Sustainability in Everyday Life

Integrating Environmental, Social, and Economic Goals

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Abstract

Transition toward sustainable society requires behavior change. Finnish university students (n = 210) assessed their own achievements in implementation of sustainable development (SD). The informants rated statements of SD according to their thinking and estimated implementation behavior in their own daily lives. The data were collected between autumn 2008 and spring 2009 using a theory-grounded semantic differential technique. A measurement instrument was created in which 36 variables of environmental, economic, and social sustainability were balanced. These variables were indicators of SD implementation. Seven orthogonal factors (dimensions, aspects) emerged from the ratings of sustainability in daily life after principal axis factoring and varimax rotation: (1) responsible global citizenship, (2) life cycle approach, (3) advanced consumerism, (4) health and community, (5) recycling, (6) strong local business, and (7) post-materialism. These seven themes are discussed in this article. A model of sustainable behavior in a high consumption society is created.

Key words: behavior change, high consumption society, sustainability, sustainable development

Introduction

Sustainable development (SD) is a holistic and systemic phenomenon. Main threats to SD are natural resource depletion, pollution, and increase in the volume of emissions approaching the carrying capacity limits,[1–3] as well as human inequality at the local and global levels. The inequality can be perceived as extreme wealth and extreme poverty, and the structures that sustain inequalities.[4–7]

In a sustainable society, all human activities are in accordance with the principles of SD. The following three components are in focus simultaneously: (1) economy, (2) ecosystems, and (3) human beings, communities, and society (Fig. 1). Transition into an ecologically, economically, and socially sustainable society requires innovative technical solutions, new policies, and behavior change.[8–10] The transition is possible when governments provide opportunities for all of their citizens to flourish within the ecological limits.[11] Citizens are responsible for making fair and just everyday choices and for the nurturing of civil society.

People are accustomed to dealing with SD as a three-dimension phenomenon in which economic, environmental, and social aspects overlap. Even though they know what sustainability is theoretically, they may not know what it could mean in their behav-

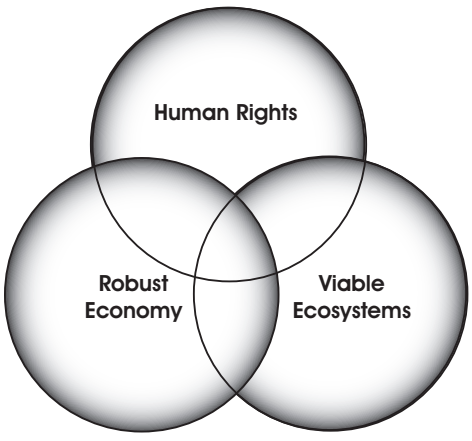

Figure 1. Sustainable Development Integrating Three Standpoints

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ior. In this article, we analyze the recognition of SD with empirical data. We are interested in knowing how sustainability becomes apparent in everyday life. We investigate how environmental, economic, and social goals integrate in Finnish university students' everyday life. The analysis generates a model of sustainable behavior in a high consumption society.

Method

The data were collected between autumn 2008 and spring 2009 using a theory-grounded semantic differential technique[12] that is an improvement of the semantic differential rating scale originally developed by Osgood.[13] Finnish university students (n = 210) rated statements of sustainable development (SD) according to the implementation of the items in their daily lives. The discretionary sample consisted of students of social services. Their ages ranged from 18 to 40 and they lived in different regions of Southern Finland.

A measurement instrument was created that balanced variables of ecological, economic, and social sustainability. Each of these three aspects of SD consists of 12 variables. These 36 items are based on SD strategies from different areas: Agenda 21 Environment and Development Programme,[14] the European Union Strategy for Sustainable Development,[15]Agenda 21 for the Baltic Sea Region—Baltic 21,[16] Sustainable Development—New Bearings for the Nordic Countries,[17] and Towards Sustainable Choices—A Nationally and Globally Sustainable Finland.[18] Information from the following indicators was also used: Sustainable Society Index,[19] Genuine Progress Indicator,[20–22] Ecological Footprint,[23,24] Wellbeing of Nations,[25] and The Happy Planet Index.[26]

The measurement instrument was created with operationalization of environmental, economic, and social sustainability items in mind so that it is possible to measure sustainability as a wide phenomenon (Table 1). Three dimensions of sustainability were emphasized similarly. An example of a rated item from ecological sustainability is: "favoring vegetarian food." Informants were asked to rate items according to their real implementation using a nine-step scale—from "not at all" to "always, perfectly."

