

**SOCIO-ECONOMIC,
ENVIRONMENTAL AND REGIONAL
ASPECTS OF A CIRCULAR ECONOMY**



ABSTRACT BOOK
OF THE INTERNATIONAL CONFERENCE
FOR THE 75TH ANNIVERSARY OF DTI

19-20 APRIL 2018

Pécs, Hungary



Editor: Viktor Varjú

Technical Editor: Viktor Glied

Published by MTA KRTK
RKI Transdanubian Research Department
Pécs, Hungary, 2018.

ISBN 978-963-9899-98-8

PLENARY SESSIONS

ARJAN VAN TIMMEREN: THE IMPORTANCE OF LOCALIZATION AND COMMUNITIES FOR (SHORT CIRCUIT) CIRCULAR ECONOMIES

*Full professor, TU Delft – Amsterdam Institute for
Advanced Metropolitan Solution
E-mail: A.vanTimmeren@tudelft.nl*

Our current urban systems were built upon and exist within the paradigm of waste.

Besides of that, society can no longer afford to be divided into strictly urban areas and their hinterlands. Future cities should consider polycentric urbanization and localization approaches where they are designed to have interwoven networks and overlap in terms of facilities and dependencies. The transition from unsustainable cities to more sustainable and resilient cities must gradually develop in an evolutionary way where today's open and global systems for energy and materials will be complemented by what has been referred to as more local and regional 'short circuit' Circular Economies that facilitate local social cohesion as well.

Localization is not about isolating communities from other cultures, but about creating a new, sustainable and equitable basis on which they can interact. In the context of the notion of Circular Economy, short circuit economies can be developed when community initiatives are taken to release the imagination of those involved and enable them to take further steps towards economic revitalization and stronger and healthier communities.

Because the development of short circuit economies has a potential to raise awareness and creativity on a local level, adaptive governance, with the help of a Geo-design Decision Support Environment (GDSE), will be an important force in the transition to sustainable pathways in cities. The aim of economic localization is not to establish complete self-sufficiency at an urban or village level. In fact, localization does not mean everything being produced locally, nor does it mean an end to trade. It simply means creating a better balance between local, regional, national and international markets, and foremost of surplus materials and energy as near as possible to where it is needed (comparable to the principle of subsidiarity). It also means that large corporations/national governments should cede more power to communities, giving them more control over what is produced, where, when and how, and promote trading policies that are to the benefit of both parties. A very

important result of more short circuit economies is that the use of resources together with the problems arising from our lifestyles and consumption patterns will become more apparent and transparent to the public at large. Hence, the distance between awareness and action can be decreased.

Besides of giving this more general perspective to change by localization and community support strategies, this lecture will also include a number of examples from the Netherlands of such communities and buildings to illustrate the potential and beauty of it.

Acknowledgement: The research behind this work is financed by the REPAiR (REsource Management in Peri-urban Areas) project. This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 688920.

KEYWORDS: urban development, short circuit, localization

BERTALAN ANDRÁSFALVY: ORIENTAL PARALLELS OF THE HISTORY OF THE HUNGARIAN NATION IN FARMING AND WAY OF LIFE OF THE PEASANTRY

*Professor Emeritus – University of Pécs,
Széchenyi Prize-winning ethnographer*

Now it is hard to describe and analyse in details the how of the traditional diverse peasant farming system, as the natural environment in which this was born, varied by regions but always harmonised with nature, is gone for ever. The peasantry forced to leave the flood plains and the forests was unable to continue their traditional management systems anywhere, because forests and flood lands were transformed by the farming system of landlords interested in profit maximisation. Hungarian history is identified as the events concerning the destiny and interests of the goods producing large estate owners of the feudal Hungary – and not that of the peasantry that made the majority of Hungarian society until 20th century. We were taught, for example, that the forestry act of Maria Theresa was one of the first modern European forestry acts at that time. This act made it impossible to continue the former peasant forestry, in which not the production of wood and potash for the market mattered but fruit farming, animal husbandry (utilising foliage as fodder), beekeeping and the management of different trees and other plants suitable for the manufacturing of different goods – all in an amazingly maintained and sustained harmony. The same happened to the flood areas. The works called river regulations, eliminating the flood lands, were started already in the early 18th century, as the landowners could easily annex the lands saved from flood to their cereal producing allodial estates. The value of useful goods, gained from the traditional management system of the peasantry, was many times more than the value that cereal production could give on the arable lands “saved” from water, from inundation. The diverse flood plain management of the Hungarian was first impacted by the degradation of the Great Hungarian Plain to waste land, and then it was totally annihilated by the water regulations started in the 18th century. Both times this was done in accordance with the interests of a minority: the large estate owners who had power.

Parallel to the expropriation of the flood plains another process took place: the landlords took over the forests used by the peasantry. This eliminated the diverse use of forests by the peasants, also at the “meadow edges”.

The foundation of the peasants' flood plain management and forestry was the experience and knowledge (unfortunately undocumented in written form) collected during centuries, or millenniums, amidst and cooperating with varied and diverse natural endowment, which always served the community, society, i.e. every human being and the conscious protection of environment, of sustainable development. This has been conflicted for millenniums by the greed of the minority monopolising power, the greed of certain persons who do not care about either the interests of the community made by the majority of their fellows, or about future, the sustenance and protection of these natural endowments. The interest of this latter attitude has always been served by the literacy of the power of the time that emphasised the scientific and progressive character of this view, as opposed to the civilisation of the peasantry stigmatised as underdeveloped – which, on the whole, always produced and created more value for the people. These recognised facts can serve as samples for finding solutions for our ever growing environmental problems, and assist us in the solution of the issues of the fall of biodiversity and in addressing the challenges of climate change.

KEYWORDS: traditional land and forest management, Hungarian peasantry, historical approach

ISTVÁN POMÁZI: TRANSITION TOWARDS CIRCULAR ECONOMY: CHALLENGES AND OPPORTUNITIES

*PhD, Chief Advisor, Ministry for National Economy,
Vice-Chair of OECD Environment Policy Committee
E-mail: pomazi.istvan@gmail.com*

The concept of the circular economy is not totally new however it has become popular in the last decade: both the policy makers and the businesses are looking for alternative solutions changing the present economic model. The main aim of the circular economy approach is to decouple the economic growth from resource use and improving the resource efficiency. This would contribute to the reduction of the environmental pressures originating from the consumption of the increasing global population and rising living standards.. In a circular economy, materials and products are re-used and recycled rather than discarded, helping to achieve higher levels of material productivity and greater resource efficiency. Providing potential economic benefits, improving resource efficiency and furthering the transition to a circular economy will contribute to the achievement of climate and biodiversity goals and increased human well-being.

The paper gives an overview of global and regional trends in material use and the environmental consequences of increasing resource consumption. The transition to the circular economy would generate new economic and employment opportunities and would be accompanied with significant environmental and social benefits via more efficient use of resources. At the same time there are number of economic, social and governance/institutional challenges and barriers to implement this concept.

The newly emerging business models can provide a lot of opportunities to stimulate transition to circular economy. At the same time there are barriers to overcome such as: market failures, non-alignment of different policies, underpricing of externalities, harmful subsidies, trade restrictions and consumers behavior.

The Organisation for Economic Co-operation and Development (OECD) plays an important role in multilateral environment policy and has a valuable analytical capacity to assess and modeling macro-economic implications

of transition towards circular economy. The paper also highlights main initiatives and activities of G7 and OECD to support member countries in moving towards more resource efficient, low-carbon and circular economy.

KEYWORDS: OECD, circular economy, challenges

**ANDREAS OBERSTEG, JÖRG KNIELING:
GOVERNING TOWARDS A CIRCULAR ECONOMY.
LINKING URBAN PLANNING AND
WASTE MANAGEMENT**

*HafenCity University Hamburg –
Urban Planning and Regional Development
E-mail: andreas.obersteg@hcu-hamburg.de*

This paper is produced in the frame of the Horizon 2020 Project REPAiR (REsource Management in Peri-urban Areas: Going Beyond Urban Metabolism). REPAiR aims at extending the concept of Urban Metabolism through two aspects: by exploring the roles of governance, territorial and socio-cultural characteristics; and by strengthening the relationship between resource management and design – not only of products, but also space. For these purposes REPAiR develops, tests and implements strategies for improved urban metabolisms in six peri-urban living labs in the case study areas of Amsterdam, Ghent, Hamburg, Łódź, Naples and Pécs.

The focus of the paper lies on the results of a governance analysis in the case study areas, with a special emphasis on the governance setting of the Hamburg case. The analysed governance setting includes the variety of institutions and actors as well as instruments affecting the urban metabolism, covering formal and informal as well as economical and organizational instruments. The research question is in how far existing governance arrangements support or restrict resource efficiency and sustainable development. The case study aims at improving waste metabolisms with a priority on bio waste. Its area comprises peri-urban parts of the district Hamburg-Altona and the County of Pinneberg. The area is characterized by a variety of urban and peri-urban settlement types (e.g. urban cores, village centres, suburban detached houses, large housing estates, retail, logistic etc.), open spaces (e.g. agricultural land, natural preservation areas, etc.) and a very distinguished concentration of tree nurseries and horticultural farms (circa 500 enterprises).

Within the paper, the governance setting, the various stakeholders and their networks are mapped and it gives an overview of their motivations, interests and possible conflicts. The stakeholder setting comprises four main typologies: actors from the public sector on numerous governmental levels (municipal, county, land, national, EU) and different fields (waste management, environmental planning, spatial planning, business development); the private

sector (agricultural enterprises, waste management, recycling, housing and real estate); intermediate actors (NGOs, economic chambers, associations); and citizens (inhabitants of different types of quarters and neighbourhoods with different socio-economic and cultural structures as well as different types of built environment).

The paper concludes with discussing the research question and an outlook identifying further reaching research aspects with regard to governing the urban metabolism in the field of urban planning and waste management.

Acknowledgement: The research behind this work is financed by the REPAiR (REsource Management in Peri-urban Areas) project. This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 688920.

KEYWORDS: *urban planning, waste management, stakeholders, Hamburg peri-urban area*

HENNING WILTS: EUROPE'S CHALLENGING TRANSFORMATION TOWARDS A CIRCULAR ECONOMY: OPPORTUNITIES AND BARRIERS

*PhD, Head of Research Unit Circular Economy, Wuppertal Institute
E-mail: henning.wilts@wupperinst.org*

The transformation of global production and consumption patterns into a circular economy model is high on the political agenda. For example, the European Commission has produced an Action plan for the Circular Economy and the UN's Sustainable Development Goals (SDGs) also prominently set out closed-loop principles under SDG 12, "Ensure sustainable consumption and production patterns".

The fundamental idea behind the circular, or closed-loop, economy is to retain as much value as possible from products and components when they reach the end of their useful life. This requires an integrated approach that, for example, takes the recyclability of products into account during the design phase, extends their usage process and ensures materials can be substantially recovered after use. There are high hopes associated with this system:

- It is expected that the circular economy will lead to a much more efficient use of natural resources, and that the reduction in demand for materials will also make a substantial contribution towards a low carbon economy.
- It should also ensure the competitiveness of the specific market, for example by reducing supply risks for industry or developing innovative business models, such as sharing or leasing.
- In addition, it is intended that the circular economy will also create jobs and new employment opportunities.

In the light of all this potential, we are faced with the question of why we are still so far from operating closed-loop systems in reality. Central to the effective design of the circular economy is the observation that this has hitherto failed primarily as a result of problems of information. Until now the implementation of the circular economy concepts has often been significantly hindered by a lack of information about availability, quality, quantities, price, location and other relevant information about secondary raw materials. The resulting gap between technological recovery potentials and actual uptake of recycled material can be shown by the example of the German recycling system: Although the waste infrastructure in Germany is one of the most

advanced with overall recycling rates of over 80%, currently only about 14 per cent of the material used in the industry are recyclates.

Against this background the presentation will discuss key challenges for this process: If a circular economy is such a convincing business case, why haven't we been more successful in its implementation? Why is our current economic model still so dominantly linear? Specific emphasis will be put on potentials of blockchain technologies as cornerstone of the Industrial Revolution 4.0: Making use of blockchain technologies and smart contracts could significantly improve the coordination of recycled raw materials, increase the share of secondary raw materials in production and reduce the need of primary resources.

The presentation aims to make a contribution to a realistic assessment of the digitalization in the waste management sector and draws conclusions on prioritized investment opportunities as well as specific need for further research.

KEYWORDS: Europe, transformation, digitalization, waste management

MARCIN DĄBROWSKI: LIVING LAB AS A VEHICLE FOR CO-CREATION AND STRATEGIC TRANSFER OF CIRCULAR ECONOMY SOLUTIONS ACROSS REGIONS

*PhD, Assistant Professor, Chair of Spatial Planning and
Research, Department of Urbanism, Technical University of Delft
E-mail: M.M.Dabrowski@tudelft.nl*

‘Learning from abroad’ is widely recognised as a way to innovate and improve strategies and policies implemented by regions and cities. However, while copying foreign solutions from the ‘sender’ place to a ‘recipient’ may generate new ideas and legitimise policy change, it also brings the risk of misguided transfer and sub-optimal results. There is, hence, a growing recognition of the limitations of a simple transfer of (best) practices from ‘place A’ to ‘place B’, particularly when the imported solutions entail complex networks of actors and rely on place-specific dynamics. Departing from such critiques of the literature and practice on policy transfer and the related concepts, this research sheds light on the process of transfer of knowledge between regions in the field of circular economy and at the regional scale. In particular, it sheds light on how actors from different regions engage in knowledge transfer activity through participation in a network of Peri-Urban Living Labs (PULLs), organised as part of the H2020 REPAiR project to generate eco-innovative solutions for using waste as a resource. Thus, early findings are presented, first, on how the process of co-creation of knowledge in networks of stakeholders from the participating regions takes place in PULLs. Second, insights from participant observation and stakeholder interviews are used to investigate how the knowledge brought in from different areas is used in the elaboration of eco-innovative solutions for building circular economy in particular region and, *vice-versa*, how the solutions elaborated in a particular PULL can be adapted and transformed to be used elsewhere. The study, on the one hand, offers insights on the barriers for knowledge transfer in circular economy between differentiated regional contexts; and, on the other hand, it probes whether knowledge co-creation in PULLs indeed allows for building shared understandings making solutions more readily transferable across space.

Acknowledgement: The research behind this work is financed by the REPAiR (REsource Management in Peri-urban Areas) project. This project has received funding from the European Union’s Horizon 2020 research and innovation programme under Grant Agreement No 688920.

CECÍLIA MEZEI: LOCAL RESOURCE MAPPING

*PhD, research fellow, MTA KRTK Institute for Regional Studies,
Hungary*

E-mail: mezeic@rkk.hu

In order to meet great environmental challenges including climate change, more attention needs to be paid to the resource efficiency. Establishing a resource efficient economy is a major environmental and development challenge today, which needs political actions at all (international, national and local) levels. Improving resource efficiency by better understanding of amount, value, structure, ownership, use etc. of resources within a given place is crucial to planning and implementing good resource based spatial policies. For the adaptive and sustainable development of a territory the decision-makers need the exact information about the potential and the consumption (capital formation, stocks, flows etc.) of resources related to the development processes of a given place.

