

ANALYSIS OF KEY PERFORMANCE INDICATORS OF UKRAINIAN AND GLOBAL PRINTING COMPANIES

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Abstract: The activities of Ukrainian and global printing companies have many common features. However, in the context of geopolitical challenges and economic turmoil, appropriate strategic development and management efficiency are essential to ensure favorable prospects for the printing industry. An important area of research is to assess the peculiarities of digital technologies' impact on printing enterprises' activities, as well as to ensure their competitive advantages. The article analyzes the main indicators of printing enterprises' development, as well as the aspects that affect the efficiency of their activities. In addition, the author considers several geographical factors, integration into relevant commodity markets, and the possibility of using diversified supply chains. The peculiarities of the printing enterprises' formation in Ukraine and globally are related to the crisis period. It was caused by the spread of the coronavirus pandemic and the war in Ukraine, which triggered crisis processes in the economy and business sector. The issue of ensuring effective information technologies and creating prospects for the development of printing enterprises is a crucial task. Therefore, it is based on the analysis of their performance indicators in recent years. The paper outlines the key principles of the functioning of a printing enterprise, the specifics of digitalization and integration into the international market. Also, it defines the essential functions to be used in a dynamic market in a crisis. The research findings indicate the current practice of improving the quality of corporate strategy by diversifying it, improving the quality of digital technologies, and creating special concerns and industrial associations of the printing industry to ensure its livelihood. This study can be helpful for restoring the printing industry in Ukraine and for further analytical research on the peculiarities of global printing enterprises' operations.

Keywords: printing, printing enterprises, publishing, corporate strategy, digital technologies, commodity markets, book products.

1 Introduction

The current development of the printing industry is driven by the proliferation of companies specializing in the diversity of services and service capabilities, thanks to the intensity of digitalization and the use of innovative services. In recent years, printing companies have been paying more and more attention to the specifics of managing their operations' internal structure and the quality of integration into newly developed markets. The use of such technologies has become most relevant since 2019 due to the escalation of the global coronavirus pandemic. However, even in the context of the gradual digitalization of printing companies, the use of specialized tools can improve the level of presence in the commodity market. The Ukrainian printing industry is in a rather difficult situation due to its primary focus on the industrial sector, which manufactures goods and is the most crucial revenue group for Ukrainian enterprises. Due to the war, almost half of Ukraine's economy has been shrinking, leading to the liquidation of most printing houses and enterprises, as well as general chaos in the market. Due to the geographical fragmentation of the industrial sector, maintaining a printing enterprise is not commercially viable. Therefore, there is a need to analyze possible means of integration into new commodity markets.

The experience of global printing companies and their use of digital technologies provide a key example for national enterprises that can enter new commodity markets and gain competitive positions. The use of such practices can also help enterprises find the most appropriate and rational mechanisms of interaction between the distribution of traditional manufacturing, its maintenance and transportation of products, and digital, which is constantly evolving and dynamic in the market.

The importance of conducting this study can improve the quality of the internal situation in the Ukrainian market and outline the basic principles of printing companies' activities in the global market. For this reason, the analysis of the key principles of activity and the analysis of market capitalization and general market trends are prerequisites for further assessment and forecasting of the development of the printing market and its business entities.

2 Literature review

The development of printing and printing enterprises is essential for ensuring the efficiency of medium and large businesses worldwide. The research focuses on the peculiarities of commercial, organizational, and strategic activities of Ukrainian printing enterprises and global ones, which can provide helpful experience for further development. Special attention should be paid to the use of digital technologies and opportunities for the development of the printing industry following global market needs. According to Cao (Cao 2022), the use of digital technologies in the printing industry can stimulate some competitive advantages, as well as strengthen the quality of the company's positioning in the global market. Răcheru (Răcheru 2021) believes that the printing market will grow. Still, the approach to manufacturing products may change, as in the nearest future, the use of digital products that can be implemented worldwide will be more relevant. According to Lysenko-Ryba (Lysenko-Ryba 2021), the modern world is constantly moving towards improving the quality of business conduct and management. Therefore, given the global geopolitical challenges, the printing industry has to transform to achieve high commercial results and ensure its viability in the market. Chen (Chen 2020) points out that the printing industry was in a difficult situation during the spread of the coronavirus pandemic and was able to return to efficient operation only after two years of effective stimulation of digital technology development. In such circumstances, regardless of the location of the printing company, it is most important to follow up on the next steps:

- to create automated processes;
- to use high-quality tools to disseminate information about the company's activities;
- to carry out advertising;
- to provide helpful business services.

