
The Integration of Digital Marketing Solutions with Industry 4.0 in Enterprises in Poland – Aspects of Management and Security

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Wioletta Wereda¹, Patrycja Bryczek-Wróbel²

Abstract:

Purpose: The aim of the article is to introduce the integration of digital marketing solutions with Industry 4.0 in enterprises in Poland on the example of the NewConnect market – in the aspects of security and management.

Design/Methodology/Approach: A combination of quantitative and qualitative research approaches was applied. To be more specific, data were collected by means of a diagnostic survey with the help of a questionnaire. More precisely, the data were accumulated utilizing the CATI system, by which interviews were conducted by a telephone conversation. The study acquired its quantitative data from the field in the months of July and August 2022 through surveys. Apart from empirical methods, theoretical research methods have also been administered including analysis-synthesis used to critically analyze reviewed literature. And finally, the technique includes abstraction for choosing specific parts for inspection.

Findings: The considerations contained in the article are the part of a broader research on the integration of digital marketing solutions with Industry 4.0 in enterprises in Poland from the NewConnect market.

Practical Implications: Enterprises in Poland use digital marketing to cooperate with various stakeholder groups. Thanks to Industry 4.0, managers can use modern marketing solutions to increase profits, customer loyalty, and reduce marketing costs.

Originality/value: In modern times, the important element is the development of digital marketing in enterprises. The important part of the research are showing the effects in the process of implementing the digital marketing in Industry 4.0 era for companies in Poland.

Keywords: Digital marketing, enterprises, Industry 4.0, social media marketing, the NewConnect market, security management.

JEL classification: M31, M21, L22.

Paper Type: Research study.

¹PhD., Institute of Organization and Management; Faculty of Security, Logistics and Management/Military University of Technology, Warsaw, Poland,
ORCID: 0000-0002-6948-0239, e-mail: wioletta.wereda@wat.edu.pl;

²PhD., Institute of Security and Defense, Faculty of Security, Logistics and Management/Military University of Technology, Warsaw, Poland,
ORCID: 0000-0001-7154-733, e-mail: patrycja.bryczek-wrobel@wat.edu.pl;

1. Introduction

One notable distinction between digital marketing and its traditional counterpart lies in its capacity to promptly respond to marketing campaigns and identify potential errors. This is made possible through the tracking of campaign views and engagement on the Internet, as well as the analysis of opened content. What is more, it is the fourth industrial revolution is a concept regarding the use of automation and processing and data exchange, as well as the implementation of various new technologies allowing the creation of the so-called systems cyber-physical and changing production methods.

It also applies to the digitization of production, where devices and technological systems are communicated with each other, including via the Internet, and where large are analysed amount of production data. Industry 4.0 is here a conceptual aggregate encompassing a number of new technologies – among others Internet of Things, cloud computing, Big Data analysis, artificial intelligence, and additive printing, augmented reality or collaborative robots.

The second dimension of Industry 4.0 is related to production management, organization activities and value creation chain. In particular, there is a change in the architecture of production management systems and moving from linear processes and the traditional pyramid of production management systems to a network of connections and non-linear production.

Combining the previously mentioned innovations with new artificial possibilities intelligence may ultimately lead to a revolutionary change in the ways of managing production, where systems will operate in a highly autonomous manner, dynamically changing their structure and functions within organization. It is important to combine the solutions of Industry 4.0 with the digital marketing which can develop many advantages in enterprises.

2. Literature Review and Applied Research Methodology

2.1 The Characteristics of the Concepts of Digital Marketing

The term “digital marketing” was first used in the 1990s. Online marketing, Internet marketing and web marketing are terms used to describe digital marketing. Due to the rapid development of digital marketing with the emergence of the Internet, it is called "Internet Marketing" (Amin and Priasnah, 2019, p. 17). In the literature there are a lot of definitions of digital marketing.

Due to Kannan and Li (2017) digital marketing can be defined as “an adaptive, technology-enabled process in which companies collaborate with customers and partners to co-create, communicate, deliver and sustain value for all stakeholders.” Digital formats of large amounts of data are also an advantage, as it makes it easier

to obtain information about specific touchpoints between customers and companies.

The data collected is believed to be useful in measuring and optimizing various online marketing campaigns as well as measuring the cost of customer acquisition and retention. Among the advantages of digital marketing is that it is low-cost but successful at attracting clients 24 hours a day (Santos, 2020).