These data were analyzed using explorative factor analysis. Before analysis, the data were log transformed due to skewing toward being moderate negative. The syntax was NEWX = SQRT (K – X), where K is equal to the largest score plus 1.[27] The Kaiser-Meyer-Olkin measure of sampling adequacy test verified the sampling adequacy for the analysis, KMO = 0.88, which indicates great sample size.[28] Bartlett's test of sphericity was significant, X^2 (378) = 2250.71 ($p < 0.001$), indicating sufficiently high correlation between items. Eight items were dropped from the analysis because of low communalities. Individual KMO values varied between 0.410 and 0.714.[29]

A principal axis factoring was conducted on the 28 items with orthogonal rotation (varimax). The number of factors was obtained from the sizes of the eigenvalues, by Cattell's screen test, and ease of interpreting the factors.[27,30] Seven factors had eigenvalues over Kaiser's criterion of 1 and in combination explained 48.6% of variance. The variables with loadings of 0.38 and above were interpreted.[27,29] Reliability was estimated using Cronbach's α (Table 2).

Results

Seven orthogonal factors (dimensions, aspects) emerged from the ratings of sustainability in daily life after principal axis factoring and varimax rotation. The factors were named as follows:

1. Responsible global citizenship
2. Life cycle approach
3. Advanced consumerism
4. Health and community
5. Recycling
6. Strong local business
7. Post-materialism

Environment Sustainability	Economic Sustainability	Social Sustainability
• Recycling	• Product longevity and durability	• Communality
• Taking care of hazardous waste	• Eco-labeled products	• Equality and tolerance
• Composting	• Quantity and quality of packaging	• Health-promoting lifestyle
• Favoring walking, cycling, and public transport	• Product recyclability	• Social paticipation
• Saving energy	• Favoring of forefront companies	• Global poverty reduction
• Using renewable energy sources	• Vibrant local business	• Elimination of public health risks
• Water saving	• Vibrant small business	• Consumer's social responsibility
• Housing temp, max 21˚C	• Quality of the materials in commodities	• Intergenerational link
• Vegetarian diet	• Product repair eligibility	• Nurturing of civil society
• Organic food	• Quantity and quality of product manufactring waste	• Volunteering
• Local food	• Energy efficiency in product manufacture and use	• Use of study opportunities
• Replacing goods and equipment only when broken	• Use of services instead of owning goods	• Low value for ownership

Table 1. Measurement Instrument—Operationalization of 36 Items of Environmental, Economic, and Social Sustainability

Variable	1 Responsible global citizenship	2 Life cycle approach	3 Advanced consumerism	4 Health and community	5 Recycling	6 Strong local business	7 Post-materialism
1. Social participation	.662	.115	.164	.168	–.056	.252	.171
2. Nurturing of civil society	.570	.219	.218	.218	.057	.162	.071
3. Equality and tolerance	.568	.139	.142	.105	.004	.027	.137
4. Global poverty reduction	.483	.280	.199	.020	.084	.071	.238
5. Consumer´s social responsibility	.478	.301	.365	.128	.065	.129	.173
6. Intergenerational link	.374	.101	-.115	.364	.238	.186	.123
7. Product recyclability	.142	.631	.288	.115	.243	.275	-.001
8. Product repair eligibility	.194	.556	.156	.122	.028	.216	.286
9. Quantity and quality of packaging	.160	.550	.224	.166	.177	.032	.128
10. Product longevity and durability	.262	.420	.170	.165	.010	.160	-.065
11. Energy efficient	.075	.200	.559	.198	.237	.123	.200
12. Favoring of forefront companies	.233	.310	.553	-.007	.107	.303	.047
13. Favoring of eco-labeled products	.253	.369	.553	.130	.113	-.065	.046
14. Quantity and quality of manufacturing waste	.151	.323	.508	.065	.140	.204	.183
15. Organic food	.226	.001	.487	-.065	.198	.261	.077
16. Quality of materials in commodities	.120	.393	.407	.039	.143	.170	.230
17. Health promoting lifestyle	.124	.125	.045	.818	.106	.013	.071
18. Elimination of public health risks	.143	.195	.185	.733	.055	-.125	.089
19. Community	.388	-.059	-.007	.504	-.002	.321	-.026
20. Recycling	.006	.162	.126	.117	.797	.055	.010
21. Composting	-.043	.025	.185	.022	.655	.080	.146
22. Using renewable energy sources	.217	.206	.230	.049	.299	-.069	.200
23. Taking care of hazardous waste	.160	.219	.107	.075	.249	.071	.181
24. Vibrant local business	.210	.225	.201	-.036	.074	.664	.132
25. Vibrant small business	.153	.224	.231	.061	.087	.569	.129
26. Use of services instead of owning goods	.110	.050	.092	.151	.100	.052	.697
27. Low value for ownership	.225	.078	.182	.063	.140	.133	.518
28. Replacement of goods and equipment only when broken	.151	.329	.049	-.185	.044	.081	.378
Eigenvalues	8.3	2.1	1.8	1.4	1.3	1.1	1.0
Variance (total 48.6 %)	8.8 %	8.5 %	8.4 %	6.9 %	5.7 %	5.3 %	5.1 %
Cronbach α	.8	.8	.8	.8	.7	.7	.6

