INSTITUTE OF REAL ESTATE STUDIES
Ukmarjeva 6, SI – 1000 LJUBLJANA

NTNU
Norwegian University of
Science and Technology

4th CONFERENCE OF INTERDISCIPLINARY RESEARCH ON REAL ESTATE

BOOK OF ABSTRACTS

TRONDHEIM, September 12-13, 2019

CIRRE 2019

4th CONFERENCE OF INTERDISCIPLINARY RESEARCH ON REAL ESTATE
TRONDHEIM, September 12-13, 2019

SCIENTIFIC COMMITTEE:

Prof. dr. Darja Kobal Grum, Assoc.prof. dr. Bojan Grum, Prof. dr. Alenka Temeljotov Salaj, Prof. dr. Olav Torp, Assoc.prof. dr. Carmel Lindkvist, Assoc.prof. dr. Marit Støre Valen, Prof. Svein Bjørberg, Prof. dr. Tore Haugen, Prof. dr. Athena Roumboustos, Prof. dr. Marija Bogataj, Dr. Jardar Lohne, Prof. dr. Edward Finch, Assoc.prof. dr. Jan Veuger, Assoc.prof. dr. Boštjan Kerbler, Prof. dr. Valentina Zileska Pancovska, Assist.prof. Milena Vukmirović, Assoc.prof. dr.dr. David Bogataj, Assist.prof. dr. Marjana Šijanec Zavrl, Assoc.prof. dr. Knut Boge, Prof. dr. Anita Cerić, Prof. dr. Champika Lasanthi Liyanage, Assist.prof. dr. Visar Hoxha, Assist.prof. dr. Božena Lipej, Assist.prof. dr. Boštjan Aver, Prof. dr. Ilfryin Price, Assit.prof. dr. Aljoša Dežman, Assoc.prof. dr. Francisco Campuzano Bolarin, Prof. dr. Susanne Balslev Nielsen, Goran Milanov, Assoc.prof. dr. Eva Martínez-Caro, Prof. dr. Muhsin Kilic

EDITORIAL COMMITTEE:

dr. Bojan Grum,
Chairman of the Organizing Committee,
Institute of real estate studies
European Faculty of Law, New University, Nova Gorica, Slovenia
bojan.grum@evro-pf.si
Tel: +386(0)41617208

dr. Darja Kobal Grum,
Chairman of the Scientific Committee,
Department of Psychology, University in Ljubljana, Slovenia
E-mail: darja.kobal@ff.uni-lj.si
Tel: +386(0)40429636

dr. Alenka Temeljotov Salaj,
Chairman of the Programme Committee,
Norwegian University of Science and Technology, Norway
E-mail: alenka.temeljotov-salaj@ntnu.no
Tel: +47 46445072

Organized by:

INSTITUTE OF REAL ESTATE STUDIES
Ukmarjeva 6, 1000 Ljubljana, Slovenia
Tel: +386(1)4214210
Fax: +386(1)4214215
e-mail: cirre2016@gmail.com

and

NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY
Department of Civil and Environmental Engineering
Gløshaugen, Høgskoleringen 7a
7491 Trondheim

Published by:
Institute of Real Estate Studies
Ukmarjeva 6, 1000 Ljubljana, SI

Edited by
Bojan Grum
Alenka Temeljotov Salaj
constructa@siol.net
tel: +386(1) 4214210

CONTENTS

Session 1
Session 1.1

Social needs in refurbishment sustainable projects case Trondheim, Ila

Alenka Temeljotov Salaj
NTNU Norwegian University of Science and Technology, Trondheim
alenka.temeljotov-salaj@ntnu.no

Svein Bjørberg
NTNU Norwegian University of Science and Technology, Trondheim
svein.bjoerberg@ntnu.no

Carmel Margaret Lindkvist
NTNU Norwegian University of Science and Technology, Trondheim
carmel.lindkvist@ntnu.no

Trondheim Municipality has adopted the Climate and Energy Action Plan to 2030, which sets an ambitious climate goal of 80% reduction of GHG emissions by 2030. Trondheim Municipality has recently also initiated programmes for energy efficiency measures and renewable energy for cultural heritage buildings and areas. The set of specific instruments includes a bold city vision, public incentive schemes, and open innovation with industry partners and the research centres. Sustainable refurbishment of existing buildings requires more people-centered innovative processes and solutions. Gaining better insight in the needs of cities and citizens, and correspondingly the ability to develop processes, services and business models that better fit people's needs is a task for urban facility management in the neighbourhoods. The objective of this paper is to adapt the refurbishment project needs to the population by analysing their habits and developing some activities that they would like to get, with the goal to improve their health and wellbeing. The survey was conducted among 233 citizens from Trondheim, neighbourhood Ila Some of the very interesting results show the diversity of the needs. The reasons for the refurbishment are: aesthetic (22% of respondents), comfort (22%), reduce electricity costs (17%) and environmental friendliness (12%). Respondents perceptions is that thermal comfort is the major indoor problem in summer (23%) and winter time (27%). On the question what type of financial help they would be interested, the answers are: participations form the municipality to finance the community projects (29%), lower prices on energy and renewable resources of energy (26%), tax reduction (19%), co-funding (15%) and better loan possibilities (10%).

Keywords: Individual/ Social needs, Urban FM, sustainability, refurbishment.

Housing Federation Hub initiative
3D models to interact with peoples in housing communities

Laila M Bendiksen
Department of Interst Policy and Law, NBBL, Oslo
LMB@nbbl.no

Christian F Mathisen
Department of Competence and Innovation, NBBL, Oslo
CFM@nbbl.no

Runar Skippervik
Building Department, TOBB, Trondheim
rsk@tobb.no

The objective of this paper is to present results from one approach in The Co-operative Housing Federation of Norway (NBBL) HUB activities, which consist of eight different feasibility study projects regarding potential contribution to Paris Climate Agreement. NBBL is a national membership association representing 41 co-operative housing associations (building co-operatives) managing 12.700 housing co-operatives and condominiums, counting 510.000 houses representing 1.020.000 members which is approximately 25% of total housing in Norway. Norwegian building mass consist of app 400 million square meters gross area. Of this housing is app 67%. To reach climate agreement goals it is not enough to concentrate on new constructions, biggest potential is in existing buildings mass. The methodology used are both qualitative and quantitative research methods. It was organized as a summer school for five students for four weeks working on site. A substantial part of getting information was to listen, not teach, to understand peoples need and voices, totally creating a visualised survey. Peoples point of view was important to make the tool, 3D model, as best as possible as a co-creation methodology. The results, and experience of the practical use, show that an interactive 3D model showing the total area of housing and each apartment. The research is important to increase the understanding of Well-being and potential in housing areas for a more sustainable society. For NBBL it is a new way of getting better platform for decision of development projects in communities.

Keywords: 3D model, communication, co-creation with residents, well-being.

Can urban rail transit land value be captured? In Athens, probably not!

Athena Roumboustos
University of the Aegean
athena@aegean.gr

The introduction of new rail-based transportation systems in metropolitan urban areas is considered important by planners wishing to provide sustainable transit options despite the lack in public funds. In this context, the present study addresses three research questions in the Athens-Piraeus Metropolitan Area: (i) Is there land value uplift in metropolitan areas due to urban rail transit?(ii) Do Tram or Metro stop/stations have a greater impact on land value uplift?(iii) Can this land value be captured or is there too much variability limiting the possibility of capture measures requiring standardisation (e.g. forms of taxation)? A hedonic model based on differences of differences is built in response. Despite existing transit options, properties near tram and metro stop/stations enjoy higher real estate values. The Tram could be more attractive. However, considerable variability undermines findings. Given this remark, larger samples are needed, while the need to normalize and, therefore, compare studies is hampered by the variability of locations and availability of data. Land value capture becomes limited with ad hoc applications which cannot be transferred and repeated.

Keywords: Land Value Uplift, Land Value Capture, Urban Rail, Hedonic Models

Session 1.2

Social infrastructure on the basis of psychological factors Cluster analyses

Darja Kobal Grum
Department of Psychology, University of Ljubljana, Slovenia
darja.kobal@ff.uni-lj.si

Bojan Grum
European Faculty of Law in Nova Gorica, Slovenia
bgrum@siol.net

Embedded in the strand of research on social infrastructure dynamics, our study was designed to: (1) define the social infrastructure; (2) determine its dimensions which lead to people's satisfaction with living and life conditions; and (3) establish the main psychological factors that are related to social infrastructure. Finally, on the basis of various algorithms we aimed to group the clusters of selected psychological factors that are planted in social infrastructure dimensions. The sample comprised 230 adults residing in a variety of towns or villages of different sizes in Slovenia. They filled in a questionnaire of social infrastructure characteristics, designed for the purpose of this study. We also measured their sense of community, life satisfaction and locus of control. The results show the groups of variables with similar properties which differ from each other according to independent clusters. This study highlighted the importance of studying the social infrastructure within the terms of individual psychological factors.

Keywords: Social infrastructure, satisfaction, psychological factors, clusters analyses

Psychology in construction (PSYCON)

Abigail Taiwo
University of Wolverhampton

Ezekiel Chinyio
University of Wolverhampton
ezemine@googlemail.com

Construction projects require team work and proper integration for successful project execution and completion. Previous studies have implicated psychosocial factors as significant determinants of effective team behaviour (Brewer & Gajendram, 2011), progressive decision making, firm integrations, as well as strategic planning and innovativeness within the construction industry. However, the current built environment pedagogy does not provide a platform module in which the psychological perspective of all such factors are taught or examined. Yet, this psychological perspective cannot be overlooked within the reality of construction and manufacturing environment. Our aim is to design a multidisciplinary educational curriculum, tagged psychology in construction (Psycon) which will explore the various areas of human factors within the built environment as affected by psychosocial influences to create greater awareness of such factors to students as this will benefit their professional interactions with people. The scope of Psycon will include the psychology of team work, personality factors, communication, the psychology of Leadership and leadership behaviour, recruitment and selection, psychological well-being (including stress and psychopathology in the work place), accident proneness, motivation, psychological process of built environmental behaviour, etc. Another dimension of Psycon is the research of issues underpinning the pedagogy. We are planning a series of multidisciplinary workshops where engineers and psychologists will come together to brainstorm on significant issues to be included within the curriculum. The outcomes of these workshops will inform curriculum re-design process which will be tested through action research.

Reference:
Brewer,G. and Gajendram, T. (2011) Attitudinal, behavioural, and cultural impacts on e-business use in a project team: a case study, *Journal of Information Technology in Construction* (ITcon), Vol.16, p.637-652, http://www.itcon.org/2011/37

Keywords: Psychology of behaviour, built environment education, human factors in construction, pedagogy, cross-disciplinary research.

Positions regarding the value of real estate linked to the location of the neighborhood and a sense of security in it

Bojan Grum
Eurpopean Faculty of Law, New University, Ljubljana, Slovenia
bgrum@siol.net

The article focuses on how users of the neighborhood perceive a sense of security as a result of the crime rate and how this perception affects the value of the property according to the location of the neighborhood. The research is based on a systematic review of literature and on quantitative research. Fear of crime seems to be closely linked to the density of the population of the built environment. The location of the stay is related to the characteristics of the neighborhood such as the socio-economic homogeneity of the neighborhood, inter-neighborhood relations and mutual assistance. The results show a strong correlation between the level of crime, the sense of security, and the movement of property values. Research based on a systematic overview is usually limited to urban centers, and the results of quantitative research cover all locations of residence. The results show that the highest level of agreement about crime (burglaries, robberies, physical violence and vandalism) is reflected among participants living in the center of cities. The highest level of agreement about the general feeling of fear is expressed by participants living on the outskirts of towns. The degree of agreement falls with the distance from the city centers. This is followed by the pronounced economic effects on the value of real estate. The contribution is also useful in terms of the information base and gives directional values for the evaluation of individual elements, which have influence on real estate value.

