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Sustainable Housing Environment and Its Impact on Consumption Patterns

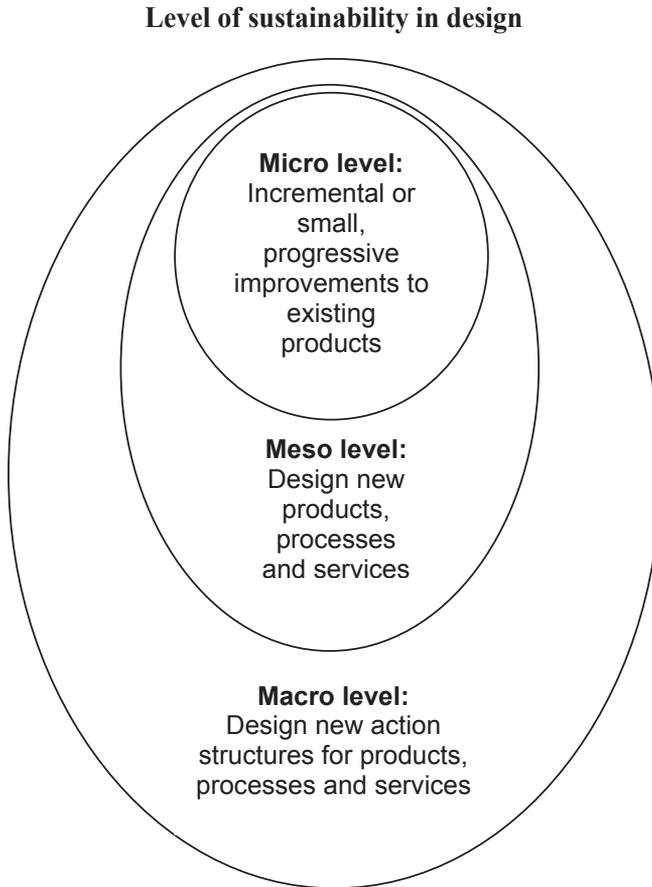
Introduction

During the last 20 years the architecture and design community has established a consensus that sustainable development presents a vital topic in predicting and implementing future trends, needs, production and consumption patterns. Sustainability so is affecting the built environment and is modifying people's lives. New trends of use of the living space come from the new concepts of urban layouts and architectural projects for the housing environment (due to the sustainability rules) as well as they are results of technological development. The interdisciplinary cooperation is then necessary to meet the complexity of problems connected to a global sustainable development. In practice, urban and architectural design of sustainable housing environment should be considered in conjunction with technical, social and cultural conditions. Ecological advantages, urban and architectural design can work as a catalyst for the advancement of social sustainability and social inclusion. A holistic approach in design, considering the social, economic and ecological dimensions of solutions, maximises the success of future developments.

The above quotes illustrate that the way sustainability is framed in the architecture and design disciplines determines the issues that are considered important: technology fixes, user involvement or cultural and social interaction. Different implementation levels of sustainability design can be illustrated as shown in Figure 1.

The actions within the **micro level** provide a better, more sustainable way of use of some products: they can be implemented with only small expenditures but must be promoted and supported by the educational campaigns addressed to the user. To this level also belong the small improvements of existing products: e.g. non-toxic (or low toxic) fuel used by existing home heating systems. The **meso level** includes new, sustainable products and technologies for construction projects. This group of improvements concerns all the innovative technologies and materials therein sustainable façade systems, intelligent services. In the last decades we can observe a rapid development of the product services belonging to this group. Finally, the **macro level** concerns more complicated action structures: network cities respecting sustainable rules, processes of social participation and neighbourhood organisation (Keitsch, 2012).

Figure 1



Source: M. Keitsch, (2012), Editorial Sustainable Architecture, Design and Housing [in:] Sustainable Development, Sust. Dev. 20, 141-145, www.wileyonlinelibrary.com [access 10.06.2014].

What does the sustainable housing environment mean?

