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Assessment of the success of local development projects based on data from social networks

Abstract: The complexity of the goals of regional development and the dynamics of social changes have placed on the agenda the task of expanding the composition of indicators and the set of tools used for analysis. It is necessary to overcome the excessive formalization of regional planning processes. This article provides an overview of publications on the use of data from social networks to analyze the processes important for the development of regions. This review aims to analyze the possibility of using these new tools in the development and monitoring of regional and local development programs. Publications were selected on the basis that they cover the main aspects of such development programs. The main directions for the application of data from social networks in territorial analytics are identified, as well as opportunities for involving members of the public in management processes. New sources of data have made it possible to enrich traditional tools used for the analysis and planning of territorial development. These data can be successfully used to understand the stratification of local communities and identify social problems. Identification of accessibility models and spatio-temporal models of human behavior allows architects and planners to understand how people move within an area, so as to assess the convenience of streets, urban spaces, public transport routes, and routes for pedestrians. The fact that data in social networks are constantly accumulating means that these data sources may be used to monitor and evaluate the success of local and regional socio-economic development projects. Most people use social networks, and this fact facilitates the direct participation of a large number of residents in the process of collecting and updating various data, as well as in development projects.

Keywords: local development, information and communications technology

JEL: O29, D83

Introduction

The most important goal of regional and local development is the improvement of the level and quality of life of the population. In the process of shaping the policy of regional development, elaboration of development programs and

projects uses official statistics [Zarova, 2013]. For the purpose of monitoring socio-economic processes in the regions and assessing the effectiveness of government activities, officially approved lists of indicators are used. Socio-economic indicators have long been a tool for assessing and comparing the level of development of countries and regions, although critics believe that, from a technical point of view, the set of statistics serves as a metaphor for phenomena that can't be directly measured [Cobb, Rixfrod, 1998, p. 32]. In this case, the numerical form of the indicator does not always indicate a high quality of this tool.

Formalization of procedures for assessing the level of development is necessary when creating a single system of strategic planning for the whole country. Such a system is created in the Russian Federation after the adoption in 2014 of the federal law "On Strategic Planning in the Russian Federation". The Ministry of Economic Development has developed recommendations on the structure and content of strategic plans of the subjects of the Russian Federation. At the same time, the use of these guidelines as a template may lead to a decrease in the effectiveness of social and economic policies at the regional level, ignoring the important problems of the development of a particular territory [Kosevich, 2016, p. 12].

Significant differentiation of the development of the regions is confirmed by the conclusions obtained in the course of work on the preparation of the Strategy for Spatial Development of Russia. It was found that labor productivity in enterprises and organizations operating in agglomerations depends on the number of people living within an hour and a half from the center of the agglomeration. The greatest elasticity is observed for agglomerations with a population of 1.5 to 5 million people. The growth of labor productivity is present both in industry and in the service sector. Agglomerations attract migration flows from medium and small settlements. At the same time, the number of rural settlements in Russia in the 21st century is annually diminishing by approximately 20,000, mainly due to the lack of residents. The population of agglomerations in 2015 reached 85 million people, that is 58% of Russia's population. Studies and surveys of the population show that among the causes of migration in recent years, the importance of the comfort factor of living environment is growing. The pace of social and economic development varies greatly between regions and within them. More than 50% of the population lives outside the zone of economic growth [Korotaev, 2016].

An important role for the success of the process of forming a regional policy, as well as for ensuring that the measures taken and projected are consistent with the real problems of the territory, is the understanding of the structure of regional and local communities. One of the stages in the elaboration of regional development programs is the identification of key stakeholders interested in the development of the territory. In order to implement the principle of public participation, the traditional division of the local community into rep-

resentatives of government, business, and the non-profit sector is not enough. Understanding the structure of the community is important to clearly define which social groups will be the beneficiaries of individual development projects. The development of new types of entrepreneurship, the share economy, social networks leads to a change in the structure of the community and the interaction between its members. The high rate of social change in Russia is determined both by innovative factors and by intensive migration processes. The migration situation in Russia in recent years has become a relatively independent factor that deepens the disparities in economic and social development in individual regions and the country as a whole [Kosevich, 2016, p. 113]. A similar situation is typical for many regions of Europe.