According to Güleş (Güleş 2020), it is necessary to build international commodity markets and look for effective mechanisms for their functioning in the context of modern geopolitical challenges. They can affect not only the regional economy but also be important for the global one. Analytical studies by Gomaa (Gomaa 2022) indicate that printing enterprises, as a rule, use several types of activities related to the traditional manufacturing of products. Also, there is increasing integration of these products into digital ones with their subsequent maintenance. Łukaszewicz (Łukaszewicz 2021) determined that any printing company should improve its services and use modernized technologies to increase its capacity. According to Fernandez (Fernandez 2022), the only way to support the economy can be as follows:

- to support national commodity markets;
- to stimulate business development;
- to build social policy;
- to develop a national legal system focused on ensuring the efficiency of business and commercial organizations.

According to Eidukynas (Eidukynas 2022), the partial growth of the printing industry and the restoration of printing enterprises is possible under such conditions. Moreover, the use of digital technologies will bring it closer to world-class enterprises. Thus, modern scholars believe that global printing enterprises use many digital tools to improve their operations. Therefore, Ukrainian printing companies should pay attention to the possibility of mastering commodity markets. Even with the conducted research, the analysis of the peculiarities of the Ukrainian and global printing enterprises' activities remains relevant and vital for further studies aimed at their further development and improvement.

3 Aims

This study aims to analyze the activities of Ukrainian and global printing enterprises to assess the effectiveness of their development and to highlight the specifics of management activities and strategic direction. An essential area of the study is to assess the current state of the global and Ukrainian printing industries. Also, it is crucial to outline the impact of digital technologies on their development and the possibility of gaining competitive advantages for business entities. The achievement of this goal provides many opportunities for domestic enterprises to formulate an effective corporate policy and integrate into the global market to ensure their own survival and gradual recovery of the country's economic situation. The main tasks are as follows:

- to analyze the functioning of the Ukrainian and global printing industry;
- to identify the role of printing enterprises in such development;
- to find possible ways of growth.

Special attention is paid to the use of digital marketing tools, automated systems, etc., which are the main tools for gaining competitive advantages in the printing industry. The analysis of the last five years of Ukrainian and global enterprises' activities allows the author to highlight the main stages of their functioning and opportunities for further development.

4 Materials and methods

The analysis was conducted using scientific research methods, which helped to determine the principles of activity of printing enterprises in Ukraine and the world. In particular, based on the search method, the leading international printing companies were described and characterized by their regional distribution, as well as their commercial and strategic activities. This method was also used to analyze information on the prospects for further development of the printing market and possible challenges and threats to its stable functioning. An analytical method was employed to conduct a comprehensive analysis of the state of the Ukrainian printing market. This methodology was used to process and systematize materials on the geographical location of printing enterprises, the number of people per enterprise, potential prospects, and threats to their operation. In addition, based on the use of open statistical sources of Ukraine, the current state of the printing industry in Ukraine was presented. The use of analytical research methods will make it possible to assess the peculiarities of the use of digital technologies. It will also offer a basis for the further development of the printing market, companies, and prospects of the Ukrainian market. The dynamics of changes and features of transformation were determined by using the method of comparative analysis. With the help of statistical reports, the author formed a deductive analysis of the further development of the printing industry. The issue of digital technologies is studied from the perspective of actualization of this issue on state resources, mass media, and calculation of the efficiency of printing market share growth. Therefore, the use of the deductive method made it possible to determine the prospects for the development of the printing market until 2030. The applied methods can be implemented in comprehensive studies of the functioning of the Ukrainian printing market before the war, as well as the current global market and the place of printing companies in it. The developed approach enables the following research findings to be presented regarding the peculiarities of the Ukrainian and global printing companies' functioning.