While Circular Economy concept focuses on the total use of local and incoming resources, the local resource based, bottom up development approaches usually deal with the better and more effective use of local resources as driver of local economic development. For this good strategic planning processes local decision-makers and planners (mostly the local/regional governments) require exact local information about the groups, quality and amount of local resources.

The paper presents a local resource mapping (planning) model concept. The model attempts to account the total amount and value of local resources, to calculate the potential of these local resources (by different resource use types), and to give some development proposals for the local decision-makers based on the local circumstances and features. The pilot model was tested for Hungarian settlements for a limited range of resource use types. The paper reviews the model concept and the first results came from the test phase of the model.

Acknowledgement: The research supported by the KÖFOP-2.3.3-VEKOP-16-2016-00001 “Helyi versenyképesség-fejlesztési kutatási program (Research programme of local competitiveness development)” priority project.

KEYWORD: resource, local development, modelling

ZOLTÁN GRÜNHUT AND ÁKOS BODOR: APPLYING THE SCHWARTZ THEORY OF HUMAN VALUES TO CONTEXTUALIZE ENVIRONMENTAL AWARENESS

*PhD, PhD, research fellows, MTA KRTK Institute for Regional Studies,
Hungary*

E-mails: grunhut@rkk.hu; bodor@rkk.hu

The paper has a pretty simple argument: if environmental awareness should be understood as a normative stance which makes subjects to construct perceptions and interpretations, i.e. individual conceptualizations that both ontologically and in an epistemic sense take into consideration a pan-relational attachment to and an existential involvement into the broadly defined natural environment, then this understanding has to have a linkage to other values as well. Since, among the various concepts, Shalom H. Schwartz's proposes a framework which is generally respected as a theory measures universal values that are recognized throughout all major cultures (or civilizations), the paper considers this conceptual background much suitable to contextualize how environmental awareness is embedded into the matrix of basic human values. Schwartz's concept identifies ten composite values and further describes the dynamic relations amongst them by arranging them into a circular structure. The ten values are grouped into four higher-ordered categories. The present paper assumes that environmental awareness is highly related to the higher value-category of 'self-transcendence' which is built up on 'benevolence', i.e. preserving and enhancing the welfare of those with whom one is in frequent personal contact; and 'universalism' which embraces norms and attitudes like showing understanding, appreciation, tolerance, solidarity and protection for the welfare of all people and for nature. The paper obtains data for its empirical investigation from the last round of the European Social Survey (2018) which has a block about the indicators of Schwartz's concept and another thematic part about perceptions and attitudes related to climate change interpreted as environmental awareness in this inquiry.

Acknowledgement: The research behind this work is financed by the REPAiR (REsource Management in Peri-urban Areas) project. This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 688920.

KEYWORDS: *environmental awareness, values, survey*

MARIT H. HELLER: ECONOMIC INCENTIVES IN PROMOTING PRO-ENVIRONMENTAL BEHAVIOUR – AN INSTITUTIONAL ECONOMICS PERSPECTIVE

*PhD, Norwegian University of Life Sciences;
E-mail: mhe@forskningsradet.no*

The ability of economic incentives to promote environmentally friendly behavior has been questioned in the literature. Most studies investigating this issue are grounded in the agent-based rational choice model. The aim of this study is to expand our insights by applying an alternative theoretical framework combining elements from classical institutional economics and self-determination theory to study incentives for waste sorting. The two theories that have been applied belong to a tradition that emphasizes both agents and social structures when explaining a social phenomena. This approach has been referred to as relational and the main idea is not a unilateral focus on either individuals or social structures, but rather how they are interlinked and related. The analysis is based on data from a Norwegian municipality, Ulstein, which introduced and later terminated a differentiated waste fee. There are three main findings from this study. First, the findings by earlier studies that moral considerations are important in relation to motivation for waste sorting, was confirmed. Second, the economic incentive had a divisive effect on the motivation to sort household waste. Perceived autonomy linked to fundamental values about environmental concern seems to play an important role in explaining why half the sample reports no extra efforts in sorting waste as a response to the economic incentive. The other half was influenced by the external logic given to them (i.e., to save costs and hence report increased motivation to sort household waste). Finally, an increased practice of illegal waste disposal was observed as a response to the differentiated waste fee.

MARCIN MAZUR, MICHAŁ KONOPSKI, KONRAD CZAPIEWSKI: LOCAL SELF-GOVERNMENT AS A DETERMINANT FOR THE IMPLEMENTATION OF CIRCULAR ECONOMY IN THE RURAL AREAS OF POLAND. DIAGNOSIS OF THE SITUATION IN SPATIAL TERMS

*Institute of Geography and Spatial Organization PAS, Warsaw;
m.mazur@twarda.pan.pl*

Competence and predisposition of local authorities determine development of a given area and implementation of innovative solutions to an increasing extent. These are expressed in skillful management of local resources as well as in the use of external support for development. Nowadays, it is necessary for the decision-makers to apply increasingly specialized knowledge derived from various fields, but at the same time to maintain holistic approach, strategic planning and long-term vision that are necessary for local development to be sustainable. The aim of the presentation is to assess the state in the structure of local self-government authorities in the rural areas of Poland and an overview of its diversity in space and depending on the functions presented by a commune. The analyzed time interval has been limited to the current tenure, i.e. in the period from 2014 to 2018. However, both the current situation and the trends observed based upon the reference to the situation prevailing in previous tenures will be taken into account. The scope of the presentation mainly includes the structure of education of mayors of small towns, commune heads and councilors, as well as the fact whether in a given commune authorities acquired specialized education, directly or indirectly related to waste management. The role of supplementary and explanatory information will be fulfilled by the structure of their gender and age as well as the number of fulfilled tenures providing knowledge concerning stability of local authorities. The analysis for the diversity of these variables is an important cognitive value of presented study and may be a contribution to future in-depth inquiry explaining the mechanisms shaping the relationship between endogenous potential of the commune resulting from the structure of its local authorities and various aspects of development.

KEYWORDS: Local government, human capital, education, local selfdevelopment

SESSIONS

TIBOR KISS: BLUE ECONOMY VS. CIRCULAR ECONOMY

*University of Pécs, Faculty of Business and Economics,
Blue Economy RC, Pécs; kisst@tkk.pte.hu*

One of the current sustainability efforts is Circular Economy. It is debatable, whether it is a long lasting theory or will soon disappear. An evaluation criteria could be the level of its connection to ecological systems as really eternal systems on the human scale. A comparison will be made to The Blue Economy, because its principles follow Nature's processes. They 'cascade' nutrients and energy in the same way as do ecosystems, which is very similar to the basic principle to the Circular Economy. We argue that Circular Economy is an important step ahead, because it can be applied in big industrial systems as well (see e.g. the industrial ecology principle). A huge amount of natural resources can be saved by help of this theory. However, there is a danger of „greanwashing”: this notion could also be devaluated by big industrial actors, who might use Circular Economy as dressing gowns for their –otherwise polluting – activities

KEYWORDS: The Blue Economy, Circular Economy, natural resources

ANDRAS DONAT KOVACS: EMERGENCE OF THE NEW ENVIRONMENTAL PARADIGM IN THE RURAL AREAS OF V4 COUNTRIES

MTA KRTK, Budapest; kovacs@rkk.hu

As a consequence of the human activities, the face of our Earth has radically changed by today. Due to the unfavourable impacts resulting from the extensive intensification of production and consumption, the environmental systems of our planet – and together with them the social communities as well – got into danger. Though, most countries of the world regard the protection of the environment as one of its tasks but the real aspects of sustainability are either neglected by most of the states or not fully taken into consideration. This is mainly caused by the fact that the economic aspects still predominate in the development concepts and national policies. Today, when man would be able to provide a solution for numerous problems, the solution of global and local environmental conflicts are still hindered by short-term economic interests. Thus, the stopping of the negative processes existing in the environmental systems requires a change in view. This change must take place on all social levels (international, national, regional, local) since the handling of conflicts depends on whether the smaller and bigger communities (settlement, regional, national, EU, UN) are able to protect and maintain the geographic spaces in harmony and cooperation with each other. So we need a new environmental paradigm! In our view, the new environmental paradigm is an environment-centred worldview, which plays a decisive role in sustainability (reflected in attitudes, actions, laws, development programs et.). This is very important in our country and in our neighbouring countries as well as in the V4 countries and within the new structure of the countryside. These countries have taken a number of strategies, actions and programs for environmental issues, and the attitude of their societies has changed significantly in the past decades. But maybe not enough? The main purpose of my research is to explore the latest ideas and practices aimed at resolving social-environmental conflicts. The locations of the investigations are Hungarian, Czech, Slovak and Polish rural areas. The research would cover three years, and during the first period I'd like examine and compare the environmental processes in some selected sampling areas. The main questions are: What are the real actions and aspirations of the former socialist countries that create harmony between nature and society? The new paradigm is relevant in that countries? What

kind of territorial differentiation has occurred over the last 25 years due to environmental awareness in these countries? How could these countries cooperate on environmental issues? So the main goal is to explore and demonstrate the environmental-conscious ideas and practices in the rural areas of the V4 countries. I would like to share my most recent experiences in the topic at the upcoming conference.

KEYWORDS: new environmental paradigm, rural areas, V4 Countries

**KATALIN HARTUNG, ISTVÁN BESSENYEI:
TOWARDS THE BLUE ECONOMY – COST VERSUS
ENVIRONMENTAL POLLUTION MINIMISATION
(A MICROECONOMIC APPROACH)**

*University of Pécs, Faculty of Business and Economics, Pécs;
hartungk@ktk.pte.hu*

This paper considers ‘cap and trade’ mechanism and industrial heterogeneity implying interfirm transactions which involve semi-finished products, by-products and wastes also. Linear activity analysis framework is used in order to reveal differences and similarities between cost- and emission minimising firms, taking into consideration also the optimal structure of interfirm transaction. We show that in case of a cost minimiser firm shadow prices relating to emission constraints may serve as a basis for environmental penalties. We also show that the market price of a pollutant can be even negative. In addition, we also prove that a firm can only realize a profit, if its polluting emission will reach at least one positive emission constraint. We define the Blue Economy type of company as a pollution minimiser firm and redefine the concept of technological progress in this framework. It will be shown that an aggregated environmental pollution index can alternatively measure the value of the set of goods demanded by consumers. Further improving our model, we abandon its’ linearity by assuming that pollutants are not perfect substitutes and that firms can have some market power. We will demonstrate that this market power is used for the reduction of environmental pollution.

KEYWORDS: Blue Economy, ‘cap and trade’ mechanism, environmental penalty, environmental pollution, linear activity analysis model

ISTVÁN POMÁZI, ELEMÉR SZABÓ: CIRCULAR ECONOMY POLICIES IN THE EUROPEAN UNION AND MEMBER COUNTRIES

*Ministry for Economy, Ministry of Agriculture, Budapest;
istvan.pomazi@ngm.gov.hu elemér.szabo@fm.gov.hu*

The present economic model is dominated by linear approach of the production and consumption, in the process of which the different raw materials are extracted from the nature and from them goods are produced for different uses. After the use of these products huge amount of waste is generated, most of this is going to the landfills. The concept of the circular economy has become popular in the last decade: both the decision makers and the businesses are looking for alternative solutions replacing the present economic model. The main aim of the circular economy approach is to decouple the economic growth from resource use and improving the resource efficiency. This would contribute to the reduction of the environmental pressures originating from the consumption of the increasing global population and middle class. The transition to the circular economy would generate new economic and employment opportunities and would be accompanied with significant environmental and social benefits via more efficient use of resources. The authors give an overview of the recent efforts of the international organisations (e.g. United Nations, OECD and the European Union) to enhance the concept of resource efficiency and circular economy. The group of developed countries, including the European Union play an important role in the formulation and implementation of the circular economy. Furthermore, this study aims at reviewing the measures at the European Union level and the national efforts of its member states in the context of the circular economy. The authors also analyse, by using different material flow and resource productivity indicators, the regional differences among the European Union member countries in the development and implementation of the circular economy concept with a special focus on selected Central and Eastern European member states including Visegrad countries. The transition from current economic model to circular one requires new solutions, especially new innovations, including eco-innovations in technical, social-economic and institutional meanings, and moreover, sharing knowledge and efficient use of available resources and techniques. To this end the authors explore some experiences on how transitional policy measures could be assisted by innovative solutions in Visegrad countries.

KEYWORDS: circular economy, resource productivity, European Union, Visegrad countries

TAMÁS FLEISCHER: QUESTION-MARKS AND ILLUSIONS RELATING THE ROLE OF THE CIRCULAR ECONOMY

*Centre of Economic and Regional Studies of the Hungarian Academy of
Sciences, Budapest; tamas.fleischer@krtk.mta.hu*

Ensuring sustainability requires that our social and economic activities respect the environmental barriers. Sustainability disposes with external conditions (ensuring the survival of the environmental system) and internal conditions (ensuring the adaptation of the human operated systems to the former). It can be an important role for the circular economy to make perceptible and measurable the external conditions of sustainability – that is the limitedness of the material (and energy) streams – for the operators of the socio-economic systems. Expectations that attribute much more than that to the idea of the circular economy are chasing illusions. The circular economy is able to function alongside the linear economy – at its expense but together with –, but a functioning system that does not have any environmental input and output at all is unimaginable. At the same time, the objectives of the circular economy need further clarification, determining its relationship to such sustainability concepts, as i.e. the non-growth theory. The most important indicators of the circular economy must provide a complete description of the flow of materials, thereby ensuring the measurability of a direct aim of the circular economy namely the reduction of material streams crossing the border of the human systems and the natural environment. It is not sufficient to reduce the specific flow of material streams (as compared to economic performance), but the balance of material volumes (including critical substances, water, etc.) is to be measured and decreased. Considering the details, the current EASAC indicator recommendations also show distortions to overcome, such as taking account of new jobs only as the impact of the circular economy on the employment, and with ceasing activities only when calculating the effect on the emissions. A similar torsion is over-emphasizing the significance of the material flows crossing the EU-boundary – as this flow is linked but very indirectly to the inputs and outputs of the human activity at the border of the environment.