This article provides an overview of publications on the use of data from social network for the analysis and identification of social structures of the local community, patterns of behavior of residents and movement in space, the ranking of urban spaces in terms of attractiveness and determining how urban spaces and objects are used. In view of the above considerations, this research has a dual purpose: first, to analyze publications on the application of these social networks and other Internet sources for the purposes of analyzing the social processes of the territory; and, secondly, to determine the possibility of using new tools in the process of developing and monitoring regional and local development programs.

Theoretical background

The study of social systems has always been a field of activity for sociologists. Traditionally used tools are associated with field research, and long-term observation requires considerable time and money. Since the structure of the questionnaires, the methods of forming a sample, and the methods for processing the data obtained are adapted for specific purposes, the results of various regional studies may not be comparable. The high dynamics of social change requires the improvement of social research tools and the use of new open data sources.

For several decades, the Dutch urbanist Jan Gehl has been developing his method of studying the social life of the city. Research is carried out by manual collection of information, which allows observers to directly gain knowledge about how the urban space is used. It is necessary to strengthen the social function of urban space as a meeting place, which contributes to ensuring social stability and the formation of an open democratic society [Gehl, 2010]. Gehl suggests the development of living, safe, healthy and sustainable cities as key goals. One of the objectives of sustainable development is to increase the attractiveness of the territory for the population and visitors. Attractiveness, in turn, is largely determined by the degree of activity of residents and

the variety of activities in the urban space. Based on Gehl's methodology in different cities on all continents, dozens of projects have been developed and implemented to bring life in urban areas, revitalize "the visible life of cities".

The complexity of organizing such observations makes it difficult to apply this approach throughout the country. The need to develop new low-cost tools for studying the social activity of local communities has become a challenge for urbanists, sociologists, architects. Over the past years, the number of research projects is growing, in which time and costs of preparing information are significantly reduced through the use of data from social networks. The first projects of this kind were carried out in megacities, where users of social networks create large amounts of data. It is of interest to analyze the feasibility of applying these approaches and tools to identify social, economic and environmental problems, as well as to assess the success of regional and local development projects. The necessary condition is the formation of new mechanisms for taking into account the opinion of the population and involving it in the management of the territory.

Technological achievements in the field of communications and information technologies have created new models of recreational and social activities that replaced those forms of activity that occurred spontaneously in the urban public space. The physical configuration of modern cities depends heavily on new information and communication technologies [Martí, Serrano-Estrada, Nolasco-Cirugeda, 2017]. The data of social networks are used to study social processes in the city, analyze mobility patterns, the ways and intensity of use of urban spaces by residents, and involve them in spatial planning and management.

Methods

A number of publications, describing the results of research on the feasibility of using of data from social networks to analyze different aspects of life in cities and regions, have been selected from the open sources. The purpose of the present publication is not so much to review the maximum number of such studies, but rather to identify works aimed at various aspects of regional and local development. Evaluation of the success of socio-economic development programs of the territory assumes consideration of such aspects as the social structure of the local community, spatial organization, including patterns of mobility, the most attractive public spaces, and spaces that need to be revitalized, and the participation of residents in various development projects. These aspects determined the criteria for selecting articles for consideration. An analysis of the content and conclusions of the researchers was conducted to determine the relevance of the results to our goals. This made it possible to determine the list of tasks that were put in the studies, the data

sources used and the methods for their processing. Discussion of the results was conducted with the aim of assessing the applicability of data from social networks both for solving traditional problems of urban and regional analytics, and for identifying new aspects and topics.

Results

On the example of Amsterdam, an analysis was made of how people represent the city in social networks, and how these images influence the ways of using urban spaces and objects [Boy, Uitermark, 2017]. The study was based on in-depth interviews, as well as over 400,000 geotagged posts from Instagram. Authorities often use their resources to ensure that the city and region are represented in media in accordance with specific tasks. For example, to promote the image of a successful, attractive territory. Since power elites do not have control over the content of social networks, the ways in which a city can be represented in them can differ significantly from those in traditional media. The authors of the study wanted to test the hypothesis about whether the spread of social media really leads to horizontal networks with significant critical potential. The results of the analysis revealed a combination of factors influencing which images of the city are posted by representatives of different social groups. Users are keenly aware of the selectivity of images, as a result of which Instagram represents the image of a city that is sanitized and almost devoid of negative [Boy, Uitermark, 2017]. A similar study was carried out in St. Petersburg (Russia) [Rykov in al., 2016]. It was aiming to identify sustainable models that affect how people use the city and how they depict it in social networks, and also analyze the social organization of the city. In contrast to the research in Amsterdam, new methods of image analysis from Instagram were applied in this work. Image recognition tools were used along with geospatial analysis to study the spatial organization of semantic domains, social networking sites being created in the urban space.