5 Results

In recent years, Ukraine's printing industry has been undergoing a transformation. It has been driven by the emergence of innovative technologies and a gradual market reorientation. Despite this trend, the need to use traditional printing means remains relevant for both the national and global markets. A significant segment of the Ukrainian market has been expanded

due to the sales policy in the food industry. The latter requires additional resources for packaging, loading, and production of printing materials such as labels, wrappers, and many other means of product identification. In addition, the demand for traditional materials for the media remained high, allowing the domestic market to undergo a gradual transformation.

The global printing market is primarily characterized by the amount of growth and introduction of innovative technologies aimed at improving the technological process, advertising, and the use and utilization of a number of specialized products that can be integrated into digital markets. In addition, printing companies in the global market are geographically diversified. Moreover, there is a growing practice of using branches aimed at developing, creating, and processing digital technologies such as 3D printing, increasing capacity through optimization measures, etc.

In Ukraine, this process is only gradually developing. Still, it should be borne in mind that only in 2019, when Covid-19 was spreading, the majority of enterprises needed digitalization and automation of the majority of processes. This encouraged them to partially develop and reduce the staff working directly at such enterprises. Until 2022, the Ukrainian printing market had positive qualities, but due to the war, a significant part of the economy was destroyed, and infrastructure was damaged. It is currently known that about half of all Ukrainian enterprises were liquidated in 2022 for various reasons. In addition, it is worth noting the peculiarities of the geographical location of enterprises and the overall decline in the Ukrainian printing market, as the main customers were mass media, state institutions, and manufacturers. The general geographical location of Ukrainian printing companies is shown in Table 1.

Table 1: Regional allocation of Ukrainian printing enterprises

Region	Area, thousand square km	Population, thousands of people	Population density, persons per 1 km ²	Number of enterprises	Number of residents per enterprise, thousands of people	Area covered by the company, thousands of m ²
Central	36,4	2112,1	52,1	107	11,0	0,41
Metropolitan	50,7	7508,8	77,1	1055	7,5	0,05
Prychornomorskyi	121,1	7011,7	71,0	155	25,7	0,41
Prydniprovskiyi	55,2	5255,5	87,5	175	25,7	0,24
Podilskiyi	70,5	3051,1	78,1	251	17,8	0,18
North-Eastern	81,0	5177,8	74,1	111	27,0	0,16
North-Western	10,1	1287,1	51,1	75	15,1	0,58
Carpathian	57,7	6073,6	126,1	292	29,5	0,27
Donetsky	51,1	6811,1	118,1	269	16,5	0,11
Ukraine	603,5	46143,7	76,5	2921	15,8	0,21

Source: compiled based on (Sarı, Güles, Yiğitöl 2020)

Based on the data in Table 1, it can be argued that the main regions of allocation of printing enterprises are Central and mainly South-Eastern Ukraine. Given this geographical allocation, the operations of the majority of printing enterprises have become problematic due to the ongoing hostilities in Ukraine. As a result, the production capacity of enterprises was reduced during 2014-2022. Since 2022, the number of enterprises has dropped significantly by more than 50%. This situation in the printing industry is caused by the spread of international market orientation, as the national market has ceased to function fully. Therefore, the search for innovative means and opportunities to penetrate new markets has become a key principle for improving the quality of functioning of printing enterprises.

The overall situation in the Ukrainian printing market is focused on manufacturing specialized products used for trade turnover

and serving the interests of medium and large businesses. The share of public administration services and the use of printing to meet the needs of the media are not priority segments of this market. However, after 2022, they remained the most relevant, which caused a massive market decline. The issue of medium and large businesses leaving the Eastern region of Ukraine has become a challenge. Only about 17.5% of pre-war enterprises are currently operating, while most operate under temporary administration. The overall dynamics of the number of operating businesses in the printing industry are shown in Table 2.