Keywords: Sense of security, crime, value of real estate, neighborhood, location of living

Identity as a concept of design – Slovenian parliament

Sonja Miculinić
Nova University, Ljubljana, Slovenia
sonja.miculinic@omnia-arhing.si

The architectural renovation of the Slovenian Parliament's hall in 2000, called the Great hall, was a very challenging task from conceptual point of view. The design should express the Slovenian national and architectural history and identity. That was the first renovation of Slovenian Parliament built in 1950 and after establishment of Slovenian state in 1991. With the architectural design was meant to show a history of Slovenian political acting over time and development of Slovenian society and architecture. The objective of this paper is to analyse the steps of architectural work from both research and design standpoints that are important to understand and create new space on the basis of humanistic, social and technical view, to capture the historical moments of given elements and new, contemporary methods and design. It is a case study. The circle, center of the amphitheatrically floor plan, characterizes the center of legislative power, the seat of the highest democratic institution. The circular design corresponds to the Slovenian archetype of elders gathered in a circle at a stone table under the village linden tree. The stone central circle is associated with the symbolism of the Prince's Stone and follows Jože Plečnik's idea who in 1947 drew up a design of the Slovenian parliament in the form of a cone with a circular base (the unrealized project of the Cathedral of Freedom). All the used material are Slovenian: the color combinations and choice of materials (grey flooring and grey granite from Slovenian mountain Pohorje on the floor, white walls and ceiling, cherry veneer on the walls and deputies' desks, and grey leather deputy chairs and balcony chairs) give the space elegance, lightness, and harmony. The wall behind the seats of the National Assembly's presidency is marble from quarry Hotavlje. Elegance of the furniture is assembled with the highest technology solutions.

Keywords: Architecture, history, Slovenian parlaiment

Session 1.3

Mastering the Post-socialist City: three decades of urban transformation

Prof Dr Kaliopa Dimitrovska Andrews
New University, European Faculty of Law, Slovenia
kaliopa.dimitrovska@gmail.com

The paper reviews the impact of the pressures of globalisation, the expansion pressures of the European Union (EU), and general market competition, on the urban transformation of land use patterns and physical structure in post socialist cities in Central and Eastern Europe (CEE). The art of restructuring and rebuilding cities is still high on the agenda of the professional debate, searching for methods and concepts that could lead to better and sustainable cities. Especially critical in the current debate are the issues of globalisation and cross-national transference of ideas as well as the methods of dealing effectively and appropriately with issues of urban design and reinforcement of cultural identity. These aspects are among the most important preconditions for achieving a distinctive image, economic strength and vitality of post socialist and/or post-industrial city. Significant planning and urban design issues are discussed within he three decades of urban transformation of CEE cities in a context of both, the influence of EU integrated spatial planning policy and implementation of the sustainable development paradigm. It can be concluded that processes of mastering the post-socialist city are similar in the most of CEE countries but have been advancing with various speeds throughout the regions.

Keywords: Post-socialist city, urban transformation, EU planning policy, sustainable development, Central and Eastern Europe

Legitimacy of Urban Planning Typologies in Planning Documents

Ivan Stanič
European Faculty of Law, Ljubljana, Slovenia
ivan.stanic@ljubljana.si

Urban planning typologies, as proscribed in regulatory planning documents, have direct impacts on the built-up structure of a given space. They also specify the capacity of a given property to generate revenue, thus also directly affecting the rights that can be enjoyed on or from a property. On the one hand we can speak about the impacts such a document can have on the built-up structure of a city or region concerning urban design and functioning. On the other hand we can speak about the political decisions, taken by a representative body, which adopts the document as a legally binding condition. Therefore, the legal code, which is simultaneously a technical guideline, is in essence also a political document since it temporarily or permanently allows or disallows capital gains from a given property and is a vehicle for increase or decrease of value of neighbouring properties. It can also be observed from the perspective of granting or violating human rights, as are stated in international documents on the matter. The article deals with elements inherent to urban design, urban planning, architecture and engineering, such as plotting and re-plotting, proscription of floor space index, built-up index, heights, backdrops, curtilage and other classical tools of urban design and property management, which are derived from evidence and inventory. The argument is that necessary preliminary steps of argumentation of the new condition have to be taken before a decision is made, since the decision is a new legally binding condition, which directly affects enjoyment of a property and/or its development potential. Concerning the dual approach, meaning research of extant conditions and their correct valorisation, followed by decision-making, which specifies the new condition (seen as preservation, rehabilitation or regeneration) the article is concluded in a legalistic, positivist manner, whereby the dilemma of actions is described in the limits of *what is* and *what should be.*

Keywords: Urban planning typology, Democratic procedure, Planning inventory, Planning evidence

Towards territorial cohesion? Path dependence of regional policy in Central and Eastern Europe

Bradley Loewen, PhD
Norwegian University of Science and technology
bradley.loewen@ntnu.no

This research addresses the need for greater understanding of the political-institutional dimension of regional development amidst growing regional polarization and peripheralization in Central and Eastern Europe (CEE). As part of the multi-national Marie Curie Initial Training Network (ITN), RegPol^2 – Socio-economic and political responses to regional polarization in CEE – this research bridges economic geography and political science, to emphasize long term governance aspects of regional policy in lagging regions. Regional Policy – currently guided by an economic competitiveness objective based on innovation – is put into focus in a comparative case study of Czechia, Estonia and Hungary since the systemic transition. The research aims to understand institutional aspects shaping regional development trajectories under a common EU Regional Policy umbrella. By adopting historical and discursive institutional approaches, the concepts of path dependence and institutional change are used to analyze complex institutional-territorial structures. Document analysis and expert interviews are used to trace the development of national policies and institutions through common policy periods: transition, pre-accession and post-accession. Interviews with 19 policy experts, including a leading expert from each of the three countries, reveal the strategic directions and implications of policy shifts beyond the faces of the policies themselves. From the policy perspective, the three countries adopted different interpretations of core concepts of EU Regional Policy, implementing, for example, different strategies for achieving competitiveness-based growth. From a governance perspective, processes of decentralization and more recently centralization, are associated with institutional stability and capacity, which are important for delivering Regional Policy as the main tool for regional development in CEE. Thus, EU Regional Policy has had a path shaping effect on national policies, but, at the same time, has had unintended consequences threatening progress towards traditional cohesion goals. Contradictions between the current Regional Policy objectives of innovation and competitiveness amidst centralized policy institutions offer few opportunities for lagging CEE regions, which are in most need of cohesion to stem the negative impacts of polarization. Institutions are increasingly seen to be important for regional development, although attention in CEE turned away from them after EU accession. Discussions on the post-2020 EU policy reforms should consider the impacts on institutions once again, particularly for supporting lagging regions.

Keywords: Urban planning, political institutional dimension, EU policy

Key words: co-creation, governance, citizen, participation, politicsEU law as a protecting system for landscapes in a perspective of property development

Webbe de Vries LL.M.
NoorderRuimte Centre of Applied Research on Area Development,
Hanze University of Applied Sciences, Groningen

The environment has an impact on the value of real estate partly due to the experience of the surroundings by the population that lives, works and recreates in these areas. For the real estate branch it is important to have knowledge of sustainable added values thereof. In densely populated areas the surroundings of the population are constantly threatened by several factors claiming public space, influencing the livability of the human habitat. The main research question is 'How to protect the importance of environmental values in the human habitat by legal means'. The focus is on European Union law (EU law) as a supra-national legal system, meaning that EU law precludes national law. Desk research is done by studying the most important Directives and EU case law. A large number of EU Directives are established ith the objective of protecting various aspects of the landscape as human surroundings. A number of Directives contain strict binding provisions, having a large impact on the sustainability of landscapes. EU case law have, in most situations, a teleological character. EU law, as a supra national legal system, influences national law in protecting the human surroundings. In a large number of EU case law, the EU Court decided, because of a teleological interpretation, in favor of the protection of landscapes as the human surrounding. Knowledge of these directives therefore, is of great importance for the Real Estate industry, and in particular for Real Estate development. It is recommended that professionals in the industry of Real Estate, particularly in matters of valuation as well as Real Estate development, have knowledge of and insight into the outcomes of EU law, especially of EU Directives and EU case law.

Keywords: Environmental values, EU Directives, knowledge

Session 1.4

Urban facility management
Study on practices in regenerated urban areas

Federica Larato
Politecnico di Milano
federica.larato@mail.polimi.it

Svein Bjorberg
Norwegian University of Science and Technology, Trondheim,
svein.bjoerberg@multiconsult.no

Amin Haddadi
Multiconsult
amin.haddadi@multiconsult.no

The paper presents recent research has highlighted an emerging trend in the FM practice: Urban Facility Management (UFM). The transition from basic FM towards the management of complex urban areas is a highly challenging development of the field. To shed a light on this rising practice and understand how it is emerging, this paper aims to review the literature and to provide a practical framework for the application of UFM. The general model of UFM, which is developed through research and three case studies in Oslo, namely Aker Brygge, Nydalen and Vulkan, aims at delineating the main components of this practice and untangling its complexity and manifold aspects. In-depth analysis of the literature within UFM resulted in a general understanding of the management practice. The development cases, instead, supported the development of a practical framework for UFM applied for a concrete area in Milan. The literature background led to the recognition that UFM has its roots in the shifted practice of Facility Management towards sustainability, especially concerning social aspects. This community-oriented approach delivers the best integration between people, process and place for the wellbeing of the society. The UFM organization works for the core business of the urban area it is characterized by a central governance, the community involvement through co-ownership and a none-profit nature. The research, and the development of models for UFM can contribute to a broader understanding the field. They have enriched both the qualitative and the practical understanding of the complex processes of managing cities in an increasing urbanized world. Urban Facility Management can be an effective step towards more environmentally -, economically - and socially sustainable cities.

Keywords: Urban Facility Management, UFM, sustainability

Maintenance strategies and organization of property management services in Norwegian municipalities

Marit Støre-Valen
Norwegian University of Science and Technology, Trondheim
marit.valen@ntnu.no

Several reports of Norwegian Municipalities state that many municipalities lack goals and maintenance strategies of the property management and that this creates a huge maintenance backlog (NKF, 2019; Arbeidstilsynet, 2013; Civitas, 2013; Hopland & Kvamsdal, 2018; Valen & Olsson, 2012). The purpose of this study was to look at the quality of the property management services, maintenance strategies and status of the maintenance backlog among a selection of Norwegian municipalities, searching to find the causes for this maintenance backlog. The status of the quality of the property management services and the maintenance backlog of the public building stock was examined by a survey among 31 municipalities, conducted in 2007. This survey is replicated in 2018 and followed up by interviews of the property management leaders during the spring 2019. Totally more than 40 municipalities are examined. In 2007 we found that the municipalities that have regularly routines for doing condition surveys and that decided what is an acceptable level of the condition state of the building stock, thinking in long terms and having strategies and goals to reach their goals. The survey from 2018 show some improvement of the level of back log and condition. The average condition grade was improved from 1,43 to 1,39 in 2018. Also, 67 % of the municipalities state that they are giving good property management services while 25 % state the same back in 2008. The in-depth interviews points towards that the success criteria for good property management depend on a good organization of the competences and tasks, having a long-term goal and strategies for how to reach and up keep good property management services as well as making the politicians to understand that lack of maintenance is a "not capitalized" debt in the future. The property management services in the municipalities has improved since 2008. 2/3 of the municipalities have established a long-term plan with a goal and strategies for how to catch up the maintenance backlog. These findings are in line with the findings from other reports (NKF, 2019; Arbeidstilsynet, 2013). The surveys indicate that the success for good property management is a systematically approach to preventive maintenance and a long-term plan for how to deal with the maintenance back log, organizing the competences in multi-disciplinary teams.

Keywords: Maintenance strategies, Property Management, services

Svartlamon Cultural Heritage, a low cost urban and ecological district

Kathrine E Standal
Svartlamon Housing Fondation, Trondheim, Norway
boligstiftelsen@svartlamon.org

Cato Leuraers
Norwegian University of Science and Technology, Trondheim, Norway

Svein Bjorberg
Norwegian University of Science and Technology, Trondheim,

Svartlamon is an area in Trondheim, a low-cost urban district within the city. It is not just a neighbourhood but also a community, organized in Svartlamon Boligstiftelse (Housing Fondation). In 2001, Svartlamon was designated as an experimental urban ecological zone, this concept includes new solutions within housing, technology and new management, rehabilitation and construction processes: Svartlamon is "a living lab". Through this paper examine 'How can an urban ecological research area with buildings of historical value carry out maintenance and preservation of architecture within low cost economy? This will be answered with the research questions: 1/What specific building regulations and laws underlie the area?; 2/What are the different ways of organizing and developing this community?; 3/How is the maintenance practiced by Svartlamon Boligstiftelse? To understand this experimental case and its housing situation and community, different methods have been used based on the different needs: on-site visits, interview with the CEO of Svartlamon Boligstiftelse and the carpenter responsible for the maintenance, survey between the inhabitants, condition survey, research about regulations and literature research. In order to make our research more significant parts of the study focuses on two specific buildings in Svartlamon, a brick and a wooden building. In order to refurbish or maintain, it is important to know about specific regulation of the area to identify its main goals and values. The paper will look into special regulation plan that encourages new sustainable solutions, resident contribution and other experimental design. The regulation plan is based on some dispensations from the building code in Norway and on local Agenda 21 principles. This process can allow residents to build, maintain their own house and create their own environment, rather than just being passive consumer of their houses. In order to understand how to fill the gap between the present condition of Svartlamon and the lower standard for a wellbeing area the maintenance theory is studied. In addition, the current organization of the maintenance is studied so as to understand everyone's role (owner, manager, user) and the ordinary municipality's maintenance routines is deepened with the study of the legislation. Finally, the paper will try to understand both why the maintenance is practiced the way it is today and point out the importance of maintenance objectives and plans. As a deepening of the maintenance chapter the paper deals with issues with the foundation and the importance of architectural value. The brick building studied has a severe problem with the wooden pile foundation from beginning of 1900, the paper will investigate the problem and will also try to find more economical solutions than the one already proposed. Based on the principles of restoration the analysis chapter on 4architectural value has the purpose of describing how to make a responsible and critic refurbishment in order to strengthen the historical and cultural heritage of Svartlamon.

