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INDUSTRY 4.0 AS A MAJOR FACTOR IN THE FORMATION OF IMC (INTEGRATED MARKETING COMMUNICATIONS)

Relevance of the problem. Mankind is on the verge of a technological revolution that will fundamentally change the way we live, work and build relationships with each other. By its scale, scope and complexity, the transformation itself is absolutely unlike to anything humanity has experienced before.

Development of the Internet, information and communication technologies (ICT), sustainable channels of communication, cloud computing and digital platforms, as well as the information "explosion", contributed to the emergence of public information systems and global industrial networks, which had interacting with each other beyond the boundaries of individual enterprise. Such systems and networks had a transformative impact on all sectors of modern society, the economy and business and converted industrial automation to a new fourth stage of industrialization.

Analysis of recent research and publications. E.Toffler ("Future Shock", "Ekospazm"), P.Druker ("Anatomy of industrial society"), I.Vallerstajn, D.Stiglits, D.Rifkin noticed about the inevitability of a global emergency of the industrial revolution. Klaus Schwab brought great contribution to the systematization of knowledge about The Fourth Industrial Revolution with the same name work.

The Aim of this article is to define the role of the Industry 4.0 in the formation of the integrated marketing communications (IMC).

Main material exposition. The rate, at which new discoveries and technological breakthroughs occur, has no historical precedent. There is a reformatting of almost all industrial sectors in nearly every country, and the width and depth of the changes themselves portends transformation of entire production, administration and management systems.

Currently, in this context, the majority of scientists identify four revolutionary stages in the development of the industry:

- The first industrial revolution: production was mechanized with the help of water and steam.
- The second industrial revolution: electricity, which helped to create mass production.
- The third "digital" revolution: electronics, communications and information technologies, automated production.

The fourth industrial revolution is coming out of the third. It is characterized by "merging technology and erasing boundaries between physical, digital and biolo-

gical spheres," robotization of production (see table 1) [1].

Identification of the fourth industrial revolution (by K. Schwabe) can be justified by three factors:

- **Rates of development.** Unlike earlier, this industrial revolution develops not linear, but rather exponential rate. It is the product of a multi-faceted, deeply interdependent world in which we live, as well as the fact that new technology itself synthesizes all the more advanced and efficient technologies.

- **The scope.** Reliance on the digital revolution and the combination of different technologies gives rise to an unprecedented paradigm shift in economics, businesses, society, in every individuals. It changes not only "what" and "how" we do, but also "who" we are.

- **Systemic exposure.** It provides a holistic internal and external transformation of all the systems of the countries, companies, industries, and society as a whole.

In the long term it will merge technologies and the erasing of borders between physical, digital and biological spheres [2].

Fourth Industrial Revolution, better known as the "Industry 4.0", got its name from the initiative in 2011, headed by businessmen, politicians and scientists, who defined it as a means of improving the competitiveness of the manufacturing industry in Germany through enhanced integration 'cyber physical systems', or the CPS, in factory processes. Analogs of such programs exist in other countries: Smart Factory in the Netherlands, Usine du Futur France, High Value Manufacturing Catapult in the UK, Fabbrica del Futuro in Italy, Made Different in Belgium, the "Made in China 2025", etc. [3].

In the US, in 2014 the company General Electric, AT & T, Cisco, IBM and Intel created the Industrial Internet Consortium, which offers more advanced paradigm of development prospects. Industry 4.0 - the fourth industrial revolution, decentralized production, which extends from design and raw material supply chain to the manufacturing, distribution and customer service. Interests Industrial Internet Consortium extend beyond production. The essence and of both approaches is in compounding of machines, analytics and people. Industry 4.0 distinguishes embedded systems, automation and robotics, and industrial approach of the Internet Consortium wider - already includes everything that can be connected to the Internet, provides data and provides feedback to improve efficiency.

