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PRINCIPAL CONVERGENT MODELS OF METROPOLIS CREATIVE DEVELOPMENT IN EU AND UKRAINE**Chala V.S., PhD in Economics***E-mail: nika.orlovskaya@gmail.com**Pridneprov's'ka State Academy of Civil Engineering and Architecture*

The article concerns grounding of the consideration that creative function in its development crucially depends on such factors as modern creative industries complex, traditional creative industries complex and creative basis of metropolis economy. It is correspondingly proposed to accept methodological model of the three-level factors system of city mega-economic leadership and the hierarchical interrelation in which have been empirically proved in the thesis on example of EU metropolises. For these means the integrating evaluation method was introduced in form of metropolis creative development index (MCDI) comprised of nine indices referring three morphological levels of model. It is shown in the article that peculiarities of creative function development in EU metropolises are connected with one of three principal models – globalizing, expanding and accumulative. There also presented the results of European identification of the Ukrainian metropolises. Applying the same MCDI methodology to Ukraine's urban leaders enabled grounding further convergent EU models: globalizing model in Kyiv, Dnipropetrovs'k and Donetsk, correspondingly – expanding model for Lviv, Kharkiv and Odessa, and – accumulative model for Zaporiz'ja and Kriviy Rig

Keywords: metropolis, global city, urban hierarchy, metropolis creative development index, creative function, creative industries, EU, Ukraine

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БАЗОВІ МОДЕЛІ КОНВЕРГЕНЦІЇ КРЕАТИВНОГО РОЗВИТКУ МЕГАПОЛІСІВ В ЄС ТА УКРАЇНІ**Чала В.С., к.е.н.***E-mail: nika.orlovskaya@gmail.com**ДВНЗ «Придніпровська державна академія будівництва та архітектури»*

Стаття присвячена дослідженню зв'язку між інтелектуальною невиробничою складовою економічного розвитку, а саме креативною функцією, та мегаекономічним лідерством мегаполісів. Представлене обґрунтування основних елементів цієї функції та запропоновано трирівневу систему факторів креативного базису, традиційних креативних індустрій та новітніх креативних індустрій, які в сукупності пояснюють мегаекономічний феномен місцевого розвитку, а глобальну економічну систему — як ієрархічний каркас найбільш продуктивних та впливових мегаполісів світу. У статті з'ясовані особливості європейської урбанізаційної системи, доведено переважну міжнародну спеціалізацію мегаполісів ЄС на послугах, передусім на

створенні креативної продукції для інтернаціоналізованого ринку високо-професійних бізнес-послуг та інноваційного інформаційного контенту. Доведено зв'язок між рівнем розвиненості креативної функції та продуктивністю і глобальністю економіки мегаполісів ЄС. Здійснено європейську ідентифікацію найбільших міст України, запропоновано механізми та інструменти конвергентних моделей розвитку креативної функції мегаполісів України та ЄС

Ключові слова: індекс креативного розвитку мегаполісу, креативна функція, креативні індустрії, мегаполіс, глобальне місто, світова урбанізаційна ієрархія, ЄС, Україна

Actuality of the problem. Polarization of the world economy during last decades has strongly influenced structure and character of main metropolises functioning. Their economies have experienced dramatic changes, which resulted in transforming them from the world production centers into powerful cities with key specialization on services. At the same time TNCs and TNBs concentration in these metropolises and related to it agglomeration of other business activities transforms them into global cities, which direct world production flows. In these circumstances the development of national economics is closely related with their metropolises positioning in global urban hierarchy, which is determined by post industrial imperative. The most meaningfully above mentioned contrasts revealed themselves in European Union, regulative form of which is traced on mega-regional, national and local levels.

Analysis of the recent research. Theoretical groundings of local economy growth were broadly studied by V. Arthur, E. Glazer, V.S. Zanadvorov, P. Krugman, P. Lucas, K. Murphy, F. Fujita, M. Storper, M. Porter, P. Romer, J. Rotenberg, A. O'Sullivan, G. Saloner, F. Solow and others. Scientific problems related with metropolis global functions were the subject of multiple principle researches of L. Antonyuk, V. Babaev, V. Baburin, V. Biloshapka, O. Boyko-Boychyk, M. Castells, V. Chyzikov, O. Denisenko, J. Friedman, R. Florida, O. Galenko, J. Gilmour, I. Givotovs'ka, P. Hall, J. Howkins, D. Luk'yanenko, F. MacCan, P. Marcuse, Y. Panchenko, S. Sassen, A.J. Scott, S. Sidenko, N. Sluka, R.J. Sternberg, J. Short, Sh. Tacuno, P. Taylor, V. Vakulenko, T. Yamaguchi and many others. Still there is lack of empirical evidence proving direct relationship between productivity and creative function development of local economy. Moreover there is a rising actuality of improving and systematization of mechanisms and instruments for harmonized convergent development of metropolises, as forwards of EU and Ukrainian economy.