Table 2: The number of operating business entities by the type of "Printing" economic activity, 2018-2022

Types of economic activities	CTE A-2010 Code	2018	2019	2020	2021	2022*
Printing activities and related services	18.01	4874	5005	4767	4468	2143
- newspaper printing	18.11	221	224	230	218	98
- printing other products	18.12	3157	3300	3164	2945	1433
- manufacturing of printing plates and other printing services	18.13	1197	1184	1083	1034	424
- bindery activities and provision of related services	18.14	299	297	290	271	105

Source: compiled based on (Turek, Budzik, Oleksy, Bulanda 2020)

The statistics in Table 2 show that Ukraine experienced a gradual development of printing enterprises during 2018-2021, which allowed for a positive growth trend of about 1.5% per year. However, in 2022, due to hostilities in several crucial regions where printing companies are located, the possibility of further operation was threatened. It was the beginning of the enterprises' reorientation to foreign markets of the European Union. In particular, about 30% of the current printing enterprises in Ukraine function only because they focus on the markets of Poland, Lithuania, and Germany. It is a common practice to use digital technologies that give Ukrainian enterprises advantages in a competitive environment. Another global practice is to expand and improve printing companies' operations by expanding their management structure. The use of additional branches and the creation of subsidiaries aimed at producing and servicing digital services has become a key tool for most modern Ukrainian enterprises in 2022 and will remain promising in 2023 and 2024.

The global printing market is developing rapidly. Companies are introducing innovative technologies, as well as modern management systems, and increasing competition among themselves. The key challenge for the global printing industry was the spread of the coronavirus pandemic in 2019, which shook the market by 10%, and the total capitalization level fell by USD 1.9 billion. Nevertheless, it is worth considering a number of transformational processes in the market. The companies that comprise the bulk of the market are in America, China, and Europe. These geographical regions make up about 85% of the global printing market. After 2019, the ability to use digital technologies has become a key advantage, as they allow for resource savings in production and qualitative optimization of manufactured products.

In the geopolitical dimension, competition between America and China for European and global markets in the printing industry is present. It aims to improve the quality of services, the efficiency of their implementation and servicing. The use of transport systems, order acceptance automation, and other tasks facing medium and

large businesses are becoming increasingly important. The largest printing companies with the highest capitalization tend to use several key areas that can strengthen their development and position. These areas include:

- improving marketing services;
- implementing digital logistics and automated systems;
- using modernized printing manufacturing facilities;
- using Big Data systems, etc.

According to the estimates of reputable analytical publications and the World Bank, the global printing market could reach USD 574 billion by 2030 and grow by 5-10% in the coming years. This pace is driven by improvements in the quality of technology and the ability to integrate it into the production process, as well as the need to supply most digital commodity markets. More detailed features of the global printing market are shown in Table 3.

Table 3: Characteristics of the global printing market

Indicators	Details	Development prospects
Market value in 2022	USD 476.21 billion	The market value is gradually increasing, which may be a positive aspect of the printing industry's development
Revenue forecast in 2030	USD 574.12 billion	The estimated value is based on an assessment of the largest worldwide printing companies
Digital Transformation Index	70-100 points	This index is used for countries, and the assessment is carried out by enterprises, including printing companies
Expected Market Growth Rate	2.4% between 2022 and 2030	The average growth rate of the printing market and the possibility of its expansion by using digital technologies
Regional scale	North America, Europe, Asia-Pacific, Latin America; Middle East and Africa	The biggest sales regions are countries with a high turnover of services and products in the commodity markets
Major companies	Quad/Graphics Inc., Acme Printing, Cenvo, RR Donnelley, Transcontinental Inc., LSC Communications US, LLC., Gorham Printing, Inc., Dai Nippon Printing, The Magazine Printing Company, Cimpres plc, Quebecor World Inc.	The leading printing companies are becoming more and more involved in the use of modern technologies and the possibility of digitalizing the service process to improve their current operations

