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Transdisciplinarity as a Direction for the Development of Contemporary Urban Planning

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In the article, the co-authors track the development of the principles of cross-disciplinary interactions in urban planning. The disciplines representing the scientific background of urban planning have often been the subject of research performed by local authors, but the principle underlying the patterns of interactions and interdisciplinary hierarchies has hardly been the subject of any completed research. The team of co-authors has systematized domestic models of cross-disciplinary cooperation in urban planning. The co-authors have identified the most important stages in the evolution of cross-disciplinary interactions, including "multidisciplinary", "interdisciplinary" and "trans-disciplinary" stages called so in a manner similar to the foreign practice.

The "multidisciplinary" integration model is based on the ability of an urban planner to summarize the knowledge extracted from various areas of research. This model encompasses an extremely limited number of disciplines and questions a specialist's physical ability to acquire the whole range of knowledge that he/she needs. Later this model was revised and the idea of "interdisciplinary" integration was widely spread all over the world; this idea implies that the profession of an urban planner encompasses several specializations. The cross-disciplinary synthesis is implemented through interdisciplinary research and emergence of pre-border areas in the scientific knowledge.

The "transdisciplinary" model is the most relevant one. The concept of urban planning and its contemporary structure was developed on the basis of "trans-disciplinary" interactions. The system of the urban planning knowledge is to be considered as part of the system of human knowledge, based on artificial habitats as complex heterogeneous facilities. In this case, boundaries of the urban planning knowledge are interpreted as adapting depending on the properties of a particular urban planning facility. This concept enables us to take account of (1) the dynamic nature of the ever-growing list of scientific disciplines that comprise the system of the urban planning knowledge, (2) various types of activities (involvement of residents, public organizations, initiatives announced by representatives of government authorities at different levels), which constitute a significant part of urban planning in the present-day world .

Keywords: urban planning, profession of an urban planner, structure of the urban planning science, trans-disciplinarity.

Urban planning has always comprised a pool of versatile systems of knowledge and efforts of different specialists; however the methodology of this integration enjoyed little research. Despite the fact that the 20th century brought a number of concepts describing the "constituent elements" of urban planning, the nature of genuinelinks between disciplines remained unclear. [1]

The profession of an urban planner emerged in the first half of the 20th century. In the UK, the Royal Town Planning Institute was founded in 1914; in the USA, the first national Conference on City Planning was held in 1909, and the Harvard University established the School of City Planning in 1929. The American Society of Planning Officials was founded in 1934, and later about thirty departments and colleges specializing in the training of certified urban planners and urban engineers were established.

In the first quarter of the 20th century, Russian engineers A.P. Ivanitsky, M.D. Zagryadskov and others offered a vehicle designated for the training of urban planning specialists majoring in architecture, civil engineering and economics. [2] Specialized training institutions were incorporated in Petrograd and later in Moscow, where students were to study urban planning, improvement of urban and rural environments, transport, and public utilities. The engineers, who graduated from these institutions, were to work in cooperation with architect planners. However these institutions turned out unpopular in the context of a centralized planning system. [2]

The idea of getting different professionals together in order to resolve urban planning problems was implemented through the incorporation of new professional organizations for urbanists. The first Society of Urban Architects was founded in 1928. [3] The Council of People's Commissars of the USSR approved the organization of the International Congress for Modern Architecture in Moscow, and had it been held in Moscow, its Charter could have been entitled as the Moscow Charter. Unfortunately, at the last moment foreign delegates were prohibited from entering the country, and the International Congress for Modern Architecture was held in Athens, where the Athens Charter was issued.

The second society of urbanists (Soviet Society of Urbanists) was founded in 1987. It served to bring together architects, economists, geographers, managers, ecologists, and philosophers. The society's goals included the restoration of links with international societies of planners; development of the methodology for the interdisciplinary assessment of urban

planning projects; development of the system designated for the training and certification of professional planners in the fourteen branches of the Soviet Society of Urbanists in the republics. In 1989, the first International Meeting of Urbanists was held in Moscow and Peresavl-Zalessky. The Soviet Society of Urbanists was admitted into the International Society of City and Regional Planners in Warsaw in 1990. Due to the disintegration of the USSR, in 1992 this Society was liquidated. Later, several members of the society of urbanists (F. Vysokovsky and others) launched a system of professional training of urbanists at the Higher School of Economics in Moscow.