Numerous publications are devoted to research that helps develop programs for the revitalization of cities, including the development of transportation system. The Finnish city of Turku has become a platform for studying the possibilities of applying data from social networks for urban and transport planning, and as a tool for developing a policy for the development of the territory [Cerrone, Pau, Lehtovuori, 2015]. During the project in Turku, the approaches previously tested in megacities were rethought. The difference in the scale of the city influenced the fact that Twitter and Foursquare used by other researchers could not be the main sources of information. In Turku there were not enough regular users of these applications, which could create a sufficient amount of data for analysis. The Instagram data were the only data set that became the basis for studying the space-time templates, since it

contains a large number of users and allows the use of data collected within one year. On the other hand, Instagram is only a part of people's lives, only showing those moments that make them take pictures. The authors view this as an advantage, since the photographs are largely related to space, time and how people interact with the city and with each other. Researchers analyzed the type of users, the meaning of captions added to photos, expressed emotions, visual content of images. The opportunity to see the city through the eyes of residents and visitors of the city gives new information about the meanings that people attach to urban spaces. Instagram photos provide an opportunity to see the "sense of the place" from the point of view of people. This, in turn, gives an understanding of whether projects are needed to revitalize this place, and in what direction it is worthwhile to make changes from a social point of view.

First of all, the authors were interested in the current spatio-temporal dynamics in the city center, which could be used to analyze the possibilities for further development of the center. In the course of the study, spatio-temporal models were constructed that provided quantitative estimates for events that gather people in certain areas of the urban space, as well as the range of interests, habits and attitudes of the local population – in other words, feel the pulse of the city [Cerrone, Pau, Lehtovuori, 2015]. Activity models were identified by mapping various types of use of urban facilities that can attract a certain type of human activity. The focus was on combinations of uses at certain times. In other words, essentially, they ran the analysis, which is usually performed by direct observation in the Gehl's technique. Based on the hashtag, the degree of success of individual cultural events was analyzed, which caused great activity in Instagram, accompanied by positive emotions. Analysis of photographs of various public spaces made it possible to reveal the degree of their attractiveness. Gehl's conclusion was confirmed that the enthusiasm for architects by the functional approach leads to the fact that even the central squares and streets cannot be viewed by people as an attractive background for photographs. This confirms the need for activities to revitalize such spaces.

A study of the existing models of mobility using the example of an average large city was carried out in the city of Concepción (Chile) [Salas-Olmedo, Rojas-Quezada, 2016]. The results of the study were verified by local experts and confirmed the basic models of mobility with respect to spaces of social interaction, such as shopping centers, recreation areas, parks, etc. As the data the messages in Twitter were used, the place of creation of which had a binding to the map.

In terms of identifying the tools based on the use of social networking data, a study of Mushrooms' street in Alicante, Spain, is of great interest. Thus the basic attention was given to so-called social use of street and its public image [Lazzarini, López Baeza, 2016]. In the framework of the project to

increase the attractiveness of the street in 2013, images of mushrooms were installed along it. The study was conducted both through the study of images in Instagram, and by conducting surveys of passers-by. Analysis of the content of hashtags, assigned by users to their photos, revealed a gradual change in attitude towards the reconstruction project. Photos, dated close to 2013, had more negative hashtags. As we approach 2015, the hashtags to photos from the Mushrooms' street have turned into positive ones. This trend was confirmed by interviewing people. Another aspect concerns the wider impact of the intervention in the face of the street. Over time, Mushrooms' street became part of Alicante's identity. This fact is noted both in field studies, and in the analysis of data from Instagram. Such conclusions, as a rule, can be based only on long-term observations. Thus, field studies have confirmed the possibility of using Instagram data as a tool for assessing users' perception of urban transformations. The authors also conclude that Instagram has the potential to be used as a new tool that makes it possible to give sense and meaning to projects to revitalize cities. Such projects should respond to how users read, describe and interpret the urban environment.