KEYWORDS: circular economy, sustainability, material flow, indicators

**CRISTINA LINCARU, SPERANȚA PIRCIOG:
HIGH HUMAN CAPITAL AGGLOMERATIONS AS A
SOURCE OF POSITIVE EXTERNALITIES FOR
CIRCULAR ECONOMY DEVELOPMENT –
CASE STUDY ROMANIA**

*National Scientific Research Institute for Labor and Social Protection –
INCSMPS, Bucharest; cristina.lincaru@yahoo.de*

Recent researches findings state the huge potential of Circular Economy to create new jobs. Ketels&Protisiv (2017) points that following the 2008 crises the circular economy's industries (33, 45 and 95 NACE divisions) employment grow double rate than the overall economy. Admitting that the main source of employment growth is the productivity growth based on innovation (OECD 2007) than we consider interesting to look at the circular economy form the agglomeration employment externalities shaped under evolutionary and new economic geography perspectives. Regional innovativeness allows an old and new approaches discussed by Panne (2014) among the Marshallian specialization (1890) and Jacobian (1969) diversification externalities. We intend to explore the Anselin (2008) spatial clusters structures of high human capital in the sense of Moretti (2012) and the employment multiplier (Fjelsted, 1990, 2), the economic sector analysis (basic/nonbasic) according to (Thulin, 2014, p.2) at NUTS 5 / LAU2 level salaried employed by economic sectors at 2 digits selected for Circular Economy in Romania in 2011 using Census microdata. Winters (2012) finds (for the USA) that the local human capital level has positive externalities and "less educated workers generally receive the largest external benefits". The clustering tendency for high and human capital in Romania identified for the circular industries could highlight new questions and answers in regard to better understand socio-economic, environmental and regional aspects of a circular economy.

KEYWORDS: high human capital, agglomerations, employment multiplier

PATRÍCIA HONVÁRI: RURAL INNOVATION? THE SUCCESS OF RENEWABLE ENERGY INVESTMENTS IN RURAL AREAS

MTA KRTK, Budapest; honvari.patricia@rkk.hu

Nowadays, more and more focus is put on the renewable energy sources. Taken into account the possible future exhaustion of the fossil energy sources, the actual and near danger of the climate change, the drastic increase of the greenhouse gases in the last 200 years, as well as the growing need for sustainable development and liveable environment, the increasing necessity of the renewable energy sources have become clear. However, if we take a look at the situation in Hungary, the present energy trend raises questions and concerns about competitiveness, energy safety and sustainability. Although, there is a wide acceptance among the literature and researchers that Hungary has huge potentials regarding the renewable energy sources. Not only the national energy-security and energy-policy confirm the need to examine the utilization of renewable energies. In certain rural settlements the signs of rural innovation can already be seen: new functions emerge and the emphasis of the local economy is changing. Therefore, also from the side of rural development, it is highly important to analyse development paths that are able to bring added value to rural areas in the long term – and renewable energy utilization is one of these paths. The paper is based on an empirical research, and tends to contribute to the better understanding of the processes behind rural renewable energy investments. To demonstrate this, the investments of rural local municipalities have been chosen. I will interpret the renewable energy utilization as an innovation process, and determine those factors that can contribute to the success – or, on the other hand obstructing the development process. This way, the paper also gives opportunity to draw conclusions that are valuable not only for Hungary, but for other countries as well.

KEYWORDS: renewable energy, rural development, rural innovation

EDIT HOYK: URBAN ADAPTATION TO CLIMATE CHANGE FROM THE PERSPECTIVE OF A CIRCULAR ECONOMY

HAS CERS Institute for Regional Studies, Kecskemét; hoyk@rkk.hu

The attempts to reduce the negative effects of climate change in urban environment primarily focus on overheating protection and decrease of UHI effect primarily. Green infrastructure has a prominent role in this adaptation process, which connects to a circular economy through the economic recovery of innovative solutions. In our research, we measured the urban climate – within a medium sized Hungarian city (Kecskemét) – with five Netatmo NRG01-WW weather stations, which give us a climatic cross-section of the town. We analysed 10 August 2017 – 10 November 2017 period. The measured parameters were the following: temperature, precipitation, humidity and wind. Because green surfaces can play a significant role to reduce UHI effect, we made qualitative and quantitative survey about the green areas of Kecskemét downtown (size of green areas, number, type and health of the trees). We used Google Street View and a simplified version of EU method for health status classification, with three health classes (1 – good; 2 – medium; 3 – bad health condition). Our results show 1,5-2 °C differences between the densely built downtown measure point and the loosely built downtown edge or the intermediate measure points, with higher nightly temperatures in the downtown. This indicates the presence of the UHI phenomenon in Kecskemét. However, there is no significant difference in the daytime warming. In the precipitation, there may be a significant difference between the city centre and downtown edge (data can show almost 30 mm difference within one day). The differences in precipitation between different points of the city reflect the unpredictable rainfall patterns; within a distance of 1 km, there is a deviation of up to 30% in the rainfall. Green areas of the downtown approx. 60 ha, which is about 30% of the investigated area. This value is relatively high, although it is not a coherent green area; the largest coherent greenery is about 5 ha – this extension can have a significant impact on the urban microclimate, but other green areas in the downtown are too small for a similar impact. Because of this, in case of the vegetation of the downtown, emphasis should be placed for shielding and decreasing of the daytime overheating. To achieve this, we need healthy canopy with high density and other alternative solutions, such as green facades, green roofs etc. A significant part of the woody vegetation surveyed

by the city centre is in poor condition. Our results show that more than 50% of the trees are in medium or bad health condition (class 2 or 3). This indicates that bigger part of the trees can reach upper limit of their viability within 10-15 years. The unpredictable rainfall pattern confirms the necessity and urgency of urban rainfall management. The problems from abundant rainfall and lack of precipitation ameliorated with the help of this management, and it is easier to maintain green territories also. Our examination outlined that great emphasis should be placed to increase the extent of urban green spaces for which different elements of green infrastructure (green facades, green roofs) should be used.

KEYWORDS: adaptation, climate change, green infrastructure, UHI

**MIHÁLY DOMBI, JÓZSEF MIHÁLY GÁLL, ANDREA
KARCAGI-KOVÁTS, ANDREA BAUER-GÁTHY,
SZILÁRD KÁDÁR: STRUCTURE OF MATERIAL
REQUIREMENT OF THE FOOD SUPPLY**

University of Debrecen, Debrecen; dombi.mihaly@econ.unideb.hu

Food supply is one of three commodity groups with major environmental impact, together with household energy consumption and mobility. Consumption of animal products as well as wastes and losses along the food supply chain generate enormous amounts of requirement for natural resources. Our research project ‘Food-related use of natural resources through the lens of socio-economic metabolism’ aims to evaluate strategies towards lower environmental impacts of the food system. Therefore, resource use of the supply chain has to be investigated with special regards to biotic flows, which represent the product flow of the system. In parallel to the food commodities, other material inputs (abiotic materials and fuels) and material stock as infrastructure of the production processes are to follow up. In this way, hot spots of resource use and efficiency gaps can be identified. Physical input-output tables (PIOTs) are able to model the structure of production and consumption processes of an economy. A PIOT describes material flows between industries as well as final demand purposes in mass (metric tons). Our work in progress intend to utilize the existing but unpublished jet PIOT called EXIOBASE v3, which covers Hungarian economies resource use in details as well. To combine this dataset with stock-relevant data, EU KLEMS is the most relevant database. Inventory of food-related material stocks is a very novel result hence there is no former study exists on this group of material stock. Material stocks are at high importance with regard to sustainability as they drive at least half of the material input for construction and other investment flows. Furthermore, stocks cause path dependency in several input flows, for instance maintenance and fuel consumption of buildings or vehicle fleet. Our model allows for scenario analysis of impacts on primary and intermediate resource requirement in connection to certain policy interventions.

KEYWORDS: Material requirement, physical input-output tables, material flows and stocks

ZSÓFIA NEMES: THE ROLE OF INDUSTRIAL PARKS AND CIRCULAR ECONOMY IN SUSTAINABLE MUNICIPAL DEVELOPMENT THE CASE STUDY OF SZÉKESFEHÉRVÁR (HU)

*Corvinus University of Budapest – Institute of Geography, Geoeconomy
and Sustainable Development, Budapest; nemeszsofi9600@gmail.com,
zsafia.nemes@stud.uni-corvinus.hu*

Székesfehérvár as one of the most competitive Hungarian cities could be able to base its future perspectives on sustainable development and growth, smart specialisation and green economy. Currently, the industrial sector is the most important in the economic structure of the city which has a very developed – privately owned – industrial park as well, with a large number of multinational corporations from all over the world, a very impressive FDI intensity and an extremely open economy. Focusing on industrial production, as well as international/regional competitiveness and sustainability, the question arises immediately: What can be the role of new initiatives and projects aiming at circular and green economy in making Székesfehérvár an even more attractive, competitive and better performing city in the Central Eastern European region? Székesfehérvár has a big potential to develop its economic (industrial) productivity in a sustainable way by focusing especially on the environmental dimension of its rapidly growing industrial park. The key factor is how the concept of circular economy and resource efficiency can be applied in this certain case. Another crucial aspect is the possible role of the public sector and the local government in the sustainable development of the industrial park if it is in private ownership. Networking and cooperation between the actors and institutions of both public and private sector are essential for making environmental and economic benefits from circular economy and the 'green development' of the city.

KEYWORDS: industrial parks; smart specialisation; circular economy; public sector; sustainable municipal development

SÁNDOR ZSOLT KOVÁCS: THE WAY OF FINANCIAL SERVICES TOWARDS SUSTAINABILITY

HAS CERS Institute for Regional Studies, Pécs; skovacs@rkk.hu

Since the second half of 20th century in society the consciousness started to rise about that the Earth's capacities are limited, so began a kind of social responsibility practices, which are now linked to the financial institutions as well. Nowadays, we can see a new view at the financial institutions (banks, savings banks). Their long-term commitment towards meeting the critical needs of local communities and society have increasingly materialized by the integration of social, environmental as well as economic concerns in their business operations and stakeholder relations. Banks and savings banks have thus adopted a balanced and comprehensive approach to socially and environmentally responsible practices, covering a whole range of aspects, including economic (e.g. regional development, financial inclusion), social relations (e.g. workforce life-long learning, training), and environmental (e.g. preservation of natural heritage, protection of the environment campaigns) issues (the so-called “triple bottom-line“ approach). According to the literature a bank is green bank, if the eligible activities serve the environmental protection. The aims of ethical banking go beyond economic benefits to include social objectives, assuming that both are relevant in a socio-economic model. In some cases, traditional banks incorporate ethical and social aspects through CSR, which can be another way to add value. CSR contributes to value, and thus to a competitive advantage to the company. This is a self-regulating mechanism whereby financial entities monitor and ensure their adherence to law and international norms, specifically in terms of the triple-bottom line comprising people, planet and profit, but it does not involve directly ethical commitments around financial decision-making.

Acknowledgement: Project no. 120007 has been implemented with the support provided from the National Research, Development and Innovation Fund of Hungary, financed under the K_16 funding scheme.

KEYWORDS: sustainable finance, green banking, social and environmental responsibility of financial institutions

**TAMÁS BAKO, JUDIT KALMAN: THE ROLE OF
POVERTY AND DEMOGRAPHICAL ASPECTS IN
ENVIRONMENTAL RELATED DEVELOPMENTS**

MTA KRTK KTI, Budapest; judit.kalman@krtk.mta.hu

While the spatial/regional element of social inequalities has been increasingly recognized and well-researched, there has been much less attention paid to what socio-economic processes shape educational disparities at a regional level and to the consequences of such disparities. The literature is especially scarce about what factors explain aggregate human capital accumulation and development regionally. This paper takes a closer look at human capital and wage inequalities across micro-regions in Hungary between 1992 and 2014. Our beta and sigma convergence models show that human capital has slightly improved across all micro-regions throughout this period and we see convergence, i.e. that micro-regions with lower initial values with respect to all three examined human capital indicators developed faster. Still our conditional convergence models controlling for certain other important factors and simultaneous estimations of human capital accumulation and per capita GDP growth reveal the picture not to be so rosy, as micro-regions with better economic structure and situation have clear advantages.

KEYWORDS: human capital, convergence, regional development, Hungary

CSABA LAKÓCAI: LOCAL COMPLEMENTARY CURRENCIES: LINKING CIRCULAR ECONOMY TO LOCAL DEVELOPMENT POLICY

*Research Centre for Economic and Regional Studies,
Institute for Regional Studies, University of Pécs,
Faculty of Economics, Doctoral School of Economic and Regional
Studies, Pécs; lakocai.csaba@rkk.hu; lakocai.csaba@ktk.pte.hu*

The concept of circular economy is related to the striving for a systemic change in the economic system. According to our assumption, it can be achieved through the partial relocalization of the economic activity. Local or regional complementary currencies can be effective tools of this process as they can facilitate the implementation of certain local policy objectives, such as urban renewal and environmental regeneration, by better connecting local capacities and resources to local demands and keeping the wealth locally. There are some existing examples of local complementary currencies that contribute to the waste reduction as well as to the better reuse of raw material and waste products. This presentation is going to show some cases and deal with the question (and problem) of the measurability.

Acknowledgement: Project no. 120007 has been implemented with the support provided from the National Research, Development and Innovation Fund of Hungary, financed under the K₁₆ funding scheme.

KEYWORDS: circular economy, relocalization, local currencies, environmental policy

**DANIJEL TOPIC, DAMIR SLJIVAC, GORAN
KNEŽEVIĆ, KREŠIMIR FEKETE, DENIS PELIN,
ZVONIMIR KLAJČ, MATEJ ŽNIDAREC, SÁNDOR
KOVÁCS ZSOLT, BERNADETT HORVÁTHNÉ
KOVÁCS: LEVELIZED COSTS OF ELECTRICITY
(LCOE) FROM PV SYSTEMS IN CROSS-BORDER
AREA OF CROATIA AND HUNGARY**

*Faculty of Electrical Engineering, Computer Science and Information
Technology Osijek, Osijek; danijel.topic@ferit.hr*

PV systems have one of the highest annual growth rate of installed capacity. One of the main advantages of the PV systems is that they have very high technical potential. Installation cost of the PV systems had significantly decreased in last years. In addition, efficiency of PV systems in last years has increased. This all factors are influencing levelized cost of electricity (LCOE). This paper will present calculation of levelized cost of electricity for PV systems in Osijek-Baranya county in Croatia and in Somogy and Baranya counties in Hungary. LCOE for different PV system technologies will be determined.

Acknowledgement: The presentation and the research behind the presentation was supported by RuRES (Renewable energy sources and energy efficiency in a function of rural development - <http://rures.eu/>), Interreg V-A Hungary-Croatia Co-operation Programme 2014-2020 HUIR/1601/3.1.1/0033 project.