As a broad concept, sustainable development is today an unavoidable mainstream connotation, with increasing implications on how we reside, conduct business and educate. Ranging from policy agreements or guidelines to pragmatic in-practice approaches, the global challenges we face in the time of rapid changes (whether climatic, financial or social) are addressed differently. The idea of sustainability can be applied practically to all aspects of human society and activities influencing economy and political systems, affecting ecological and environmental behaviour and social habits (Bannova, Hagbert, 2014).

Urban attributes of sustainability

Sustainability in housing environment appears already at the stage of planning. Lands for future investments must be carefully selected according to the rule of protecting the biologically active areas of the earth. This means so that the construction sites for sustainable estates would cover also the less attractive and difficult locations never landscaped before or the brownfields. All types of location specified above usually bring urban and technological challenges during the design and building processes. The other possibility to achieve a sustainable settlement is transformation of the existing fabric by improving technological quality of development and social aspects of the quality of living. An alternative for the urban sprawl creating extensive suburbia will be rather a set of new eco-districts independent of the city infrastructure.

The eco-district size of about 5-10 thousands inhabitants and sufficiently high density of development justify the local services and facilities building. Eco-district may have own transportation system, recreational and green areas and social infrastructure. It has also local job possibilities. The compact structure increases accessibility of services and encourages residents to give up the car for a bike within the district. On the other hand, efficient transportation network enables gratification of higher needs.

Urban quality of the eco-district makes its structure: differentiated scale, height and types of buildings. Attractive public spaces and urban furniture help to create social life and establish neighbourhood ties (Drapella-Hermansdorfer, 2011).

Architecture design quality

While the forms of architectural response to environmental issues will differ markedly from place to place, the professional field of sustainable architecture until now has followed a trajectory similar in all developed countries. Initially the discourse was dominated by issues of energy efficiency, but quickly expanded to include broader environmental and social concerns. Currently the field encompasses a diversity of practices and perspectives that range from the pragmatic to the esoteric and extend from local discourses of place to global discourses of technology. Architects suspect that sustainable architecture is probably a term that will disappear in the future because what we are talking about is good architecture and good architecture should be sustainable. The extreme version of this view is to construe sustainability and architecture as synonymous; sustainable architecture becomes a tautology where it is not “architecture” unless it is “sustainable” (Owen, Dovey, 2008). Sustainability has a certain currency or symbolic capital in the field, but only to the degree that it can be seen as producing good architecture. Sustainable imperative is responsible for a productive unsettling of the field, transforming the space of possibilities and producing new ways of thinking about architecture.

Respecting the principles of sustainable design an architect may use two groups of tools. The first consists of the so-called “traditional approach”, while the other means implementation of sustainable technologies. Implementation of the so-called traditional pro-environmental actions is always supported by the use of modern, innovative technologies. Altogether they include the following actions to achieve sustainable architecture:

- Use of recyclable materials and restoration - is the appropriate choice of materials at the design stage, that they can be recycled and used in construction again;
- Water storage system - in addition to the construction of water reservoirs, rational use of water and the recovery of waste water systems should be implemented, e.g. “gray water” in toilets;
- Building orientation for daylighting;
- Attention to air quality in buildings to avoid “sick building syndrome”;
- Striving to reduce the electricity consumption, replacing electricity with renewable energy;
- Use of environmentally friendly materials for building construction to minimise toxic and noxious emissions to air and waste.

All the actions mentioned above should be supported by the use of innovative energy-efficient materials and technologies, including building control systems.

This concept of sustainability in architecture must affect the architectural form. New materials and technologies bring new forms and create a new language of ar-

Figure 2

Contemporary *green architecture* examples

A. Bosco Verticale in Milan



Source: Photo taken by the author.

B. Residential building in Torino,
25 Verde Building



Source: Photo taken by the author.

Figure 3

Contemporary *vernacular architecture* examples



Source: www.topboxdesign.com/tag/spain/page/4/
[access: 08.09.2014].