Thus **the aim** of presented article is to run a systematic research on theoretical grounding of metropolises' transformation process in European economy and its influence on the further development strategies for the biggest cities of Ukraine.

Statement of main results. Working on contemporary mega-economic leadership of cities, measured by well known P. Taylor's interlocking model index, led us to the scientific distinguishing of three main groups of factors, which are reflecting particular essential transformational features. So called *globalizing factors* group include concentration of TNC and TNB head-offices, strengthen of global cities autonomy, active cross-cultural interaction, dominating influence of mega-regional and global institutions, which are situated in city). The second group called by us *economic factors* comprises of significant reduction of production function, up building of creative industries, high dynamic of informational systems development, overconcentration of financial, innovative, investment and cultural recourses. *Gravitation factors* group is formed by such an important facts as high level of integration to the world transport systems, global absorption of intellect, postindustrial pattern of local economy development.

Further researches uncovered the historical approaches toward explanation of divergent economic leadership of cities. By this we strived to create a complex view on the phenomenon of metropolises becoming global cities. Besides grounding on multiple fundamental researches in this field [3], we proposed definition of *global city* – as a powerful metropolis, which plays the role of command-control center for distribution and redistribution of production factors in the world economy, the activity and structure of which are highly dynamic and permanent at the same time due to global strategies realization, resulting in industrial production reduction and contrary rise of non-material functions internationalization, especially of advanced producer services.

The selective analysis of evolutionary theories on mega-economic city leadership (table 1) persuasively testifies the growing role of dynamic agglomeration effects as a «spill-over» effects mostly in creative class thus highlighting the prominent role of metropolis creative function. Really, Wolff's «world capital management» function and S. Sassen – P.Taylor's advanced producer services are made by R.Florida's creative class of workers[9].

Table 1. Global city leadership theories classification (selective analysis)

Criteria of local economy growth in the works of principal scientists				
Static agglomeration effects	Export specialization effects	Dynamic agglomeration effects	Global economy servicing specialization	Creative class accumulation center
J.-H. von Thunen (модель «зон впливу міст») A. Weber (production scale effect) A. Marshall (industrial agglomeration) R. Vernon (localization effect) D.R. Vinning, B.J. Barry (rank-scale rule) W.J. Reilly (gravitation model) J.V. Henderson (congregation effect)	W. Christaller (central place theory) A. Losch (industrial theory of central place) H. Hoyt (city formative mono-function) A. Fisher (multi-functional theory) T. Yamaguchi (extended reproduction functions)	J. Jacobs (urbanization effect) R. Coase (transaction costs) K. Arrow, P. Romer (knowledge «spill-over» effect) F. Perroux (growth poles) D. Starett (spatial impossibility theory) M. Porter (innovational clusters theory) P. Krugman (center-periphery theory)	P. George, P. Derycke (frame theory) J. Friedman- G. Wolff (world capitals control theory) M. Castells (flows theory) S. Sassen (global city theory) P. Taylor (city network interlocking model) D. Bell (transport hubs theory)	A. Scott, A. Pratt (cultural economy theory) B.J. Pine, J. H. Gilmore (experience economy theory) Ch. Landry (creative city theory) J. Howkins (creative economy theory) R. Florida (creative class theory)

Source: made by author in [1]

Studying the wide range of creative economy terminology [1] enabled us to form own understanding of *metropolis creative function* – as a system function of discovering, commercialization and internationalization of individual original potential (intellect, skills, talents) as a specific production factor, which appears by creative industries intensive development in the local economy structure [2]. Principal methodological differentiation of creative function is the fact that original individual potential lies in social background and can not be that easily inherited by generations unlike traditional production factors as natural resources for example. Second, is the widely agreed fact that creativity discovers itself when «it's searched», thus it got under subjective will. Third, once it's got impulse of growth it shows constant growth since creative class is international by its mind set and is inclined to communicate with creative class, so show tendency to increase its presence in local economy.

Considering these important theoretical givens we have set ambitious goal to explore where does metropolis creative function take roots and is boosted, knowing that it somehow directly influences metropolis integration into global

city network and results in higher productivity for its economy. Even further to measure not solely the manifestations of creativity in global cities, but to consider the creative function potential at all of the formation stages – so to shift from metropolis creative function to metropolis creative development process measuring. In line with this rethinking we have examined most the principal researches on city creative function measuring. First of all, significant part of them does not give a deep sight on local economy creativity sources, just measures it's influence on productivity. Secondly, most of studies on this topic were held in frames of separate countries – not the group of countries. Third, criteria base, meaning indicators of city creative development, differ in a great manner from research to research, so that it is hard to talk about some principal system of estimation, which can be applied to international analysis of global cities. Forth, there is still a lack of empirical evidence of interconnection between mega-economic leadership and creative development level of metropolises.