KEYWORDS: LCOE, PV systems, cross-border area

JUDIT GÉBERT, ZOLTÁN BAJMÓCY, GYÖRGY MÁLOVICS, JUHÁSZ JUDIT, MÉREINÉ BERKI BOGLÁRKA: SUSTAINING WELL-BEING INSTEAD OF SUSTAINING RESOURCES – EVALUATING LOCAL ECONOMIC DEVELOPMENT ON THE BASIS OF THE CAPABILITY APPROACH

University of Szeged, Faculty of Economics and Business Administration, Szeged; gebert.judit@eco.u-szeged.hu

Most authors agree that the goal of local economic development (LED) is increasing well-being, or the quality of life of local citizens. However, it is rather rare in the LED literature when authors explicitly state the concept of well-being they rely on, and take that as a point of departure for their works. We argue that this misconception about well-being is one of the cause of neglecting social and environmental aspects in LED concepts. Present paper understands well-being in line with the capability approach (CA) of Amartya Sen. The CA has clearly influenced community economic development and the design and evaluation of development projects in low income settings. The literature of the CA has highly criticised the resource-based approaches of the economy and has argued that instead of focusing on the sustainability of environmental or other resources, we should focus on sustaining capabilities, namely the opportunities to live the life we have reason to value. However, possible contributions of the CA to planning theory are mostly unexploited yet. Accordingly, taking the CA as a point of departure for strategic urban planning, especially in high income countries, is uncommon. We argue that even when the planning process is not based on the CA, it is useful to rely on the CA as a framework for evaluation and feedback. We developed a framework to evaluate LED processes. We used this framework to analyse urban planning processes in 23 Hungarian large cities. We carried out content analysis of strategic planning documents and conducted 49 stakeholder interviews. We found that the rich informational basis of the CA helps to identify several causes (both in terms of outcomes and processes) why LED measures may fail to contribute to the well-being of citizens. These are barriers that (1) prevent people from actually using the newly created means, (2) that leave valued options unaddressed, or (3) lead to the disappearance of former valued options.

KEYWORDS: capability approach, strategic urban planning, Hungary

**SARA ELHADAD, BALINT BARANYAI,
JANOS GYERGYAK: ENERGY ANALYSIS OF
INTEGRATING RESIDENTIAL BUILDING
ENVELOPES IN NEW MINIA, EGYPT**

Marcel Breuer Doctorate School, Faculty of Engineering and Information Technology University of Pécs, Pécs; sarareda@mu.edu.eg

Nowadays, high consumption of energy and the inability to save it are some of the challenges in the world. The building sector consumes 32% of global energy and it is responsible for 20% of total emissions of greenhouse gases. The energy sector plays a major role in any country to achieve the economical and social development. Therefore it is essential to develop integrated strategies for designing energy-efficient buildings that reduce energy consumption and enhance the global thermal performance. The main aim of this research is to assess the energy analysis through building features that reduce energy consumption and improve the thermal comfort of residential buildings in Egypt. More specifically, the effect on building envelope for different strategies such as windows type, building construction and orientation of dwelling are studied for New Minia, Egypt. A case study building is located in New Minia City, South Cairo, Egypt, at latitude 28.08N, and longitude 30.73E. Egypt characterized by hot arid climate. The building is a typical two story reinforced concrete structure commonly found in Egypt. The total area of the building is 300 m², which consists of 9 rooms and a courtyard. The first step starts by screening the construction materials based on the Egyptian standards followed by a field survey in the new Minia City to examine the different topologies that was constructed in the city. The simulation tool, IDA ICE 4.7 (Indoor Climate and Energy), is used to analyze the energy simulations and the indoor climate of the building. The study raises the attention to the following energy efficient building characteristics: (1) Doubling the thickness of the external walls with 50 mm polystyrene foam, (2) using 20 mm polystyrene foam to enhance the roof construction and (3) using double glazed windows with lower U-value and integrated shading. Following the suggested enhancements is shown to save up to 25 % of energy compared to existing buildings. The energy can be reduced by 5.8% if the proper orientation of the dwelling is selected, by 5.8% if used double glazed windows and integrated shading, and by 2.5% if insulation material used for walls and roofs. The Life Cycle Cost of electricity for the existing building

is 525,600 USD for average building life 50 years. This cost can be reduced by 131400 USD per 50 years if the suggested strategy is implemented. The energy consumption of residential buildings represents a major component of energy usage in Egypt, and this research reaches to considerable findings results. Existing residential building was identified, and sets the improved features of the dwelling. The energy analysis was determined for each of these building parameters. The estimated results show a significant energy savings by 25 % compared to the existing situation.

KEYWORDS: Energy analysis, Thermal comfort, Residential buildings, Hot arid climate, IDA ICE 4.7

SYLVIA GRACZKA: MEASURING AVOIDED MATERIAL? THE COMPLEX CASE OF WASTE PREVENTION INDICATORS

Corvinus University of Budapest, Institute of Geography, Geoeconomy and Sustainable Development, Bucharest; graczek@gmail.com

The Action Plan for Circular Economy in force and the planned Waste Package amendments by the European Parliament and Member States do not only prioritize waste prevention, but it is envisioned that new regulation shall straight ahead set prevention targets by 2025. Even though National Prevention Programmes had to be introduced by Member States in 2013, only guidelines operating with rather random activity lists and case studies exist. A commonly accepted indicator system for waste prevention is still awaited. In policy terms, the concept of waste prevention needs a fundamentally diverse approach relative to waste management: different players are involved, new methods are to be developed, and the regulation should not be limited to waste, rather, should also extend to sustainability of consumption and production. This is one important reason why waste prevention indicators are not easy to define: waste statistics in use are unable cover the field of prevention where the avoided material needs to be recorded. However, well-founded waste prevention policies should be based on clear, commonly accepted terms (e.g. excluding the almost equally important recycling, including re-use to a certain degree), and – currently non-existent – commonly used indicators to define goals, monitor and evaluate implementation. Based on a decade of work, my research topic is waste prevention indicators in the EU and Member State policies. The methodology covers analysing national waste prevention programmes and literature on waste prevention indicators seeking to define benchmarks in waste prevention that could be the basis of prevention policies and common indicators. Besides demonstrating benchmarks, good practices shall be presented, together with indicators that may potentially serve as starting points to internationally agreed indicators and may contribute to the development of common EU prevention targets.

KEYWORDS: waste prevention, indicator, EU, waste policy

**MATEJ ŽNIDAREC, DANIJEL TOPIĆ, DAMIR
ŠLJIVAC, DENIS PELIN, ZVONIMIR KLAIĆ,
GORAN KNEŽEVIĆ, KREŠIMIR FEKETE,
MARIO PRIMORAC, DARIO DOŠEN:
RENEWABLE ENERGY POTENTIAL IN
OSIJEK-BARANYA COUNTY**

*Faculty of Electrical Engineering, Computer Science and Information
Technology Osijek, Osijek; matej.znidarec@ferit.hr*

Osijek-Baranya county is situated in the eastern part of Croatia with humid continental climate. It is rich with solar, biomass and geothermal energy. This paper conducted an analysis of renewable energy potential in Osijek-Baranya county. Paper analysis is divided in solar energy potential, biomass potential and geothermal energy potential.

Acknowledgement: The presentation and the research behind the presentation was supported by RuRES (Renewable energy sources and energy efficiency in a function of rural development - <http://rures.eu/>), Interreg V-A Hungary-Croatia Co-operation Programme 2014-2020 HUHR/1601/3.1.1/0033 project.

KEYWORDS: Renewable energy potential, solar energy, biomass, geothermal energy

YAN SONG, JORGE GIL LOPES, ALEXANDER WANDL, ARJAN VAN TIMMEREN: EXPLORING URBAN METABOLISM INDICATORS FOR MUNICIPALITIES OF METROPOLITAN AREAS

Delft University of Technology, Delft; yan.song@tudelft.nl

The urban metabolism approach has been proposed for more than half a century. Its applications, especially the indicator analysis, are applied in many domains. By the indicator analysis of an area's metabolism, development strategies and urban design outcomes can be proposed from the perspectives of resource consumption and waste production. Since a large number of activities of metropolitan areas' municipalities have started to integrate urban metabolism issues with urban development, there seems to be a substantial gap in the urban metabolism indicator study of metropolitan areas and corresponding local public administrations. This study is aimed at developing urban metabolism indicator framework, to support the urban design procedure of metropolitan area. To put the proposed indicators into practice, a set of urban metabolism indicators is proposed to be adopted in Amsterdam Metropolitan Areas. The selection process is conducted by using the Delphi method. In doing so, a 2-round questionnaire is responded by qualified experts to select the most relevant and practicable urban metabolism indicators. Then, these selected indicators are generated and grouped into different categories. By organising the Peri-Urban Living Lab Workshop Amsterdam Metropolitan Area, the potential usage of these indicators can be discussed. In the meantime, the urban metabolism indicator framework can be established based on the perspectives from urban metabolism related stakeholders. This exploration contributes to the field of practical application of urban metabolism indicators in municipalities of metropolitan areas.

Acknowledgement: The research behind this work is financed by the REPAiR (REsource Management in Peri-urban Areas) project. This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 688920.

KEYWORDS: Urban metabolism indicator, metropolitan area, stakeholder workshop

**GUSTAVO ARCINIEGAS, LIBERA AMENTA,
MARCIN DĄBROWSKI, HILDE REMOY, ALEX
WANDL: INTEGRATING GEODESIGN WORKSHOPS
INTO A PERI-URBAN LIVING LAB FOR
IMPROVING WASTE AND RESOURCE
MANAGEMENT: INSIGHTS FROM THE
AMSTERDAM METROPOLITAN AREA**

TU Delft, Delft; g.a.arciniegaslopez@tudelft.nl

Geodesign is an interdisciplinary practice, emerging from the collaboration of professionals and stakeholders, working jointly on a shared focal spatial problem or place. Geodesign couples the creation of design proposals with impact simulations informed by geographic contexts, systems thinking, and digital technology. Though already used for strategic spatial planning, the potential of geodesign for waste management and recycling is yet to be explored. This article reports on the progress of a series of collaborative geodesign workshops organized as part of the Horizon 2020 project REPAiR (REsource Management in Peri-urban Areas: Going Beyond Urban Metabolism). REPAiR employs living labs to develop integrated place-based eco-innovative spatial development strategies aiming at a quantitative reduction of waste flows, namely food waste, and construction and renovation waste, as well as an improved metabolism and spatial quality of wastescapes. This paper focuses on the insights from the Peri-Urban Living Lab (PULL) workshops in the Amsterdam Metropolitan Area (AMA), in The Netherlands. These workshops are part of the ongoing AMA PULL and can be viewed as both physical and virtual environments, in which stakeholders work together and follow an iterative method to discuss and co-design innovations using both digital and non-digital support tools. The AMA PULL involves a sequence of four interconnected workshops, focusing, respectively, on co-exploration, co-design, co-production and co-decision. They are interconnected as the outcomes of each of them are feeding into the work of the subsequent one. Each workshop in the series is designed to identify and subsequently address specific objectives and is structured differently in terms of type, participants and support tools. Private, local and regional stakeholders discuss in them resource management challenges of the study area, both local and space-specific, and co-design strategies to address these challenges using interactive

decision support tools implemented in large touch-enabled digital surfaces. The support tools are part of an interactive web-based database and user-interface system called Geodesign Decision Support Environment (GDSE). Using the GDSE, workshop participants are able to: 1) get informed about the status quo of the AMA in terms of key material and waste flows, as well as social, economic and environmental sustainability; 2) co-design eco-innovative solutions (EIS) to address challenges of resource management; 3) numerically assess life cycle effects/impacts of the application of these EIS in the AMA, as compared to the status quo; 4) allow comparisons between different strategies; and 5) encourage informed decision making on future strategies for the AMA based on these comparisons. Of the entire four-workshop series, the first two workshops named ‘co-exploration’ and ‘co-design’ have already been held. Surveys conducted among the participants before and after the workshops reveal a good impression from participants on the workshop effectiveness, particularly for encouraging learning of skills to develop EIS that lead to improved waste and resource management in the Amsterdam Metropolitan Area and, potentially, in other settings in other metropolitan areas in Europe. Upcoming workshops will focus on the quantitative evaluation and comparison of the developed solutions and the collaborative choosing of the strategy that best suits the stakeholders perspectives.

Acknowledgement: The research behind this work is financed by the REPAiR (REsource Management in Peri-urban Areas) project. This project has received funding from the European Union’s Horizon 2020 research and innovation programme under Grant Agreement No 688920.

KEYWORDS: geodesign, living lab, waste and resource management, collaborative workshop, spatial decision support

BÉLA KUSLITS, TAMÁS KOCSIS: THE SOURCE OF FOOD: MOTIVATIONS AND OBSTACLES ON THE SUSTAINABLE FOOD MARKETS OF BUDAPEST

Corvinus University Budapest, Budapest; kuslits.bela@gmail.com

Establishment of a circular agri-food economy requires the lowest possible level of non-renewable inputs while producing and distributing food products. Lower levels of negative externalities are clearly more sustainable, but not necessarily more viable in economic terms when in competition with mainstream production. However, higher prices could also give a better living standard to sustainable producers if the necessary market conditions are present. Institutions which help consumers identify and choose sustainable products are important contributors to the financial feasibility of circular economy. Closing the loop between consumer and producer in monetary terms is an important incentive towards circular material flows as well. Sustainable food production and consumption can be framed in multiple ways. Some of them may have similar results from an environmental-science point of view (namely that their level of externalities is similar) still, consumers may perceive them very differently, which influences their potential for growth fundamentally. In our research, we have identified two fundamentally different approaches to communicating sustainable food production: in the first case, checking various ethical aspects of production is institutionalized and communicated to the consumer in form of labels, in the second case the market relationship is institutionalized in a way that helps consumers make ethical judgements themselves, such as in the case of local markets. In the first case the origin of the product may be inaccessible for the consumer, but certain aspects are clearly controlled by a third party. In the second case, consumers have to make their own judgements on the products, but the institutional frame helps them to do so. These two main approaches both help the development of sustainable food production and offer opportunities for very different policy and business strategies. The paper focuses on the drivers of sustainable food consumption in Budapest, Hungary. A survey was recorded in four types of food purchasing institutions: regular food store, traditional market, farmers' market and an organic market. While designing the survey instrument we have incorporated the questionnaire of Botonaki et al. (2006) besides questions about price-knowledge and sensitivity of respondents. Statistical analysis of the results revealed two important aspects of the consumers

perception of various food products. First, the average consumer understands that organic and local products are more expensive than those produced with mainstream technologies, but they find the perceived price differences higher than the subjective value of the products. Second, there are clearly identifiable sociological groups who are the primary consumers of sustainable food. While the general willingness to pay for these products remains low, people who belong to these groups give a solid basis of growth for local and organic producers.

KEYWORDS: short supply chain, externalities, ethical production, consumer choice

MÁRTA SOMOGYVÁRI: BUSINESS STRATEGY FOR THE CIRCULAR ECONOMY

*Faculty of Business and Economics University Pécs, Pécs;
somogyv@tk.pte.hu*

Business strategy for the circular economy Circular economy seems to be a new industrial paradigm, at least rhetorically. The concept of eliminating waste, conserving energy, reusing or refurbishing old products that used to be thrown away is appealing for CEOs and politicians worldwide. Abandoning the linear “take, make, disposal” economy model could help to decrease the environmental stress caused by material extraction, agriculture, fossil fuel burning and waste disposal. In spite of the plummeting literature in this field, the strategic management struggles to develop a useful framework how to implement these ideas in practice. The aim of this paper is to examine the barriers and risks that prevent companies of entering into a circular economy cluster that is based on the main principles of circular economy. The Reduction principle aims to minimize the input of primary energy, raw materials and waste. The Reuse principle fosters to use items again for the same purpose for which they were conceived. The Recycle principle refers to converting waste into input material for other industrial or energy processes. These principles have various impacts on the value creating process of a company. We examine the possibilities of circular economy in a model of a geothermal cascade, where every heat step of a cascade is used by various energy, industrial, service and agricultural processes. The business ecosystem of the cascade consists of a geothermal power plant, thermal spa, district heating, restaurant, laundry, greenhouse, fishpond. We examine the crucial energy and material flows in the cascade and evaluate the risks and benefits of “closing or opening a loop” between the companies. The risks and benefits for each company is measured in cash flow. We create several scenarios in order to examine the resilience of a cluster in the case of environmental and financial shocks.

