to it than someone who does not value leisure as much. The same logic applies to the components of sustainable development. If an individual values clean envi-

ronment, he will be more likely to accept the need for recycling, accept and buy (more expensive) ecologically produced food etc. Therefore an understanding of happiness determinants provides information about the support to sustainable development.

We investigated closely a series of potential happiness determinants. Results (Table 5) indicate that sustainable development is not high on the priority list of individuals. Slovene population is quite traditional, health, personal freedom, trust, love, family and happiness of loved ones are most important. Factors like clean environment and clean air are important, but social cohesion, equality, green food and other elements that are related to sustainable development much less.

Table 5: Determinants of happiness

	Factor	Does the factor contribute to your happiness (% of Yes)	If Yes, how important is the factor for your happiness in life (scale 1-3)
1	Health	99,0	2,93
2	Personal freedom	98,1	2,90
3	Trust	97,0	2,86
4	Love	96,9	2,86
5	Family	96,5	2,9
6	Happiness of loved ones	96,3	2,75
7	Leisure	95,6	2,72
8	Fairness	95,5	2,79
9	Clean and preserved environment	94,9	2,72
10	Clean air	94,5	2,79
11	Friends	93,9	2,65
12	Healthy life-style	93,9	2,76
13	Bright future	90,9	2,76
14	Help to others	89,0	2,56
15	Employment (job)	88,9	2,78
16	Trips to nature	86,5	2,44
17	Work/study conditions	85,6	2,62
18	Social cohesion	85,4	2,55
19	Equality	85,1	2,69
20	Standard of living	83,5	2,59
21	Taking care of older	83,1	2,67
22	Absence of poverty in the society	82,8	2,58
23	Feeling of belonging to the society	79,1	2,60
24	Education	76,9	2,67
25	Charity work	76,1	2,47
26	Money	75,8	2,59
27	Sports	71,5	2,46
28	Educating people about the importance of clean environment	70,6	2,61
29	Small GHGs emissions	63,8	2,67
30	Green food	61,9	2,64

31	Pets	59,5	2,42
32	Life in the village	56,9	2,35
33	Religion	31,6	2,34
34	Life in the city	30,6	2,20
35	Spending time in malls	12,4	2,01

* Scale description: 1=not very important impact, 2=mediocre impact, 3=very important impact

It was interesting to see whether individuals actually contribute to increasing their happiness factors by being actively involved in activities related to them. Table 6 summarizes the results. Individuals invest most in their loved ones and friends. This answers is also expected, given that both elements are high on the happiness factors ladder. Surprisingly, also elements of sustainable development are very highly ranked. The highest ranking has the 'compact light bulb use'. But given that this is cost efficient and that it has been for a while to buy the standard-sized energy inefficient bulbs, the high ranking is not completely exogenous. It is however encouraging to see other factors of sustainable development ranked high (recycling, behaving eco-consciously, helping neighbours and elderly and other). These are also the elements that are linked to higher costs or time consumption and are not demanded by the state. Therefore, people are being active in the field of sustainability. Interestingly, religion ranked last.

Table 6: How do you try to increase your happiness?*

Item	**Mean**	**Mode**	**% of sample with the modal answer**
I spend as much time as possible with my loved-ones.	4,45	5	57,9
I invest in relationships with my friends.	4,29	5	46,6
I use compact lightbulbs.	4,17	5	49,6
I try to be more successful at work.	4,10	5	34,4
I recycle.	4,03	5	40,3
I contribute to cleaner environment by behaving eco-consciously.	4,00	4	39,5
When possible, I help the neighbours and elderly.	3,98	5	35,3
I save water and electricity.	3,96	5	37,5
I try to be fair to myself.	3,93	4	36,4
I attempt to continuously educate myself (read books, follow the news, ..)	3,88	5	33,1
I motivate all members of our household to cooperate in housekeeping.	3,81	5	30,6
I teach family and friends about the importance of environmental protection	3,74	5	30,3
I try not to be too burdened with my job.	3,73	4	28,4
I do not use aggressive detergents.	3,65	3	29,0
I use environmentally friendly textiles, detergents.	3,55	3	34,0
I walk, cycle and use public transport.	3,44	5	27,1
I do charity work.	3,35	3	31,9
I reagularlly attend medical check-ups.	3,14	3	28,0
I travel.	3,11	3	27,5
I am active in my community and try to impact the decisions and outcomes by taking part in charity work, environmental activities, etc.	2,90	3	27,3
I try to make more money (overtime, second job, moonlighting, etc.).	2,81	1	25,5
I buy ecologically produced food, despite its higher price.	2,80	3	32,4
I gamble.	2,33	1	37,3
I try to have more faith in God.	2,26	1	45,4

* Answers on a scale 1-5 (1- never, 5-always).