Source: <http://www.theinnovationdiaries.com/wp-content/uploads/2011/07/vernacular-architecture.jpg>
[access: 08.09.2014].

chitecture. The most pervasive among them seem to be *green architecture* and *vernacular architecture*. While the *green architecture* focuses on fitting the building into the natural environment, respecting location and the climatic conditions using simple, natural and low-processed materials, *vernacular architecture* (called also *folk architecture*) means the use of local skills, traditions and recourses in building design.

Social aspects of sustainability in housing

Sustainable settlements promote local governments and all kinds of social activity. An important role is played by social participation that allows creating original, individual design concepts and development. Participation in the design process teaches residents responsibility for their environment and encourages to creativity. Thanks to such creativity housing environment may become exciting place of living, neighbourly friendly, safe and giving a chance of personal development to everybody.

New settlements designed according to the rules of sustainability would have access to green recreation areas and also should have access to the fields and gardens used for home – or collective, limited ecological food production. New “garden” activities may enrich neighbourly ties and improve mutual confidence helping at the same time partly solve the unemployment problems and supply healthy food to community residents.

Areas of impact of sustainable residential environment on consumers' behaviour

Sustainability at home

The paradigm of sustainability is influencing consumers' behaviour and attitudes already now and will influence them far more in the future. Sustainability will change consumers' choice of products and services; it will also stimulate many product innovations. Following the rules of sustainability consumers would gradually move away from the high consumption, starting obviously from the group of soft goods: limiting amount of the selected products being purchased, correcting choice within an assortment group, replacing lower quality and poorer health claims goods with the higher quality ones. This process can be already spotted, especially in wealthy societies. Changes of consumption patterns will spread and cover also the group of durable goods in parallel with the new pro-ecological lifestyles successful adoption. It is also important to note that pro-ecological approach stimulate innovations.

New lifestyles strongly influenced by ideas of sustainability seem to be a key to understand future trends in consumption. These trends will appear especially in housing because many groups of products relate to habitation. Some of them are soft goods (nondurable) of frequent use; the others belong to the group of hard goods (durable) that yield utility over time. Among them the most important are: 1) products directly related to habitation (e.g. building, flat and its equipment); 2) products indirectly related to habitation (e.g. items used for recreation or hobby). Inside the first group of products one can indicate three different sets of products:

- **Building; house/flat** and all the materials and technologies used to build/renovate and finish a building/flat
- **Furnishing and equipment**
- **Portable and non-portable devices and items** used at home

The new technologies and building policy have already resulted with a higher standard of recently constructed development or renovated complexes. Significant improvement one can observe also in furniture, finishing production. Building industry is using a bigger number of safe for health and environmentally friendly materials for constructions, plasters, paints and facings. Pro-ecological standards are also respected by all producers of items used at home. The presented above conclusion does not catch more sophisticated relationships between sustainability and habitation patterns that are determining consumers' choice.

Case study: Activities related to popular electronic devices taken at home

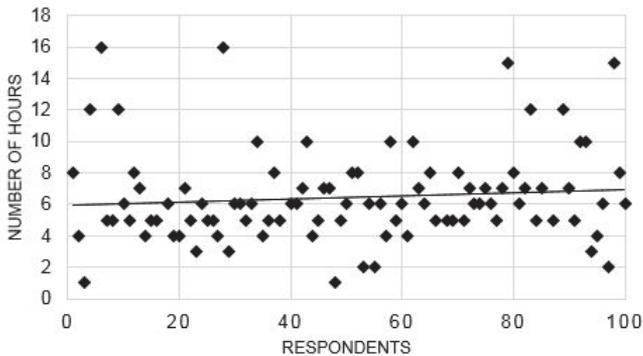
To reveal how new technologies and items are accessible and easy to use at home and how they influence the concept of everyday living the survey among inhabitants

in the Silesia region in Poland was taken. The aim of the research was to identify the impact of the innovative products on the way of use of the home space and particular rooms. The survey was held in July 2014. The study involved 100 randomly selected respondents who completed the online questionnaire; several surveys were distributed in paper form as well. The floor area of residential properties used by respondents is unified: most of them (over 80%) use a flat of size 51 m² - 65 m². It is important to underline that this size of dwellings is currently offered by developers for all segments of quality standard. Following consumers' preferences and choice in Poland one can assume that the buyers prefer rather to choose more attractive (and more expensive) locations than a bigger size of a flat.