Keywords: Maintenance, regulation, standard, refurbishment

An advanced design project on 'Sustainable Building Engineering' in teaching future engineers

Guillaume Carpentier
ESITC Caen, Caen, France
guillaume.carpentier@esitc-caen.fr

Peter Ireman
ESITC Caen, Caen, France

Laurence Gautier-Chevreux
ESITC Caen, Caen, France

Marie Bagieu
ESITC Caen, Caen, France

This paper describes a unique design project devised to teach and apply technical skills in Sustainable building design, but also in the practical cooperation between students in a realistic design project. The 4-week long project now involves students of different nationalities from different universities and has been based each year on real design projects. Student teams of 8-10 per team have to deliver a realistic design to examiners from both academia and industry. The students select from a number of optional modules. No student can take all of them, so appreciation of the skills available within the team are important.

Keywords: Sustainable building – BIM – SMART Construction – Academic / Practice Training – Industry Cooperation

Future shock: The realtions between the concepts of Sustainable Facility Managemnet and Smart Cities

Dave Collins
Norwegian University of Science and Technology, Trondheim
dave.collins@ntnu.no

This presentation intends to demonstrate what the concepts of Sustainable Facilities Management and Smart Cities are how each term can related to one another both theoretically and practically. Using existing literature and case studies, this presentation approaches the subject matter both in terms of definition and in terms of field synergy. Using literature from theory and practice from the perspective of FM and Planning, this presentation outlines how both of these terms are not only related, but have the possibility to strengthen each other. The findings show that at different scales Sustainable Facilities Management has possibilities to positively impact the optimisation and building level challenges of Smart Cities whilst also contributing to the social and technological aspects at building level. The findings in this presentation offer practical possibilities in the studies of FM, planning, architecture, smart cities studies and other studies of the built environment.

Keywords: SFM, smart cities, facilities management, built environment, sustainable futures

Session 2
Session 2.1

Health and well-being in the urban environment
Creating inspiring active cities for the future

Mara Gabriela Diaconu
Norwegian University of Science and Technology, Trondheim
mara.diaconu@ntnu.no

Johan van der Zwart
Norwegian University of Science and Technology

Beatrix Vereijken
Norwegian University of Science and Technology, Trondheim

Alenka Temeljotov-Salaj
Norwegian University of Science and Technology, Trondheim

The challenge of the new era lies in creating a balance between rapid urbanization and the health and well-being of the citizens. Recently, research on relations between urban environments, health and well-being has shown a series of challenges for maintaining and improving human health and well-being. Urban areas are extremely complex environments in which a large number of factors such as environmental, social, cultural, and economic have an impact on the health of its citizens. Chronic, non-communicable diseases (NCDs) are the number one cause of death and disability in the world. Individual lifestyles are a central factor determining the incidence of NCDs, but individual choice is influenced, and sometimes even dictated, by the physical, cultural, and economic environment within which it is exercised. The definition for well-being is challenging in itself, and the terms "happiness", "life satisfaction", or "quality of life" are often used in the same context and associated with urban health and well-being. Creating inspiring active cities for the future is the new focus of urban development of neighborhoods and districts, both new and existing. There are several main points where policies and citizens should meet and debate for a better future, such as active living based on walkability and recreation; equitable health outcomes based on accessible, affordable health care; affordable, local, fresh food; and strong public safety. A healthy, active city is one that is continually creating and improving opportunities in the built and social environments and expanding community resources to enable all its citizens to be physically active in day-to-day life. The shift from the "old city" concept into the new, active living city has to come from community participation, partnerships, and shared power and decision-making. In this presentation, we will describe our vision for an inspiring active city that will enable a city to provide enticing opportunities for physical activity and active living for all. Active living is a way of life that integrates physical activity into daily routines. The literature defines active living as accumulating at least 30 minutes of activity each day. The way these active minutes are collect it will vary between different people, depending on their age, background, health, and interests. Activities may vary as widely as walking or bicycling instead of driving or being driven in bus or metro, performing fitness exercises, participating in sports competitions or organized training, playing in the park, working in the garden, taking the stairs, and using recreational facilities. All these activities contribute to an active life for the population, but the city environment must contribute to establish healthy habits in its citizens. For the city of the future, the goal is to create opportunities where citizens will enjoy incorporating health-enhancing physical activity into daily life, and where built, social, and cultural environments are key focal points to reach this goal. The built environment includes land-use patterns, transport systems,

urban design, green and blue spaces, and all buildings and spaces that are created by people (including schools, homes, workplaces, and recreation areas). Elements in the social environment that influence participation in physical activity include income, equity, culture, and social support and inclusion. Creating inspiring active cites must generate changes in any of those environments in the short and long term, and community participation is essential for the success of any intervention. Design a creative vision of the city and profile the target groups and neighborhoods are the first step in profiling an active city. Consultation with citizens and stakeholders' is the next step to describe what they want to see in the future, creating a picture of their ideal or preferred future, and shape it together with the local and national policies and strategies. The third step is a SWOT analysis to identify the strengths, weaknesses, opportunities, and threats for the plans, followed by the fourth step regarding the funding and resource opportunities for the new places. These four steps will help the local, regional, and national government to adopt the best solution for an active city and decide on the key areas to pursue setting up the new goal and objective for each intervention. A participatory approach is a key principle for a healthy and inspiring city, and the success of active living in the city depends on a focus on partnership and commitment between public sector (local, regional, and national governments), civil society and voluntary sector, and the private sector (both well-established companies and new entrepreneurs). We will illustrate our vision with several examples from inspiring initiatives across cities in Europe.

Key words: Health, well-being, urban development,

Pådriv project

Åsmund Bunkholt
TreFokus, Oslo
aasmund.bunkholt@trefokus.no

Pådriv (Front Runner) is a partnership between public, private and social actors who are working together for the improved sustainable urban development of Hovinbyen in Oslo. A development that is socially inclusive, environmentally friendly and economically feasible. Pådriv was officially launched in March 2017 and aims to help create a paradigm shift within the current constructs of sustainable urban development in Norway and internationally. Pådriv is characterized by concrete projects and continuous progress. Pådriv uses Hovinbyen as the geographic focus for its projects. Hovinbyen is Oslo's largest urban development area, which will be vastly transformed in the next 20-30 years. Pådriv is already coordinating and assisting the development of small and large-scale solutions, and aims to do so for many years. The strength of Pådriv lies in its network of individuals, called Pådrivere (Front Runners), and the knowledge and insight they share. The Pådriv network is open to individuals from all sectors and industries. National and international actors can apply to become a Pådriv Partner, and thus become part owner of the initiative The Network Manager is responsible for the daily management of Pådriv and reports to the Steering Committee. The Network Manager works closely with a working group consisting of selected partners.

Key words: Co- governance, citizen, participation

Comparison of user involvement and operational staff involvement in the design process of a hospital building project

Helle Lohmann Rasmussen
Technical University of Denmark (DTU)

Designers increasingly involve operational staff and end users in the design of new building projects. However, this involvement can challenge and frustrate designers, end users and operational staff alike. The purpose of this study is to compare the involvement of end users and operational staff in the design process of a hospital building project. To do so, I examine when and how designers involve the two groups. I carried out a single case study on the design process of a medium size hospital building in Denmark, and collected interviews, observations and document mining. The study results shows that involvement of end users is different from the involvement of operational staff. In the examined case, designers involve users very early and through three different tools: Service Blue Prints, Patient Journeys and Personas. These tools allow discussing the project at an abstract level before developing an actual design proposal. On the contrary, designers involve operational staff, in this case cleaning staff, hygiene staff, Operation and Maintenance staff, much later and after the first design proposal is developed. This process does not include any tools to keep input at an abstract level. The involvement consist of designers presenting design solutions and operational staff - roughly speaking - accepting or rejecting the suggested solutions. Two external 'innovation consultants' facilitated both involvement of users and operational staff. Based on this study, I argue that end users and operational staff are involved very differently in the examined case. Designers involve end users in the design process in a playful way by using three different tools. None of these tools are used when designers involve operational staff. I recommend that further research is undertaken to investigate if the use of such tools would be beneficial when designers involve operational staff, too.

Keywords: Facilities Management, FM in design, knowledge transfer, user involvement.

Conceptualisations of Smart Hospital by Experts in Teams

Johan van der Zwart
Norwegian University of Science and Technology
johan.zwart@ntnu.no

The concept of Smart hospitals looks to future hospitals as infrastructures for effective and efficient clinical processes as well as infrastructures for supportive social interactions between patients and health professionals with the objective to design places that increase health service quality, productivity and patient's positive experience. This requires experts and knowledge input from different disciplines like medicine and healthcare sciences, Information and Communication Technology, Social Sciences and Architecture. One of the biggest challenges in healthcare is the rising demand for services, while there is a decrease in workforce due to an aging society. Given the current budget constraints, healthcare systems are therefore under pressure to provide cost effectively high-quality services which requires fundamental reforms. When healthcare process data becomes more detailed and accurate, leveraging the concept of smart hospitals could contribute to better use of healthcare resources, including the hospital buildings. A research question is: What is the impact of a smart technology supported physical environment on the healthcare service delivery in hospitals? In the project 5 interdisciplinary student groups of in total 28 students (12 medicine, 5 economies, 5 social sciences and 6 Technology) explored the concepts for future Smart Hospitals during a 4 week intensive course in Experts in Team. The projects included 3 phases: (1) conceptualisation; (2) writing an article based on literature research and; (3) integrating the findings in a proposal for a product. The 5 projects reflect the students' research on the application of smart technologies in future hospitals, ranging from: (1) the use of drones for acute healthcare: (2) application of artificial intelligence for improving diagnosis; (3) use of Building Information Models to optimise use of healthcare resources; (4) reducing hospital acquired infections by tracking flow of objects and people and; (5) home delivery of diagnostic services to reduce number of patients in the hospital. The link between healthcare services and the physical environment has the potential to be re-invented through digitalisation and analytics of hospital process data leading to higher predictability and reduction of variation, hence supporting real-time healthcare service planning. This requires cross-cutting solutions from healthcare management, logistic management and facility management in combination with ICT and social sciences.

Keywords: Smart hospital, Enterprise Building Information Model, Experts in Team, architecture research, education

Session 2.2

Status of Facility Management in Turkey

Levent Alatli
Turkish Facility Management Association, YKS
leventalatli@gmail.com

Bahadir Adiyaman
Turkish Facility Management Association, YKS
badiyaman@yks.com.tr

In Europe, facilities management (FM) is generally seen as a mature market. However, this is largely the case because of the high level of sophistication of the FM market in central and northern Europe. South East Europe (SEE) however, is less developed and lacks the maturity of many of its European neighbours. Even though the FM market in Turkey is the biggest among SEE country, little research has been undertaken to really understand it and compare with other parts of Europe. This study aims to gain a qualitative understanding of the complexities of developing a mature FM market in Turkey. The purpose of the research is to take an inductive, constructivist approach to gaining knowledge about the maturity of the FM market in Turkey. The design of the study is qualitative in nature, because the study is more interested in the complexity of views from key informants. The research explores the current level of maturity. Data is collected through in-depth, semi-structured interviews. The findings will critically analyse the perceptions of the country, regarding its key challenges and opportunities of the business environment; FM organizations; FM supply market; Professional bodies; FM education; and FM research. The interviews enable the critical evaluation of the maturity of the FM market in SEE. Different participants from Turkey are interviewed, both from the association, industry and academic fields. FM is a global discipline, recognised in every sector, in every organisation. At a global level, this is a very pertinent topic, as FM is increasingly being standardised and globalised. However, across the globe, especially in Europe, there are varying degrees of maturity of the discipline.