Data mining results

To further investigate the patterns of happiness determinants, we ran data mining. Data mining is a relatively new method, used in business, that helps analyze large quantities of information and find any useful information by approaching the data from different perspectives. Basically, the purpose of data mining is to identify any existing patterns in a large set of data using different techniques. The patterns are actually models that are identified using mining models. The most typical data mining techniques are: decision trees, association rules, clustering and neural networks.

For the purpose of identifying 'happiness patterns' we used the "Analyze Key Influencers". The method is based on the so called SQL 2008 R2 Data mining algorithm Naive Bayes which uses conditional independence to determine whether two variables are connected. Formula for Bayes bayes theorem algorithm is:

Prob(B given A) = Prob(A and B)/Prob(A), where A nad B are variables.

Let's have a look at a simple example. The probability that a 20-year-old is a student is 60 percent. The probability that a person, carrying notes is a student is 85 percent. What is the probability, that a random 20-year-old, carrying notes, is a student? P = 0,6 * 0,85 / (0,6 * 0,85 + (1 – 0,6) * (1 – 0,85)) = 0,895 = 89,5 %.

In terms of our happiness research, we could say the following. What is the probability that a random person who for example thinks that health and family do influence happiness is happy.

The method is based on using two sets of sub-samples: the testing sample and the 'control' sample. The purpose of the testing sample is to actually seek for patterns meaning that we are creating a model, while the control sample is used to check the valididty of the model.

The analysis included all 800 statistical units and asked them, to rate their happiness from 1 to 10, as well as list the factors, they believe influence happiness. People we have interviewed were invited to choose among 36 various factors from 4 main categories: personal factors and relationships, economic factors and money, social responsibility / society and the environment. Pool participants have stated for each factor, whether it influences their happiness or not. We used this data to build a model predicting when a person will be happy or unhappy - a happiness model.

For the purposes of this analysis we have classified persons, who rated themselves from 1-3 as unhappy (104 people) and people who have answered from 8-10 as happy (322). 374 people have rated their happiness between 4 and 7, which we classified as neutral.

We continued the analysis on the 322 statistical units to research influences on happiness. The subsample exceeds the 50 unit minimum, required by SQL 2008 R2 Analyze Key Influence. In order to correctly use the Naive Bayes algorithm, we have split the statistical units to a set of data for creating our happiness model and a set of

units for testing the happiness model. The proportion between the sets of data was 70:30 – 70 percent.

The results (Figure 2) of the data mining analysis is largely in line with the findings of the descriptive statistics. Presence of friends is the most powerful factor influencing happiness, absence of friends is the most powerful factor determining unhappiness. Sport activities are surprisingly the second most powerful factor. Other relatively strong influences include: family, religion, and helping others. The influence is strongly reduced with health, spare time, education and nature tours.

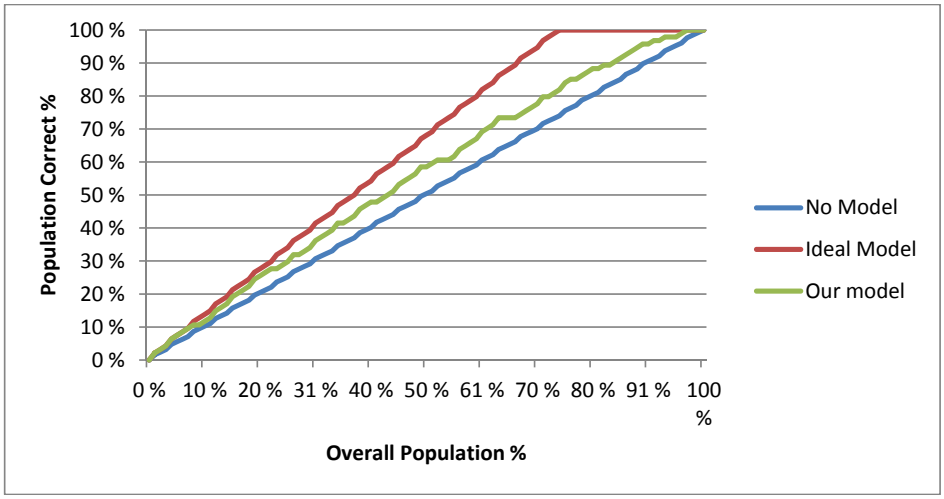
Figure 2: Model: factors influencing happiness