Digital marketing is a type of direct marketing that uses interactive technologies such as email, websites, Internet forums, and news groups, interactive television, and mobile communications to electronically connect customers with businesses (Tiago and Veríssimo, 2014). In addition, online marketing has both advantages and disadvantages for online business sellers; its benefits include the elimination of the need for online stores because social media may act as their marketing platform, the ease with which they can reach clients via internet access, and the ability to have two-way discussions at their own pace.

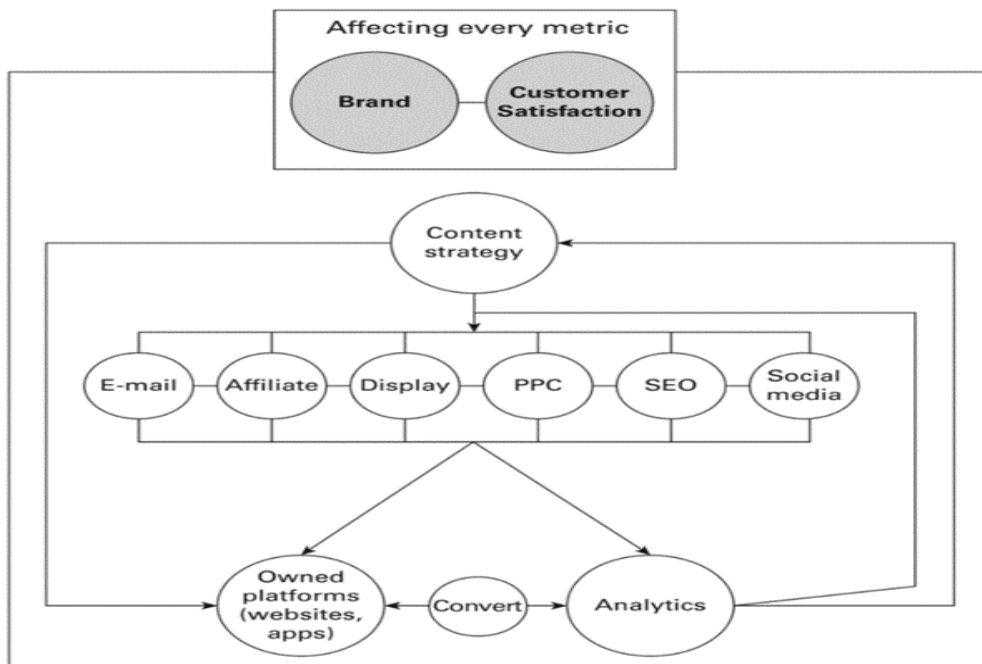
However, its limitations include the fact that some buyers still prefer to view and inspect products or services in person and are also unwilling to pay for transactions. Additionally, the business profile (years in operation, monthly net income, and online marketing training) has no bearing on the rewards and challenges encountered by online business sellers. Similarly, training in online marketing and the various types of online businesses (product-based, service-based, and product-and-service-based) has little bearing on the rewards and challenges encountered (Santos, 2020).

What is more, there is a high chance that online selling affects the growth and stability of our economy. Consumer behaviour has a major effect on e-commerce. Due to the convenience of the practice, e-commerce is anticipated to continue to gain popularity. Local industries should embrace it rather than oppose this new reality. They can use digital marketing to develop a website and advertising campaigns that will put them in front of their target audiences. It is not tough to compete against giant corporations. It only needs a well-thought-out online strategy and a capable digital marketing business (Aque *et al.*, 2021).

Thus, digital marketing refers to the technique of using available digital marketing tools (CRM, databases, websites) in order to shape appropriate relations with the client by means of prediction, effective identification of his needs and satisfying them (Chaffey, Smith, 2017, p. 21) . The elements that build the digital marketing ecosystem are shown in Figure 1.

The digital marketing tools available help shape a content strategy that can be used on platforms, websites and applications. The analysis allows you to make modifications to your own pages, which then influences the shaping of the subsequent content strategy. All these elements affect brand data and customer satisfaction. A well-built content strategy builds a positive brand image and meets customer expectations.

Figure 1. The digital marketing ecosystem



Source: Own work based on Kingsnorth, 2021, p. 35.