Keywords: Facilities Management, Strategy, Maturity, Turkey

Economic aspects of housing investments and management requirements for housing in Turkey

Yeşim Aliefendioğlu
Assistant Professor, Department of Real Estate Development and Management, Faculty of Applied Sciences, Ankara University, 06590, Çankaya, Ankara, Turkey;
aliefendioglu@ankara.edu.tr; yesim006@gmail.com

Harun Tanrıvermiş
Professor, Department of Real Estate Development and Management, Faculty of Applied Sciences, Ankara University, 06590, Çankaya, Ankara, Turkey;
tanrivermis@ankara.edu.tr; tanrivermis@gmail.com

Esra Ural
Lawyer, Ph.D. Candidate, Department of Real Estate Development and Management, Faculty of Applied Sciences, Ankara University, 06590, Çankaya, Ankara, Turkey;
esraural@yahoo.com

Housing needs had determined as the basis and cause of the slum problem in Turkey that emerged since 1950s after the migrations of people from rural areas to cities. The need for housing has continued to increase rapidly due to migration and population growth. The excess demand for urban centres in particular has led to an increase in land prices and therefore the transition to super structures has accelerated. With the increase in high-rise buildings over time, management problems also began to arise. In order to meet the social needs of the owners sitting in high-rise buildings, special arrangements were needed to address the problems arising from the existence of areas subject to collectivization or common property use. In order to solve the existing problems, the Condominium Law No. 634 dated 23.06.1965 were enacted and come into into force and then the amendment of the Law No. 5711 with the title of "Special Provisions Concerning Collective Structures" together with the Law No. 634 article 66 and other clauses have been added. The housing ownership rate for households in the urban areas is observed to be 60%, and investment in housing acquisition has been rapidly increased over the last 10 years. In addition, households with more than one residence in cities, summer cottage or second housing investments had increased continually. Management of detached housing, multi-storey housing and sheltered sites and co-operative sites is carried out by the management chosen by the floor owners board according to the condominium Law No. 634. There are significant problems in the management of collective structures by floor owners in terms of service delivery, quality of Service and compliance with legislation. It is not possible for floor owners to be experts in real estate law and real estate management in general and to provide management services in accordance with the legislation. In the last 10 years, it is observed that multiple different models are applied together in the management of housing structures due to the increasing management problems and the changing of nature of housing investments. These are such as sites managed by floor owners, real estate in which management services are partially or completely outsourced, and facilities managed by cooperatives. In collective buildings; the existence of a triple structure as the floor owners unit, block floor owners unit its presence has been remarkable. Although the existence of collective structures and especially joint ownership areas with a mixed structure is witnessed, the legal structure is silent and does not set up any injunctive provisions for collective building management. Therefore, there are some identified gaps in the legal structure. In addition to the condominium law, a professional management is needed in order to make collective building management and to correct existing gaps in accordance with many regulations such as parking regulations, elevator regulations, waste water discharge regulations, energy performance

regulations, thermal insulation regulations, shelter regulations, central heating regulations, fire regulations, paid annual leave regulations, notification law and work times regulations. In the case of Turkey, it is observed that managers were chosen by the floor owners in many housing projects. The chosen manager usually comes from one of the floor owners, but in some cases he or she can come form outside and usually a non-professional. However, the management of collective structures is also an area that requires some expertise to deal with. Leaving the management of many floor owners and structures with common and joint ownership areas to persons with no legal expertise raises many problems in practice. As a result of poor management practices, there are losses in collection fees and value losses due to the increase in vacancy rates. In the projects where management is carried out by a facility management firm and expertises, it is seen that existing problems are resolved easily and the demand for the projects increases. In addition to the issue of who is assigned as the manager of the block, it observed that there is absence of reediness of all the floor owners and even the lack of meetings with the owners and termed as a problem. It is frequently encountered that some of the processes and decisions made are contradicts with the legal requirements specified in the law. However, as a result of the failure to secure a majority at the first property owners organization meeting, the majority sought at the second meeting tend to drop and decisions can be made even if most of the floor owners without common agreement. Under these circumstances, the extent to which the management represents the landowners and can respond to their needs becomes a controversial matter. In cases where a manager is appointed outside the condominium unit owners, heating, maintenance of the common areas, security and personnel costs are not reflected in separate item rather they are shown as a single item on the invoices. Particularly in the complex buildings or super structure with social facilities, different security gates and personnel, it has encountered that there is a problem of high dues and costs which must be reduced. execution of management by a facility management company makes an effective difference in solving existing problems. The fact that the management of the collective structures by a facility management company brings a higher burden in terms of cost, it is seen that the management of these properties by facility managers provides higher profit gains in the long run. However, in small housing projects, the difference in the tax rate is a deterrent to the transfer of management to a professional facility management company. Lack of adequate knowledge and experience of managers chosen among floor owners or from outside; personnel and heating costs, leasing of common areas, etc., causes wrong decisions in many aspects and causes cost increases in the long run. When the existing housing projects in Ankara were examined, it is concluded that the success of the facility management has an important role in the formation of brand value. In recent years, the demand for brand housing has increased. It is observed that the success in facility management was influential in the increase in demand. In addition, the management of facilities by professional companies is important to ensure the sustainability of residential buildings. It has been found that facility management, which is seen as an interdisciplinary field of study, has become a requirement in residences and other collective structures within the framework of the examples studied, has a direct effect on raising the satisfaction ratings of residents and in particular increasing the value of investment.

Keywords: Housing, basic economics of housing investments, management requirement for housing, management companies, management expenses and associated problem areas.

Evaluation of facility management effectiveness and management services in city hospitals in Turkey

Harun Tanrıvermiş
Professor, Department of Real Estate Development and Management, Faculty of Applied Sciences, Ankara University, 06590, Çankaya, Ankara, Turkey;
e-mail: tanrivermis@ankara.edu.tr; tanrivermis@gmail.com

Yeşim Aliefendioğlu
Associate Professor, Department of Real Estate Development and Management, Faculty of Applied Sciences, Ankara University, 06590, Çankaya, Ankara, Turkey;
e-mail: aliefendioglu@ankara.edu.tr; yesim006@gmail.com

In recent years, facilities management services are observed to take pace and are developing rapidly in Turkey, but it is observed that the areas of expertise such as real estate management, facilities and asset management cannot be entirely separated from each other. Facility management and service companies, which are rapidly evolving and continuing their institutionalization, tend to operate in many areas and health facilities management has been added to this in recent years. In Turkey health services are provided at first level by health institutions, state hospitals, research and education hospitals at Universities on the other hand after the 2000s private health institutions in this area are also rapidly constructed as private hospitals and within the charity universities. According to the Law No. 6428 on the Establishment, Renewal and Procurement of Services with the Public Private Partnership (PPP) Model and Amendment of Some Laws and Decree Laws by the Ministry of Health in 2013, it was made possible to construct and operate the facilities required within the framework of the PPP model. In this model the decisions to invest; the preliminary of the project, preliminary feasibility report is prepared, and tender documents are prepared after the appropriate determination of the property ownership by the Treasury. In favour of the results of the tender winner the contractual agreements are established for the construction right to the company winner and the superficies (right of construction) of up to 30 years is given except for the fixed investment. In the model, consultancy, research and development services, some services that require advanced technology or high financial resources and management services are provided from domestic and foreign companies. In hospitals constructed with PPP model, it is adopted as a principle that facility management companies are outsourced other than the facility (hospital) primary services and responsibilities. In the model defined as City Hospital, which provides services in many branches and is defined as Health Campuses, it will be possible to construct and operate city hospitals within the scope of PPP Model in 29 regions determined throughout the country. This model contains three actors; Public (Ministry of Health), beneficiary firms and facility management companies. The model; there is a need for intensive feasibility studies for the determination of investment and operational time and contract design, as well as the development of standards for facility management, service level agreement and key performance indicators without leaving the intensive academic and research studies is needed. Two city hospitals had been constructed in the capital Ankara and they are located on the western and eastern sides of the city, Ankara Bilkent City Hospital (with a planned 3,704 bed) and Ankara Etlik City Hospital (with a planned 3,577 bed). After the opening of Bilkent City Hospital, which is the largest public-private cooperation project in Turkey's healthcare sector and the largest hospital investment on one parcel, this made a closure of 6 public hospitals serving in the city among the remaining other 5 hospitals servicing in different neighbourhoods of the city, the closure of hospitals and buildings identified with the names of those districts will be made available for other purposes. The Bilkent Hospital has been built on 674.000 m^2 land area with a total covered area of 1,312,358 m^2 and the total number of beds is 3,810 units. Management services from 10 city hospitals that are currently in service were outsourced and from facility management companies. However, the fact that the Ministry of

Health's management and operations related to facility management have not been standardized and clearly stipulated between the facility management company, and the administrative and medical management of the hospitals have not been separated, there is identified negative effects which affects the quality of service delivery. There is a need for integrated facility management in city hospitals, all kinds of technical maintenance and repair works, periodic maintenance and control of operating equipment, cleaning, security, heating, cooling and lighting services, management of commercial areas management, stationery, landscape and parking management, catering, warehousing, all processes and operations except the essential technical and core services such as archives, medical imaging, etc. should be taken over to the to the facility management companies. For this purpose, the results of the questionnaires applied to facility management company employees, hospital managers and patients and their relatives in July 2019 were used to demonstrate health services delivery and the contribution of facility management experts to patient satisfaction. The facility opened to service patients and health workers were found to have significant issues that they were satisfied with and were not. Firstly, the enclosed space is quite large and the per-bed space is almost twice as high as the standards, putting additional costs on facility management firms. It is emphasized that there are disruptions in treatment and consultations due to the greater and large distance between the clinical areas of the campus and there is loss of time. With the city hospitals, the size of the spatial areas and the excess of workload have been observed to decrease inter-employee communication. City hospitals were planned without considering the problems of urbanization, infrastructure and transportation, and the opinions and consultancy services of the facility management specialists and other stake holders were not taken during the planning phases. It was determined that the connection routes of the built hospital and the access to transportation services of patients from different districts and within the city had problems with the patients and their relatives, the auxiliary services around the hospital were not sufficient and the time and it has been determined that the time and cost of access to treatment services for beneficiaries is high. Making new arrangements in order to increase the satisfaction in the management of the spaces of the hospital offering inpatient and outpatient services in all branches, in the aspects such as increasing patient and employee satisfaction, reducing the management costs and expenses of the closed area and to harmonize the expectations of the Facility Management - Health Management - Employees - Patients and to increase satisfaction. It should be emphasized that the development of integrated facility management approaches and the utilization of digitalization is essential. Management enterprises; with the vision of continuous training and development, the staffs should aim at achieving the level of excellence with the choice of personnel and the approach of business oriented accordingly, it is necessary to review the employees and organizational structures.

Keywords: City hospitals, public and private cooperations, PPP, service delivery, service standards and satisfaction analysis.