KEYWORDS: strategic management, geothermal cascade, circular cascade, scenario analysis

MARIA MOLNAR: SUSTAINABLE AND INTELLIGENT URBAN MOBILITY IN HUNGARY IN CONNECTION WITH SMART CITIES

*Szent István University, University of Szeged, Szeged;
marcsella007@gmail.com*

Cities face many challenges, which need to be solved. In addition to the air pollution, noise sources have increased in the cities over the past few decades related to road and rail transport.

The European Innovation Partnership on Smart Cities & Communities emphasizes the importance “integrated infrastructures and processes across energy, ICT and transport” to “improve the efficiency and sustainability” in the cities (European Innovation Partnership on Smart Cities & Communities 2013, pp 3).

Cohesion policy has identified 11 thematic objectives for the 2014-2020 programming cycle. Supporting the shift towards a low-carbon economy, adaptation to climate change, environmental protection and resource efficiency and sustainable transport development can be found among the goals.

National Rural Development Strategy for the period 2012-2020 of Hungary highlights the modes of energy-efficient and environmentally friendly transport to reduce environmental pressure, gas emissions (Vidékfejlesztési Minisztérium, 2012).

The Hungarian Parliament approved Act No. LVII of 2015 concerning energy efficiency in 2015. Energy efficiency becomes increasingly important for Hungary.

The smart cities (digital or intelligent or green cities) contribute to sustainable development. The concept of digital city has already appeared in 1990s (Bastelaer 1998).

The key objective of the smart cities is to improve the efficiency of city operations from energy production, innovative transport to the welfare of the population.

Lados et al identify the smart city with 7 subsystems, which are the following: people subsystem, business subsystem including political and regulatory environment, urban service subsystem, transport subsystem, communication subsystem, water management subsystem and power subsystem (Lados 2011). According to Thuzar, “smart cities should also be sustainable, converging economic, social and environmental goals”. However, there is need for city

“development policies” (Albino et al 2015).

The topic was given by the 6th Annual Forum of Danube Region Strategy, which was held in Budapest in October 2017.

Particular emphasis was put on methodological compilation in both the empirical and the applied researches. I used both quantitative and qualitative analyses.

The study looks to answer the following main questions: How can Hungary contribute to sustainable mobility?

I have formulated the following hypotheses:

H1: The increased carbon dioxide emissions, the environmental load and urban congestion require the modernization of transport systems.

H2: The environmental behaviour of consumers contribute to efficient energy saving.

H3: The energy-efficient and sustainable mobility will improve the living conditions of the population.

I am using a structured questionnaire for the qualitative research in order to examine traffic behaviour of the population.

KEYWORDS: sustainable urban mobility, smart cities

ANDRÁS MÁRTON: THE ROLE OF FUTURE ORIENTATION IN THE ACCEPTANCE AND LOCAL IMPLEMENTATION OF RENEWABLE ENERGIES

*Institute of Economic Geography, Geoeconomics and Sustainable Development, Corvinus University of Budapest, Budapest;
andras.marton2@stud.uni-corvinus.hu*

Local communities and stakeholders can greatly affect environmental sustainability through future orientation. Sustainability is influenced by energy usage, resource types, waste management and some other factors. Besides, renewable energies are an important part of circular economy, that is undoubtedly a new and promising way of environmentally sustainable economic development. This study examines the role of future orientation of local groups and stakeholders. Findings indicate that future orientation has a positive effect on stakeholders' "green behavior", meaning that they are more open to accept and participate in the local implementation of new green technologies. Furthermore, the more future oriented local people (stakeholders, decision makers) are, the more aware and committed they are about the role of renewable energies (and green technologies) in circular economy. Clearly, the concept of renewable energy production stands on similar principles of continuous regeneration (circular reproduction) to the concept of circular economy. The city of Székesfehérvár, Hungary is a developed, medium-sized industrial regional center in Middle Hungary. Its importance in local economy and relative independence from the capital of Budapest makes it a good choice for a case study in energy sustainability. Since Székesfehérvár identifies potential development area in energy efficiency and renewable energies in its integrated urban development strategy and the regional smart specialization concept, it has been appointed empirical study area for the research.

KEYWORDS: *renewable energy, future orientation, green economy*

DENIS CERİĆ: THE USE OF CIRCULAR ECONOMY DEMANDS AND REGULATIONS AS A BRANDING TOOL IN TOURISM IN THE BALTIC SEA REGION

Institute of Geography and Spatial Organization Polish Academy of Sciences, Warsaw; d.ceric@twarda.pan.pl

The Baltic Marine Environment Protection Commission – Helsinki Commission (HELCOM) is the governing body of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, known as the Helsinki Convention. The HELCOM was established about four decades ago to protect the marine environment of the Baltic Sea from all sources of pollution through intergovernmental cooperation, and the Contracting Parties are Denmark, Estonia, the European Union, Finland, Germany, Latvia, Lithuania, Poland, Russia, and Sweden. Recently, the HELCOM set down the new demands and regulations regarding sustainability that is to come into force in 2019 and 2021, which represent a huge challenge for different kind of businesses in the Baltic Sea Region, including tourism. The paper is about how do the marketing policies of tourism businesses coping with new demands and regulations concerning circular economy on the example of a business-to-business network of cruise destinations in the Baltic Sea Cruise Baltic. It is about a good practice of tourism management in the Baltic Sea Region which decided to work with the new demands as a branding tool, in order to strengthen the brand of the Baltic Sea area as the greenest cruise destination in the world for guests, both when it comes to social, economic and environmental sustainability.

KEYWORDS: circular economy, cruise tourism, Baltic Sea

ZSUZSANNA ZSIBÓK: CLIMATE EFFECTS AND CIRCULAR ECONOMY IN LONG-RUN ECONOMIC MODELLING

CERS HAS, Pécs; zsibok@rkk.hu

During the past decades the economic literature has recognised the role of environmental factors, especially climate change, on the long-run economic development, although these issues have only rarely appeared in economic models. Stern's seminal report (Stern, Nicholas, 2006: Stern Review on the Economics of Climate Change, HM Treasury, London) established a new economic strand of research, the so-called climate change economics which is methodologically centred on integrated assessment modelling. This method is "integrated", since environmental problems appear across several disciplines, and "assessment", since it aims to serve policy decision-making through numerical models. Economic models, especially cost-benefit analyses, integrate climate change with the help of special variables such as the mitigation costs or the energy use. Usually, forecasts are made on the basis of two types of scenarios: one is a business-as-usual scenario which assumes unchanged behaviour of the economic actors, providing a reference scenario. This baseline scenario is contrasted to one or more additional scenarios that reflect certain climate policy interventions. Concerning circular economy, modelling efforts study the macroeconomic effects of a potential transition towards a circular economy (which involves, according to the OECD, reduced demand for certain natural resources, and the materials that are derived from them). This transition can be characterised by a more efficient resource use, according to which an improved economic performance can be realised with the same or less resource use. A special feature of circular economy modelling is that many aspects of a circular economy transition are "out of sample", that is, very little historic experience is available in this field. Many of the studies available in the literature of circular economy modelling were prepared in 2015 or later, and most of them use computable general equilibrium (CGE) models and macro-econometric models, as well as global and national input-output models (material flow analysis). Current economic models are built relying heavily on historic correlations (in a linear economy) between different sectors. This approach has inherent limitations when modelling the circular economy with very different relationships between sectors. Our research intends to review the existing economic modelling techniques related to

climate change and circular economy with a special focus on regional models. We show that although more and more researches deal with climate change, the regionalisation of the models remains scarce – often, models operate with world regions and not subnational regions.

Acknowledgement: Project no. 120004 has been implemented with the support provided from the National Research, Development and Innovation Fund of Hungary, financed under the K_16 funding scheme.

KEYWORDS: *economic modelling, circular economy, climate change*

BERNADETT HORVÁTHÉ KOVÁCS, CECÍLIA MEZEI, RÓBERT BARNA, ARNOLD CSONKA, KINGA SZABÓ, MÓNICA NAGY, IMRE NAGY, ELEONÓRA STETTNER, ÁDÁM CSUVÁR, BENCE IMRE, ADRIÁN CSIZMADIA, ZSÓFIA GÁSPÁR-PINTÉR, ALEXANDER TITOV, DANIJEL TOPIC, DAMIR SLJIVAC, GÉZA GELENCSÉR: ECONOMIC AND ECOLOGICAL FACTORS OF TERRITORIAL CAPITAL IN KOPpany VALLEY MICRO REGION

Kaposvár University, Kaposvár; kovacs.bernadett@ke.hu

Koppany Valley is a micro region of uniting settlements that are associated along numerous common features which underground their development, such as Natura 2000 program. This area has got diverse but also typically impoverishing territorial capital. In the course of the analysis of time series the authors assess the tendencies of economic-social processes and of the territory's ecological value according to Camagni's model at the settlements of Koppany Valley. The hypothesis set for the survey is that the balance of territorial capital shifted to the human-relational elements in Koppany Valley, while the area itself became poorer in both hard and soft elements of economic and ecological capital.

Acknowledgement: The presentation and the research behind the presentation was supported by RuRES (Renewable energy sources and energy efficiency in a function of rural development - <http://rures.eu/>), Interreg V-A Hungary-Croatia Co-operation Programme 2014-2020 HUHR/1601/3.1.1/0033 project.

KEYWORDS: territorial capital, economical-ecological aspects, circular economy

KORNÉL NÉMETH, GÁBOR PINTÉR, ERZSÉBET PÉTER: ANALYZING “CONSUMER” ATTITUDES RELATED TO RENEWABLE ENERGY SOURCES IN THE TRANSDANUBIAN REGION

*University of Pannonia Nagykanizsa Campus, Nagykanizsa;
nemeth.kornel@uni-pen.hu*

Renewable energy technologies, which favour environmentally-friendly local interests and values, seem to be appreciated. Competition is no longer just between fossil and renewable energies, but also between each renewable energy utilization technology, the ultimate winners of which must be the users. We need knowledge and motivation to turn our favorable domestic conditions into “national treasure” as soon as possible, which makes these resources useful for society. Barriers that prevent consumers from being more energy-efficient and renewable energy sources from being more widely distributed have long been known, however, they still have not been eliminated. People in our country are not keen on the practical utilization. The disincentives include the “these are overly expensive methods” attitude, the old habits, the lack of information and good practices, and the “fear” of new solutions. Due to the complexity of renewable energy issues (economic, social and environmental impacts) the area requires a multidisciplinary approach. Our comprehensive research focuses on the solutions, products and latest developments on the emerging renewable energy market. The aim of the analysis is to provide an up-to-date picture of the “market” covered by the stakeholders of the renewable energy industry, pointing out what factors are driving or hindering the development of the industry. This study discusses the results of a public opinion survey of 600 respondents conducted within the framework of a representative quantitative study, which is part of the overall research. In this part of our work we examine, analyze and interpret the public awareness of the renewable energy market products and their latest developments, as well as the public expectations regarding them.

Acknowledgement: The research that founded that publication of Kornél Németh was supported by the ÚNKP-17-4 New National Excellence Program of the Ministry of Human Capacities.

KEYWORDS: renewable energy, public opinion survey, related knowledge, consumer attitudes

ZOLTÁN GÁL: SUSTAINABILITY CHALLENGES IN THE FINANCIAL SYSTEM IN THE AGE OF INDUSTRY 4.0 – THE CASE OF GREEN BANKING

CERS HAS, Pécs; galz@rkk.hu

Previous decades of financialization disrupted the global growth process leading to the ongoing crisis and uncertainties in the global economy. The paper introduce the major challenges and alternative solutions for financial sustainability such as green finances. Green finances are located in an intersection of financial industry, economic growth and environment with its legislation. It is a natural trend that arose from the shift from profit only, to a new goal that lies in equilibrium between nature, profit and people. This paper examines potential of green finances, and present the most important green financial products and the related corporate social repsonsibility aspects. These products strengthen environmental causes, such as high fuel efficiency, clean energy and eco - friendly activities. Paper will show besides the positive impacts the controversies of green finances.

Acknowledgement: Project no. 120007 has been implemented with the support provided from the National Research, Development and Innovation Fund of Hungary, financed under the K_16 funding scheme.

KEYWORDS: *sustainable finance, green finance, CSR, green financial products*

ZOLTÁN AGG: CLIMATE CHANGE RELATED VALUES AND ATTITUDES IN THE BALATON REGION

Pannon Egyetem, Veszprém; comitatus91@gmail.com

In the so called sociological project where we examine the changes related to climate and environment as well as the transformation of values and attitudes and analyze the social contexts of these factors in today's Hungarian society. The environmental problems caused by climate change has already changed the way of thinking as of individuals and as of social groups, their relation to the environment, and the adverse consequences enhance the natural environment. It is our assumption that the importance of environmental considerations, their recognition and awareness, and the change of value system are determined by different groups of individual, individuals and communities. It can be influenced by the schooling, township and the age as well meanwhile differences can also be made on the basis of a worldview. Compared to domestic value sociological studies, the novelty of our research is precisely in the study of environmental values by social groups, group awareness, environmental changes and the transformation of value systems in an area where individuals, families and other communities are particularly sensitive to environmental sensitivity. In the project named "Regional impact of climate change related extreme weather and damage minimization opportunities for the coming decades", we conducted a questionnaire-based survey in the research topic "Climate change related values and attitudes". The questionnaire called "Climate change related values and attitudes in the Balaton region" (principal investigator: prof Leveleki M.) has a chapter called "Problem perception, referential points and information sources", in which we focused on how sensitized the Balaton regional population is to climate change (global warming) and how this impacts their everyday life. We also sought to answer where people get their information on these issues, and how they perceive these information sources. During the planning phase there was a debate among the sociologists on whether a general population sample is at all necessary, as opposed to surveying those social groups of specialists and public figures supposedly well-versed in climate change issues. As a compromise, both the special groups (or agents, as prof Kamarás I. terms them) and the regional population were surveyed using the questionnaire. Though these samples proved smaller than originally planned (300 instead of

400 general population, and 40 instead of 50 per agent group) the sample size proved adequate. Population sampling was necessary to determine the level of awareness in the general public, and comparing their data to the agent groups' answers, and in many cases this produced new conclusions.