Trying to contribute into overcoming the first problem, we have agreed the most systematic approach to city creative development of P. Cohender [5], better known as three-level anatomy model of creativity revealing in local economy. We have adopted it in line with global economic leadership of cities and scientific category of «development» as a consistent, directed and irreversible changes [1]. To our conviction on the theoretical level the consistency of metropolis creative development depends on first factor – *creative basis (CB)*, i.e. availability of conditions for the accumulation of international creative class in particular city, its cohesion, interconnection and as a result generation of original ideas. Next factors logically result from CB and being called *traditional creative complex (TCC)* and *modern creative complex (MCC)* are represented by two types of industries, in which the process ideas commercialization is directly held, transforming them into market products and services. The principal difference between them is the fact that the factor of TCC (cultural industries, science, producer services) is not a sufficient precondition just by itself for metropolis to become a global city. It just plays the role of directing the creative development into highly productive and dynamic spheres of metropolis economy. This is the MCC (creation of content for informational products and global capitals management by TNC and TNB) which provides irreversibility of metropolis creative development by cycling in day-to-day international activities multiple flows of international creative class, information and capitals. The resulting model of metropolis creative development we have proposed can be presented on the graph 1.

Development characteristics		Creative development factors	Metropolis global specialization	Metropolis global function	Key creative development indicators
Metropolis creative development as:	Irreversible changes (creative class realization in modern creative industries)	Modern creative complex factor (MCC)	Financial flows center	Global capitals management center	1) number of TNC and TNB head-offices 2) proportion of employment in sphere of content production for informational products
			Informational flows center		
	Directed changes (creative class realization in traditional creative industries)	Traditional creative complex factor (TCC)	Advanced business services center	Fourth – sector services center	1) proportion of employment in financial and business services
			Scientific center	Capitalization on science center	2) Proportion of employment in culture and leisure
			Cultural center	Capitalization on culture center	3) Proportion of employment in R&D
	Consistent changes (creative class and original ideas formation as a condition for creative industries development)	Creative basis factor (CB)	Cross-culture creative class center (creative infrastructure center)	Platform for knowledge spill-over (dynamic agglomeration effect)	1) % working age population qualified ISCED 5-6 2) number of active NGOs 3) % of foreign-born in local population 4) Multinational transport accessibility 5) % of city with municipal transport accessibility 6) % of households with a reach to Internet 7) number of patent applications per capita

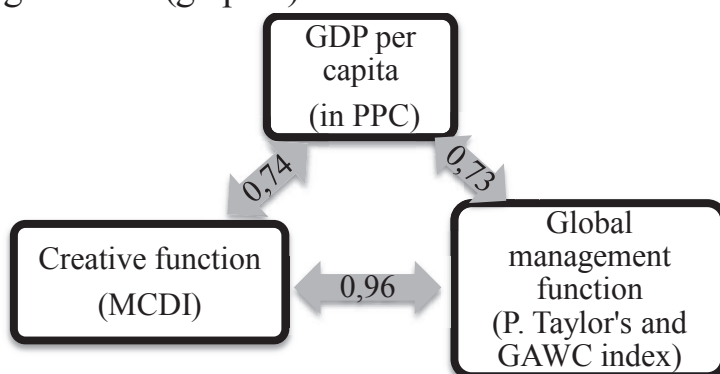
Graph 1. Principal model of metropolis creative development factors and indicators interconnection

Source: developed by author in [1]

Obviously whole model working as one mechanism with it's semantically assumed internal connections is seen by us to have direct influence on metropolis productivity and the place in global urban hierarchy. However we felt the lack of empirical evidence. Accordingly striving to overcome the second and the forth above mentioned problems, we have chosen the European metropolises as a base for our researches. Causes of this choose is relatively rich empirical data base, being collected by EU initiative Urban Audit, and naturally the fact that Europe is home for significant part (around 40 %) of global cities indicated by P. Taylor's ranking.

Numerous analytic and scientific researches have resulted in constantly multiplying European Union official reports and actions devoted to the crucial role of local economies and unlocking of creative industries potential like arts, architecture, media, heritage, audiovisuals, knowledge intensive business services, advertising, engineering, consultancy, and so on. According to official estimates creative industries make up to 4.5 % of European Union's GDP and occupy 3% of European Union's total employment. Moreover during the period of 2000-2007 creative industries have been showing average 3.5% annual employment growth rate comparing to 2% in China and USA, and 1% in overall European Union economy.