Brainstorming as an educational tool for students' engagement into social and individual challenges facing climate mitigation

Marit Støre-Valen
Norwegian University of Science and Technology, Norway
marit.valen@ntnu.no

Coline Senior
Norwegian University of Science and Technology, Norway

Alenka Temeljotov-Salaj
Norwegian University of Science and Technology, Norway

NBBL, the Co-operative Housing Federation of Norway and its local co-operative housing association in Trondheim, TOBB, have an ambition to do a sustainable refurbishment and upgrading of a neighbourhood of seven blocks of flats, built in the sixties. They have a long-term vision to contribute to climate mitigation and lowering CO2 emissions by renovating and upgrading the buildings they are in charge of. Having developed their vision and strategy, they were then facing the challenge of communicating it to the residents and getting their approval. A collaboration between TOBB and NTNU arranged a summer school for students with the purpose of finding solutions to improve communication and motivate people to take collective actions to mitigate the effects of the climate changes. The research question of this paper is: To what extent can the brainstorming session enable students to understand social and individual challenges in climate mitigation, in a relaxed informal learning atmosphere? A brainstorming session was organized to allow creative thinking about the well-being improvements of the community. This was used during the design process to encourage the civil engineer students to engage into a more sociological approach with a goal to achieve a more user-based solution rather than a purely technical one. The students were also guided by the facilitators to think of strategies that could trigger engagement, such as a friendly competition between the different blocks to reduce energy consumption and find ways to communicate with the residents. The facilitators used a structured socio-technical approach and suggested several ways to illustrate the different actions that could be easy to catch for the residents. The ideas were put on Post-it notes on the Blackboard and organized into topics by the facilitators. The brainstorming session was an effective way to broadening the students' minds in order to develop actions toward engagement and motivation of the residents. The students understood the topic more broadly and learned to go beyond their technical knowledge to adopt more social and individual based approaches in order to achieve successful refurbishment projects. The students also learned that one way to motivate people is to create opportunities for them to meet and share experiences, in which the built environment plays a major role. For example, the blocks of flats are surrounded in a large green environment, but the residents had hardly none social meeting points, that are seen necessary to allow social networks to emerge. We also believe that social meeting places are important arenas to use to create stronger belonging and identity to the people of the community. The method was also useful for the facilitators to evaluate how much the students knew about the topics. The facilitators learned not to rely only on the students' professional/technical experiences as they had close to none in the social aspect but to rather call for their personal impressions or other familiar situations. Throughout the session, the co-creation process emerged as essential for social behaviour changes in order to create a common understanding, develop increased sense of belonging, social meeting points and engagement of the residents. We therefore recommend a socio-technical approach to be implemented from FM perspective to achieve better communication and active participation of the users in refurbishment projects.

Keywords: Brainstorming, refurbishment, co-creation, FM role, user-based solutions

Session 2.3

Challenges of energy use in changing climatic conditions

Živa Kristl
New university, European faculty of law, Delpinova ulica 18B, 5000 Nova Gorica
ziva.kristl@epf.nova-uni.si

Coline Senior
Norwegian University of Science and Technology, Trondheim
coline.senior@ntnu.no

Alenka Temeljotov Salaj
Norwegian University of Science and Technology, Gløshaugen, Trondheim
alenka.temeljotov-salaj@ntnu.no

Energy use in the building sector is considered to have mayor impacts on overall system efficiency and green-gas emissions. The area is well covered with research and publications as well as with regulatory documents, which results in encouraging alleviation of the existing problems. In the future, however, the systems will have to adapt to climate changes, circular production processes, ageing population, urbanization, immigration and vulnerable infrastructure. This means that the upcoming strategies for raising the competitiveness of the building sector will have to include new environmental, economic and social approaches which also form the three main pillars of sustainability. As buildings and infrastructure have a long-life span, they are not only exposed to climate during the time of their construction, but also to climate change over the decades of their operation. In this regard, not only the buildings that are currently being designed but also the existing buildings have to be taken into consideration. This paper deals with the main challenges in the field of energy use in the changing climatic conditions. Specifically, three key challenges are addressed: climate adaptation schemes, energy efficiency and resilience to climate change. For this purpose, a literature review of the above-mentioned challenges has been carried out, based on the relevant literature search. The challenges are evaluated in regard to state of art, the research interest and the regulatory issues, resulting in the assessing the advances and defining research gaps. Despite numerous significant developments, there is not many comprehensive studies dealing with these issues, however they define several important problems. One of the important challenges is institutional response. Particularly, in the developed countries, the current infrastructure and building regulations are adapted to the earlier climate patterns and do not include the future conditions. Many publications claim that changes of politics and development of legislation are sometimes hindered by inaccurate climate change predictions. In the field of resource efficiency, the EU legislation currently does not provide a well-established approach in terms of addressing the entire building life cycle. Climate resilience mainly deals with larger systems, while on the level of buildings the field is still developing. Such situation reduces the competitiveness of the sector and increases lagging behind the goals of achieving sustainability.

Keywords: Energy use, climate change, key challenges

Developing a practical and evidence-based tool for systemic governance reform in co-creation processes

Savis Gohari
Norwegian University of Science and Technology
savis.gohari@ntnu.no

There is a growing academic and practice-based interest in co-creation processes with the aim of monitoring and supporting the needs and aspirations of citizens over time. However, very few attempts have been made to address to what extent the policy field in which co-creation is implemented is influential with respect to the type and effects of these processes. This paper argues that the key stumbling block to implementing co-creation in practice lies not in the availability of underpinning capabilities, but in gaining the support of politicians and senior bureaucrats. While co-creation has become an essential method for enhancing the quality of public policymaking and delivery, its implementation relies mainly on the dominant public sector's cultures and values. This paper pays particular attention to city governance and the management of the policy decision-making process, aiming to propose a theoretical model for co-creation process. In this regard, we will first undertake a narrative review of different models of co-creation and will apply the common philosophical assumptions to an empirical case study of a community-based research led by Norwegian University of Science and Technology. The results will help to re-develop a more fitted co-creation process model and to answer the research objectives.

Keywords: Systemic governance reform, co-creation, city

Development of a new building element for prefabricated constructions of advanced performance

Katerina Tsikaloudaki
Aristotle University of Thessaloniki, Department of Civil Engineering
e-mail: katgt@civil.auth.gr

Stella Tsoka
Aristotle University of Thessaloniki, Department of Civil Engineering

Theodore Theodosiou
Aristotle University of Thessaloniki, Department of Civil Engineering

The paper concerns the development of an innovative building module with advanced thermophysical and mechanical properties that will act as a bearing element and/or as an internal partition wall in prefabricated residential buildings. This new building module will satisfy high requirements with regard to its operation and performance. Specifically, it will be able: i/ To bear and deliver safely all the imposed building loads. ii/ To display advanced energy performance, contributing to the formation of a building with almost zero energy consumption. iii/ To demonstrate excellent hygrothermal behavior, by preventing the surface and interstitial water vapor condensation, as well as minimizing the impacts from rain. Iv/ To provide acoustic insulation protection. v/ To have resistance against fire actions. vi/ To exhibit an advanced environmental performance in order to minimize its environmental footprint during its life-cycle. The high performances of the building element are ensured by the proper configuration and assembly of the layers that compose it, and are verified through analytical and experimental studies, measurements at qualified laboratories, monitoring of the indoor and ambient conditions in an experimental chamber that will be especially constructed for this purpose. In this way, the development of a multifunctional building element is achieved, that, when repeated, it can formulate a building envelope with high structural, hygrothermal, energy, acoustic, fire and environmental performance at the minimum possible time and cost. The accomplishment of this objective offers multiple benefits to the business sector and the research community, but also to the society, as it promotes the construction of buildings with advanced energy and environmental performance that can mitigate and adapt to the climate change impacts. In this paper, the configuration of the new building element is presented and the first findings of the research on its performance are presented.

Keywords: Sustainability, Protection of Environment, Conservation of Environment

Multimap as a method for strategic planning - and practical tool for urban FM profession

Svein Bjorberg
Norwegian University of Science and Technology
svein.bjoerberg@multiconsult.no

Robin Sæterøy
Multiconsult
robin.sateroy@multiconsult.no

Ina Aspestrand
Multiconsult
ina.aspestrand@multiconsult.no

The objective of the paper is to present experiences from mapping performance of building portfolios as an input to strategic planning using multiMap method. MultiMap was developed in 1997 to map technical condition and so far, been used for strategic portfolio analysis of approximately 35 million m2, mostly hospitals and buildings in municipality sector, but also adapted to cover roads, parks and nautical installations along the total coastline of Norway. During the experienced period other modules has been developed, such as usability and adaptability, as input for Real Estate Management Strategy. The methodology was used for a common Nordic project on Sustainable Refurbishment (SURE), finished in 2015, to obtain and upkeep "Wellbeing" for users and owners of buildings which is the balance between economy, social aspects and environment. To upkeep Wellbeing over time is duty of the Facility Managers. Living environment is the totality in our daily life described as the social and physical framework, but during our life social needs are changing. It is about safety, security, activity, rest etc. Good indoor environment is not enough in itself, but outdoor in streets, parks, shops, cafes, schools, places for work, medical treatment and activities are all a part of the total environment. Also increasing population in urban areas ask for development of Urban FM (Facility Management). This paper presents findings in real life projects, improvements and practical use of results so far and suggested new areas to be developed to fulfil Urban FM needs. The methodology used are both qualitative and quantitative research methods. A substantial part of getting information to the model is based on structural collection of data and knowledge already present in the actual organization. This gives quick and cost-efficient access to information at required level of accuracy. The results, and experience of the practical use, show that the model is generic and can be implemented for urban areas. Practical outcome will be a better possibility to see buildings and space / areas between as an integrated facility management puzzle organized as Urban FM.

Keywords: Urban development, Urban FM, Strategic analysis, Wellbeing

INVITED SESSIONS
Smart Procurement

Competition in large projects PPPs vs traditional procurement

Athena Roumboustos
University of the Aegean
athena@aegean.gr

Competition *for* the market supports price efficiency, improves allocative efficiency, reduces production costs, promotes innovation and protects social welfare. To this end, competition for large projects was investigated based on contract award notice information published by EU member states between 2006 and 2016 concerning road and rail works. Projects of over EUR 10 million were included in the analysis which considered as variables influencing competition: institutional maturity, tender attributes and, finally, national policies coupled with competition *in* the market. Competition *for* the market was studied using descriptive statistics and regression analysis. The study revealed the varying and, overall, modest influence on competition of the tendering process attributes. The key driver being how national authorities structure the demand side of the market: overall demand for respective works; their share of large contracts; the concentration of top raking home actors. Based on these attributes particular country types could be identified reflecting the combination of the share of the overall demand for respective works in Europe vs the share of large contracts tendered in the country and coupled with the concentration of top raking home actors. These combinations had a considerable effect on how competition *for* the market evolved under the various contexts as well as how the tendering process attributes influenced competition. Furthermore, the policies effected in adjacent markets (here rail and road works) had a significant impact suggesting that, possibly, the national context refers to structure of both the demand and supply side of the markets where top raking actors are active across sectors, such as infrastructure in general and not restricted to transport infrastructure.

Keywords: procurement, infrastructure projects, competition

The next stage in project procurement – OS2.0?

Bjørn Andersen
Norwegian University of Science and Technology, Trondheim
Department of Mechanical and Industrial Engineering

The last couple of decades have seen a number of different approaches to improving the various project problems related to lowest-cost bidding, failure to assign risk to the best suited actor, lack of trust among project participants, etc., often resulting in cost or schedule overruns, quality issues, and often legal disputes in the wake of projects. Approaches to combatting these problems include more relational project/procurement models, such as alliancing or integrated project delivery, different modes of early contractor involvement in the project development process, more stable project value chains, etc. An extensive initiative has been launched by the Construction Industry Institute, hosted by the University of Texas, Austin, that takes an even more radical approach, by reorganizing the project creation process as well the fundamental business model in the industry. This approach has been called OS2.0, and this presentation will outline the main features of this system, which include among others: i/ A completely redesigned process to design the project and compose the supply chain based on an open source, cloud-enabled integration platform that automatically creates a flat, first-tier delivery consortium based on pre-approved designs and rates. Test calculations indicate a reduction in transactional cost from appr. 40 to 4 %. ii/A new business model where the owner no longer first obtains up-front financing for the investment, then hires suppliers, and pays these during/at the end of the construction period, but instead composes a "delivery consortium" to build the facility based on a leasing model, where each participant either takes an equity stake in the facility until it is decommissioned or provides its part in the facility as a service during the lifetime against an annual pay. iii/New mechanisms for governance that distribute risk more soundly and handle insurance, financial security, bonding, etc., based on complete transparency, open data transfer and mining, and blockchain technology. The presentation will provide some more details about the rationale behind the model and its components.

Keywords: Project procurement, OS2.0, business model

Collaborative Project Delivery Methods

Atle Engebø
Norwegian University of Science and Technology
atle.engebo@ntnu.no

The purpose here is to provide an overview of Collaborative Project delivery methods in the context of Norway. In Norway, the most common PDMs are *Utførelsesentreprise* (Design-Bid-Build) and *Totalentreprise* (Design-Build). However, in recent times *samspillsentreprise* (Collaborative Project Delivery) have become increasingly popular. The Norwegian method is characterized by early involvement of the actors, dialogue, trust and openness. Projects are often carried out with shared objectives and shared financial interests. Regarding organisation, mainly two variations are primarily used: 1/ Collaboration with Design-Build ("Samspill til totalentreprise"): Builders, users, designers, contractors and possibly managers collaborate in the development of the project from the programming phase into a pre-project with target price. Then the interaction group takes over the responsibility and the project go into a traditional Design-Build contract. 2/ Collaboration with incentives ("Samspill med incitement"): Builders, users, designers, contractors and possibly managers collaborate in the development of the project from the programming phase into a pre-project with target price. Then the project is carried out as a billing work, with agreed allocation of over / undercutting of target price. In our research we break down collaborative project delivery methods into elements. The elements are categorised as Contractual, Cultural and Organizational elements. The client normally decides the contractual elements, but the contractor can influence the project delivery model by selecting organizational and cultural elements. The presentation will focus on these elements and how responsibilities are perceived in such a context – drawing from empirical data from real-life cases.