Respondents were asked about number of hours spent daily at home: during one selected working day of a week and of a weekend, excluding time for a night sleep. Short time spent daily at home may mean that a person takes most of his or her activities out of home. It can therefore be concluded that also innovative behaviours take place at home rarely or never. The survey asked respondents to indicate the quantity of hours spent in the flat/house on the day in a week and on one day of the weekend. The obtained results are presented in two graphs (Figures 4 and 5).

Figure 4

Number of hours spent at home daily during the working day



Legend:

◆ - number of hours a respondent spends at home a day ——— - average amount of time (all respondents)

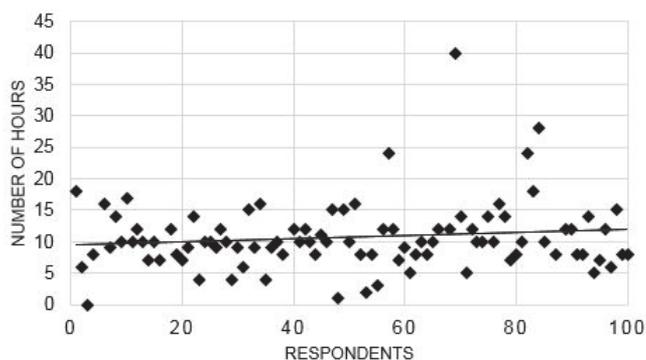
Source: Elaborated by the author, based on own research.

In both graphs, the trend line has been drawn. Respondents spend at home 6-7 hours on the selected day during the work week, while during the weekend this number increases to 10-12 hours. Similar results are obtained after calculating the arith-

metic mean. The most common value for the day of the work week is five hours and ten hours for the day on the weekend.

Figure 5

Number of hours spent at home daily during the day of weekend



Legend:

◆ - number of hours a respondent spends at home a day — - average amount of time (all respondents)

Source: Elaborated by the author, based on own research.

Table 1

Frequency of the selected activities taken at home, related to modern technologies

Activity \ Frequency	Every day	At least couple times a week	More than couple times a month	Less than couple times a month	No
Shopping via Internet	2 ^a	9	38	29	17
Use of electronic banking services	3	21	64	3	4
Use of e-mails	80	13	1	1	2
Use of social networking	32	20	14	8	16
Watching films, series and other programmes on Internet	8	19	34	12	20
Sport/fitness activities also using online or DVD instructions	1	6	10	12	56
Internet research for health and beauty advices, DIY tips, advices	5	13	30	31	14
Use of the phone apps instead of traditional planner, calendar, calculator, etc.	17	11	5	5	50

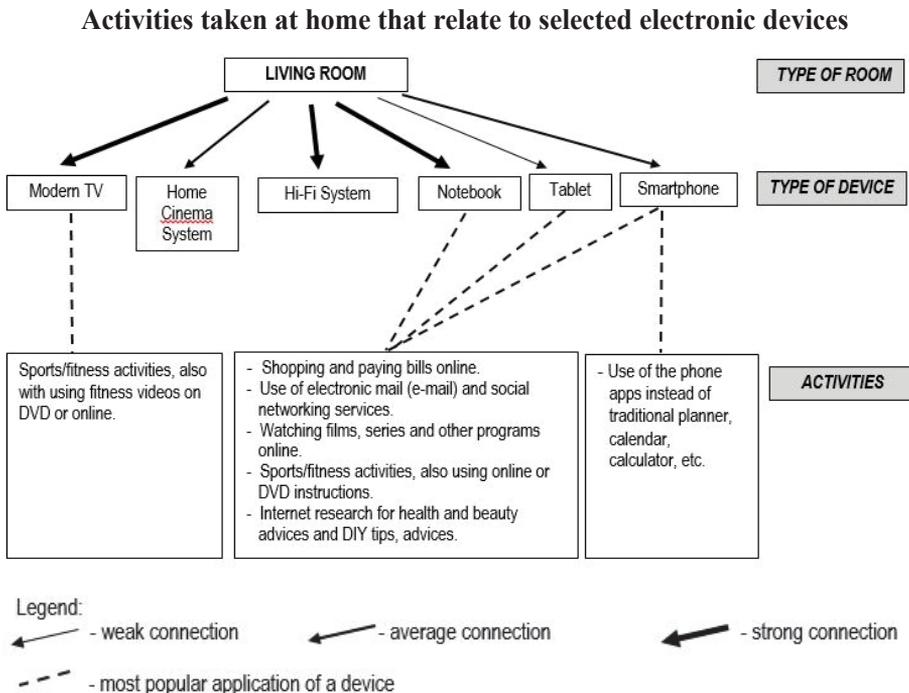
^a Number of indications.