Continuing relatively scarce scientific research on the impact of creative function improvement upon productivity of local economy we have enlarged empiric evidence to 31 principle metropolises (out of 52 indicated by EU because of statistics availability) including 13 global cities and proved the strong connection through out EU (graph 2).



Graph 2. Correlations system between mega-economic leadership, productivity and creative development of EU global cities

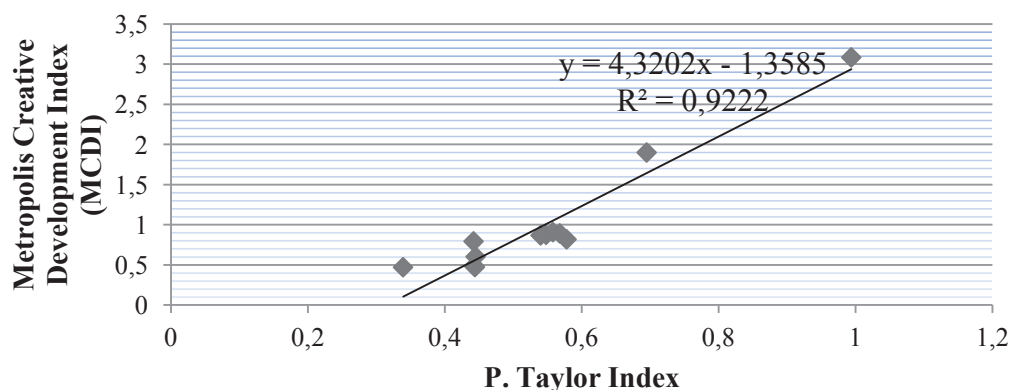
Source: developed by author using [1;12; 13]

Methodologically it have become possible due to authorial *metropolis creative development index* [1] introduction (or so called *MCDI*) (formula 1) comprising of 9 indicators with referring weighting coefficients, correspondingly referring to three hypothetic morphological levels of creative economy model: creative basis, traditional creative industries complex and modern creative industries complex.

$$MCDI_i = \sum \frac{(k_j * UMCDI_{ij})}{m} \quad (1)$$

where $UMCDI_{ij}$ – unitary index of i – metropolis, calculated for j – factor (formula 2);

k_j – j -indicator weighting coefficient for overall $MCDI_i$ calculation; defined by expert estimations method; $\sum k_j = 1$.



Graph 3. Results of pair correlation between mega-economic leadership and creative development level of EU global cities

Source: developed by author[1;12]

$$UMCDI_{ij} = \frac{S_{ij}}{AS_{ij}}, \quad i = 1 - n, j = 1 - m, \quad (2)$$

where S_{ij} – value of j - indicator for i -metropolis;

AS_{ij} – average value of j -indicator for the whole group of EU global cities.

Table 2. System of metropolis creative development indicators adapted to EU available statistical database

Indicator j	The name of indicator	Weight, %	The morphological element of creative development
Si1	Number of local companies that produce content for informational society products	30	Modern creative complex
Si2	Number of companies with headquarters in city quoted on stock market	20	
Si3	Proportion of employment in financial and business services (%)	20	Traditional creative complex
Si4	Researchers as percentage of persons employed, all sectors (%)	10	
Si5	Proportion of employment in culture and leisure (%)	10	
Si6	Multinational accessibility (EU-27=100)	2,5	Creative basis
Si7	Proportion of working age population qualified ISCED 5-6 (%)	2,5	
Si8	Non-EU national as a percentage of total population (%)	2,5	
Si9	Participation in various types of socially based organizations during the year (%)	2,5	

Source: developed by author[8;13]

Interpreting the results (table 3) of MCDI calculation enabled us to improve standard classification and divide all EU metropolises into three groups: current, future and potential global cities of EU (table 4).

Table 3. Analysis of correlation between GDP per capita and MCDI for all EU principle metropolises (extracting global cities)

EU metropolises group	Average MCDI	Metropolises' names
Current global cities	1,015	Amsterdam, Brussels, Budapest, Warsaw, Dublin, London, Madrid, Milan, Munich, Paris, Stockholm, Frankfurt-am-Main
Future global cities	1,002	Prague, Rome, Ljubljana, Luxembourg, Bratislava, Wien
Potential global cities	0,516	Helsinki, Berlin, Hamburg, Stuttgart, Cologne, Lisbon, Lyon, Dusseldorf, Nurnberg, Hannover, Bremen, Tallinn, Essen