Keywords: Collaborative project delivery, transnational logic

Transactional procurement forms – have they reached their end-of-life?

Ole Jonny Klakegg
Norwegian University of Science and Technology
ole.jonny.klakegg@ntnu.no

Traditionally, procurement has been based on transactional economic theories. The basic philosophy is: Specify what you want to buy, and let suppliers compete for the contract. Sign on the tender with the lowest unit-price. For decades, this has been the dominating philosophy in commercial relations. In projects, the philosophy will further assume that the parties, when entering the contract, will identify the risks involved and allocate each risk to the one party that is better positioned to handle it. Today, projects (and the contracts involved) are becoming larger and more complex. Changes and economic realities push for quick execution of the projects once they are finally decided and plans approved. The result is that these projects are critical and characterized by a high degree of risk. Allocating and handling this risk is a major challenge in modern projects. It seems unlikely that the contract parties (customer and supplier/service provider) can identify and allocate the risk. The consequences can be harsh for suppliers and service providers. For one project that runs into severe problems, they will need many successful projects to compensate for the money lost. In real life we have seen that even large companies (international construction companies) have gone bankrupt over projects gone bad. It is possible to blame tough competition, erroneous cost estimation, headless tactical pricing or unprofessional clients, but it does not make the loss any easier to bear. Neither does it put a stop to the recurring problem. For clients, the consequences are not less painful. Not only does bad projects waste money in the clean-up process. They also tie up finances needed for other purposes, beyond control of those responsible for budgets. Many of these critical, complex projects are found in the public sector. Public special purpose buildings, transport infrastructure etc. are highly complex, risky enterprises financed by society's money. When such projects go bad, you and I face consequences in terms of society's reduced ability to serve public needs. We know that public sector has been conservative in their choice of procurement forms. The transactional logic is still dominant in this sector, even deeply rooted in the legislation and regulations for public acquisitions. The purpose of this presentation is to test the viability of the foundation for transactional procurement forms in today's project market. Is there still a case for transactional procurement forms – or have they reached their end-of-life?

Keywords: Procurement, transnational logic

Social Infrastructure

Lifetime Neighbourhoods: Literature review and research agenda

David Bogataj
University of Padua, Department of Management and Engineering, Vicenza, Italy
david.bogataj@gmail.com

Valerija Rogelj
New University, European Faculty of Law, Nova Gorica, Slovenia

Number of older adults (80+) is expected to triple in next half of century. Ageing of population is driving up health care and long-term care expenditures. Municipalities are responsible for organizing and financing of long-term-care services. Exposure to risk associated with build environments can cause accidents like falls or even loneliness. Loneliness is measured as the mayor risk driver for older adults living in urban environment. The literature review presents benefits of built and social environment and experiences gained in (a) Retirement Villages and (b) Independent Living Communities, (c) Assisted Living Facilities (d) Nursing Homes and (e) CCRCs. CCRSs can contribute to development of lifetime neighbourhoods providing living environment for all generations and good adaptation to the fast changes of needs in case of decreasing functional capacities from technical and financial aspects. The spatial planning, development, and management of lifetime neighbourhoods, as a risk mitigation strategy of the fast ageing cities, are of specific interest, investigated in our research. The conclusions lead to our further study how the particular solutions from (a) to (e) can be implemented in lifetime neighbourhoods and how it mitigates the risk of accidents and social exclusion, creating the value for the community.

Keywords: Social infrastructure, long time care, risk mitigation

Investments in the social infrastructure of rural areas in the North-eastern Slovenian region

Marija Bogataj
Zavod INRISK, Slovenia

Marta Kavšek
Zavod INRISK, Slovenia

Valerija Rogelj
New University, European Faculty of Law, Nova Gorica, Slovenia

David Bogataj
University of Padua, Department of Management Engineering
david.bogataj@gmail.com

The question of the deinstitutionalization process, which Slovenia has committed itself in the framework of European policy of ensuring a decent ageing, opens up dilemmas or (a) help older people to arrange investments for a more accessible home in which they lived before entering long-term care (LTC), or (b) to organize LTC more concentrated in the villages or part of the "silver villages". Before this dilemma, Slovene local action groups (LAGs) are now in the process of preparing long-term and medium-term plans for the de-institutionalization of LTC in their communities. We tried to answer this question in the five local action groups located on the southern and eastern edge of Slovenia. We have provided the basic characteristics of social inclusion and the financial capacity of implementing deinstitutionalization in those areas and demographic projections of expected needs in the next half century. We based our conclusions on the standards, given in "Pravilnik o standardih in normativih socialnovarstvenih storitev" (= Rule book on Standards and Norms of Social Security Services, Uradni list RS, št. 45/10, 28/11, 104/11, 111/13, 102/15 in 76/17). According to the studies of three types of surveys, namely, the respondents who are responsible for the deinstitutionalization of LTC, respondents being in the institutional LTC and elderly people who are entering an LTC in the next ten to thirty years, we have come to the conclusion that it is reasonable to invest in the villages for the elderly and to organize the LTC in the silver villages combined with the daily care in such centers and organize better transport solutions for the elderly. The finding is based on the recognition that the elderly of this area are mainly in lower income classes and would, without a good organization, also to help them to put their real estate on the real estate market, difficult to provide decent living in the last decades of their lives.

Keywords: Rural areas, social infrastructure, long time care, Slovenia

Overview of the documents on long-term care in the European Union member states

Barbara Grah
Faculty of Economics, University of Ljubljana

Vlado Dimovski
Faculty of Economics, University of Ljubljana

Simon Colnar
Faculty of Economics, University of Ljubljana

Sandra Penger
Faculty of Economics, University of Ljubljana

Jana Žnidaršič
Faculty of Economics, University of Ljubljana

David Bogataj
University of Padua, Department of Management Engineering
david.bogataj@gmail.com

Ageing population is one of key challenges in the European Union. Therefore, the European Union member states need to constantly monitor trends related to the ageing population and take appropriate actions. One area that fits within that scope is also long-term care, and relation between long-term care and built environment is a research area that is gaining in importance. The purpose of this paper is to present the overview of the existing studies related to the interdependence of the long-term care and built environment within the European Union member states and subsequently to identify existing challenges. An in-depth literature review of existing secondary sources is used to examine the current state of the interdependence of built environment and long-term care in the European Union member states and identify existing challenges. The findings reveal the relatively high differences in the interdependence between the built environment and the long-term care across the European Union Member states as well as the key challenges the European Union will have to deal with in the future. The European Union member states'-built environment related to the long-term care still need important improvements, as especially in some countries, as for example also Slovenia, the existing system, are ineffective and unable to satisfy existing older people demand. We therefore propose a range of actions to be taken in order to improve built environment for provision of the long-term care services for the ageing Europeans.

Keywords: Long-term care, older adults, European Union, ageing population

The Right to Home
Who is Obliged to Ensure Proper Housing to Elderly?

Eneja Drobež
Zavod INRISK & Constitutional Court of the Republic of Slovenia

In its recent decisions, the Constitutional Court has developed the concept of the right to home as a constitutionally protected right, which can prevent the eviction of an individual from the dwelling in which he resides. The court emphasized the special importance of providing home to vulnerable groups. We believe that older people can be considered as a vulnerable group, since they can find themselves in a difficult financial situation in the autumn of their lives due to the decline in income received during their working lives. Therefore, we believe the recent decisions of the Constitutional Court have a special significance for providing home for the elderly. In this regard, the key question is whether the state and other persons of public law are bound only to passivity in the sense that they are not allowed to evict a person from her dwellings if this would be disproportionately affect her right to home, or is the state obliged to actively provide home to those who - for whatever reason - do not have it? The Constitutional Court emphasized that the right to a home is conceived as a negative right, which means that the state should be obliged to withstand interventions in the home of an individual, but it should not be obliged to provide a home to someone who does not have it. In our opinion, a more detailed analysis of the decisions of the Constitutional Court in this area shows that the state is not only obliged to passivity, but is also obliged to actively provide home to vulnerable groups of the population. An appropriateness of the home must also depend on the concrete needs of the individual, his state of health, psycho-physical abilities and his age. We believe that such interpretation of the constitutional review also corresponds to international obligations adopted by the Republic of Slovenia.

Keywords: Constitutional Court, right to home, elderly, Slovenia

Specialised Housing Solutions for Older Adults

Valerija Rogelj
New University, European Faculty of Law, Nova Gorica, Slovenia

David Bogataj
University of Padua, Department of Management and Engineering, Vicenza, Italy
david.bogataj@ntnu.no

Assisted living facilities and other types of specialised housing can enable older adults to live longer in the community while mitigating the increasing public expenditures for health care and long-term care. We show that Slovenian communities are not prepared for the community care and the built environment is not appropriate. We have developed the model for measuring the social value of the built environment for older adults. Using this model, the creation of social value by mitigation of the risk of falls, diseases, and social exclusion is measured, using the multiple decrement approach, which is a novelty. The actuarial present value is used to provide the scientific evidence of benefits of development and management of various specialised housing solutions for older adults with declining functional capacities.

Keywords: Specialised housing, older adults, community care, Slovenia

Students' Corner

BREEAM challenges in refurbishment project – a case of Tempeveien building

Rajan Luqman
Norwegian University of Science and Technology, Trondheim

The purpose of this report is to find out how the refurbishment of Tempeveien 22 meets the criteria in the BREEAM-NOR Manual "pollution" and "land use and ecology" to reduce the building's negative effects on the environment in order to achieve level "Outstanding". Focusing on the environment becomes more important for everyday life, and at the same time, the authorities set stricter requirements for reducing polluting emissions. The construction industry can reduce its emissions through BREEAM certification of its constructions, as it will achieve reduced emissions from this industry through the criteria set by the manual. Through literature searches and meetings with managers at the Maxbygget project, one has come up with solutions used on the project and relevant theory related to affected topics. Where the aim is to evaluate the chosen solutions used on the Max-bygget, and possibly use this to suggest better solutions. It has been done well and some fewer good solutions to this project. Thus, upcoming projects in Veidekke Entreprenřr and KLP Eiendom can bring the experiences from the BREEAM-NOR project at Tempeveien 22 to build better BREEAM-NOR buildings. Upcoming project on the area might also take inspiration from Max-bygget, with refurbishing building by following the BREEAM-NOR Manual. This can help the Municipality of Trondheim on step further in achieving their goal of a sustainable Trondheim by 2020.

Keywords: BREEAM, refurbishment, construction industry, Norway

Developing a business model for PV panel from facitity management

Yan Xue
Norwegian University of Science and Technology
yan.xue@ntnu.no

Diffusion of PV panel is considered as a potential for renewable energy. In the existing articles, financial element has proved to be the core point to affect different stakeholders' participation. Hence, business model is a promising method to directly solve this problem. The basic pattern of the business model applied in PV panel is three sectors' cooperation, they are solar company, citizens, and a third-company, who is always an investor or a bank. There are some barriers in the process, such as high up-front cost, various informational gaps, cultural difference, ect. Most of these problems can be solved from facility business due to the role of FM. Facility managers can organize a platform for a new business model, which can contain solar panel company, citizens, private company, as well as municipal sectors. All the stakeholders in this model can get benefits. At the same time, the facility managers can also communicate with different stakeholders to eliminate various informational gaps. Then the multiple stakeholders can share the benefits and risks together.