KEYWORDS: climate change, Balaton, information sources

DORA FAZEKAS, JENNIFER DICKS: MODELLING THE IMPACT OF CIRCULAR ECONOMY ON THE LABOUR MARKET

Cambridge Econometrics, Cambridge; df@camecon.com

Moving towards a more circular economy would have clear environmental benefits. Waste would be minimised and the maximum potential of raw materials realised. What is less clear is the impact of circular economy activities on the wider economy, specifically the labour market. A report by the European Commission (1) states “The transition towards a more circular economy brings great opportunities for Europe and its citizens”. Furthermore, “[i]t creates local jobs” and “is closely interlinked with key EU priorities on jobs and growth”. Research (2) has shown that circular economy activities have positive impacts on the labour market, for example due to increased consumer spending (through lower consumer prices), the high labour-intensity of recycling activities and the high-skilled jobs created by remanufacturing activities. Furthermore, the innovative and entrepreneurial nature of circular economy activities could add to overall growth in jobs and create long-term, sustainable opportunities. But how can we measure the future impact of the circular economy on the labour market? We must first identify key features and sectors in a more circular economy, then understand their direct economic impacts on the wider economy. We also need to understand the indirect impacts of circular economy. Only when we have considered all direct and indirect impacts, through e.g. supply chains, wage rates and labour crowding out effects, can we truly understand how the circular economy might impact on the labour market. These questions have been addressed using the global macroeconomic model E3ME(3). Once key circular economy activities and sectors are identified (and potential policies to promote their development) the most important activities in terms of employment can be identified. The direct impacts of these activities must be quantified before a scenario analysis is applied to assess overall labour market impacts. The scenarios are based on various degrees of increased uptake of circular economy activities in future and the results of the scenarios are compared to a case in which there is no change in the current rate of circular economy activities. The E3ME model is based on an input-output structure, which allows for analysis of both rebound and multiplier effects. It includes econometric equations of employment levels and wage rates to account for wider labour market impacts. These features

combined provide an overall impact on the labour market at sectoral level, which policy makers can extend to consider the composition of employment and the skills mix under different scenarios. Using modelling to determine the overall opportunities and threats to the labour market, while keeping in line with the overall circular economy goals of extracting the maximum value from all raw materials, products and waste, reducing emissions and improving energy efficiency, is of upmost importance when designing new policy.

Source: 1. European Commission COM(2017) 33 2. Delivering the circular economy - A toolkit for policymakers Ellen MacArthur Foundation, SUN, and McKinsey (June 2015) 3. www.e3me.com

KEYWORDS: Modelling, labour market, E3ME, employment

ANDRÁS J. KOVÁCS, ZSOLT MÉHES, ATTILA BORBÁS: RATIONAL USE OF RESOURCES IN WASTEWATER TREATMENT SYSTEMS

KUKK K+F Ltd, Budapest; andras@kukk.hu

Rational use of resources is applying principles of industrial ecology. This have recently been termed as circular economy. These have always been guiding principles for smart engineers with conscience for society and environment. Using byproducts within the operational system gives chance for rational use of resources, for feasible realization of processes to produce profit and send positive social messages. For environmental and related circular economy development for rural regions the concept of decentralized, clustered symbiotic wastewater treatment will be presented. The core of the approach to wastewater treatment (WWT) is the fact that effluents should not be viewed as waste, but as assets to be processed for the benefit of the society and the operator. As long as WWT is considered a legal duty without economic motivations many difficulties must be solved. To make these activities efficient and profitable the core technology should be advanced than state of the art, to make these sustainable, the entire system should be revisited. Decentralized or clustered WWT means that the effluent is treated within the reach of the producer, rather than transporting to a central unit at higher costs than the health and environmental protection would make judicious. A short comparison of these sewage treatment options is given below:

Comparison of centralized and decentralized WWT systems

Feature	Decentralized, clustered	Central system
Transport of sewage	No need for long transport of sewage ▲	Long transport range, possible geographic difficulties ▼
Specific cost of investment	Smaller ▲	higher ▼
Efficiency		
Effluent standards	Met ▲	Met ▲
CO ₂ emissions	reduced p	average ▼
Excess sludge treatment	Can be difficult ▼	Can be easily realized ▲
Operators	A few ▲	more ▼
Development works	simple ▲	complicated ▼
Financing	affordable ▲	excessive ▼

Ownership	Integrated ownership and system of interest ▲	Dislocated ownership and system of interest ▼
Reuse of processed water	Simple, beneficiary ▲	complicated ▼
Specific use of energy	smaller ▲	higher ▼
Aesthetics	Should be considered ▼	Unfortunately ignored ▲
Smell	no ▲	Unfortunately ignored ▼
Positive: negative p:q	11:2	3:9

Those positive marks (▲) have been the results of technological development (symbiotic operation) and rational use of resources within the system. In symbiotic operation native algae streams use CO₂ products of facultative microorganisms of activated sludge system is exchange of consuming the O₂ produced by algae. This symbiosis improves treatment efficiency by at least 20% with lower specific energy consumption and CO₂ emissions. Wastewater contain enough nutrient for both type of microorganism. To make this happen we should provide light and proper reaction conditions. By doing this not only decentralized clusters, but large systems can also be retrofitted to higher efficiency and by such to higher operational capacities at affordable investment and operational costs.

SME scale effluents treatment can also be improved by symbiotic technologies, but there are reserves in applying circular economy principles. Some of such schemes will be presented for industrial and agricultural units.

KEYWORDS: wastewater treatment; industrial ecology; symbiotic operations; decentralised, cluster systems

DAMIAN MAZUREK: THE ESSENCE OF (SMART) SPECIALIZATION – CIRCULAR ECONOMY (CE) IN NATIONAL AND REGIONAL INNOVATION STRATEGIES ON THE EXAMPLE OF POLAND

*Institute of Geography and Spatial Organization PAS, Warsaw;
d.mazurek@twarda.pan.pl*

The idea of Circular Economy (CE) leads to improving waste management and resource utilization. It is a smart approach, but should it be a smart specialization? Regional and national smart specializations were examined and compared with development potentials. There are a few general topics regarding specializations: 1) their number, 2) their multidisciplinary, 3) criteria for identifying smart specializations. In Poland's case there have been 81 regional smart specializations identified. Many of them cover a wide spectrum of sectors. The identification approach of smart specializations is multidimensional and multisectoral, so the identified specializations are difficult to classify. Circular Economy is also a wide field. In 16 voivodships (NUTS 2) 11% of smart specializations are related to ecology, but there are also other specializations, which have common field with the CE. Considering the national level there are 17 smart specializations identified which are divided into 4 categories: 1) Healthy society, 2) Agricultural, forest and environmental bioeconomy, 3) Sustainable energetics, 4) Innovative technologies and industrial processes. All of these categories are very broad and the CE concept can be matched to all of them. The next issue is the identification of smart specializations associated with evaluation of regional strengths. Identification of smart specializations should be connected with and dependent on endogenous potentials of regions. The role of the new regional policy is to strengthen the competitive industries or branches. The need for developing the CE, according to national policy priorities, should be primary, because waste management and recycling is not sufficiently developed. This argument questions the validity of the CE identification as a smart specialization, but on the other hand the CE needs innovative solutions, which can be supported by smart specializations. The paper aims to verify identified national and regional smart specializations in the context of the CE idea. The term "specialization" is often misunderstood. To specialize should mean to reduce development to a few sectors – leading industries with the highest potential for development. These leading industries should have an

opportunity to be competitive at international level. Probably, the CE will be one of the most intensively growing fields in the next years. Under this term many industries are hidden, and not all of them can be a field of smart specialization. The final problem is to explain how all European countries or regions can specialize in the same field. The CE should be treated rather as a goal in development strategies than a smart specialization – especially if it is implemented to many countries and regions.

KEYWORDS: smart specializations, circular economy, Poland

**ADAM DROBNIAK, KLAUDIA PLAC:
TRADITIONAL INDUSTRIES VS. MODERN
INDUSTRIES – ECONOMIC AND ENVIRONMENTAL
RESILIENCE OF THE EU COUNTRIES AND
REGIONS**

*University of Economics in Katowice, Faculty of Economics, Katowice;
adam.drobniak@ue.katowice.pl*

The article refers to the issue of economic growth assessment, in the context of traditional and modern industries, made in the convention of economic and environmental resilience of the states and regions of the European Union. Its aim is to present a broader, i.e. economic and environmental context for the development of the green economy and circular economy. At the theoretical level, the scope of the article refers to the state-of-the-art in the field of resilience, green economy and circular economy. At the methodological level, the article is based on GDP dynamics indices combined with indices describing the elements of the green economy and circular economy. Thus, it investigates a correlation between the level and dynamics of economic development of the EU countries and regions (NUTS2) – in the dimension: traditional industries vs. modern industries – and their environmental impacts depicting the degree of development of the green economy and circular economy. In addition, within the paper a case study method was used, which illustrates the level of development of the green economy and circular economy in the post-industrial agglomeration (i.e. Upper Silesian Agglomeration in Poland), whose economic structures still depend to a large extent on traditional industries. The inference related to the overall assessment of the relationship between the size and dynamics of economic growth (depending on traditional industries or modern industries) and their impact on the development of green economy and circular economy was made using a portfolio analysis based on distance (Euclidian distance) and clustering analysis for the EU countries and regions. The demonstrated significant differences in economic and environmental resilience of individual EU countries and regions illustrate the hybridization of modern economic development on the one hand, and on the other, they form the basis for formulating recommendations for policies supporting the development of green economy and circular economy.

*KEYWORDS: economic resilience, green economy, circular economy,
the EU regions*

**RÉKA HORECZKI, ÁKOS BODOR,
ZOLTÁN GRÜNHUT, VIKTOR VARJÚ:
ENVIRONMENTAL ATTITUDES AT THE MAYOR OF
RURAL AREA IN BARANYA**

CERS HAS (MTA KRTK), Pécs; horeczki@rkk.hu

When asked to consider how important protecting the environment is to respondents personally, the view of Hungarian continues to be overwhelmingly positive. 95% of citizens questioned consider that protecting the environment is important to them personally. Only 5% do not regard it as important (EuroBarometer 416). In most socio-demographic groups there is relatively little deviation from the Hungarian average. The most common groups in this analysis are gender, age, education and difficulties paying bills. In our recent research we concentrate the urban-rural dichotomy therefore our question is the domicile can be an influencing element or grouping factor? First we introduce the environmental attitude of the Hungarian (Baranya county's) rural inhabitants. We will analyse 163 settlements in Baranya county which below 1000 inhabitants. The mayor represent the majority opinion in this small villages. Our research focuses specifically on environmental issues, with empirical examination of the distinctiveness of Baranya county's settlement leaders environmental perspectives as contrasted with the general Hungarian population. We will analyse the environmental attitudes of settlement leaders/mayors in the rural areas of Baranya county. We will compare the socio-cultural attributes (trust – generalized trust, institutional trust, educational level, sex, age) and environmental attitudes at the mayor of the small settlements. Our main questions: how environmentally friend the settlement leader and this mentality how influence the environmentally project and development possibilities in the village; the local or the global environmental issues have been detected? According to preliminary results are: surprisingly low the environmentally friend mayor in the interviewed settlements. We are looking for the reasons for this in our presentation.

Acknowledgement: This study were supported by the OTKA (NK 116424) Interrelations between Trust and Governance at the Local Level and the RuRES (Renewable energy sources and energy efficiency in a function of rural development research) Interreg V-A Hungary-Croatia Co-operation Programme 2014-2020 HUHR/1601/3.1.1/0033 projects.

KEYWORDS: environmental attitude, trust, Baranya county

HANNA HREHOROWICZ-GABER: THE SECOND LIFE OF GOODS IN THE CITY SPACE

*Croacow University of Technology, Institute of Cities and
Regions Design, Kraków; hanna.hrehorowicz@interia.pl*

Circular economy is becoming more important and is taking practical place applications in economic systems. CE popularization is connected with European Union development programs and law regulations. Currently taken actions are focused on reduction of natural resources usage and energy consumption and they are positively rated by society and industry. However the recycling does not change the nature of final goods. One of the method in circular economy is the re-using the goods without energy costs process of recycling. In example re-use of packages in modern design. Reaching for a whole range of various elements which were used to secure the goods, which apparently are no longer useful, because their goal was to secure goods in transport, is a new trend in the city space shaping. Unit packages and pallets are used after small renovation alike in private spaces, public buildings or in public spaces of the city. The multiplicity of ideas in reusing, euro pallets, cable reels, crates, fruit boxes, etc. is increasing every single day and its visual and useful usable is surprising us more and more. The second life of apparently useless stuff give us a motivation for seeking further solutions in reusing goods and making circular economy more visible and real in everyday life.

KEYWORDS: recycling, reusing, public space, design

MÓNIKA HOSCHEK, NIKOLETTA NÉMETH: CLIMATE-SMART AGRICULTURE PERSPECTIVES IN THE ADAPTATION METHODS OF HUNGARIAN FARMERS TO CLIMATE CHANGE

*University of Sopron Alexandre Lámfalussy Faculty of Economics,
Sopron; nemeth.nikoletta@uni-sopron.hu*

As population grows and consumption increases, the demand for agricultural products is also getting higher. Forcings on agricultural change are several: 700 million tonnes of agrifood waste is produced in Europe each year, high water demand of irrigation, the challenge of climate change. Adding climate change as a phenomenon to the circular economy theory in agriculture leads us to the definition of 'climate-smart agriculture'. Agriculture has to adapt continuously to climate change being highly exposed and with the goals of productivity, adaptation and mitigation it can become climate-smart. Along the main goals of EU Circular Economy package connected to agricultural activity, the energy-efficient production, well-operated waste management, revised fertilisers regulation and efficient water reuse have to be highlighted. In our presentation the results of a national survey are going to be introduced, examining the completed and planned adaptation methods of Hungarian farmers to climate change, concentrating on CE perspectives. The questionnaires and interviews are from different counties of Hungary. Land size, main activity, own equipment and the perception of climate change significantly influence adaptation solutions. The main questions are the followings. How important is to match crops and animal species to local climates and to have high-yields both in crop and in livestock production? Which energy-efficient technologies should be used? How could the rules of soil management help to keep soil carbon and moisture level? How is it possible to protect soil from degradations? Which ways help farmers to reach more efficient water storage and water management? Which possibilities are present to reduce and reuse agricultural waste? Finally, how would a better weather forecasting help farmers? Developing irrigation system (with the exposure of water scarcity), technology (durability, reliability, long life expectancy of agricultural machinery) and cultivation methods, as well as reusing water are the most frequently given answers by Hungarian farmers to climate change, reacting to production changes. Determining factors of natural environment that influence agricultural production are the annual

average temperature, the annual average precipitation, the number of sunny hours and the extreme weather conditions. We analysed how the given answers and adaptation solutions of Hungarian farmers to climate change suit CE principles and whether they lead to sustainable and smart farming.