Change of technological structures, followed by a sharp jump in productivity and economic growth (industrial revolutions)

Industrial revolution	Period	Innovation breakthroughs	Result
The first industrial revolution	Late 18th - early 19th centuries	Water and steam engines, looms and mechanical appliances, vehicles, metallurgy	The transition from an agrarian economy to industrial production, development of transport
The second industrial revolution	The second half of the 19th century - the beginning of the 20th century	Electrical energy, high-grade steel, oil and chemical industry, telephone, telegraph	Mass production, the electrification, the railways and the division of labor
The third industrial revolution	Beginning with 1970'	Digitalization, the development of electronics, the use in the production of information and communication technologies and software	Automation and Robotics
The fourth industrial revolution	A term introduced in 2011, within the framework of the German initiative - Industry 4.0	Global industrial networks, the Internet of Things, using of renewable energy sources, the transition from metal to composite materials, 3D printers, vertical farms, food synthesis, self-guided vehicles, neural networks, genetic modification, biotechnology, artificial intelligence	Distributed production, distributed energy, network access and collective consumption, replacement of intermediaries in the distributed network, direct access of the manufacturer to the consumer, the economy of sharing (car sharing)

Source: <http://nag.ru/articles/article/30196/na-poroge-revoljutsii-chetv-rtov-promyshlennoy.html>.

The National Institute of Standards and Technology of USA (*NIST*) describes the fourth revolution as the introduction of cyber physical systems and customized manufacture and cyber physical systems as "smart, covering computing (i.e. hardware and software) and effectively integrated physical components that interact closely with each other, to perceive changes in the state of the real world" [4].

As already noted, the pace of development and commercialization of its penetration into all spheres of society is not just high, they are rapidly increasing. Currently, the average life of the company-member S&P index fell from 60 to 18 years and if corporations want to keep afloat, they must constantly innovate.

In this regard, all the more clearly to invest in innovation. Currently, German industry invests 40 billion in commercial Internet infrastructure every year until 2020. This is a significant part of the European investments in the fourth industrial revolution, which is expected to amount to EUR 140 billion per year. The average cost of one workplace at research institutions of the advanced countries more than \$ 2 million. The cost of certain laboratories cost reaches 10 billion US dollars. The budgets of higher education institutions in the United States and China often exceeds 5 billion US dollars. Total US spending on research and development exceeds 450 billion US dollars, China - 200 billion US dollars. According to experts, China's employment in

science and technology closer to 40 million. people [5, 6].

However, the creation of "smart manufacturing" development of 3D-Printing technology will inevitably require new materials and new means of working, new technologies, the definition of common platforms and languages that will communicate fluently machines of various corporations, the development of new cyber security measures, new organizational forms and methods of production management, etc. Thus, the consequences of such technological innovations will affect virtually all branches of science and industry.

The technological basis for the transition to a new economic paradigm is the Internet of Things.

Internet of Things (IoT, Internet of Things) - integrated system of computer networks and the connected physical objects (things) with built-in sensors and software for the collection and exchange of data with remote monitoring and control in the automated mode, without human intervention [7].

There are a consumer (mass) segment of the application of the Internet of Things, which includes personal connected devices - smart watches, various types of trackers, cars, smart home devices, etc. and corporate (business) segment, which includes the vertical and cross-industry markets - industry, transport, agriculture, energy (Smart Grid), smart city (Smart City) and others.

Industrial Internet of Things (Industrial Internet of Things, IIoT) - Internet of Things for the corporate / industry applications - a system of integrated computer networks and connected industrial (production) facilities with integrated sensors and software for data collection and data exchange with remote control and management in an automated, without human intervention [8].

In further investigations the Industrial Internet of Things, in particular its use in the industry, was named Industrial Internet. It radically changes the whole economic model of the interaction of "supplier - customer" that allows:

- to automate the process of monitoring and managing the life cycle of the equipment;
- to organize effective self-optimizing the chain of companies - suppliers to the companies - end users;
- to switch to the models "sharing economy" and more.

The fourth industrial revolution is planning to get automated equipment to talk to each other without human intervention. In fact, it is about creating self-organizing global production systems with highly flexible and realizing synergy potential of technological development. Production forces will become self-organized, will receive feedback on the final product, assembly, machine, household appliance. Today, some companies are already widely used technology and services in the Internet of things. But in spite of the mass applications and startups on the Internet of things, the percentage use of these technologies is limited. We are waiting for the explosion, which, according to various estimates occur in the next 5-7 years. Technologies should be a cheap and step over the threshold of mass (for example, sensors crossed the threshold of cheapness in the dollars).

It is expected that most implementations of new technologies realized in the energy, housing and communal services that require exact calculations and scrupulous data transmission, are insured against human intervention. The biggest profits get transport, in particular due to lower operational losses and unreported machines to perfection.