A study on public areas located in the province of Alicante, Spain, proposes a methodology for determining successful areas and studying their location [Martí, Serrano-Estrada, Nolasco-Cirugeda, 2017]. The authors raise the question of why some places are socially more successful than others. The answer to this question can lead to an understanding of the social dynamics of the local population and the reasons for preferring certain places over others. These preferences have traditionally been studied through quantitative and qualitative field studies. The analysis of the success of the areas is based on data from social networks, and the findings are verified on the basis of specific bibliographic references. The results show that social networks are able to reflect social interaction occurring in urban public places, and to establish user preferences for some public spaces over others in the city. In particular, the identification of areas and their ranking in accordance with the preferences of users of social networks is not only possible, but they have been recognized as quite reliable.

Another study, carried out in Copenhagen (Denmark) is focused on the methods of involving citizens and other stakeholders in the planning and management of the city. The purpose of the study was to analyze the possibilities of using the social media resource "Volunteer Geographic Information" (VGI) as a tool for providing transparent, democratic governance processes of interest to planners, citizens, politicians and scientists [Guerrero at al., 2016]. Through the hashtag #sharingcph created by the city of Copenhagen in 2014, the VGI data, consisting of georeferenced images, was collected from Instagram, classified according to their content and analyzed. The results of the study confirm the great potential of using social networks as a means of involving residents in the management of the territory. At the same time, the

authors state the necessity of additional studies to overcome existing technical and ethical limitations.

A number of studies were aimed at creating operational prototypes of various services for city management on the Internet. For example, the SocialGlass web platform for developer approval supports the analysis, integration and visualization of large-scale and heterogeneous urban data to support planning and decision-making processes in cities. The SocialGlass system is based on the processing and integration of data from various sources [Psyllidis at al., 2015]. These sources include social networks (Twitter, Instagram, Foursquare), publicly available municipal data and resources from knowledge repositories. Thanks to the application of various methods for processing heterogeneous information, the SocialGlass web platform allows you to display demographic information, models of people's movement, traffic density on the map, as well as opinions and preferences of citizens and visitors about specific places in the city.

Discussion

The majority of the researches cited above were published in the last five years. The data of social networks were first used to analyze various aspects of the life of megacities (New York, San Francisco and Tokyo). As a result of various studies, the possibility of using social networking data for small and medium-sized cities was confirmed. The described studies were aimed primarily at finding out the possibilities that the use of these data for urban and transport planners, sociologists, and government officials provides. When carrying out complex studies, as a rule, information was used from various sources. In addition to social networks, such as Twitter, Instagram, Foursquare, the sources of cartographic information were used, field research was conducted. To be able to use the data collected from the social networks, it is important to assess how representative is the accumulated aggregate of information for a particular city or region. Another important limitation is the respect of ethical principles, that is, the absence of intrusion into the privacy of users.

The objectives of the study in the reviewed publications were the following:

❏ Activity patterns, spatio-temporal patterns of people's behavior, accessibility patterns [Cerrone, Pau, Lehtovuori, 2015]. These patterns give an idea of the spatial and temporal characteristics of the activity of residents and visitors of the city [Lazzarini, López Baeza, 2016];

❏ The life of people in the city – in urban spaces, inside buildings, the attitude to city objects and spaces and the ways of using them [Rykov at al., 2016], [Boy, Uitermark, 2017], [Cerrone, Pau, Lehtovuori, 2015];

❏ Identification of the most important landmarks forming the identity of the place [Lazzarini, López Baeza, 2016], [Martí, Serrano-Estrada, Nolasco-Cirugeda, 2017];

❏ The ranking of urban spaces and the identification of user preferences for some public spaces over others [Martí, Serrano-Estrada, Nolasco-Cirugeda, 2017];

❏ Social organization of the city, social interactions and social structure of the population [Rykov at al., 2016];

❏ Organizational aspects – opportunities to engage in urban planning and management [Guerrero at al., 2016].