Acknowledgement: The research was supported by 'AGRARKLIMA-2 - VKSZ_12-1-2013-0034 – Analysis of the effects of prognosticated climate change and the adaptation possibilities in agrarian and forestry sectors' project.

KEYWORDS: *climate change, agriculture, adaptation, circular economy, climate-smart agriculture*

NOÉMI CSIGÉNE NAGYPÁL: WHAT CIRCULAR ECONOMY CAN LEARN FROM INDUSTRIAL ECOLOGY PRACTICES?

*University of Technology and Economics, Budapest;
nagypaln@gmail.com*

Circular economy (CE) is becoming popular in policy making not only in Europe but practically globally. The popularity of the concept can partly be explained by the fact that it is a general, comprehensive concept, involving several economic sectors and not only the production but also the consumption and post-consumption phase. All stakeholders can identify relevant aspects and try to find their role in its realisation. While circular economy is a very ambitious, however so far mostly theoretical concept, industrial ecology (IE) has already been tested in various sectors and geographical settings in the past decades. In the first part of this paper the development and relationship of the two concepts as well as some similar approaches are introduced, based on an international literature review. Afterwards, the lessons learnt from the practical implementation of industrial ecology are analysed and conclusions for “up-scaling”, that is the potential extension to macro level are investigated. For that purpose, practitioners of industrial ecology in Europe are surveyed. The questionnaire surveys and semi-structured interviews focus on the following issues: benefits, success factors and barriers of the realisation of closed material flows and other aspects of IE; impact of changing regulatory environment; the sensitivity of the system(s); experiences of cooperation and communication practices, stakeholder involvement; the relationship of innovation and IE and lessons learnt from earlier successful and unsuccessful – geographical or sectorial – extension attempts. By surveying companies from various sectors and countries, general and specific factors can be identified. Since circular economy is very complex by its nature, facing several challenges during its realisation, particularly concerning social and institutional aspects, it is especially useful to gather information about current, already tested practices. The results of the literature review as well as the primary survey may be useful for policy makers and practitioners in order to be able to avoid typical pitfalls in the future.

KEYWORDS: circular economy, industrial ecology, lessons

TAMAS GYULAI (PIRKKO MELVILLE, SATU FREYBERG): RESOURCE WISDOM AS SOCIAL INNOVATION FOR SUSTAINABLE DEVELOPMENT

IQ Kecskemét Ipari Kutató Kft., Kecskemét; tamas.gyulai@europe.com

The novelty of Resource Wisdom is its ability to use different resources, such as natural resources, raw materials, energy, products and services, facilities and time in a carefully considered manner which also promotes well-being and sustainable development as it aims to increase the competitiveness of enterprises and the well-being of citizens by reducing the consumption of natural resources. Commitment is created to a pattern of everyday life that supports the emergence of new technological, business and service innovations. It is a new operating model for cities to create sustainable well-being from a circular and carbon-neutral economy. The operating model of Resource Wisdom combines everyday choices, new innovations and various sustainable development projects to form a cohesive whole, creating a shared goal for a city region. By using the model, the various functions and areas of responsibility of city management can be brought together to work towards a shared goal while given the opportunity to lead the local community on the path towards a successful, sustainable future. The steps towards Resource Wisdom are measured by using four indicators: 1. carbon foot print 2. the ecological foot print 3. material loss 4. the perceived wellbeing of residents. The city of Jyväskylä implemented this operating model as a way to sustainable innovations through a culture of experiments and prototyping. The main characteristics of the concept are the following: • Step by step program for cities and their stakeholders for creating well-being from circular and carbon neutral economy – a scalable model • A framework for cities to encompass climate, environment and resource efficiency policies as a modular program o Baseline Assesment o Roadmap 2030-50 § Energy renewal § Sustainable transport § Waste as a resource § Healthy food § Valuable water § Happy communities o Implementation o Network membership o Monitoring and reporting • Real engagement o co creation via interactive platform provides foresight and info on problems occurring in resident's daily living • Learn by prototyping o testing ideas in real environment makes abstract issues concrete and sensible actions. • Challenging “business as usual” o culture of experiments enable us

to think outside-the-box and break routines • Sustainability gets acceptance o successful experiments tell powerful stories how sustainable lifestyle makes urban life better. The experience of the city of Jyväskylä in Resource Wisdom can be useful for other cities that intend to develop economic development strategy in line with sustainability principles therefore it can be a practical model in regional development and smart specialization.

KEYWORDS: sustainable economic development

MIHÁLY LADOS: NATURE-BASED URBAN DEVELOPMENT SOLUTIONS AS TOOL FOR SUSTAINABLE AND LIVEABLE CITIES

*Centre for Economic and Regional Studies of Hungarian Academy of
Sciences, West Hungarian Research Department of the Institute for
Regional Studies, Győr; ladosm@rkk.hu*

Similarly to Circular Economy (CE), Nature-based solutions (NBS) has also strong relation to the issues of sustainability. Perhaps one of the major distinction between these two approaches would be that while CE rather focuses on the scarcity of resources NBS has more relations to the climate change. The H2020 Smart Cities and Communities financed NATURVATION project defines the meaning of NBS, builds up a data base of 1,000 NBS of 100 European Cities and prepare 54 NBS case studies of 12 European and 6 cities from other continents. The first part of the paper introduces the main objectives, actions and players of NATURVATION project. The second part the approaches and definition of NBS. In the projects there six key European cities. There is one Hungarian among them, which is Győr. The final part the paper analyses the three NBS cases of Győr.

*KEYWORDS: Natur-based Solutions, Sustainability, Liveable City,
Smart City, Climate Change*

**MARIA CERRETA, PASQUALE DE TORO,
PASQUALE INGLESE, SILVIA IODICE:
OPERATIONALIZING CIRCULAR ECONOMY:
ADAPTIVE ASSESSMENTS FOR WASTESCAPE
REGENERATION**

*University of Naples Federico II – Department of Architecture (DiARC),
Naples; maria.cerreta@unina.it*

The activation of a process of management, recovery, regeneration and recycling of waste landscapes, called “wastescape”, constitutes the challenge faced by the Horizon 2020 Project “REsource Management in Peri-urban Areas: Going Beyond Urban Metabolism” (REPAiR) (local scientific director Prof. Michelangelo Russo of the University of Naples Federico II, scientific coordinator Prof. Arjan van Timmeren of the Delft University of Technology). According to the principles of the circular economy (EC), wastescape can be considered an innovative resource for the regeneration of territories in crisis, and allow a change of paradigm able to determine multiple and different environmental, economic, social and cultural implications. Exploring approaches and synergistic techniques to tackle and manage change involves focusing not only on the characteristics of waste landscapes and on potential opportunities for transformation and regeneration, but also considering waste, in particular building waste, as an instrument for activate new models of sustainable use of territorial resources, based on the principles of EC, and identify integrated, eco-innovative and place-based development strategies. Therefore, waste is understood as a potential resource, taking a positive meaning from the point of view of circularity and recycling. Starting from the European policies and regulations on waste management (2008/9 / EC), and taking into account the recent ISPRA 2017 reports on urban waste and special waste, it is possible to identify the specifics of waste landscapes, also in relation to the flows of materials, energy and type of waste, and define if, when and where they can become a productive resource for urban metabolism (UM). The REPAiR project, integrating the Life Cycle Assessment approach with that of Geodesign and that of Living Labs, structure a methodological approach aimed at making operational the concept of UM according to the EC principles, deepening the dynamics between energy flows, waste, information and people and identifying ecological and innovative solutions deriving from

a win-win-win approach, considering the environmental, social and economic impacts of the transformations and the benefits deriving from the intrinsic relationships inherent in metabolic systems.

Acknowledgement: The research behind this work is financed by the REPAiR (REsource Management in Peri-urban Areas) project. This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 688920.

KEYWORDS: Wastescapes, Urban Metabolism (UM), Life Cycle Assessment (LCA), Material Flow Analysis (MFA)

**REIKE, DENISE (NEGRO, S.O., HEKKERT, M.P.):
USING PROXIMITIES FOR STUDYING INTER-
ORGANISATIONAL COLLABORATION PROCESSES
IN THE CIRCULAR ECONOMY**

*Copernicus Institute of Sustainable Development, Utrecht University,
Utrecht; d.reike@uu.nl*

Over the past few years, the circular economy (CE) has increasingly been promoted as an important means to induce the paradigm shift in resource use required for the transition towards more sustainable societies. The circular economy aims to design out waste and to enable consecutive cycles of use for products and materials through repair, reuse, remanufacturing, refurbishing, and recycling products and materials in a way as to retain their maximal value (Geissdoerfer et al., 2016; Kirchherr et al., 2017). Literature from both practice and academia highlights that collaboration with existing or new value chain partners is essential in order to implement the technological and organisational innovation required for re-configuring linear value and supply chains into circular ones (Ellen Mac Arthur Foundation, 2014; Geng & Doberstein, 2010). Despite a widespread assumption on the importance of inter-organisational collaboration, a closer look at the literature reveals that collaboration processes and their characteristics have hardly been addressed in the context of the circular economy leading to a lack of practical guidance. For example, Geng & Doberstein (2010) in a broader study on the development of the circular economy in China identified the lack of well-functioning collaboration as one of the major barriers preventing CE from diffusing more widely. More knowledge on collaboration processes including success characteristics and bottlenecks is arguably needed to aid implementation. At the same time, the lack of practical guidance is starkly related to absence at the theoretical level of accepted analytical tools for describing and analysing the circular economy more generally. As a complex, multi-disciplinary field, the circular economy builds on various theoretical lenses and draws on analytical tools from multiple fields such as industrial ecology, cleaner production, reverse logistics, and waste management. However, these fields have neither brought forward approaches suited to analyse collaboration beyond organising technicalities and material flows. This paper proposes that the theoretical foundations of the circular economy can be further fueled by using an established approach from innovation sciences and human geography, the proximity approach

developed by Boschma (2005), in order to analyse inter-organisational collaboration in the circular economy. We argue that Boschma's dimensions of geographical, organisational, institutional, and social proximity which are established concepts to analyse collaboration in the context of collaboration for technological innovation can serve as a basis for characterising circular economy collaboration processes as they evolve over time. For this purpose, we specifically show how the latest extensions of the proximity concept linking it to cross-functional learning and knowledge development make the approach suited to study innovation beyond the technological aspects. Thereafter, we extend on the proximity approach methodologically. It is commonly applied in quantitative studies and focused on hard factual data. We derive new, more qualitative indicators based on the proximity literature which can be applied when using other type of data sources such as interviews for analysis. In a first empirical application we show that the concept is suitable to reveal characteristics of collaboration along with possible bottlenecks. We also conclude that the proximities' approach offers considerable potential for extension from classic innovation contexts to complex, uncertain contexts such as the challenges connected to circular economy implementation.

KEYWORDS: collaboration, inter-organisational, proximities, innovation sciences

ZOLTÁN PÁMER: CROSS-BORDER ASPECTS OF ENVIRONMENTAL (AND CE) RELATED DEVELOPMENTS

HAS CERS Institute for Regional Studies, Pécs; pamer@rkk.hu

EU integration, cohesion policy and continuous administrative reforms in Hungary have had significant impact on competences and responsibilities of various governmental and decentralised bodies since the year 2000. EU integration and cohesion policy promoted decentralisation, in line with the subsidiarity principle. Hungary seemed to pioneer in this process, Croatia later took a similar path. Government reform after 2010 diverted Hungary to the path of centralisation that resulted further asymmetries in cross-border cooperation. Sustainable development has been a key priority of the Hungary-Croatia IPA Cross-border Cooperation Programme implemented in the 2007-2013 programming period, 60% of the community funding has been spent to this objective, in form of various soft and hard projects of environmental and nature protection and tourism. The paper aims to analyse the difference in institutional patterns, territorial and institutional distribution of funding under the sustainable development priority, comparing Hungary and Croatia.

KEYWORDS: Decentralisation, territorial governance, cohesion policy, cross-border cooperation

DÓRA BÁLINT: OSZKÁR, THE HUNGARIAN RIDESHARING PLATFORM AS AN EXAMPLE OF RESILIENCE IN MOBILITY

*HAS Centre for Economic and Regional Studies, Pécs;
dorabalint29@gmail.com*

In mobility, peer-to-peer platforms have been rising in every geographical scale. One of them is OSZKÁR, a long-distance ridesharing company which connects drivers and passengers between settlements. It has grown larger than any other Hungarian ICT facilitated platform in this sector which means OSZKÁR can be an excellent example to examine domestic users' mobility patterns in detail. On-demand or sharing economy enables for travelers to give a quick response to mobility changes which can be grouped into two categories. The first case is when occasional events concentrated in one place (e.g. festivals, sports events) so smaller settlements have suddenly become popular destinations for travelers. Public transportation or other service providers can't adopt these changes fast enough to meet the demand. On the other group is the seasonal factor (e.g. holidays) when a large number of people are traveling (e.g. families, students) to specific destinations and choose an alternative way of transportation. Both cases ridesharing platforms can be a highly adaptable form of mobility with the help of internet and smartphones. I examine this fluidity in case of OSZKÁR. I use a database from the platform which contains passengers' departure and arrival settlements to demonstrate this resilience. I choose four different dates to examine the impact of the events in the number of routes. According to my hypothesis, these events can highly affect the number of passengers and the types of destinations.

KEYWORDS: ridesharing, on-demand economy, mobility, resilience

**MACIEJ KOWALCZYK (MAŁGORZATA
GRODZICKA-KOWALCZYK): HOW TO IMPLEMENT
THE CE PRINCIPLES IN POLAND ASAP?**

*Pheno Horizon (OLP Sp. z o.o.), Narutowicza;
maciej.kowalczyk@phenohorizon.com*

Revitalization processes is a good opportunity to use the circular economy model for functioning of Polish cities. Comparing requires revitalization (in Poland: eliminating crisis levels in 5 spheres: social, economic, environmental, spatial, functional and infrastructural) where the key is the implementation of the Revitalization Program we find the perfect tool. The question is not whether it is worth implementing CE, but how to do it wisely and using the current EU programming perspective.