One of the key ways of development of the Internet of things and the fourth industrial revolution lies in the fact that the materials are able to identify themselves with their own tags. That is, for any part contains information about where it was made, what designed, and so on. The most common form is barcodes. Such tags are changing communication between things that have "can not talk", and change communication in general. The communication process transforms itself and acquire new quality characteristics and participants. Communication channels will become more complicated [9].

It is possible to divide them into five groups:

The first group - communication with oneself. This kind of reflection gain, usually through social networks.

We get feedback from their way of thinking and to place on the Internet.

The second group - the communication with the person's own body. For example, there are sensors wearable health and physical activity. As a result, access to the body becomes, on one hand, "clearer", on the other - access technology becomes dangerously mediated. The critical question of who will dispose of these data, what possibilities control over these systems exist.

The third group - human communication with other things. The images of the world we perceive through culture. That is the knowledge that the pen - it's a pen, comes to us from our culture. But if the pen has a bar code, on which certain information is available by reading a smartphone, we find contact with the pen.

The fourth group - communication of things with things or machines with machines, which is carried out with the help of Internet of Things. It is about the implementation of inter-machine communication systems and services (M2M), i.e. the main element of the Internet of Things and Comprehensive Internet.

The fifth group - human communication with another person, and assembling collective entities of different sizes. In the world there are many collective organisms - from the family to the state. Technologies, coordinating a group of people thought process are already established.

Such a variety of communication processes require not only the creation of a single standardized platform technology. It is necessary to explore the concept of the a multivector and multi-criteria process. Since the communication will take place in a market economic environment, we believe that one of the effective approaches to the development of this problem may be the concept of **integrated marketing communications**.

A feature of the integrated marketing communications is the duality of their nature: the ability to implement both in the real and in the virtual economy (in the Internet space) by combining channels and means of promotion [10]. The company may deploy the marketing communications in both the real and the virtual space separately, in parallel and integrated in both areas. Very relevant in this context, studies concerning the advanced technologies for implementing business processes, including communications.

IBM asked more than 5,000 C-level executives from 70 countries which technologies they think will be particularly important in the next three to five years. Most CxOs agree that cloud computing and mobile solutions will continue to play a key role, while the Internet of Things is expected to make a big impact as well (see fig. 1) [11].

These trends will undoubtedly have an impact on the marketing promotion: there are actual entirely new forms of communication and virtual channels. They have also become an integral part of a modern IMC complex.

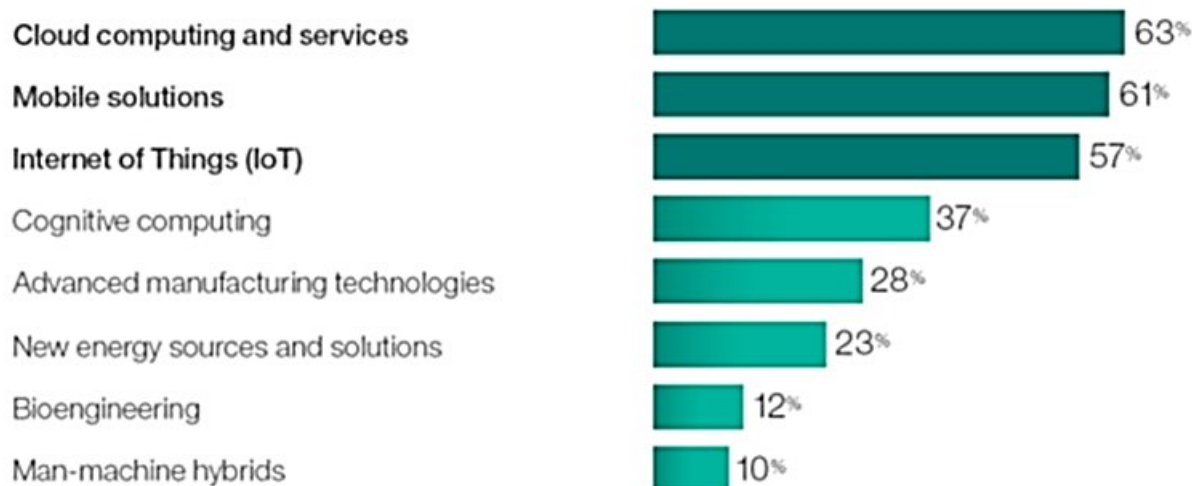


Fig. 1. Areas Of Development Of The Most Advanced Technologies Of Interest To Businesses In 2015-2020

Source: <http://www-935.ibm.com/services/c-suite/study/study/>.