Source: Elaborated by the author, based on own research.

Calculating 7-8 hours of sleep and approx. 9-10 hours of professional activity (with the commuting time) it follows that the remaining time respondents spend at home. The remaining time is dedicated to activities related to the household and family. Analysing in the same way respondents' daily schedule during a day on the weekend we can conclude that respondents spend approx. 5 hours outside the home. Given that respondents spend a lot of time at home it is worth analysing activities taken at home by residents, especially the activities associated with innovative technologies.

The most important activities taken at home and related to innovative technologies were included in Table 1. They relate to such devices as personal computer (mobile phone, tablet, etc.) connected to Internet, modern TV, home cinema and Hi-Fi systems. Use of these devices may replace many services available before only at post-office, bank, cinema, theatre, fitness club and also substitute other social activities taken outside of home. It is important to note that these devices have been available for individual consumers only for a few years. They evolve very quickly; sales volumes of products belonging to the group of innovative devices are increasing dynamically, influence people's everyday behaviours significantly, especially modifying their activities taken at home. Respondents declared everyday use of their personal

Figure 6



Source: Elaborated by the author, based on own research.

computers (e-mails, social networking) and smartphone's apps. They often replace TV sets with the on-line watching films, series and other programmes. This means that the TV set "organising" the family life until now is currently superseded by a personal computer. Watching TV programmes is not a social activity any more. Increasingly, respondents shop and pay their bills via Internet.

Lifestyle changes caused by using innovative products (devices) influence the way of use of the living area of homes. In the context of relatively small floor area of most dwellings in Poland we can observe how residents adapt new activities to the dwellings of limited size.

Figure 6 shows how everyday activities taken at home, implementing innovative devices are distributed in the living space. Respondents' declarations about the way and place of use of the selected electronic devices allowed to construct a scheme of some new functions of the living room related to these devices and activities.

Conclusions

Residential preferences strongly correlate with changes in lifestyles related to urban inhabitation and increasing sensitivity to environmental problems. Eco-districts of an appropriate scale and rich functional programme, respecting the demands of sustainable development might provide an alternative to shrinking cities and the urban sprawl in the future. High quality urban and social environment is becoming increasingly important for contemporary city dwellers, as well as good and safe for health materials and technologies used for construction and furnishings of homes. It is important to underline that the rate of change in housing environment quality relates to the level of wealth and will increase slowly following the economic growth.

The results of the study indicate that the Poles spend most of their free time at home. This relates both to weekdays and weekends. The survey was examining respondents' activities taken at home, especially the way of use of innovative electronic devices. Respondents who participated in the survey used desktops and laptops at home (for e-mailing and social networking), electronic banking and shopping on Internet.

Innovative mobile devices are used in all rooms in the dwelling, but mostly in the living room. It can be assumed that the small size of innovative electronic products used at home and more frequent replacement of traditional equipment by portable devices (e.g. TV set replaced by laptop) will strengthen the following trends:

- a) Increasing the range of functions of individual rooms at home, especially of the living room: dwellers can perform various activities in the same room and at the same time, using different electronic devices.
- b) Blurring of classical zoning of the living space of a flat/house: redefinition of areas used individually and collectively resulting in an increase of acceptance for the small floor area of the flat.