Digital marketing consists of various channels used by marketers to promote their goods or services. As an advertiser, the main goal is to choose the most effective communication channel while maximizing return on investment (ROI). Below is the list of important digital marketing channels as mentioned (Amin, Priasnah, 2019, p. 17; Pelsmacker et al., 2018):

1. In today's world, social media marketing stands as one of the most prominent and impactful methods of digital marketing. This rapidly growing digital channel has gained immense popularity. Social media, in particular, are distinguished by their wide reach, because the shared content can reach a wide audience and you can count on an equally quick response. Unlimited access is equally important here. Most of the platforms, social applications are mainly offered free of charge. The content posted on social media is subject to constant modifications thanks to the possibility of editing them or posting comments. There are such types of social media serving marketing as (Grębosz et al., 2016, pp. 17-18):

A. Blogs - websites where the host regularly provides text with an assigned publication date. Usually, the owner of such a blog is one person and most often it is run in the style of an open diary, where experiences are described, or it is run in the form of a thematic blog.

B. Social networking sites - sites enabling contact with other users through created individual accounts (profiles). Typically the exchanged content are text messages, photos, videos. Examples of social networking sites are: Twitter, Facebook, LinkedIn.

C. Collaborative projects - pages that present a project for a group of people to collaborate on a text shared on the web. Anyone who is involved in this endeavour may modify a work created by someone else for the purpose of improving it. One such site is Wikipedia, for example.

D. Content communities - specific types of portals that enable the publication and sharing of texts with other users and the transfer of files inserted into the network by other people. Examples of a content community include PowerPoint, YouTube.

E. Digital social world - virtualisation of the real world through the use of computers. Users can create their characters using avatars and place them in virtual reality, who can interact with each other and simulate the real world.

F. Digital game world - Internet games that use servers, where each user can see other characters and act together.

2. Email marketing involves sending promotional messages about products or services to potential customers through email. It is a straightforward and easily understandable form of digital marketing. The primary goal of email marketing is to promote products by offering discounts and advertising events, while also increasing brand awareness and driving traffic to a company's website. Various types of emails can be sent as part of an email marketing campaign, such as blog subscription newsletters, welcome email series, seasonal campaigns, post-purchase drips, cart abandonment campaigns, follow-up emails for downloads, holiday promotions for loyal customers, and re-engagement campaigns. One of the major advantages of email marketing is its cost-effectiveness compared to other marketing methods. It is often used to foster customer loyalty rather than acquiring new customers. By incorporating visually appealing advertisements and linking product images to the company's website, businesses can effectively capture the attention of potential customers.

3. The Internet houses a variety of search engines, such as Google, Yahoo, Bing, and Baidu, which serve as invaluable tools for users seeking specific information. The process of enhancing a website's visibility and rank on these search engines is known as search engine marketing. This marketing strategy can be further divided into two distinct categories: search engine optimization (SEO) and sponsored search. According to Neil Patel, SEO is the practice of achieving a high ranking in the unpaid section of search engine results, also known as organic marketing or organic listing. The higher a webpage's rank on a search engine, the more traffic it is likely

to receive. SEO involves two key components: the search engine itself and the searcher. Notably, Google dominates the search engine market, accounting for a staggering 67 percent of all searches. While commercial search engines like Google, Yahoo, and Bing predominantly power paid search engines, they also play a significant role in overall search engine functionality.

4. The traditional approach to marketing involves placing signs or billboards along roadsides, as well as running advertisements in magazines or newspapers, all in an effort to promote a company's product or service. In the digital realm, this takes the form of online display advertising. Marketers today can achieve the same outcome by utilizing online display advertising, which encompasses various formats such as video ads, banner ads, interactive ads, and rich media ads. The visual nature of display advertising makes it highly effective in capturing attention. Furthermore, marketers have the ability to target specific audiences based on factors such as website content, location, gender, age, and device type. This allows for the display of relevant ads to the right consumers, resulting in cost savings and increased sales.

5. Affiliate marketing is a form of advertising that operates on a performance-based model, where individuals receive compensation for promoting the products or services of others on their websites. Two platforms that exemplify affiliate marketing are hosting video advertisements through the YouTube Partner Program and sharing affiliate links on social media profiles.

6. The concept of native advertising encompasses advertisements that prioritize content and are displayed alongside organic content on a platform. A prime illustration of this can be seen in the sponsored content featured on BuzzFeed. However, many people also consider Facebook ads and Instagram advertising to fall under the umbrella of "native" advertising.