Source: compiled by the author

The analysis in Table 3 on the development of the printing market shows that legal companies are taking some active measures in the printing industry to expand their influence and penetrate new commodity markets and regions. The critical issue for the modern printing industry is to master the digital printing commodity market. It will include various information services, from advertising and design to digital logistics and automated

production systems. The investment activities of the largest companies are similar to those in Ukraine, as they direct most of their investments to automation and improvement of the quality of such activities. For this reason, the development and opportunities for improvement of the printing market will be monitored in 2024 and 2025 due to its digitalization.

The war in Ukraine has also affected the overall operations of most printing companies. They have to increase their corporate social responsibility and have clear policies regarding the regions in which they operate. However, the increased use of digital technologies and many tools can help to improve the quality of the overall transformation and the possibility of developing a global digital market that will interact with each other. The modern printing market closely cooperates with various types of businesses. It will continue to grow, which is strategically essential for its long-term viability, and secondly, it will become a key tool for servicing physical commodity markets.

Traditional printing markets will also be widely represented, as full digitalization is a long-term process, so companies use a mixed form of activity. This should be an example to follow for the Ukrainian industrial printing sector. This principle is used to transfer the implementation of technologies diversified by the nature of their work and focus on a specific customer group. For example, the Raksul uses a diversified system to improve the quality of traditional printing activities, the production of printed materials, as well as specialized structures. The company also has a number of programs for its own digital development, which were adopted in 2021.

Such principles of printing companies' operations allow them to maintain their competitiveness in the modern world and improve their performance. The specifics of the largest printing companies in the global market are shown in Table 4.

Table 4: Analysis of the largest printing companies' activities in the global market

Company	Market capitalization	Specifics of the company's activities
Quad/Graphics, Inc	\$272,39 mln.	The company uses modern tools of the printing industry, increasing production rates by around 2% per year
The Vomela Companies	\$510 mln.	The company is focused on the use of advertisement graphics and its implementation in the global printing industry
Raksul Inc	\$570 mln.	A Japanese company whose key focus is printing of any materials regardless of their size
Fort Dearborn Company	\$613.5 mln.	The company serves the food industry and many others by manufacturing customized labels, stamps, etc.
Elanders AB	\$689 mln.	The high capitalization results from the use of innovative technologies and special tools aimed at improving the printing industry
TungKong Inc	\$770 mln.	The company is focused on modern personal data protection systems. Its major clients are financial and banking institutions and certain public authorities.
Transcontinental	\$1 billion	Over the past 5 years, the

Inc.		company has been widely implementing the use of digital technologies and 3D printing
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Source: compiled based on (Paszkievicz, Bolanowski, Budzik, Przeszlowski, Oleksy 2020)

The companies listed in Table 4 occupy the bulk of the global printing market and have a qualitative impact on its functioning and opportunities for further development. For Ukraine, the experience of such companies can be a means to improve the current market situation and encourage domestic production, improve the quality of digital infrastructure, etc. However, given the current circumstances, it is difficult to predict the prospects for further development of the Ukrainian market. It is necessary to increase the presence of businesses and the number of operating enterprises to focus on national production and local consumers. The development of the industrial sector can help to stabilize both the economic situation and create the conditions for further growth of the printing market.

Thus, the analysis of the Ukrainian and global printing markets suggests that their digitalization is a key means to improve the functioning of companies in the future. The closest perspective is the use of Big Data tools by printing companies, the introduction and creation of additional branches responsible for 3D printing, and the development of automated systems. However, the global community has been gradually recovering since 2019. Since then, it has been stimulating the growth of medium and large businesses, which are the focus of printing companies. Meanwhile, Ukraine has seen its economy shrink by almost one-half. This situation requires improving the printing market digitalization quality and diversifying its corporate strategy for further recovery in Ukraine.