The trends mentioned above will change housing preferences and consumers' choice and will modify significantly consumption patterns.

Bibliography

- Bannova O., Hagbert P. (2014), *Experiments in mapping human factors for sustainable design and living* (in): Mira R. G., Dumitru A., *Urban sustainability, Innovative spaces, Vulnerabilities and opportunities*, Institute of Psychosocial Studies and Research, "Xoan Vicente Viqueira", <http://www.udc.es/dep/ps/grupo/varios/urbansus.pdf> [access: 20.08.2014].
- Drapella-Hermansdorfer A. (2011), *Ekodzielnica jako element współczesnej teorii i praktyki urbanistycznej (Ecodistrict as an element of urban theory and praxis)*, (in): *Czasopismo Techniczne 2-A/2/2011*, Kraków.
- Keitsch M. (2012), *Editorial Sustainable Architecture, Design and Housing* (in): *Sustainable Development*, Sust. Dev. 20, John Wiley & Sons, Ltd and ERP Environment, www.wileyonlinelibrary.com [access: 10.06.2014].
- Meesters J. (2009), *The meaning of activities in the dwelling and residential environment. A structural approach in people-environment relations*, (in): *Sustainable Urban Areas*, 27, Delft centre for Sustainable Urban Areas, Delft.
- Owen C., Dovey K. (2008), *Fields of sustainable architecture*, "The Journal of Architecture", Vol. 13, Issue 1, Taylor & Francis.

Summary

This article main topic is to discuss key concepts, methods, applications and lessons learned in sustainable architecture, design and housing environment in last 20 years. Sustainable architecture and urban design challenges new and ingenious urban and architectural design at various levels. Examples are the following.

- Minimising the negative environmental impact of buildings by enhancing efficiency and moderating the use of materials, energy and development space.
- Developing measures to relate form and adapt the design to the site, the region and the climate.
- Establishing a harmonious, long lasting relationship between the inhabitants and their surroundings by addressing the essence of good form-giving.

As indicated above sustainable housing environment (and architecture) shall be thus well built, easy to use and beautiful. Implementation of sustainability demands is strongly affecting inhabitants (consumers') behaviour. This article highlights special aspects of sustainability in architecture, design and housing, due to their impact on contemporary consumption.

Key words: sustainability, housing environment, innovative technologies.

JEL: Q01, Q55, R29

Zrównoważone środowisko mieszkaniowe i jego wpływ na wzorce konsumpcji

Streszczenie

Głównym tematem artykułu jest omówienie podstawowych koncepcji, metod, zastosowań i nauk płynących ze zrównoważonej architektury, projektowania i środowiska mieszkaniowego w ciągu ostatnich 20 lat. Zrównoważona architektura i urbanistyka stanowi wyzwanie dla nowego i pomysłowego projektowania urbanistycznego i architektonicznego na różnych poziomach. Przykłady są następujące:

- minimalizowanie negatywnego oddziaływania na środowisko budynków przez zwiększanie skuteczności i łagodzenie wykorzystania materiałów, energii i przestrzeni rozwoju,
- opracowanie środków odnoszących się do formy i adaptacji projektu do terenu zabudowy, regionu i klimatu,
- ustanowienie harmonijnej, długotrwałej relacji między mieszkańcami a ich otoczeniem przez zwrócenie uwagi na istotę dobrego projektowania.

Jak wskazano wyżej, zrównoważone w ten sposób środowisko mieszkaniowe (i architektura) będzie dobrze tworzone, łatwe w użytkowaniu i piękne. Realizacja wymogów zrównoważonego rozwoju silnie oddziałuje na zachowanie mieszkańców (konsumentów). Artykuł uwypukla szczególne aspekty zrównoważonego rozwoju w architekturze, projektowaniu i mieszkalnictwie, zważywszy na ich wpływ na współczesną konsumpcję.

Słowa kluczowe: zrównoważony rozwój, środowisko mieszkaniowe, technologie innowacyjne.

Kody JEL: Q01, Q55, R29

Artykuł nadesłany do redakcji we wrześniu 2014 r.

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