However the idea of poly-professionalism of urban planners enjoys no support among contemporary legislators. The "Urban Planner" standard (2016) contemplates "the organization of planning and design of territories, the organization of research aimed at the development of urban planning documentation and the technical support provided in respect of the urban planning documentation." The restriction of the urban planner's role to "the development of urban planning documentation" and "design oflocal territories" is contrary to the expectations of the general public, as they want to make urban planners responsible for the sustainable and well-balanced development of Russian cities and towns.

As long as urban planning is considered part of the construction and development industry, numerous important phenomena and other developing disciplines remain outside the "professional realm." The absence of any concept that can integrate any area of urban planning research into a consolidated system of knowledge, supports the practice of duplicating foreign patterns in urban planning activities, facilitates professional disunity and ultimately weakens the status of the Russian urban planning.

Each stage of the urban planning development boasts its original principle of cross-disciplinary interactions. For example, according to V.N. Semenov and M.G. Dikansky, the synthesis of disciplines comprising "urban building" or "urban planning" processes was implemented in the so-called "linear" manner, in other words, it was described as a mere set of information. [4] Initially, the understanding of the cross-disciplinary synthesis in urban planning was reduced to the list of disciplines. Presently, the English-language research practice calls this period "multidisciplinary." [1; 5] The multidisciplinary integration of disciplines preserves their independence, and systems of knowledge are consolidated as a result of the accrual of varied skills by professional urban planners. [6] An urban planning specialist (a civil engineer in the pre-revolutionary practice and an architect planner in the Soviet days in the aftermath of 1930) becomes the instrument of this cross-disciplinary integration.

In the 30ies of the 20th century, the problem of the urban planning knowledge was discussed in the Soviet media [7] in the context of a challenging task of training a "universal planner." V.I. Boberko, A.P. Ivanitsky and several other authors offered a "hierarchical" concept with architecture on top and with other "non-architectural disciplines" being subordinate to architecture.

Two original works, famous for their in-depth analysis, are worth mentioning here. The first one is the text of the Charter of the Society of Urban Architects (headed by N.A. Ladovsky) and the second one is the article written by L.A. Ilyin and entitled "The Evolution of Urban Planning" (1921). According to Ilyin, "… now we will have not only to build houses, but also towns and systems of towns, and to develop … regions. Urban planning will consolidate the state, municipalities and urban communities, as nothing can be created without this consolidation." [3]. Here, the cited author considers interaction between different types of knowledge and different types of activities, performed by professionals, authorities, and urban residents. The Charter mentions "… the need to establish a higher… education institution to study the whole range of issues associated with urban planning." [3] The city is mentioned as the factor "facilitating the research" that serves as the basis for the organization of the system of professional education. It is noteworthy that in the Charter urban planning is mentioned as the type of professional knowledge, while urban science is specified as non-professional knowledge (one of the objectives pursued by the Society of Urban Architects consists in "… the transfer of existing urban planning courses to specialized educational institutions and the launch of a course in urbanism at public institutions of higher education" [3]).

Despite the fact that the co-authors of the postwar edition of "Urban Planning" (namely, A.V. Bunin, L.A. Ilyin, N.Kh. Polyakov, and V.A. Shkvarikov) compiled a different list of disciplines that comprised urban planning, most of these disciplines were to solve problems of art and ideology, while the idea of synthesis of disciplines was hardly discussed at all. [4] Later, in the works written by V.L. Glazychev, Z.N. Yargina, V.V. Vladimirov, T.F. Savarenskaya, I.M. Smolyar, new areas of knowledge were included into the list of disciplines comprising urban planning.

The emergence of new disciplines that became an integral part of the courses mastered by urban planners caused the need to consider the system of professional education as the main instrument for the synthesis of disciplines. This system, coupled with the post-degree self-study performed by planners, was responsible for the implementation of the disciplinary synergy in practical activities. In the 60ies and 70ies of the 20th century, it turned out evident that this type of synthesis could not be implemented by an urban planner as a universal specialist who had an understanding of an integrated urban structure and who was able to control it. The inception of economic geography, development of geoinformation systems, promotion of mental analysis in urban sociology [5;6] caused drastic changes in the principle of cross-disciplinary interactions. Some foreign researchers (namely, Nigel Taylor [5]) believe that a major gap between urban planning and architecture dates back to the

60ies and 70ies of the 20th century, when the role of a city was reconsidered. Initially, the city was viewed as a physical space (and back then the objectives pursued by architecture and urban planning were similar), but later the city was understood as a collection of heterogeneous types of activities conducted in the environment that contemplated the availability of private ownership that applied to land and personal property.