In most studies, the hypothesis was confirmed that data from social networks can be used to study various aspects of city life. New sources of information and methods of their processing allowed enriching traditional tools for analysis and planning of the development of the territory [Lazzarini, López Baeza, 2016]. The studies that have been analyzed focus on the use of data from social network for the analysis and identification of social structures of the local community, patterns of behavior of residents and movement in space, the ranking of urban spaces in terms of attractiveness and determining how urban spaces and objects are used.

The conclusions received by the authors of the reviewed publications make it possible to identify the following directions for the application of social networks and Internet sources. From the point of view of revealing the problems of the territory, which can become a starting point for the elaboration of regional development programs, these data allow analyzing social structures and social dynamics of the local community. Data from social network can be successfully used to understand the stratification of local communities, and also to identify the links between social groups and public spaces and objects used by them. The information obtained is necessary to compare the actual use of objects and spaces with their purpose, recorded in the development plans of the territory. Data from social networks help to identify social problems, for example, social inequality and others. On the other hand, the interrelationships between social groups and spaces can serve as a starting point for building interaction with these communities and involving them in development projects. The analysis of activities that are registered and displayed by users of social networks can reveal how diverse life is in different city spaces, whether these buildings and objects remain alive for most of the day, or they are filled with life only for several hours a day. The identification of patterns of accessibility and spatial-temporal patterns of people's behavior allows architects and planners to understand how people move inside the territory. This is important for assessing how convenient the layout of streets, urban spaces, public transport routes. This provides information for creating convenient routes for pedestrians, both for residents and tourists.

The example of the creation of small architectural forms on Mushroom's street in Alicante leads us to the conclusion that the assessment of the social and economic results of projects on the change of urban spaces and objects should be carried out taking into account the factor of time. The inertness

of social processes, the acceptance of changes that have occurred over time, indicate that monitoring social network data is necessary to detect changes in the number of positive or negative estimates. The fact that data in social networks are accumulating suggests that these data sources can be used to monitor and evaluate the success of socio-economic development projects in the territory. Since people constantly use their smartphones, this facilitates the opportunities for directly involving a large number of residents in the process of collecting and updating various data, and also allows identifying those residents who are ready to take an active part in development projects.

Although most studies used the term "city" more often, in fact, the analysis covered wide spaces, including suburbs, as well as several settlements in the region. This allows us to assume that the opportunities offered by the analysis of social network data are applicable both for a single settlement and for the scale of a whole region. To form and promote the image of an attractive region, it is necessary to take into account the images and captions, which locals and tourists post on social networks. It is important to understand the "rules of the game" under which this content is created. For the analysis and evaluation of the attractiveness of the city, digital footprints left by people in social networks are becoming increasingly important. This allows us to say that for the projects of regional and local development, the development of approaches to the experience economy is becoming increasingly important.

Summary

The analysis of publications has shown that social network data can be used to study various aspects of the life of the territory. Using this data allows enriching existing methods of regional analytics, forming new approaches and tools for identifying social, economic and environmental problems. Social networks can be used to assess the success of regional and local development projects. Given the form and nature of the data, it is advisable to use a set of analytical approaches, including methods for analyzing large data, qualitative analysis, semantic analysis of texts, image recognition and network analysis.

Bibliography

- BOY, J. D., UITERMARK, J., (2017), *Reassembling the City through Instagram. Transactions of the Institute of British Geographers.* DOI:10.1111/tran.12185.
- CERRONE, D., PAU, H., LEHTOVUORI, P., (2015), *A Sense of Place. Exploring the potentials and possible uses of Location Based Social Network Data for urban and transportation planning in Turku City Centre*, [in:] Turku Urban Research Programme's Research Report 1/2015. DOI: 10.1016/j.optm.2005.06.017.