The unique advantage of using the IMC is to achieve synergetic effect in the marketing activities in the real-virtual market. [12, 13]. Synergy in the context of the problem - the excess of the cumulative effect used for the promotion of communications products over the sum of the effects of the individual components of the communication. Its meaning is that the concerted use of various communications tools allows to achieve a higher overall result than separately. In any case, when using multiple means of communication potential occurs to form a synergistic effect [14].

Current market conditions and the level of development of information technologies determine further development of IMC theory. In our opinion, it should be identified such fundamental changes in the marketing activities of modern companies:

- Accelerating the spread of commercial communications through the use of new technological possibilities of marketing communications channels;
- The tendency to the predominance of virtual tools in the promotion of the complex structure of the IMC;
- The interactive nature of the interaction with the consumers with the ability to target and / or customization directly at the place and time stipulated by way of the Internet of Things;
- New principles of cooperation in the "producer-consumer" chain, reducing intermediary links;
- The transition to a new type of competition, which is relatively "equalizes" the possibility of leading international industrial corporations and small businesses through the use of "social" communication channels, and to demonstrate how new technological envelope provided goods and services;
- The ability to more accurately measure the economic efficiency of the IMC and communication by monitoring the digital data about consumers.

It is important that under the influence of the Industry 4.0, with the increasing role of information technology in society, development of the market depends largely on the buyers. In order to achieve the most effective response to the demands of consumers need to use interactive means of disseminating information, which leads to a new way of functioning of marketing communications within the IMC concept.

Conclusions and suggestions. Paper is devoted to the role of the Fourth Industrial Revolution in the formation of integrated marketing communications. The four revolutionary stages in the development of the industry are characterized, each of the technological modes, historically preceding the Fourth Industrial Revolution, features were considered. There are given its identification factors: development rates, the scope and systemic exposure.

The phenomenon of "Industry 4.0" is studied and its effect on the current market conditions is substantiated. The essence of this approach is comes to decentralized production extends from design and raw material supply chain to the manufacturing, distribution and customer service. The concept of the "Internet of Things" is considered, it is the technological basis for the transition to a new economic paradigm and its corporate part - Industrial Internet - in the most affected sectors such as industry, transport, agriculture, energy (Smart Grid), smart city (Smart City) and etc. The perspectives of the technologies development in these industries are defined, as well as the expected effects, the key of which is the ability of materials to identify themselves using their own tags (barcode).

This progress significantly affect the process of communication, which will acquire new quality characteristics and participants. Thus, under the influence of the Fourth industrial revolution all communication

channels can be divided into five groups: 1) communication with oneself; 2) the communication with the person's own body; 3) human communication with other things; 4) communication of things with things or machines with machines, which is carried out with the help of Internet of Things; 5) human communication with another person and assembling collective entities of different sizes.

The most effective tool for the promotion of goods on the market in these conditions is an integrated marketing communications (IMC), because it allows to combine channels and means of communication in both the real and the virtual space separately, in parallel and integrated in both spheres. Overview of the most promising areas of technological development up to 2020 in business structures justifies the urgency of entirely new forms of communication and virtual channels, which become an integral part of a modern complex IMC. The attention is focused on the unique advantages of IMC - the formation of a synergistic effect, which is achieved by coordinated use of various communication tools in the form of higher total result than a case of separate application.

A fundamental changes in the marketing activities of modern companies under the influence of the Fourth Industrial Revolution are marked, the main of which is the priority of the buyers, and accordingly, the use of interactive means of dissemination information in the framework of the updated concept of IMC.

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Литовченко І., Шкурупська І. Промислова революція 4.0 як основний фактор формування ІМК (інтегрованих маркетингових комунікацій)

Поява державних інформаційних систем і глобальних промислових мереж зробила вплив, що перетворює всі сектори сучасного суспільства, економіки та бізнесу, трансформувала промислову автоматизацію на нову четверту сходинку індустріалізації. Мета даної статті полягає у визначенні ролі промислової революції 4.0 у формуванні інтегрованих маркетингових комунікацій (ІМК).