7. Pay-Per-Click (PPC) is an effective method for driving traffic to your website, as it involves compensating publishers for every click on your ad. Google AdWords is widely recognized as a leading PPC platform, enabling you to secure prominent positions on Google's search engine results pages by paying for each click on your links. Additionally, PPC can be employed on various other platforms, such as Facebook, Twitter, and LinkedIn, through paid advertising, Promoted Tweets, and Sponsored Messages, respectively.

2.2 Combining Digital Marketing with Industry 4.0

Industry 4.0, also referred to as the fourth industrial revolution, is a transformative movement that goes beyond just digitization and automation. It has a profound impact on how businesses engage with their industry. For organizations that are in the early stages of integrating digital practices, there is a lack of clarity regarding which processes, technologies, business models, and personnel to adopt and when to do so. To stay ahead in the market, companies must also incorporate digital

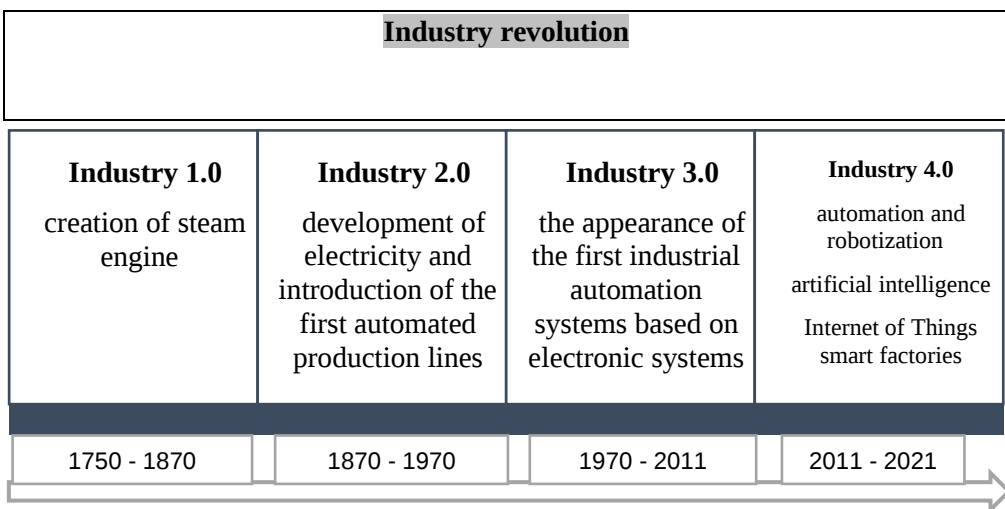
marketing into their strategies to maintain a competitive edge (Campbell, 2020). In order to fully grasp the essence of Industry 4.0, it is necessary to provide a brief overview of the industry's history (Figure 2).

The initial industrial revolution occurred in the late 19th century, introducing the first steam engine. This innovation greatly impacted and automated production in agriculture, equipment manufacturing, and manual labor. Consequently, this revolution had far-reaching effects on the economy, social life, and prevailing culture and politics. The advent of mass production led to reduced prices, attracting a new customer base. The second industrial revolution, spanning from 1870 to 1970, was characterized by the growing significance of electricity, enabling the development of mass production through electrically powered motors.

Technological advancements during the First and Second World Wars disseminated globally. It was during this time that two pivotal inventions emerged, which continue to hold immense importance for humanity today: digital computers and the Internet. During the 1950s, industrial production began utilizing them. The programmable logic controller emerged during the third industrial revolution (1970-2011) and played a pivotal role in automating production processes.

Just a few decades later, computers were developed to support the implementation of this controller. In the 1960s, as computer networks expanded, information exchange between computers became possible, but it was in the 1980s when this application truly flourished. The Internet, a groundbreaking innovation connecting people and devices, has become one of the most significant inventions. As a result, Industry 3.0 came to a close, marking the era of information and communication technologies (ICT) (Gunal, 2019, pp. 4-5).

Figure 2. History of the evolution of industry



Source: Own study based on Gunal, 2019, pp. 5-6.

The utilization of information and communication technologies greatly facilitated the production processes, yet human control remained vital for the operation of machines and the progression of work. However, the fundamental principle of Industry 4.0 is to delegate these responsibilities to intelligent machines. The onset of the fourth industrial revolution is attributed to the year 2011, originating from the minds of the Germans.