Table 2. Factor Loadings, Eigenvalues, Variance, and Reliability Estimates

Responsible global citizenship

Sustainable development (SD) is not only dependent on alleviating global problems, such as the climate change or biodiversity loss, but also increasingly on the ability to build a society that does not exclude anyone.[31,32] Every member of society should have—regardless of age, sex, race, ethnicity, or quality of disability—the opportunity to use personal talents and skills.[33] Capabilities of citizens support individual freedom and social inclusion.[34,35]

In a global age, justice extends beyond people who are physically related in our life to include those who are a part of the causal chains of consumerism.[36–38] Ethical consumers require a trading model in which the business is just and fair.[39] Customers' morals become apparent when dealing with products made by forced work or child labor.[40]

Solidarity is the key to sharing the advantages and disadvantages of the development in an equitable way. In order to achieve this goal, we need shared responsibility.[41,42] It means, for example, that all people engage in costs of emissions in order to take care of our common future.[43] Solidarity is a form of altruism. According to the World Value Survey, thrift was negatively correlated with subjective well-being.[44] Spending money for others makes us happier than using it for ourselves.[45]

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Diversity enriches daily lives and helps to maintain creativity in a society.[46] It also builds a human connection among local, national, and international levels. Human equality as a value obligates us to act for poor, disabled, or discriminated people. Thinking like economists, however, undermines community and creates competition between people.[47] It is a threat to the solidarity and the mutual care.

What is also needed is economics for a finite planet. People are forced to think, sooner or later, how much is enough.[11,48] "Growth for the sake of growth is the ideology of the cancer cell."[49]

Life cycle approach

Product chain management is based on life cycle thinking. The goal is to get an overview of the product's impact on nature and humans. A life cycle approach covers the selection and use of raw materials, manufacturing, packaging, transport and distribution, installation and maintenance, operation, and decommissioning.[50,51]

A life cycle approach describes consumers who prefer long-lasting products. They prefer repairing products instead of getting new ones and they are willing to recycle products at the end of the life cycle. They are also concerned about packaging waste of the product, which is about 160 kilograms (353 pounds) per year per person in Europe.[52]

Environmental and social impacts of the product are mostly determined by the designer. The design affects the longevity of the product, repairing options, timelessness of the product, and its target group.[51] The International Organization for Standardization (ISO, www.iso.org) has published ISO 14062 for integrating environmental aspects into product design and development and ISO 26000 for guidance on social responsibility.

Supply chain management is particularly difficult in electronics. The challenge is how to consider the complex effects of metal mining in developing countries, circumstances of employees in manufacturing plants, and the processing of hazardous waste. A long warranty period and repairing option ensure the quality and durability of the product. Consumers are ready to pay more for the product if the supply chain is transparent.[53,54]

Advanced consumerism

Advanced consumers pay attention to eco-efficient, eco-labeled products and they favor pioneer companies. This kind of a consumer may also prefer organic food produced in natural ways without synthetic fertilizer and chemicals. The advanced consumer is aware of causal chains and a holistic consideration—this understanding is based on the ideal of freedom and responsibility.

Eco-efficiency means production in which use of water, energy, and raw materials is minimized per unit. It takes care of emissions and pollutants as well. Eco-efficient production does not burden the environment with waste or by-products because they are used as raw materials in the beginning of the new process.[55,56] The model of eco-efficiency production is contained in nature. During the course of evolution poor techniques have disappeared. The remaining best options are present around us.[57]

Favoring of ecolabeled products involves a holistic approach. It pays attention to the harms of the product manufacturing and usage. Some ecolabel criteria are also applicable to services. The ecolabel guarantees that products and services consider the environmental and social impacts, which also include health risks for the consumer.