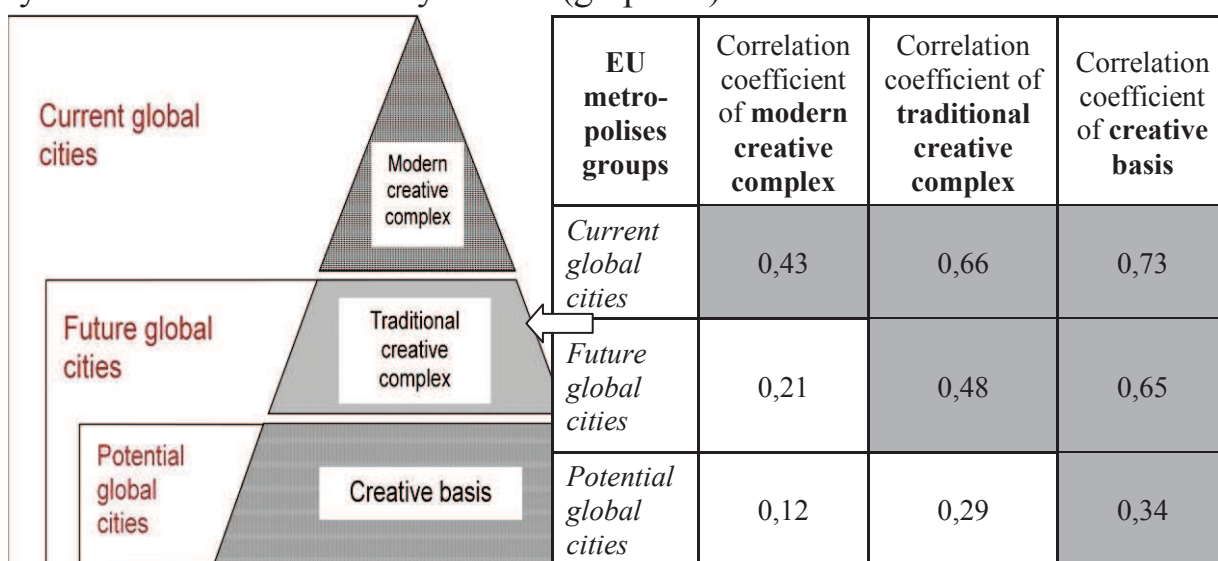
Source: developed by author in [1] using [11]

Table 4. Classification of EU metropolises due to MCDI values and correlation with GDP

Table 1. Classification of EU metropolises and its MCDI values and correlation with GDP								
Group	№	Metropolis name	GDP per capita	MCDI	Correlation coefficient			
EU principle metropolises	EU global cities	1	Amsterdam	44800	0,876207	0,736	0,583	
		2	Brussels	51982	0,868667			
		3	Budapest	27900	0,471854			
		4	Warsaw	30620	0,488169			
		5	Dublin	44000	0,474276			
		6	London	72500	3,085641			
		7	Madrid	28700	0,819533			
		8	Milan	36200	0,908866			
		9	Munich	47727	0,603645			
		10	Paris	65300	1,900986			
		11	Stockholm	37200	0,7944			
		12	Frankfurt-am-Main	66500	0,893365			
	EU secondary metropolises	13	Berlin	21095	0,63393	0,71		0,109
		14	Rome	31200	1,023965			
		15	Prague	33400	1,42662			
		16	Ljubljana	26800	0,990655			
		17	Luxembourg	54900	0,988057			
		18	Bratislava	29780	0,813551			
		19	Wien	37700	0,772133			
		20	Bremen	18427	0,412219	0,31		
		21	Hamburg	40688	0,61577			
		22	Hannover	37495	0,442835			
		23	Dusseldorf	57353	0,495306			
		24	Essen	29941	0,364436			
		25	Cologne	36392	0,571626			
		26	Lyon	29600	0,498373			
		27	Lisbon	26900	0,519222			
		28	Nurnberg	38132	0,461483			
		29	Tallinn	21097	0,408659			
		30	Helsinki	41100	0,712497			
		31	Stuttgart	51138	0,574309			

Source: developed by author in [1] using [11;12]

The further decomposition and analysis of structural MCDI indicators (MCC, TCC, CB) (graph 4b) has shown even more interesting results. In all three groups the creative basis exerts the most tight connection with local productivity, while only in future and current global cities the traditional creative complex make significant impact, and exclusively in current global cities the modern creative complex is of relatively great effect on economic growth. This practically proves the hypothesis of hierarchical connection in system of creative economy factors (graph 4a).



a) illustrative form

b) numeric form

Graph 4. Hierarchical model of creative factors impact in different types of EU metropolises

Source: developed by author in [2]

Investigation of creative strategies peculiarities in all of three groups have allowed us to determinate corresponding metropolis creative mode.