Factor	Value	Favors	Relative Impact
Friends	Yes	Happy	
Playing sports	Yes	Happy	
Family	Yes	Happy	
Religion	Yes	Happy	
Helping others	Yes	Happy	
Health	Yes	Happy	
Spare time	Yes	Happy	
Education	Yes	Happy	
Nature tours	Yes	Happy	

We further tested also the validity of the model. Our model of happiness was verified against testing data which were initially excluded from the data set. Graphical representation of model verification was done in a lift chart. The x-axis of the chart represents the percentage of the test dataset that is used to compare the predictions. The y-axis of the chart represents the percentage of predicted values. The diagonal straight line represents the results of random guessing, and is the baseline against which to evaluate lift. The red line shows the ideal results for the training data set if we could create a model that always predicted perfectly, and the green line that shows the actual lift, or improvement in results, for the model. Figure 3 presents the test of the model to predict value »happy«.

Figure 3 shows that our model of happiness better predicts whether a person is happy than a random guess. In 50 % of the population the model is more accurate than random guesses by 10 percentage points. We can tell from the chart that the ideal line peaks at around 75 percent, meaning that if we had a perfect model, we could identify 100 percent of happy people by examining 75 percent of the total population. The actual lift for our model of happiness when we target 75 percent of the population is around 80 percent, meaning we could identify 80 percent of happy people targeting 75 percent of the total population..

Figure 3: Lift chart for the model - predicted value "happy"



To verify our model of happiness, we used another tool for data mining model assessment.We used classification matrix (Table 7). Almost 76 percent of values were predicted correctly, which is pretty good.

Table 7: Overall assessment of happiness model

Model name:	Naive Bayes - Training data (%)	Naive Bayes - Training data (N)
Total correct:	75,59 %	96
Total misclassified:	24,41 %	31

The identified model provides a relatively good estimate of the determinants of individuals' happiness, much better than a random guess. Merging both analyses, descriptive and data mining, it becomes clear that sustainable development determinants are not very high on the priority list of people. Therefore, expecting wide and strong support to any more stringent or expensive measures aimed at closing the gap of sustainability is hard to expect.

Conclusion

The paper presents preliminary results of the determinants of happiness in Slovenia and subsequent potential for the implementation of the sustainable development model of economic development.

The article is based on a simple idea that if something increases the satisfaction, happiness of people, they will be consequently more motivated to contribute to improv-

ing the situation in that field and thereby directly influence their happiness. Therefore, if people believe that it is good to have clean air, eat healthy food, recycle, use public transport and so on, and if living in a clean environment increases their happiness, they can be rationally expected to be motivated to do the same themselves and thereby contribute to actual implementation of the sustainable development model.

The results of the preliminary study show that Slovenians are quite traditional, health, personal freedom, trust, love, family and happiness of loved ones are the elements that were most often chosen as those that are important for individual's happiness. What about sustainable development elements? Elements like clean environment and clean air are important, but social cohesion, equality, green food and some other elements that are related to sustainable development much less. Data mining analysis also confirmed the importance of family and friends for those that classified themselves as happy, but added interestingly also some other aspects like sports, even religion, which was ranked very low on the list of all factors. Therefore, one of the crucial challenges of future work includes further analysis of data and structures. Also, it would be interesting to make a comparative analysis across the region.

NOTES

[1] We are very grateful for the valued contribution of Ms. Anita Frajman Ivković (Ekonomski fakultet u Osijeku) in the process of questionnaire development. Also, we would like to thank the public opinion researcg agency Aragon and their researchers for their comments.

[2] The text of the Protocol to the UNFCCC was accepted in Kyoto, Japan, on 11 December 1997. Countries were able to sign it from 16 March 1998 to 15 March 1999 at United Nations Headquarters, New York. During that period 84 countries signed the Protocol. Other Parties may accede to it at any time. The Protocol is subjected to ratification, acceptance, approval or accession by Parties. Kyoto Protocol entered into force on 16th February 2005, 90 days after at least 55 Parties to the Convention, including Annex I Parties which accounted for at least 55 % of the total CO2 emissions for 1990 from that group, sent their documents of either ratification, acceptance, approval or accession (Status of ratification, 2012).

[3] Nicholas Georgescu-Roegen (1906-1994) was an American (Romanian born) economist who dealt with the problem of capitalism and published an article 'Mathematical Proofs of the Breakdown of Capitalsim' in Econometrica in 1960. Otherwise, the author is most known for the concept of degrowth which means that economic growth can not continue forever. The model is presented in his 1971 book The Entropy Law and the Economic Process.

[4] Already some kindergardens have implemented recycling and serve integrated farming produce in their meals.

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