The USSR responded by returning the term "urbanism" into Russian-language works in the 70ies, for example, the author of the preface to the work "Urban Dynamics" (1974) written by G. Forrester, wrote that "… the book may be of substantial interest to geographers, specializing in economic geography, urbanists, urban planners, economists." "Urbanism" was mentioned as a system of knowledge that united specialists in different areas of knowledge in the process of studying and solving urban problems. "A multidisciplinary" model, used to integrate disciplines, gradually transformed into "a cross-disciplinary " model. [5; 6] "Cross-disciplinarity" means the implementation of projects by a team composed of professionals specializing in different areas of knowledge each making his or her contribution into decision making.

At the turn of the 20th century, politics (democratization; "civil involvement"; development of the new stage of "civil involvement" implemented in the form of ecological initiatives; public movements in support of low mobile citizens, etc.) started to influence urban planning. Intensifying urbanization made it necessary to take account of the so-called "tacit knowledge" that manifests itself as a set of urban planning information available to every citizen, an unofficial system of values and behavioral patterns typical for residents of major cities of the world. Unprofessional collection and processing of urban planning statistics becomes widely spread; these data are used in accordance with the "crowd surfing" principle. "An urban planner" acts as a "systems integrator" of the knowledge about the urban habitat and coordinates public interests.

In the 20th century, cross-disciplinary knowledge of urban planning was based on scientific disciplines. The early 21st century was characterized by two simultaneous processes, that is, the aggravation of the problem of an artificial environment was accompanied by the aggravation of its subjective structure. This process caused criticism of the cross-disciplinary model of interaction:

1) the so-called "integrated approach" served as the instrument employed to implement the "cross-disciplinary" model. This approach was built around the idea of consolidation of the heterogeneous data related to the urban planning facility, while the amount of these data, their unsuitability for consolidation and the unavaiability of any models applicable to their joint analysis gave rise to severe criticism expressed in respect of this approach [9] and later caused it to be acknowledged inconsistent. [10];

2) the growing number of urban planning disciplines did not make any urban process transparent: "the number of research projects is sufficient… however the condition of the present stage of the study of a city is characterized by encyclopedism of findings, rather philosophical completeness" [11]; numerous researchers spoke about the problem of integrity of urban planning knowledge;

3) the result of cross-disciplinary interactions consisted in the generation of documents, including development strategies, master plans, designs for the long-term development of local areas, and as the time progressed, it turned out clear that their development consumed enormous resources, while their implementation did not exceed 10% [12];

4) interaction between professionals, specializing in different areas of knowledge turned out more complex due to the heterogeneity of ideologies, terms, principles and values typical for independent scientific disciplines [13; 14];

5) a "cross-disciplinary" model prevented the analysis of the extent of non-professional involvement in urban planning.

Due to the crisis in the system of cross-disciplinary interactions, the structure and composition of the notion

Table 1. Interdisciplinary and Cross-disciplinary Interactions in Urban Planning: Consequences of Their Implementation in the Context of Present-day Challenges

Present-day "Challenges" in Urban Planning	Principle of Cross-disciplinary Interactions	
	Interdisciplinary Model	Cross-disciplinary Model
Higher non-professional involvement in the resolution of urban planning problems	The problem of integration of a substantial share of contributors to urban planning activities into its structure	Acknowledgement of legitimacy of versatile civil initiatives, their potential integration into the system of the urban planning activity
Deteriorated performance in the process of development of urban planning documentation ("standard design")	Problems of tracking all types of public initiatives, individual unique urban planning challenges	Flexible approaches towards the composition and content of the design documentation; potential individual approach to the list of scientific disciplines comprising urban planning
Dissatisfaction of the society in respect of the response to public initiatives, needs, requests	Higher public disappointment in respect of the process of production of urban planning documentation	Generation of new professional and educational standards for the new types of urban planning activities, such as "urban planner - coordinator", "urban planner - innovator"
Incompatibility between Russian professional and educational standards in urban planning, international trends and national interests	Generation of professional and educational standards on the basis of the outdated idea of urban planning as a set of hierarchically subdominant disciplines	An updated concept of urban planning as a dynamically developing list of research disciplines, to be integrated in the manner similar to a bionic self-regulating system
A greater number of research disciplines and areas of knowledge that are engaged in the resolution of urban planning problems	Problems in the application of a "comprehensive approach" to process extensive amounts of heterogeneous data	The acknowledgement that urban planning has dynamic and adaptive characteristics; acknowledgement of existence of the system of uncertainties (see the concept developed by Yu.M. Moiseev) and "unobvious" urban planning knowledge (see the concept of the "visible range of urban planning problems" by A.V. Krasheninnikov

of urban planning were also heavily criticized. [5; 6] Many researchers disputed the existence of urban planning as an independent area of research because it was impossible to describe its structure using thelanguage of regular academic disciplines. The development of the concept of a "cross-disciplinary" [1; 5; 6] model of interactions in urban planning was to eliminate these contradictions (Table 1).