Due to globalizing model current global cities are experiencing the forcing of local economy internationalization through attracting TNCs and TNBs headquarters, especially in knowledge intensive business-services sector. As well as it is usually stimulated the global specialization in one of particular informational contenting industries, for instance telecommunication, computerization, publishing, polygraph, multiplication, video and other record reproduction, broadcasting, newsmaking and recreational contenting. The model occurs to be quite independent from government, meanwhile the private-governmental partnerships, joint special funds and long-term programs creation have shown its efficiency in EU metropolises, the same is fare to the introduction of tax privileges and subsidies, the launch of international cooperative activities and partial financing of international projects.

Table 5. Three principal models of managing metropolis creative development in EU

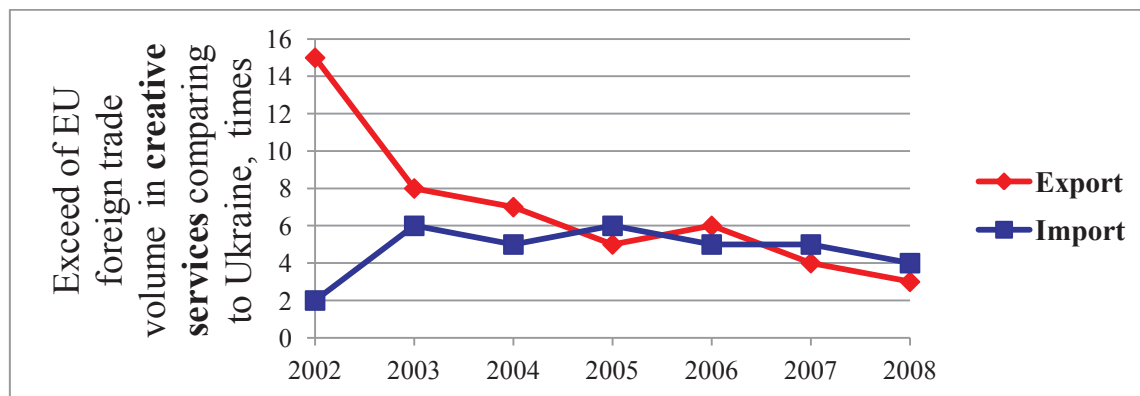
Model of creative metropolis development in EU	The morphological level of creative development in focus	The scale of approach	Organizational level	EU metropolises' group
Globalizing	Modern creative complex	Industry	Metropolis	Current global cities
Expansive	Traditional creative complex	Sector	Metropolis-region	Future global cities
Accumulative	Creative basis	Cluster	Government – region-metropolis	Potential global cities

Source: developed by author in [1] using [6; 7;10]

Expansive model has rather different peculiar features. Future global cities of EU are seen as typical acceptors of this particular model. Quite often they arrange unique cultural, natural and historical heritage. Internal market of traditional creative industries, supply and demand for creative product, is usually strongly supported by EU Regional Policy initiatives in here. Strengthening of cultural diversity, traditional identification and overall originality with corresponding transformations in local economy structure are seen as leitmotif of this model.

Accumulative model is aimed to increase the presence of creative production factor – to multiply individual original potential of local citizens with a help of migration, social self-identification, self-organization and broadening common activities of different groups of metropolis population. This model is characteristic for EU potential global cities, which arrange relatively scarce cultural heritage. They aim to build a strong metropolis brand, acknowledged abroad, using public places original planning and even rebuilding entire metropolis regions or quarters into a new and creative units «with a great appreciation for originality, new approaches in regarding and making things»[9]. Besides there are lots of efforts put influencing social life improvement and building the platform for periodic cultural events organization. This model often demands for large-scale and cost-intensive rebuilding projects, this is why it is usually quite dependent on local – regional – national administration alignment and cooperation, including common practice of private-public partnership concerning funding.

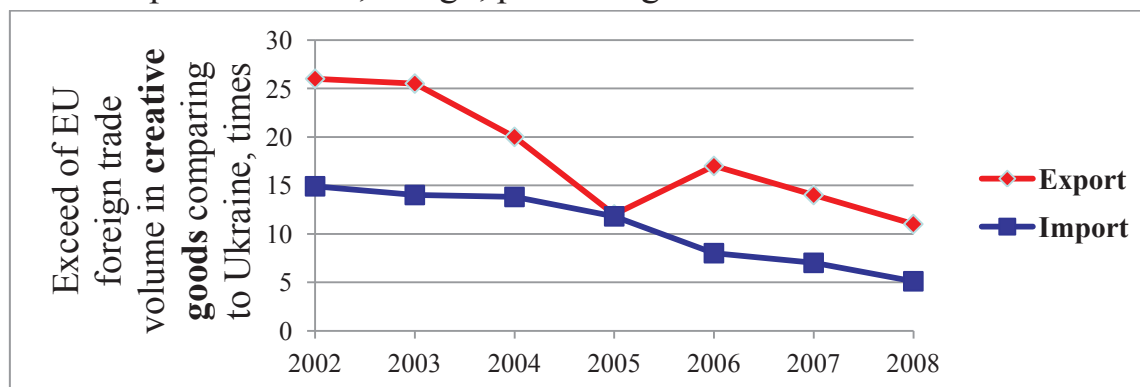
Talking about Ukraine, the same sector plays prominent role in Ukraine: in 2008 creative industries amounted around 3 % of GDP which is equal to 77 % of building industry and 30% of agricultural sector impact [14]. Our own investigations of related UNCTAD data show that Ukrainian foreign trade volume has grown 15 times since 2002, reducing the gap to the corresponding indicators of EU (graph 5, 6).