Наведено фактори ідентифікації Четвертої промислової революції: темпи розвитку, розмах і системний вплив. Поняття "Інтернет речей" розглянуто в якості технологічної основи для переходу до нової економічної парадигми та її корпоративної частини – Промислового Інтернету – найбільш стосується таких галузей, як промисловість, транспорт, сільське господарство, енергетика (Smart Grid), розумне місто (Smart City) та ін. Промисловий Інтернет розглянуто з точки зору впливу на процес комунікації, який буде здобувати нові якісні характеристики і учасників. Таким чином, всі комунікаційні канали розділено на конкретні групи.

Як найбільш ефективний інструмент для просування товарів на ринок запропоновано концепцію

інтегрованих маркетингових комунікацій (ІМК), оскільки вона дозволяє об'єднувати канали та засоби комунікацій як в реальному, так й у віртуальному просторі окремо, паралельно, а також інтегровано в обох сферах. Акцентовано увагу на унікальній перевазі ІМК – формуванні синергетичного ефекту, який досягається при узгодженому використанні різних інструментів комунікацій у вигляді більш високого загального результату, ніж при роздільному застосуванні.

Ключові слова: промислова революція 4.0, Четверта промислова революція, Інтернет речей, Промисловий Інтернет, інтегровані маркетингові комунікації (ІМК), дуальність реального-віртуального ринку.

Литовченко И., Шкурупская И. Промышленная революция 4.0 как основной фактор формирования ИМК (интегрированных маркетинговых коммуникаций)

Появление государственных информационных систем и глобальных промышленных сетей оказало преобразующее воздействие на все секторы современного общества, экономики и бизнеса, трансформировали промышленную автоматизацию на новую четвертую ступень индустриализации. Цель данной статьи состоит в определении роли промышленной революции 4.0 в формировании интегрированных маркетинговых коммуникаций (ИМК).

Приведены факторы идентификации Четвертой промышленной революции: темпы развития, размах и системное воздействие. Понятие "Интернет вещей" рассмотрен в качестве технологической основы для перехода к новой экономической парадигмы и ее корпоративной части – Промышленному Интернету – наиболее затрагивающей такие отрасли, как промышленность, транспорт, сельское хозяйство, энергетика (Smart Grid), умный город (Smart City) и др. Промышленный Интернет рассмотрен с точки зрения влияния на процесс коммуникации, который будет приобретать новые качественные характеристики и участников. Таким образом, все коммуникационные каналы разделены на конкретные группы.

В качестве наиболее эффективного инструмента для продвижения товаров на рынок предложена концепция интегрированных маркетинговых коммуникаций (ИМК), поскольку она позволяет объединять каналы и средства коммуникаций как в реальном, так и в виртуальном пространстве по от-

дельности, параллельно, а также интегрировано в обеих сферах. Акцентируется внимание на уникальном преимуществе ИМК – образовании синергетического эффекта, который достигается при согласованном использовании различных инструментов коммуникаций в виде более высокого общего результата, чем при раздельном применении.

Ключевые слова: промышленная революция 4.0, Четвертая промышленная революция, Интернет вещей, Промышленный Интернет, интегрированные маркетинговые коммуникации (ИМК), дуальность реального-виртуального рынка.

Litovchenko I., Shkurupskaya I. Industry 4.0 as a Major Factor in the Formation of IMC (Integrated Marketing Communications)

The emergence of public information systems and global industrial networks had a transformative impact on all sectors of modern society, the economy and business and converted industrial automation to a new fourth stage of industrialization. The aim of this article is to define the role of the Industry 4.0 in the formation of the integrated marketing communications (IMC).

There are given the Fourth Industrial Revolution identification factors: development rates, the scope and systemic exposure. The concept of the "Internet of Things" is considered, it is the technological basis for the transition to a new economic paradigm and its corporate part – Industrial Internet – in the most affected sectors such as industry, transport, agriculture, energy (Smart Grid), smart city (Smart City) and etc. Industrial Internet significantly affect the process of communication, which will acquire new quality characteristics and participants. Thus, all communication channels can be divided into particular groups.

The most effective tool for the promotion of goods on the market is an integrated marketing communications (IMC), because it allows to combine channels and means of communication in both the real and the virtual space separately, in parallel and integrated in both spheres. The attention is focused on the unique advantages of IMC – the formation of a synergistic effect, which is achieved by coordinated use of various communication tools in the form of higher total result than a case of separate application.

Keywords: Industry 4.0, the Fourth Industrial Revolution, Internet of Things, Industrial Internet, integrated marketing communications (IMC), the duality of the real-virtual market.

Received by the editors: 19.10.2016
and final form 28.12.2016