Keywords: Business model, PV panel, stakeholders, FM

Analysis of outdoor thermal comfort at a university campus in Norway

Johannes Brozovsky
Norwegian University of Science and Technology
The Research Centre on Zero Emission Neighbourhoods in Smart Cities
johannes.brozovsky@ntnu.no

Sara Corio
University of Genoa
Departmet for Civil, Chemical and Environment Engineering

Niki Gaitani
Norwegian University of Science and Technology
The Research Centre on Zero Emission Neighbourhoods in Smart Cities

Rapid urbanisation and a changing climate put enormous pressure on urban areas worldwide. Besides energy-related issues, the environmental quality and aspects connected to health and wellbeing get evermore attention. Improving human thermal comfort in urban spaces is seen as a key aspect of climate-resilient and sustainable urban design. The purpose of this study was to identify, analyse and alleviate areas of discomfort at the campus of the Norwegian University of Science and Technology (NTNU). The campus is currently in the early stages of a redevelopment where existing buildings are to be refurbished and new buildings will be added. For the analysis, experimental data from long-term weather recordings and infrared measurements, as well as numerical data were used. While the weather recordings were used as input to the numerical model of the campus area, the infrared images served as calibration data for the model. The numerical model of the campus was created with ENVI-met v. 4.4, a three-dimensional non-hydrostatic tool for surface-plant-air interaction. For the validation, infrared images of building and ground surfaces obtained on April 11 were compared to simulation results from the ENVI-met model. ENVI-met presented a tendency to overestimate the surface temperature values, where IR-measured values were below or close to 0 °C. The comfort analysis focused particularly on solar radiation, local air temperatures, and the wind field at pedestrian level and was carried out on four days: 21.03., 21.06., 23.09. and 21.12. For that, the Predicted Mean Vote and Predicted Percentage of Dissatisfied models were used for the evaluation of the outdoor thermal comfort conditions. Notably, areas exposed to high wind speed and adjacent to trees showed uncomfortable conditions for pedestrians during cold weather conditions. Due to the prominent SW wind direction especially east-west passages with trees or particularly exposed areas like in front of the main building were identified as problematic. It was found that trees and architectural elements such as walls or buildings were most effective in decreasing the wind speed. However, due to shading, trees had an overall undesirable impact on outdoor thermal comfort except for the summer solstice. When placed proficiently, architectural elements were able to mitigate thermal discomfort. Changing solely the ground or building surface materials only showed a marginal impact on outdoor thermal comfort conditions. This study identified areas with uncomfortable conditions on NTNU campus and proposed strategies on how to alleviate the reasons for outdoor discomfort. The proper design of public spaces involving advanced monitoring and simulation techniques can contribute significantly to the improvent of the microclimate and comfort conditions at the campus.

Keywords: Thermal comfort, NTNU campus, dissatisfied model

Co-creation and Co-designing Public Space. Presenting Initial research plan

Trine Olsen Møgster
NTNU Institutt for Bygg- og Miljøteknikk
trinolsen@gmail.com

Participatory planning as a statuary principle of planning in Norway is rooted in $ 1-1 in the Norwegian Plan and Building Act of 2008. Participatory planning is a process in which stakeholders are given the opportunity to influence decisions that concern their lives and activities. These processes are to be rigged so that affected parties, or the public at large, are given the opportunity to understand what is going to happen and that they are given a leeway to influence the plan. The rationale for statutory participation rests in our democratic system. Plans that affect people's lives should take regard of the interests of people today and ensure to uphold the interest of the generations that come after us. The Planning and Building Act therefor insist on transparency. The plans need to be accessible to the people concerned, and particularly vulnerable groups are to be taken into consideration and special attentions given to their opportunity to be heard. This dimension of the statutory involvement is most often complied through public hearings, information meetings and digital publication of planning documents on the planner's web pages. Another dimension of participation is the expectation that the interests that are affected by a plan share any critical information which may influence the plan. There are various methods of obtaining information about a place that offers opportunities for people participation. Interviews, door-to-door campaigns, information stand, place analysis and cultural heritage analysis are examples of this. Harvesting information from stakeholders ensures quality in the decisions taken. As Shipley and Utz (2012) have pointed out, participation can, if done right, increase the multitude of voices that are heard in a planning process. This opportunity to bring forth a diversity of voices and opinions creates a breeding ground for better quality and innovation in the development of any urban area. To include more heads to think about challenges and opportunities in a planning process, opens the way for new solutions and better solutions can come on the table (Drazkiewicz et.al. 2015). Where the plan sets high ambitions for social sustainability it is of particular importance to increase the relevance and significance of the information taken into account. Valuable insights that may enrich the development of custom-fit solutions may be the output. I plan to study the public, private, people co-creation processes within urban intervention pilots on Fornebu, Norway. An holistic system design that manages participatory planning of public space. This, the co-creation and co-designing asks for a more rigourous involvement of the people. And it challenges the roles and mandate of the various stakeholders involved. My focus of study will be on the co-creation process and it's significance for innovative development of public space. The co-creation process on Fornebu are to experiment with new social connections, public spaces, environment and sustainable usage, neighborhood identity, cultural diversity and social cohesion. My assumptions as I start off this study is that co-creative participatory planning and co-designing public space are vital means for the urban development to respond to new use-patterns and thus to find solutions that meet new needs. Collectively imagining and inventing public spaces can strengthen the connection between the people and the place. Co-creating and co-designing can be means to respond to changes in needs and use patterns of public spaces. The key question is how to model this process of co-designing and co-creating innovative social spaces? What are the needed skills, capabilities and technologies for co-creating and co-designing social sustainable engaging public spaces? What dilemmas are to be addressed and what preconditions need to be met? How to go about such endeavor? In an urban lab neighborhood praxis can be tested that critically questions and challenges our relation to nature, public space and social inclusion.

Keywords: Co-creation, innovative social places, research plan

Other Abstracts

Status of facility management in Kosovo

Sihana Gjikolli
European Faculty of Law, New University, Slovenia
sihana.gj@gmail.com

This paper discusses the evolution of the Facility Management (FM) industry in Kosovo to the present and offers some predictions about where the industry is headed. With an annual GDP per capita of EUR 2,600 Kosovo is one of the poorest countries in Europe. In 2011, 5.4% of GDP has been generated by the real estate industry. Kosovo however, is less developed and lacks the maturity of many of its European neighbors.(Reality Consult GmbH International management consultancy for Real Estate and Facility Management, 2014). At this time, there is little research and publications about the situation of FM in Kosovo. This study aims to gain a qualitative understanding of the complexities of developing a mature FM market in Kosovo. The purpose of the research was to assess the current effects of FM in Kosovo, what is the current market and what are the prospects for the future for this region. The research proposal is to take the current situation - what are the main challenges within the business environment from the perspective of the FM. This is accomplished through an interview with one of the experts in the field in Kosovo. The research wants to explore the reasons behind the current levels of maturity, and this cannot be solved by simply gaining quantitative measures. The FM in Kosovo will be dealt with a semi-structured interview with one of the experts in this field in Kosovo. Among the questionnaires of the interview, such as the current FM business situation, FM organizations; The FM supply market; Professional bodies; FM Education; and the FM prospect in the future will achieve satisfactory results for the state of this sector in Kosovo. This research is the first quantification of knowledge and perception regarding the FM in Kosovo.

Keywords: Facilities Management, Strategy, field, Maturity, sustainability, Kosovo

Impact of land policy on the real property market operation in the city municipality of Nova Gorica

Nastja Mihelj
European Faculty of Law, New University, Ljubljana, Slovenia

Božena Lipej
European Faculty of Law, New University, Ljubljana, Slovenia
bozena.lipej@gmail.com

Land policy or land management is one of the key levers that enable the execution of spatial strategies and development programmes. Land policy is important in creating spatial conditions for efficient real property management, it encourages a sustainable spatial development and thereby ensures conditions for a coherent and comprehensive development of cities, towns and other residential areas. It constitutes an initial implementation policy of spatial planning in the territory of the municipality and reduces unpredictable land management, which may reflect in unpredictable spatial or socio-economic development. The central issue of the research is on whether land policy impacts real property market operation on a local level. The research deals with the regulation of these areas at a national level, as well as with the regulation and practical implementation in the City Municipality of Nova Gorica. There is no comprehensive system for the implementation of land policy established in Slovenia, but there are specific, predominantly administrative spatial measures. When defining the land policy, its principles, objectives and instruments must be taken into account. However, in this respect it is required to make an analysis of the situation and trends in the area of spatial planning, land transactions and land management. On the basis of the examined materials and analyses (analysis, interpretation, comparative, descriptive and synthetic methods), some proposals and viewpoints have been formed and we believe they should be further analysed or considered in the preparation of professional bases for implementation of land policy on a local level. The research found that land policy is an important integral part of the social and economic system and the spatial planning policy. It must function in conformity with other policies, such as residential, agricultural and environmental. The research presents the results of the analysis of the real property market operation over the period of last 10 years in the analytical region of Nova Gorica and its surrounding area, and the issue of building permits in the same period. Further, in the City Municipality of Nova Gorica, we have analysed the implementation of the decree on the compensation for the use of building sites and assessment of public utility charges, connected to the site servicing programme. The conclusion of the research synthesizes the findings and presents the conclusions with regard to the set research questions.

Keywords: Land policy, property management, Slovenia

Institutional arrangements of real property registration

Klavdija Trnovšek
European Faculty of Law, New University, Ljubljana, Slovenia

Božena Lipej
European Faculty of Law, New University, Ljubljana, Slovenia
bozena.lipej@gmail.com

All developed countries are setting up real property registration systems, which represent an important part of national spatial and real property data infrastructures, provide support to ensuring real property ownership and enable real property market operation. Considering the traditional classification of real property registration systems, land registry and cadastre systems are either unified – single-institutional or dual – double-institutional. In case of a unified system, in simplified terms, all activities take place a one single institution, and in the dual system activities take place within two, or even three institutions. The central object of the research is real property registration from the aspect of institutional arrangements. International associations and organizations play an important role in the creation of European and global trends of real property registration, since they develop guidelines and recommendations for developed as well as less developed countries, drawing on best practices. In recent years, the European real property organizations have been discussing whether the countries should decide on a single-institutional or a dual-institutional real property registration system, but they failed to reach a uniform position due to different objective and historical factors. The following methods were used in the research: inductive and deductive method, comparative method, analysis and interpretation, descriptive method, synthetic method, explanatory and historical method. The research delivers a comprehensive review of land register and cadastre in Slovenia, and European and global trends of real property management or registration. We have analysed and compared two European national real property systems with a unified (the Netherlands, Lithuania) and dual (Denmark, Croatia) registration system. Development of real property management, together with the development of real property records has been constantly improving and upgrading. The decision on the appropriate organizational form of real property registration depends on which approach is more rational, efficient and appropriate in a specific environment. It seems we are gravitating towards a unified system, which is also supported by international development and investment institutions, because such a system offers more advantages, savings and an environment, which is friendly to real property records users. For example, years ago, Sweden, Norway and Finland all went from the long-lasting dual real property records management to a unified one. The conclusion presents the findings and some proposals to be further evaluated by decision makers, particularly in the Slovenian environment.

Keywords: Real property registration, guideline, international trend

The impact of Real Estate and Psychological factors on the potential buyers of Real Estates

Mitja OMERZU
European Faculty of Law, New University, Ljubljana, Slovenia
mitjacrp@gmail.com

Bojan GRUM
European Faculty of Law, New University, Ljubljana, Slovenia

Article is based on empirically tested hypothetic model of real estate and psychological factors of deciding for the purchase of the real estate (the authors: Grum, Kobal Grum, 2014). In the article the model describes a relation between separate real estate factors of deciding (financial factors, physical factors, factors of living environment, socioeconomics factors) and psychological factors, which are divided between motivation and emotions. With the help of confirmatory factor analysis, we tried to verify or modify the existing hypothetic model. Main objective of our research was the discovery of possibilities and a special understanding of specific groups of users determined by their gender, age, level of education, as well as an insight in to their common or comparable vey of thinking about the importance of specific real estate factors. The empirical data of the field offers us an interesting inside view in to the behavior of specific groups of users, as well as the basis for determining new ways of marketing and planning approaches. We wanted to present the statistical probability, connected to the researched results, with which an individual from a certain group will specify his or her preference for the real estate factors and what is the meaning he or she will contribute to them. And how are the selected real estate factors connected to the motivation and emotion specific for him or her. Of course, a universal rule cannot be applied for everyone and everywhere. Mere change of background or culture will bring a different result.

Keywords: real estate, real estate factors, psychological factors, emotions, motivation, confirmatory factor analysis.