Graph 5. Convergent dynamics of EU-Ukraine cohesion concerning volumes of creative services trade, 2002-2008

Source: developed by author using [14]

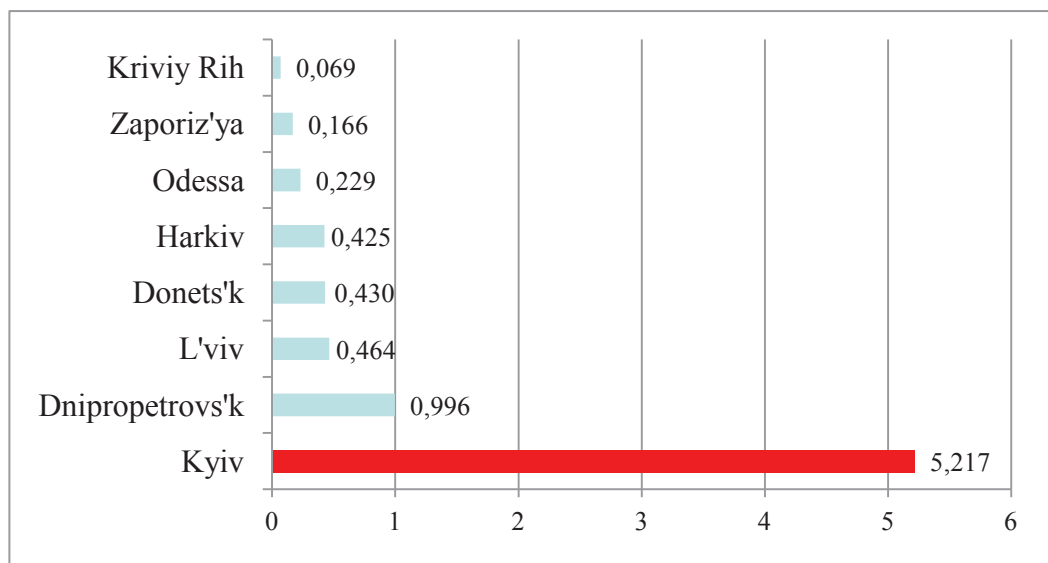
It reached 0.5 % of corresponding EU export volume, 0.7 % – of import volume. Ukraine over performs all Baltic countries, Bulgaria and generally demonstrates the level of Slovenia and Greece. The main creative export positions of Ukraine are advertising and marketing services, research and development, IT, architectural, engineering and technological services. Among other transition economies Ukraine is the absolute leader of export in particular spheres of arts, design, publishing.



Graph 6. Convergent dynamics of EU-Ukraine cohesion concerning volumes of creative products trade, 2002-2008

Source: developed by author using [14]

The same methodology of research has been adapted to available statistics and applied to Ukrainian metropolises. It reveals Kyiv as the absolute leader in creative economy development (graph 7). Kyiv's modern creative complex is 18 times more developed, the traditional complex is 12 times more developed and its creative basis is 5 times over performing the other 7 Ukrainian metropolises. All eight Ukrainian metropolises were defined according to set EU criteria [6].



Graph 7. Results of MCDI calculation for Ukrainian metropolises, 2012

Source: developed by author in [1] using [4]

Theoretical basis of object and subject analysis, as well EU metropolis creative function analysis, which have been represented above, gave us the legitimacy to make a conclusion. The simultaneously high development level of all three factors (CB, TCC, MCC) in metropolis creative development model, or just two first ones (CB and TCC) corresponds the best way with further choose of globalizing model for mega-economic growth. In Ukraine, these metropolises are Kyiv, Dnipropetrovs'k and Donets'k. Contrary, the lack of sufficient development level of the second factor of metropolis creative development model – traditional creative complex of local economy stipulates orientation onto expansive model, even though the first factor – creative basis – is highly cultivated. These types of metropolises in Ukraine are L'viv, Harkiv and Odessa [1].