"Transdisciplinarity" means renunciation of boundaries between the research disciplines for the benefit of operations involving complex heterogeneous phenomena. [5; 14] The concentration of "the whole range of issues associated with urban planning", anticipated by N.A. Ladovsky almost one hundred years ago, has almost been implemented: the boundaries of independent disciplines and areas of research have been done away with; therefore, urban planning can be considered as a system of knowledge, generated and retained as a unity not by means of the academic consolidation of sciences, but due to urban integrity. The process of evolution of principles of the disciplinary synthesis may be analyzed in the context of the comparative analysis of several widely known models (see Figure 1).

Let's consider the model developed by I.M. Smolyar (see Figure 1a). "The multi-disciplinarity" of this model is comprehensive: the work covers 18 disciplines and over 150 "combinations", or topics that comprise several research schools. [15] It is characteristic that the principle of interaction between these disciplines and schools in this model has no "nucleus"; it is reduced to the conventional "consolidation" of data borrowed from different disciplines.

The model proposed by Yu.P. Bocharov [2] and based on the North-American programmes of urban planning education (Figure 1b) can be considered another step forward and an update of the "multi-disciplinary" model, where "cross-discipliniary" synthesis of disciplines is implemented by means of setting the stage for the joint project development by a team composed of professionals in various areas of knowledge. Each of the areas of knowledge represents an independent area of research, and the intersection of interests between them creates the area called "urban planning".

Ultimately, the model that illustrates some ideas generated by A.A. Vysokovsky (Figure 1c) develops the idea of multiple layers and the typological complexity of the urban planning knowledge. "The trans-disciplinarity" of this model consists in its multiple layers and steps, namely, in its "adaptational disciplines": in terms of its ideology, the training programme implemented by the Higher School of Urbanism (Moscow) differs from other urban planning schools by its flexibility and focus on the "ad hoc" training of future professionals in urban planning depending on his/her prior education. The acknowledgement of the right of students not to hold any degrees in architecture [16] and the willingness to "adapt" future urbanists in the course of their studies makes Higher School of Urbanism different from other institutions of higher education offering programmes in urban planning.

The self-adjustble composition of term papers, the flexibility oflists of disciplines, the ability to absorb any new knowledge depending on the customer's and the city's needs represent the features of a "trans-disciplinary" model of contemporary