FM Sourcing Strategies, Business Models and Value Chains

Per Anker Jensen
DTU Management, Technical University of Denmark
pank@dtu.dk

The aim of the present research is to identify typical sourcing strategies and business models in Facilities Management (FM) and map archetypes of value chains with complimentary sourcing strategies and value chains. While there is a huge amount of literature on sourcing in FM, the business models and value chains have only been limited researched. The paper is original in combining an investigation of sourcing strategies, business models and value chains in FM. Based on literature and case studies from the author's previous research, the paper takes a generic value chain as a starting point together with the recent ISO standard on sourcing process and a business model framework. The typical sourcing strategies for FM among core business organisations and for Facilities Services (FS) among in-house FM organisations are investigated as well as the typical business models among FM in-house organisations and external FS providers. Archetypical values chains are established by a combination of sourcing strategies and business models. The research identified 9 archetypes of FM value chains divided in three groups according to whether the core business organisation mostly occupy rented facilities, mostly occupy owned facilities or has facilities operation as a core business like serviced office providers etc. The results can help all parties involved in the FM value chain to get a clearer understanding of their position in the value chain and help them further develop their sourcing strategies and/or business model.

Keywords: Value chain, sourcing strategies, business models, maturity, archetypes

Influence of Blockchain Technology & Applications

Jan Veuger
Saxion University of Applied Sciences and Hanze University

Danielle Mendes Thame Denny
Roberto Ferreira Paulo
[1]Communication, Faculdade Armando Álvares Penteado, São Paulo, Brazil
[2]Secretaria da Fazenda do Estado de São Paulo, São Paulo, Brazil

JiaRui Zhang
Hefei University
Department of Computer Science and Technology, China

Prof. dr. Ben van Lier
University Berlin and Rotterdam University of Applied Sciences

Jo Bronckers
Co-founder & board member FIBREE.

Esther L. Dekker
Max Property Group, Head Office Netherlands

Mieke Oostra
Jelle Rijpma
Utrecht University of Applied Sciences

Michel Vonk
University of Technology
Department of the Built Environment and Industrial Engineering and Innovation

Wendel Hulsebos
Hanze University of applied Sciences Groningen

Blockchain could have a huge impact on the value chain in our society. Examples are efficiency, transparency, ownership, value (transfer), automation and service provision. When we want to understand the world of blockchain, we need to understand the innovation of the currency Bitcoin in 2009 that is built on underlying technology called Blockchain. Bitcoin is a combination of four individual elements: (1) cryptography, (2) a peer-to-peer network, (3) an open source protocol and (4) a shared ledger. This makes it a phenomenon that people are enthusiastic about. The internet already makes it possible to transfer information quickly, cheaply without paper and without intermediaries being involved. Blockchain gives the same benefits for transferring values. Internet is used to transfer word and image, blockchain for transactions. Blockchain is a combination of two elements: a shared and distributed ledger with synchronized data spread over multiple sites, countries and / or institutions and a cryptography: digital token with a monetary value.

Keywords: Blockchain, real estate, energy, applications, housing associations

Placemaking in function of creating a sustainable neibourhood Case study Maršala Birjuzova street in Belgrade

Dr Milena Vukmirović
University of Belgrade
Faculty of Forestry, Department of Landscape Architecture and Horticulture,
milena.vukmirovic@sfb.bg.ac.rs

Suzana Gavrilović, MA
University of Belgrade
Faculty of Forestry, Department of Landscape Architecture and Horticulture,
suzana.gavrilovic@sfb.bg.ac.rs

Democratic changes in Serbia after 2000 and transitional process of the socio-political system also had an impact on the improvement of the planning framework which was aimed at involving citizens in the process itself. However, this mainly refers to the introduction of a process of early public insight into the draft planning documents, which gives very little opportunities to citizens and civic associations to contribute to the design and development of the city. Considering this, planning and design process can still be characterised as centralised and "top-down", as evidenced by big projects such as Belgrade Waterfront, recently adopted City of Belgrade Development Strategy, but also with projects like Extension of the pedestrian zone along Knez Mihailova Street and Belgrade Gondola project. Citizens reacted angrily to these interventions because they were not involved in the design process and because there were no information and communication with the local community. In order to promote and establish a desirable "bottom-up" approach, the World Bank Office in Belgrade has launched a series of activities including the Placemaking workshops. Defined as an "overarching idea and a hands-on approach for improving a neighbourhood, city, or region", placemaking serves as a process that "inspires people to collectively reimagine and reinvent public spaces as the heart of every community" (PPS 2007). The focus of this paper is the results of the two-day workshop that was organised in May in Belgrade in order to study the location of Maršala Birjuzova Street. Although the reconstruction of the street was completed in 2016, the main goal of the workshop was to determine the possibilities of further improvement of the space in order to meet the needs of its users. Four groups of users participated in the workshop - pupils of local private high school, street residents, students of the Faculty of Forestry and the Faculty of Architecture and owners of local shops and businesses. Emotional mapping was used to enable different stakeholder groups to express their positive vs. negative place - based preferences. All data were collected and analysed in ArcGIS and by performing Hot spot analysis using the Getis-Ord Gi statistic we identified statistically significant spatial clusters of high values (hot spots) and low values (cold spots). Identified spatial clusters (areas) display subjective, qualitative and bottom-up spatial information and how different groups perceive the location and what the mostly preferable/unpreferable areas are. Special attention of this paper will be given to the presentation of the workshop results considering the ways how different groups of users perceive the actual and the future transformation of the street in order to make this place more user-friendly and sustainable.

Keywords: Placemaking, public space users, sustainable neighbourhood, Maršala Birjuzova Street, Belgrade, GIS

Protection of buyers of new buildings by ZVKSES from the buyer's and the investor's perspective

Blaž Grum
European Faculta of Law, New Univercity, Ljubljana, Slovenia
blaz.grum@gmail.com

Buying a property is certainly one of the biggest and most important steps in life. As this is usually the case for a larger financial burden, and because many people meet with a real estate purchase process only once in a lifetime, it is very important that they pay special attention to the process of purchase. In the past, when buying new buildings, buyers were frequently abused by investors. Probably the most famous example is the Zbiljski gaj Affair, which was one of the main reasons for the adoption of Protection of Buyers of Apartments and Single Occupancy Buildings Act (ZVKSES). The latter prescribes a series of conditions that the investor must fulfill before he can conclude a sales contract with the buyer for the purchase of a property. Even after the conclusion of the sales contract, the investor is obliged to provide the buyers with a set of rights that enable them to secure the process of buying real estate. In this way, the law effectively protects customers from arbitrary behavior by investors. In the article, I will try to show the essential rights that ZVKSES provides to buyers of new buildings and the cost aspect if they want to use all their rights. On the other hand, I will present the aspect of the investor, who, in order to guarantee the rights of the buyer and fulfill the prescribed conditions, has more potential costs for the implementation of the project. I will also review the case-law regarding the provision of rights under ZVKSES, and based on this and based on my own experience with the sale of new buildings, I will propose improvements to ZVKSES.

Keywords: buyer, seller, real estate, purchase, new building, ZVKSES

Challenges of aging in place in Slovenia

Boštjan Kerbler
Urban Planning Institute of the Republic of Slovenia, Ljubljana, Slovenia
bostjan.kerbler@uirs.si

Richard Sendi
Urban Planning Institute of the Republic of Slovenia, Ljubljana, Slovenia
richard.sendi@uirs.si

Maša Filipovič Hrast
University of Ljubljana, Faculty of Social Sciences, Ljubljana, Slovenia
masa.filipovic@fdv.uni-lj.si

Western society is characterized by increasing aging. Slovenia is no exception in this trend. Demographic changes and new financial circumstances have an increasingly strong effect on public finance sustainability and, consequently, on housing provision for the elderly. In the European Union there is thus an increasing awareness that this problem cannot be solved with housing models and other forms of eldercare that have been used to date; instead, it will be necessary to develop new solutions and to introduce new forms of services that will be more effective and financially less burdensome. Active aging, a society for all ages, and services enabling the elderly to live independently are therefore concepts that have been the main topics of research programs in the European Union in recent years. Their goal is to lower the rising costs of housing provision for the elderly and providing services, thus reducing pressure on national funds, and at the same time to make it possible for the elderly to remain active members of society for as long as possible. One of the ways in which society has responded to such issues is the idea that the elderly should be able to remain in their home environment as long as possible, where they would be capable of leading their lives as independently as possible with the best possible quality of life. The concept is called "aging at home" or "aging in place". This idea is widely supported in society because it is in line with the wishes and needs of the elderly. Most of them would like to remain at home, in the same familiar living and social environment, and they would also like to retain their independence and self-reliance as long as possible. This form of living in Slovenia is interesting because the country has so far primarily developed the institutional form of housing provision for the elderly, which is the most expensive among all forms of housing provision. On the other hand, Slovenia is characterized by a high rate of owner-occupied housing and low population mobility. But it could be assumed that high-quality aging in place can be ensured by adapting the built environment and providing accessible community support services. For these reasons in particular, it is important to explore various aspects of aging in place, especially the needs and desires of the elderly in this regard, the obstacles and deficiencies they face, and the spatial differences between them. Due to these reasons a national study titled The Model of Quality Aging in Place in Slovenia was conducted in Slovenia between 2017 and 2020. The study was supported by the Slovenian Research Agency (grant number J5-8243). Its main objective was to determine the optimal conditions for quality aging in place and the support services required for the elderly to remain full members of society for as long as possible and thus actively involved in social life, all supported by a system that is financially sustainable for the government. The most important results of the study were presented at the conference and in the conference paper.

Key words: Elderly people, housing, living environment, aging at home, aging in place, support services for the elderly

Predicting energy consumption of buildings based on their geometrical properties using artificial neural network

Todorka Samardzioska
Ss. Cyril and Methodius University, Faculty of Civil Engineering, Skopje, Macedonia
samardzioska@gf.ukim.edu.mk

Valentina Zhileska Panchovska
Ss. Cyril and Methodius University, Faculty of Civil Engineering, Skopje, Macedonia

Silvana Petrusheva
Ss. Cyril and Methodius University, Faculty of Civil Engineering, Skopje, Macedonia

Mihail Naumovski
Ss. Cyril and Methodius University, Faculty of Civil Engineering, Skopje, Macedonia

Maja Gosheva
Ss. Cyril and Methodius University, Faculty of Civil Engineering, Skopje, Macedonia

Geometrical characteristics of the building have a significant impact on the building energy consumption and building classification in the appropriate energy class. Therefore, this paper develops a model for prediction of energy consumption of the buildings and the influence of the building shape factor on the building's energy class. The inputs for the model are building geometrical parameters: 1) shape factor and 2) areas of the building envelope components, i.e. the areas of: walls, windows, floor, roof and the heated area. In that manner, material properties are neglected for this analysis in order to investigate the influence of dimensions and shapes only on the building energy class. The model uses data of 58 analysed buildings in total. After testing several predictive models, General Regression Neural Network (GRNN) from the predictive modelling software DTREG has been chosen as the most suitable and with most accurate prediction. The mean absolute percentage error is MAPE = 4.7%, coefficient of determination R^2= 89.22 (which presents the general fit of the model), and the coefficient of correlation is 0.945. It is concluded that the model gives satisfactory accuracy for predicting the energy consumption of buildings based on their geometrical properties. Regarding the heat transmission function through the building envelope, the general conclusion is: the smaller the shape factor is, the less is the need for heating/cooling.

Keywords: Building, geometrical properties, energy efficiency, artificial neural network

LVC's potential for implementation in Norway and a re-zoning's impact on real estate value

Alexander Bergsland Finsnes
Norwegian University of Science and Technology, Trondheim
mailto:alexander.finsnes@vedal.no

The purpose of this study is to assess Land Value Capture's feasibility for implementation in Norway, as well as examine how the value basis for Land Value Capture (LVC) is created. Due to the thesis' limitations, this will be examined by estimating how a re-zoning affects real estate prices through a case study at Sluppen in Trondheim, Norway. The feasibility study for LVC is done by presenting eight existing LVC strategies along with relevant Norwegian legislation, followed by a discussion on the strategies' potential for implementation. Most of the literature is obtained from a literature study executed prior to this thesis, while a large part is also fetched through a document study executed while writing the thesis. Data related to the assessed properties have been retrieved from public, Norwegian databases, while the land value assessments are based on the yield and residual methods. The results show that there are several existing LVC strategies that are feasible for implementation in Norway, as they for instance have similarities with the Norwegian development agreements. The land value of the three properties assessed in the case study, which are all subject for a re-zoning and a new development plan, are highly dependent of the utilization degree stated in their respective zoning plans. It would be interesting to look further into LVC's feasibility in Norway, by obtaining opinions from professionally qualified politicians and bureaucrats. In order to establish a more certain relation between land value and utilization degree, more properties at Sluppen and other districts should be assessed.

Keywords: Land Value Capture, zoning plan, utilization degree, real estate value, Norway

NOTES