This revolutionary concept sparked heightened global competition, as rising production costs and the pursuit of superior quality compelled the Germans to take action and devise a strategic plan. Their endeavors are focused on generating unconventional products and expediting their market introduction (Gunal, 2017).

The Internet of Things is a rapidly advancing technology within Industry 4.0, with applications primarily in distribution, customer service, and facility utilization. Effective communication plays a vital role in establishing connections among different segments of the supply chain that operate under the principles of Industry 4.0. By employing communication platforms enabled by the Internet of Things, the management of information and communication has become achievable (Szozda, 2017). An overview of the technologies used in Industry 4.0 is presented in Table 1.

Table 1. *Technologies used in Industry 4.0*

Technologies used in Industry 4.0	Components and Benefits
Data and connections	● large databases - data storage, processing and computation thanks to the "Internet of Things" and communication between machines - connection and transfer of information / data; ● cloud technologies (<i>cloud computing</i>) - data storage centralization and virtualization;
Analytics and artificial intelligence	● digitization and automation of knowledge-based work - the use of artificial intelligence in machine learning; ● advanced analytics - improved algorithms and data availability, implementation of advanced data mining systems used mainly for forecasts.
Human-machine interaction	● tactile interfaces and new graphical user interfaces - possibility of quick communication using mobile devices; ● virtual reality - the use of optics, including those that expand reality in industry.
Automated machinery park	● new production possibilities, e.g. with the use of a 3D printer - an extended range of materials, increased precision, quality, the possibility of immediate obtaining spare parts or raw materials; ● advanced robotics - the use of artificial intelligence, full automation of production, use of technology (machine to machine) ● energy storage - production and storage of energy by carrying out daily activities in companies.

Source: Own study based on Szozda, 2017, p. 403.

IoT platforms facilitate the management of resources and maintenance costs. Similar to social media profiles, IoT devices function by storing all data on connected profiles. These platforms encompass the following IoT options (Szozda, 2017):

- business applications - PLM, ERP, CRM;
- web applications, i.e. social media;
- devices, machines, materials;
- user devices - computers, telephones, laptops, etc.

Following the advent of Industry 4.0, discussions arose surrounding the advancements in marketing within the industry. According to Kotler, innovative marketing encompasses a series of organized actions that not only cater to existing products but also strive to introduce groundbreaking products or services. This approach ultimately leads to customer contentment, the exploration of unexplored applications, and the pursuit of untapped consumer segments. Thus, innovative marketing serves as a catalyst for product diversification and the creation of pioneering markets (Kotler and de Bes, 2003, p. 104).

The question that arises is the connection between digital marketing and Industry 4.0. It is evident that both share common elements, including the utilization of systems like the Internet of Things, artificial intelligence, and Machine-to-Machine communication. Moreover, these systems are complemented by digital tools such as Big Data, automation, and social cooperation (Sawicki, 2020).

To examine the current digital marketing trends, research was carried out to analyze the utilization of digital technologies for communication purposes. The primary focus of this study is to understand the advancements in the modern world. (Ungerman, Deřdková, 2020) – some on them were mentioned before:

1. Artificial intelligence, also known as AI, possesses the capability to autonomously analyze consumer behavior online. This technology enables web pages to automatically customize their content based on the specific user visiting the site. Additionally, AI is utilized in generating social media posts, thereby expanding their audience reach.
2. Social media influencer (Influencer) collaborates with companies to promote their products on their personal profile and provide their opinion. An influencer possesses significant influence over individuals who are interested in their online presence. Often, they possess more persuasive power than the actual company itself.
3. Conversational marketing, which centers around fostering authentic communication with users, involves engaging in continuous dialogue with clients through the utilization of chatbots.

4. Search engine optimization (SEO) plays a crucial role in the overall success of a website. By strategically positioning the website and incorporating relevant links, SEO not only ensures the accuracy of the content but also enhances the company's webpages, comments, and more.

5. Unrestricted access is provided to customers, allowing them to utilize multiple channels simultaneously. Similarly, companies employ a variety of channels to disseminate information. This entails the synchronization of various platforms, including YouTube, Facebook, Instagram, blogs, and specialized websites such as LinkedIn.

2.3 Characteristics of Respondents

The research has embraced a hundred companies (26 percent of all organizations from the sample and in total the sample was 382 businesses from Poland). Majority of the researched firms are engaged in fundamental activities to do with provision of trade and financial services. Below are: building and construction, new technologies and e-commerce as well as media and computer science.