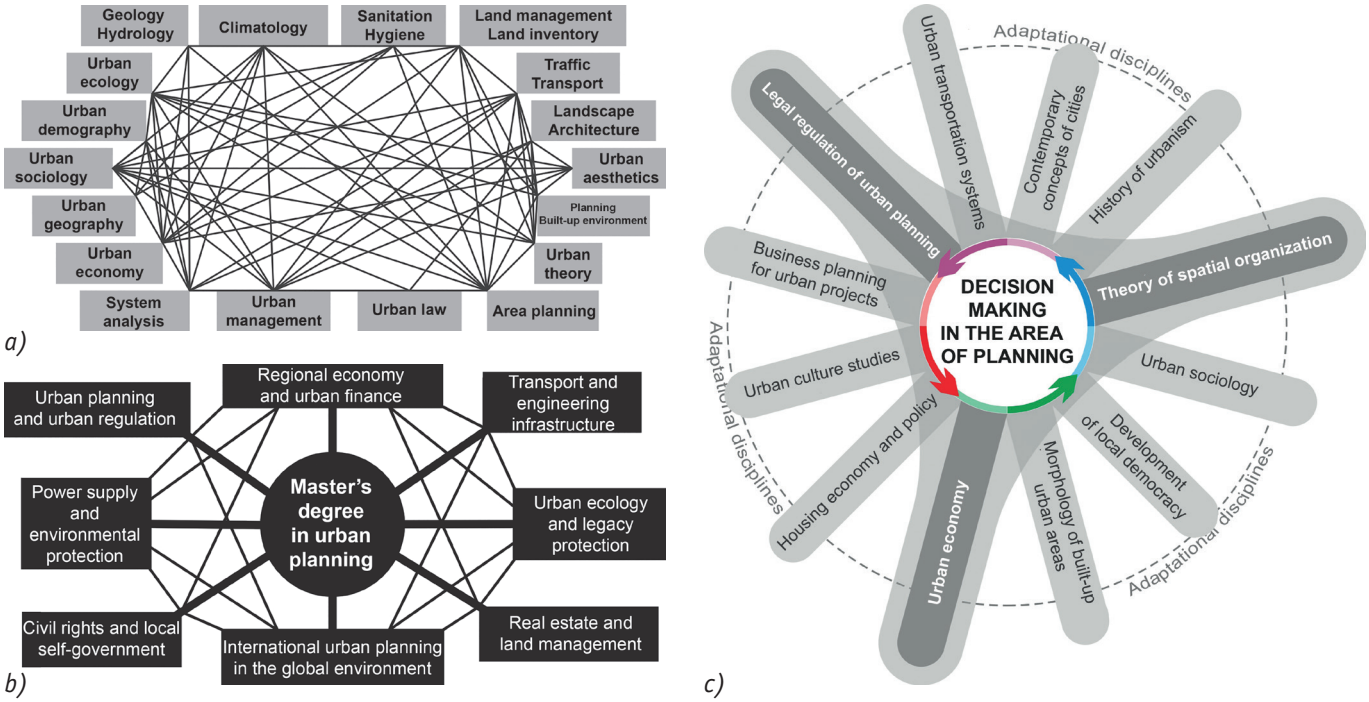

Figure 1. Different types of cross-disciplinary interactions in urban planning: a) "The multi-disciplinary" model developed by I.M. Smolyar, 2004. [15]; b) "the cross-disciplinary" model based on English-language training programmes for urban planners, 2006. [2] c) "The transdisciplinary" model of the training process at the Higher School of Economics, developed by A.A. Vysokovsky, 2011. [16]

urban planning, focused on the high adaptability in the context of unique individual urban planning objectives. Other Russian cities have also implemented several trans-disciplinary initiatives, including sessions of the International Baikal Winter University of Urban Planning [17] in Irkutsk (under the methodological supervision of M.G. Meerovich, Corresponding Member of RAACS) and research schools "Transformation of Urban Transportation and Utility Space" in St. Petersburg (developed by M.L. Petrovich).

Instruments employed to implement different models of cross-disciplinary interactions are of interest. "The multi-disciplinary" model employs ratios, calculation methodologies, and models borrowed from different disciplines and integrated into urban planning. In practice, they represented heterogeneous values [19], and their consolidation can only be implemented in the event of their limited number coupled with the highest qualification of an urban planner. [14] These values include dimensions of a built-up area, the density of the road system, the percentage of built-up areas, and the population density. [19] "The cross-disciplinary" model has added more complex qualitative characteristics to an urban planning facility. [19] For example, it has generated the FAR ratio (Floor Area Ratio) that represented a correlation between the floor area of a building and the land site it occupies (depending on the density of the road system) that serves as the instrument for the regulation of built-up areas, which means that the smaller the built-up area, the higher the building to be constructed in it [20], FSI (Floor Space Index), etc. These parameters enable us to compare the urban planning performance of different cities or districts of a city. The "trans-disciplinary" model stimulates the emergence of a space for communications, coupled with a universal "language" to be used by the experts to be comprehended by the population [19]. Trans-disciplinarity is oriented towards the attainment of integrated contextual target values, such as "safety", "regional identity", rather than the values which specific areas of knowledge find convenient. These integrated target values include the assessment of "the quality/standard of public relations" [19], the appeal of urban areas [19], the functional diversity [19], allocation of the responsibility for a car accident between road users [21], etc.

The evolution of cross-disciplinary interactions in urban planning is driven by the impact produced by sociopolitical processes on the pace of urbanization. [14; 18; 22] The dynamic complication of an urban planning facility, or an artificial habitat, extends the "radius" of its application, which has already overcome the boundaries of professional interests expressed by the experts and which has been generating an "open-end" area for the freely available urban planning knowledge. The understanding of the fact, that the urban planning activity (depending on its profile) can be considered as part of the "cross section" of a set of jointly developing disciplines, becomes an important constituent of contemporary urban planning. Different types of urban planning activities serve as an integrating factor that consolidates the attainments of disciplines and their communications.

The concept of the trans-disciplinary character of the urban planning knowledge is to be considered as the basis for further discussions and research projects which will clarify the extent of its application and for the assessment of its potential benefits and drawbacks.

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