- COBB, C.W., RIXFORD, C., (1998), *Lesson learned from the History of social Indicators*. San Francisco, CA: Redefining Progress.
- European Commission, (2011), *Roadmap to a Resource Efficient Europe*. COM (2011), 571, http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52011DC0571.
- GEHL, J., (2010), *Cities for people*. Washington, DC: Island Press.
- GUERRERO, P., MØLLER, M.S., OLAFSSON, A. S., SNIZEK, B., (2016), *Revealing cultura-lecosystem services through instagram images: the potential of social mediavolunteered geographic information for urban green infrastructure planningand governance*. Urban Plan 1, 1. DOI: 10.17645/up.v1i2.609.
- KOROTAEV, V., (2016), *Priorities Spatial Development of the Russian Federation to 2030*, Strategic leaders Forum 2016, viewed 30 October 2016, http://2016.forumstrategov.ru/upload/documents/Korotaev.pdf.
- KOSEVICH, A. V., (ed.), (2016), *State management of regional development of the Russian Federation*, publishing house of the International Institute of Economics and Law, Moscow.
- LAZZARINI, L., LÓPEZ BAEZA, J., (2016), *The Mushrooms' Lesson: Instagram as a tool to evaluate users' perception of urban transformations*. Un nuovo ciclo della planificazione urbanistica tra tattica e strategia, Roma-Milano: Planum Publisher, pp. 178-184.
- MARTÍ, P., SERRANO-ESTRADA, L., NOLASCO-CIRUGEDA, A., (2017), *Using locative social media and urban cartographies to identify and locate successful urban plazas*. Cities 64, 66–78. DOI: 10.1016/j.cities.2017.02.007.
- PSYLLIDIS, A., BOZZON, A., BOCCONI, S., AND BOLIVAR, C. T., (2015), *A Platform for Urban Analytics and Semantic Data Integration in City Planning*. In International Conference on Computer – Aided Architectural Design Futures, Springer, pp. 21-36.
- RYKOV, Y., NAGORNYY, O., KOLTSOVA, O., KREMENETS, A., NATTA, H., MANOVICH, L., CERRONE, D., CROCKETT, D., (2016), '*Semantic and Geospatial Mapping of Instagram Images in Saint-Petersburg*' [in:] Proceedings of the Artificial Intelligence and Natural Language AINL FRUCT 2016 Conference, Saint-Petersburg, Russia, 10-12 November 2016, FRUCT Oy, 2016.
- SALAS-OLMEDO, M. H., ROJAS-QUEZADA, C., (2016), *Mapping mobility patterns to public spaces in a medium-sized city using geolocated tweets*, arXiv preprint arXiv:1608.02364.
- ZAROVA, E., V., (ed.), (2013), *Operational monitoring in the structure of regional situational centers of social and economic development*, publishing house of the Plekhanov Russian University of Economics, Moscow.

Ocena sukcesu lokalnych projektów rozwojowych w oparciu o dane z sieci społecznościowych

Streszczenie: Złożoność celów rozwoju regionalnego, dynamika zmian społecznych wymaga poszerzenia składu wskaźników i zestawu narzędzi do analizy. Konieczne jest przezwyciężenie nadmiernej formalizacji procesów planowania regionalnego. Ten artykuł zawiera przegląd publikacji na temat wykorzystania danych z sieci społecznościowych do analizy procesów ważnych dla rozwoju terytorium. Celem tego przeglądu jest analiza możliwości wykorzystania tych nowych narzędzi w opracowywaniu i monitorowaniu regionalnych i lokalnych programów rozwoju. Publikacje wybrano z uwagi na zawierające

przez nie główne aspekty programów rozwojowych danego terytorium. Określono główne kierunki stosowania danych z sieci społecznościowych w analizach terytorialnych, a także możliwości zaangażowania mieszkańców w zarządzanie danym obszarem. Nowe źródła danych pozwoliły wzbogacić tradycyjne narzędzia do analizy i planowania rozwoju terytorialnego. Dane te można z powodzeniem wykorzystać do zrozumienia stratyfikacji lokalnych społeczności i zidentyfikowania problemów społecznych. Identyfikacja modeli dostępności i modeli czasoprzestrzennych zachowań ludzkich pozwala zarządzającym i planistom zrozumieć, w jaki sposób ludzie przemieszczają się wewnątrz terytorium, aby ocenić, jak wygodne są ulice, przestrzenie miejskie, trasy transportu publicznego i trasy dla pieszych. Fakt gromadzenia danych w sieciach społecznościowych umożliwia wykorzystanie tych źródeł danych do monitorowania i oceny powodzenia projektów rozwoju społeczno-gospodarczego danego terytorium. Większość osób korzysta z sieci społecznościowych, co ułatwia możliwość bezpośredniego udziału dużej liczby mieszkańców w procesie zbierania i aktualizowania różnych danych, a także w projektach rozwojowych.

Słowa kluczowe: rozwój lokalny, technologie informacyjne i komunikacyjne

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