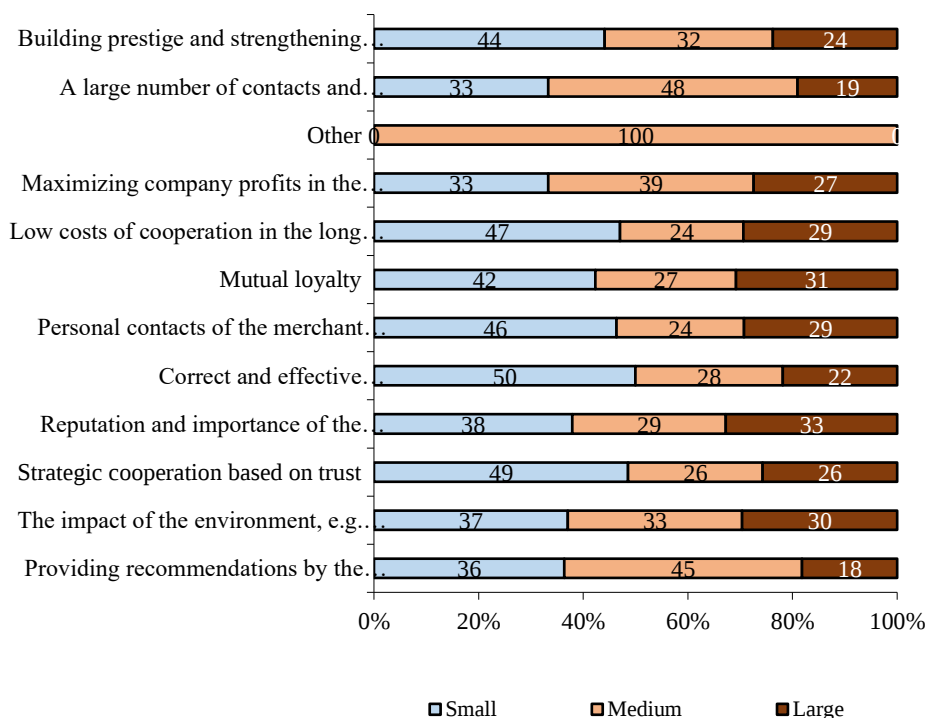
Therefore, in the research, a systematic random selection was applied within the layers depending on the characteristic of the main profile of activity specified for needs of documentation about NewConnect market addressed for particular enterprise) (the layers correspond to the size of the enterprise).

Empirical research was conducted in the period of July - August 2022 throughout the entire country (16 provinces in Poland). The major location of surveyed enterprises' head offices is located within: Mazowieckie and Łódzkie Voivodship (16 entities each), Śląskie Voivodship (14 entities) and Wielkopolskie Voivodship (12 entities).

3. Results

In reference to the most important organizational, financial and image-related effects in the process of implementing the digital marketing in Industry 4.0 era for the organization itself, i.e. innovative enterprises, the following should be mainly mentioned: low cooperation costs in the long term, maximizing the company's profits in the long term, building prestige and strengthening the company's brand in the eyes of customers, personal contacts between the trader and the customer, strategic cooperation based on trust, a large number of contacts and contracts concluded in the long term, mutual loyalty, providing recommendations by the customer for the company, reputation and importance of the company on the market, correct and effective long-term communication with the client (Figure 3).

Figure 3. The most important effects in the process of implementing the digital marketing in Industry 4.0 era for enterprises according to surveyed managers from the NewConnect market in Poland (N = 100) in July-August 2022



Source: Own work.

4. Conclusions

The synergy between digital marketing and Industry 4.0 is evident, as they work in harmony to provide holistic solutions that are becoming more prevalent among companies striving to thrive in the market. The intense competition and perpetual urgency in the business landscape necessitate a reassessment of resources within organizations and a shift towards adopting the standards set by the evolving external environment.

Summing up, the global enterprises landscape is being fundamentally altered by the Fourth Industrial Revolution, also known as Industry 4.0. This transformative force is marked by the presence of intelligent systems, Artificial Intelligence (AI), Big Data, and advanced IT infrastructure. Industry 4.0 signifies a new era in the development of manufacturing, and numerous organizations are eagerly seeking to embrace this transition.

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