Health and community

Health and community structures and processes are interconnected. Lifestyle changes are relevant for improving public health, such as paying attention to a reasonable amount of work, addiction prevention, healthy nutrition, and physical activity.[58–60]

Empowerment of individuals is based on a community, which includes families, relatives, friends, and voluntary organizations. Community provides defense against health-threatening risks.[61,62] Being a part of a community is a basic human need, and thus a key factor for well-being.[63,64]

The importance of social participation for human well-being is empirically verified. Participation provides people trust,[65,66] strong identity,[63] physical and mental health,[61,67–69] and the ability of sensing pleasure.[70] Happiness in daily life is characterized by good social relations.[71]

There will be no sustainable development if humans and their economy and societies are not conceived as part of the biosphere—included, transformed, and integrated into sustainability. At a practical level, it means that all the life on Earth is not equal. For example, sustainability allows, when necessary, eliminating bacteria with antibiotics. According to Miller and Spoolman there are worldviews that have an impact on sustainability: (1) self-centered, (2) anthropocentric, (3) biocentric, (4) ecosystem-centered, and (5) biosphere- or Earth-centered.[36] Åhlberg has suggested a "sustainocentric" worldview to integrate compatible parts of the anthropocentric worldview with the rest of the worldviews.[72]

Recycling

Every day in the United States, 132,000 computers are retired.[36] Recycling secures the sufficiency of natural resources, saves energy, and decreases emissions from landfills. The need for energy can be reduced by 95 percent when using recycled aluminum. Plastics, such as product packaging, can be reused for daily commodities such as fleece cloths.[55,73] The landfill has become a symbol of incorrect process and product design.

Because of the huge amount of wasted food, the demand for increased agricultural production is rising. This is connected to increased use of fertilizers, pesticides, and fuels. As a result of anaerobic decomposition, discarded food is also a major source of methane.[74] The British Waste and Resource Action Programme estimates that wasted food generates greenhouse emissions equivalent to the amount of every fifth car in traffic.[75]

Organic waste gets composted in controlled conditions. The product of composting, composted soil, can be used for growing plants or fertilizing them. The amount of recycling, composting, and waste can be used as indicators for material intensity.[76]

In nature most chemical substances are recycled forever. People, animals, and plants absorb heavy metals from food, water, soil, and air. Elimination of toxins is essential, due to their cumulative nature in the liver, kidneys, and central nervous system and the disruption of these organs. Also microorganisms in soil and water are sensitive

to heavy metals, which negatively affect growth, reproduction, and activity of the organism.[52,77,78]

Strong local business

Strong local business means that the community, area, or region reduces its dependence on the global economy. Local resources are used in products, services, food, and energy. The whole community benefits from this financially. It has its own financial institutions. Within this system, trade relations are fair and transparent because owners of the companies are part of the local community.[79–81]

Local economies are relevant to the stability and prosperity of the citizens,[82] as the local economy decreases the adverse effects of globalization and urbanization. A strong local economy represents a deep-rooted democracy, in which communities have opportunities to decide matters dealing with their daily lives.[83] The local business maintain connections between people and enhances a sense of friendship.[84]

Current global economic development has been based on the growth of production of commodities. Computers, printers, TVs, cars, and mobile phones are sold to every home, and even, sometimes, to every single person. In opposition, the sustainable local business is associated more and more with the sale of services. After all, people do not need washing machines—they need clean clothes.[11]

The local service economy combines freedom and responsibility. Sustainable business management supports a preservation of local culture and empowers communities. It takes care of people, animals, plants, other organisms, and life-sustaining ecosystems.[79,80,83,84] Factors of a "good life" are possible to describe at the local level because local people know the characteristics and peculiarity of their communities.[85]

Postmaterialism

According to Inglehart, shifting from materialistic values to post-materialistic values means emphasizing human relationships and the meaningfulness of people's unique lives.[86–89] This transformation means that people's worldviews are changing. This paradigmatic shift is spelled out also by Maslow,[90] Allardt,[91] and Schwartz.[92] A post-materialistic worldview may generate and sustain a sustainable way of life.[93] In everyday life it means that the importance of ownership has decreased, services are used instead of owning goods, and renewal of goods is motivated by real needs.

Achievements of the 20th century centered on increased opportunities and facilities. The goal of the 21st century is shifting away from materialistic goals. It means transitioning from the dominating culture of "having" to the culture of "being" and "doing."[94–96] In the transition from consumption-based lifestyle towards a more sustainable way of life, material values are replaced with social participation and capability. They appear in the aim of social inclusion, community, life control, altruism, and modesty.[89] The role of ownership is remarkable when trying to reach a sustainable society.[96]

Post-materialistic behavior prioritizes services including sports clubs, gyms, libraries, and art galleries, as well as maintenance, repair, and rental services. In the future, quantity of food is less important than the quality, health, and safety of it. As a result of the transition from an industrial society into a service society, "having" becomes less important. Use of services does not highlight the importance of having.[88,89,97]