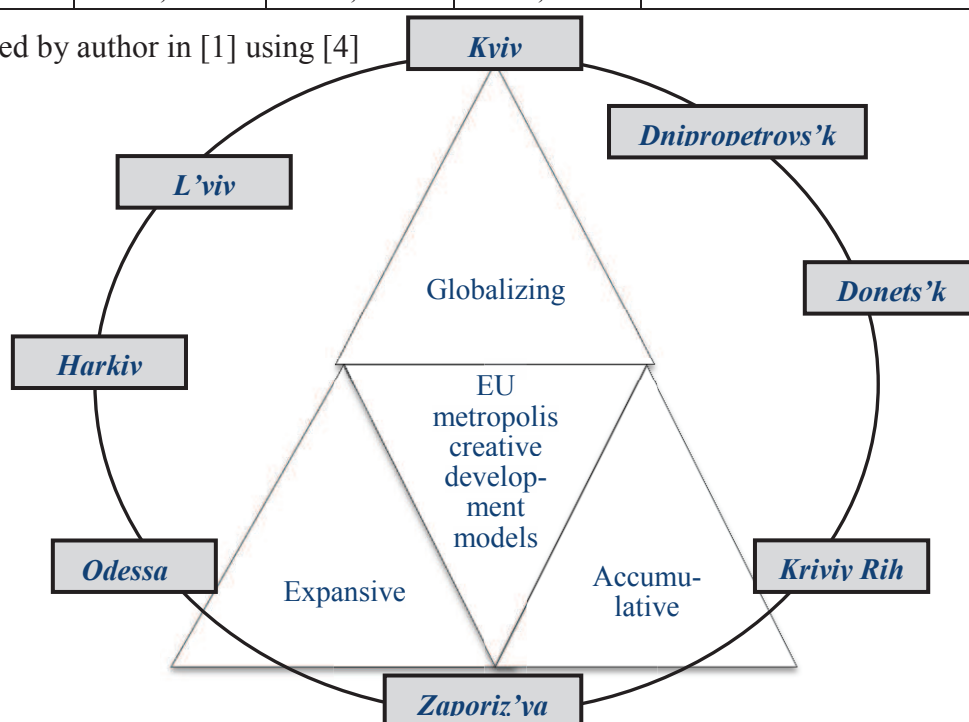
Metropolises, which have relatively less developed first factor of creative development – creative basis – are seen as those that have not boosted yet demand for local creative products to the sufficient level. That is why their further convergent development can be the most effective in terms of accumulative metropolis creative development model.

Logical results gained in process of analysis of perspective convergent models for Ukrainian metropolises can be graphically illustrated by the graph 8. Due to their structural MCDI indicators being closer of farther to biggest values (table 6) and above mentioned logical framework all Ukrainian metropolises were positioned relating three principal creative development models (graph 8).

Table 6. Comparative analysis of structural MCDI indicators development in Ukrainian metropolises and relative analysis of suitable EU models

Ukrainian Metropolis	Creative basis (1)	Traditional creative basis (2)	Modern creative complex (3)	Suitable creative development convergent model
Kyiv	4,77	11,9	17,9	Globalizing
Dnipropetrovs'k	1,15	3,82	1,69	Globalizing
L'viv	1,12	0,30	2,11	Expansive
Donets'k	1,28	1,19	0,88	Globalizing
Harkiv	1,42	0,81	1,19	Expansive
Odessa	1,17	0,35	0,57	Expansive
Zaporiz'ya	0,61	0,38	0,38	Accumulative
Kriviy Rih	0,24	0,15	0,18	Accumulative

Source: developed by author in [1] using [4]

**Graph 8.** Illustrative framework of Ukrainian metropolises positioning regarding the system of EU metropolis creative development models

Source: developed by author in [1]

Conclusions. Intensification of localization processes and strengthening of metropolises' role in global economy for Ukrainian cities consisted in time with a deep structural crisis of transformational period, remarkable decline of urban population. This prevented them from fully using benefits of economic globalization. Nonetheless it is observed the EU - Ukraine convergent dynamics of creative services and products foreign trade during recent years. Wherein there are still lots of principle differences in metropolis development – significant technological lagging behind of local economies, overweighting of immigrating processes by emigrating, mismatching of international transport connections requirements. Only Kyiv can be regarded as global city among other metropolises in Ukraine on the basis of our creative development index estimations. AS a result of systematic analysis of

creative function convergent development in Ukrainian metropolises we were empirically enabled to propose globalizing model for Kyiv, Dnipropetrovs'k and Donetsk; expansive model –for L'viv, Harkiv and Odessa; accumulative – for Zaporiz'ya and Kriviy Rih.

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