KEYWORDS: revitalization, EU programming perspective, cities

KRZYSZTOF JANC: FOUNDATIONS OF THE DIGITAL CIRCULAR ECONOMY – GEOGRAPHICAL APPROACH

*University of Wrocław, Institute of Geography and Regional
Development, Wrocław; krzysztof.janc@uw.edu.pl*

New technology, mainly related to internet-based services, transforms traditional business models and traditional consumer behaviour. Therefore the circular economy is much better and more efficiently today thanks to digital technology. Digitalisation of every aspect of firms and people's functioning is a big challenge and also opportunity to implement the circular economy solutions. This is especially important if we consider that the transition to the circular economy needs a better coordination of material and information flows between and within companies (Wilts, Berger, 2017) but also in the whole society. We could distinguish five technology trends which are drivers of digital circular economy (SAP, 2017): supercomputing, cloud computing, a smarter world based on outcomes, and cybersecurity. In relation to these trends the main aim of the presentation is to describe the basic features of the digital circular economy regarding spatial differentiations. Presentation will focused on spatial differences and changes in internet geography in the context of a division into countries from the perspective of the social and economic development. The matters were analysed based on a selected data describing the technological, economic and social level of internet geography, e.g. IP addresses, Wi-Fi networks. This approach should give a information about countries readiness for digital circular economy implementation from the perspective of widely understood society. In each of the distinguished levels of the internet related phenomenon (technological, economic, social), one may observe occurrence of strong spatial diversities between countries of the world and relations with geographical space. Differentiation in the level of social and economic development is the main determinant affecting distribution of elements of the internet infrastructure and organization of its functioning. At the economic and social level, relations between events in the offline world and the course of processes in the online world result from variety of internet users from particular areas, i.e. various language preferences, the level of competence and knowledge, needs to use the internet. It is worth noticing that occurrence and dissemination of new phenomena, such as cryptocurrencies, crowdsourcing, usually reflects the hierarchy of countries at the global scale due to the level of social, economic and technological development.

Literature SAP, 2017, Value Creation In Digital Circular Economy Business. Inspire and shape a digital world that reinvents waste, recycling, and environmental services, SAP. Wilts H., Berger H., 2017, The digital circular economy: can the digital transformation pave the way for resource-efficient materials cycles?, InBrief 04/2017, Wuppertal Institute for Climate, Environment and Energy.

KEYWORDS: digital circular economy, internet geography, countries

GUSZTÁV NEMES: LOCAL PRODUCERS, SHORT FOOD CHAIN AND SOCIAL INNOVATION – THE EUROPEAN TERRITORIAL QUALITY MARK IN HUNGARY

MTA KRTK KTI, Budapest; nemes23@gmail.com

Short food chains are important part of the Circular Economy concept. They not only reduce food miles, but keeping larger part of the added value locally, they can become the engine of local development, helping to sustain entrepreneurship and human activity, traditional ways of life and production in less developed rural areas. Nevertheless, to actually succeed in the ever increasing global competition, small scale local producers have to face many challenges. Boosting social innovation, building networks, adapting good practices with the help of rural development policies and institutions is an important way to enhance the process. This paper explores how the European Territorial Quality Mark (ETQM) was recreated in Hungary in the framework of the LEADER Programme and what are the main challenges for the participating local action groups (LAGs) and rural entrepreneurs to make it a success. European Territorial Quality Mark (ETQM) is an umbrella system for territorial branding and quality assurance of rural products and services. It mainly concerns locally produced and processed food, aims to improve quality, entrepreneurial networks, joint marketing, short supply chains and other ways of enhancing food sovereignty and the circular economy. ETQM was originated by Spanish, French and Italian LAGs in 1998 and was supported financially and professionally directly by the European LEADER Observatory (AEIDL). By now its main stronghold is in Spain, where a network of some 50 LEADER LAGs are actively using ETQM as an inherent part of their local development strategy. There are two overall aims of the system: (1) To increase territorial competitiveness, based on criteria of quality, environmental conservation and solidarity in each individual territories, identified by a logo specific to the territory. The final aim here is to improve the quality of life of its inhabitants and to ensure the quality of goods, services and cultural, historical and environmental heritage produced in the territory. (2) The building of a joint territorial quality mark, at European level, identifying with the same symbol and obtained by the same procedure, all territories involved in the project, in order to improve

their chances to go and compete in dynamic global, European and/or national Markets. ETQM Hungary originates from action research starting in 2008, aimed at enhancing domestic and transnational rural development co-operation. Researchers contributed in many ways: bringing international contacts, information; language skills; spreading a culture of co-operation, mediation and facilitation, etc. Impressive results of the programme are an associated network of 4 local brands, hundreds of participating entrepreneurs and significant domestic interest both from local development groups and from policy circles. However, development has not been without setbacks and a real breakthrough for ETQM Hungary to become a nationwide project is yet to come. In this paper we explore successes and dilemmas concerning the process. Our analysis is based on long term involvement, cooperation and joint reflection between researchers and development practitioners.

KEYWORDS: Rural development, short food chains, quality assurance system, social innovation, LEADER

ÁDÁM CSUVÁR: HUNGARIAN HOUSEHOLDS’ BIOMASS AND NATURAL GAS CONSUMPTION IN THE CONTEXT OF THE “ENERGY LADDER” HYPOTHESIS

Kaposvár University, Kaposvár; csuvar.adam@hotmail.com

In the lecture, we compare the “energy ladder” hypothesis with the consumption of biomass and natural gas by Hungarian households. According to the theory, the energy consumption of households will shift to more modern energy sources as a result of their income growth. Thus, the relationship between income and biomass/natural gas suggests an opposite/identical direction. However, if we draw attention to the data, we see that they do not support the assumption of the model. In the lecture, we are looking at the factors that hinder the “ladder” from functioning properly. To resolve this contradiction, we rely on the results of international authors and Hungarian data. Based on data from the period under review, it is apparent that resource prices had a stronger impact on the purchasing power of households, and determined the choice between the two energy sources better than incomes did -thus overturned the logic of the hypothesis. At the end of the lecture, we are also mentioning the practical significance of moving on the “energy ladder”.

KEYWORDS: microeconomics, residential heating, energy transition, sustainable energy

**PHAN VAN THANH (SZILÁRD PODRUZSIK):
ENTERPRISES IN VIETNAM:
THE IMPLEMENTATION OF CSR**

Kaposvar University, Kaposvár, thanhpv.hut@gmail.com

Corporate social responsibility (CSR) has become a prominent issue for long-term sustainability, and many enterprises have come to recognize it as a key factor in their success. Companies that engage in CSR initiatives build consumer trust and convey a positive company image. However, CSR initiatives, so far, have tended to focus mainly on large and multinational companies. Under pressures from the society, large companies have integrated CSR in their business strategy either in short or long term strategy. CSR is considered as a decisive factor for sustainable growth and increased profitability. In Vietnam, a developing country, it is difficult to implement CSR because its legal system is incomplete and monopoly, corruption and group interests strongly influence society. However, many large enterprises are aware that in order to develop sustainably, enterprises must comply with environmental protection standards, gender equality, labor rights, labor safety, equal pay, talent management and community development. While, with more than 97 per cent of registered enterprises are small and medium enterprises (SMEs). The implementation and application of CSR in Vietnamese SMEs are facing many difficulties and limitations. Because of the limited by the financial resources, personnel, size of the business, in most cases the business owner is also the director. Vietnamese SMEs focus more on maximizing profits than on social responsibility. Therefore, the main purpose of this article is investigate the practice of CSR in Vietnamese enterprises. Also, the article collates the recommendations given by researchers in order to strengthen and improve the implementation of CSR in Vietnam as well as gives some recommendations to help Vietnamese enterprises get success in applying CSR in their sustainable business objectives. The findings of this study are important to Vietnamese enterprises and future researchers in CSR in Vietnam in particular.

KEYWORDS: Corporate Social Responsibility, CSR, Vietnamese Enterprises, Vietnam

ERJAN AKHMEDOV: SUSTAINABLE DEVELOPMENT AS A MAIN DEVELOPMENT PRIORITY IN MAJOR OIL-EXPORTING COUNTRIES

Since the beginning of the current oil price plunge many oil-exporting countries have faced a radical negative change in their macroeconomic situations because oil export proceeds constitute the lion's share of their budget revenues. It should be noted that this is not the first oil plunge, which affects economies of these countries negatively. Even though now there is a consensus that oil-export oriented economic models and policies make countries vulnerable to oil price fluctuations and result in weaker growth in the longer term, oil-exporting countries repeat making the same mistakes for tens of years. Attempts of practical implementation of sustainable development policies in different oil-exporting countries brought to light a lot of problems, which need to be addressed and solved properly. In fact most of such attempts in most of oil-exporting counties failed. The article addresses the reasons why these countries keep implementing non-sustainable development policies leading to cyclical economic crises and suggests a set of measures, which should result in a sustainable economic and social development.

KEYWORDS: Sustainable development, oil-exporting countries, cyclical economic crises

BERTALAN LAURA, JANKÓ FERENC: LOCAL FOOD AND SHORT SUPPLY CHAIN IN HUNGARY

*PhD student, associat professor – Soproni Egyetem, Lámfalussy Sándor
Közgazdaságtudományi Kar;
bertalan.laura@uni-sopron.hu, frk.geo@gmail.com*

Growing urban population and climate change put food security and sustainable food supply into the foreground. Besides the obviously unsustainable global food system we are witnessing the appearance of short supply chains; this mode of distribution got recently particular attention in Hungarian rural policy supported by the European Union, and could be understood and interpreted in the theoretical frames of the concept called circular economy. Nevertheless, the re-birth of traditional peri-urban areas as local food suppliers is delaying. Entering the market for small scale producers is difficult in case of multinational retail chains as well as short supply networks. The aim of the paper is to put the topic within the context of circular economy and particularly to analyse the strategies of the local food producers as well as the obstacles, which hinder them in local market appearance in Hungarian context. Our basic data are from questionnaire surveys and interviews carried out among food producers and other participants in local food supply chain. Our study demonstrates that local markets in Hungary play only a marginal role in reaching people. However modern ways of food sales, online and other direct food supply channels, e.g. community supported agriculture, are viable only in metropolitan environments with conscious urban consumers, like Budapest in Hungary. Self-employed farmers and entrepreneurs can be found mostly on local farmers markets, which usually cannot get EU-funding and develop without a particular supporting and distributing network. Farmers producing food in high quality and larger quantity for regional markets could be the winners in the competition for rural development funds. The question is whether the products of these farmers will be able to get on the shelves of larger retail chains in short term, which were almost unreachable for them until today. The paper concludes that without appropriate support and training for farmers as well as community engagement and change in consumer behaviour there cannot be a link between urban population and local farmers.

*KEYWORDS: short food supply chain, local farmers market,
rural development, Hung(a)ry*

JELENA DUNJIC, IMRE NAGY: SERBIA AND EU LAW HARMONIZATION IN WASTE MANAGEMENT. CASE STUDY: REGIONAL WASTE MANAGEMENT CENTER SUBOTICA

*PhD Student, Full Professor – University of Novi Sad, Department of
Geography, Tourism and Hotel Management; University of Kaposvar,
Faculty of Economics; imre.nadj@dgt.uns.ac.rs nagy.imre@ke.hu*

As a candidate country for EU membership, Serbia is obliged to bring its laws and regulations into line with laws and regulations in the European Union. These laws also apply to the field of environmental protection and, consequently, waste management. According to the Law on Waste Management of the Republic of Serbia (Official Gazette RS, No. 36/2009, 88/2010 and 14/2016) and the Waste Management Strategy for the period 2010-2019. (Official Gazette of RS, No. 29/10) Serbia is divided into 26 waste management regions, 9 of which are in AP Vojvodina. One of the regional centers is the Regional Waste Management Center Subotica. So far, the Regional Waste Management Center in Subotica is one of the best equipped regional centers in Serbia. Considering that the EU Directives set ambitious targets for reducing deposited waste and a greater representation of reuse and recycling, in this paper we will examine how much the regional center of Subotica could meet the set goals.

KEYWORDS: EU Directives, Subotica, Serbia, regional center for waste management

TIBOR JÁNOS MOLNÁR: MESSAGE FROM THE 18TH CENTURY TO THE 21ST – SUSTAINABLE LAND USES AND FARMING METHODS IDENTIFIED BY THE HISTORICAL ECOLOGY IN THE CARPATHIAN BASIN

*PhD student, University of Pannonia Georgikon Faculty,
Festetics Doctoral School; molnar.tibor.janos@gmail.com*

21st century has a good chance to bring radical changes, which will force humankind to a level that is lower than the currently known, but it will be a more sustainable civilization. These changes are still taking place, but the breakpoint has not yet been reached. After the comfort provided by the achievements of industrial revolutions it may be shocking to live on the standard of previous centuries. 18th century was the last era before the industrial revolution, mass use of fossil fuels and change in production method. Researchers of historical ecology have described a number of land use options and biodynamic community farming from this century, which can be used to ensure the self-sufficiency of local communities in case of collapse of the current civilization. If sustainable development evolves into the fourth industrial revolution, increasing digitalisation and robotics, it can give new life chances to working people who are becoming redundant in production and services. They can resettle from the overcrowded urban ecosystems to rural areas. Self-sufficient community farming can contribute to localized commodity exchange and consumption through valuable bio and handicraft products. Sustainable land use has an additional, but more strategic benefit: restoration of the ecological system that has been damaged in the last two or three centuries. This is an urgent need to alleviate the consequences of extreme weather events caused by climate change. Authorities of hungarian historical ecology (Ágnes Várkonyi, Bertalan Andrásfalvy, Lajos Rácz) and present-day researchers (Péter Batáry, János Oláh, Zsolt Hetesi) recommend to at least partially restore the former ecological system of the Carpathian Basin (and with a broader perspective in Europe). They agree that it is particularly important to increase biodiversity and forest cover, as well as floodplain/riparian management. Sharing economy is becoming more popular nowadays. Adapting to this trend the forms of community farming regulated by customary and village laws can also revive.

Keywords: historical ecology, floodplain management, sustainable land use, community farming

GERGELY MARTON*, ZOLTÁN RAFFAY**: INTERPRETATION OF SUSTAINABILITY IN THE HUNGARIAN TOURISM SECTOR

**Phd, Senior lecturer, University of Pécs, Faculty of Science, Institute of Sport Sciences and Physical*

***PhD, Senior lecturer, University of Pécs, Faculty of Business and Economics, Institute of Marketing and Tourism*

E-mail: martongergely@gamma.ttk.pte.hu; raffayz@ktk.pte.hu

Hungarian tourism has gone through a spectacular development since the regime change, but in several fields it has not been able to catch up with the worldwide trends. Such fields are sustainability and its partial elements.

All three aspects of sustainability – economic, social and environmental – can be interpreted in the tourism sector, but all there have specific features.

Economic sustainability is the foundation of almost all activities in tourism, because, coming from the for-profit character of the travel industry, not one part of tourism can be run profitably without economic sustainability.

Social sustainability appears in a much more differentiated way, as the professional management of the leading tourism companies applies it in every field of their operation but the market actors that are smaller or have more limited financial possibilities typically do not pay attention social sustainability.

As regards environmental sustainability, two main categories can be identified: the first is the set of tourism services the vested interest of which is the preservation of the values of nature (ecotourism, angling tourism, hunting tourism etc.), while actors in the second group see the sustainability of the natural environment more as a PR or marketing action. It is remarkable that also in this field we can see differentiated behaviours of actors, depending on their financial means.

As a summary, during our research we assessed and identified the fields of sustainability and their forms of appearance in the Hungarian tourism sector, and we also categorised our findings. These findings allow us to say that that an extremely wide range of attitudes and actions can be identified in sustainability in the Hungarian tourism sector, and the sector has still a long way to go so as to catch up with the Western Europe service provider that are market leaders in this respect.

Keywords: Hungary, tourism, environmental sustainability