Discussion

The seven orthogonal factors discussed here emerged from the ratings of sustainability in daily life after principal axis factoring and varimax rotation. These factors integrate the three dimensions of sustainability. To see the whole picture it is important to add that the factors ignore the significance of sustainable energy solutions in the context of sustainable everyday life. Total energy use (gigajoule per capita per year) was between 10–20 with hunter-gatherers, 40–70 in the agrarian society, and 150–400 in the industrial society.[98] An average American uses the energy equivalent to 150 human beings working for her/him all the time.[99] Energy is one of the basic needs of a human being.[100,101]

Sustainable energy solutions are essential because current methods to produce and consume energy lead to irreversible changes in the Earth.[102,103] However, fossil fuels were supported five times more than renewable energy sources in 2010 worldwide.[104] During the last 6 years the use of coal has consecutively grown globally even though it is the most polluting source of energy.[105] Furthermore, coal is often imported from countries that have not ratified the International Labour Organization's agreement on health and safety in mining.[106] In Europe, coal is responsible for 0.12 deaths from accidents, 25 deaths from pollution, and 225 cases of serious illness per terawatt hour of electricity generated.[107,108] This is strongly counter to the social and environmental aspects of sustainability.

Energy producing solutions are linked to the ecological integrity and safeguarding of biodiversity. They are also linked to democracy, nonviolence, and peaceful co-existence among people. Accelerating emissions also promote erosion of land, which is a threat to stable and flourishing societies. Climate change has negative effects on human health and nutrition. The most vulnerable group of people are the poor in the global south.[109,110] Sustainable energy solutions are crucial for our welfare, now and especially in the future.

A model of sustainable behavior in the high consumption society (Fig. 2) illustrates our conclusions. The model combines the seven factors and the importance of sustainable energy solutions. Together they create the base for human well-being as follows:

1. SD maintains the conditions of life, such as the viability of land, biodiversity, and ecosystem vitality.[11,15,17,18,36,96,111]
2. SD promotes the meeting of basic human needs and safeguards diversity of human activities and capability.[35,42,112–114]
3. SD aids equality of rich and poor, helps to share advantages and disadvantages of development in a just and fair way, and creates equal opportunities within and between nations.[41,43,115,116]
4. SD promotes broad-based social inclusion, maintains dependence of people, and combats the public health risks.[11,14,15,117]

Everyday life consists of prioritization of competing factors, conflicting results, and tolerating compromises.[118] As we search for sustainable alternatives, the needs of our families, desire for comfort, and the prices of goods are ultimately the driving forces of our behavior; sustainable choices are rarely being realized.[37]

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Figure 2. Model of Sustainable Behavior in High Consumption Society

The presented operationalization of environmental, economic, and social sustainability offers 36 items for comparison of priorities. The created model of sustainable behavior in the high consumption society describes how the informants of this research behave in their everyday lives in Finland. We hope that it aid others in determining what can be done to promote sustainability. In addition, the single items and the model are easy to monitor and they are now available for reflection. The likelihood of a behavior change increases when tension between the current state and the desired situation grows.[8]

The consumer and production are linked in society. In the near future unsustainable production will lose its competitive advantage.[108] The best companies have already realized that product processing chain operations should be predecessors in the environmental and socially sustainable production.[117] Already today the stocks of companies that follow the principles of SD have better market values than the average.[119] SD is also one of the key solutions to the global problem of unemployment and, in the long run, it is an essential precondition for mankind's survival.[11,57,101,120,121]

Merits of this research include the following: (1) Educational. It is crucial to know what the big picture is on a practical level in daily life. This research enhances systemic and detailed thinking in how to promote sustainability. Systems thinking and ability to see the big picture is more and more important in a complex global age when societies are transitioning to a more sustainable world. (2) Theoretical. The research integrates the most important aspects of sustainable development indicators, earlier research, and international SD strategies. (3) Empirical. The research builds on long and sound empirical research tradition of how to rate/assess important issues of real life with semantic differential[13] and theoretical differential technique.[12]

Semantic differential and its amended version, theoretical differentiation, are both rating methods. When rating is used, reasons for each rating are left out of the research. Future rating of items should be complemented with interviews and observations. Vital ecosystem services are crucial for diverse life and are the precondition for mankind's survival. This is a reason for "strong sustainability."[122,123] Therefore, in forthcoming research, the sustainable use of biodiversity should be given more attention. The informants, university students (n = 210), were highly educated adults. The results can be generalized theoretically to other highly educated 18- to 40-year-old people living in a high consumption society.

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