6 Discussion

The study results show the prospects and importance of the printing market development, while business entities use various means to improve their functioning. Over the last 5 years, the transformation of the printing market has undergone significant changes due to the emergence of digital technologies, automated systems, Big Data technologies, changes in the global geopolitical situation, and new global challenges for humanity. Such challenges stimulate active market growth and the possibility of its improvement. It allows printing companies to implement competitive actions and means to strengthen their market positions.

The analysis of digital technologies used by printing companies in the Ukrainian and global markets may be a prospect for further research on the specifics of their activities. The Ukrainian market is in a difficult situation, so, in fact, each company is forced to partially be split into other commodity markets and improve its own manufacturing capabilities to strengthen its competitiveness in the global market. The use of digital technologies, which are accepted in the worldwide space, can provide Ukraine with valuable experience in interacting with an external buyer. In addition, rational and high-quality management will be a successful factor in integrating with the international world market. It is still essential to develop smart logistics for the circulation of traditional printing products and the possibility of their transportation based on the efficient distribution principle.

An exciting direction for analyzing may be the allocation of companies in the world that have been retrained for digital and traditional products, as well as the analysis of further prospects. In addition, to conduct this analysis, it is possible to use a methodology for calculating indicators and percentages of resource management efficiency and the difference between traditional printing and modern digital manufacturing. The same calculation scheme can be used to analyze the Ukrainian national printing space and provide clear data for further development

strategies. Such systems will also be effective for any business that operates both digital and traditional production facilities.

The principles of quality, competitiveness, and marketing are important for successful operation in the global printing market. Ukrainian companies should conduct marketing research to obtain complete information on the general state of the global or international regional printing market to achieve a positive result. Therefore, conducting a study on quality standards in different world regions, rules, and principles of printing products' sales, as well as the specifics of this business, can be an important area for further research. By choosing one of the segments and conducting a comprehensive statistical study on the peculiarities of using specific tools, it can qualitatively improve the prospects of Ukrainian companies in the world space.

Based on the statements made above, it is vital to conduct a comprehensive study of the functioning of the current global printing market, its segmentation, the competitiveness of business entities, and the real prospects for Ukraine to enter it. The use of this information can help stabilize the internal state of the economy in the country.

7 Conclusion

According to the conducted research, it can be concluded that the activities of printing enterprises should be aimed at improving current business processes, considering global trends in the development of the printing industry, and stimulating their own output to international standards. The most acute challenges for the printing industry include:

- the rapid digitalization that began after the spread of the coronavirus pandemic;
- the need to create additional corporate departments dealing with digitalization.

In addition, the current printing services market is dynamic due to geopolitical challenges and the transformation of the business approach to corporate social responsibility.

Ukrainian printing companies were mainly focused on medium and large businesses operating in the South-Eastern region. Therefore, with the beginning of the war in 2022, most of them were either fully or partially closed down. As a result, printing companies operating in the Ukrainian market are forced to diversify their corporate strategy to enter global commodity markets and accelerate digitalization to improve:

- the quality of basic manufacturing processes;
- the possibility of further transportation;
- the use of efficient logistics routes.

When analyzing the global market of printing companies, it is possible to state that over the past 5 years, there has been a tendency to use the mechanism of Big Data technologies and special tools to be implemented to improve the product quality. The main principles of the global printing market include the following:

- a gradual increase in production capacity;
- a focus on the development of medium, large, and small businesses.

These principles allow companies to ensure their own viability and financial stability. In addition, the companies with the largest market capitalization are gradually digitizing and using digital marketing tools to improve the quality of their market presence, strengthen their own brand, and expand into other commodity markets. For Ukrainian companies, this example can serve as a basis for an effective management policy and become a key tool for implementing economic stabilization policies in the country caused by the war.

Thus, the study shows that during 2018-2022, the printing market went through two stages of a crisis, and despite this, it

tends to grow until 2030. Digital technologies and effective management tools can be a factor in improving the quality of competitiveness among printing companies in Ukraine and worldwide.

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